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2018 Evaluation Plan

Ameren Illinois Company Energy Efficiency Programs

Final

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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 AIC's portfolio of energy efficiency programs implemented between January and December 2018. As part of the 2018 evaluation effort, the team will assess AIC's Residential and Business Programs, which feature the following initiatives:

- Residential Program
 - Retail Products
 - Income Qualified
 - Public Housing
 - Heating and Cooling (HVAC)
 - Behavioral Modification
 - Appliance Recycling
 - Multifamily
 - Direct Distribution of Efficient Products
- Business Program
 - Standard
 - Custom
 - Retro-Commissioning (RCx)
 - Streetlighting

This document provides detailed evaluation plans for each program and their associated initiatives, 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 AIC portfolio and to suggest improvements in the design and implementation of existing and future programs.

2. Program-Specific Evaluation Plans

2.1 Residential Program

In this section, we outline the anticipated evaluation activities for each of the Residential Program initiatives, as well as cross-cutting activities proposed to inform the entire Residential Program. AIC’s planned Residential Program provides services to residential customers, and is made up of eight initiatives:

- Retail Products
- Income Qualified
- Public Housing
- Heating and Cooling (HVAC)
- Behavioral Modification
- Appliance Recycling
- Multifamily
- Direct Distribution of Efficient Products

In accordance with Illinois evaluation requirements, we will deliver a draft annual Residential Program impact evaluation report on March 15, 2019, covering the 2018 program year. In addition, we will deliver stand-alone memos summarizing results of process and NTGR research, where applicable. At the close of the 2018 evaluation, we will deliver an integrated process/forward looking evaluation report that rolls up all the stand-alone memos relevant to the 2018 Residential Program.

Table 1. Schedule of 2018 Residential Program Evaluation Deliverables

Deliverable	Date
Draft Annual Residential Program Impact Evaluation Report	March 15, 2019
Final Annual Residential Program Impact Evaluation Report	April 30, 2019
Annual Integrated Impact Report	April 30, 2019
Annual Integrated Residential Program Process/Forward Looking Evaluation Report	May 31, 2019

2.1.1 Retail Products

The objective of the Retail Products Initiative is to increase awareness and sales of high efficiency products through retail and online stores. The Initiative provides instant discounts at point-of-purchase and/or mailed rebates after purchase on the following products:

- Omnidirectional LEDs
- Specialty LEDs
- Smart Thermostats
- Multi-Speed Pool Pumps
- Air Purifiers
- Tier 1 Smart Power Strips

The implementation contractor will work with participating retailers to promote qualifying products through in-store marketing, special product placement, and product demonstrations. Implementation staff will also visit participating retailers to provide sales associates with training on how to best promote the Initiative with customers.

Evaluation Approach

The assessment of the 2018 Retail Products Initiative 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 the Initiative?
2. What were estimated net energy and demand savings from the Initiative?
3. What are the installation rates of products sold through the Initiative?
4. What types of customers purchased initiative-discounted products? What percentage of products purchased in retail settings were purchased by non-AIC customers? What percentage of these products were purchased for use in commercial settings?

Process Questions

5. How did the change in design (from an initiative that provided discounts only on efficient lighting to one that discounts a wide variety of products) impact initiative processes? What additional processes were required?
6. Was initiative implementation effective and smooth?
7. In what areas could the Initiative improve to increase its overall effectiveness?
8. Were customers satisfied with the Initiative, the products, and the process for participation?

Forward Looking

9. What was initiative free-ridership? What was the estimated impact of the Initiative on energy efficient product purchases? How many customers would have purchased a less-efficient product if the Initiative had not provided discounts or marketed the products?
10. What was participant spillover from the Initiative? How many customers purchased non-discounted efficient products due to the Initiative?
11. What are the stocking practices of retailers that sell products that the Initiative discounts? What is the availability of standard efficiency versions of the products? What is price difference between standard and efficient versions of the products? How much do initiative discounts reduce the price difference between standard and efficient products?
12. What is customer awareness and use of the products discounted through the Initiative? What is their understanding of the benefits of using energy efficient versions of these products? What is their willingness to pay for the energy efficient versions of these products?

Evaluation Tasks

Table 2 summarizes the 2018 evaluation activities planned for the Retail Products Initiative.

Table 2. Summary of Retail Products Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Review relevant administrative reports, and marketing and outreach materials to document initiative design and changes.
Initiative Staff Interviews		✓		Conduct interviews with AIC and implementation contractor staff to understand initiative design and implementation.
Initiative Process Model Development		✓		Develop initiative process model based on staff interviews and material review to identify critical initiative processes that require evaluation.
In-Store Lighting Customer Intercept Interviews	✓	✓	✓	Conduct in-store interviews with customers purchasing initiative-discounted lighting at participating retailers. Use the interview results to estimate initiative net-to-gross ratios (NTGRs) by bulb type, leakage, and percentages of products purchased by commercial customers. Interview results will also provide an estimate of market share for inefficient versus efficient lighting products.
In-Store Product Stocking Study		✓	✓	Conduct shelf stocking study of all product types discounted through the initiative to assess availability of standard efficiency products and the price difference between standard and energy efficient versions of the products.
Non-Lighting Participant Survey	✓	✓	✓	Conduct quarterly participant interviews with customers who purchased non-lighting products discounted by the initiative. Use the interview results to estimate NTGRs, installation rates, participant satisfaction, and participant use of the discounted products.
Residential General Population Survey		✓	✓	We will include questions on the 2018 residential general population survey (see Section 2.1.9) to assess customer awareness of initiative discounts, the products being discounted through the initiative, and their perceptions of the benefits of the energy efficient versions of these products.
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

The evaluation team will conduct a comprehensive review of all initiative materials. This includes initiative implementation plans, marketing plans, QA/QC documents, all materials provided to retailers, as well as mass marketing and in-store materials. We expect to submit a request at the beginning of the program year to obtain materials related to the initiative design. We will request additional materials at the end of the program year to ensure we have a complete set of materials used throughout the year. These activities will inform our process assessment.

Deliverable: Data requests

Deliverable Date: March and November 2018

Task 2. Initiative Staff Interviews

The evaluation team will conduct up to six in-depth phone interviews with AIC and implementation staff involved in the design and administration of the Retail Products Initiative. We will conduct two rounds of interviews. We will schedule the first round at the beginning of the program year to understand initiative design elements that could impact evaluation methods. Given that the non-lighting aspects of this initiative are new, we will conduct another round of interviews towards the end of the program year to get feedback on the initiative performance and implementation challenges that occurred during the year. These interviews will allow us to fully explore the details of the initiative design and implementation and to examine the perspective of the people who are in direct contact with participating retailers and processing initiative payments and data. We will conduct the interviews over the telephone using experienced Opinion Dynamics staff. We will record and transcribe all interviews to facilitate analysis.

Deliverable: Completed interviews

Deliverable Date: April and November 2018

Task 3. Initiative Process Model Development

Using information that we gain from initiative staff interviews and materials review, we will develop a process model for the Initiative. With so many new measures and implementation processes, the model will identify critical initiative processes for evaluation as well as indicators for initiative progress in addition to energy savings, such as customer awareness of initiative discounts. The model will document initiative goals, the barriers to achieving them, and the activities that the implementer is using to overcome them. The Initiative discounts a varied set of products, which will likely require more than one model. We will construct separate models for measures that have distinct program theories, such as those that are delivered through different channels.

Deliverable: Initiative process models

Deliverable Date: June 2018

Task 4. In-Store Customer Interviews

The evaluation team will conduct interviews with customers purchasing lighting in stores selling efficient bulbs discounted through the Retail Products Initiative. The goals of this effort are to estimate initiative free-ridership through a self-report survey, estimate the influence of price reduction and initiative marketing on efficient bulb purchases, and estimate leakage rates. We will attempt to interview all customers purchasing lighting during our in-store visits. Our priority will be conducting interviews with customers purchasing initiative-discounted bulbs. We will also interview customers purchasing non-initiative bulbs or other alternatives, such as incandescent, halogen, CFLs, or non-ENERGY STAR LED bulbs. Interviewing customers purchasing non-initiative lighting will allow us to assess market share for different product types, initiative awareness, the impact of initiative marketing, and barriers to efficient bulb purchases.

We will conduct interviews at approximately 20 different retail locations. We will review initiative sales data to identify a representative sample of stores focusing on locations that have the most initiative sales across a variety of retail types (i.e. big box, DIY, agriculture) across the AIC territory. To accurately estimate sales to non-AIC customers, we will also consider store location relative to AIC borders as part of sample design. We will conduct interviews for three consecutive days at each location, two weekend days and one weekday. We will work the initiative implementer to gain access to the stores to conduct the interviews, which is typically done in conjunction with in-store lighting demonstrations.

Based on our experience conducting in-store intercept interviews, we expect that this study design will yield approximately 800 completed interviews. The number of interviews with initiative participants will depend on

the market share of initiative-discounted bulbs relative to other bulbs, but we expect that at least half of the interviews we conduct will be with initiative participants.

Deliverable: Draft and final survey instruments

Deliverable Date: March 2018

Deliverable: Results memo

Deliverable Date: July 2018

Task 5. Retail Lighting Product Shelf Survey

While in the stores conducting customer interviews, we will conduct shelf surveys of lighting products and other products discounted through the Initiative. The purpose of this survey is to gather information about the state of the market for each product in terms of the efficiency levels and price points. For lighting, we will compare the results to the shelf studies we conducted in PY5, PY6, and PY8 to determine how the lighting market has changed in response to EISA and technological developments. We will also record information on the presence of initiative marketing materials.

Deliverable: Draft and final data collection instruments

Deliverable Date: March 2018

Deliverable: Results memo

Deliverable Date: July 2018

Task 6. Non-Lighting Participant Survey

The evaluation team will conduct rolling surveys with customers who have purchased non-lighting discounted products through the Initiative. We will use these surveys to estimate NTGRs and installation rates for each measure. We will also measure participant satisfaction with the initiative measures and processes, as well as how customers are using the discounted products. Customers will have submitted their rebate application through an online portal that requires an email address. We will email customers a request to complete a survey shortly after they have received their rebate check. Ideally, we will conduct surveys every quarter with recent participants to minimize the time between initiative participation and survey date. The number of target survey completes by measure type will depend on the number of participants, which is unknown at this point. We will target enough completes to achieve 10% precision at 90% confidence (90/10) for NTGRs and installation rates by measure type.

Deliverable: Draft and final data collection instruments

Deliverable Date: April 2018

Task 7. General Population Survey for Market Research on Retail Products

In 2018, the evaluation team plans to conduct a general population survey with residential customers (Section 2.1.9). To gain information about the existing market for the products discounted through the Initiative, we will include a battery of questions on this survey. We will ask about customer awareness of initiative discounts and their awareness of the different methods for participating (i.e. instant discounts, mailed rebates). We will ask about customer awareness and/or use of the product. We will also explore customer perceptions of the benefits of the energy efficient versions of the products and their willingness to pay to receive those benefits.

Deliverable: Draft and final data collection instruments

Deliverable Date: August 2018

Task 8. Impact Analysis

The evaluation team will review all records in the initiative database. We will check to ensure that all discounted products meet initiative requirements and the correct savings assumptions have been applied for each product type. 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 V6.0 to estimate gross energy and demand savings for each measure. The evaluation team will use these values and data from the initiative tracking database to calculate gross initiative savings. The evaluation team will apply verified installation rates from the IL-TRM V6.0, as listed in Table 3.

Table 3. Retail Products Initiative Installation Rates

Measure Description	Installation Rate
Omnidirectional LEDs	89.9%
Specialty LEDs	93.5%
Smart Thermostats	100%
Tier 1 Smart Power Strips	100%
Multi-Speed Pool Pumps	100%
Air Purifiers	100%

For lighting measures, we will calculate 2018 ex post net savings by applying SAG-approved NTGRs to ex post gross electric and gas savings (see Table 4). For non-lighting measures discounted through the retail products initiative, we do not currently have SAG-approved NTGRs. As a result, we are currently conducting research into the NTGRs used for these measures in other jurisdictions and will provide recommended NTGRs for each measure.

Table 4. Retail Products Initiative 2018 NTGRs

Measure Description	NTGR
Omnidirectional LEDs	0.70
Specialty LEDs	0.70

Deliverable: Recommended NTGRs for new measures

Deliverable Date: March 2018

Deliverable: Results in draft annual impact evaluation report

Deliverable Date: March 15, 2019

Task 9. Reporting

The evaluation team will include impact analysis results for the Retail Products Initiative in the annual Residential Program impact evaluation report for AIC, ICC staff, and SAG review. We will then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2019

Evaluation Budget and Timeline

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

Table 5. Residential Retail Products Initiative Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$12,500
2	Initiative Staff Interviews	April and November 2018	\$7,800
3	Initiative Process Model Development	June 2018	\$20,000
4	In-Store Customer Intercept Interviews	March and July 2018	\$134,000
5	In-Store Shelf Stocking Study	March and July 2018	\$50,100
6	Non-Lighting Participant Survey	March 2018	\$94,800
7	General Population Market Research	August 2018	\$26,700
8	Impact Analysis	February 2018 and March 2019	\$49,700
9	Draft Annual Impact Report	March 15, 2019	\$47,300
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$442,900

2.1.2 Income Qualified

The Income Qualified (IQ) Initiative is a home energy diagnostic and whole-house retrofit offering. The target market for the initiative is low- to moderate-income AIC customers with a household income up to 300% of federal poverty guidelines for household size. Typical measures installed through the IQ initiative include energy efficient light bulbs, low-flow faucet aerators and showerheads, HVAC equipment (e.g., furnaces and central air conditioners), programmable thermostats, and building envelop measures. Several important initiative design and implementation changes will occur to the Initiative in 2018:

- Community action agencies (CAAs) will provide recruitment and implementation services for the Initiative (in addition to AIC implementation contractor staff and trade allies);
- Multifamily properties will be eligible to participate;
- The Initiative will provide no-cost energy savings kits at special-events and through other direct distribution efforts; and
- Customers in select communities will receive enhanced rebates for HVAC and lighting equipment, promoted in conjunction with the HVAC and Retail Products initiatives.

Evaluation Approach

The 2018 evaluation of the IQ Initiative includes both process and impact analyses as outlined in the following sections.

Research Objectives

Impact Questions

1. What are the estimated gross energy and demand impacts from this initiative?
2. What are the estimated net energy and demand impacts from this initiative?

Process Questions

3. Initiative Design and Implementation Effectiveness
 - a. Is the initiative being implemented according to design?
 - b. What are the initiative's marketing and outreach efforts?
 - c. What implementation challenges occurred in 2018, if any, and how were they overcome?
 - d. Did implementation and design changes/enhancements in PY9 or 2018 achieve their intended outcomes? What areas for improvement exist?
 - e. What are the respective roles and responsibilities of the AIC initiative staff, the AIC implementation contractors, program allies and CAAs in implementation and outreach? How do these stakeholders coordinate, if at all?
 - f. Is there any confusion among customers around how to participate or where to get services?
 - g. Has the new delivery structure created any barriers to participation? If so, how can they be overcome?
 - h. What successes and challenges, if any, has the inclusion of CAAs created? What are the opportunities for improvement? What quality assurance/quality control (QA/QC) processes exist and are they sufficient to ensure high quality projects?
 - i. How is the initiative reaching multifamily customers? Is outreach performing as expected and are there opportunities to improve multifamily outreach?
 - j. What are the barriers and motivators for multifamily participation? How can they be addressed?
 - k. Are efforts to identify and recruit all-electric buildings effective? If barriers exist, how can they be addressed?
 - l. Are incentive levels for low income, moderate income, and multifamily segments appropriately balancing encouragement to participate with initiative costs?
4. Initiative Participation
 - a. How many homes received audits? How many homes received shell measures? Has participation met expectations? If not, why?
 - b. How many multifamily properties and units received audits? How many received shell measures? Has participation met expectations? If not, why?

