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Ameren Illinois Company Multi-Year Evaluation Plan

2018-2021 Plan Period

Revised Draft – 2020-2021 Update

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Opinion Dynamics

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1. Introduction

This document presents the multi-year evaluation plan for Ameren Illinois Company's (AIC) 2018 Energy Efficiency Plan, which covers calendar years 2018-2021. Opinion Dynamics, along with its subcontractors Cadmus, Navigant, and Michaels Energy ("the evaluation team") has been contracted by AIC to provide independent evaluation of the 2018 Plan electric and gas energy efficiency programs. In this document, we provide a high-level overview of the evaluation activities planned for each year. On an annual basis, we will also provide detailed evaluation plans specific to each program year for AIC, Illinois Commerce Commission (ICC) staff, and Stakeholder Advisory Group (SAG) review. While the multi-year evaluation plan will serve as the foundation for these annual plans, AIC's programs and evaluation priorities may change from year to year. This specific version of this document is revised to reflect revisions to the multi-year evaluation plan made in preparation for the 2020 annual evaluation.

The overall goal of annual evaluation efforts is to determine the electric, gas, and electric demand savings from AIC's energy efficiency program offerings, as well as what steps, if any, could be taken to optimize program performance from either an energy savings or customer satisfaction and engagement perspective. Findings from the evaluation process may be used by AIC and relevant stakeholders to demonstrate progress against savings targets, modify program design and operations, inform strategies to achieve deeper program savings, and ensure customer satisfaction and cost effectiveness.

The following sections describe the AIC energy efficiency portfolio to be evaluated, as well as key evaluation considerations guiding the evaluation team's approach and planned outcomes.

1.1 Legislative Mandates Informing Energy Efficiency Evaluation

AIC's 2018 Energy Efficiency Plan reflects the significant changes made to Illinois' energy efficiency landscape as a result of the Future Energy Jobs Act (FEJA) passed in 2016. This legislation introduced changes to utility electric savings targets, planning cycles and requirements, and to performance incentive mechanisms. At the same time, a number of these changes have important implications for evaluation of the utility's energy efficiency programs over the next cycle.

- **Cumulative Persisting Annual Savings (CPAS)**: Beginning in 2018, electric savings goals for the utilities are defined based on cumulative persisting annual savings as a percentage of sales. As such, annual evaluations of AIC's programs will track CPAS for 2018 and beyond.
- **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.
- **Utility Responsibility for All Energy Efficiency**: With passage of the FEJA, the delivery of energy efficiency programs is consolidated under the utilities, which mean that the Illinois Power Agency (IPA) and the Department of Commerce and Economic Opportunity (DCEO) no longer serve as funding and delivery channels for utility customers. From an evaluation perspective, this means that the evaluation team will be assessing savings from a wider range of customers (e.g., public sector customers formerly served by the DCEO).

- **Leveraging Advanced Metering Infrastructure (AMI) in Planning, Implementation and Evaluation:** While AIC's rollout of AMI is not yet complete, the evaluation team will look for opportunities, where feasible, to use this data in assessing program performance. Likely candidates include programs evaluated using consumption analysis.

As noted throughout this and the evaluation team's annual evaluation plans, we are actively engaging with AIC, ICC staff, and the SAG on these issues, as well as collaborating with other evaluation teams in the state to ensure the evaluation of the 2018 Plan achieves these key objectives.

1.2 AIC's Energy Efficiency Portfolio

AIC's energy efficiency portfolio for the 2018 Plan is made up of two core programs, the Residential Program and the Business Program; each program consists of multiple initiatives that target specific market segments and/or equipment types. In addition, AIC will be operating and claiming savings from a Voltage Optimization Program beginning in 2019. The Residential and Business Programs generate electric and gas savings for AIC's customers and while some components are consistent with past AIC energy efficiency offerings (e.g., Business Custom and Residential Behavioral Modification), other initiatives are new (e.g., the Business Behavioral Modification Pilot and the Voltage Optimization Program).

