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2021 Evaluation Plan

Ameren Illinois Company Energy Efficiency Programs

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1. Introduction

Ameren Illinois Company (AIC) hired the Opinion Dynamics evaluation team to perform impact and process evaluations for AIC's portfolio of energy efficiency programs implemented between January and December 2021. As part of the 2021 evaluation effort, the team will assess AIC's Residential, Business, and Voltage Optimization Programs. In some cases, the Programs are further split into a number of initiatives, which are themselves in some cases further split into discrete channels. The list below describes the Programs and initiatives expected to be evaluated in 2021; further detail on channels is presented in Section 2.

- Residential Program
 - Retail Products Initiative
 - Income Qualified Initiative
 - Public Housing Initiative
 - Multifamily Initiative
 - Home Efficiency – Market Rate Initiative
 - Midstream Heating & Cooling Initiative¹
 - Appliance Recycling Initiative
 - Direct Distribution of Efficient Products Initiative
- Business Program
 - Standard Initiative
 - Custom Initiative
 - Retro-Commissioning Initiative
 - Streetlighting Initiative
- Voltage Optimization Program

In addition to evaluations of the above programs, the evaluation team will assess AIC's pilot efforts and provide evaluation support across a wide range of cross-cutting areas. 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 processes. The overarching evaluation objectives in 2021 are to determine gross and net energy and demand impacts associated with the AIC portfolio, to suggest improvements in the design and implementation of existing initiatives, and to support AIC's transition to the upcoming 2022-2025 energy efficiency plan period by providing actionable market information that can be used to continue to refine AIC's programs.

For context on the evaluation of these programs over time, Table 1 provides a summary of completed and planned evaluation activities for the 2018-2021 period.

¹ The Midstream Initiative will replace the legacy AIC HVAC Initiative beginning in 2021. The evaluation team understands that some legacy HVAC Initiative projects will be completed in 2021 as well; impact evaluation for these projects will be completed as part of the Midstream Initiative's evaluation efforts.

Table 1. Summary of 2018 – 2021 Evaluation Activities

Evaluation Activity	Program Year	Residential Program							Business Program					VO	
		Retail Products	Income Qualified	Public Housing	Behavior Mod.	HVAC/Midstream	Appliance Recycling	Multifamily/OSS	Direct Dist.	Standard	Custom	RCx	Streetlighting		BOC
Program Material & Data Review	All	Conducted for all programs each year													
Program Manager and Implementer Interviews	All	Conducted for all programs each year													
Market Actor/Program Ally/Community Organization Interviews	2018		•				•			•	•	•			
	2019		•			•									
	2020											•			
	2021	•				•									
Participant Survey/In-Depth Interviews	2018		•	•	•		•	•		•	•			•	
	2019					•				•			•	•	
	2020	•	•				•			•	•				
	2021		•					•						•	
Nonparticipant Survey	2018	Overall Residential Assessment							Overall Business Assessment						
	2019														
	2020														
	2021		•												
Engineering Analysis	2018	•	•	•		•	•	•	•	•			•	•	
	2019	•	•	•		•	•	•	•	•			•	•	
	2020	•	•	•		•	•	•	•	•			•	•	
	2021	•	•	•		•	•	•	•	•			•	•	
Desk Reviews and/or On-Site Verification	2018										•	•			
	2019		•								•	•			
	2020										•	•			
	2021										•	•			
Statistical Analysis	2018				•						•				
	2019				•						•				•
	2020				N/A						•				•
	2021				N/A						•				•
Updates to the IL-TRM	2018					•						•			
	2019					•						•			•
	2020					•						•			
	2021					•						•			

1.1 Legislative Mandates Informing Energy Efficiency Evaluation

This is the final calendar year of AIC's four-year 2018 Plan, which was developed based on guidance provided through Illinois Senate Bill 2814 (the Future Energy Jobs Act [FEJA]). This legislation introduced changes to utility electric savings targets, planning cycles and requirements, and to performance incentive mechanisms. These changes also had important implications for evaluation of the utility's energy efficiency programs over the course of the cycle.

- **Cumulative Persisting Annual Savings (CPAS):** Electric energy savings goals for Illinois utilities are defined based on persisting savings as a percentage of sales. As such, annual evaluations of AIC's programs, including those outlined in this plan, capture both first-year savings as well as persisting savings over the life of delivered measures.
- **Weighted Average Measure Life (WAML):** FEJA allows AIC to create a regulatory asset and amortize and recover the total expenditures of that regulatory asset "over a period that is equal to the weighted average of the measure lives implemented for that year that are reflected in the regulatory asset."² Therefore, we calculate WAML for AIC's electric energy efficiency programs as part of the evaluation effort and report on it in accordance with the guidelines for calculation presented in the Illinois Stakeholder Advisory Group's (SAG) WAML Report.³
- **Applicable Annual Incremental Goal (AAIG):** The AAIG is defined as the difference between the cumulative persisting electric savings goal for the year being evaluated and the cumulative persisting electric savings goal for the previous year. The utility must achieve sufficient savings through its programs to replace savings from measures at the end of their measure life before progress can be counted towards the AAIG.
- **Non-Electric Fuel Savings Can be Counted Towards Electric Goals:** The utilities may count gas or other fuel savings towards their electric savings goals if (1) a joint electric and gas program runs out of gas funds but electric budget remains available, and (2) if programs save both electricity and gas but there is not a distinct gas program offered. The evaluation team will work with AIC to calculate this conversion and include it in the 2021 Integrated Report as described in Section 3.7.
- **Leveraging Advanced Metering Infrastructure (AMI) in Planning, Implementation and Evaluation:** Given that AIC's rollout of AMI was recently completed, the evaluation team has collaborated with AIC to identify opportunities to use this data in assessing program performance. A number of applications are highlighted within this evaluation plan including the evaluation of AIC's Virtual Commissioning offering as described in Section 2.2.4 and advanced M&V research for the Custom Initiative as described in Section 2.2.2.

1.2 Evaluation Policies and Definitions

In preparing this plan, the evaluation team reviewed the most recent Illinois Energy Efficiency Policy Manual (Version 2.0), ICC Order 17-0311 approving AIC's Energy Efficiency and Demand-Response Plan (2018 Plan), and the requirements of the FEJA related to evaluation. We also provide a set of key terms and definitions used within this document so that stakeholders have a clear understanding of what is planned.

² Weighted Average Measure Life Report. Illinois Energy Efficiency Stakeholder Advisory Group. February 20, 2018.

³ Ibid.

Evaluation Terms and Definitions

Within this section, we outline and define the key terms used throughout this plan and in reporting on AIC’s energy efficiency achievements. The first set of terms, presented in Table 2, relates to gross and net energy (MWh and therm) and demand (MW) savings.⁴

Table 2. Savings-Related Terminology and Definitions

Savings Terminology	Definition
Ex Ante Gross Savings	Gross savings present in the final program tracking database provided by AIC
Ex Ante Net Savings	Net savings present in the final program tracking database provided by AIC
Verified Gross Savings	Gross savings calculated by the evaluation team
Verified Net Savings	Net savings calculated by the evaluation team based on verified gross savings and SAG-approved NTGRs

Within Table 3, the evaluation team also defines each of the impact evaluation activities outlined within the evaluation plan. Note that we have differentiated between activities applicable to prescriptive and custom measures, respectively, and use this terminology consistently throughout the evaluation plan.

Table 3. Impact Evaluation Activity Definitions

Prescriptive Measures	Custom Measures
<p><u>Definition:</u> Measures with predetermined savings values or IL-TRM algorithms for use in determining savings</p> <p><u>Example:</u> A-Line LED bulb</p>	<p><u>Definition:</u> Unique or complex measures for which there is not an IL-TRM algorithm</p> <p><u>Example:</u> Compressed air system resequencing</p>
Impact Evaluation Activity Definitions	
<ul style="list-style-type: none"> ■ Database Review: This activity involves reviewing the program or initiative-tracking data to check that incentivized measures meet all program requirements. ■ Engineering Desk Review: This activity involves reviewing supporting project documentation, as well as initiative-tracking data to ensure that original data was entered correctly from invoices/documentation. ■ IL-TRM Application Review: This activity involves reviewing initiative-tracking data to see that the correct deemed input values and IL-TRM specified algorithms are used in calculating savings. ■ On-Site Verification: This activity involves on-site visits, typically with a sample of projects, to verify that incentivized measures are installed and operational. 	<ul style="list-style-type: none"> ■ Database Review: This activity involves reviewing the program or initiative-tracking data to check that incentivized measures meet all program requirements. ■ Engineering Desk Review: This activity involves reviewing project documentation and calculations, and making any associated revisions to account for analytical errors, incorrect assumptions, etc. ■ On-Site Measurement & Verification: This activity involves conducting site specific measurement and verification (M&V) (for example, metering equipment runtime), typically with a sample of projects, to estimate site-specific savings. ■ Consumption Analysis: This analysis involves the use of regression models with historic customer energy usage information to calculate annual energy savings ■ Modeling: The use of building simulation models to estimate building-level energy savings

⁴ Gross savings are the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated. Net savings are the change in energy consumption and/or demand that is attributable to a particular energy efficiency program (SEE Action Energy Efficiency Program Impact Evaluation Guide).

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. AIC's planned Residential Program provides services to residential customers, and is made up of eight initiatives, which in some cases are further split into channels.

- Retail Products Initiative
- Income Qualified Initiative
 - Single Family
 - Community Action Agency (CAA)
 - Smart Savers
 - Multifamily
- Public Housing Initiative
- Multifamily Initiative
- Home Efficiency – Market Rate Initiative
- Midstream Heating & Cooling Initiative
- Appliance Recycling Initiative
- Direct Distribution of Efficient Products (Direct Distribution) Initiative
 - School Kits
 - Community Kits

AIC will implement a number of changes to the Residential Program in 2021 – most notably, the retirement of AIC's legacy HVAC Initiative and replacement with the new Midstream Heating & Cooling Initiative.⁵

AIC organizes initiatives in the manner described above, and all impact evaluation activities will report savings disaggregated into these initiatives. However, for evaluation planning purposes, the evaluation team groups multifamily-focused initiatives and channels together to provide a more holistic evaluation perspective. Section 2.1.5 of this plan describes evaluation of the Income Qualified – Multifamily channel, the Public Housing Initiative, and the Multifamily Initiative following initiatives in a combined manner.

In accordance with Illinois evaluation requirements, we will deliver a draft annual Residential Program impact evaluation report on March 15, 2022, covering the 2021 program year. This report will include information on 2021 program participation, 2021 verified gross and net impacts for all Residential Program initiatives, as well as initiative and program-level weighted average measure life (WAML) and cumulative persisting annual savings (CPAS) for the Program.

⁵ This change is currently expected to be implemented in mid-year 2021; impact evaluation activities described in this evaluation plan will also cover any projects completed through the legacy Initiative.

In addition, we will deliver stand-alone memos summarizing results of process and NTGR research, where applicable.

Table 4. Schedule of Key 2021 Residential Program Evaluation Deliverables

Deliverable	Date
Draft Annual Residential Program Impact Evaluation Report	March 15, 2022
Comments Received from Stakeholders (15 business days)	April 5, 2022
Second Draft of Annual Residential Program Impact Evaluation Report	April 14, 2022
Comments Received from Stakeholders (5 business days)	April 21, 2022
Final Annual Residential Program Impact Evaluation Report	April 30, 2022
Annual Integrated Impact Report	April 30, 2022

2.1.1 Retail Products Initiative

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 discounts for a range of products, including omnidirectional and specialty LEDs, advanced thermostats, and a range of appliances and consumer electronics.

Customers can receive a rebate for their purchase of qualifying products through the following channels:

- By receiving a point-of-sale discount on purchases of qualified LEDs, advanced power strips, air purifiers, dehumidifiers, bathroom vent fans, and water dispensers at participating retailers;
- By submitting an online or mailed-in rebate application for the purchase of qualified advanced thermostats, variable-speed pool pumps, refrigerators, freezers, clothes washers, heat pump water heaters, and electric clothes dryers purchased at a retail location or online retailer;
- By registering online and downloading a coupon for qualified advanced thermostats that can be used at the check-out at select in-store and online retailers; and
- By purchasing discounted LEDs, advanced thermostats, advanced power strips, air purifiers, dehumidifiers, or bathroom vent fans through the AIC Online Marketplace.

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 2021 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

- What were the estimated gross energy and demand savings from this initiative?
- What were estimated net energy and demand savings from this initiative?

Process Questions

- Was initiative implementation effective and streamlined?
- In what areas could the Initiative improve to increase its overall effectiveness, or ease of implementation?
- How did the various rebate channels perform relative to one another? Did rebated measures align well with the channels through which they were offered?

Evaluation Tasks

Table 2 summarizes the 2021 evaluation activities planned for the Retail Products Initiative.

Table 5. Summary of Retail Products Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Staff Interviews		✓	Conduct interviews with AIC and implementation contractor staff to understand initiative design and implementation.
Initiative Materials and Database Review	✓	✓	Review all initiative tracking data, relevant administrative reports, and marketing and outreach materials to document and provide feedback on initiative design with a focus on any changes introduced in 2021.
Retailer and Manufacturer Interviews		✓	Conduct interviews with corporate-level partner retailer and manufacturer contacts to explore industry expert perspectives on program implementation, the state of the market, and anticipated future trends.
Impact Analysis	✓		Calculate gross and net impacts using the IL-TRM V9.0 and SAG-approved NTGR values for 2021.

We describe each of these activities in detail below.

Task 1. Initiative Staff Interviews

The evaluation team will conduct up to four 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. We will conduct another round of interviews towards the end of the program year to gather feedback on the initiative performance and implementation challenges that occurred during the year. This second round of interviews will involve an in-person visit by Opinion Dynamics staff to meet with implementation team staff and get firsthand exposure to implementation processes. 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 phone interviews using experienced Opinion Dynamics staff. We will record and transcribe all interviews to facilitate analysis.

Deliverable: Completed interviews

Deliverable Date: April and December 2021

Task 2. Initiative Materials and Database Review

The evaluation team will conduct a comprehensive review of all initiative materials and program sales and savings tracking data. Materials include 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 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 evaluation.

Deliverable: Data requests

Deliverable Date: April and December 2021

Task 3. Impact Analysis

The evaluation team will review all records in the initiative database. We will check to ensure that the correct savings assumptions have been applied for each product type, to verify that the database is providing correct

information. We will also assess the database to ensure that project data has been recorded fully and correctly. We will resolve any discrepancies found in the database and report on findings.

We will use the savings parameters outlined in the IL-TRM V9.0 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 V9.0.

For all measures rebated by the Retail Products Initiative, we will calculate 2021 verified net savings by applying SAG-approved NTGRs to verified gross electric and gas savings. We expect that new products will be introduced in 2021 for which a SAG-approved NTGR is not available, and we expect to provide supplemental NTG recommendations to SAG for these measures as soon as possible. We will also use the participant survey to estimate NTGR for these new measures to support a recommendation for future years of the Initiative.

Deliverable: Interim impact analysis memo

Deliverable Date: July 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 4. Retailer/Manufacturer Interviews

The evaluation team will conduct semi-structured in-depth interviews with up to 15 corporate-level retailer and manufacturer contacts to explore their perspective on the state of the market and anticipated future trends. In light of anticipated changes in federal energy policy priorities over the next two to four years following the results of the 2020 election, interviews with key market actors will include specific questions on the topic to gauge the expectations of these industry professionals. We will conduct interviews with these industry professionals in Q2 2021.⁶ The sample frame will include corporate-level contacts from a purposive sample manufacturers and retailers producing and selling program-discounted products. We will request a list of contacts from the implementation contractor and review alongside program tracking data to prioritize outreach efforts and maximize representation of program sales with consideration of retail channel and product type.

Deliverable: Draft interview guide

Deliverable Date: April 2021

Deliverable: Completed interviews

Deliverable Date: May 2021

Deliverable: Memo summarizing findings

Deliverable Date: June 2021

Task 5. Reporting

The evaluation team will include 2021 Retail Products Initiative impact analysis results in the draft Residential Program annual impact evaluation report. We will incorporate our responses to stakeholder feedback in a final report. We will submit separate deliverables containing results from process and forward-looking research tasks.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2022

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2022

⁶ Current plans for task timing are preliminary. The evaluation team will carefully consider developments in the lighting market (e.g., any potential proposed orders from the US Department of Energy) in determining the timing for executing this task.

Evaluation Budget and Timeline

Table 6 summarizes the timing and budget associated with each evaluation activity.

Table 6. Retail Products Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Staff Interviews	April and December 2021	\$6,500
2	Initiative Materials and Database Review	April and December 2021	\$8,300
3	Impact Analysis	March 2022	\$10,400
4	Retailer/Manufacturer Interviews	June 2021	\$26,100
5	Draft Annual Impact Report	March 15, 2022	\$40,000
	Comments from AIC and ICC Staff	Within 15 Business Days	
	Final Annual Report	April 30, 2022	
Total Budget			\$91,300

2.1.2 Income Qualified Initiative

This chapter outlines the planned evaluation of the single family portion of the AIC Income Qualified (IQ) Initiative.⁷

IQ – Single Family and IQ – CAA

The core service provided by the IQ Initiative is a home energy diagnostic and whole house retrofit offering. The target markets for this offering are (1) single family customers with household incomes up to 300% of federal poverty guidelines for household size (the IQ – Single Family channel [Single Family]) and (2) single-family homes with household incomes up to 200% of federal poverty guidelines who are also participating in the Illinois Home Weatherization Assistance Program (IHWAP) (the IQ – CAA channel [CAA]). The IQ Initiative also provides no-cost Building Performance Institute (BPI) energy audits that identify building shell and HVAC retrofit opportunities and provide health and safety inspections. During the audit, implementation staff also install energy efficient “direct install” (DI) measures such as LEDs, showerheads, faucet aerators, advanced power strips, pipe insulation, and programmable/advanced thermostats at no cost.

Following the audit, customers may also receive building shell measures such as air sealing and insulation, and HVAC measures such as central air conditioner replacements, boilers, heat pumps, window air conditioners, as well as heat pump water heaters.

The Initiative provides all audit services and DI measures at no cost to the customer. Low-income customers pay no out-of-pocket costs for HVAC and shell retrofits through the CAA channel. Some Single Family participants co-pay out of pocket costs for HVAC-related mechanical repairs and building shell retrofits. Incentives within the Single Family channel will be offered in two “tiers” where low-income homeowners receive all services and measures at no cost, while moderate income customers may pay up to \$4,000 in out-of-pocket costs. On-Bill Financing (OBF) is available to assist Single Family customers with covering out of pocket project costs.

If the customer does not qualify for additional measures, the Energy Advisor will inquire if the customer would be interested in receiving an advanced thermostat. If the customer is not comfortable installing an advanced

⁷ Evaluation activities associated with the multifamily portion of the IQ Initiative is included in the Multifamily Initiatives chapter of the plan, along with other multifamily offerings.

thermostat themselves, appropriate literature explaining Energy Efficiency tips will be provided. If the customer is in the defined Smart Savers zip codes, information to put them in contact with Smart Savers for an advanced thermostat installation will be provided.

Leidos oversees the implementation of the IQ Initiative in coordination with several implementation partners. Walker-Miller and AIC program allies serve moderate-income single family properties and low-income customers who do not participate in IHWAP. CAAs, with support from AIC partner Resource Innovations, serve low-income single family customers that participate in the IHWAP program at the same time. All AIC program allies providing Initiative services must be “core” allies, meaning they are BPI-certified.

Additional Offerings

In addition to the core services described above, the IQ Initiatives include two additional key offerings:

- The **Smart Savers** channel was launched in August 2018 as a pilot market development effort to provide advanced thermostats at no-cost to hard-to-reach customers. AIC first identified four geographic areas to target and expanded the offering to 11 communities in 2019. Customers in the targeted areas received e-mail invitations to apply online or by phone for a free advanced thermostat to install in their homes. Participating customers are given the option of requesting a thermostat to install themselves or a contractor to install the device.
- Launched in 2020, in response to the COVID-19 pandemic, the Initiatives offer virtual audits and **Safe and Virtual Energy Efficiency (SAVE) Kits** as a completely contactless way to deliver energy efficiency to IQ customers. The SAVE Kit includes several energy- and water-saving products (e.g., LEDs, low-flow showerheads, advanced power strips, and door sweeps), a booklet of installation instructions, and the tools customers need to install the products (e.g., a screwdriver and plumber’s tape). Customers apply for kits online or through Market Development Initiative (MDI) Partners and, once they have received the kit, may choose from several verification options to receive an incentive.

Evaluation Approach

The 2021 evaluation of the IQ Initiative includes both process and impact analyses as outlined in the following sections.

Research Objectives

Impact Questions

- What are the estimated gross energy and demand impacts from the Initiative?
- What are the estimated net energy and demand impacts from the Initiative? (Note: the Initiative uses an assumed net-to-gross ratio (NTGR) of 1.0; gross and net savings are identical)

Process Questions

- Initiative Design and Implementation Effectiveness
 - What were the Initiative’s marketing and outreach efforts?
 - Is the Initiative being implemented according to design?
 - Have there been any modifications to design or implementation to the core Initiative, SAVE Kits, or Smart Savers compared to 2020? What have been the successes and challenges associated with these changes?