- c. How many energy savings kits were distributed? Has participation met expectations? If not, why?
 - d. What are the barriers to installation of incentivized shell measures after receiving an audit? What specific needs and barriers to multifamily properties have?
5. Participant Experience and Satisfaction
- a. Are customers satisfied with aspects of the participation processes in which they have been involved?
 - b. Are customers satisfied with the participation process and Initiative measures?
 - c. How does the participation experience compare between participants who participated through AIC staff versus community agencies?
 - d. What are multifamily property managers'/owners' experiences and satisfaction with the initiative?
 - e. What non-energy benefits (NEBs) are generated by the Initiative?

Evaluation Tasks

Table 6 summarizes the 2018 evaluation activities planned for the IQ initiative.

Table 6. Summary of Income Qualified Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Review of implementation plans, marketing plans and collateral, and the initiative tracking database
Initiative Staff Interviews		✓		Explore initiative implementation, changes to design, and future plans for the IQ initiative
Initiative Process Model Development		✓		Develop initiative process model based on staff interviews and material review to identify critical initiative processes that require evaluation.
Participant Survey	✓	✓		Verify measure installation, gather satisfaction and participation experience metrics, understand plan/barriers to converting from audit to retrofits, and experiences working with community agencies
Energy Savings Kit Recipient Surveys	✓	✓		Collect kit satisfaction metrics and data for the in-service rate (ISR) calculation
In-Depth CAA Interviews		✓		Document agency involvement and collect feedback on successes and challenges in first year
In-Depth Multifamily Manager Interviews		✓		Gather satisfaction and participation experience metrics; explore needs and barriers for multifamily customers
On-Site Verification	✓	✓		Conduct site visits to verify that measures are installed and assess the quality of installation.
Engineering Desk Review	✓			Ensure that original data was entered correctly from invoices/documentation.
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.

Activity	Impact	Process	Forward Looking	Details
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

We will review initiative materials, including implementation plans, marketing plans and collateral, and tracking databases to assess initiative implementation and provide recommendations for improvement, where applicable. The evaluation team will also review the tracking database to assess initiative participation as an input to the impact evaluation. Over the course of the evaluation, this task will include three data requests at the end of Q2, Q3, and Q4 2018. In each instance, we will request single-family and multifamily participant tracking data, including project information (e.g., measures installed and participation dates), contact information (e.g., phone number) and an indicator of whether the customer participated through a CAA. We will also request a list of community agency partners, the count of projects completed by agency, and key contacts for each agency. This data will inform process model development, data collection tasks (e.g., surveys and interviews), and the impact analysis.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

We will conduct two rounds of interviews with the AIC initiative manager and AIC implementation contractor staff. We will schedule the first round at the beginning of the program year to fully understand the Initiative’s design and implementation and elements that could impact evaluation methods. If needed, we will submit a data request for additional documentation or materials discussed during the interviews. We will also conduct another round of interviews towards the end of the program year to get feedback on the Initiative’s performance and implementation challenges that occurred during the year. We anticipate conducting two to three interviews per set (four to six total).

Deliverable: Completed interviews

Deliverable Date: April and November 2018

Task 3. Initiative Process Model Development

Given the IQ Initiative’s substantial design and implementation changes in 2018, we will develop a detailed process flow chart for the Initiative to inform future evaluation efforts and identify critical initiative processes for evaluation.

Deliverable: IQ Initiative process model

Deliverable Date: June 2018

Task 4. Participant Survey

The evaluation team will field a participant telephone survey with single-family and multi-family initiative participants (tenants) in 2018 who received audits and/or weatherization retrofits. We will use a stratified sampling approach to calculate robust verification rates at the measure level. We will also attempt to survey a mix of delivery channels (e.g., AIC implementation contractors, CAAs, program allies) and test for significant differences in responses between these groups. We expect to complete approximately 200 total surveys, but the specific targets for single family versus multifamily projects will depend on the project mix in the tracking data.

The survey will verify measure installation as well as gather information regarding satisfaction, drivers of participation, actions taken, and key demographics. For those who have not “converted” from audit to retrofit, we will ask about plans to complete a retrofit and barriers to completing the retrofit, if applicable. The survey will also ask participants who participated through a CAAs specific questions about their experiences working with the agencies. The survey will also include questions to assess NEBs related to the initiative.

The evaluation team will conduct a rolling survey every quarter (Q3 and Q4 2018, and Q1 2019). However, this will require that AIC delivers quarterly updates to initiative tracking data that include, at minimum, a list of participants, their contact phone or e-mail, type of participant (i.e., audit only, retrofit only, or both), and an indicator for community agency involvement. If a rolling survey is not possible, the evaluation team will request the first three quarters of participation data in September 2018 and field the survey in Fall 2018.

Deliverable: Draft and final survey instrument

Deliverable Date: April 2018

Task 5. Energy Savings Kit Recipient Surveys

The initiative now offers energy savings kits. We will work with AIC staff to understand what data is available on kit recipients and determine whether a participant survey is feasible. If so, this survey would collect information around satisfaction with the kit contents and key inputs for in-service rates (ISRs). The mode and sampling approach for this survey depends on the number of kits distributed and the availability of contact information. We expect to conduct the survey via phone and to use either a census approach (i.e., attempt to contact every recipient with contact information) or a random sample approach. The evaluation team will conduct a rolling survey every quarter (Q3 and Q4 2018, and Q1 2019).

Deliverable: Draft and final survey instrument

Deliverable Date: May 2018

Task 6. In-Depth CAA Interviews

2018 is the first year that CAAs will provide recruitment and implementation services for the initiative. Thus, it is important to document the involvement of CAAs, identify key successes and challenges, and provide recommendations for improvements. To accomplish this, the evaluation team will conduct interviews with CAAs and synthesize data from the initiative staff interviews and initiative planning materials. The evaluation team will request contact information and counts of projects for each agency from the initiative manager. In August 2018, the evaluation team will conduct up to ten in-depth interviews (the final target depends on the number of agencies involved).

Deliverable: Draft and final interview guides

Deliverable Date: August 2018

Task 7. In-Depth Multifamily Manager Interviews

Another key change in 2018 is the inclusion of multifamily customers as eligible participants. This sector has unique challenges, stakeholders, and needs for energy efficiency retrofits, especially regarding implementing building shell and appliance upgrades. Thus, in August 2018, the evaluation team will conduct up to 15 in-depth interviews with multifamily building owners and managers that participated in the initiative (target depends on the total number of participants). The primary purpose of these interviews is to collect information around satisfaction with the participation process (e.g., ease of participation, level and quality of initiative support provided) and specific challenges and needs among multifamily participants. Additionally, if needed, we will verify the installation of common area measures at their property that could not be verified in the survey. Interviews will also include questions to assess NEBs related to the initiative.

Deliverable: Draft and final interview guides

Deliverable Date: July 2018

Task 8. On-Site Verification Visits

On-site visits will also be prioritized for 2018 given changes in the Initiative’s implementation. The visits will be designed to verify measure installation, as well as assess the quality of installation, and depth of savings in participating homes (e.g., assess whether there were missed opportunities to achieve greater savings). We will recruit for the site visit via the participant survey (Task 3) and offer a \$50 incentive to encourage participation. Among those who volunteer for the site visits, we will use a stratified sampling approach to calculate verification rates by measure. For measure with low incidence, we may use a census approach to ensure they are included in the visits. If we do not receive enough volunteers from the survey, we will reach out to participants by phone to recruit additional volunteers. We expect to complete approximately 40 site visits, but the specific targets for single family versus multifamily projects will depend on the project mix in the tracking data.

Deliverable: Results provided in annual impact evaluation report

Deliverable Date: March 2019

Task 9. Impact Analysis

The 2018 evaluation will include gross and net impact estimates. The impact evaluation team will use savings algorithms from the IL-TRM V6.0, and data inputs from the initiative tracking database to estimate ex post gross savings. We will also conduct engineering desk reviews to check that original data was entered correctly from invoices/documentation. We will use a stratified sampling approach to calculate verification rates by measure, and will determine the appropriate number of desk reviews to complete based on a review of initiative materials and tracking data. Finally, we will calculate 2018 net savings by applying the SAG-approved NTGR of 1.0 to gross electric and gas savings.

Deliverable: Results provided in annual impact evaluation report

Deliverable Date: March 2019

Task 10. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Draft and final annual impact report

Deliverable Date: March 2019

Evaluation Budget and Timeline

Table 7 summarizes the timing and budget associated with each evaluation activity.

Table 7. Income Qualified Initiative Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$9,990
2	Initiative Staff Interviews	April and November 2018	\$8,500
3	Initiative Process Model Development	June 2018	\$10,300
4	Participant Survey	April 2018	\$48,500
5	Energy Savings Kit Recipient Surveys	May 2018	\$34,700
6	In-Depth CAA Interviews	June 2018	\$16,600
7	Multifamily Manager Interview Guide Draft	July 2018	\$16,900
8	On-Site Verification Visits	October 2018	\$40,800
9	Impact Analysis	March 2019	\$27,700
10	Draft Annual Impact Report	March 15, 2019	\$28,400
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$242,300

2.1.3 Public Housing

The Public Housing Initiative offers home energy diagnostic services and whole-house retrofits for single- and multi-family properties owned by government entities (i.e., federal, state, and municipal housing authorities) and located in communities where the average household income is at or below 300% of Federal Poverty Guidelines. The initiative implementer will collaborate with federal, state and municipal government agencies within the AIC service territory to identify and weatherize eligible properties. The Initiative provides measures at no cost to the customer, including:

- **Weatherization and Shell Measures:** The Initiative’s comprehensive weatherization design and delivery mirrors weatherization provided under AIC’s Income Qualified initiative. Based on AIC’s 2018-2021 compliance filing, we expect the initiative will provide air sealing, duct sealing, attic insulation, and ECM blower motor retrofits as needed at each property. Enhanced rebates will also be offered for energy efficient heating and cooling system replacement, covering furnaces, air conditioners, heat pumps, and ductless heat pumps. Following prevailing income-qualified weatherization procedures in Illinois established in the Illinois Weatherization Assistance Program, the initiative will also complete any minor health and safety repairs necessary as a prerequisite to installing weatherization measures. To the extent practicable, most weatherization measure specifications will be designed to mirror the Illinois Weatherization Assistance Program.
- **Direct Install Measures:** Direct install measures include LED light bulbs, low-flow faucet aerators, low-flow showerheads, pipe wrap, programmable thermostats or smart thermostats, and Tier 2 smart power strips.

Consistent with AIC’s strategy of cross-promoting initiatives where appropriate, the implementer will also market enhanced residential HVAC rebate offers through the HVAC Initiative and recycling of secondary refrigerators through the Appliance Recycling Initiative.

Evaluation Approach

The 2018 evaluation of the Public Housing Initiative includes both process and impact analyses as outlined in the following sections.

Research Objectives

Impact Questions

1. What are the estimated gross energy and demand impacts from this Initiative?
2. What are the estimated net energy and demand impacts from this Initiative?

Process Questions

3. Initiative Design and Implementation Effectiveness
 - a. Was the Initiative implemented according to design?
 - b. What were the Initiative's marketing and outreach efforts?
 - c. What QA/QC processes does the implementer have in place? Are they sufficient to ensure high quality projects?
 - d. What implementation challenges occurred in 2018 and how were they overcome?
 - e. What role(s) do housing authorities play in initiative implementation and outreach? What successes and challenges, if any, has their inclusion created? What are the opportunities for improvement?
 - f. What are the barriers to housing authority participation? What is the best way to reach housing authorities with information about the initiative?
 - g. What NEBs might result from the Initiative?
4. Initiative Participation
 - a. How many single-family homes, multi-family properties, and multi-family units received audits? How many received weatherization and direct install measures? Has participation met expectations? If not, why?
 - b. How many energy savings kits were distributed? Has participation met expectations? If not, why?
 - c. What are the barriers to installation of incentivized shell measures after receiving an audit? What specific needs and barriers to energy efficiency do multifamily public housing properties have?

Evaluation Tasks

Table 6 summarizes the 2018 evaluation activities planned for the Public Housing Initiative.

Table 8. Summary of Public Housing Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Review of implementation plans, marketing plans and collateral, and the initiative tracking database
Initiative Staff Interviews		✓		Explore and document all initiative implementation details
Initiative Process Model Development		✓		Combine results of initiative staff interviews and materials review to develop a detailed process flow model for the Public Housing Initiative
In-Depth Housing Authority Interviews		✓		Document housing authority involvement and collect feedback on successes and challenges in first year; understand barriers and needs specific to public housing sector
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

We will review initiative materials, including initiative implementation plans, marketing plans and collateral, and tracking databases to understand and assess initiative implementation. The evaluation team will also review the tracking database to assess initiative participation as an input to the impact evaluation. This task will include two data requests. The first, in July 2018, will request the following:

- Additional documentation or materials discussed during the initiative staff interviews, as needed;
- Initiative participant-tracking data (including both single- and multi-family properties) and contact information through June 2018; and
- A list of housing authority and community agency partners, count of projects completed by agency, and key contacts

The evaluation team will use this information to execute data collection tasks (e.g., surveys and interviews) and develop the process flow chart. The second data request will be for the final initiative tracking data and will inform the impact analysis.

Deliverable: Data requests

Deliverable Date: July and November 2018

Task 2. Initiative Staff Interviews

We will conduct two sets of interviews with the AIC initiative manager and implementation contractor staff. The first set, in April 2018, will be used to understand initiative design and implementation, successes and challenges encountered in the first half of the year, and identify evaluation priorities. The second round of interviews, in November 2018, will be a check-in on final initiative performance. We anticipate conducting two to three interviews per round (four to six total).

Deliverable: Mid-year interviews

Deliverable Date: April 2018

Deliverable: End-of-year interviews

Deliverable Date: November 2018

Task 3. Initiative Process Model Development

Given that 2018 is the first year for the Public Housing Initiative, and that the Initiative includes a diverse set of implementation and outreach organizations, the evaluation team will develop a detailed process model for the Initiative. We will provide a flow chart that reflects implementation details gathered through initiative staff interviews, the initiative materials and database review, and in-depth interviews with housing authorities.

Deliverable: Initiative process model

Deliverable Date: June 2018

Task 4. In-Depth Housing Authority Interviews

Housing authorities are the Initiative's participants. The evaluation team will conduct up to ten in-depth interviews with housing authority staff (the final target depends on the number of housing authorities involved). The interviews will provide the housing authorities' perspectives on the participation process, including their satisfaction with key components and their experiences learning about, enrolling in, and completing projects through the Initiative. Interviews will also gather information about housing authorities' priorities, needs, and challenges with respect to increasing the energy efficiency of their properties and will to develop recommendations about ways that the Initiative can best serve this segment. We will also explore NEBs that may have occurred as a result of initiative. The evaluation team will request contact information and counts of projects for each agency from the initiative manager. We will attempt to interview a range of agencies (e.g., by geography, participation levels, or other criteria) to best represent the range of factors that may be motivating or limiting participation.

Deliverable: Draft and final interview guides

Deliverable Date: August 2018

Deliverable: Conducted interviews

Deliverable Date: September 2018

Task 5. Impact Analysis

The 2018 evaluation will include gross and net impact estimates. The impact evaluation team will use savings algorithms from the IL-TRM V6.0, and data inputs from the initiative tracking database to estimate ex post gross savings. The Public Housing Initiative targets income-qualified customers. Accordingly, we will calculate 2018 net savings by applying the SAG-approved NTGR of 1.0 to ex post gross electric and gas savings.

Deliverable: Results provided in annual impact evaluation report

Deliverable Date: March 2019

Task 6. Reporting

The evaluation team will provide all impact findings in the annual Residential Program impact report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Draft and final annual impact report

Deliverable Date: March 2019

Evaluation Budget and Timeline

Table 7 summarizes the timing and budget associated with each evaluation activity.

Table 9. Public Housing Initiative Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$11,400
2	Initiative Staff Interviews	April and November 2018	\$9,700
3	Initiative Process Model Development	June 2018	\$11,500
4	In-Depth Housing Authority Interviews	September 2018	\$19,500
5	Impact Analysis	March 2019	\$23,600
6	Draft Annual Impact Report	March 15, 2019	\$28,100
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$103,800

2.1.4 Behavioral Modification

AIC administers the Behavioral Modification Initiative as a part of the Residential Program to reduce its residential customers’ energy consumption. Initially launched in August 2010, the Initiative 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.