Table 1 shows the various initiatives that make up the Residential and Business Programs. The Business Program's Custom and Standard Initiatives, as well as the Residential Program's Income Qualified and Retail Products Initiatives are the most significant contributors to annual savings. The role of the Business Program is particularly important to highlight here given the fact that beginning in 2018, AIC's largest commercial customers (i.e., 10 MW customers), who previously participated at high rates, will no longer be permitted to participate in the utility's energy efficiency programs. As a result, AIC and its implementation contractors will need to reach significantly more small and medium customers to achieve their ICC approved electric savings goals.

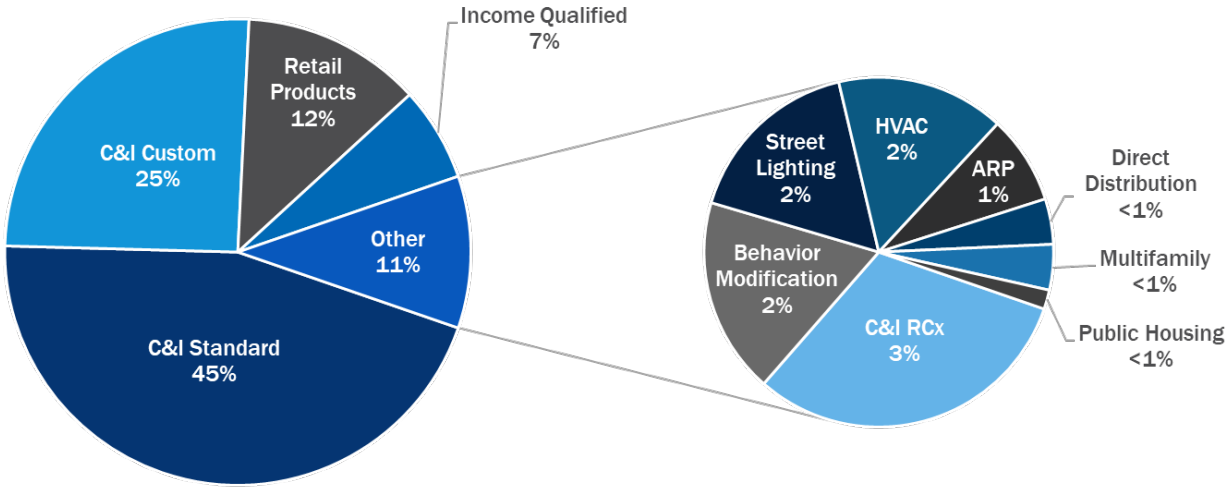
Table 1. AIC 2018-2021 Energy Efficiency Programs and Initiatives

Residential Program Initiatives	Business Program Initiatives
■ Retail Products	■ Standard
■ Income Qualified	■ Custom
■ Public Housing	■ Building Operator Certification
■ Residential Behavioral Modification	■ Retro-Commissioning
■ HVAC	■ Streetlighting
■ Appliance Recycling	■ Business Behavioral Modification Pilot
■ Direct Distribution of Efficient Products	
■ Multifamily	

Figure 1 shows the 2018-2021 Plan's description of each initiative's contribution to overall annual incremental electric savings. It should be noted that while AIC's annual incremental goals for the 2018-2021 plan period are fixed, AIC may achieve these goals in any cost-effective manner. While Figure 1 represents the information contained in the 2018 Plan filing, some changes should be expected throughout the plan period. In particular, based on early 2018 evaluation indicators, we expect that the Business Custom Initiative is likely

to make up a somewhat smaller share of AIC's achieved yearly electric savings than planned, and the Business Standard Initiative is likely to make up a somewhat larger share than planned.