- Did implementation and design changes/enhancements in 2020 or 2021 achieve their intended outcomes? What areas for improvement exist?
- How effectively are the various implementation partners working together to achieve the goals of the Initiatives?
- What implementation challenges occurred in 2021, if any, and how were they overcome?
- What successes and challenges, if any, has the inclusion of CAAs created? What are the opportunities for improvement?
- Initiative Participation
 - How many single-family homes received audits, direct install measures, and shell/HVAC/water heating measures? Has participation met expectations? If not, why?
 - What was the distribution of CAA and non-CAA single family projects? Did CAA channel participation meet expectations?
 - How many SAVE kits were distributed?
- Participant Experience and Satisfaction
 - Are customers satisfied with the participation processes?
 - Are customers satisfied with the participation process and Initiative measures?
 - How does the participation experience compare between participants who participated through AIC staff versus community agencies?
- Co-payments, Tiered Incentives, and OBF
 - From AIC and its partners' perspectives, what have been the successes and challenges associated with the introduction of co-pays and OBF to the Single Family channel?
 - What feedback do participants have about the reasonableness of the co-payments? Did co-payments limit the size of their projects or the efficiency of the equipment they installed?
 - How much uptake of OBF has there been among Single Family participants in 2021? What is the average and range of total loan values and monthly payments?
 - Have there been any issues with borrower performance, e.g., unpaid bills/arrearages, or have staff noted any borrower confusion or complaints about OBF, e.g., confusion about the line item on their bill, or having a higher bill?
 - What feedback do borrowers have about the benefits or challenges related to taking on an OBF? Did the OBF loan improve borrower access to affordable financing (i.e., interest rates and terms they would accept), or could borrowers have accessed financing similar to OBF? Did access to OBF change the size of the retrofit projects they undertook or the efficiency of equipment they installed?
 - What barriers did non-borrowers face, if any?

Evaluation Tasks

Table 7 summarizes the 2021 evaluation activities planned for the IQ Initiative.

Table 7. Summary of Income Qualified Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Staff Interviews		✓	Gather information about Initiative marketing, implementation, and success and challenges in 2021; capture changes compared to 2020; ensure the evaluation plan covers current Initiative design and operations.
Initiative Material and Tracking Data Review	✓	✓	Review of implementation plans, marketing plans and collateral, and the Initiative tracking database
Process Model Updates		✓	Update Initiative process models to reflect any changes made in late 2020 or 2021 (namely, Smart Saver).
Single Family Participant Survey		✓	Survey of Single Family channel, CAA channel, and SAVE kits participants. Gather satisfaction and participation experience metrics, understand plan/barriers to converting from audit to retrofits, and experiences working with implementation partners and CAAs. Gather feedback on OBF and copays, where applicable.
Smart Savers Interviews		✓	Up to 20 in-depth interviews with Smart Savers participants; approximately 10 self-install participants and 10 participants who had a program ally install the thermostat. Gather feedback on satisfaction with the thermostat, experience with program ally or self-install, and thermostat engagement behavior after installation.
Overarching Income Qualified Process Evaluation Report		✓	Overarching process report presenting a holistic assessment of the operation of the IQ Initiative, incorporating program administrator, implementation partner, and customer perspectives.
Impact Analysis	✓		Estimate gross impacts for 2021 through review of the Initiative tracking database and application of the IL-TRM V9.0 and net impacts using the SAG-approved NTGR of 1.0.
Reporting	✓		Final chapter of the Residential Program Annual Impact Evaluation Report

We describe each of these activities in detail below.

Task 1. 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 in Q2 2021 and use the process model developed in the 2020 evaluation as a foundation to discuss planned or executed changes to Initiative design and implementation. We will also discuss the QA/QC process, planned marketing and outreach efforts, and any challenges Initiative staff have faced or anticipate they will face in 2021. Next, we will conduct another round of interviews in Q4 2021 to get feedback on Initiative performance and implementation challenges that occurred during the year. We anticipate conducting five interviews per round (ten total).

Deliverable: Completed interviews

Deliverable Date: April and December 2021

Task 2. 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. Additionally, we will review OBF data that is made available to the evaluation team. In July 2021, we will request interim program tracking data through June 2021 and other Initiative materials. We will use this data to complete Initiative process model updates (see Task 3) and to develop a participant survey sample (see Task 4). We will request final program tracking data in January 2022 for use in the final impact evaluation.

Deliverable: Data requests

Deliverable Date: July 2021 and January 2022

Task 3. Initiative Process Model Development

As part of our 2021 evaluation, we will develop a detailed implementation process model to outline the Smart Savers channel. This task may include additional follow-up e-mails or calls with Initiative and implementation staff to confirm process details.

Deliverable: Process model for Smart Savers (included in process report) *Deliverable Date:* November 2021

Task 4. Single Family Participant Survey

The evaluation team will field a mixed-mode (telephone and web) participant survey with IQ Initiatives participants in Q3 of 2021. We will use a stratified sampling approach to ensure statistical precision for surveyed sub-groups (various measures, Single Family and CAA channel projects, use of OBF, etc.) and will test for significant differences in responses between these groups. The survey will gather information regarding satisfaction with the Initiative and the overall participation experience. For customer who have received an audit and DI measures, but not shell and HVAC work, we will ask whether they plan to move forward with shell and HVAC work and if not, why. We expect to complete approximately 350 surveys, but specific targets for measures and channels will depend on the project and measure mix in the tracking data through June 2021.

Deliverable: Draft and final survey instrument

Deliverable Date: August 2021

Task 5. Smart Savers Participant Interviews

We will conduct up to 20 in-depth interviews with Smart Savers participants; approximately 10 with self-install participants and 10 with participants who had a program ally install the thermostat. The interviews will serve to gather participant feedback on satisfaction with the thermostat, experience with program ally or self-install, and thermostat engagement behavior after installation.

Deliverable: Draft and final interview instrument

Deliverable Date: August 2021

Task 6. Overarching Income Qualified Process Evaluation Report

Drawing on our process evaluation activities for 2021, the evaluation team will prepare an overarching process evaluation report for the IQ Initiative. The report will aim to provide a holistic assessment of the operation of the IQ Initiative, incorporating program administrator, implementation partner, and customer perspectives.

Deliverable: Draft and final process report

Deliverable Date: December 2021

Task 7. Impact Analysis

The 2021 evaluation will include gross and net impact estimates. The impact evaluation team will use savings algorithms from the IL-TRM V9.0, and data inputs from the Initiative tracking database to estimate verified gross savings. Finally, we will calculate 2021 net savings by applying the SAG-approved NTGR of 1.0 to verified gross electric and gas savings.

Deliverable: Interim impact analysis memo

Deliverable Date: September 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 8. Reporting

The evaluation team will include 2021 Initiative impacts in the draft Residential Program annual impact evaluation report. We will incorporate our responses to stakeholder feedback in a final report. We will submit separate deliverables containing results from process and forward-looking research tasks.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2022

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

Table 8 summarizes the timing and budget associated with each evaluation activity.

Table 8. Income Qualified 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Staff Interviews	April and December 2021	\$12,000
2	Initiative Material and Tracking Data Review	July 2021 and January 2022	\$14,600
3	Initiative Process Model Development	November 2021	\$13,100
4	Single Family Participant Survey	August 2021	\$61,400
5	Smart Savers Interviews	August 2021	\$22,500
6	Overarching Income Qualified Process Evaluation Report	December 2021	\$25,600
7	Impact Analysis	March 2021	\$66,800
8	Draft Annual Impact Report	March 15, 2022	\$24,000
	Comments from AIC and ICC Staff	Within 15 Business Days	
	Final Annual Report	April 30, 2022	
Total Budget			\$240,000

2.1.3 Low Income Needs Assessment

Research Approach

The Low Income Needs Assessment aims to better understand the unique conditions and needs of IQ customers and to uncover the barriers they experience that limit their involvement in AIC IQ programs. As outlined in the following sections, this research leverages general population surveys with residential customers and in-depth interviews with landlords of properties that may house IQ customers to meet these objectives.

Research Objectives

We have designed this research to answer the following questions:

- What are the unique conditions and needs of IQ customers?
 - What are building/technology characteristics of IQ customers and how do they differ from non-IQ customers?
 - What energy upgrades are most needed in the IQ segment?
 - What level of energy burden and insecurity do AIC’s customers experience?
- What barriers do IQ customers experience that limit their involvement in current AIC IQ programs? How do these relate to owner/renter status and geography?
- What program design approaches are most appealing to IQ customers and landlords serving IQ tenants?

Research Tasks

Table 9 summarizes the research activities planned for the Low Income Needs Assessment.

Table 9. Summary of Low Income Needs Assessment Research Activities for 2021

Activity	Details
Internal Stakeholder Interviews	Conduct interviews with AIC, MDI, and implementation contractor staff to understand program design, delivery, performance, data availability, and perceived IQ community needs. In-depth discussion and review of the planned research.
General Population Residential Survey	Surveys with IQ (participants and nonparticipants) and non-IQ customers to collect data on household characteristics, sources of discomfort or high bills, and demographics. Survey includes a discrete choice survey exercise on measure offers and incentive formats/program designs.
Landlord In-Depth Interviews	Interviews with landlords to learn more about their awareness and acceptance versus resistance to IQ programs.
Reporting	Memo on key findings from the tasks above, including any recommendations for improving IQ program delivery.

We describe each of these activities in detail below.

Task 1. Internal Stakeholder Interviews

We will conduct up to three exploratory interviews with relevant internal stakeholders including those involved with the IQ Initiative, non-IQ and Market Development Initiative (MDI) efforts, and key Leidos staff. These interviews will inform a shared understanding of IQ Initiative performance, design and implementation, data availability, and perceived gaps in program reach and success. We will use this information to finalize our research plans for the Low Income Needs Assessment. These interviews will also provide relevant internal stakeholders with an opportunity to review planned research tasks and ensure that they are relevant and useful based on Initiative status and plans for the near future.

Deliverable: Completed interviews

Deliverable Date: March 2021

Task 2. General Population Residential Survey

In August 2021, we will field a web-based survey with up to 750 residential non-IQ and 750 IQ customers (approximately 250 of which will be past participants of AIC's IQ offerings). To achieve this balance of IQ and non-IQ survey respondents, at least half of our survey invitations will be sent to customers in census tracts with disproportionately high levels of IQ-qualified customers. Past IQ participants will be sampled separately, using AIC participant records. We will use a mixed-mode sampling approach, leveraging customer emails and service addresses ("mail push-to-web") to invite customers to take the survey. In addition to online, customers can call into a toll-free number to take the survey over the phone. To encourage participation, respondents will receive an incentive upon completion of the survey. We will finalize the sampling design, target completes, and outreach strategy based on tracking data availability.

The survey will collect insights on IQ customer awareness of AIC IQ programs, baseline building and in-home technology characteristics, sources of high energy bills and thermal discomfort, barriers to participation, and key demographics (including inputs into energy burden estimates). The survey will also include a discrete choice exercise that explores potential incentive models and program offerings.

Deliverable: Draft and final survey instrument

Deliverable Date: April 2021

Deliverable: Fielded surveys

Deliverable Date: August 2021

Task 3. IQ Landlord In-Depth Interviews

In June 2021, we will conduct telephone interviews with up to 15 landlords of properties that house IQ customers. To encourage participation, respondents will receive an incentive upon completion of the interview. We will finalize the sampling design, target completes, and outreach strategy based on data availability. The interviews will explore IQ landlord awareness of and interest in AIC IQ programs, barriers to participation, and solicit their feedback on how to improve program design and processes.

Deliverable: Draft and final survey instrument

Deliverable Date: April 2021

Deliverable: Completed interviews

Deliverable Date: June 2021

Task 4. Reporting

We will deliver a memo summarizing key findings from Tasks 1 through 3 above. Based on these findings we will recommend any opportunities for improving program delivery and strategies for increasing IQ Initiative participation.

Deliverable: Draft and final memo

Deliverable Date: October 2021

Evaluation Budget and Timeline

Table 10 summarizes the timing and budget associated with each research activity.

Table 10. Low Income Needs Assessment 2021 Research Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Internal Stakeholder Interviews	Interviews: March 2021	\$10,000
2	General Population Residential Survey	Instrument: April 2021 Survey: August 2021	\$140,800
3	Landlord In-Depth Interviews	Instrument: April 2021 Interviews: June 2021	\$59,200
4	Reporting	Draft and final: October 2021	\$20,100
Total Budget			\$230,100

2.1.4 Home Efficiency - Market Rate Initiative

The Home Efficiency - Market Rate Initiative is a new initiative being offered by AIC as part of the 2021 portfolio. The Initiative focuses on providing home weatherization/envelope efficiency measures and operates in conjunction with the existing IQ Initiative's Single Family channel. The Home Efficiency – Market Rate Initiative and the IQ Initiative’s Single Family channel both offer the same weatherization measures coupled with a tiered incentive system that provides higher incentives for low- and moderate- income customers treated through the IQ Initiative and somewhat lower incentives for market-rate customers served through the Home Efficiency – Market Rate Initiative. Table 11 outline the incentive tiers offered through the IQ and Home Efficiency Initiatives; Home Efficiency – Market Rate participants fall into Tier 3.

Table 11. IQ and Home Efficiency Incentive Tiers

Measure	Tier 1 (Low Income)	Tier 2 (Moderate Income)	Tier 3 (Market Rate)
Air Sealing	\$0.70/CFM	\$0.53/CFM	\$0.35/CFM
Attic Insulation	\$1.50/sq. ft.	\$1.13/sq. ft.	\$0.75/sq. ft.
Wall Insulation	\$1.80/sq. ft.	\$1.35/sq. ft.	\$0.90/sq. ft.
Rim Joist Insulation	\$2.00/lin. ft.	\$1.50/lin. ft.	\$1.00/lin. ft.
Crawlspace Wall Insulation	\$4.00/lin. ft.	\$3.00/lin. ft.	\$2.00/lin. ft.

Evaluation Approach

The 2021 evaluation of the Initiative includes both process and impact analyses as outlined in the following sections. In addition to these questions, the evaluation team will explore using planned IQ Initiative evaluation activities (detailed in Section 2.1.2) to provide supplemental process research findings for the Initiative.

Research Objectives

Impact Questions

- What are the estimated gross energy and demand impacts from this Initiative?
- What are the estimated net energy and demand impacts from this Initiative?

Process Questions

- Initiative Design and Implementation Effectiveness
 - What were the Initiative’s marketing and outreach efforts?
 - Is the Initiative being implemented according to design?
 - How effectively are the various implementation partners working together to achieve the goals of the Initiative?
 - What implementation challenges occurred in 2021, if any, and how were they overcome?
- Initiative Participation
 - How many single-family homes received audits, direct install measures, and shell measures? Has participation met expectations? If not, why?

Evaluation Tasks

Table 12 summarizes the 2021 evaluation activities planned for the Home Efficiency - Market Rate Initiative.

Table 12. Summary of Home Efficiency - Market Rate Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Staff Interviews		✓	Gather information about Initiative marketing, implementation, and successes and challenges in 2021; capture changes compared to the 2020 pilot offering; ensure the evaluation plan covers current Initiative design and operations.
Initiative Material and Tracking Data Review	✓	✓	Review of implementation plans, marketing plans and collateral, and the Initiative tracking database
Impact Analysis	✓		Estimate gross impacts for 2021 through review of the Initiative tracking database and application of the IL-TRM V9.0 and net impacts using SAG-approved NTGRs.
Reporting	✓		Final chapter of the Residential Program Annual Impact Evaluation Report

We describe each of these activities in detail below.

Task 1. 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 in Q2 2021 and use the process model developed in the 2020 evaluation as a foundation to discuss planned or executed changes to Initiative design and implementation. We will also discuss the QA/QC process, planned marketing and outreach efforts, and any challenges Initiative staff have faced or anticipate they will face in 2021. Next, we will conduct another round of interviews in Q4 2021 to get feedback on Initiative performance and implementation challenges that occurred during the year. We anticipate conducting three interviews per round (six total).

Deliverable: Completed interviews

Deliverable Date: April and December 2021

Task 2. 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. In July 2021, we will request interim program tracking data through June 2021 and other Initiative materials. We will use this data to complete Initiative process model updates (see Task 3) and to develop a participant survey sample (see Task 4). We will request final program tracking data in January 2022 for use in the final impact evaluation.

Deliverable: Data requests

Deliverable Date: July 2021 and January 2022

Task 3. Impact Analysis

The 2021 evaluation will include gross and net impact estimates. The impact evaluation team will use savings algorithms from the IL-TRM V9.0, and data inputs from the Initiative tracking database to estimate verified gross savings. Finally, we will calculate 2021 net savings by applying SAG-approved NTGRs to verified gross electric and gas savings.

Deliverable: Interim impact analysis memo

Deliverable Date: September 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 4. Reporting

The evaluation team will include 2021 Initiative impacts in the draft Residential Program annual impact evaluation report. We will incorporate our responses to stakeholder feedback in a final report. We will submit separate deliverables containing results from process and forward-looking research tasks.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2022

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

Table 13 summarizes the timing and budget associated with each evaluation activity.

Table 13. Home Efficiency – Market Rate Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Staff Interviews	April and December 2021	\$6,000
2	Initiative Material and Tracking Data Review	July 2021 and January 2022	\$5,000
3	Impact Analysis	March 2021	\$25,000
4	Draft Annual Impact Report	March 15, 2022	\$14,000
	Comments from AIC and ICC Staff	Within 15 Business Days	
	Final Annual Report	April 30, 2022	
Total Budget			\$50,000

2.1.5 Multifamily Initiatives

AIC offers a group of multifamily-focused initiatives and channels designed to provide a range of measures that result in lower energy use, lower costs of living and increased comfort for tenants of subsidized or low-income heavy, publicly owned housing serving low-income customers, and non-subsidized or market-rate multifamily and mixed-use buildings with three or more units. AIC serves these multifamily residents through the Income Qualified – Multifamily channel, Public Housing Initiative, and Multifamily (market rate) Initiative,

collectively known throughout this plan as the Multifamily Initiatives. Overall, the delivery models and measure offerings for these Initiatives are similar (with some variation).

In 2020, AIC transitioned the delivery of measures for multifamily customers to a “one stop shop” model, where Initiative staff conduct a detailed property assessment and interview upon initial contact that includes highlighting any available incentive opportunities for the property across all AIC Residential and Business Programs. The one stop shop approach allows property managers to access incentives offered through Small Business Direct Install (SBDI), the Custom Initiative, and other Residential and Business Program Initiatives. The goal of the one stop shop model is to make access to AIC offerings as streamlined and seamless as possible for property managers and housing authorities.

The CMC outreach coordinator generates the bulk of leads for the Multifamily Initiatives, though lead opportunities also emerge through referrals from the Leidos team. The CMC outreach coordinator communicates with Public Housing Associations and other housing organizations to provide educational offerings and promote energy efficiency opportunities in their sector to ultimately generate interest in participation.

The one stop shop approach begins with an Energy Advisor (EA) from CMC conducting a full property assessment to identify the available energy-saving opportunities of which the facility may qualify. CMC staff act as a central point of contact for initial identification and coordination of direct install and program ally-installed measures. This process involves an extensive interview with property management or the building owner, during which implementation staff obtain a detailed understanding of the history of building envelope and interior upgrades at the property. Upon assessment completion, the EA recommends appropriate upgrades to the property manager. As multifamily customers participate in the Multifamily Initiatives, the EA introduces them to the AIC multifamily resources webpage which is set up as a resource for customers to access information regarding incentive offerings, energy efficiency grants, loans, and rebates. Property managers may also access educational and support resources, including ENERGY STAR® information and the Efficient Choice Tool (described further in Section 2.4.2) for selecting energy efficient appliances.

The Multifamily Initiatives delivery method differs based on the type of measure offering and Table 14 includes descriptions of these nuances.

Table 14. Multifamily Initiatives Measure Offerings and Delivery Methods

Location/Offering	Measures Offered	Installation Process
In-unit	<ul style="list-style-type: none"> ▪ Specialty and standard LED light bulbs, low-flow showerheads and thermostatic shower valves, Tier 1 advanced power strip, low-flow kitchen faucet aerator, low-flow bathroom faucet aerator, water heater pipe insulation, door and window insulation foam stripping, advanced thermostat, door sweep, outlet and switch plate cover on exterior walls, and ductless heat pumps 	<ul style="list-style-type: none"> ▪ CMC staff complete the assessment and installation for in-unit measures ▪ CMC performs a 10 percent administrative review on 100 percent of the properties ▪ Ductless heat pumps are available to PHA and IQ eligible participants only
Common Area	<ul style="list-style-type: none"> ▪ Retrofit 4' light fixtures, LED Lighting fixture retrofits, occupancy sensors, and ENERGY STAR® bathroom fans 	<ul style="list-style-type: none"> ▪ CMC staff complete the assessment ▪ Program allies conduct installation for common area measures ▪ Vending machine controls are available to PHA and Market Rate participants only

Location/Offering	Measures Offered	Installation Process
Exterior	<ul style="list-style-type: none"> ▪ Security lighting, walkway lighting, and parking lot lighting 	<ul style="list-style-type: none"> ▪ CMC staff complete the assessment ▪ Program allies conduct installation for exterior measures
Building Envelope	<ul style="list-style-type: none"> ▪ Air sealing, attic insulation, ceiling insulation, window sealing 	<ul style="list-style-type: none"> ▪ CMC staff complete the assessment ▪ Program Allies conduct installations for building envelope measures ▪ 100 percent of multifamily building envelope projects receive both pre- and post-inspections ▪ Measure offerings are available to PHA and IQ eligible participants only
Window Air Conditioner Replacement Pilot	<ul style="list-style-type: none"> ▪ Window A/C unit 	<ul style="list-style-type: none"> ▪ The property completes installation process, with QA/QC from CMC ▪ Offered to Public Housing and IQ eligible participants only ▪ The Window A/C Pilot requires a 100 percent validation of new unit installation and removal and recycling of old units.