The Initiative has traditionally included three forms of treatment: a hard-copy printed home energy report (HER) mailed four times a year to the customer’s billing address; an electronic HER (eHER) sent once per billing cycle to all customers with email addresses (generally once a month); and an online portal, which customers can log onto to view the same report and access additional information. While AIC is moving to a new implementer for the Initiative in 2018, we anticipate that the initiative will be offered in a similar manner.

Evaluation Approach

The 2018 evaluation of the Behavioral Modification Initiative includes an impact analysis, persistence study, and a process analysis as outlined below. Additionally, we plan to conduct an evaluability assessment of the initiative’s data early in the program year.

Research Objectives

Impact Questions

The 2018 Behavioral Modification Initiative evaluation is focused on the assessment of initiative impacts and is structured to answer the following research questions:

1. Does the new program implementer collect and provide the necessary data to allow for a thorough evaluation of initiative activities?
2. Now that AIC has switched implementers for the Initiative, are the newly selected treatment and control groups equivalent?

3. What are the estimated electric energy, electric demand, and therm savings from the Initiative in 2018?
4. Do estimated savings need to be adjusted due to the treated population’s participation in other AIC initiatives? If yes, by how much do savings need to be adjusted?
5. What are the program savings between customers experiencing a *stoppage* in treatment?
6. What are the program savings for *dual fuel or gas only* customers receiving a *stoppage* in treatment?
7. What is the difference in program savings between customers who have received the report for longer (e.g. duration) than customers who have received the report for a shorter duration (i.e., are there differences across cohorts)?

Process Questions

1. How has the Initiative changed since PY9 and the Transition Period?
2. Do customers recall receiving HERs and do they read them?
3. Do reports increase customer awareness or engagement with AIC and its programs?
4. How satisfied are participants with the initiative?
5. What changes in behavior have customers made based on recommendations in the HERs?
6. What improvements can be made to increase customer engagement with HERs and eHERs such that it leads to reductions in energy use?
7. What additional services does Tendril offer (e.g., usage alerts, weekly email challenges, etc.) and what effect do they have on customer behavior related to energy use?

Evaluation Tasks

To achieve our research objectives, we will complete a series of evaluation tasks as outlined in Table 10. Additional detail regarding each task can be found following the table.

Table 10. Summary of Behavior Modification Program Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Evaluability Assessment	✓	✓		Review data to ensure it meets the requirements for our analysis activities.
Initiative Material & Database Review	✓	✓		Review materials to assess initiative design, implementation, and operations.
Initiative Staff Interviews	✓	✓		Explore how the Initiative has changed since PY9 and the Transition Period.
Equivalency Analysis	✓			Confirm that the random assignment of customers to treatment and control groups led to relatively comparable groups.
Consumption Analysis	✓			Conduct billing analysis to quantify the changes in energy use among the treatment and control groups.

Activity	Impact	Process	Forward Looking	Details
Channeling Analysis	✓			Determine the savings due to participation in other AIC residential initiatives.
Persistence Study	✓	✓	✓	Estimate the difference in savings between customers experiencing a <i>stoppage</i> in treatment compared to those who continue to receive regular treatment.
Customer Internet Survey		✓		Evaluate satisfaction with HERs, eHERs, and web portal, awareness of AIC programs, changes in behavior in response to HERs, and gather suggestions to improve customer engagement through the Initiative.

We describe each of these activities in detail below.

Task 1. Evaluability Assessment

We will review data sources provided by AIC and the implementation contractor to ensure that they include all information we require to conduct impact and process evaluations, as well as a persistence study. This includes, but is not limited to complete data for initiative participants and a control group, at least 18 months of pre-program customer billing data, post-program billing data through latest date available, dates of first report received or experiment start date, opt-out and moveout dates, as well as dates where select customers stopped receiving reports and again resumed receiving reports.

Deliverable: Evaluability Assessment Memorandum

Deliverable Date: May 2018

Task 2. Initiative Material & Database Review

The evaluation team will review the initiative tracking database and other initiative materials, including the 2018 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: November 2018

Task 3. Initiative Staff Interviews

We will conduct telephone interviews with key staff from AIC and the implementation contractor. The interviews will provide us with a comprehensive understanding of the Initiative and its implementation, including insights into the daily workings of the Initiative, changes made in 2018, and areas of success and challenges. We will pay special attention to issues related to the transition to a new implementer and the selection of a new treatment group.

Deliverable: Conduct interviews

Deliverable Date: June 2018

Task 4. Equivalency Analysis

As a first step, we will conduct an equivalency analysis to ensure that the treatment and control groups are comparable in terms of energy usage and key demographics. This review will strengthen the internal validity and defensibility of the research design by ensuring that the random assignment of customers to treatment and control groups led to relatively comparable groups. To assess equivalency, we will utilize Experian data appended to the treatment and control group’s monthly usage data. If the groups differ in terms of energy

usage, we will conduct a review and comparison of the new implementer’s data cleaning and modeling methods to our data cleaning and modeling methods to understand why differences in results exist.

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: December 2018

Deliverable: Results provided in annual report

Deliverable Date: March 2019

Task 5a. Consumption Analysis

The evaluation team will use consumption analysis as the primary method to determine energy savings and demand impacts from the Initiative. Further, given the experimental design, the estimated savings from the consumption analysis are considered net savings. The evaluation team will conduct an intent to treat (ITT) approach and estimate savings using a difference-in-differences (DID) model. 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.

As outlined in the IL-TRM V6.0, the evaluation team will calculate measured electric and gas savings from consumption analysis that adjusts for weather influences over years (Equation 1). This improves 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 HDD and CDD, using a base of 65 degrees Fahrenheit for HDD and 75 degrees Fahrenheit for CDD for standard weather years leveraging the IL-TRM.

Equation 1. Standard Weather-Year-Adjusted Model Estimating Equation

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

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 for standard weather year

β_4 = Coefficient for CDD for standard weather year

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

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

HDD_{it} = Sum of HDD (base 65 degrees Fahrenheit) for standard weather year

CDD_{it} = Sum of CDD (base 75 degrees Fahrenheit) for standard weather year

ε_{it} = Error

It is important to note that the consumption analysis will include all customers in the treatment group. 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.

Task 5b. Channeling Analysis

Savings from the Behavioral Modification Initiative 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. As a result, savings from equipment that was rebated through AIC's Residential Program appear in both the savings results for the Behavioral Modification initiative and the rebate initiatives, and thus would be double-counted if an adjustment were not made. Therefore, we will calculate a savings adjustment to account for the portion of net savings estimated from the consumption analysis that has been claimed by other AIC initiatives.

We will base the savings associated with participation in other AIC initiatives on the results of their respective 2018 impact evaluations, as well as on legacy savings from past participation in AIC initiatives for equipment that has not yet reached the end of its lifetime. As such, we will conduct a participation lift and channeling analysis (incorporating historical trend analysis) to assess trends in initiative participation over time and adjusted net savings estimates. Participation lift analysis assesses whether behavioral initiative treatment has an incremental effect on participation in other AIC initiatives while the channeling analysis identifies the portion of savings from behavioral treatment is double-counted by other AIC energy efficiency initiatives.

Task 5c. Additional Savings Adjustments

In accordance with the IL-TRM V6.0, the evaluation team will also calculate adjusted savings for the Initiative taking persistence and retention into account. This adjustment will take place after the consumption and channeling analysis have been conducted as outlined in IL-TRM V6.0, Section 6.1.1 Adjustments to Behavior Savings to Account for Persistence.

Task 6. Persistence Study

The evaluation team will refine the persistence study research approach based on discussions with AIC and their implementation contractor regarding the planned stoppage in treatment. In general, the evaluation team will conduct consumption analyses to determine energy savings since the treatment was stopped for some participants, as well as any decay in savings. The consumption analysis will be conducted at the program level to understand the total impacts of the cessation of program treatment. Findings from the persistence study will be used to inform updates to the IL-TRM.

For the persistence study, we will use the results from the consumption analysis and estimate an annual decay rate as follows:

Equation 2. Decay Rate Calculation

$$\text{Decay Rate} = 1 - \frac{\% \text{ Savings for Treatment in First Year After Stoppage}}{\% \text{ Savings for Control in First Year After Stoppage}}$$

In addition, we will estimate lifetime persistence savings:

Equation 3. Lifetime Persistence Savings

$$\text{Lifetime Persistence Savings} = \frac{\text{Total Savings for Control in First Year After Stoppage}}{\text{Decay Rate} + \text{Annual Attrition} - (\text{Decay Rate} * \text{Annual Attrition})}$$

As well as measure life:

Equation 4. Measure Life

$$\text{Measure Life} = \frac{\text{Total Savings for Control in First Year After Stoppage} + \text{Lifetime Persistence Savings}}{\text{Total Savings for Control in First Year After Stoppage}}$$

This approach is consistent with other Illinois persistence studies to provide a point of comparison.

Deliverable: Results provided in annual report

Deliverable Date: March 2019

Task 7. Customer Internet Survey

The evaluation team will gather data through the internet survey with customers from the treatment and control groups, which we plan to implement on at least an annual basis. For 2018, responses to the survey will provide early feedback to AIC about how the transition to a new program implementer has progressed. In addition, we will seek to assess customer participation in the initiative, satisfaction with HERs (print, electronic, and web portal formats), changes in customer behavior in response to tips provided in the HERs, and what improvements could be made to the initiative from the customer perspective.

Deliverable: Draft and final survey instrument

Deliverable Date: July 2018

Deliverable: Results provided in annual report

Deliverable Date: March 2019

Task 8. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Draft report

Deliverable Date: March 15, 2019

Deliverable: Final report

Deliverable Date: April 30, 2019

Evaluation Budget and Timeline

Table 11 summarizes the timing of each evaluation activity, as well as the budget associated with each task.

Table 11. 2018 Behavioral Modification Initiative Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Evaluability Assessment	August 2018	\$15,000
2	Initiative Material & Database Review	December 2018	\$7,500
3	Initiative Staff Interviews	November 2018	\$5,500
4	Equivalency Analysis	March 2019	\$7,000
5a	Consumption Analysis	March 2019	\$53,000
5b	Channeling Analysis	March 2019	
5c	Additional Savings Adjustments	March 2019	
6	Persistence Study	March 2019	\$33,000
7	Customer Internet Survey	March 2019	\$35,000
8	Draft Report	March 15, 2019	\$28,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Report	April 30, 2019	
Total			\$184,000

2.1.5 HVAC

Through the HVAC Initiative, AIC offers incentives for the purchase of high-efficiency heating and cooling equipment to both single and multifamily homes. The overall goal of this Initiative is to persuade customers to purchase higher-efficiency equipment than they might otherwise purchase. AIC implementation staff will work directly with contractors and distributors to educate them about the incentives available, as well as to train them on promoting the initiative. Measures offered through this Initiative include: programmable and smart thermostats, air source heat pumps (ASHP), central air conditioners (CAC), high efficiency blower motors, and air source heat pump water heaters (HPWH). Further, the Initiative includes incentives for both early retirement (ER) and replacement on burnout (RB).

Approved contractors will become HVAC Initiative Allies, and will receive training from AIC around Initiative requirements, promotion and customer communications. AIC will also assign an Account Manager to each ally to support their involvement in the Initiative.

Evaluation Approach

The 2018 assessment of the HVAC Initiative includes both impact and process analyses, as outlined in the following sections.

Research Objectives

Impact Questions

The 2018 impact evaluation will address the following questions regarding the HVAC Initiative:

1. What were the Initiative’s estimated gross energy and demand impacts?
2. What were the Initiative’s estimated net energy and demand impacts?

Process Questions

In addition, the evaluation team plans to answer the following process-related questions:

3. Did initiative implementation change compared to the prior program year? If so, how and why was this change made and was this change advantageous?
4. Did the number of participants meet expectations? If not, how and why did it differ from expectations?
5. What challenges did the implementer encounter in 2018?

Evaluation Tasks

Table 12 summarizes the 2018 evaluation activities conducted for the HVAC Initiative.

Table 12. Summary of HVAC Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Review all initiative materials and the tracking database to ensure collection of appropriate data to inform the evaluation.
Initiative Staff Interviews		✓		Interview AIC and implementation managers to understand goals, progress to date, initiative changes from PY9 and over the 2018 period, successes and challenges, and future goals.
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each activity below in detail.

Task 1. Initiative Material & Database Review

The evaluation team will review all initiative materials and tracking data, including initiative rebate forms, implementer reports, initiative manuals, and initiative ally communications, as well as extracts from the initiative tracking database.

In January 2018, the team will request initiative materials; communications will continue with AIC and its implementation staff regarding data needs. The team will request year-end initiative data in November 2018.

Deliverable: Data requests

Deliverable Date: March and November 2018

Task 2. Initiative Staff Interviews

The evaluation team will perform up to three in-depth interviews with AIC and implementation staff. These interviews will focus on assessing goal achievement, initiative design/delivery modifications and reasons for change, implementation challenges and successes, and plans for the initiative’s future. We will plan to conduct interviews both early in the program year as well as toward the close of the program year.

Deliverable: Completed interviews

Deliverable Date: April and November 2018

Task 3. Impact Analysis

To estimate 2018 ex post gross savings for the HVAC Initiative, the evaluation team will use appropriate IL-TRM V6.0 savings algorithms to estimate gross savings for each measure. The team will derive inputs for the algorithm primarily from the initiative tracking database (SEER level, climate zone, etc.). When input data are unavailable from the database, the team will use deemed inputs from the IL-TRM V6.0. The team will multiply gross savings by each measure installed, as tracked through the participant database.

The evaluation team will review all of the data in the 2018 tracking database to support estimation of gross impacts for the HVAC Initiative. The team will also verify up to 70 HVAC measure installations by reviewing available project documents (e.g., invoices, AHRI numbers) and comparing the resulting findings to the tracking database.

The evaluation team will apply the SAG-approved NTGRs to gross savings (presented in Table 13) to determine 2018 net impacts.

Table 13. HVAC Initiative 2018 NTGRs

Measure Description	NTGR	
	Electric	Gas
Programmable thermostats	0.870 ^a	0.870 ^a
Smart thermostats	N/A ^b	N/A ^b
SEER 16+ CAC or ASHP (Early replacement [ER])	0.761	—
SEER 16+ CAC/ASHP (RB)	0.641	—
Brushless Motors	0.761	0.761
Heat Pump Water Heaters	0.760 ^c	—

^a SAG-approved value for Home Efficiency Standard

^b No NTGR because TRM savings are deemed net savings

^c Value is approved for ComEd. No approved value exists for AIC.

Deliverable: Analysis provided in draft report

Deliverable Date: March 2019

Deliverable: Analysis provided in final report

Deliverable Date: April 2019

Task 4. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Residential Program impact report *Deliverable Date:* March 15, 2019

Deliverable: Chapter in final annual Residential Program impact report *Deliverable Date:* April 30, 2019

Evaluation Budget and Timeline

Table 14 summarizes the timing of each evaluation activity, as well as the budget associated with each task.

Table 14. HVAC Initiative 2018 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$10,800
2	Initiative Staff Interviews	April and November 2018	\$11,600
3	Impact Analysis	April 2019	\$25,600
4	Draft Annual Impact Report	March 15, 2019	\$17,900
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$65,800

2.1.6 Appliance Recycling

The Appliance Recycling Initiative promotes the retirement and recycling of working, but inefficient refrigerators and freezers from the homes of AIC’s electric customers by offering a turn-in incentive and free pickup, as well as information and education on the cost of keeping an inefficient unit in operation. This initiative will be cross-promoted with the Retail Products Initiative so that customers purchasing new energy efficiency refrigerators and freezers know how to dispose of their older equipment, as well as through the Income Qualified Initiative, where in-home assessments are done to help identify potential energy efficient upgrades.

Evaluation Approach

The 2018 assessment of the Appliance Recycling Initiative includes both impact and process analyses as outlined in the following sections.

Research Objectives

Impact Questions

The 2018 Appliance Recycling Initiative evaluation seeks to provide estimates of gross and net electric savings associated with the Initiative. The 2018 impact evaluation will answer the following questions:

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

3. What are the part-use factors, and locations the unit was previously held?

Process Questions

The evaluation team will also explore limited process-related research questions for the 2018 evaluation, including the following:

4. Did the initiative implementation change since PY8? If so, how and why, and was this change advantageous?
5. What were any challenges faced by the implementer in 2018?
6. How well did the initiative transition to start up after not operating in PY9 or the transition period?