Figure 1. AIC Portfolio 2018-2021 Electric Savings Summary based on Annual Incremental Electric Savings

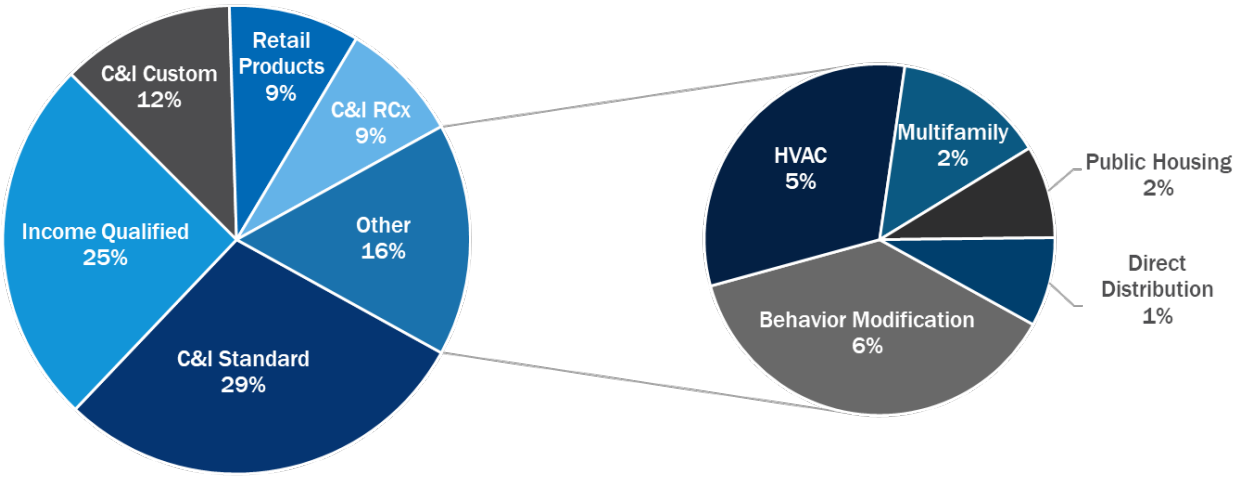


Source: AIC 2018-2021 Plan Compliance Filing

Additionally, as discussed in Section 1.1, the utility's electric savings goals are now based on cumulative persisting annual savings (CPAS), making programs and initiatives that offer equipment with longer lifetimes increasingly important long-term. This is due to the fact that AIC will be required to replace any savings attained by their programs that "expire" (e.g., program-incented measures reach the end of their life). However, only a small portion of AIC's portfolio savings will expire during this plan period, which means that Figure 2 closely represents initiative contributions to 2021 CPAS goals. In contrast, AIC will be required to replace a significant share of savings achieved during 2018-2021 in future plan periods.

Figure 2 provides an overview of the portfolio's gas savings for the 2018 Plan period. As with the electric portfolio, the Business Program and the Residential Program's Income Qualified and Retail Products Initiatives are key contributors. Also as with the electric portfolio, we expect that some changes to the distribution of savings by initiative will occur throughout the plan period.