If the property decides to explore other SBDI, Business Program, Building Envelope or Ally-Installed measures, the EA will explain each program and work with them to understand their program ally options in their area so that a program ally can conduct an in-depth audit to develop work scopes and quote the incentives. The EA communicates with the property throughout the process, providing support and expertise to create a seamless participation experience. If the property chooses to not take full advantage of the available incentives at the time of the assessment, CMC staff will also follow up about completing additional work in the future.

Leidos and CMC work together to implement the Multifamily Initiatives. Leidos’ role is to provide oversight for the Initiatives, including support for marketing efforts and initiative implementation, while CMC is responsible for conducting outreach, installations, QA/QC inspections on direct install measures, and managing project submissions, inventory, and initiative tracking data.

Evaluation Approach

The 2021 evaluation of the Multifamily Initiatives includes an impact analysis and a process analysis as outlined below. To support these efforts, the evaluation team plans to interview the AIC initiative managers and implementation team, conduct interviews with participating property managers, review relevant background materials and documentation, and conduct an engineering analysis to determine gross and net impacts.

The 2021 Multifamily Initiatives evaluation is also intended to provide AIC, Leidos, and CMC with early feedback on the performance of the transition to the one stop shop approach to delivery for the Multifamily Initiatives. In particular, Illinois stakeholders have expressed an interest in better understanding how to encourage the uptake of more comprehensive measures in multifamily buildings in AIC service territory and we plan to qualitatively explore how the one stop shop approach is impacting the uptake of more comprehensive measures such as HVAC equipment and building envelope measures.

Research Objectives

Impact Questions

The objective of the 2021 Multifamily Initiatives evaluation is to provide estimates of gross and net electric (kWh, kW) and gas (therm) savings associated with the Initiative. The 2021 impact evaluation will answer the following questions:

- What are the estimated gross energy and demand impacts from the Initiatives?
- What are the estimated net energy and demand impacts from the Initiatives?

Process Questions

The evaluation team will also explore several process-related research questions as part of the 2021 evaluation:

- What implementation challenges have occurred in 2021, and how have the Initiatives overcome them?
- What have been the biggest successes for the Initiatives in 2021? What are the reasons for these successes?
- How did the delivery process change in 2021 across the Multifamily Initiatives?
- What impacts has COVID-19 had on the Initiatives in 2021? How are these impacts being addressed?
 - What impact have the various new virtual delivery methods had on participation in the Multifamily Initiatives?

Process Questions - One Stop Shop Transition Feedback

- What is the customer journey through the one stop shop delivery model from the first point of contact to the QA/QC process?
- What are property managers' levels of satisfaction with each step of the one stop shop participation process in which they have been involved (e.g., application process, virtual audit, measure installation)?
- What are the key opportunities to improve in the customer journey?
 - How have improvements to the Marketing Cloud Journey impacted the customer experience?
- What are property managers' decision-making processes for moving forward with more comprehensive upgrades beyond the set of direct install measures that have historically been offered through the Multifamily Initiatives?
- How does the one stop shop delivery model align with property managers' decision-making processes for making upgrades, and for going beyond basic upgrades to incorporate more comprehensive high efficiency measures?
- What are the barriers that may prevent property managers from installing more comprehensive measures?
 - Do property managers in rural areas face any unique barriers to program participation? How can these barriers be addressed?

- What impact has the one stop shop model had on participating property managers' awareness of the following:
 - The benefits associated with completing energy efficient upgrades at their facilities
 - The funding resources available to support energy efficiency improvements
 - The variety of measures available to them through additional Residential and Business Program Initiatives?
- What changes could the Initiatives make to improve the participation experience from the property managers' perspective? What would the ideal program model look like from the property managers' perspective?
- What impact have the Multifamily Initiatives design changes had on:
 - Property manager participation in the Multifamily Initiatives
 - Property manager satisfaction with the Initiatives
 - The types of measures property managers decide to install through the Initiatives
 - Performance of the Initiatives as compared to previous program years
- What changes could the Initiatives make to increase uptake of energy efficient offerings from across Residential and Business Program offerings (e.g. delivery methods, cross-program channeling, etc.)?

Evaluation Tasks

Table 15 summarizes the 2021 evaluation activities planned for the AIC Multifamily Initiatives.

Table 15. Summary of AIC Multifamily Initiatives Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material & Database Review		✓	Review the 2021 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 further understand Initiative performance and evaluation priorities for 2021.
Multifamily Cross-Cutting Property Manager Interviews		✓	Conduct interviews with property manager participants in the Income Qualified, Public Housing, and Multifamily (market rate) Initiatives to gather feedback about their experience and satisfaction with the one stop shop design changes.
Impact Analysis	✓		Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V9.0 specified algorithms are used in calculating gross savings. Determine 2021 net impacts using SAG-approved NTGR values.

Task 1. Initiative Materials and Database Review

The evaluation team will conduct a comprehensive review of all initiative materials and tracking data including marketing and implementation plans, customer communications, and extracts from the tracking database.

The purpose of this review is to document the design and implementation of the Multifamily Initiatives in 2021. We anticipate requesting tracking data at mid-year and the end of the year to support the impact evaluation.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

We will conduct early-evaluation and year-end interviews with AIC and implementation contractor staff to confirm our understanding of Multifamily Initiatives design and implementation in 2021. A key priority of these interviews is to learn more about the transition to the one stop shop delivery approach and to understand the impacts that the transition to this approach has had on the Initiatives from the staff perspective. These interviews will also provide AIC and implementation staff with an opportunity to discuss their evaluation priorities for 2021. In total, we expect to complete six interviews: one interview each with Leidos, CMC, and AIC staff early in the program year and another interview with each of the three parties at the end of the year.

Deliverable: Completed interviews

Deliverable Date: May and December 2021

Task 3. Multifamily Property Manager Interviews

We will conduct in-depth interviews with property managers who participate in the multifamily components of the Income Qualified, Public Housing, and Multifamily (market rate) Initiatives. The purpose of these interviews is to understand property managers' experiences with the new one stop shop design. We will specifically explore property managers' decision-making processes for completing general property upgrades and high efficiency upgrades, assess initiative re-design alignment with these decision-making processes, and investigate property manager satisfaction with initiative components. In addition, we will leverage the information provided in these interviews to make recommendations for opportunities to improve the Initiatives.

The evaluation team will provide a summary of key findings from the interviews with multifamily property managers in the form of a PowerPoint presentation. Where appropriate, we will also report on similarities and differences in findings across the Initiatives. Note that this task was originally scoped as part of the 2020 evaluation plan but was placed on hold due to delays in the one stop shop roll-out and the COVID-19 pandemic. As such, this task does not appear in the 2021 budget but is repeated here for clarity.

Deliverable: Interview guide

Deliverable Date: April 2021

Deliverable: Memo with summary of findings

Deliverable Date: June 2021

Task 4. Impact Analysis

To determine gross impacts associated with the Multifamily Initiatives, 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 V9.0. 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 V9.0 to calculate verified gross savings associated with the measures recorded in the database. For net impacts, we will apply the SAG-approved NTGRs for 2021, which vary by channel. We anticipate beginning the impact analysis in August 2021 based on the expected availability of Multifamily Initiatives tracking data.

Deliverable: Interim impact analysis memo

Deliverable Date: September 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 5. Reporting

The evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2022. 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, 2022

Deliverable: Chapter in final annual Residential Program impact report *Deliverable Date:* April 30, 2022

Evaluation Budget and Timeline

Table 16 summarizes the timing and budget associated with each evaluation activity.

Table 16. Multifamily Initiatives Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$9,700
2	Initiative Staff Interviews	May and December 2021	\$9,500
3	Multifamily Property Manager Interviews	April and June 2021	N/A
4	Impact Analysis	March 15, 2022	\$59,300
5	Draft Annual Impact Report	March 15, 2022	\$36,400
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2022	
Total Budget			\$114,900

2.1.6 Midstream Heating and Cooling Initiative

In 2021, AIC is launching the Midstream Heating and Cooling Initiative (Midstream Initiative), which will encourage market actors such as distributors and contractors in AIC territory to promote and install a number of measures. The Initiative is expected to include air source heat pumps (ASHPs), central air conditioners (CACs), ENERGY STAR certified smart thermostats, and heat pump water heaters (HPWHs). The Initiative will provide an incentive to distributors that will in turn lower the cost of efficient equipment for contractors thus encouraging them to pass those savings onto their customers and encouraging them to install more efficient heating and cooling equipment and water heaters than they might normally install.

Evaluation Approach

AIC is transitioning their residential HVAC incentive offerings from a downstream program approach to a midstream approach for residential heating and cooling equipment and heat pump water heaters in early 2021. Because the midstream approach is new, 2021 is an opportunity to prioritize process evaluation questions and ensure that the new program design and processes are working well for all market actors. To assess program processes, we will conduct in-depth interviews with contractors and distributors to understand how the processes are working. Additionally, we will survey contractors to quantitatively understand their experience with the new program design. All data collection activities will seek to understand any market effects the Midstream Initiative may be having. As the transition of initiative design will begin in spring 2021, most evaluation activities will occur in the fall of 2021 to ensure that market actors have experience with the new initiative design before being asked to assess it.

Research Objectives

Impact Questions

The 2021 impact evaluation will answer the following questions:

- What were the estimated gross energy and demand impacts from this initiative?
- What were the estimated net energy and demand impacts from this initiative?

Process Questions

The 2021 process evaluation will answer the following questions:

- How have changes in program design affected:
 - Sales of efficient HVAC and HPWH equipment
 - Market actor participation in the Initiative
 - Customer willingness to install efficient products
 - Market actor satisfaction with the Initiative
- What barriers exist to market actor participation and how can they be overcome to improve the program?
- What, if any, market effects may be occurring because of the Initiative?⁸

Evaluation Tasks

We propose seven evaluation activities, including a number of primary data collection activities, to assess the Midstream Initiative in 2021. Table 17 summarizes these activities and we provide additional details including specific deliverables and dates below.

Table 17. Summary of Midstream Initiative Evaluation Activities for 2021

Activity	Impact	Process	Summary
Initiative Staff and Implementer Interviews	✓	✓	Interview AIC and implementation managers to understand goals of Initiative change, schedule of Initiative rollout, and identify successes and challenges with the transition from downstream to midstream.
Initiative Material and Database Review	✓	✓	Comprehensive review of Initiative materials to understand details of Initiative rollout and database review to support sampling and reporting.
Contractor Interviews		✓	Complete up to 10 interviews with contractors active in the downstream and midstream approaches to get an in-depth understanding of how the transition effected their business.
Contractor Web Survey		✓	Using results from the contractor interviews, we will prepare a survey for contractors to assess their experience with the Initiative including sales, satisfaction, and areas of possible improvement.
Distributor Interviews		✓	Complete up to 20 interviews with distributors active in the Midstream Initiative to get an in-depth understanding of how the transition affected their

⁸ Note that at the time of this plan, AIC was in the process of finalizing the design of the market effects components of this Initiative. As such, the evaluation team will determine what changes, if any, to this plan are needed once that process is complete.

Activity	Impact	Process	Summary
			business. Special attention will be paid to their increased responsibility in supporting AIC's efforts to promote efficient HVAC and HPWH products.
Impact Analysis	✓		Review initiative tracking data to ensure that correct deemed input values and IL-TRM V9.0 specified algorithms are used in calculating gross savings. Determine 2021 net impacts using SAG-approved NTGR values.
Reporting	✓	✓	We will analyze results from each data collection activity and provide a report that synthesizes results across data sources and offered conclusions and recommendations.

Task 1. Program Staff and Implementer Interviews

We will conduct an interview with the AIC and Leidos managers of the Midstream Initiative. These interviews will focus on understanding the transition to a midstream approach, the goals of the transition, and the overall schedule of the rollout. These interviews will also address how the new initiative will help AIC meet its goal of promoting and selling heat pump water heaters. Results of these interviews will inform subsequent data collection activities, especially the development of interview guides and survey instruments.

Deliverable: Completed interviews

Deliverable Date: May 2021

Task 2. Initiative Material and Database Review

We will conduct a comprehensive review of all initiative materials and tracking data. This includes marketing and implementation plans, trade ally communications, training information, forms used by contractors to log purchases, workbooks (or other systems) used by distributors to log sales and extracts from the tracking database. The data extracts will inform the development of our samples for the contractor and distributor data collection activities.

Deliverable: Data requests

Deliverable Date: May 2021 and December 2021

Task 3. Contractor Interviews

Contractors played a large role in delivering the Initiative via the downstream approach and they will continue to play a role in the Midstream Initiative, albeit a different one. Under the downstream approach, contractors sold the program to customers whereas now they will be collecting customer data and reporting that to distributors. We will complete up to 10 contractor interviews after the Midstream Initiative has been operating for a couple months so that we can get their early perspective about program rollout.

We will use these interviews to inform the development of the contractor survey in Task 4. These interviews will explore how the change in initiative approach may have affected their business in terms of staffing, sales, and satisfaction. We will pay particular attention to how the new approach may have impacted their sales of Initiative supported equipment and their assessment of how the Initiative is impacting the broader market for efficient equipment. The interviews will also ask respondents to identify any successes and challenges they may have experienced with the new Initiative processes including getting customer data the distributors need to submit to AIC. We will offer potential respondents an incentive to encourage participation in the interviews.

Deliverable: Draft and final survey instrument

Deliverable Date: September 2021

Task 4. Contractor Web Surveys

Using results from Task 3, we will develop a contractor survey that will quantify the topics we explored in the interviews. We will field these surveys soon after the contractor interviews are complete so as to understand the perspective of contractors after they have a few months of experience with the new Initiative. We will distribute these surveys via email and will offer potential respondents an incentive to encourage participation in the survey. We will attempt a census of all contractors that have been involved in the Initiative. In 2019, there were 320 active and inactive trade allies registered with the Initiative and the team successfully surveyed 66 allies. For budgeting purposes, we are assuming similar numbers and response rates to what we achieved in 2019.

Deliverable: Draft and final survey instrument

Deliverable Date: October 2021

Task 5. Distributor Interviews

Distributors play a key role in the promotion of midstream incentives. As such, we will complete up to 20 distributor interviews to explore how the Initiative is impacting their business and understand how AIC could potentially improve the participation process. We will field these interviews after the initiative has been operating for several months so that the distributors have some experience with the new Initiative. We will explore how the Initiative may have affected their business in terms of staffing, stocking practices, communications with contractors, sales of efficient equipment, and satisfaction with the Initiative. We will pay particular attention to how the Initiative may have impacted their sales of Initiative supported equipment and their assessment of how the Initiative is impacting the broader market for efficient equipment. We will offer potential respondents an incentive to encourage participation in the survey.

Deliverable: Draft and final survey instrument

Deliverable Date: September and October 2021

Task 6. Impact Analysis

To determine gross impacts associated with the Midstream 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 V9.0. 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 V9.0 to calculate verified gross savings associated with the measures recorded in the database. For net impacts, we will apply the SAG-approved NTGRs for 2021. Impact analysis will also include any projects completed through the legacy HVAC Initiative in 2021.

We will complete a mid-year impact review with partial 2021 program year data and provide to AIC and ICC Staff for review.

Deliverable: Interim impact analysis memo

Deliverable Date: June 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 7. Reporting

We will deliver a process memo summarizing key findings from Tasks 1 through 5. Based on these findings, we will draw conclusions about how the new Initiative is impacting market actors and the broader market and we will recommend any opportunities for improving program processes and increasing sales of efficient HVAC equipment and heat pump water heaters.

Additionally, the evaluation team will provide all impact findings in the Residential Program Annual Impact Evaluation Report in March 2022. 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 process memo *Deliverable Date:* December 2021

Deliverable: Chapter in draft annual Residential Program Impact Report *Deliverable Date:* March 15, 2022

Deliverable: Chapter in final annual Residential Program Impact Report *Deliverable Date:* April 30, 2022

Evaluation Budget and Timeline

Table 18 summarizes the timing and budget associated with each research activity.

Table 18. Midstream Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Program Staff and Implementer Interviews	May 2021	\$7,400
2	Initiative Material and Database Review	May and December 2021	\$7,500
3	Contractor In-Depth Interviews	September 2021	\$25,500
4	Contractor Survey	October 2021	\$27,000
5	Distributor Interviews	September/October 2021	\$36,300
6	Impact Analysis	March 15, 2022	\$39,700
7	Draft and Final Process Report	December 2021	\$35,400
	Draft Annual Impact Report	March 15, 2022	
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2022	
Total Budget			\$178,800

2.1.7 Appliance Recycling Initiative

The Appliance Recycling Initiative promotes the retirement and recycling of functioning, inefficient refrigerators, freezers, and room air conditioners 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 is cross-promoted by the Retail Products Initiative so that customers purchasing new energy efficient refrigerators and freezers know how to dispose of their older equipment, as well as through the Income Qualified and Multifamily Initiatives, where energy assessments are conducted to help identify potential energy efficient upgrades.

The Initiative also includes the Appliance Recycling Kits offering, which provides free energy saving kits to customers residing within low-income areas who have recycled an appliance through the Appliance Recycling Initiative. In 2021, the kits contain four LED light bulbs, one low flow showerhead, two faucet aerators, a Tier 1 advanced power strip, and a water heater temperature card to promote water heater temperature setbacks.

Evaluation Approach

The 2021 assessment of the Appliance Recycling Initiative includes both impact and process analyses as outlined in the following sections.

Research Objectives

Impact Questions

The 2021 Appliance Recycling Initiative impact evaluation will answer the following questions:

- What were the estimated gross energy and demand impacts from the Initiative?
- What were the estimated net energy and demand impacts from the Initiative?

Process Questions

The evaluation team will also explore limited process-related research questions for the 2021 evaluation, including the following:

- Did the Initiative’s implementation change since 2020? If so, how and why, and was this change advantageous?
- What challenges did the implementer face in 2021?

Evaluation Tasks

Table 19 summarizes the 2021 evaluation activities planned for the Appliance Recycling Initiative.

Table 19. Summary of Appliance Recycling Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material and 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.
Impact Analysis	✓		Review initiative tracking data for accuracy, completeness, and to ensure that correct deemed input values and IL-TRM V9.0 specified algorithms are used in calculating savings. Determine 2021 gross and net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material and 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 the tracking database for relevant data required to estimate gross savings using the IL-TRM V9.0 algorithms. The tracking data also contain measure data, including ex ante savings. The marketing materials and information regarding Initiative processes will inform the team’s design of interview instruments.

The team will make an initial data request in January 2021, with subsequent requests in April 2021 and January 2022, to obtain the final initiative tracking database.

Deliverable: Data requests

Deliverable Date: January and April 2021 and January 2022

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 2020, 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 2021 and initiative plans for the near future.

Deliverable: Completed interviews

Deliverable Date: July 2021

Task 3. Impact Analysis

The evaluation team will use engineering and database reviews to estimate the Initiative’s 2021 verified gross savings. The initiative database contains relevant physical characteristics of appliances recycled through the initiative, including capacity (in cubic feet), year of manufacture, and unit configuration, all of which are key inputs to the algorithm for calculating gross savings, as well as necessary information for calculating savings from kit measures. The evaluation team will review all records in the initiative database to ensure the correct savings assumptions have been applied for each appliance type and verify that the database is providing complete and accurate information at both the measure and project level. We will also resolve any discrepancies found in the database and report on findings.

The evaluation team will complete a mid-year impact review with partial 2021 data and provide results to AIC and ICC Staff for review. We will use the values provided in the initiative tracking database and savings parameters outlined in the IL-TRM V9.0 to estimate verified gross energy and demand savings for each measure. We will also estimate verified net savings by applying SAG-approved NTGRs to verified gross electric savings (see Table 20). We will provide our findings in a memo with feedback on data quality and completeness, and application of IL-TRM V9.0 algorithms and other SAG-approved assumptions. We will replicate this analysis at the end of the evaluation period to calculate verified gross and net energy and demand savings for all of 2021.

Table 20. Appliance Recycling Initiative 2021 NTGRs

Measure Description	NTGR
Refrigerator Recycling	47.0%
Freezer Recycling	54.0%
Room Air Conditioner Recycling	50.0%
All Kit Measures	100.0%

Deliverable: Interim impact analysis memo

Deliverable Date: June 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 4. Reporting

The evaluation team will include 2021 initiative impacts in the draft Residential Program annual impact evaluation report. We will incorporate our responses to stakeholder feedback in a final report. We will submit separate deliverables containing results from process and forward-looking research tasks.