Forward-Looking

7. What are the levels of free-ridership and participant spillover for this initiative?
8. How do retailers dispose of units turned back to them?

Evaluation Tasks

Table 15 summarizes the 2018 evaluation activities conducted for the Appliance Recycling Initiative.

Table 15. Summary of Appliance Recycling Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Review all initiative materials and data in the tracking database to ensure collection of appropriate data to inform the evaluation.
Initiative Staff Interviews				Interview AIC and implementation staff to gather insights into initiative design and delivery.
Participant Survey (Process & NTG)		✓	✓	The survey will be administered by telephone to gather data to update the Initiative’s NTGR, as well as verify participation and appliance locations. The NTG algorithm will be developed based on the IL NTG Protocols.
Retailer Interviews	✓		✓	These interviews will be used to determine what proportion of units turned in to retailers get recycled versus disposed of or resold.
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each activity below in detail.

Task 1. Initiative Material & Database Review

The evaluation team will conduct a review of all initiative materials and tracking data. This will include initiative marketing and implementation plans, as well as the initiative tracking database. The team will rely on tracking database for relevant data required to estimate gross savings using the IL-TRM V6.0 algorithm. The tracking data also contain measure data, including ex ante savings and incentives.

The team will also request initiative materials, including marketing materials and information regarding the Initiative's processes. These materials will inform the team's design of interview instruments.

Deliverable: Data request

Deliverable Date: January 2019

Task 2. Initiative Staff Interviews

The evaluation team will conduct up to two interviews with initiative managers and implementers. The interviews will focus on changes in the initiative's design or marketing strategy since PY9, specific marketing tactics and perceived results, and initiative performance. Interviews will also provide stakeholders with an opportunity to ensure that the team achieves an up-to-date understanding of initiative operations in 2018 and initiative plans for the near future.

Deliverable: Conducted interviews

Deliverable Date: July 2018

Task 3. Participant Survey

The evaluation team will conduct a participant survey to assess participation satisfaction, how much recycled units were plugged in and used, the location of the units, and free-ridership questions to estimate a NTGR for future application. We will deliver a memorandum summarizing these results in late 2018.

Deliverable: Draft and final survey instruments

Deliverable Date: July 2018

Deliverable: Draft memorandum

Deliverable Date: November 2018

Deliverable: Final memorandum

Deliverable Date: December 2018

Task 4. Retailer Surveys

To establish the baseline market conditions prior to any intervention by the Initiative, the evaluation team will research how the retail haul-away market operates without any utility intervention. We will determine the general processes retailers follow when they remove appliances from customer homes in the absence of any utility interventions.

The evaluation team will review the most recent available research and interview local appliance retailers in AIC's service territory to determine the likely fate of appliances that participants say would have been picked up by a retailer absent the Initiative. We will then use this information to inform the NTGR analysis for those units. These results will be incorporated into the same memorandum summarizing participant survey results.

Deliverable: Draft and final survey instruments

Deliverable Date: July 2018

Task 5. Impact Analysis

The evaluation team will use the tracking database to estimate the Initiative's 2018 ex post gross savings. The database contains relevant physical characteristics of appliances recycled through the initiative, including

capacity (in cubic feet), year of manufacture, and unit configuration (all inputs to the algorithm for calculating gross savings). We will utilize results of the 2018 participant survey to verify participation. We will use the most recent *past* survey data for the part use factor (i.e., the proportion of the year the units were plugged in).

To calculate ex post net savings, the evaluation team will apply SAG-approved NTGRs (Table 16).

Table 16. Appliance Recycling Initiative 2018 NTGRs

Measure Description	Electric NTGR
Refrigerator	0.52
Freezer	0.62

Deliverable: Analysis provided in draft report

Deliverable Date: March 2019

Deliverable: Analysis provided in final report

Deliverable Date: April 2019

Task 6. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2019

Evaluation Budget & Timeline

Table 17 summarizes the timing of each evaluation activity and provides budgets associated with each task. The total budget for the 2018 Appliance Recycling Initiative evaluation is \$90,200.

Table 17. Appliance Recycling Initiative 2018 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material & Database Review	January 2019	\$7,400
2	Initiative Staff Interviews	July 2018	\$8,200
3	Participant Survey	November 2018	\$26,400
4	Retailer Interviews	October 2018	\$17,500
5	Impact Analysis	February 2019	\$13,700
6	Draft Annual Impact Report	March 15, 2019	\$17,100
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$90,200

2.1.7 Direct Distribution of Efficient Products

The Direct Distribution of Efficient Products Initiative ("Direct Distribution Initiative") provides energy savings kits to students in participating 5th to 8th grade classrooms with a focus on low income communities that receive both electric and gas service from AIC. The kits contain LED light bulbs, and LED nightlight, low flow

showerheads and faucet aerators, a tier 1 smart power strip and a furnace filter tone alarm. By providing the kits in conjunction with energy conservation education in the classroom, AIC hopes to reduce energy use in participating student homes. To achieve its goals related to the Initiative, AIC will partner with the Illinois Board of Education, parent and teacher organizations, and public and private school systems.

Evaluation Approach

The 2018 assessment of the Direct Distribution Initiative includes both process and impact analyses as outlined in the following sections.

Research Objectives

Impact Questions

For the 2018 Direct Distribution Initiative evaluation, the team will estimate gross and net electric and natural gas savings. The team will design the 2018 impact evaluation to answer the following questions:

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

Process Questions

The evaluation team will also conduct a process evaluation to explore how the Initiative. The evaluation will seek to address the following process-related questions:

3. Initiative Participation
 - a. How many kits were distributed to participants?
 - b. What were the installation rates for each measure?
4. Initiative Design and Implementation
 - a. Did AIC make any changes to the Initiative since PY9? How did these changes affect initiative performance or delivery?
 - b. What implementation challenges occurred in 2018?
 - c. What changes could AIC make to improve future initiative effectiveness?

Evaluation Tasks

Table 18 summarizes the 2018 evaluation activities conducted for the Direct Distribution Initiative.

Table 18. Summary of Direct Distribution Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Review implementation plan, initiative marketing materials, and instructional materials.

Activity	Impact	Process	Forward Looking	Details
Initiative Staff Interviews		✓		Interview AIC and implementation staff to gain insights into the Initiative’s design and delivery.
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each activity below in detail.

Task 1. Initiative Material & Database Review

The evaluation team will review critical initiative documentation, including records of marketing and outreach efforts, instructional materials, web-based student survey results, and all other paperwork. To do so, the team will request the following:

- Initiative tracking database (all available data)
- Verification, installation rate, and measure satisfaction results from the web-based student surveys
- Specification sheets for each item included in the energy efficiency kits
- Initiative instructional materials
- All initiative marketing materials
- Any documentation of implementation processes

The team will make an initial data request in August 2018, with subsequent requests in January 2019 to obtain the final initiative tracking database.

Deliverable: Data requests

Deliverable Dates: August 2018 and January 2019

Task 2. Initiative Staff Interviews

The evaluation team will perform up to three in-depth interviews with AIC staff and implementation contractors, focusing on initiative goals and progress toward meeting these goals. Additionally, the evaluation team will explore the following: Initiative changes since PY9, design and implementation, strengths and weaknesses, and outreach and marketing.

Deliverable: Conducted interviews

Deliverable Date: July 2018

Task 3. Impact Analysis

The evaluation team will conduct the following tasks to determine gross and net savings:

- Analyze the Initiative tracking database at the end of 2018 to verify participation
- Apply installation rates for all measures and water heater saturation rate by fuel type, derived from the implementer’s web-based surveys

- Apply the IL-TRM V6.0 per-unit savings for each measure to verified participation numbers to determine ex post gross savings
- Apply the SAG-approved NTGRs by measure to calculate net savings (Table 19). Where no existing NTG recommendations exist, the evaluation team will conduct research early in 2018 to determine an appropriate value for application.

Table 19. Direct Distribution Initiative 2018 NTGRs

Measure Description	Electric NTGR	Gas NTGR
LEDs	0.83	—
LED Nightlight	TBD	—
Smart Power Strip	TBD	—
Showerheads	1.05	1.05
Faucet Aerators	1.04	1.04
Water Heater Setback	1.00	1.00

Deliverable: Analysis provided in draft report

Deliverable Date: March 2019

Deliverable: Analysis provided in final report

Deliverable Date: April 2019

Task 4. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2019

Evaluation Budget & Timeline

Table 20 summarizes the timing of each evaluation activity. Table 20 also shows the budget associated with each evaluation task. The total budget for the 2018 Direct Distribution Initiative evaluation is \$57,200.

Table 20. Direct Distribution Initiative 2018 Evaluation Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material & Database Review	August 2018 and January 2019	\$10,000
2	Initiative Staff Interviews	July 2018	\$10,800
3	Impact Analysis	February 2019	\$19,300
4	Draft Annual Impact Report	March 15, 2019	\$17,100
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$57,200

2.1.8 Multifamily

The Multifamily Initiative offers incentives and services that enable energy savings and lower operating costs in market-rate multifamily housing (buildings with four or more units and managed by a private entity). The 2018 Initiative’s target audience includes property management companies with multiple properties,¹ but the Initiative will also extend outreach to individual property owners as necessary. We anticipate that the implementer will conduct all outreach and recruitment, perform audits to identify installation opportunities, and provide direct installation of energy-saving measures for building common areas and tenant units. Measures are provided free-of-charge. The provided measures are as follows:

- **In-unit:** Initiative offerings for tenant units include LEDs, low-flow showerheads, faucet aerators, programmable thermostats, pipe wrap, and Tier 2 smart power strips. The implementer is responsible for installing most of the in-unit and common area measures; the exception is programmable thermostats, which the implementer provides to participating customers for installation by the customer’s own staff.
- **Common Areas:** Common area offerings include light bulb replacements. The implementer offers properties medium screw-based standard and specialty LED upgrades for incandescent or halogen lamps in interior and exterior settings. The implementation contractor conducts all of the lighting upgrades.

In addition, Ameren Illinois uses the Multifamily initiative to cross-promote other energy-saving opportunities as appropriate, including Appliance Recycling, HVAC upgrades through the HVAC Initiative, and commercial-grade measures through the Business Program.

¹ According to Ameren Illinois’ 2018-2021 compliance filing, these efforts are designed to identify a single-point-of-contact who can authorize upgrades at multiple properties, thereby streamlining implementation. This is a change relative to 2017 program implementation (e.g., PY9) in which the program marketed to any property manager.

Evaluation Approach

Research Objectives

Impact Questions

The objective of the 2018 Multifamily Initiative evaluation is to provide estimates of gross and net electric (kWh, kW) and gas (therm) savings associated with the initiative. In particular, the 2018 impact evaluation will answer the following questions:

1. What are the estimated gross energy and demand impacts from the Initiative?
2. What are the estimated net energy and demand impacts from this Initiative?
3. What is the estimated NTGR for in-unit direct install measures and common area direct install lighting, to be applied prospectively?

Process Questions

The evaluation team will also explore a number of process-related research questions as part of the 2018 evaluation:

4. How many projects were completed? By how many different customers? What types of projects?
5. Did participation meet initiative planning expectations? If not, how different was it, and why?
6. How has the initiative changed compared to past years? If so, how, why, and were these advantageous changes?
7. What implementation challenges have occurred in 2018, and how has the Initiative overcome them?
8. Are participating property managers satisfied with the Initiative's key components? Are tenants living in units that received direct-install measures satisfied with the measures?
9. Are participating property managers aware of applicable initiatives that AIC cross-promotes through the initiative in 2018? If yes, what is their level of interest in participating in these other opportunities?
10. What changes could the Initiative make to improve the customer experience?
11. What NEBs might result from the initiative?

Evaluation Tasks

Table 21 summarizes the 2018 evaluation activities planned for the AIC Multifamily Initiative.

Table 21. Summary of AIC Multifamily Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review		✓		Review the 2018 database, relevant administrative reports, and marketing and outreach materials to document initiative design and changes.
Initiative Staff Interviews		✓		Conduct interviews with AIC and implementation staff to understand changes in initiative design and implementation.
Property Manager Survey		✓	✓	Survey participating property managers to investigate initiative processes, participant satisfaction, and awareness of cross-promoted initiatives. Gather data for estimating NTGRs (i.e., free-ridership and spillover).
Tenant Survey		✓	✓	Survey tenants living in upgraded units to investigate satisfaction with measures and gather data for estimating NTGRs (i.e., free-ridership and spillover).
IL-TRM Application Review	✓			Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each activity below in detail.

Task 1. Initiative Material & Database Review

The team will conduct a comprehensive review of all materials and tracking data. We will review these materials to document the design and implementation of the 2018 initiative, including marketing and implementation plans, customer and initiative ally communications, and extracts from the tracking database. We anticipate requesting tracking data at mid-year to support the property manager and tenant surveys, and a final tracking data request at the end of the year to support impact evaluation.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

We will conduct a brief early-evaluation interview with AIC and implementation contractor staff before finalizing the evaluation plan to confirm our understanding of the Multifamily Initiative design and implementation in 2018 and to discuss the evaluation priorities of AIC and implementation staff. As in past years, we also plan to complete a more detailed interview with initiative staff closer to the end of the year to get staff perspective on initiative performance and detailed information on initiative marketing. In total, we expect to complete three interviews: one combined early evaluation interview, and two separate interviews with AIC and implementation staff at the end of the year.

Deliverable: Completed interviews

Deliverable Date: April and November 2018

Task 3. Property Manager Survey

We plan to complete approximately 70 interviews with participating multifamily property managers in AIC's service territory. The interviews will collect data needed to establish (pipe wrap) and update (in-unit LEDs, common area LEDs, showerheads, faucet aerators, programmable thermostats) NTGRs by measure. Given the initiative's new focus on property management companies with multiple properties, surveys will also provide information about these entities' property management practices. Surveys will explore property manager experiences with the Initiative and will assess their awareness of and interest in the initiatives that Ameren cross-promotes through the Multifamily Initiative, as well as any NEBs that may result from the Initiative. We plan to field the survey in fall 2018. Results will be provided in a memorandum in December 2018.²

Deliverable: Draft and final survey instrument

Deliverable Date: July 2018

Deliverable: Draft memorandum

Deliverable Date: December 2018

Deliverable: Final memorandum

Deliverable Date: January 2019

Task 4. Tenant Survey

We will field a survey with tenants living in units that received smart power strips to gather data needed to establish a NTGR for Tier 2 smart power strips.³ As power strips are not usually permanent fixtures of a rental unit, we believe it is appropriate to assume that tenants are the key decision-maker about this measure given their role in non-initiative decision-making, even though property managers make the ultimate decision to enroll a property into the initiative. We will field a mail-push-to-web survey with tenants living in units that received direct install measures through the Initiative. Additionally, we will use the survey to gather updated information on the awareness and purchase of LEDs, which the Initiative began offering in the Transition Period. We will use tenant responses to contextualize the NTGR for LEDs as determined through the property manager survey. Finally, we will include questions to assess NEBs related to the initiative and questions to gauge satisfaction with all measures received through the initiative.

We will target approximately 70 completed surveys, and will adjust this target as necessary to achieve the 90/10 level of confidence and precision. We plan to field the survey in fall 2018. Results will be provided in a memorandum in December 2018.⁴

Deliverable: Draft and final survey instrument

Deliverable Date: July 2018

Deliverable: Draft memorandum

Deliverable Date: December 2018

Deliverable: Final memorandum

Deliverable Date: January 2019

² To expedite survey delivery and analysis, we will likely begin research before the program year is closed. Based on past participation patterns, we believe that using a partial year of program data is unlikely to bias our survey results, and therefore, we expect to complete this survey with only a partial program population to ensure that we can deliver draft results in Q4 2018 or Q1 2019. We will review program tracking data before a survey is fielded to confirm that participation is representative.

³ We will coordinate this research with other AIC residential initiatives that are offering Tier 2 smart power strips for the first time in 2018.