Figure 2. AIC Portfolio 2018-2021 Gas Savings Summary



Source: AIC 2018-2021 Plan Compliance Filing

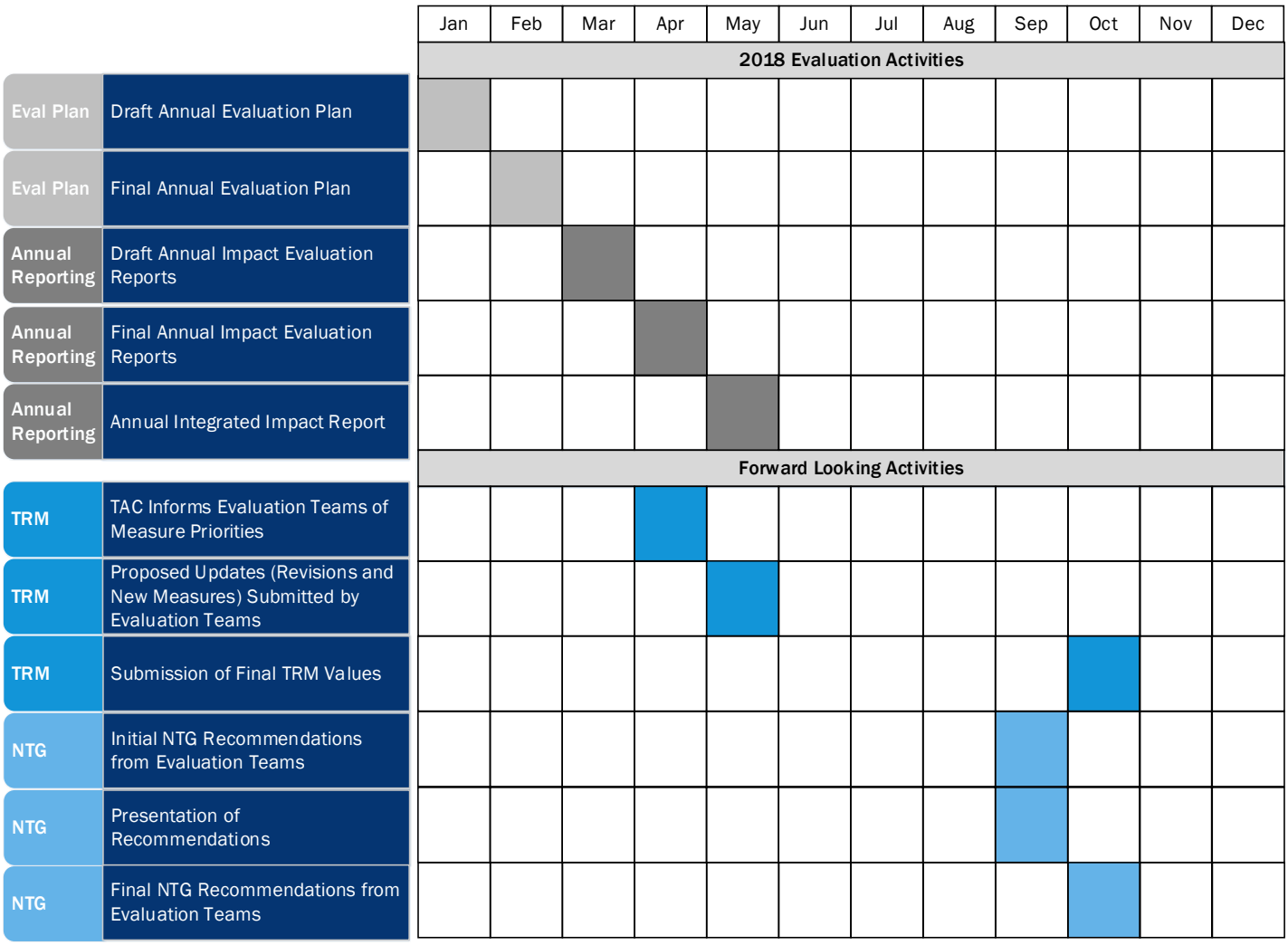
2. Evaluation Policies and Definitions

In preparing this plan, the evaluation team reviewed the most recent Illinois Energy Efficiency Policy Manual (Version 1.1), ICC Order 17-0311 approving AIC's Energy Efficiency and Demand-Response Plan (2018 Plan), and the requirements of the FEJA related to evaluation. Within this section, we outline key requirements around when evaluation-based information should become available. 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.

Evaluation Requirements

Figure 3 outlines the dates at which the evaluation team must provide inputs to and outputs from its evaluation efforts, using 2018 as an example. These include evaluation plans and reports, and research and evaluator recommendations related to Net-to-Gross (NTG) Ratios, and the Illinois Statewide Technical Reference Manual (IL-TRM).

Figure 3. Annual Evaluation Milestones



Beyond the stipulated timelines presented in Figure 3, it is important to note that the NTG policies included in the Illinois Energy Efficiency Policy Manual state that:

- Free-ridership must be assessed for each program when conducting NTG research;
- Spillover should be included whenever feasible, and the use of secondary sources should be considered if primary research is not possible; and
- Portfolio-level spillover analysis should be considered at least once during a Plan period if feasible.

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.[1]

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 IL-SAG approved NTGRs (or approved research based values applied retrospectively)

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.

[1] 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).