Deliverable: Chapter in draft annual Residential Program impact report

Deliverable Date: March 15, 2022

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

Table 21 summarizes the timing and budget associated with each evaluation activity.

Table 21. Appliance Recycling Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material and Database Review	January 2021	\$8,300
2	Initiative Staff Interviews	July 2021	\$6,200
3	Impact Analysis	March 2022	\$19,400
4	Draft Annual Impact Report	March 15, 2022	\$13,500
	Comments from AIC and ICC Staff	Within 15 Business Days	
	Final Annual Report	April 30, 2022	
Total Budget			\$47,400

2.1.8 Direct Distribution of Efficient Products Initiative

The Direct Distribution of Efficient Products (Direct Distribution) Initiative provides energy savings kits through two delivery channels: School Kits and Community Kits, described below.

- School Kits:** 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 four LED light bulbs, low flow showerheads and faucet aerators, a Tier 1 advanced power strip, pipe insulation, and a shower timer, as well as a Home Energy Worksheet (HEW) that collects data on fuel type and measure installation. 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.
- Community Kits:** Provides energy saving kits to under-served communities and in-need customers. Measures distributed include LED bulbs, outdoor light sensors, weather stripping, outlet gaskets, refrigerator and freezer thermometers, pipe insulation, LED nightlights, and thermostatic shutoff valve showerheads.

Evaluation Approach

The 2021 assessment of the Direct Distribution Initiative includes both process and impact analyses for each delivery channel, as outlined in the following sections.

Research Objectives

Impact Questions

For the 2021 evaluation, the team will answer the following questions:

- What were the estimated gross energy and demand impacts from the Initiative?
- What were the estimated net energy and demand impacts from the Initiative?

Process Questions

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

- Initiative Participation
 - How many kits were distributed to participants?
- Initiative Design and Implementation
 - Did AIC make any changes to the Initiative since 2020? How did these changes affect initiative performance or delivery?
 - What implementation challenges occurred in 2021?
 - What changes could AIC make to improve future initiative effectiveness?

Evaluation Tasks

Table 22 summarizes the 2021 evaluation activities to be conducted for the Direct Distribution Initiative.

Table 22. Summary of Direct Distribution Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material and Database Review	✓	✓	Review implementation plan and data in the tracking database to inform the evaluation
Initiative Staff Interviews		✓	Interview AIC and implementation staff to gain insights into the Initiative’s design and delivery.
Impact Analysis	✓		Determine 2021 gross and net impacts using IL-TRM V9.0 and SAG-approved NTGR values.

We describe each activity below in detail.

Task 1. Initiative Material and Database Review

The evaluation team will review Initiative tracking data in conjunction with coordinated Residential Program data review.

Deliverable: Data requests

Deliverable Date: April 2021 and January 2022

Task 2. Initiative Staff Interviews

The evaluation team will conduct one in-depth interview 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 2020, design and implementation, strengths and weaknesses, and outreach and marketing.

Deliverable: Completed interviews

Deliverable Date: July 2021

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 2021 to verify participation and measure details
- Apply installation rates for all measures and water heater saturation rate by fuel type as agreed with the implementation team
- Apply the IL-TRM V9.0 per-unit savings for each measure to verified participation numbers to determine verified gross savings
- Apply the SAG-approved NTGRs by measure to calculate net savings

Deliverable: Analysis provided in draft report

Deliverable Date: March 2022

Task 4. Reporting

The evaluation team will provide all impact findings in the Residential Program annual impact evaluation report in March 2022. 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, 2022

Deliverable: Chapter in final annual Residential Program impact report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

Table 23 summarizes the timing of each evaluation activity. Table 23 also shows the budget associated with each evaluation task.

Table 23. Direct Distribution Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material and Database Review	April 2021 and January 2022	\$2,000
2	Initiative Staff Interviews	July 2021	\$5,000
3	Impact Analysis	March 2022	\$18,000
4	Draft Annual Impact Report	March 15, 2022	\$14,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2022	
Total Budget			\$39,000

2.2 Business Program

AIC’s planned Business Program provides services to non-residential customers (including the public sector) and is made up of four main initiatives: the Standard Initiative, the Custom Initiative, the Retro-Commissioning Initiative, and the Streetlighting Initiative. Within these initiatives, numerous subprograms are also offered; for example, AIC offers SBDI as part of the Standard Initiative and a Virtual Commissioning (VCx) offering as part of the Retro-Commissioning Initiative. In addition to the four main initiatives being offered in 2021, AIC also offers Building Operator Certification (BOC) training.

In this section, we outline the anticipated evaluation activities for each of the Business Program initiatives. In accordance with Illinois evaluation requirements, we will deliver a draft annual Business Program impact evaluation report on March 15, 2022, covering the 2021 program year. This report will include information in 2021 program participation, 2021 verified gross and net impacts for all Business Program initiatives, as well as initiative and program-level WAML and CPAS for the Program.

In addition, we will deliver a number of stand-alone memos summarizing results of process and NTGR research, where applicable.

Table 24. Schedule of 2021 Business Program Evaluation Deliverables

Deliverable	Date
Draft Annual Business Program Impact Evaluation Report	March 15, 2022
Comments Received from Stakeholders (15 business days)	April 5, 2022
Second Draft of Annual Business Program Impact Evaluation Report	April 14, 2022
Comments Received from Stakeholders (5 business days)	April 21, 2022
Final Annual Business Program Impact Evaluation Report	April 30, 2022
Annual Integrated Impact Report	April 30, 2022

2.2.1 Standard Initiative

The Standard Initiative offers AIC private and public sector business customers fixed incentives for the installation of prescriptive energy efficiency measures. The following offerings are available through this Initiative:

- The **Core offering** of the Initiative provides incentives for lighting, variable speed drives (VSDs), HVAC equipment, steam traps, compressed air leak repair, and other measures. The Core offering is application-based.
- The **Instant Incentives (Midstream) offering** provides midstream incentives to AIC business customers purchasing products at distributor retail locations to help increase the market share of efficient products. While the offering has successfully supported the market for efficient lighting products for several years, newly in 2021 the offering plans to begin a midstream model for HVAC products as well.
- The **Online Store offering** provides all AIC business customers with an e-commerce option to order and receive a variety of energy-saving lighting products, including LEDs, occupancy sensors, advanced thermostats, and advanced power strips.
- The **Green Nozzle offering** provides free efficient water nozzles to gas customers and to customers in the food service sector who use electric or natural gas water heating. This offering has historically accounted for a very small proportion of therm savings for the Standard Initiative.
- The **Small Business offering** provides energy assessments and direct install energy efficiency measures to AIC’s small (primarily DS-2 and/or GDS-2) customers. While the Standard Initiative is designed to serve business customers of all sizes, this offering is a critical participation channel for AIC’s small customers.

Evaluation Approach

The 2021 assessment of the Standard Initiative focuses on accurate quantification of energy and demand impacts from the Initiative.

Research Objectives

Impact Questions

The 2021 impact evaluation will answer the following impact-related questions:

- What are the estimated gross energy and demand impacts from the Initiative? What offerings make up the largest proportions of these impacts?
- What are the estimated net energy and demand impacts from the Initiative?

Process Questions

The 2021 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:

- Initiative Participation
 - What were the characteristics of participating customers? How many projects were completed and through which offerings? By how many different customers? What types of projects did customers complete?
 - 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?
- Initiative Design and Implementation
 - Did the Initiative’s implementation change from 2020? If so, how and why? Was this an advantageous change?
 - Did the Initiative experience any implementation challenges in 2021? If so, what were they, and how were they overcome?
 - What changes could the Initiative make to improve the customer experience and generate greater energy savings?

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 2021 evaluation of the Standard Initiative (Table 25).

Table 25. Summary of Standard Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material and Database Review	✓	✓	Gather information about initiative design, implementation and performance in 2021.

Activity	Impact	Process	Details
Initiative Staff Interviews		✓	Explore changes made since 2020 and gather information about initiative marketing, implementation, and 2021 performance.
Impact Analysis	✓		Review initiative tracking data to ensure that correct deemed input values and IL-TRM V9.0 specified algorithms are used in calculating savings. Estimate gross impacts through review of the initiative tracking database and application of the IL-TRM V9.0. Estimate net impacts using SAG-approved NTGR values for 2021.

We describe each of these activities in detail below.

Task 1. Initiative Material and 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.

Deliverable: Submit data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2021 to explore initiative performance, changes since 2020, and other topics relevant to our research objectives. We will conduct two interviews with Business Program staff: (1) a brief interview mid-cycle to understand changes made to the initiative in 2021 and to provide time for the evaluation team to modify any research tasks as necessary and (2) a comprehensive interview toward the end of 2021 allowing the implementation team the opportunity to comment on the initiative’s performance throughout the year. In total, we plan to complete between three and 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 staff specific to offerings (e.g., implementation staff for the Small Business offering), as needed.

Deliverable: Conduct interviews

Deliverable Date: June and December 2021

Task 3. Impact Analysis

To estimate verified gross impacts associated with measures installed through the Standard Initiative, 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 V9.0 specified algorithms are used in calculating savings, and replicate savings calculations to ensure accuracy. This step will produce gross savings estimates for 2021.

In addition, we will calculate 2021 net savings by applying the SAG-approved NTGRs for 2020 to electric and gas gross savings.

Deliverable: Results provided in annual report

Deliverable Date: March 15, 2022

Task 4. Reporting

The evaluation team will provide all impact findings in the Business Program Annual Impact Evaluation Report in March 2022. 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, 2022

Deliverable: Chapter in final annual Business Program impact report *Deliverable Date:* April 30, 2022

Evaluation Budget and Timeline

Table 26 summarizes the timing and budget associated with each evaluation activity.

Table 26. Standard Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material and Database Review	Ongoing	\$5,100
2	Initiative Staff Interviews	June and December 2020	\$5,300
3	Impact Analysis	March 2021	\$61,000
4	Draft Annual Impact Report	March 15, 2021	\$29,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2021	
Total Budget			\$100,400

2.2.2 Custom Initiative

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 and demand savings. Incentives are calculated based on energy savings estimates for each project and may vary between different technologies and fuel types.

AIC made the Custom Initiative available to public sector customers beginning in June 2017. Since this time, the Initiative began targeting public sector facilities such as water treatment facilities. Enhanced incentives for public sector or other financially-strained customers are provided where necessary.

The Custom Initiative also includes a number of smaller “incubator” offerings, 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 by 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;
- The **Feasibility Study offering**, which helps participants define project costs and energy savings opportunities, primarily targeting manufacturing/industrial facilities with compressed air systems;
- The **Competitive Large Incentive Project (CLIP) offering** provides a competitive offer for customers to bid on incentives that may be different than the typical Custom incentive.

These incubator initiatives are designed primarily to help customers overcome barriers to participation in AIC's Business Program, and typically do not directly yield energy savings.

The Custom Initiative also offers a number of additional services to AIC customers, including education and training opportunities.

Evaluation Approach

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

Research Objectives

The primary objective of the 2021 Custom Initiative evaluation is to provide estimates of gross and net electric and gas savings associated with the Initiative. In addition, the evaluation includes a targeted process analysis. Note that in addition to the 2021 Custom Initiative evaluation, the evaluation team expects to conduct Custom Initiative-focused research in 2021 (detailed in more depth in Section 3.4.1).

Impact Questions

The 2021 impact evaluation will answer the following questions:

- What were the estimated gross energy and demand impacts from the Initiative in 2021?
- What were the estimated net energy and demand impacts from the Initiative in 2021?

Process Questions

The evaluation team will also conduct a basic process evaluation in 2020. The process research will utilize data from in-depth interviews with AIC and implementation staff and a review of initiative implementation and marketing materials. We will explore a number of process-related research questions outlined below.

- Initiative Participation
 - What were the characteristics of participating customers? How many projects were completed through the different offerings? By how many different types of customers? What types of projects?
 - Did customer participation meet expectations? If not, how and why is it different from expectations? Would any changes in the mix of customers and projects have been desirable?
- Initiative Design and Implementation
 - Did the Initiative's design and implementation change from 2020? If so, how and why and was this an advantageous change?

- Did the Initiative experience any implementation challenges in 2021? If so, what were they, and how were they overcome?
- What changes could the Initiative make to improve the customer experience and generate greater energy savings?

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

Evaluation Tasks

Table 27 summarizes the 2021 evaluation activities proposed for the Custom Initiative.

Table 27. Summary of Custom Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material and Database Review	✓	✓	Gather information about initiative implementation and performance.
Initiative Staff Interviews		✓	Explore changes made since 2020 and gather information about initiative marketing, implementation, and 2021 performance.
Engineering Desk Reviews	✓		Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc.
On-Site Measurement and Verification	✓		Collect data to inform measure verification and verified gross impacts.
Impact Analysis	✓		Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc. Collect data to inform measure verification and verified gross impacts. Determine 2020 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material and 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 will request extracts from AMPLIFY on a regular basis and will continue to communicate with AIC and Leidos about data needs as needed.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2021 to explore initiative performance, changes since 2020, and other topics relevant to our research objectives. We will conduct two interviews with Business Program staff: (1) an interview in the beginning of 2021 to understand changes made to the initiative from 2020 and to provide time for the evaluation team to modify any research tasks as necessary and (2) a comprehensive interview toward the end of 2021 allowing implementation staff the opportunity to comment on the Initiative’s performance throughout 2021. In total, we plan to complete between three and 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 also conduct interviews with staff specific to this initiative, as needed.

Deliverable: Completed interviews

Deliverable Dates: June and December 2021

Task 3. Impact Analysis

Conducting gross impact analysis for custom projects requires custom engineering calculations. Since custom projects can have large variability in measures and savings, the gross impact analysis for the Custom Initiative will employ a sample-based, 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 the implementer’s measurement and verification results. We will tailor the scope of each on-site visit to the specific measures installed at the site, but at a minimum, the review engineer will perform the following actions during the on-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 incented.
- 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 10 of the largest and/or most complex Custom Initiative projects.⁹ No other on-site visits 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 verified 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 verified savings for the population of Custom projects, is:

Equation 1. Ratio Estimate of Population Total¹⁰

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

Where:

y = The total verified 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, it is too early to predict the level of activity expected for the Custom Initiative in 2021 and desirable sample sizes for the impact evaluation. We will determine the optimal sampling approach based on the number, type, and size of projects completed in 2021, and target 10% relative precision at 90% confidence (90/10) by fuel type. For budgeting purposes, we assume 50 project

⁹ Projects are selected for formal M&V plans and reports to support discussion with the implementation team; selection of projects for formal M&V plans and reports does not relate to sampling. All projects receive high-rigor impact evaluation regardless of selection for formal M&V plans and reports.

¹⁰ Cochran, William. 1977. *Sampling Techniques*. New York: John Wiley & Sons.

reviews. We believe this is a conservative sample size that will be sufficient to provide 90/10 precision at the initiative level, at a minimum. As the 2021 evaluation concludes and we update our understanding of Initiative project characteristics, we will revise our planned sample size as necessary.

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 waves of impact research for the Custom Initiative in 2021. 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 the share of final initiative savings we project the wave represents.

We anticipate drawing separate samples for gas and electric projects and, within each sample, stratifying projects by size. Stratification by size allows us to over-sample large savers, thus ensuring that our analysis covers a sufficient share of initiative savings. From within each stratum, we will randomly sample participants to achieve the precision and confidence targets. As necessary, we will adjust the sample size depending on participation in order to achieve the statistical targets if necessary.

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 verified 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 2021 net savings by applying the SAG-approved NTGRs for the Custom Initiative of 82.2% and 93.9% to electric and gas gross savings, respectively.

Deliverable: Site visit formal M&V plans *Deliverable Date:* Rolling

Deliverable: Desk review and site visit results *Deliverable Date:* Rolling

Deliverable: Final analysis in draft report *Deliverable Date:* March 2022

Task 4. Reporting

The evaluation team will provide all impact findings in the Business Program annual impact evaluation report in March 2022. 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, 2022

Deliverable: Chapter in final annual Business Program impact report *Deliverable Date:* April 30, 2022

Evaluation Budget and Timeline

Table 28 summarizes the timing and budget associated with each evaluation activity.

Table 28. Custom Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material and Database Review	Ongoing	\$6,600
2	Initiative Staff Interviews	June and December 2021	\$5,900
3	Impact Analysis	Ongoing	\$192,200
4	Draft Annual Impact Report	March 2022	\$20,300
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 2022	
			\$225,000

2.2.3 Retro-Commissioning Initiative

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 and public sector customers identify no-cost and low-cost efficiency optimizations and implement these improvements to achieve energy savings in existing energy-using systems. We anticipate that the initiative will have changed in significant ways from 2020 to 2021, given the discontinuation of the Compressed Air Retro-Commissioning offering to prioritize longer-lived energy efficiency opportunities in the AIC portfolio. The initiative now includes the following offerings:

- Large Facilities
- Industrial Refrigeration
- Retro-Commissioning Lite
- Virtual Commissioning¹¹

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 awareness and financial barriers,

¹¹ While the Virtual Commissioning offering is a component of the Retro-Commissioning Initiative, its evaluation plan is provided separately in Section 2.2.4 due to substantial differences in required evaluation activities.

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 includes a quantification of energy and demand impacts and a limited process analysis.

Research Objectives

Impact Evaluation

The 2021 research objectives for the evaluation of the RCx 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 2021 impact evaluation will answer the following questions:

- What are the estimated gross energy and demand impacts from the Initiative in 2021?
- What are the estimated net energy and demand impacts from the Initiative in 2021?

Process Evaluation

We plan to conduct a limited assessment of initiative processes in 2021. Our process analysis will primarily focus on changes made by the Initiative moving into 2021 and will be based on our review of initiative materials, initiative staff interviews, and process questions included in the participant survey.

- Initiative Participation
 - What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
 - Did customer participation meet expectations? If not, how and why is it different from expectations? Would any changes in the mix of customers or projects have been desirable?
 - How many RSPs actively participated in the various sectors and offerings targeted by the initiative? How many projects did each RSP complete?
- Initiative Design and Implementation
 - Did the Initiative's design and implementation change from 2020? If so, how and why and was this an advantageous change?
 - Did the Initiative experience any implementation challenges in 2021? If so, what were they, and how were they overcome?
 - What changes could the Initiative make to improve the customer experience and generate greater energy savings?

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

Evaluation Tasks

The table below summarizes the 2021 evaluation activities proposed for the RCx Initiative.

Table 29. Summary of Retro-Commissioning Initiative Evaluation Activities for 2021

Activity	Impact	Process	Forward Looking	Details
Initiative Material and Database Review	✓	✓		Gather information about initiative implementation and performance.
Initiative Staff Interviews		✓		Explore changes made since 2020 and gather information about initiative marketing, implementation, and 2021 performance.
Impact Analysis	✓			Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc. Collect on-site data to inform measure verification and verified gross impacts. Determine 2020 net impacts using SAG-approved NTGR values.

We describe each of these activities in detail below.

Task 1. Initiative Material and 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 will request extracts from AMPLIFY on a quarterly basis and will continue to communicate with AIC and Leidos about data needs as needed.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2021 to explore initiative performance, changes since 2020, and other topics relevant to our research objectives. We will conduct two interviews with Business Program staff involved in retro-commissioning: (1) a brief interview mid-cycle to understand changes made to the Initiative in 2021 and to provide time for the evaluation team to modify any research tasks as necessary and (2) a comprehensive interview toward the end of 2021 allowing implementation staff the opportunity to comment on the Initiative’s performance throughout 2021. We will likely conduct interviews focusing on all Business Program initiatives together, but we will conduct interviews with staff specific to this initiative as needed.

Deliverable: Completed interviews

Deliverable Dates: April and November 2021

Task 3. 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 reviews¹² and on-site M&V (as needed).

Given the timing of this evaluation plan, it is too early to predict the level of activity for the Initiative in 2021 and desirable sample sizes for the impact evaluation. We will determine the optimal sampling approach based on the number and types of projects completed in 2021, and target 90/10 confidence and precision around our results, by fuel type.

We anticipate drawing separate samples for gas and electric projects and stratifying projects into small and large energy savers (or small, medium, and large savers, depending on the initiative results) within each sample. Stratification of projects by size allows us to over-sample large savers, thus ensuring that our analysis covers a sufficient share of initiative savings. From within each stratum, we will randomly sample projects to achieve the desired 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.

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

- **Conduct engineering desk reviews for a census of completed projects in 2021.**
- **Conduct engineering desk reviews and on-site M&V for a census of completed projects in 2021.**
- **Conduct engineering desk reviews for a census of completed projects in 2021, followed by a stratified random sample of completed projects that will receive on-site M&V.** 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 for each sampled site (for each impact metric, at the project level), and apply these realization rates to the preliminary verified gross savings values determined for each project through engineering desk reviews to determine overall verified gross savings for the Initiative.

For budgeting purposes, we have assumed that we will conduct 15 engineering reviews and 5 on-site visits. We will adjust the sample size depending on participation in order to achieve the statistical targets, if necessary. As needed, and as project completion timing allows, we will conduct our impact analysis in multiple waves to expedite our 2021 evaluation results.