Task 5. Impact Analysis

To determine gross impacts associated with the Multifamily Initiative, we plan to review contents of the 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 V6.0. We will resolve any discrepancies found in the database, report on findings, and provide details related to any gross savings adjustments. The team will use algorithms and assumptions from the IL-TRM V6.0 to calculate ex post gross savings associated with the measures recorded in the database.

For net impacts, we will generally apply the SAG-approved NTGRs for 2018, listed in Table 22. The initiative is offering two new measures for the first time in 2018: pipe wrap and Tier 2 smart power strips. We will conduct background research early in the program year to review the reasonableness of net-to-gross assumptions that the initiative is planning to use to calculate savings from each measure. If the initiative has not yet established values for these parameters by the time of our task, we will complete secondary research to recommend interim values that the initiative can use for the 2018 year.

We anticipate beginning the impact analysis in September 2018 based on the expected timing of the final initiative tracking data.

Table 22. Multifamily Initiative 2018 NTGRs

Measure Description	Electric NTGR	Gas NTGR
In-Unit – LEDs	0.77	–
In-Unit – Programmable Thermostat	0.79	1.00
In-Unit – Faucet Aerators	0.79	1.00
In-Unit – Showerheads	0.79	1.00
In-Unit – Pipe Wrap	TBD	TBD
In-Unit – Tier 2 Smart Power Strips	TBD	TBD
Common Area – LEDs	0.83	–

Deliverable: Results provided in annual report

Deliverable Date: March 15, 2019

Task 6. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2019

⁴ To expedite survey delivery and analysis, we will likely begin research before the program year is closed. Based on past participation patterns, we believe that using a partial year of program data is unlikely to bias our survey results, and therefore, we expect to complete this survey with only a partial program population to ensure that we can deliver draft results in Q4 2018 or Q1 2019. We will review program tracking data before a survey is fielded to confirm that participation is representative.

Evaluation Budget and Timeline

Table 23 summarizes the timing and budget associated with each evaluation activity.

Table 23. Multifamily Initiative Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$3,100
2	Initiative Staff Interviews	April and November 2018	\$7,100
3	Property Manager Survey	July 2018	\$38,000
4	Tenant Survey	July 2018	\$36,800
5	Impact Analysis	March 15, 2019	\$22,200
6	Draft Annual Impact Report	March 15, 2019	\$36,500
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2019	
Total Budget			\$143,700

2.1.9 Residential Cross-Cutting Evaluation Activities

Residential General Population Survey

AIC is entering its tenth year of program operation, and conducts general marketing and education around energy efficiency in addition to discrete energy efficiency offerings. Over time, these marketing and education efforts can result in energy savings outside of initiatives that could count as spillover. While spillover among initiative participants is captured in individual initiative evaluation efforts, non-participant spillover is not captured. As a result, the evaluation team will conduct ongoing general population surveys to quantify non-participant spillover and collect additional information that may be beneficial to initiative implementation (e.g., initiative awareness, and consumer preferences and perceptions).

As non-participant spillover is likely typically rare, estimating non-spillover requires a sample of at least 350 respondents to ensure acceptable precision at a desired confidence level. To conduct this research, the evaluation team will draw a random sample from AIC’s residential customer database, using customer identification numbers to flag those participating in any AIC energy efficiency initiatives (including the Behavioral Modification Initiative). While we cannot flag customers who receive discounted lighting through the Retail Products Initiative, we will exclude lighting measures from our spillover calculations as these have a high likelihood of being initiative-incented bulbs.

The general population survey will contain modules with questions about all of AIC’s residential energy efficiency initiatives. Residential, non-participating respondents will be asked individual initiative module questions based on whether they have made the necessary initiative upgrade and why they did not participate in that initiative. We will use survey responses to identify motivators and barriers, preferred communications channels and existing level awareness, satisfaction with AIC, and likelihood to recommend an AIC initiative to a friend. We will explore whether any of this spillover has the potential to overlap with other measured spillover, and will minimize savings overlap across different data sources.

Additionally, to gain information about the existing market for the products discounted through the Retail Products Initiative, we will include an additional battery of questions on this survey in 2018. Specifically, we will ask about customer awareness of initiative discounts and methods for participating (i.e. instant discounts, mail-in rebates, retail and online purchase options). Some of the products discounted are well-known by all

customers such as dehumidifiers and room air conditioners, but others, such as smart thermostats and Tier 1 smart strips, are less well known. Depending on the product type, we will ask about customers awareness and/or use of the product. We will also explore customer perceptions of the benefits of the energy efficient versions of the products and their willingness to pay to receive those benefits.

Finally, if AIC uses customer segments to target its marketing messages, the team will request that the residential database include tags for these segments. The team would then select a stratified random sample, which would provide results at the segment level to understand how these customer segments behave in the energy efficiency market. In addition, the survey responses will help identify residential market segments that are least likely to participate in AIC’s energy efficiency initiatives and the barriers to participation for these market segments.

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 non-participant spillover, as well as how the value will be applied to initiative savings going forward. Survey fielding and analysis will be completed in time to meet the September 1st deadline for initial NTG recommendations.

Evaluation Budget and Timeline

Table 24 summarizes the timing and budget associated with each Residential Program cross-cutting evaluation activity.

Table 24. Cross-Cutting Residential Program Evaluation Activities – Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Residential General Population Survey	April 2019	\$100,000
Total Budget			\$100,000

2.2 Business Program

AIC’s planned Business Program provides services to non-residential customers, and is made up of four initiatives: the Standard Initiative, the Custom Initiative, the Retro-Commissioning Initiative, and the Streetlighting Initiative. Within each of these initiatives, AIC includes various targeted offerings (for example, the Small Business offering contained within the Standard Initiative).

In this section, we outline the anticipated evaluation activities for each of the Business Program initiatives, as well as cross-cutting activities proposed to inform multiple Business Program initiatives. The research proposed for this program is particularly important as AIC rolls out energy efficiency offerings to a different eligible population than in the past. More specifically, with the exclusion of 10 MW customers, who historically participated heavily in AIC programs, as well as the addition of public-sector customers, AIC and its implementation contractors are serving a different market. As such, the evaluation team has proposed early and targeted research to help identify and address any challenges to implementation and savings generation, or barriers to program participation.

In accordance with Illinois evaluation requirements, we will deliver a draft annual Business Program impact evaluation report on March 15, 2019, covering the 2018 program year. This report will include information in 2018 program participation, 2018 ex post gross and net impacts for all Business Program initiatives, as well as the program-level weighted average measure life (WAML) and cumulative annual persistent savings (CPAS) for the Program.

In addition, we will deliver a number of stand-alone memos summarizing results of process and NTGR research, where applicable. At the close of the 2018 evaluation, we will deliver an integrated process/forward looking evaluation report that rolls up all the stand-alone memos relevant to the 2018 Business Program.

Table 25. Schedule of 2018 Business Program Evaluation Deliverables

Deliverable	Date
Draft Annual Business Program Impact Evaluation Report	March 15, 2019
Final Annual Business Program Impact Evaluation Report	April 30, 2019
Annual Integrated Impact Report	April 30, 2019
Annual Integrated Business Program Process/Forward Looking Evaluation Report	May 31, 2019

2.2.1 Standard

The Standard Initiative offers AIC business customers fixed incentives for the installation of prescriptive energy efficiency measures. The core Initiative provides incentives for lighting, variable frequency drives (VFDs), HVAC, steam traps, compressed air leak repair, and other measures, obtained by applying for a rebate through AIC. In addition, the Standard Initiative offerings available to AIC’s business customers through other channels:

- The Instant Incentives offering provides mid-stream incentives to customers purchasing lighting products at distributor retail locations to help increase the market share of efficient lighting products
- The Ameren Illinois Business Customer Online Store (Online Store) is available to all electric business customers, and offers a variety of energy-saving lighting products, including LEDs, occupancy sensors, and smart power strips

The Standard Initiative is designed to serve business customers of all sizes including small, medium and large businesses. However, the Initiative is a critical participation channel for AIC’s small customers, who in past years were targeted by a series of stand-alone Illinois Power Agency approved energy efficiency programs.

- In 2018, the Standard Initiative will newly include a Small Business offering, providing direct install energy efficiency measures to AIC’s small (primarily DS-2 and/or GDS-2) customers

In 2018, the Initiative is also planning to begin or continue exploring a number of relatively new measures, including laminar flow restrictors, Q-Sync motors, heat recovery grease trap filters, and more. As necessary, the evaluation team will conduct research around these measures (including NTG and process research) to understand their impact on the Initiative’s performance.

Evaluation Approach

The 2018 assessment of the Standard initiative focuses primarily on a rigorous quantification of energy and demand impacts as outlined in the following sections, but includes process and forward-looking questions as well.

Research Objectives

Impact Questions

The 2018 impact evaluation will answer the following impact-related questions:

1. What are the estimated gross energy and demand impacts from this initiative?
2. What are the estimated net energy and demand impacts from this initiative?

Process Questions

The 2018 evaluation of the Standard Initiative will also include limited process research, primarily based on our interviews with implementation staff and review of initiative materials. We will seek to answer the following questions:

3. Initiative Participation
 - a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What type of projects?
 - b. Did customer participation meet expectations? If not, how and why is it different from expectations? Were any changes in the mix of customers and projects desirable?
4. Initiative Design and Implementation
 - a. Did the Initiative's implementation change from 2017? If so, how and why and was this an advantageous change?
 - b. Did the Initiative experience any implementation challenges in 2018? If so, what were they, and how were they overcome?
 - c. What changes could the Initiative make to improve the customer experience and generate greater energy savings?

Forward Looking

The evaluation will also answer the following forward-looking research questions:

5. What is the level of participant free-ridership and spillover for measures delivered through the Initiative's core (application-based) offering, for prospective application?
6. What is the level of participant free-ridership and spillover for measures delivered through the Initiative's Small Business (direct install) offering, for prospective application?

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

Evaluation Tasks

This section outlines the planned tasks for the 2018 evaluation of the Standard Initiative (Table 26).

Table 26. Summary of Standard Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Gather information about initiative implementation and performance.
Initiative Staff Interviews		✓		Explore changes made since 2017 and gather information about initiative marketing, implementation, and 2018 performance.
Core Participant Survey		✓	✓	Collect information to develop NTGRs for prospective application, verify installation of equipment, as well as gather limited information to inform initiative process assessment.
Small Business Survey		✓	✓	Collect information to develop NTGRs for prospective application, verify installation of equipment, as well as gather limited information to inform initiative process assessment.
Engineering Desk Reviews	✓			Review a sample of project documentation and initiative tracking data to ensure that original data was entered correctly from invoices/documentation.
On-Site Verification	✓			On-site visits for a sample of Small Business projects to verify that incentivized measures are installed and operational.
IL-TRM Application Review	✓			Review initiative tracking data to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

The team will conduct a comprehensive review of all initiative materials and tracking data. This includes Business Program marketing and implementation plans, customer and ally communications, and extracts from the Business Program tracking database (i.e., AMPlify). We request extracts from AMPlify on a regular basis and will continue to communicate with AIC and Leidos about data needs as needed. At a minimum, we will request a mid-year extract of the database in June 2018, and make subsequent requests at the close of 2018 (December 31, 2018) and then again in January 2019, when we expect the database to be finalized.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2018 to explore initiative performance, changes since 2017, and other topics relevant to our research objectives. We will conduct multiple interviews with Business Program staff: a brief interview mid-cycle to understand changes made to the initiative in 2018 and to provide time for the evaluation team to modify any research tasks as necessary, as well as a comprehensive interview toward the end of 2018 allowing implementation staff the opportunity to comment on the initiative's performance throughout 2018. In total, we plan to complete three to five interviews, including interviews with the Business Program managers and marketing staff. We will likely conduct interviews focusing on all Business Program initiatives together, but we will conduct interviews with specific staff (e.g., implementation staff for the Small Business offering) as needed.

Deliverable: Conducted interviews

Deliverable Date: April and November 2018

Task 3. Core Participant Survey

The evaluation team will conduct a quantitative Internet survey with customers who have completed a project through the Standard Initiative's core (application-based) offering in 2018. The survey will focus on assessing free-ridership and participant spillover for Standard Initiative measures, and will also include limited questions to verify measure purchase and installation and to assess initiative processes.

Our sample frame will be all customers completing a core Standard project achieving savings⁵ and we anticipate attempting a census of customers in this sample frame. As needed to ensure representativeness, we will complete up to 25 follow-up phone calls with participants who do not complete the web survey.

We plan to use the data gathered from the survey to develop NTGRs for core Standard Initiative measures for prospective application. We will determine the granularity of the NTGRs to provide based on a review of initiative data and response rates achieved by the survey, but it is likely that, at a minimum, we will provide NTGRs specific to the private and public sectors. In addition, we will provide NTGRs specific to steam traps to ensure consistency with other ongoing Illinois evaluation work.

Given our sampling strategy, we generally expect to estimate separate NTGRs for public and private sector participants. However, this requires sufficient participation by public sector customers to support development of separate NTGRs. Depending on the granularity of NTGRs developed, it is possible we will need to provide blended NTGRs incorporating both public and private sector customers for some categories.

We will report results in a memorandum, which will provide our updated NTGRs, while including a full description of the methodology used to assess free-ridership and spillover. We will provide a draft memorandum to AIC and ICC staff for review and comment before we finalize results.

Deliverable: Draft and final participant survey instruments

Deliverable Date: May 2018

Deliverable: Draft memorandum

Deliverable Date: November 2018

⁵ To expedite survey delivery and analysis, we will likely begin research during the program year and administer the survey in waves as we receive updated program tracking data. Based on past participation patterns, we believe that using a partial year of program data is unlikely to bias our survey results, and therefore, we expect to complete this survey with only a partial program population to ensure that we can deliver results in Q4 2018.

Deliverable: Final memorandum

Deliverable Date: December 2018

Task 4. Small Business Participant Survey

The evaluation team will conduct a quantitative Internet survey with customers who have completed a project through the Standard Initiative’s Small Business (direct install) offering in 2018. The survey will focus on assessing free-ridership and participant spillover for direct install measures and will also include limited questions to verify measure installation and to assess initiative processes.

Our sample frame will be customers completing a Small Business project in 2018⁶ and we anticipate attempting a census of customers in this sample frame. As needed to ensure representativeness, we will complete up to 25 follow-up phone calls with participants who do not complete the web survey.

We plan to use the data gathered from the survey to develop NTGRs for Small Business measures for prospective application. We will determine the granularity of the NTGRs to provide based on a review of initiative data and response rates achieved by the survey.

Given our sampling strategy, we generally expect to estimate separate NTGRs for public and private sector participants. However, this requires sufficient participation by public sector customers to support development of separate NTGRs. Depending on the granularity of NTGRs developed, it is possible we will need to provide blended NTGRs incorporating both public and private sector customers for some categories.

We will report results in a memorandum, which will provide our updated NTGRs, while including a full description of the methodology used to assess free-ridership and spillover. We will provide a draft memorandum to AIC and ICC staff for review and comment before we finalize results.

Deliverable: Draft and final participant survey instruments

Deliverable Date: May 2018

Deliverable: Draft memorandum

Deliverable Date: November 2018

Deliverable: Final memorandum

Deliverable Date: December 2018

Task 5. Impact Analysis

We plan to conduct three key activities to estimate ex post gross impacts associated with measures installed through the Standard Initiative.

First, we will conduct engineering desk reviews to ensure that original data was entered correctly from invoices/documentation. We will draw a random sample of initiative applications and review available invoices/documentation for these applications against the initiative tracking database and document any inconsistencies. If needed, we will apply a realization rate against the tracking database to appropriately account for inconsistencies found in our sample.

Given that the Small Business (direct install) offering is being delivered by a new implementer in 2018, we will conduct on-site verification for a sample of these projects to verify measure installation. The engineer visiting

⁶ To expedite survey delivery and analysis, we will likely begin research during the program year and administer the survey in waves as we receive updated program tracking data. Based on past participation patterns, we believe that using a partial year of program data is unlikely to bias our survey results, and therefore, we expect to complete this survey with only a partial program population to ensure that we can deliver results in Q4 2018.

each site will verify that the installed measure(s), for which the initiative participants received an incentive payment, is still installed, and that the quantity is consistent with the number of measures the utility paid on. The sample design for Small Business projects will involve stratifying lighting projects by energy savings. As in prior years, we will use the Dalenius-Hodges method to determine strata boundaries, and the Neyman allocation to determine the optimal allocation of the available interviews to the strata. For budgeting purposes, we assume we will conduct 40 site visits, but our final number of site visits will be designed to achieve 90/10 confidence and precision, and will be dependent on initiative participation levels and measure types.⁷ The team will share the site visit results with AIC and ICC staff in advance of submitting the draft annual report.

Finally, we will conduct an IL-TRM application review for all Standard Initiative projects. We will review initiative tracking data to ensure that correct deemed input values and IL-TRM V6.0 specified algorithms are used in calculating savings, and replicate savings calculations to ensure accuracy.

We will generally calculate 2018 net savings by applying the SAG-approved NTGRs for 2018 to electric and gas gross savings.⁸ As needed, we will apply public sector specific NTGRs from past DCEO research to address the unique characteristics of these projects.

Table 27. Standard Initiative NTGRs for 2018

Measure Type	NTGR	
	Electric	Gas
Core Lighting	77.8%	—
Core HVAC	55.7%	49.4%
Core Leak Survey	70.2%	—
Core Specialty	84.9%	67.5%
Core Steam Trap	—	60.8%
Core VFD	83.3%	—
Green Nozzles	92.0%	89.0%
Midstream Lighting - Linear LED	77.3%	—
Midstream Lighting - Specialty LED	77.3%	—
Midstream Lighting - Standard LED	77.3%	—
Midstream Lighting - CFLs	77.3%	—
Midstream Lighting - Occupancy Sensors	77.3%	—
Online Store Measures	83.1%	—
Small Business Direct Install	96.2%	96.2%

⁷ If needed, we will conduct site visits on a partial year of initiative participation to meet statutory deadlines. Site visit timing will be dependent on initiative progress toward goals and ability to provide necessary data.

⁸ For Standard projects associated with a Staffing Grant (described in the Custom Initiative section), the evaluation team will use the same NTGR approach as past years. We will compare the NTGR developed through the 2018 interviews with the SAG-approved 2018 NTGR. The SAG-approved 2018 NTGR will be used as a floor and, if the NTGR developed through the Staffing Grant interviews exceeds the SAG-approved 2018 value, then we will apply the new NTGR to all of the projects associated with that Staffing Grant. However, if the newly developed NTGR falls below the SAG-approved 2018 value, we will apply the SAG-approved 2018 value to each of the participant’s projects.

Deliverable: Small Business site visit results

Deliverable Date: TBD

Deliverable: Results provided in annual report

Deliverable Date: March 15, 2019

Task 6. Reporting

The evaluation team will provide all impact findings in the Business Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Business Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Business Program impact report

Deliverable Date: April 30, 2019

Evaluation Budget and Timeline

Table 28 summarizes the timing and budget associated with each evaluation activity. In total, the 2018 budget for the Standard Initiative evaluation is \$220,100.

Table 28. Standard Initiative Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$7,000
2	Initiative Staff Interviews	April and November 2018	\$6,500
3	Core Participant Survey	May 2018	\$27,400
4	Small Business Participant Survey	May 2018	\$27,400
5	Impact Analysis	March 15, 2019	\$100,700
6	Draft Report	March 15, 2019	\$51,100
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Report	April 30, 2019	
Total Budget			\$220,100

2.2.2 Custom

The Custom Initiative allows AIC business customers to complete energy efficiency projects that involve the installation of equipment not covered through the Standard or Streetlighting Initiatives. The availability of this initiative allows customers to propose additional measures and tailor projects to their facility and equipment needs. Complex and large scale new construction and building renovation projects also qualify under the Custom Initiative. Custom incentives are available for both electric and gas equipment, including (but not limited to): lighting, compressed air, HVAC, refrigeration, motors, and industrial process upgrades. These projects normally are complex and unique, requiring separate incentive applications and calculations of estimated energy savings. Incentives are calculated based on energy savings estimates for each project, and may vary between different technologies and fuel types as necessary.

Beginning in June 2017, the Custom Initiative has been made available to public sector customers. The Initiative will highlight a number of measures targeted at public sector facilities in 2018, including measures targeted specifically at water treatment facilities. Enhanced incentives for public sector or other financially strained customers will be provided where necessary.

The Custom Initiative also includes a number of smaller “incubator” initiatives, including:

- The Metering and Monitoring offering, which promotes customers’ ability to review and curtail their energy use using sub-meters and software;
- The SEM offering, which is designed to help customers achieve ongoing energy and cost savings through motivating changes in participants’ organizational culture and business practices to achieve energy reduction and cost savings goals;
- The Staffing Grant offering, which provides customers with funding to help address energy efficiency project staffing needs. The offering distributes funds based on the predicted savings that will be achieved by the grant recipients; and
- The Feasibility Study offering, which helps participants define project costs and energy savings opportunities, primarily targeting manufacturing/industrial facilities with compressed air systems.

These offerings are targeted primarily at helping customers to overcome barriers to Business Program participation, and typically do not directly yield energy savings.

The Custom Initiative also offers a number of additional services to AIC customers, including education, Building Operator Certification (BOC) training, and other training opportunities (see Section 2.2.5).

Evaluation Approach

The evaluation of the Custom Initiative has impact, process, and forward-looking objectives as outlined below.

Research Objectives

Impact Questions

The primary objective of the 2018 Custom Initiative evaluation is to provide estimates of gross and net electric and gas savings associated with the initiative. In particular, the 2018 impact evaluation will answer the following questions:

1. What were the estimated gross energy and demand impacts from the Initiative in 2018?
2. What were the estimated net energy and demand impacts from the Initiative in 2018?

Process Questions

The evaluation team will also conduct a targeted process evaluation in 2018, focused primarily on the Initiative’s incubator offerings. The process research will utilize data from multiple data collection methods and sources: in-depth interviews with AIC and implementation staff, interviews with participants in the Staffing Grant, SEM, Metering & Monitoring, and Feasibility Study offerings, and a review of initiative implementation and marketing materials. We will explore a number of process-related research questions outlined below.

3. Initiative Participation
 - a. What were the characteristics of participating and non-participating customers? How many projects were completed? By how many different customers? What type of projects?

- b. Did customer participation meet expectations? If not, how and why is it different from expectations? Were any changes in the mix of customers and projects desirable?

4. Initiative Design and Implementation

- a. Did the Initiative’s implementation change from 2017? If so, how and why and was this an advantageous change?
- b. Did the initiative experience any implementation challenges in 2017? If so, what were they, and how were they overcome?
- c. What changes could the initiative make to improve the customer experience and generate greater energy savings?

5. Participant Experience and Satisfaction

- a. Were participants in the Initiative’s incubator offerings (Staffing Grants, Metering & Monitoring, Feasibility Study, BOC training, and the SEM offering) satisfied with their experiences? What aspects of initiative design or implementation could AIC change to improve effectiveness and participant satisfaction?
- b. What barriers to participation existed for these incubator offerings? How is the implementation team seeking to overcome them?

Forward Looking

- 6. What was the level of free-ridership and participant spillover associated with the Initiative in 2018?

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

Evaluation Tasks

Table 29 summarizes the 2018 evaluation activities proposed for the Custom Initiative.

Table 29. Summary of Custom Initiative Research Activities for 2018

Activity	Impact	Process	Forward Looking	Details
Initiative Material & Database Review	✓	✓		Gather information about initiative implementation and performance.
Initiative Staff Interviews		✓		Explore changes made since 2017 and gather information about initiative marketing, implementation, and 2018 performance.
Participant Survey		✓	✓	Collect information to develop NTGRs for prospective application, as well as limited information to inform initiative process assessment.
Staffing Grant Participant Interviews	✓	✓		Gather attribution information to potentially adjust project NTGRs and gather process information.
SEM Participant Interviews	✓	✓	✓	Collect information to develop NTGRs, explore satisfaction, initiative processes, and areas for initiative improvement.

Activity	Impact	Process	Forward Looking	Details
Metering & Monitoring Participant Interviews		✓		Collect information to explore satisfaction, initiative processes, and areas for initiative improvement.
Feasibility Study Participant Interviews		✓		Collect information to explore satisfaction, initiative processes, and areas for initiative improvement.
Engineering Desk Reviews	✓			Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc.
On-Site Measurement & Verification	✓			Collect data to inform measure verification and ex post gross impacts.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

The team will conduct a comprehensive review of all initiative materials and tracking data. This includes Business Program marketing and implementation plans, customer and ally communications, and extracts from the Business Program tracking database (i.e., AMPlify). We request extracts from AMPlify on a regular basis and will continue to communicate with AIC and Leidos about data needs as needed. At a minimum, we will request a mid-year extract of the database in June 2018, and make subsequent requests at the close of 2018 (December 31, 2018) and then again in January 2019, when we expect the database to be finalized.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2018 to explore initiative performance, changes since 2017, and other topics relevant to our research objectives. We will conduct multiple interviews with Business Program staff: a brief interview mid-cycle to understand changes made to the initiative in 2018 and to provide time for the evaluation team to modify any research tasks as necessary, as well as a comprehensive interview toward the end of 2018 allowing implementation staff the opportunity to comment on the initiative’s performance throughout 2018. In total, we plan to complete three to five interviews, including interviews with the Business Program managers and marketing staff. We will likely conduct interviews focusing on all Business Program initiatives together, but we will conduct interviews with specific staff as needed.

Deliverable: Conducted interviews

Deliverable Date: April and November 2018

Task 3. Custom Participant Survey

The evaluation team will conduct a quantitative web survey with customers participating in the core Custom Initiative in 2018. This survey will collect information on NTGR, as well as initiative processes. The NTGR questions will be used to develop NTGRs for the Custom Initiative for future application.

Our sample frame for the survey will be customers completing a Custom project achieving savings in 2018^{9,10} and we anticipate attempting a census of customers in this sample frame. As needed to ensure representativeness, we will complete up to 25 follow-up phone calls with participants who do not complete the web survey. We will report results from the survey in a memorandum, which will provide our updated NTGRs, while including a full description of the methodology used to assess free-ridership and spillover. We will provide a draft memorandum to AIC and ICC staff for review and comment before we finalize results.

Deliverable: Draft and final participant survey instrument *Deliverable Date:* July 2018

Deliverable: Draft memorandum *Deliverable Date:* January 2018

Deliverable: Final memorandum *Deliverable Date:* February 2019

Task 4. Staffing Grant Participant Interviews

The team will conduct interviews with AIC customers who participated in the Staffing Grant offering. Consultant staff will conduct the interviews, which will focus on gathering information on how the Staffing Grant affects initiative attribution. We will also ask process-related questions about the initiative, including how participants became aware of the initiative, their level of satisfaction, challenges encountered, and recommendations for improvement. Given the small number of Staffing Grant participants, we will attempt a census of participants for the offering. The total number of interviews will depend on the final number of participants; we will attempt to interview all Staffing Grant recipients. For budgeting purposes, we assume we will conduct up to 15 interviews.

Deliverable: Draft and final interview guides *Deliverable Date:* June 2018

Task 5. SEM Participant Interviews

We will conduct interviews with all participants in the Strategic Energy Management offering, following up on research from 2016-2017. Consultant staff will conduct these interviews, which will focus on participants' experience with participation in the initiative. We will also gather process information to continue to help refine the offering, as well as information related to attribution. For budgeting purposes, we assume we will conduct up to 15 interviews.

Deliverable: Draft and final interview guides *Deliverable Date:* June 2018

Task 6. Metering & Monitoring Participant Interviews

We will conduct interviews with all participants in the Metering & Monitoring incubator offering, following up on research from 2015-2016. Consultant staff will conduct the interviews and focus on participants' experience tracking energy usage. We will also gather process information to continue to help refine the offering. For budgeting purposes, we assume we will conduct up to 15 interviews.

⁹ Typically, this does not include participants in incubator offerings. If needed, we will prioritize research with customers participating in incubator offerings.

¹⁰ To expedite survey delivery and analysis, we will likely begin research during the program year and administer the survey in waves as we receive updated program tracking data.

Deliverable: Draft and final interview guides

Deliverable Date: June 2018

Task 7. Feasibility Study Participant Interviews

We will also conduct interviews with all participants in the Feasibility Study offering. Consultant staff will conduct the interviews, which will focus on process-related questions about the offering, including how participants became aware of the Feasibility Study, their level of satisfaction, challenges encountered, and recommendations for improvement. We plan to attempt a census of participants for the offering. The total number of interviews will depend on the final number of participants, but for budgeting purposes, we assume we will conduct up to 15 interviews.

Deliverable: Draft and final interview guides

Deliverable Date: June 2018

Task 8. Impact Analysis

Conducting gross impact analysis for custom projects requires custom engineering calculations. However, custom projects can have large variability in savings among participants. To appropriately represent this variability, the gross impact analysis for the Custom Initiative will employ a bottom-up approach to estimating gross savings. Consistent with prior years, the impact analysis will be based on site-specific engineering desk reviews and on-site measurement and verification.

We will conduct engineering desk reviews and on-site data measurement and verification for a sample of projects to review and verify savings assumptions. This may include an examination of existing equipment and/or initiative measurement and verification results. We will tailor the scope of each audit to the specific measures installed at the site, but at a minimum, the review engineer will perform the following actions during the site visits:

- Verify that the installed measure(s), for which the initiative participants received an incentive payment, is/are still installed and functioning, and that the quantity is consistent with the number of measures the initiative rebated.
- Collect additional physical data to further analyze and determine the energy savings resulting from the incented measure(s). The pertinent data collected from each site will be determined based on an in-depth review of the site's project files and will be unique to each installed measure.

As part of this process, the team will submit formal M&V plans and reports for up to 15 of the largest Custom Initiative projects. No other M&V sites will have a written site-specific plan or report.

Based on the results determined for projects in our sample, we will calculate the savings-weighted realization rate (total ex post gross savings divided by the total ex ante gross savings). This sample-based realization rate will be used to adjust the ex ante savings for the population of Custom Initiative projects. The ratio estimate of Y , the ex post savings for the population of Custom projects, is:

Equation 5. Ratio Estimate of Population Total¹¹

$$\hat{Y}_R = \frac{y}{x} X$$

¹¹ Cochran, William. 1977. *Sampling Techniques*. New York: John Wiley & Sons.

Where:

y = The total ex post savings for the sample of projects

x = The total ex ante savings for the sample of projects

X = The ex ante savings for the population of projects

Given the timing of this evaluation plan, we are not yet able to predict the level of activity expected for the initiative in 2018 and therefore cannot provide sample sizes. We will determine the optimal approach based on the overall level of participation and project characteristics we observe in the population, and target 90/10 confidence and precision around our results by fuel type. For the purposes of budgeting in this evaluation plan, we assume 60 project reviews, which we believe is a conservative estimate that will be sufficient to provide 90/10 for the entire population in the worst-case scenario and 90/10 by various project types in the best-case scenario.

In an attempt to conduct impact research in a more “real time” fashion, we will develop our sample for engineering desk reviews and on-site verification in multiple waves, using the initiative tracking database as a sample frame. We expect to conduct three or more waves of impact research for the Custom Initiative in 2018. For each wave, we will stratify the Custom Initiative projects included in the initiative tracking database by ex ante savings, and select a number of projects proportionate to size of the population we believe the wave represents.

We anticipate drawing separate samples for gas and electric projects and stratifying participants into small and large energy savers (or small, medium, and large savers, depending on the initiative results) within each sample. Stratification of participants in this way tends to include a large proportion of large savers and comparable numbers of participants from the other savings strata. From within each stratum, we will randomly sample participants to achieve the precision and confidence targets. To ensure diversity of measures and offerings, we may consider stratifying the impact sample by offering if the final population of projects appears to require it. We will also adjust the sample size depending on participation in order to achieve the statistical targets if necessary. As needed, we will conduct our impact analysis in multiple waves to expedite our 2018 evaluation results and meet statutory deadlines.

The team will share the results of our gross impact analysis with AIC and ICC staff after the completion of each wave. The Excel file provided for review and discussion will feature the ex ante and ex post savings for each project selected for engineering review and/or on-site measurement and verification, the resulting realization rate, and the reasons for the realization rate. To the degree time allows, we will also hold a meeting with AIC and its implementation team, as well as with ICC staff, to discuss the findings and answer any questions.