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 verified savings for each project selected for engineering review and for each site selected for 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.

¹² As needed, engineering desk reviews will include consumption analysis and modeling on a project-specific basis.

We will calculate 2021 net savings by applying SAG-approved NTGRs to electric and gas gross savings.

Deliverable: Gross impact analysis summary spreadsheet

Deliverable Date: TBD¹³

Deliverable: Final analysis in annual report

Deliverable Date: March 2021

Task 4. Reporting

The evaluation team will provide all impact findings in the Business Program annual impact evaluation report in March 2022. 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, 2022

Deliverable: Chapter in final annual Business Program impact report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

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

Table 30. Retro-Commissioning Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material and Database Review	Ongoing	\$2,200
2	Initiative Staff Interviews	April and November 2021	\$4,000
3	Impact Analysis	May 2021	\$50,000
4	Draft Annual Impact Report	March 15, 2022	\$20,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2022	
Total Budget			\$76,200

2.2.4 Virtual Commissioning Offering

AIC began partnering with Power TakeOff to offer a Virtual Commissioning offering that launched in July 2020 as a pilot. While the Virtual Commissioning offering is technically a subcomponent of the Retro-Commissioning Initiative, due to the substantially different evaluation approach required, its evaluation is scoped as a separate effort from that of the remainder of the Retro-Commissioning Initiative.

After the software flags high potential customers for participation, Power TakeOff energy advisors conduct a deeper analysis of these customers’ energy consumption profiles and facility characteristics. Power TakeOff uses the outcomes of this analysis to remotely identify opportunities for low and no-cost energy saving improvements at the participants’ facilities. These opportunities commonly include HVAC system modifications and lighting scheduling adjustments.

Power TakeOff energy advisors then reach out to potential participants to share the results of the analysis, confirm the energy-saving opportunities, and verify facility characteristics. The energy advisors revise their recommendations for the customers based on the information provided by the participants and then virtually share the final recommendations and documentation. The participants provide an implementation timeline stating when they plan to make the recommended changes, and the Power TakeOff energy advisors monitor

¹³ This is dependent upon the sampling approach chosen for 2021.

the AMI data to verify that the changes can be detected at the meter and that they result in the expected energy savings. Power TakeOff's M&V team continually estimate and monitor each participant's energy savings performance throughout the duration of the Initiative using individual site-level regression analyses of the participant's pre-and post-participation energy consumption to ensure changes result in persisting savings. If the Power TakeOff M&V team identifies reversion or drift in expected energy savings, the energy advisor will reach out to reengage the customer and provide additional support.

Evaluation Approach

The 2021 evaluation of the Virtual Commissioning Initiative includes a net and gross impact and limited process analysis as outlined below. To support these efforts, the evaluation team plans to interview AIC, Leidos, and Power TakeOff staff involved with implementing and managing the Initiative, request and review relevant background materials and data, and complete an impact analysis.

Research Objectives

The objective of the 2021 Virtual Commissioning Initiative impact evaluation is to provide estimates of gross and net electric and gas (kWh) savings associated with the Initiative and address a number of process questions. The 2021 evaluation will answer the following questions:

Impact Questions

- What are the estimated verified and net gross electric and gas impacts from the Initiative in 2021?

Process Questions

- Did the Initiative's design and implementation change from 2020? If so, how and why and was this an advantageous change?
- What have been the biggest Initiative successes? What have been the biggest challenges?
- What changes could AIC make to improve the customer participation experience?
- How effective are efforts to channel Virtual Commissioning Initiative participants to other AIC Initiatives?

Evaluation Tasks

Table 31 summarizes the research activities planned for the 2021 Virtual Commissioning offering evaluation.

Table 31. Summary of Virtual Commissioning Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material & Database Review	✓	✓	Review all Initiative materials and tracking data. Develop and submit requests for program tracking data extracts.
Initiative Staff Interviews		✓	Conduct interviews with AIC and implementation staff to further understand the Initiative design, learn about initiative performance and identify evaluation priorities.
Impact Analysis	✓		Determine appropriate modeling approach for the 2021 Initiative. Calculate verified net and gross electric savings using the selected approach. Determine the savings due to participation in other AIC initiatives and make adjustments to account for them. Apply the SAG-approved NTGR values to estimate net impacts.

We describe each of these activities in detail below.

Task 1. Initiative Materials and Database Review and Data Management

The evaluation team will conduct a comprehensive review of all Initiative materials and tracking data including marketing and implementation plans, customer communications, and extracts from the tracking database. To support transitioning to an advanced M&V approach to evaluation, we will request data extracts from Power TakeOff at up to two points throughout the Initiative implementation period. We plan to request early data extracts with participant AMI data, weather data, savings calculations details, participant information, and supporting data and project records including participant M&V workbooks. We may also request AMI data for the population of AIC’s small and medium business customers to support the develop of a comparison group if this type of approach is feasible and warranted. The evaluation team will work with Power TakeOff and AIC to determine the appropriate times to request the data extracts based on the number of participants and post-period data availability. The evaluation team will use these initial extracts to set up our data cleaning and modeling approach to prepare for receiving complete 2021 data in January. Upon receipt of the data, we will conduct data reviews to ensure we have the appropriate data inputs listed in the data request and we will follow up as necessary to obtain any additional data.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

We will conduct early evaluation interviews with AIC and Power Takeoff staff to confirm our understanding of the Virtual Commissioning Initiative design and implementation in 2021. These interviews will provide AIC and implementation staff with an opportunity to discuss their goals for the Initiative, highlight evaluation priorities for 2020, and share early insights on the Initiative performance. We plan to conduct one interview early in the Initiative implementation period and another at the end of the program year with Power TakeOff and AIC/Leidos for a total of four interviews.

Deliverable: Completed interviews

Deliverable Date: July and December 2021

Task 3a. Impact Analysis

The Virtual Commissioning Initiative partnership is built upon a pay for performance model, in which AIC pays Power TakeOff for savings achieved at the meter, which means that arriving at accurate estimates of savings takes on a new importance. We plan to use key industry advanced M&V protocols and lessons learned from the 2020 evaluation of the Virtual Commissioning Initiative to develop a robust and accurate modeling approach to estimate net and gross electric and gas savings. We plan to make several key methodological decisions based on interim and final program tracking and participant databases. We provide more context on these decisions below:

- **Pooled vs. Site Level modeling:** A pooled model maximizes the statistical power obtainable from the model and reduces uncertainty in the result by smoothing out the variability in results across sites. Still, site-level approaches provide more granular information about performance by facility that a pooled model is unable to provide. The evaluation team will use the number of customers enrolled in the Initiative and lessons learned from the 2020 Initiative evaluation to 1) assess which approach is most appropriate for the 2021 Initiative and 2) apply the appropriate approach to estimate savings. If selected, the site-level approach would include reviewing Power TakeOff's site-level model specifications and data cleaning decisions,¹⁴ assessing of how these modeling and data cleaning decisions align with industry best practice, and making adjustments to Power Takeoff's approach as necessary to produce final savings estimates. Depending on the size of the final population of customers we may complete a site-level analyses for a sample of participants.
- **Comparison Group Development and Handling of COVID-19 Impacts:** Past evaluations of Virtual Commissioning Programs in Illinois have used a pre-post regression without a comparison group. In a pre-post regression, the customers' post-treatment energy is compared to the customers' pre-period energy usage (adjusted for weather and other key variables). The difference is attributed to program participation as gross impacts. However, the COVID-19 pandemic has dramatically changed customers' energy usage behavior and rendered a pre-post model less appropriate for evaluating savings. The evaluation industry is coalescing around the use of comparison groups as the methodological approach for assessing savings given the exogenous impacts of COVID-19. We plan to assess the feasibility and appropriateness of developing a comparison group for the 2021 Virtual Commissioning Initiative. If appropriate, we will leverage comparison groups to support estimates of net and gross savings estimates.

In the process of developing the final model, we will evaluate several different model specifications and formulations. We will select the final model using econometric best practices by evaluating model fit and significance diagnostics, such as Akaike Information Criteria (AIC) and robust standard errors.

The evaluation team will apply the Illinois SAG-approved NTGR value of 1.0 to estimate net impacts, which is consistent with other Virtual Commissioning evaluations in Illinois.

Deliverable: Findings in draft report

Deliverable Date: March 2022

Task 3b. Joint Savings Analysis

A key objective of the Virtual Commissioning Initiative is to channel small and medium businesses, a previously underserved segment, into other AIC initiative offerings. Savings from the Virtual Commissioning Initiative reflect both non-purchase behavioral changes, such as adjusting lighting schedules or HVAC systems, and

¹⁴ These specifications and data cleaning decisions may include but are not limited to savings uncertainty thresholds, selection of weather data, treatment of non-routine events and exogenous routine events that impact facility energy consumption, and Power TakeOff's approach to handling COVID-19 impacts.

purchase behaviors. Therefore, savings from equipment that is rebated through other AIC Initiatives will appear in both the savings results for the Virtual Commissioning Initiative and savings results for rebate initiatives, which will result in a double-counting of savings if an adjustment are not made. The evaluation team will calculate a savings adjustment to account for the portion of net savings estimated from the impact analysis that has already been claimed by other AIC initiatives.

The evaluation team will base the savings associated with participation in other AIC initiatives on the results of their respective 2020 impact evaluations. As such, the team will conduct a joint savings analysis to calculate adjusted net savings estimates. The joint savings analysis identifies the portion of savings from the Virtual Commissioning interventions that is double-counted by the Virtual Commissioning Initiative and other AIC energy efficiency initiatives.

Deliverable: Findings in draft report

Deliverable Date: March 2022

Task 4. Reporting

The evaluation team will provide all impact findings in the Business Program Annual Impact Evaluation Report in March 2022. 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, 2022

Deliverable: Chapter in final annual Business Program Impact Report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

Table 32 summarizes the timing and budget associated with each evaluation activity.

Table 32. Virtual Commissioning Offering Evaluation Schedule and Budget

Task	Evaluation Task	Deliverable Date	Budget
1	Initiative Material & Database Review	Ongoing	\$26,900
2	Initiative Staff Interviews	July and December 2021	\$6,200
3	Impact Analysis	March 2022	\$72,600
4	Draft Annual Impact Report	March 15, 2022	\$22,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2022	
Total Budget			\$127,700

2.2.5 Streetlighting Initiative

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 targets 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 fixtures. For municipalities who own their own fixtures, the Initiative provides incentives for LED replacement at a reduced cost. For municipalities that do not own their streetlighting fixtures, AIC is currently replacing streetlights it owns with LED technology upon burnout at no cost to customers. In addition,

the Initiative offers early replacement of these streetlights 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 focuses on impact evaluation efforts to quantify savings achieved by the Initiative in 2021 and includes basic process evaluation activities to assess overall Initiative performance.

Research Objectives

Impact Questions

The 2021 impact evaluation will answer the following questions:

- What were the estimated gross energy and demand impacts from the Initiative in 2021?
- What were the estimated net energy and demand impacts from the Initiative in 2021?

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

Evaluation Tasks

Table 33 summarizes the 2021 evaluation activities proposed for the Streetlighting Initiative.

Table 33. Summary of Streetlighting Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
Initiative Material and 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.
Impact Analysis	✓		Review project documentation and calculations to account for analytical errors, incorrect assumptions, etc. Determine 2020 net impacts based on AIC planning assumptions and/or evaluation team recommendations.

We describe each of these activities in detail below.

Task 1. Initiative Material and 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 will request extracts from AMPLIFY on a quarterly basis and will continue to communicate with AIC and Leidos about data needs as needed.

Deliverable: Data requests

Deliverable Date: Ongoing

Task 2. Initiative Staff Interviews

To support our evaluation, we will develop an in-depth interview guide for 2021 to explore initiative performance, changes since 2020 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 2021 allowing implementation staff the opportunity to comment on the initiative’s performance throughout 2021. In total, we plan to complete three to five interviews, including interviews with the Business Program managers and marketing staff. We also plan to conduct Streetlighting-specific interviews with relevant staff.

Deliverable: Completed interviews

Deliverable Date: April and November 2021

Task 3. Impact Analysis

To assess gross savings in 2021, the evaluation team will conduct engineering desk reviews of the ex ante savings calculations made for streetlighting and apply the IL-TRM algorithm for streetlighting measures. 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. To calculate net impacts, the evaluation team will apply SAG-approved NTGRs to verified gross impacts.

Deliverable: Final analysis in annual report

Deliverable Date: March 15, 2022

Task 4. Reporting

The evaluation team will provide all impact findings in the Business Program annual impact evaluation report in March 2022. 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, 2022

Deliverable: Chapter in final annual Business Program impact report

Deliverable Date: April 30, 2022

Evaluation Budget and Timeline

Table 34 summarizes the timing and budget associated with each evaluation activity.

Table 34. Streetlighting Initiative 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Material and Database Review	Ongoing	\$4,500
2	Initiative Staff Interviews	April and November 2020	\$4,500
3	Impact Analysis	March 2021	\$18,500
4	Draft Annual Impact Report	March 15, 2021	\$32,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2021	
Total Budget			\$59,500

2.2.6 Building Operator Certification Assessment

AIC, in partnership with the Midwest Energy Efficiency Alliance (MEEA), offers the Building Operator Certification (BOC) Training to building operators in AIC territory. BOC is a nationally recognized course and certification training that was developed by the Northwest Energy Efficiency Council (NEEC) and focuses on energy-efficient building operations and preventative maintenance procedures.

The BOC offering consists of two levels of training. The Level I course consists of 8 one-day classes focused on building systems maintenance. The Level II course consists of 7 one-day classes focused on equipment troubleshooting and maintenance. Both courses consist of classroom training, project assignments to be completed at the participant's facility, and in-class tests at the end of each day. Graduates who elect to take the Certification Exam and pass, earn the BOC Certification and become a Certified Building Operator. Certified Building Operators maintain their certification through annual continuing education and completion of maintenance processes. While participants do not need to be AIC customers to enroll in the course, AIC provides a partial tuition reimbursement upon completion of the course (\$500 to put toward the total cost of \$1,400) to incentivize participation.

Evaluation Approach

The evaluation of the BOC offering has both impact and process components; objectives for both are outlined below. This approach assumes the BOC Training will continue to be funded as a traditional initiative in 2021. The Illinois SAG has formed a Market Transformation Savings Working Group to explore the possibility of evaluating BOC and other initiatives under a new approach to effectively capture the long-term market impacts of these initiatives. The evaluation team expects a decision on whether to reclassify the initiative as a Market Transformation initiative following the 2020 evaluation. In the event the Illinois SAG reclassifies the BOC Training as a Market Transformation Initiative, we will evaluate the initiative consistent with the methodology set forth by the Illinois SAG in subsequent evaluation years.

Research Objectives

Impact Questions

The 2021 impact evaluation will answer the following impact-related questions:

- What are the estimated energy, demand, and therm impacts attributable to the BOC Initiative?
- What energy-savings actions, and other improvements not claimed by other AIC initiatives, did participants implement due to what they learned in the training? How did the training influence these actions?
- What amount of channeling occurs from the BOC offering to AIC's other energy efficiency rebate initiatives? Do other AIC initiatives already capture BOC savings?

Process Questions

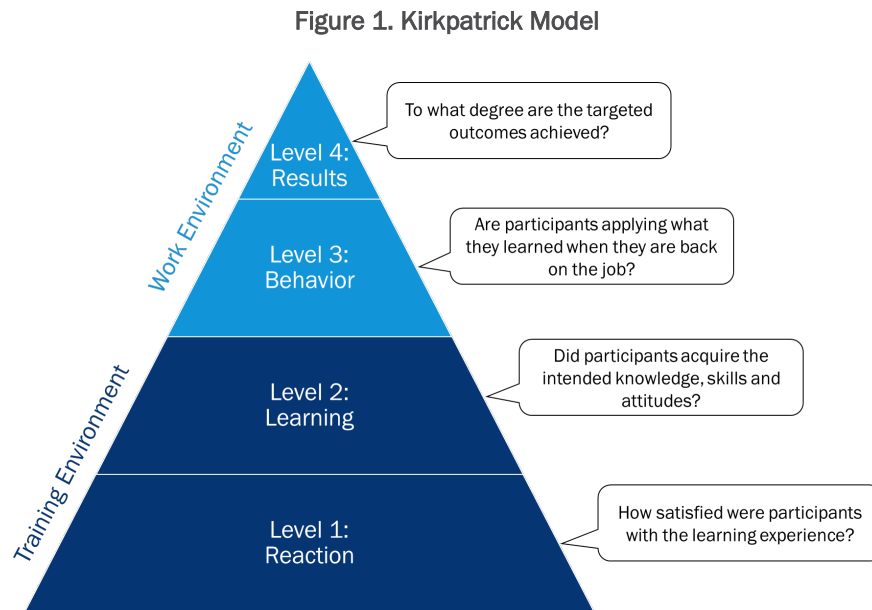
In addition, we will seek to answer the following process-related questions:

- Are BOC participants satisfied with the training experience?
- What improvements could be made to the training to increase effectiveness and participant satisfaction?

Conceptual Framework

Our evaluation framework leverages the Kirkpatrick Model, the gold standard for evaluating adult training interventions in the training industry. As illustrated in Figure 1, Kirkpatrick's Model consists of four levels:

- Level 1 - Reaction: measures how participants feel about the learning experience. The value of Level 1 is that a good training experience improves knowledge transfer.
- Level 2 - Learning: measures the degree to which participants change attitudes, increase knowledge, or enhance skills as a result of the learning experience. The value of Level 2 is to demonstrate that learning occurs as a result of the training.
- Level 3 - Behavior: measures the degree to which participants apply what they have learned outside of the learning environment. This level seeks to demonstrate whether trainees take the information they learn and apply it.
- Level 4 - Results: the degree targeted outcomes are achieved system-wide. In this study, we measured the training's results in terms of energy savings. The value of measuring Level 4 is to inform the return on training investment realized from the training endeavor.



The evaluation team will explore the influence of the BOC Training on any reported behavior changes to determine whether resulting energy savings are attributable to the initiative. We will make attribution determinations based on a preponderance of qualitative and quantitative evidence collected through surveys and interviews.

Evaluation Tasks

Table 2 summarizes the 2021 evaluation activities planned for the BOC Initiative. These tasks fall into two categories: (1) estimating savings from the 2020¹⁵ course participants and (2) gathering quantitative and qualitative data to support process and impact evaluations for 2021 course participants. Opinion Dynamics will take a census approach to each activity.

Table 35. Summary of Building Operator Certification Initiative Evaluation Activities for 2021

Activity	Impact	Process	Details
2021 Initiative Staff Interviews		✓	Explore changes made since 2020 and gather information about 2021 design and implementation.
2021 Participant Baseline O&M Practices and Energy Efficient Equipment Survey	✓	✓	Collect information on 2021 participants' facilities, energy-related equipment, and O&M practices prior to training intervention.
2021 Participant Reaction Interviews		✓	Gather feedback from participants on their experiences and satisfaction with training.
2021 Level 1 and Level 2 Interim Assessment		✓	Use results of course assignments (pre-course knowledge assessment, exams, and homework assignments) and participant interviews to assess participant reactions to the course and the level of learning that occurred.
2020 Participant Post-course Savings Interviews	✓		Collect data on specific energy savings actions taken by 2020 participants as a result of the BOC training.
2020 Verification Activities	✓		Verify details of energy-saving actions reported in post-course savings interviews and collect additional information needed to calculate energy savings.
2020 Impact Analysis	✓		Estimate verified gross and net savings using the data collected in verification activities and savings algorithms from the IL-TRM V9.0

We describe each of these activities in detail below.

Task 1. Initiative Staff Interviews

Opinion Dynamics will conduct semi-structured interviews with initiative and implementation staff at AIC and MEEA to determine any changes to the 2021 BOC Initiative. The interviews will explore initiative design and implementation elements and discuss a strategy for collecting data for use in evaluation.

Deliverable: Completed interviews

Deliverable Date: January 2021

Task 2. Baseline O&M Practices and Energy Efficient Equipment Survey

The evaluation team will field a survey to collect information on participants' facilities, equipment, building operations, and energy-related practices prior to the training intervention. We will ask MEEA staff to include the survey as homework following the first class. The survey will collect information on the presence and operation of any building energy management (BMS) systems, past energy efficiency projects/actions, and attempts to measure the resulting savings. We will also ask participants about past participation with AIC

¹⁵ We designed the 2021 evaluation to calculate BOC savings based on the actions of 2020 training participants. By their nature, follow-on actions from a training intervention like BOC require time to be completed. Given most large commercial projects also have long lead times, the evaluation team felt strongly that follow-on actions from the 2020 trainings would not be completed and able to be observed as part of the 2020 evaluation year and thus will calculate them as part of the 2021 evaluation.

energy efficiency initiatives. If the participant manages more than one facility, we will focus the surveys on the three largest facilities they manage. The survey will focus on the following measure categories that the BOC curriculum addresses:

- Boiler/Hot Water/Steam
- Chiller/Chilled Water Systems
- Cooling Tower Optimization
- Domestic Hot Water
- Economizer/Ventilation Controls
- Fan Optimization/Air Distribution
- HVAC Scheduling/Space Temperature
- Lighting
- Packaged/Split System HVAC
- Water Pump Optimization

Deliverable: Completed surveys

Deliverable Date: TBD

Task 3. Participant Reaction Interviews

Directly following the conclusion of the 2021 courses, we will reach out to participants and schedule in-depth interviews. The objective of these interviews will be to: (1) confirm completion of the course series; (2) solicit detailed feedback regarding their satisfaction with the course; (3) understand how they characterize the learning that occurred in the course; (4) characterize any changes they made to their facilities during the training; (5) record any future plans for energy-saving changes to building operations or equipment and their estimated timelines; (6) understand the role the training intervention played in these future plans; and (7) characterize any plans to participate in other AIC energy efficiency initiatives. The timing of these interviews will minimize recall issues and increase the validity of the attribution assessment. We estimate these interviews to last approximately 45 minutes and will provide participants an incentive for their time.

Deliverable: Completed interviews

Deliverable Date: TBD

Task 4. Level 1 and Level 2 Interim Assessment

Following the completion of the 2021 courses, the evaluation team will collect course materials from MEEA including a pre-knowledge assessment, instructor evaluations, homework assignments, and exams. We will analyze these materials along with the participant reaction interviews to produce a level 1 and level 2 assessment with findings related to participants' initial reaction to the course and any learnings that have manifested since completion. We will present these findings in an interim memo.

Deliverable: Level 1 and Level 2 Interim Assessment Memo

Deliverable Date: TBD

Task 5. Post-Course Savings Interviews

The evaluation team will schedule interviews with 2020 participants for a year after their completion of the training. This will allow participants time to identify, plan, gain approval, and implement projects. The interviews will focus on understanding any energy-saving actions the participant took as a result of what they

learned in the BOC Training, including energy efficiency projects and modifications to building or equipment operations. We will also assess the influence of the BOC Training on the participant's actions and channeling into other AIC initiatives. We anticipate the interviews will last approximately one hour and will provide participants an incentive as a thank you for participating complete the interview. The evaluation team will also conduct follow up research with the participants from the 2018 and 2019 trainings to understand any additional actions they might have taken as a result the training.

Deliverable: Completed interviews

Deliverable Date: August-October 2021

Task 6. Verification Activities

Using the Post-course Savings Interviews as a foundation, we will conduct verification activities with participants based on the actions they reported taking following the training. Following the interviews, the evaluation team will evaluate the attribution data collected and determine which actions are claimable through the BOC Initiative. We will then develop data requests for each participant including requests for specific project information needed for impact calculations. We will also request materials to verify the information, including:

- Exports from participants' BMS;
- Project invoices; or
- Photographs of equipment nameplates.

Depending on the size of the data request, we will offer participants a variable incentive for providing the information necessary for the impact analysis.

Deliverable: Results in annual impact evaluation report

Deliverable Date: March 2022

Task 7. Impact Analysis

The evaluation team will utilize a hybrid custom-prescriptive approach to calculating verified energy, demand, and therm savings for the 2020 BOC Initiative. We will utilize project specific information in conjunction with the IL-TRM V9.0 in developing savings estimates. If participants complete projects not covered in the IL-TRM we will estimate savings using a custom approach.

Savings resulting from training programs are akin to spillover in that they are follow-on actions taken by participants as a result of information received from program administrators. Based on guidance from the IL-TRM, we will estimate savings as we would participant spillover. As such, we will not apply a NTGR to verified savings – all savings claimed are already determined to have been influenced by BOC.

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

Task 8. Reporting

The evaluation team will include impacts from 2020 BOC training in the draft Business Program annual impact evaluation report. We will incorporate our responses to stakeholder feedback in a final report. We will submit separate deliverables containing results from process and forward-looking research tasks.

Deliverable: Chapter in draft annual Business Program Impact Report

Deliverable Date: March 15, 2022

Deliverable: Chapter in final annual Business Program Impact Report

Deliverable Date: April 30, 2022

Deliverable: Draft process report

Deliverable Date: March 2022

Deliverable: Final process report

Deliverable Date: April 2022

Evaluation Budget and Timeline

Table 36 summarizes the timing and budget associated with each evaluation activity.

Table 36. Building Operator Certification 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Staff Interviews	January 2021	\$5,200
2	Baseline O&M Practices and Energy Efficient Equipment Survey	TBD	\$7,100
3	Participant Reaction Interviews	TBD	\$9,400
4	Level 1 and Level 2 Interim Assessment	TBD	\$16,700
5	Post-Course Savings Interviews	August–October 2021	\$22,000
6	Verification Activities	March 2022	\$21,200
7	Impact Analysis	March 2022	\$16,100
8	Draft Annual Impact Report	March 15, 2022	\$28,700
	Comments from AIC and ICC Staff	Within 15 Business Days	
	Final Annual Report	April 30, 2022	
Total Budget			\$126,400

2.2.7 Disadvantaged Communities Research

Below we present a proposed scope for a non-residential Disadvantaged Communities (DAC) Study. The specific definition of a DAC varies nationwide, according to state or local policy framework. Generally, DACs refer to municipalities (e.g., a city, town) or specific parts of a municipality (e.g., neighborhoods or zip codes) that disproportionately suffer from economic, health, energy cost, or environmental burdens compared to other communities. There are multiple ways to define DACs specifically for Illinois’ and AIC’s territory. For instance, the Illinois Department of Public Health (IDHP) defines economic disadvantage as an index that goes beyond just income level; the index includes factors such as use of public assistance (e.g., food stamps), unemployment rate, and density of children in households.¹⁶ The Illinois Department of Commerce and Economic Opportunity (DCEO) has identified Economic Opportunity Zones, which are specific census tracts with economic disadvantage based on an index of poverty rate, unemployment rate, total number of children in poverty, violent crime rate, and population.¹⁷ We will work with AIC to develop an appropriate definition of a DAC for the purposes of this study.

Evaluation Approach

The overarching purpose of the DAC study will be to identify target communities with small businesses and community-serving institutions (e.g., libraries, community centers, medical clinics, non-profit organizations) that have been historically underserved by the AIC Business Program. Once we have identified these DACs, we will use a combination of survey research and targeted in-depth interviews to understand the energy-related needs, common barriers to participating in the Business Program, and effective marketing, education and

¹⁶<http://www.amchp.org>

¹⁷ <https://www2.illinois.gov/dceo/Pages/OpportunityZones.aspx>

outreach (ME&O) strategies for small businesses and community-serving institutions within these communities. We will gather input from a range of stakeholders, including AIC, Market Development Initiative (MDI) partners and Community Action Agencies (CAAs), local community leaders (e.g., local chambers of commerce, municipal governments), and a sample of small businesses and community-serving institutions themselves.

Research Objectives

- How does AIC define a DAC, or how does AIC think a DAC should be defined, within the context of their energy efficiency initiatives?
- What services, either through the AIC Business Program or the MDI, are available to small businesses and community-serving institutions within DACs?
- Which DACs in AIC’s service territory have been historically underserved by the AIC Business Program or the MDI?
- What energy-related issues and needs do small businesses and community-serving institutions within the target DACs have? Which of these issues could the AIC Business Program or the MDI potentially address?
- What barriers to energy management generally and participation in AIC Business Program or MDI offerings do small businesses and community-serving institutions face?
- What possible ME&O strategies (e.g., marketing tactics, partnerships, credible messengers, messaging strategies) do community leaders suggest would encourage Business Program and MDI participation among small businesses and community-serving institutions?

Note that the DAC study focuses on non-residential customers but many of the research objectives we propose have natural synergies with the goals of the residential Low Income Needs Assessment detailed in Section 2.1.3. Where feasible, we will coordinate with the Low Income Needs Assessment team to capture similar information for income qualified residential customers within the target DACs to provide a holistic view of the needs, barriers, and potential ME&O strategies for these communities.

Evaluation Tasks

Table 37 summarizes the 2021 evaluation activities planned for the DAC Study.

Table 37. Summary of DAC Study Activities for 2021

Activity	Details
Exploratory Staff Interviews	Up to five exploratory interviews with staff at AIC, Leidos, and other organizations to define a DAC and target non-residential customers for the purposes of this study, understand existing priorities and efforts for specific communities (e.g., within the MDI), and determine what data is available to support the study. Identify four target DACs for the study.
Data Review	Review of available non-residential customer data to support the study; review of existing reports, data, or analyses to support selection of DACs.
Interim Memo	Interim memo outlining options for DACs to include in the study; presentations or collaborative discussions, as needed, to help AIC and stakeholders select target DACs
Non-Residential Customer Survey	Surveys of small businesses and community-serving institutions within target DACs to understand energy related needs, barriers to energy management and AIC offering participation, and key firmographic information. Target of approximately 70 respondent per DACs, 280 total across four DACs.

Activity	Details
Community Leader Interviews	In-depth interviews with community leaders within DACs to understand a broader view of needs, barriers, and potentially effective ME&O strategies. Target of five interviews per DAC, 20 total across four DACs
Final Report	Final report documenting the rationale for selecting the target DACs, key survey and interview findings, and recommendations for potential programmatic and engagement strategies for each DAC.

We describe each of these activities in detail below.

Task 1. Exploratory Staff Interviews

We will conduct up to five semi-structured phone interviews with staff at AIC, Leidos, and potentially other organizations, as needed, to kick off the study. The primary goal of these interviews will be to 1) solidify the study’s definition of a DAC; 2) clarify target business and community-serving institution types; 3) determine the level of effort needed to identify which communities AIC should target, discuss what specialized services or offerings might be made available to these communities; and 4) understand what data is available to support the study. We will work with AIC staff to identify which other organizations (e.g., DCEO) or other groups within AIC (e.g., the Ameren Economic Development team), would be valuable contributors to these discussions. The results of these interviews will help right-size the level of effort in tasks 2 and 3 below. For instance, AIC and Leidos may have already identified or have an initial sense of several DACs they would like to target; or they may be a need for a participation mapping exercise to identify communities or eliminate the need for it entirely.

Deliverable: Completed interviews

Deliverable Date: April 2021

Task 2. Data Review

We will submit a data request to support the study. We will determine the specific data needs for this study using input from Task 1 above. This data request may include, for example, contact and business segment information for non-residential AIC customers (either all customers or customers within specific DACs), Business Program and MDI tracking data, and existing analyses or documentation outlining the decision-making behind priority DACs that AIC and Leidos have already selected or considered. We also will ensure that we leverage what data we have already received from AIC in previous evaluation years, such as historical Business Program tracking data.

While not currently budgeted, one option is to perform a historical mapping exercise to inform DAC selection and deliver an analytical tool to AIC to assist them with decision-making. This tool would map historical participation in the Business Program (and possibly the MDI) across AIC’s service territory and overlay census or other data (e.g., Economic Opportunity Zones) depending on how AIC would like to define a DAC. For instance, we might overlay census data on income, unemployment, use of public assistance, environmental pollution data, and more. If such an analysis is of interest or needed by AIC to select DACs, we will work with AIC to adjust the scope of this research to accommodate it.

Deliverable: Data request

Deliverable Date: April 2021

Task 3. Interim Memo

We will provide a memorandum of results from tasks 1 and 2, including recommendations and the rationale for target DACs. After providing the memo and any underlying analyses or tools, we will work collaboratively

with AIC and its partners to select target DACs. The budget for this study assumes that AIC will select four target DACs for the study, but we may also recommend additional DACs that could be served in the future.

Deliverable: Draft and final memo

Deliverable Date: June 2021

Task 4. Non-Residential Customer Survey

We will conduct a telephone survey with small businesses and community-serving institutions within the target DACs. We will specifically target AIC customers that have not previously participated in the AIC Business Program or the MDI. The overarching goals of this survey will be to understand common energy-related issues and needs among these customers (e.g., poor weatherization or blight, aged HVAC equipment, lack of knowledge about energy management), barriers to making energy improvements or participating in AIC offerings (e.g., lack of awareness, distrust, lack of time or dedicated staff resources), and key firmographic information. The study budget assumes that we will survey approximately 70 non-residential customers in each DAC; 280 total across the four target DACs. We will aim to survey a range of target business and institution types.

Non-participant businesses and institutions can be difficult to reach generally and it can be challenging to identify the right respondent at a given business or institution. To ensure the success of this effort and manage fielding costs, we will carefully screen respondents, offer a \$30 incentive for completing the survey, and send reminder postcards and e-mails (where e-mails are available) to encourage customers to participate in the survey. To mitigate possible fielding risks related to COVID-19 (e.g., lockdowns or closed businesses), we will plan to launch this survey in the late summer or early Fall 2021, when it is generally expected that COVID-19 vaccination will be well underway. We will revisit survey timing, as needed.

Deliverable: Draft survey instrument

Deliverable Date: July 2021

Deliverable: Final survey instrument

Deliverable Date: August 2021

Task 5. Community Leader Interviews

In addition to feedback from target businesses and community-serving institutions, we will leverage the knowledge of community leaders within each DAC about the energy-related needs, barriers to energy management and AIC offering participation, and effective engagement strategies for their communities. Examples of community leaders might include non-profit organizations (including potentially MDI partners or CAAs), chambers of commerce, or local government officials involved in economic development. We will confer with AIC and its partners to identify initial respondents in each DAC and then use a “snowball” sampling approach, where we ask respondents to recommend other leaders or organizations that may have valuable input. We anticipate completing approximately five interviews per DAC but may complete more if we can identify additional valuable respondents.

Deliverable: Draft survey instrument

Deliverable Date: July 2021

Deliverable: Final survey instrument

Deliverable Date: August 2021

Task 6. Final Report

We will deliver a final report to AIC and present the findings. This report will include the results of analyses across all four DACs, as well as specific findings and recommendations for how to best serve each DAC. This report will document the energy-related needs, barriers to energy management or participating in AIC offerings,

and potentially effective offerings and ME&O strategies for each community; we will also highlight any commonalities across DACs regarding these topics.

Deliverable: Draft report

Deliverable Date: October 2021

Deliverable: Final report

Deliverable Date: November 2021

Evaluation Budget and Timeline

Table 38 summarizes the timing and budget associated with each evaluation activity.

Table 38. 2021 DAC Study Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Exploratory Staff Interviews	April 2021	\$10,800
2	Data Review	April/May 2021	\$10,400
3	Interim Memo	May/June 2021	\$13,500
4	Non-Residential Customer Survey	July 2021	\$84,000
5	Community Leader Interviews	July 2021	\$35,000
6	Final Report	October/November 2021	\$26,800
Total Budget			\$180,500

2.3 Voltage Optimization Program

In 2021, AIC will be operating and claiming savings from Voltage Optimization (VO) as part of its energy efficiency portfolio. In this section, we outline the anticipated evaluation activities for this program. Voltage optimization is a form of energy efficiency technology implemented by electric utilities at the distribution substation or circuit level that optimizes voltage levels along distribution circuits to reduce electricity usage. There are two main VO technologies: Conservation Voltage Reduction (CVR) and Volt-Var Optimization (VVO). CVR reduces customer energy consumption by reducing line voltage and VVO improves the power factor to reduce line losses. Once implemented, VO technologies are intended to operate 24 hours a day, 365 days a year. AIC will implement hardware and software solutions using VO technologies.

AIC launched its VO program in 2018, leveraging experience gained from a 2012 VO Pilot Project. Since 2018, AIC has been installing hardware, software, and communications components¹⁸ on selected feeders¹⁹ on a phased basis, with 19 circuits deployed in 2018 and culminating in 1,047²⁰ circuits to be deployed by 2024. In 2021, evaluation activities will evaluate the impacts of approximately 170 circuits deployed in 2020. The energy savings and demand impacts estimated for those circuits will be deemed for the estimated lifetime of the technology (15 years), provided they are operable in future years.

¹⁸ AIC identified multiple technology upgrades required to successfully deploy a VO program. These technology upgrades have hardware, software, and communication components.

¹⁹ AIC staff used voltage level as the primary criteria for establishing the initial pool of potential candidate circuits and excluded circuits served by voltage levels > 20 kV or that serve only exempt customers (a customer whose highest 15-minute demand is at or greater than 10 MW).

²⁰ The number of circuits planned for VO deployment was determined based on calculated assumptions, industry results, and past AIC VO pilot results. The actual number of feeders with VO could increase based on deployment results.

Evaluation Approach

The 2021 evaluation of the VO Program focuses exclusively on estimating impacts associated with VO implementation.

In accordance with Illinois evaluation requirements, we will deliver a draft annual Voltage Optimization impact evaluation report on March 15, 2022, covering the 2021 program year. This report will include information on 2021 verified impacts.

Research Objectives

Impact Questions

The VO evaluation team seeks to address the following research question:

- What are the estimated energy savings from VO?
- What are the estimated peak demand impacts from VO?

The process evaluation for this program will be limited to annual interviews with program staff, which will aid the evaluation team’s understanding of the status of the program at the start of the evaluation year and inform the team of key developments made as the program matures.

Evaluation Tasks

Table 39 summarizes the 2021 evaluation activities planned for the Voltage Optimization Initiative.

Table 39. Summary of Voltage Optimization Evaluation Activities for 2020

Activity	Impact	Process	Details
Program Staff Interviews	✓		Explore program status, progress deploying VO technology, and potential ramifications for the 2021 evaluation.
Data Request and Materials Review	✓	✓	Request data needed for impact calculations, review and assess data for quality and completeness.
Verification of VO Deployment to Date	✓		Verify installations made through the program.
Impact Analyses	✓		Calculate 2021 impacts using algorithmic approach; deliver interim impact results in July and November 2021.

Task 1. Program Staff Interviews

We will conduct an interview with the AIC engineering staff in early 2021 to learn of any changes to program design and implementation, successes and challenges encountered in deploying VO as planned, and any potential impacts changes could have on the evaluation timeline.

Deliverable: Completed interview

Deliverable Date: March 2021

Task 2. Data Request and Materials Review

The evaluation team will request data needed to calculate impacts using the approach outlined in TRM Version 9.0. We will conduct a comprehensive review of all data submitted in response to the data request. The data review will include a VO program data inventory, QA/QC of submitted data, and an assessment of data

coverage. We will submit data requests twice during 2021 to support providing interim impact results to AIC, and we will submit a final data request in early 2022 to support the final, annual impact analysis.

Deliverable: Data requests *Deliverable Date:* May and September 2021, January 2022

Task 3. Verification of VO Deployment to Date

As an ongoing evaluation task, the evaluation team will verify continued operation of VO on circuits for each year of the study. The evaluation team will perform an analysis to verify operations of VO on a sample of circuits deployed in 2018-2020. This analysis will take place in early 2022 following a data request by January 2022.

Deliverable: VO Verification in annual impact evaluation report *Deliverable Date:* March 2022

Task 4. Impact Analysis

The evaluation team will use the methodology detailed in Chapter 6.2.1 of TRM Version 9.0 Volume 4 to calculate energy savings and summer coincident peak demand impacts due to VO. The evaluation team will calculate interim energy savings twice throughout 2021 and will deliver final results in the annual impact report in March 2022.

Deliverable: Interim results memos *Deliverable Date:* July and November 2021

Deliverable: Results provided in annual impact evaluation report *Deliverable Date:* March 2022

Task 5. Reporting

The evaluation team will provide all impact findings in the annual impact evaluation report in March 2022. The evaluation team will provide a draft report for AIC and ICC staff review and then deliver a final report that incorporates any comments from the review.

Deliverable: Results provided in annual impact evaluation report *Deliverable Date:* March and April 2022

Evaluation Budget and Timeline

Table 40 summarizes the timing and budget associated with each evaluation activity.

Table 40. Voltage Optimization 2020 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Program Staff Interviews	March 2021	\$7,200
2	Data Request and Materials Review	May & September 2021, January 2022	\$60,500
3	Verification of VO Deployment to Date	January 2022	\$36,300
4	Impact Analysis: Application of Energy Savings Algorithm	July & November 2021, March 2022	\$83,000
5	Draft Annual Impact Report	March 15, 2022	\$42,000
	Comments from AIC and ICC Staff	Within 15 business days	
	Final Annual Impact Report	April 30, 2022	
Total Budget			\$229,000

2.4 Pilots

During the 2021 program year, we understand that AIC is likely to implement a number of pilot efforts that fall outside the bounds of the Residential, Business, and Voltage Optimization Programs as currently defined. Every year, the evaluation team reserves ad-hoc budget to engage with AIC on issues of program design and evaluability. Based on early discussions with AIC, the evaluation team expects to conduct research for multiple pilot efforts in 2021 and has reserved budget to scope and support these efforts as needed.

For 2021, those items include (but may not be limited to) the Retail Products Platform market transformation effort and the Efficient Choice Tool (also known as Enervee). Further details on expected evaluation efforts for these pilots are provided below. As needed, additional pilot research evaluation plans may be developed during the course of the evaluation to address emergent needs.

2.4.1 Retail Products Platform

The Retail Products Platform (RPP) Program is a midstream market transformation (MT) initiative where incentives are paid to participating retailers for each program-qualified unit they sell in their participating stores. In general, a product is program-qualified if it meets minimum ENERGY STAR specification. However, as the program has evolved, advanced tiers have been added that save more energy and involve higher incentives. As with many midstream programs, the end use customers making purchases from participating retailers are not tracked and many – if not most – may not even be aware they participated in a program.