In general, we will calculate 2018 net savings by applying the SAG-approved NTGRs for the Custom Initiative of 82.2% (electric) and 93.9% (gas) to electric and gas gross savings.¹² As needed, we will apply public sector specific NTGRs from past DCEO research to address the unique characteristics of these projects.

¹² For Custom projects associated with a Staffing Grant, the evaluation team will use the same NTGR approach as past years. We will compare the NTGR developed through the 2018 interviews with the SAG-approved 2018 NTGR. The SAG-approved 2018 NTGR will be used as a floor and, if the NTGR developed through the Staffing Grant interviews exceeds the SAG-approved 2018 value, then we will apply the new NTGR to all of the projects associated with that Staffing Grant. However, if the newly developed NTGR falls below the SAG-approved 2018 value, we will apply the SAG-approved 2018 value to each of the participant’s projects.

- Deliverable:* Site visit formal M&V plans and results – Wave 1 *Deliverable Date:* April 2018
- Deliverable:* Site visit formal M&V plans and results – Wave 2 *Deliverable Date:* August 2018
- Deliverable:* Site visit formal M&V plans and results – Wave 3 *Deliverable Date:* December 2018
- Deliverable:* Final analysis in annual report *Deliverable Date:* March 2019

Task 9. Reporting

The evaluation team will provide all impact findings in the Business Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

- Deliverable:* Chapter in draft annual Business Program impact report *Deliverable Date:* March 15, 2019
- Deliverable:* Chapter in final annual Business Program impact report *Deliverable Date:* April 30, 2019

Evaluation Budget and Timeline

Table 30 summarizes the timing and budget associated with each evaluation activity.

Table 30. Custom Initiative 2018 Evaluation Timeline

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$7,000
2	Initiative Staff Interviews	April and November 2018	\$6,300
3	Participant Survey	July 2018	\$27,200
4	Staffing Grant Participant Interviews	June 2018	\$10,600
5	SEM Participant Interviews	June 2018	\$10,600
6	Metering & Monitoring Participant Interviews	June 2018	\$10,600
7	Feasibility Study Participant Interviews	June 2018	\$10,600
8	Impact Analysis	April, August, December 2018	\$183,000
9	Draft Report	March 15, 2019	\$33,600
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Report	April 30, 2019	
			\$299,500

2.2.3 Retro-Commissioning

Over time, deferred maintenance and changing operating directives and practices can lead to inefficient operation of building systems. Retro-commissioning is a process that examines current operations relative to the needs of equipment owners and those served by the equipment and determines opportunities for increasing equipment efficiency through maintenance, system tune-ups, scheduling, and optimization of operations.

The Retro-Commissioning (RCx) Initiative helps AIC business customers identify no-cost and low-cost efficiency improvements and implement these improvements to achieve energy savings in existing energy-using systems. The initiative focuses on compressed air systems, healthcare facilities, commercial and public sector building facilities, industrial ventilation systems, industrial refrigeration, and grocery stores. The inclusion of

public sector customers is new for AIC (beginning in June 2017). Enhanced incentives for public sector or other financially strained customers will be provided. Additionally, AIC expects a mid-sized commercial offering will be available for buildings that do not qualify as a large facility or for customers that are interested in a smaller scale retro-commissioning activity.

Secondary objectives of the initiative include:

- Channeling participation into other AIC Business Program initiatives to implement cost-effective equipment replacements and retrofits (e.g. healthcare retro-commissioning studies might recommend that laminar flow restrictors be installed through the Standard Initiative)
- Developing a network of retro-commissioning service providers (RSPs) that will continue to operate in the AIC service territory

Major market barriers to these energy efficiency opportunities are lack of awareness and the cost of the detailed engineering studies. Furthermore, even with a quality study in-hand, customer apathy can inhibit implementation of recommendations, even if they are no-cost. To overcome these barriers, the initiative subsidizes RSP studies and publicizes the benefits of retro-commissioning to foster a market for the services, with utility-certified RSPs providing the marketing outreach. AIC incentives pay for 50%–80% of the study cost.

Evaluation Approach

The evaluation of the RCx Initiative has both impact and process objectives as outlined below.

Research Objectives

Impact Evaluation

The 2018 research objectives for the evaluation of the Retro-Commissioning Initiative focus on rigorous impact evaluation. The primary objective of the evaluation is to provide estimates of gross and net electric and gas savings associated with the initiative. More specifically, the 2018 impact evaluation will answer the following questions:

1. What are the estimated gross energy and demand impacts from the Initiative in 2018?
2. What are the estimated net energy and demand impacts from the Initiative in 2018?

Process Evaluation

In addition, we plan to conduct a limited assessment of initiative processes in 2018. Our process analysis will primarily be focused on changes made by the initiative moving into 2018, and will be based on our review of the initiative database.

3. Initiative Participation
 - a. What were the characteristics of participating and non-participating customers? How many projects were completed? By how many different customers? What type of projects?
 - b. Did customer participation meet expectations? If not, how and why is it different from expectations? Were any changes in the mix of customers and projects desirable?

- c. What are the characteristics of participating RSPs? How many RSPs actively participated in the various sectors targeted by the initiative?

4. Service Provider Feedback

- a. Did the effectiveness of the initiative improve over the past several years? What have been the improvements? What were the barriers to participation? What suggestions do RSPs have for initiative delivery and implementation?
- b. Were RSPs satisfied with the initiative?
- c. Is the scope of the initiative appropriate for the market?
- d. How have changes in the initiative in 2018 affected its success?

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

Evaluation Tasks

The table below summarizes the 2018 evaluation activities proposed for the RCx Initiative.

Table 31. Summary of Retro-Commissioning Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward-Looking	Details
Initiative Material & Database Review	✓	✓		Gather information about initiative implementation and performance.
Initiative Staff Interviews		✓		Explore changes made since 2017 and gather information about initiative marketing, implementation, and 2018 performance.
RSP Interviews		✓		Explore initiative processes, marketing, and overall RSP satisfaction with the initiative.
Engineering Desk Reviews	✓			Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc.
On-Site Measurement & Verification	✓			Collect data to inform measure verification and ex post gross impacts.
Net Impact Analysis	✓			Determine 2018 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

The team will conduct a comprehensive review of all initiative materials and tracking data. This includes Business Program marketing and implementation plans, customer and ally communications, and extracts from the Business Program tracking database (i.e., AMPlify). We request extracts from AMPlify on a regular basis and will continue to communicate with AIC and Leidos about data needs as needed. At a minimum, we will request a mid-year extract of the database in June 2018, and make subsequent requests at the close of 2018 (December 31, 2018) and then again in January 2019, when we expect the database to be finalized.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2018 to explore initiative performance, changes since 2017, and other topics relevant to our research objectives. We will conduct multiple interviews with Business Program staff: a brief interview mid-cycle to understand changes made to the initiative in 2018 and to provide time for the evaluation team to modify any research tasks as necessary, as well as a comprehensive interview toward the end of 2018 allowing implementation staff the opportunity to comment on the initiative's performance throughout 2018. In total, we plan to complete three to five interviews, including interviews with the Business Program managers and marketing staff. We will likely conduct interviews focusing on all Business Program initiatives together, but we will conduct interviews with specific staff as needed.

Deliverable: Conducted interviews

Deliverable Date: April and November 2018

Task 3. RSP Interviews

The evaluation team will develop an in-depth interview guide for 2018 that will explore topics relevant to our evaluation objectives. We will focus on changes to the initiative in 2018, initiative processes, marketing, and overall satisfaction with the initiative. Based on prior RSP participation, we anticipate attempting interviews with a census of participating RSPs and completing approximately 10 interviews, but we will revise these assumptions as necessary upon review of initiative data.

We plan to draft this interview guide in summer 2018 and conduct interviews in fall 2018. We will summarize findings from these interviews in a memo to be delivered in December 2018.

Deliverable: Draft and final interview guide

Deliverable Date: August 2018

Deliverable: RSP interview findings memo

Deliverable Date: December 2018

Task 4. Impact Analysis

Conducting gross impact analysis for retro-commissioning projects requires custom engineering calculations. However, retro-commissioning projects can have large variability in savings among participants. Sources of variability include the physical size of the participant site, the systems installed, the condition of systems prior to retro-commissioning, the extent of control capabilities, the scope and quality of the retro-commissioning study itself, and the willingness of customers to implement recommendations. To appropriately represent this variability, the gross impact analysis for the Retro-Commissioning Initiative will employ a bottom-up approach to estimating gross savings. Consistent with prior years, the impact analysis will be based on site-specific engineering desk reviews¹³ and on-site M&V.

Given the timing of this evaluation plan, we are not yet able to predict the level of activity expected for the initiative in 2018. We will determine the optimal approach based on the overall level of participation and project characteristics we observe in the population, and target 90/10 confidence and precision around our results by fuel type.

In all cases where we sample, we anticipate drawing separate samples for gas and electric projects and stratifying participants into small and large energy savers (or small, medium, and large savers, depending on

¹³ As needed, engineering desk reviews will include consumption analysis and modeling on a project-by-project basis.

the initiative results) within each sample. Stratification of participants in this way tends to include a large proportion of large savers and comparable numbers of participants from the other savings strata. From within each stratum, we will randomly sample participants to achieve the precision and confidence targets. To ensure diversity of measures and offerings, we may consider stratifying the impact sample by offering if the final population of projects appears to require it. We will also adjust the sample size depending on participation in order to achieve the statistical targets if necessary. As needed, we will conduct our impact analysis in multiple waves to expedite our 2018 evaluation results and meet statutory deadlines.

Depending on the overall level of participation and project characteristics (energy savings and retro-commissioning type), we may take one of three sampling approaches to our impact analysis:

- **Conduct engineering desk reviews and on-site M&V for a census of completed projects in 2018.**
- **Conduct engineering desk reviews for a census of completed projects in 2018, coupled with on-site M&V at a random sample of completed projects.** In this case, we will use a stratified ratio estimation technique: we will draw a stratified random sample of projects for on-site verification, determine realization rates from sampled sites for each impact metric individually at the project level, and apply these realization rates to the preliminary ex post gross savings values determined for each project through engineering desk reviews to determine overall ex post gross savings for the Initiative.
- **Conduct both engineering desk reviews and on-site M&V for a random sample of completed projects.** In this case, we will use a stratified double ratio estimation technique, where we will draw a stratified random sample of projects for both engineering desk reviews and on-site verification. We will determine realization rates for each step (engineering desk reviews and on-site verification) independently and apply both realization rates to the population to determine overall ex post gross savings for the Initiative.

For the purposes of budgeting in this evaluation plan, we have assumed that we will conduct 30 engineering reviews and 10 on-site visits.

The team will share the results of our gross impact analysis with AIC and ICC staff in advance of submitting the draft annual report. The Excel file provided for review and discussion will feature the ex ante and ex post savings for each project selected for engineering review and/or on-site measurement and verification, the resulting realization rate, and the reasons for the realization rate. To the degree time allows, we will also hold a meeting with AIC and its implementation team, as well as with ICC staff, to discuss the findings and answer any questions.

We will calculate 2018 net savings by applying the SAG-approved NTGR of 91.4% to electric and gas gross savings.¹⁴

Deliverable: Gross impact analysis summary spreadsheet

Deliverable Date: TBD¹⁵

¹⁴ For Retro-Commissioning projects associated with a Staffing Grant, the evaluation team will use the same NTGR approach as past years. We will compare the NTGR developed through the 2018 interviews with the SAG-approved 2018 NTGR. The SAG-approved 2018 NTGR will be used as a floor and, if the NTGR developed through the Staffing Grant interviews exceeds the SAG-approved 2018 value, then we will apply the new NTGR to all of the projects associated with that Staffing Grant. However, if the newly developed NTGR falls below the SAG-approved 2018 value, we will apply the SAG-approved 2018 value to each of the participant's projects.

¹⁵ This is dependent upon the sampling approach chosen for 2018.

Deliverable: Final analysis in annual report

Deliverable Date: March 2019

Task 5: Reporting

The evaluation team will provide all impact findings in the Business Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Business Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Business Program impact report

Deliverable Date: April 30, 2019

Evaluation Budget and Timeline

Table 32 summarizes the timing and budget associated with each evaluation activity. In total, the 2018 budget for the evaluation of the Retro-Commissioning Initiative is \$130,900.

Table 32. Retro-Commissioning Initiative Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$3,800
2	Initiative Staff Interviews	April and November 2018	\$4,100
3	RSP Interviews	August 2018	\$17,700
4	Impact Analysis	May 2019	\$84,300
5	Draft Impact Report	March 15, 2019	\$21,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Report	April 30, 2019	
Total Budget			\$130,900

2.2.4 Streetlighting

Made available to AIC customers for the first time in 2018, the Streetlighting Initiative incentivizes municipal customers to upgrade their streetlight fixtures. High-intensity discharge (HID) lighting is still the standard technology used for streetlighting in the United States. The Initiative will target existing streetlighting and other outdoor lighting for upgrades from HID to LED technology.

The Initiative targets both municipal customers who own their streetlighting fixtures, and municipal customers with AIC-owned streetlight fixtures. In both cases, the Initiative provides incentives for customers to upgrade their lighting. AIC is currently replacing streetlights it owns with LED technology upon burnout at no cost to customers. Early replacement of these streetlights is available to customers for a per-fixture fee. The Initiative incentivizes customers to request early replacement of these fixtures, and provides an incentive to decrease the per-fixture cost to customers.

Evaluation Approach

The evaluation of the Streetlighting Initiative has both impact and process objectives to provide immediate feedback on this new offering to AIC, and to ground future evaluation work.

Research Objectives

Impact Evaluation

The 2018 impact evaluation will answer the following questions:

1. What were the estimated gross energy and demand impacts from the Initiative in 2018?
2. What were the estimated net energy and demand impacts from the Initiative in 2018?

Process Evaluation

The 2018 process evaluation will answer the following questions:

3. Initiative Implementation
 - a. What is the theory behind the operation of the Streetlighting Initiative? Is the justification for the Initiative sound?
 - b. How did internal implementation for the Initiative proceed in 2018? What were the key challenges faced by the Initiative in implementation?
4. Initiative Participation
 - c. What were the characteristics of participating and non-participating customers? How many projects were completed?
 - d. Did customer participation meet expectations? If not, how and why is it different from expectations? Were any changes in the mix of customers and projects desirable?
5. Participant Feedback
 - a. What experience did participants have with the Initiative? What was their level of satisfaction? What were the key barriers to participation in the Initiative they faced?

Forward Looking

6. What was the level of free-ridership and participant spillover associated with the Initiative in 2018?

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

Evaluation Tasks

The table below summarizes the 2018 evaluation activities proposed for the Streetlighting Initiative.

Table 33. Summary of Streetlighting Initiative Evaluation Activities for 2018

Activity	Impact	Process	Forward-Looking	Details
Initiative Material & Database Review	✓	✓		Gather information about initiative implementation and performance.
Initiative Staff Interviews		✓		Discuss theory behind the initiative, implementation challenges, our evaluation approach, and other relevant topics.
Initiative Process Model Development		✓	✓	Develop initiative process model to ground future evaluation efforts

Activity	Impact	Process	Forward-Looking	Details
Participating Municipality Survey		✓	✓	Assess participant experience with initiative and develop NTGR for future application.
Engineering Desk Review	✓			Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc.
Net Impact Analysis	✓			Determine 2018 net impacts based on AIC planning assumptions and/or evaluation team recommendations.
IL-TRM Algorithm Development			✓	Based on engineering desk reviews, develop workpaper for inclusion of streetlighting into IL-TRM

We describe each of these activities in detail below.

Task 1. Initiative Material & Database Review

The team will conduct a comprehensive review of all initiative materials and tracking data. This includes Business Program marketing and implementation plans, customer and ally communications, and (assuming that the Streetlighting Initiative tracks projects in the same manner as all other Business Program initiatives) extracts from the Business Program tracking database (i.e., AMPlify). We request extracts from AMPlify on a regular basis and will continue to communicate with AIC and Leidos about data needs as needed. At a minimum, we will request a mid-year extract of the database in June 2018, and make subsequent requests at the close of 2018 (December 31, 2018) and then again in January 2019, when we expect the database to be finalized.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2018 to explore initiative performance, changes since 2017, and other topics relevant to our research objectives. We will conduct multiple interviews with Business Program staff: a brief interview mid-cycle to discuss the initiative and to provide time for the evaluation team to modify any research tasks as necessary, as well as a comprehensive interview toward the end of 2018 allowing implementation staff the opportunity to comment on the initiative’s performance throughout 2018. In total, we plan to complete three to five interviews, including interviews with the Business Program managers and marketing staff. We will likely conduct interviews focusing on all Business Program initiatives together, but we will conduct interviews with specific staff as needed (e.g. Streetlighting specific staff).

Deliverable: Conducted interviews

Deliverable Date: April and November 2018

Task 3. Initiative Process Model Development

Based on our review of initiative materials and interviews with Business Program staff, we will develop a process model for the Streetlighting Initiative to inform future evaluation efforts and determine if the theory behind the Initiative is sound.

Deliverable: Streetlighting Initiative process model

Deliverable Date: June 2018

Task 4. Participating Municipality Survey

We will conduct direct research with Streetlighting Initiative participants to assess participant experience and explore initiative attribution. If possible, surveys will be web-based so that they can be administered on rolling basis. The evaluation team will use results from the survey, consistent with the IL-TRM, to develop a streetlighting-specific NTGR for future application.

Deliverable: Draft and final survey instrument

Deliverable Date: August 2018

Deliverable: Streetlighting participant findings memo

Deliverable Date: February 2019

Task 5a. Impact Analysis

The IL-TRM does not currently include a streetlighting-specific algorithm, but per AIC's 2018 plan filing, the savings values for measures completed as part of this initiative will have predetermined savings values consistent with the IL-TRM. To assess gross savings in 2018, the evaluation team will conduct engineering desk reviews of the ex ante savings calculations made for streetlighting. Where necessary, we will assess the assumptions made by the implementation team and comment on their appropriateness. In addition, we will conduct engineering desk reviews of initiative application forms and other supporting documents to ensure that the initiative tracking database represents this information appropriately.

There is not currently a SAG-approved NTGR for streetlighting. However, AIC's 2018 filing indicates an ex ante NTGR assumption of 90%. The evaluation team will review this assumption and other available secondary data in early 2018 to determine if this value is appropriate and make a recommendation to AIC.

Deliverable: Recommended NTGRs for new measures

Deliverable Date: February 2018

Deliverable: Final analysis in annual report

Deliverable Date: March 2019

Task 5b. TRM Workpaper Development

The evaluation team will use the engineering reviews completed as part of the gross impact analysis to prepare a workpaper for inclusion of streetlighting as a separate measure, and submit the workpaper to the IL-TRM Technical Advisory Committee for consideration as part of the Version 8 development process.

Deliverable: Workpaper for streetlighting inclusion in IL-TRM

Deliverable Date: May 15, 2019

Task 6: Reporting

The evaluation team will provide all impact findings in the Business Program Annual Impact Evaluation Report in March 2019. The evaluation team will provide a draft report for AIC, ICC staff, and SAG review and then deliver a final report that incorporates any comments from the review.

Deliverable: Chapter in draft annual Business Program impact report

Deliverable Date: March 15, 2019

Deliverable: Chapter in final annual Business Program impact report

Deliverable Date: April 30, 2019

Evaluation Budget and Timeline

Table 34 summarizes the timing and budget associated with each evaluation activity. In total, the 2018 budget for the evaluation of the Streetlighting Initiative is \$123,400.

Table 34. Streetlighting Initiative Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$3,800
2	Initiative Staff Interviews	April and November 2018	\$4,100
3	Process Model Development	December 2018	\$11,500
4	Participant Survey	August 2018	\$27,200
5a	Impact Analysis	March 2019	\$30,500
5b	TRM Workpaper Development	May 2019	\$11,900
6	Draft Impact Report	March 15, 2019	\$34,400
	Comments from AIC and ICC Staff	April 1, 2019	
	Final Report	April 30, 2019	
Total Budget			\$123,400

2.2.5 Business Cross-Cutting Evaluation Activities

As in past years, we will conduct cross-cutting Business Program evaluation activities to inform the overall implementation approach to serving non-residential customers in AIC territory. During the 2018-2021 evaluation cycle, the evaluation team plans to conduct (1) cross-cutting process research tasks that inform multiple Business Program initiatives, (2) non-participant spillover and market research, and (3) as necessary, market- or technology-specific assessments to address specific areas of concern or market barriers.

Currently, the evaluation team has the following tasks planned for 2018; however, we are also currently in the process of scoping additional market characterization tasks to support the Program (for example, we are scoping a commercial lighting market study to support the key product offering under the Standard Initiative).

Evaluation Tasks

Task 1. Program Ally Interviews

To inform the Standard and Custom initiatives, we will interview Business Program allies in fall 2018 to investigate such topics as initiative participation processes, trade ally and participant satisfaction, barriers to participation, and impacts of initiative participation on trade ally business and practices. The interviews will include a particular focus on any changes to initiative implementation in the 2018 cycle, and how these changes may have affected allies.

We will plan to conduct up to 25 interviews of a purposive sample of trade allies, including allies who have completed projects through both the Standard and Custom initiatives. Our sample will include a mix of highly active Business Program allies with allies who have completed a smaller number of projects in 2018.

Deliverable: Draft and final interview guides

Deliverable Date: July 2018

Deliverable: Program ally research memo

Deliverable Date: November 2018

Task 2. Energy Advisor Interviews

We will conduct interviews with the Business Program Energy Advisors. The interviews will cover such topics as Energy Advisors’ perceptions of customer interest in the program, interactions with customers, program processes for coordination between the Energy Advisors and Key Account Executives, success bringing

projects into the program, and suggestions for program improvement. The interviews will include a particular focus on any changes to program implementation in the 2018 cycle, and how these changes may have affected the Program. We will plan to interview all active Energy Advisors; for budgeting purposes, we assume we will conduct seven interviews.

Deliverable: Draft and final interview guides

Deliverable Date: July 2018

Deliverable: Energy Advisor research memo

Deliverable Date: November 2018

Task 3. Historical Participation Analysis

Using AIC’s non-residential customer database and AMPLify tracking data dating back to Plan 1, the evaluation team will conduct a historical analysis of Business Program¹⁶ participation to understand the types of customers the Program has served, the types of technologies the Program has delivered, and the characteristics of participating customers. We will use this analysis to determine what the Program’s most effective offerings have been, and where potential remains for the Program to intervene.

Deliverable: Historical participation analysis memo

Deliverable Date: September 2018

Task 4. Non-Participant Survey

Using AIC’s non-residential customer database and AMPLify tracking data, the evaluation team will conduct a non-participant survey with eligible AIC business customers who have not participated in the Business Program within the past three years. The non-participant survey will focus on assessing non-participant spillover (NPSO) resulting from the Program, as well as on barriers to participation that AIC can overcome to boost engagement among key market segments.

Per the IL-TRM NTG Protocols, the sample frame for this non-participant spillover research will be composed of customers who have not participated in any Business Initiatives within the last three years. In addition to including a suite of questions to assess NPSO, the evaluation team will conduct follow-up engineering analysis as necessary to quantify these savings and update the overall NPSO recommendation for the Business Program for inclusion in SAG-approved NTGRs.

Deliverable: Draft and final survey instrument

Deliverable Date: September 2018

Deliverable: Non-participant survey results memo

Deliverable Date: April 2019

¹⁶ In this context, “Business Program” refers to the entire lifetime of AIC’s non-residential offerings.

Task 5. Building Operator Certification Assessment

BOC is a nationally recognized energy efficiency training and certification program founded on the principle that trained and motivated building operators can significantly reduce energy consumption. The BOC program provides in-depth and hands-on experience to professionals in the building operations and maintenance (O&M) field. BOC combines classroom training, exams, and in-facility project assignments to train and certify building engineers and O&M technicians in the practice of energy efficient building O&M. The program provides two levels of training and certification, both designed to improve job skills and lead to improved comfort and energy efficiency at participants' facilities. The Level I course series focuses on expanding knowledge of building systems equipment and best practices for their efficient operation, with an emphasis on HVAC controls, common opportunities for operational improvements, and building scoping for energy efficiency. Level II students gain experience in preventative equipment maintenance and other targeted training topics.

BOC exposes participants to numerous O&M and retrofit changes they could make to the facilities they manage. As a result, there are a range of actions that participants could take based on their training that may lead to facility energy savings. As part of this assessment, we will answer the following questions through the evaluation activities outlined below:

- What are the energy savings per BOC participant?
 - What actions were taken due to the training?
 - What actions were not taken and why?
- Do other AIC initiatives already capture BOC savings?

BOC Participant Survey

To answer these questions, we will conduct an internet-based survey with participants in the BOC training to (1) verify participation, (2) collect information on building characteristics and workplace responsibilities, (3) understand the O&M and retrofit actions taken since completing the BOC training, and (4) the influence of the BOC training on the participant's decision to take those actions. In addition, we will confirm participation in other AIC initiatives.

We will finalize our sampling approach based on the level and nature of participation, but generally anticipate using a census approach for this survey, meaning we will attempt to reach everyone in our sample. Our outreach efforts will include an initial e-mail invitation and up to three reminders (likely once per week). Finally, we plan to offer an incentive of \$50, should the respondent qualify, to ensure that we get as many completed surveys as possible.

Deliverable: Draft and final survey instruments

Deliverable Date: August 2018

BOC Curriculum Review

In preparation for developing the participant survey, the evaluation team will conduct a review of the BOC curriculum covered by the AIC sponsored classes. As needed, the team will also interview AIC's coordinator for training and education activities to determine the timing of the BOC offerings, as well as any additional support provided by AIC to the participants.

Deliverable: Data request and interview

Deliverable Date: October 2018

Evaluation Budget and Timeline

Table 35 summarizes the timing and budget associated with each currently developed evaluation activity.

Table 35. Cross-Cutting Business Program Evaluation Activities – Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Program Ally Interviews	November 2018	\$31,000
2	Energy Advisor Interviews	November 2018	\$17,500
3	Historical Participation Analysis	September 2018	\$35,600
4	Non-Participant Survey	April 2019	\$132,700
5	Building Operator Certification Assessment	August 2018	\$33,100

3. Portfolio-Level Cross-Cutting Evaluation Activities

3.1 Illinois 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.

In addition, we will use the 2018 evaluation period to coordinate and collaborate with other IL evaluation teams on key IL-TRM related research such as planned studies around business smart thermostats and steam traps, detailed below. We will also conduct scoping activities for IL-TRM studies planned for 2019 such as the Behavioral Persistence study.

Residential & Business Smart Thermostat Studies

Smart thermostats have not been heavily incented by AIC in the past, but a number of these measures are planned for the 2018-2021 cycle. AIC plans to deliver smart thermostats to customers through both business and residential channels.

We plan to conduct smart thermostat-specific impact research during the 2018-2021 cycle. In particular, we plan to conduct an AIC-specific residential smart thermostat impact study (the IL-TRM currently contains estimates developed from research elsewhere in Illinois), and a statewide business smart thermostat impact study (the IL-TRM currently has no specific information around this measure). In 2018, we plan to monitor adoption of these measures to inform progression to these studies, which we plan to begin later in the cycle.

Steam Trap Impact Study

Efficient steam traps are currently the single largest contributor to AIC's gas savings. An IL-TRM measure for steam trap replacement/repair currently exists, but a number of assumptions in the TRM are either dated or based on information that is not specific to Illinois. Given the importance of this measure, we believe a study to verify steam trap impacts is desirable.

In 2018, we will work with the Nicor Gas, Peoples Gas, and North Shore Gas evaluation teams to conduct background research to support a study on the impacts of efficient steam traps. Our work will begin with research to understand 1) what data currently exist to support estimation of steam trap impacts, 2) what the available population of participants that have installed steam traps through energy efficiency programs in Illinois is, and 3) exploring available evaluation methods. We plan to deliver a memorandum summarizing the results of this research by June 30, 2018.

If our background research determines that a study is feasible, we will develop a scope of work immediately thereafter (to be submitted no later than July 31, 2018) and proceed with conducting this study as soon as possible. If reasonable, we will conduct this study in 2018 to inform the 2019 TRM update process.

3.2 Cost-Effectiveness Analysis

On a yearly basis, we will conduct a cost-effectiveness analysis of AIC's energy efficiency portfolio. Historically, AIC's contractor, AEG, has conducted the cost-effectiveness analysis based on evaluation-based model inputs,

and we have reviewed the other assumptions and results. Beginning with the 2018 program year, we will conduct AIC's cost-effectiveness analysis. To support this analysis, we expect to conduct a number of preliminary activities during 2018, including validation of our cost-effectiveness model against past results to ensure consistency in analysis, followed by yearly cost-effectiveness analysis to be completed after program evaluation reports are finalized.

As directed by SB2814, we will conduct a total resource cost (TRC) test to determine if AIC's portfolio is cost-effective. A program is cost-effective if its net total resource benefits are positive:

Equation 6. Definition of Cost-Effectiveness

$$\frac{\text{Total Resource Benefits}}{\text{Total Resource Costs}} \geq 1$$

To assess cost-effectiveness, the team will begin with a valuation of each program's and the portfolio's net total resource benefits, as measured by the avoided electric costs, the total incremental costs of measures installed, and administrative costs associated with the program. We will work closely with AIC and its implementer to ensure we accurately capture costs and benefits associated with the portfolio.

- The benefits used in the TRC test calculation include the full value of time and seasonally differentiated generation, transmission, and distribution, as well as capacity costs. The TRC test also accounts for avoided line losses and other quantifiable societal benefits, including avoided natural gas, water, and operations and maintenance costs.

The calculation of avoided costs of power and energy that an electric utility would otherwise have had to acquire requires the inclusion of reasonable estimates of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases. For each energy efficiency measure included in a program, the team will adjust the hourly (8,760) system-avoided costs by the hourly load shape of the end use affected by the measure; this enables us to capture the full value of time and seasonally differentiated measure impacts.

- For the cost component of the analysis, the team will consider incremental measure costs and direct utility costs. Incremental measure costs are the incremental expenses associated with installing energy efficiency measures and, where applicable, ongoing operation and maintenance costs. These costs include incentives, as well as customer contributions. Utility costs include the expenses associated with program development, marketing, delivery, operation, and EM&V.

SB2814 indicates that AIC's requirement is for its energy efficiency portfolio to be cost-effective at the portfolio level. Nevertheless, to the degree possible, our analysis will provide insight into the cost-effectiveness of various components of AIC's portfolio to provide further insight for program planning. In addition, our analysis will comply with all Illinois-specific guidance, including the Illinois TRC provisions included in the Illinois Energy Efficiency Policy Manual. We will report results of our analysis in an annual cost-effectiveness report to be delivered after yearly program impacts have been finalized.

3.3 Employment Impacts of AIC Energy Efficiency Programs

During the development of the 2018-2021 portfolios and evaluation plans, several stakeholders in Illinois expressed interest in quantifying the impacts of AIC's energy efficiency portfolio have on employment in Illinois. We plan to estimate these impacts yearly beginning in 2018.

A wide range of methods for estimating these impacts exist, and we believe it is important to collaborate with the ComEd evaluation team (and, if relevant, the Nicor/North Shore/Peoples Gas evaluation teams) to ensure consistent methodology throughout Illinois. We plan to begin conversations around this topic in the summer of 2018, to allow for discussion and agreement on consistent methodology before we produce estimates for 2018.

Given the need for coordination, we do not provide specifics around our planned approach for estimation of employment impacts at this time. However, at minimum, we expect to produce estimates of employment impacts at the overall (portfolio) level, though we may examine effects at a more granular data if it proves feasible for all evaluation teams to do so.

3.4 Quality Assurance and Control

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.

3.5 Integrated Reporting

The evaluation team will provide an annual integrated report with impact findings for all AIC programs. This report will include detailed EM&V tables, as well as a high impact measure summary table.

4. 2018 Budget

Throughout this plan, the evaluation team has outlined Initiative- and task- level budgets based on the best available information and assumptions about the 2018 portfolio and our scope of work. Upon finalization of contracting, we will provide a comprehensive portfolio-level evaluation budget.

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