By focusing on the midstream channel rather than end use customers, the intent of RPP is to transform the market for select product categories of home appliances by (1) influencing retailers to stock, sell, and demand more energy-efficient models in these product categories, and (2) collaborating with various organizations and working groups to help define more stringent specifications and standards.

Though there were some early trials of the RPP concept (e.g., PG&E, SMUD, NEEA) that started around 2013, in March 2016 the Retail Products Platform became a national effort under the auspices of ENERGY STAR (it is now generally referred to as the ENERGY STAR Retail Products Platform or ESRPP Program). The goals of national coordination included development of a cohesive and consistent program offering, teaming up to represent greater bargaining power, and supporting consistent evaluation of the individual ESRPP initiatives across jurisdictions.

As of 2020, 16 program sponsors²⁴ across the country are offering the ESRPP Program through four main retailers including Best Buy, Home Depot, Lowes, and Nationwide.^{22,23} The current pool of participating program sponsors represent more than 18% of the US market, with promotional efforts in more than 1,000 stores nationwide.

AIC will begin offering the RPP Program as a pilot in 2021. Though the menu of potential products includes a wide variety of home appliances and consumer electronics, AIC (as well as ComEd) will be focusing on only two product categories for the pilot: (1) refrigerators, and (2) clothes washers.

At the time of the drafting of this evaluation plan, AIC is still in planning stages for its participation in RPP in 2021, and therefore, development of a full draft evaluation plan for the effort is premature. However, Opinion

²¹ While utilities represent most of the program sponsors, some non-utility organizations such as NEEA and Energyze CT are also offering the program in their jurisdictions.

²² For more details see: https://www.energystar.gov/partner_resources/energy_star_retail_products_platform

²³ Nationwide is the country's leading buying, marketing, and operational support organization for independent retailers through the country.

Dynamics staff have extensive knowledge and experience with RPP and have included a summary of expected evaluation activities that will be refined once planning is completed. Opinion Dynamics staff designed the evaluation plan and conducted the evaluation for the initial PG&E RPP trial and have contributed to other important RPP documents and working groups. Opinion Dynamics staff are also familiar with IL-TRM Attachment C, which outlines Illinois-specific market transformation evaluation protocols. As such, Table 41 summarizes the tasks we expect we are likely to conduct as part of the evaluation. Final decisions, additional details, and available evaluation resources may warrant changes to evaluation scope.

Table 41. Summary of Expected Retail Products Platform Pilot Evaluation Activities for 2021

Activity	Impact	Process	Details
Program Material Review	✓		AIC documentation, current ESRPP documents, marketing and promotional plans, other evaluations, etc.
Logic Model Development	✓	✓	Fundamentally, evaluation of RPP is a theory-based evaluation that requires a very robust and descriptive depiction of how the program is expected to result in short-, mid, and long-term outcomes. Various metrics, or Market Transformation Indicators (MTIs) that will be tracked through the evaluation are derived from the program theory depicted in the logic model.
Staff Interviews		✓	Probe program expectations, concerns, goals, operations, areas for potential improvement, etc.
Field Staff Interviews	✓	✓	Retailers are asked to develop comprehensive marketing plans indicating the actions they will take to promote program-qualified models and when. Field staff support the program by visiting stores to ensure signage is in place, pricing is correct, and log promotional activities. We will conduct interviews to better understand what is actually happening in stores – as well as what might not be happening as planned.
Shelf Stocking Surveys	✓		Field staff may also be leveraged to conduct shelf surveys to help the team understand what the product assortments look like and how they may be changing over the course of the year.
Develop Baselines	✓		All MT programs are about change in a market over time. Baselines provide the initial point of comparison from which we draw conclusions about quantitative changes in the market. Baselines will be developed for both refrigerators and clothes washers.
Impact Analysis	✓		The impact analysis consists of translating unit changes attributable to the program into electricity and demand saving from the program. As part of their participation in the ESRPP program, all participating retailers are required to provide full-category sales data (i.e., sales of all units sold, not just program-qualified units). This sales data is used in conjunction with the baseline data to determine if there is evidence of quantitative changes in the market.
Reporting	✓	✓	Opinion Dynamics will develop a draft and final report. We also expect a certain degree of engagement with the IL-SAG as this is one of the first programs to be evaluated under the direction of Attachment C.

Opinion Dynamics has reserved \$150,000 for the AIC RPP evaluation in 2021 and will work with AIC to appropriately scope this evaluation to meet AIC’s needs.

2.4.2 Efficient Choice Tool

Starting in August 2020, AIC begin offering residential customers a new online marketplace experience.²⁴ The AIC Efficient Choice Tool (ECT) platform, developed and implemented by Enervee, is meant to serve as a “kayak.com” and “Consumer Reports” for residential energy-efficient home appliances and consumer electronics making it easy for them to search and compare products. The ECT helps AIC customers conduct relevant product research in real-time, including the ability to compare images, specifications, reviews, tips for use, prices, and vendor locations. Several additional website features differentiate AIC’s ECT from other sites on the Internet:

- The **Enervee Score®** shows how efficient a product is compared to all the other products currently for sale in the category. The closer to 100, the more efficient the product.
- The **CLEARCOST®** shows what a product may cost to purchase and run over its lifetime. CLEARCOST® is determined by combining the lowest available purchase price for the product that day from retailers shown on The Efficient Choice Tool, with the energy costs of using the product over its typical lifetime, with the electricity rate specified by utility service territory, and the typical amount of usage.
- The **YOU SAVE®** shows you how much money can be saved by choosing one product over a less efficient product. The YOU SAVE® estimate takes into consideration the number of years using the product, the amount of usage, and energy rate.

By offering this site and steering customers towards more efficient products, AIC is aiming to generate energy savings—but energy savings is not the only benefit to utilities that offer the ECT. Over the past several years the utility-customer relationship has been changing; instead of the traditional relationship, customers are now expecting and demanding more from their utilities. Today, active customer engagement is becoming more of a focus for many utilities and offerings like the ECT can play this role and help increase customer satisfaction.

Evaluation Approach

It is important to note that Opinion Dynamics is currently conducting a pilot evaluation that was intended to cover the period August 2020 – September 2021. The pilot evaluation final report is currently planned for January 2022. We are re-assessing the schedule for the pilot evaluation due to a significant amount of overlap between that study and this evaluation.

We are viewing the 2021 evaluation as an extension of the pilot evaluation but limited to Jan 1, 2021 to Dec 31, 2021 (note the nine months of data collection overlap). The evaluation of the 2021 ECT will include both an impact and process evaluation. The impact evaluation will consist of surveys with website visitors to determine if they purchased an energy efficient product since visiting the site, assessing the degree to which the site influenced their purchase decision, and the application of IL-TRM savings values to estimated efficient

²⁴ AIC has been offering their Online Marketplace to residential customers for the past several years. The existing Online Marketplace is a site allowing AIC customers the ability to purchase discounted products (advanced power strips, lighting, advanced thermostats, and some small home appliances) directly online. This is different from the new Efficient Choice Tool, which provides visitors with information on energy use and efficiency of products but does not offer visitors the opportunity to make purchases directly through the site. This project only covers the evaluation of the new Efficient Choice Tool, as the existing Online Marketplace will continue to be evaluated separately.

unit purchases. The process evaluation will focus on assessing customer satisfaction with the site as well as its effects on customer engagement.

As part of our 2020 pilot evaluation efforts, our plan is to work with AIC to present the proposed approach and elicit feedback from the Illinois Stakeholder Advisory Group (SAG) with the goal of reaching agreement on the approach for energy savings estimation for the pilot. We are now expecting some of these discussions may spill from the pilot evaluation to the 2021 evaluation. That being said, while the activities denoted in this plan are the activities we expect to conduct, we will also remain flexible and adaptable as we recognize the interactions with SAG may suggest different approaches for some of the activities.

Research Objectives

Impact Questions

- What were the estimated purchase rates for each of the product categories offered through the site in 2021?
- What proportion of purchases were energy efficient models?
- What were the estimated gross energy and demand savings for the site for 2021?
- What are the estimated net energy and demand savings for 2021?

Process Questions

- Are AIC customers satisfied with the website?
- Has offering the website increased customer engagement with AIC?

Evaluation Tasks

Table 42 summarizes the 2021 evaluation activities planned for the Efficient Choice Tool evaluation.

Table 42. Summary of ECT Evaluation Activities for 2021

Activity	Impact	Process	Forward Looking	Details
Initiative Staff Interviews		✓		Conduct interviews with AIC and implementation contractor staff to understand initiative design and implementation.
Program Materials Review		✓		Review all relevant administrative reports, and marketing and outreach materials to document and provide feedback on initiative design with a focus on any changes introduced in 2021.
Participant Survey	✓	✓	✓	Determine product purchase rates, verify models purchase to ensure they are energy efficient, assess satisfaction and engagement.
Impact Analysis	✓		✓	Calculate gross and net impacts using the IL-TRM V9.0 and SAG-approved NTGR values for 2021.

We describe each of these activities in detail below.

Task 1. Initiative Staff Interviews

The evaluation team will conduct up to four in-depth phone interviews with AIC and implementation staff involved in the design and administration of the ECT. We will conduct the round of interviews to coincide with the end of the trial evaluation efforts to gather feedback on the initiative's performance and implementation challenges that occurred during the trial. These interviews will allow us to fully explore the details of the initiative design and implementation and to examine successes, failures, or needed improvements from the perspective of relevant staff. We will conduct phone interviews using experienced Opinion Dynamics staff. We will record and transcribe all interviews to facilitate the analysis.

Deliverable: Completed interviews

Deliverable Date: December 2021

Task 2. Program Materials Review

The evaluation team will conduct a comprehensive review of all initiative materials. This includes initiative implementation plans, marketing plans, QA/QC documents. We expect to submit a request at the beginning of the program year to obtain materials related to initiative design and any pending marketing activities. 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 both our pilot and process evaluation.

Deliverable: Data requests

Deliverable Date: January 2021 and December 2021

Task 3. Participant Survey

Since ECT has limited program data and no ex ante savings, the biggest challenge of the ECT evaluation is to find people who have visited the site. The foundation of this study design is the survey instrument that is used to gather customer data. The sample frames for this study originate from four sources of customer contact information. The largest source is all email addresses that have been sent marketing or promotional materials directing people to the site during the year. The second source is downstream program data where the rebated products are also included on the ECT.²⁵ The third source of data comes from the Enervee website, which requires people to create a profile to access some of the more advanced features (e.g., setting up price alerts, saving search results, etc.). The fourth source of email addresses also comes from Enervee; they have included a popup on the site that asks visitors if they would be willing to take a survey in the near future. Because there is no actual program data for this initiative, the survey for this study is aimed at accomplishing several objectives including:

- Assessing customer recall of the site
- Determining product purchase rates
- Verifying purchases were energy efficient models
- Measuring the site's influence on customer purchases (net-to-gross)
- Assessing the role the site plays in affecting customer engagement and satisfaction

For this task, Opinion Dynamics will develop a survey instrument made up predominantly of closed-ended questions. The surveys will be roughly 10-15 minutes in duration including time needed to take a photo of and upload model number verification info. Surveys will be launched periodically throughout the year as we want

²⁵ The premise here is that some people may have submitted a rebate due to information they learned on the ECT. While the savings associated with these situations are already being claimed by the downstream rebate programs, a fair assessment of ECT's overall efficacy should include an estimate of how much lift ECT might be providing to related programs.

to balance the time needed for customers to visit the site and then make a purchase against waiting too long to try and collect minute details about an interaction with a website, which is not often front-of-mind months down the road. As noted earlier, some of this data collection will occur under the umbrella of the pilot evaluation; some under this evaluation. We expect to use the same survey instrument for both.

The incentive structure for this survey includes a \$5 Tango gift card to all respondents for completing the survey. In addition, because collecting product model numbers is always challenging, an additional incentive is being offered for providing the model number of the purchased product so we can verify that the model is energy-efficient (only for non-rebated products as we know all rebated products are efficient). The additional incentive for providing the model number is tiered, based on the quality/reliability of the model number information the respondent is able/willing to provide. We will offer respondents:

- An extra \$15 incentive if they can provide a photo of their purchase receipt showing the model number
- An extra \$10 incentive if they can't provide a receipt, but they can provide a photo of the product nameplate showing the model number
- An extra \$5 incentive if they can't provide a receipt or photo of the nameplate, but they can provide a hand-entered model number.

If we find that some product categories dominate the responses, and because the surveys will be ongoing throughout the year, we may develop quotas for certain product categories to help bolster product level sample sizes. Regardless of how many respondents we obtain, we will report the achieved level of relative precision at the 90% level of confidence for key metrics. We expect the 2021 survey to remain unchanged from the pilot survey.

Deliverable: Draft and final survey instrument

Deliverable Date: January 2021

Task 2. Impact Analysis

Two important outcomes of this study are the estimation of purchase rates for each of the products (i.e., what proportion of visitors made a purchase since visiting the site) and the verification that the models purchased by customers are energy efficient models. From these parameters, along with site visitation data, the evaluation team will be able to estimate the number of energy efficient purchases in each product category associated with the ECT.

The evaluation team will extract measure savings values from the IL-TRM V9.0 and apply them to the estimated efficient purchases to estimate gross energy and demand savings for each product category.

For all estimated efficient purchases resulting from the ECT, we will calculate 2021 verified net savings by applying NTGRs derived through the evaluation. There is currently no precedent for this type of program and no other NTGRs would be applicable.

Deliverable: Interim impact analysis memo²⁶

Deliverable Date: June 2021

Deliverable: Analysis in draft annual impact evaluation report

Deliverable Date: March 2022

²⁶ Note that though we mention an interim impact analysis memo here, this will likely also serve as a summary (or final) report for the pilot evaluation.

Task 3. Reporting

The evaluation team will include 2021 initiative impacts in the draft Residential Program annual impact evaluation report. We will incorporate our responses to stakeholder feedback in a final report. We will submit separate deliverables containing results from process and forward-looking research tasks.

Deliverable: Chapter in draft annual Residential Program Impact Report *Deliverable Date:* March 15, 2022

Deliverable: Chapter in final annual Residential Program Impact Report *Deliverable Date:* April 30, 2022

Evaluation Budget and Timeline

Table 43 summarizes the timing and budget associated with each evaluation activity.

Table 43. Efficient Choice Tool 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Initiative Staff Interviews	December 2021	\$3,500
2	Program Materials Review	January 2021 and December 2021	\$4,600
3	Participant Survey	January 2021	\$15,500
4	Impact Analysis	March 2022	\$19,600
5	Draft Annual Impact Report	March 15, 2022	\$23,500
	Comments from AIC and ICC Staff	Within 15 Business Days	
	Final Annual Report	April 30, 2022	
Total Budget			\$66,700

3. Cross-Cutting Evaluation Activities

The evaluation team's cross-cutting activities include a range of topics from net-to-gross research efforts, research studies to inform updates to the IL-TRM, non-energy impacts research, cost-effectiveness analysis and integrated reporting among others.

3.1 Net-to-Gross Updates in 2021

Each year, the evaluation team plays a key role in the annual SAG NTG update process held in September. In particular, the evaluation team provides draft recommended NTG updates to SAG for consideration and discussion. This year, we will deliver draft recommendations no later than August 1, 2021 to allow AIC and SAG additional time for review and discussion ahead of the September meeting process.

At the close of the annual process, the final NTG recommendations are deemed for the following year. Updates currently expected in 2021 include:

- Standard Initiative updates (part of 2020 evaluation plan)
 - Draft results for the Core Standard Initiative are expected for review by March 2021
 - Draft results for the SBDI offering were provided for AIC review in December 2020 and are currently being finalized
 - Draft results for the Instant Incentives offering are expected for review by March 2021
- Custom Initiative updates (part of 2020 evaluation plan)
 - Draft results are expected for review by March 2021

The evaluation team currently does not expect any additional NTG updates to be recommended as part of the 2021 NTG update process. Should AIC add new programs or measure types to its portfolio for which new NTGRs are required, the evaluation team will suggest additional updates through secondary research.

3.2 Illinois Statewide Technical Reference Manual Support

The evaluation team is actively involved in the annual IL-TRM update process in a number of ways.

- We are regular participants in Illinois Technical Advisory Committee (TAC) meetings, including participation in weekly calls, as well as reviewing and commenting on IL-TRM update items presented to the TAC.
- Similarly, we are regular participants in Illinois NTG Methods Working Group meetings, and often lead discussion of various topics for consideration during the update cycle.
- In 2021, we expect to be regular participants in the Illinois Lighting Forecast Working Group, formed as part of the 2019 TRM update process to support updates to the characterization of the changing lighting market.
- We coordinate and collaborate with other Illinois evaluation teams as needed on key IL-TRM related research.
- We reserve ad-hoc budget and time to support the Illinois TRM Administrator, VEIC, and other Illinois stakeholders in all of the above.

In addition, we scope and execute research activities outside of annual program evaluations and specifically designed to result in IL-TRM updates on an as-needed basis. For the 2021 evaluation year, we currently expect to execute a number of key research activities to support the IL-TRM, detailed in Table 44.

Table 44. Planned 2021 IL-TRM Research Activities

TRM Measure Number	Measure Name	Update Activity	Planned Approach
Custom Measure	Compressed Air Leak Repair	Research to update measure life	Statewide study in coordination with the ComEd evaluation team; detailed research plan forthcoming
4.5.4	LED Bulbs and Fixtures	Research to update measure costs	Desk reviews of available prescriptive project invoices
4.5.10	Lighting Controls	Research into networked lighting controls (NLC) and luminaire-level lighting controls (LLLC) to refine savings estimates, measure lifetimes, and costs	Research in planning; will involve use of available customer project data and will be dependent on available AIC projects
4.8.20	Energy Efficient Hydraulic Oils	Savings verification to refine TRM savings estimates	Coordination with implementation team to collect necessary project data and evaluation team analysis of project data
4.8.21	Energy Efficient Gear Lubricants		
4.8.22	Smart Sockets	Customer research to understand customer use of product	Survey research with customers receiving measures if AIC offers them in 2021

As needed, we will issue specific research plans covering expected research for 2021.

3.3 Non-Energy Impacts

Throughout the 2018-2021 evaluation cycle, the Opinion Dynamics team has been conducting ongoing research around non-energy impacts (NEIs). The IL-TRM currently accounts for some NEIs (water savings and some operation and maintenance [O&M] costs). In addition, the Future Energy Jobs Act (FEJA) instructs Illinois utilities to include greenhouse gas (GHG) emissions reductions in their cost-effectiveness calculations. In conjunction with other statewide evaluators, Opinion Dynamics is investigating other NEIs associated with AIC’s portfolio. This section outlines planned NEI research in 2021.

3.3.1 Residential Non-Energy Impacts Research

This work plan outlines the research objectives Opinion Dynamics will investigate in 2021 focused on residential NEIs. We plan to conduct research that supports NEI quantification for the residential Income Qualified Initiative and to continue participation in the Illinois Stakeholder Advisory Group NEI Working Group meetings to ensure continued discussion about the methods used and analyses conducted to estimate NEIs.

Research Objectives

The following key research objectives shape our 2021 residential NEI evaluation plan:

- What are the pre- and post-treatment conditions for the single- and multi-family participants in AIC’s 2020 Income Qualified Initiative, with respect to prioritized health, safety, and comfort NEIs?

- What methods and assumptions do evaluators of energy efficiency programs operated by Illinois utilities use in their estimates of participant, utility, and societal NEIs?

Evaluation Tasks

In this section, we discuss the residential NEI task we will complete in 2021.

Task 1. Income Qualified Participant NEIs Assessment

Opinion Dynamics will continue the ongoing primary research to quantify and monetize prioritized health, safety, comfort, and economic NEIs for the Income Qualified Initiative. This research captures NEIs for all types of Initiative participants, including both low- and moderate-income customers and those living in either single-family or multi-family properties.

We initiated this multi-year research effort in 2019, developing a pre-treatment survey instrument and sampling plan for initiative participants and a comparison group of similar non-participants. This research continued in 2020 when we conducted cognitive pretest interviews with 2019 Income Qualified participants to understand how respondents would react to and understand the questions in the Income Qualified Participant NEI survey and to assess respondents' ability to accurately answer the questions as intended. In 2021, we will finalize and field this survey to establish pre-treatment conditions related to participant NEIs. Table 45 below summarizes the research design.

Table 45. AIC Income Qualified Initiative Participant NEI Research Design

Group	Definition	Pre-Period Survey	Post-Period Survey
Treatment	2021 Participants	<ul style="list-style-type: none"> ▪ Gather self-reported health, safety, comfort, and economic metrics in the 12 months pre-treatment (or past 12 months if comparison) ▪ Field survey in 2021, using up to four waves to reach participants within 3 months of participation ▪ Survey a share of the comparison group at each survey wave 	<ul style="list-style-type: none"> ▪ Gather self-reported health, safety, comfort, and economic metrics post-treatment (or since first survey, if comparison) ▪ Field survey in 2022, using two waves to reach participants 11 to 16 months after participation ▪ Survey a share of the comparison group at each survey wave
Comparison	Has not participated in AIC Income Qualified Initiative (PY4 - 2020)		

Because the pre-treatment surveys will address pre-period conditions retrospectively, we will aim to field the surveys within three months of initiative participation.²⁷ The evaluation team expects to field the survey in a mail push to web format with the option to call-in to complete. Customers with an email address on file will also receive supplemental email reminders. We will offer respondents a survey completion incentive.

Results from the pre-treatment survey will comprise the baseline conditions against which we measure NEIs. As such, in 2022 we will also develop a post-treatment survey that correlates to the pre-treatment data collection instrument, with the anticipation of fielding the post-treatment survey to the same respondents in 2021. In 2021, we will also develop an approach to monetize the economic benefits of NEIs using Illinois-specific sources.

²⁷ Pre-treatment surveys will be fielded as soon after participation as possible, but we anticipate that we will not be able to verify specific program participants until after the work has been completed.

In 2022, we will combine results from the pre-treatment and post-treatment surveys to calculate changes in NEI metrics due to the initiative. We will use a difference-in-difference formula to calculate the change:

$$\text{Change in NEI Metric Due to Initiative} = (\text{ParticipantPost} - \text{ParticipantPre}) - (\text{ComparisonPost} - \text{ComparisonPre})$$

For example, if 10% of participants reported asthma-related healthcare visits in the pre-period and 7% reported them in the post-period, while 11% of comparison customers reported them in the pre-period and 10% reported them afterwards, the change in asthma-related healthcare visits due to participation would be $(7\%-10\%) - (10\%-11\%) = -3\% - -1\% = -2\%$, or a 2 percentage point decrease.

Deliverable: Income Qualified Initiative Participant NEI Report

Deliverable Date: TBD (2022)

Evaluation Budget and Timeline

Table 46 summarizes the timing and budget associated with each evaluation activity.

Table 46. Residential NEI 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Income Qualified Participant NEIs Assessment	2021 (TBD)	\$108,000
Total Budget			\$108,000

3.3.2 Non-Residential Non-Energy Impacts Research

In 2021, Opinion Dynamics plan to conduct research that supports estimation of NEIs for measures supported by the AIC Business Program and to continue participation in the Illinois Stakeholder Advisory Group NEI Working Group meetings to ensure continued discussion about the methods used and analyses conducted to estimate NEIs.

Evaluation Approach

Opinion Dynamics will use a multifaceted approach to estimate NEIs associated with measures supported by the AIC Business Program. Opinion Dynamics will use a lifecycle cost (engineering) based approach for estimating NEIs associated with O&M cost changes. For most other non-O&M based NEIs, we will also use a stated valuation approach based on in-depth interviews to obtain NEI estimates. The interviews will focus on NEIs that cannot be derived using engineering-based approach, such as worker and equipment productivity, changes in revenue and sales, reduced product loss, material costs, resource costs, and worker safety.

These estimates of NEIs can be included in marketing collateral to increase program participation, customer satisfaction, and the overall relationship between AIC and their business customers. While AIC’s Business Program is generally cost effective at the overall level on the basis of energy savings alone, Opinion Dynamics proposes this NEI study to identify and monetize impacts for use in AIC program outreach and marketing. As a first step toward developing more comprehensive set of NEIs, Opinion Dynamics will conduct the research activities discussed the in sections that follow to provide a proof of concept for a possible larger study that would produce more comprehensive and statistically valid and reliable NEI estimates.

Research Objectives

The goal of this research is to identify, characterize, and monetize NEIs resulting from AIC’s Business Program. The overarching goal of this effort is to provide a proof of concept of NEIs associated with select measures

and customer segments targeted by AIC and Leidos. Including NEIs in marketing collateral is expected to improve the value proposition of investment in EE technologies and thus increase participation. Specific research objectives are below:

- Estimate NEIs resulting from O&M cost savings using a lifecycle cost/engineering-based approach
- Estimate NEIs associated with production/revenue changes based on in-depth interviews with industrial/manufacturing program participants
- Prepare industry-specific case studies that can be used by AIC as collateral for program marketing activities

Evaluation Tasks

Table 47 summarizes 2021 evaluation activities planned as part of this research.

Table 47. Summary of Non-Residential NEI Research Activities for 2021

Activity	Details
Lifecycle Cost Analysis	Conduct lifecycle cost analysis to estimate NEIs resulting from O&M cost savings for 20 measures
Case Study Interviews	Complete 20 in-depth interviews to estimate NEIs associated with production/revenue changes based on in-depth interviews (IDIs) with industrial/manufacturing program participants.
Prepare Industry Level Marketing Collateral	Prepare industry specific marketing materials highlighting how programs result in NEIs to address customers' primary concerns.

We describe each of these activities in detail below.

Task 1. Lifecycle Cost Analysis

Opinion Dynamics will review available data to construct O&M NEI estimates for a selected set of measures. We will review measure descriptions, TRMs, in-depth interview results, and other available data to construct estimates for each measure category or end use selected for study. To estimate the cost difference between the baseline and energy efficient technologies, Opinion Dynamics will construct detailed cost schedules for the baseline and energy-efficient technologies, which will form the basis for the NEI estimates. Opinion Dynamics will use published data, technical knowledge, and reported maintenance and replacement schedules outlined in manufacturer O&M manuals, supplemented with information obtained from customer in-depth interviews, to develop and corroborate these costs. We classify costs into the following three types for further analysis:

- **Annual maintenance.** Routine maintenance recommended by manufacturers, such as annual oil changes for reciprocating air compressors.
- **Periodic repair.** Many types of equipment require repairs during their lifetimes, while other types are not repaired but simply replaced. For example, a reciprocating air compressor requires a rebuild every three years, while a screw compressor does not.
- **Replacement.** For equipment for which the baseline option is likely to fail before the end of the useful life, we include and amortize the cost of replacement of the option with a shorter lifetime. We will consider the type of equipment that will be installed as a replacement to represent the baseline condition.

Once the NEI cost schedules and cost breakdowns are developed, Opinion Dynamics will compute the NPV of the average annual lifecycle cost difference between the baseline and energy-efficient equipment. Opinion Dynamics assumes the following in computing the NPV of lifecycle costs:

- **Planning horizon.** For each line item, Opinion Dynamics defines the measure life of the longer-lasting piece of equipment (installed or baseline) to contrast the lifecycle costs.
- **Discount rate.** Opinion Dynamics will use the IL-TRM V9.0 defined nominal discount rate of 2.40% when computing the NPV of lifecycle costs.
- **Capital replacement.** Equipment replaced prior to the end of the planning horizon will be assumed to be replaced in-kind and amortized over its useful life. The annual payment of that equipment appeared as a liability starting in the year the equipment was replaced until the end of the planning horizon.
- **Select sample.** The process begins with a review of the measures and categories in the program tracking data, followed by a random sample of measures from categories across the Business Program.
- **Define baseline O&M and measure O&M Costs.** Annual O&M NEIs are developed as the difference between baseline and energy-efficient equipment annual costs. For the selected measure sample, we will define energy-efficient equipment and the associated baseline equipment characteristics using the IL-TRM for prescriptive measures and available documentation for other measures. O&M costs for both baseline equipment and the efficient equipment will be drawn from established typical O&M cost estimation databases such as RS Means.²⁸
- **Conduct in-depth interviews for cost data.** Published cost data, RS Means and Cost Library report average costs across a range of technologies. If it is possible within evaluation budget constraints, to isolate cost parameters specific to AIC program measures, Opinion Dynamics will conduct a series of interviews with cost estimation and maintenance engineering firms.
- **Estimate annual and lifecycle impacts.** Once annual O&M cost estimates are developed, lifecycle NEIs will be calculated as the net present value of the annual costs over the lifetime of the measure.
- **Extrapolate to the population.** Program-level NEI estimates are developed by extrapolating the results from each sampled measure to the population of measures in each measure category for each initiative.

All deliverable dates for this effort are TBD pending discussion and planning with AIC. Discussion and planning with AIC will be required to plan which measures should be targeted for NEI estimation.

Deliverable: Memo documenting lifecycle cost approach *Deliverable Date:* TBD

Deliverable: Sample plan *Deliverable Date:* TBD

Deliverable: Interview guides for engineering interviews *Deliverable Date:* TBD

Deliverable: Excel deliverable with O&M NEIs assigned to relevant measures *Deliverable Date:* TBD

Task 2. In-Depth Interviews to Complete Segment-Specific Case Studies

We will conduct exploratory in-depth interviews with up to five program participants to identify and quantify NEIs that cannot be measured through the techniques described in Task 1. These may include NEIs associated

²⁸ <https://www.rsmeans.com/>

with increased worker productivity, comfort, sales revenue, administrative costs, waste disposal, and product loss. The interviews will also be used to help capture missing or uncertain information required for the lifecycle cost analysis or avoided cost studies.

We will focus on customers that have multiple facilities and projects, but work closely with AIC and Leidos to determine specific segments of interest. We will use Opinion Dynamics' energy analysts to conduct IDIs to identify the relevant NEI sources to explore further in the interview (e.g., production changes or rent revenue). Once the sources of NEIs are determined, as well as the direction of those impacts (i.e., increase or decrease), interviewers will guide respondents through the series of structured probes to identify the cost and revenue centers impacted and the nature of those impacts, and to obtain estimates of specific metrics needed to quantify the NEIs (e.g., frequency, time/quantity, and salary/cost) associated with each NEI category. Since the objective is to estimate monetary costs or benefits, for some of these categories, our interviewers will probe to convert time into money.

Using interview results, we will complete a predetermined number of case studies to document changes to end user sales, productivity and revenue within specific industries. Case studies provide powerful information for sales and marketing of energy efficiency technologies to firms in industries such as manufacturing and retail. Many firms are hesitant to invest in energy efficient technologies due to uncertainty surrounding the impact on overall productivity, costs, and sales. Further, NEIs associated with custom measures can be difficult to isolate across a range of projects as the impact on the overall facility is difficult to measure.

Carefully selected case studies can be used to document evidence of such impacts that will provide point estimates of "typical" large projects, and also provide powerful marketing messages to more risk averse firms.

Deliverable: Sampling plan

Deliverable Date: April 2021

Deliverable: Draft and final interview guides

Deliverable Date: June 2021

Deliverable: Draft and final industry-specific case studies

Deliverable Date: September 2021

Optional Task. Literature Review

Advanced control systems such as networked lighting controls may provide substantial NEIs. However, to date, adoption of advanced controls has been limited. Furthermore, customers who install the controls may not be aware of the full range of features the controls provide. Opinion Dynamics will conduct a review of trade journals and academic papers for specific industries (e.g. industrial organization, building science) to document evidence of pain points addressed by features of control technologies. The following control technology features are examples of capabilities that may produce substantial NEIs.

- **Predictive maintenance.** The ability to identify and replace or repair equipment before failure, reducing O&M costs, downtime, and system failure.
- **Asset tracking.** Use of radio-frequency identification (RFID) in combination with sensor technology embedded in lighting control systems to track assets and people within a facility. This capability could have specific application in manufacturing, medical, and education settings. The technology can be used for theft detection and tracking of patients in mental health and elderly / childcare facilities.
- **Occupancy / Movement.** The ability to detect movement within a facility can be used to track changes to customer's in-store time and employee productivity.

- **Space optimization.** Occupancy sensors of advanced control systems be used to identify underutilized space. This information can be valuable to real estate planners as they assess opportunities for renting/subletting, selling space, or improving social distancing for existing occupants.

Opinion Dynamics can complete a literature review to document evidence of NEIs associated with advanced control technologies. This task is currently outside of available evaluation resources and is included as an optional unbudgeted task should AIC wish to prioritize this research.

Deliverable: Draft and final literature review

Deliverable Date: TBD

Evaluation Budget and Timeline

Table 48 summarizes the timing and budget associated with each evaluation activity.

Table 48. Non-Residential NEI Research 2021 Evaluation Schedule and Budget

Task	Evaluation Activity	Deliverable Date	Budget
1	Lifecycle Cost Analysis		\$65,000
2	Segment-Specific In-Depth Interviews		\$35,000
Total Budget			\$100,000

3.3.3 Economic and Employment Impacts of AIC Energy Efficiency Initiatives

During the development of the 2018-2021 portfolios and evaluation plans, as part of NEI research discussions, several stakeholders in Illinois expressed interest in quantifying the impacts of AIC’s energy efficiency portfolio on employment in Illinois. We will be estimating these impacts on a yearly basis.

A range of methods exist for estimating these impacts. During 2018 and 2019, the evaluation team collaborated with the evaluation team for ComEd in development of a methodology for estimating these impacts, which has now been approved by the Illinois SAG. The budget for the 2021 economic and employment impact research is \$50,000.

3.4 AMI Data and Advanced M&V

As advanced metering infrastructure (AMI) data becomes increasingly available,²⁹ there has been substantial focus on the potential of high-resolution data to support energy efficiency programs. AMI data can enhance customer targeting, program implementation, and program M&V. One example of this is the deployment of advanced M&V pay-for-performance programs like the AIC Virtual Commissioning offering, discussed in Section 2.2.4 of this plan.

In addition to enabling advanced program implementation, AMI data can be used to enhance program evaluation. The use of AMI data in program evaluation has the potential to reduce costs, provide additional insights through increased granularity, enable quasi-real time visualizations of program success, and more. The systematic use of AMI data coupled with rigorous statistical M&V approaches is collectively referred to as advanced M&V (AM&V). This evaluation plan begins to introduce AM&V concepts to the AIC portfolio through the evaluation of the Virtual Commissioning offering. In addition, the evaluation team proposes a focused AM&V research effort in 2021, to explore the potential of AM&V to support additional program implementation and evaluation activities. This research effort will pilot an AM&V screening approach for the Custom Initiative

²⁹ AIC completed its electric AMI rollout at the close of 2019.

in 2021 to test the ability of AM&V to reduce evaluation costs and provide additional programmatic insight. Lessons from this proof-of-concept can be leveraged to expand the use of AM&V approaches for additional programs in future years.

3.4.1 Custom Initiative AM&V Research

Our proposed AM&V proof-of-concept research effort focuses on the Custom Initiative. While there are several potential use cases for AM&V within the portfolio evaluation, we anticipate that Custom Initiative program offers a particularly high return on investment. Custom Initiative impact evaluation costs are typically one of the single largest evaluation line-item costs and require extensive sampling, desk review, and on-site M&V activities. Custom Initiative impact evaluation is challenging to execute in the tight evaluation windows prescribed by Illinois policy and poses substantial evaluation risk to AIC as the program administrator. Our AM&V research effort seeks to demonstrate the value of AM&V techniques to the evaluation of large, unique nonresidential efficiency projects. The end goals of the AM&V-based evaluation approach are to simplify the evaluation process for these projects, decrease total evaluation costs, increase accuracy of impact estimates, and accelerate delivery of impact results to program administrators. While we do not anticipate that AM&V will ever fully replace impact reviews for the Custom Initiative program, we hypothesize that an AM&V approach can offer cost savings by acting as a “screening” tool to reduce the number of impact reviews that are needed.

Research Questions

We seek to explore the following research questions through our research efforts:

- Can AM&V be used as a stand-alone evaluation tool for some Custom Initiative projects, reducing the need for impact reviews?
- What AM&V-measured savings threshold (and confidence interval) is required to classify a Custom Initiative project as "AM&V evaluable"?
- Can AM&V approaches be used to inform the sampling strategy used to select Custom Initiative projects for impact review?
- Which AM&V protocol(s) provides the best performance in this context?
- What additional programmatic insight can AM&V provide to the Custom Initiative?

Research Approach

In 2021, the evaluation team plans to test AM&V approaches by utilizing AMI data coupled with advanced statistical models to estimate impacts for already-completed Custom Initiative projects. The use of historical project data as a “ground truth” enables us to confidently assess the accuracy of the AM&V results. The results of the backward-looking assessment will allow us to evaluate the effectiveness of these approaches in the programmatic context and inform the deployment of AM&V-based evaluation strategies.

While we do not expect to produce a conclusive answer to each research question detailed above as part of our 2021 research, we expect that implementing this research as a proof-of-concept activity in 2021 will increase the comfort and familiarity of the AIC team with AM&V research and provide support for increased investment in AM&V-driven strategies in 2022-2025 and beyond.

Opinion Dynamics has reserved \$100,000 of evaluation budget for Custom Initiative AM&V research activities as part of the 2021 evaluation plan.

3.5 Cost-Effectiveness Analysis

Illinois state law (220 ILCS 5/8-103B [“Section 8-103B”] and 220 ILCS 5/8-104 [“Section 8-104”]) directs utilities to operate cost-effective energy efficiency programs, and to demonstrate that their energy efficiency portfolios are cost-effective using the Illinois Total Resource Cost (TRC) test. In accordance with law, relevant Illinois Commerce Commission (ICC) orders, and policy developed by the Illinois Stakeholder Advisory Group (SAG), we conduct a cost-effectiveness analysis of AIC’s energy efficiency portfolio on an annual basis.

Cost-effectiveness testing for the Illinois TRC conducted as part of our annual evaluations will align with national standard practice, as well as directives presented in the Illinois Energy Efficiency Policy Manual Version 2.0, and will incorporate information from AIC program tracking data, Opinion Dynamics’ 2021 evaluation of AIC’s portfolio, and supporting information from the Illinois TRM (IL-TRM).

To assess cost-effectiveness, the team begins with a valuation of each program’s and the portfolio’s net total resource benefits, as measured by the avoided 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.

State law requires that AIC’s energy efficiency portfolio to be cost-effective at the portfolio level, with the exception of Income Qualified programs. Nevertheless, to the degree possible, our analysis will provide insights into the cost-effectiveness of various components of AIC’s portfolio to provide further insight for program planning. In addition to the Illinois TRC test, we will conduct the program administrator cost test (PA/UCT) to support SAG requested reporting.

We will report results of our analysis in an annual verified cost-effectiveness report to be delivered after yearly program impacts have been finalized. We will utilize best efforts to provide the final 2021 verified cost-effectiveness report no later than July 1, 2022.

3.6 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. From 2005 through 2012, 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. From 2008 through 2016, he provided similar support to the New York State Department of Public Service. From 2019 through 2021, he will be assisting in evaluating multiple programs implemented by the California IOUs and third parties and advising the CPUC.

As part of the 2021 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 (including the Illinois Net to Gross Working Group); (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.

3.7 Integrated Reporting

3.7.1 Annual and Plan Summary Integrated Report

The evaluation team will provide an integrated report with 2021 impact findings for all AIC initiatives by April 30, 2022. This report will include detailed EM&V tables, an overall AIC portfolio WAML, overall AIC portfolio CPAS calculations, as well as a high impact measure summary table for the Residential Program and Business Program.

Electric utilities may count gas or other fuel savings towards their electric savings goals if (1) a joint electric and gas program runs out of gas funds but electric budget remains available, and (2) if programs save both electricity and gas but there is not a distinct gas program offered. The evaluation team will work with AIC to calculate this conversion. Initial indications for 2021 are that the Income Qualified Single Family and Smart Savers channels as well as the Custom Initiative will run out of gas funds in 2021. The lowest cost per unit savings within these three areas is Custom Gas, so it will be included to ensure overall budgets are maximized. Income Qualified Single Family and Smart Savers will be included to ensure that prioritization for income eligible residential customers is included to the extent practicable.

This report will, by nature of CPAS, present AIC's overall electric goal achievement for the 2018-2021 Plan period. We will supplement this report with AIC's four-year gas goal achievement information in order for the report to serve as a final integrated report for the Plan Period.

At the close of the 2021 evaluation, we will also prepare a summary report combining all 2021 process and forward looking deliverables for AIC and SAG.

4. Evaluation Budget

The following table outlines the estimated budget to execute the evaluation plans presented above.³⁰

Table 49. 2021 AIC Evaluation Budget

Initiative/Task		Budget
Initiative-Specific Activities		
Residential Program	Retail Products	\$91,300
	Income Qualified	\$240,000
	Low Income Needs Assessment	\$230,100
	Home Efficiency - Market Rate	\$50,000
	Multifamily Programs	\$114,900
	Midstream	\$178,800
	Appliance Recycling	\$47,400
	Direct Distribution	\$39,000
Business Program	Standard	\$100,400
	Custom	\$225,000
	Retro-Commissioning	\$76,200
	Virtual Commissioning	\$127,800
	Streetlighting	\$59,500
	Disadvantaged Communities Research	\$180,500
	Building Operator Certification Assessment	\$126,400
Pilots	\$216,700	
<i>Total Initiative-Specific Efforts</i>		\$2,104,000
Cross-Cutting Activities		
Non-Energy Impacts Research		\$258,000
AM&V Research		\$100,000
Illinois Statewide Technical Reference Manual Activities		\$153,200
SAG Participation		\$100,000
QA/QC Coordination		\$20,000
Verified Cost-Effectiveness Analysis		\$50,000
Integrated Reporting		\$50,000
Other Non-Program Activities (e.g. Evaluation Planning, Utility Collaboration, Project Management, Adjustable Goals Review, etc.)		\$410,800
<i>Total Non-Program Efforts</i>		\$1,142,000
Contingency		\$36,795
Total		\$3,282,795

³⁰ Please note that the evaluation of the Voltage Optimization Program is conducted under a stand-alone budget and is not included in Table 37. A budget for the 2021 Voltage Optimization evaluation is provided in Section 2.3.

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