Table 3. Impact Evaluation Activity Definitions

Prescriptive Measures	Custom Measures
Definition: Measures with predetermined savings values or IL-TRM algorithms for use in determining savings Example: A-Line LED bulb	Definition: Unique or complex measures for which there is not an IL-TRM algorithm Example: Compressed air system resequencing
Impact Evaluation Activity Definitions	
■ **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.	■ **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

3. Residential Program Evaluation Efforts

In this section, we outline the anticipated evaluation activities for each of the Residential Program Initiatives. The research proposed for the Residential Program Initiatives focuses on gathering data on the effectiveness of new strategies for serving AIC's economically disadvantaged customers through the Income Qualified Initiative, as well as gaining new insights related to the energy savings potential of new measures such as advanced thermostats offered through the Retail Products Initiative. Across all Initiatives, the evaluation team will look for opportunities to leverage AMI data, as well as to assess parameters associated with measure effective useful lives.

3.1 Retail Products Initiative

The objective of the Residential Retail Products Initiative is to increase awareness and sales of high efficiency products through retail and online stores. The program provides instant discounts at point-of-purchase and/or mail-in cash rebates to reduce the cost of high efficiency lighting products, home appliances, and programmable and advanced thermostats. 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 program with customers.

Table 4 shows the proposed tasks for this effort over the next 4-year period.

Table 4. Retail Products Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Gross Impact Analysis - Database Review	✓	✓	✓	✓
	Gross Impact Analysis - IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis - SAG Approved NTGR	✓	✓	✓	✓
Phased	Process Model Development	Continuous As Needed			
	Non-Lighting Participant Survey (Process & NTG)	Continuous, Real Time			
	Advanced Thermostat Process Research	✓			

We proposed the evaluation activities included in Table 4 for the following reasons:

- **2020 and 2021**: The last two years of evaluation will include an emphasis on process evaluation (2020), as well as impact evaluation and NTG assessment (2020 and 2021). The process evaluation and NTG work is important given the shifts expected in measures incentivized through the program (e.g., a decline in lighting products and ramp up of other products), and the impact evaluation work ensures AIC meets annual reporting requirements.

3.2 Income Qualified Initiative

The Income Qualified Initiative is a home energy diagnostic and whole-house retrofit program. The target market for the Initiative is low- to moderate-income AIC customers with a household income up to 300% of

federal poverty guidelines for household size. Although continuing from AIC's Plan 3 portfolio, there are several important program design and implementation changes planned for the Initiative during the 2018 Plan:

- Community Action Agencies (CAAs) and/or the Illinois Home Weatherization Assistance Program will provide recruitment and implementation services for the Initiative in addition to an AIC selected implementation contractor;
- Income qualified multifamily properties will be eligible to participate;
- The Initiative will provide no-cost energy savings kits at special events, as well as through other direct distribution efforts; and
- Customers in select communities will receive enhanced rebates for HVAC and lighting equipment, marketed in conjunction with the HVAC and Retail Products Initiatives.

Given these program changes, the evaluation team has proposed robust impact and process evaluation efforts across the four-year plan period as shown in Table 5.

Table 5. Income Qualified Initiative Evaluation Activities – Four Year Plan

	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Gross Impact Analysis – Database Review	✓	✓	✓	✓
	Gross Impact Analysis - Engineering Desk Review	✓	✓	✓	✓
	Gross Impact Analysis - IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Process Model Development	✓			
	Community Agency Interviews	✓	✓		✓
	Braided Funding Best Practices Assessment	✓			
	Multifamily Manager/Owner Interviews	✓		✓	
	On-Site Verification		✓		✓
	Participant Survey (Process)	✓		✓	

We proposed the evaluation activities included in Table 5 for the following reasons:

- **2020 and 2021**: The evaluation activities planned for the later years of the plan period mirror those conducted earlier, with 2020 serving as another heavy impact and process evaluation year while 2021 focuses largely on program impacts. Multifamily manager/owner interviews will be conducted as part of a cross-cutting research activity in 2020.

3.3 Public Housing Initiative

The Public Housing Initiative is designed to mirror the Income Qualified Initiative by providing home energy diagnostics and whole-house retrofits. The target market for the Initiative is single-family and multifamily public-sector housing owned by government entities (including federal, state, and municipal housing authorities) in communities with average household income at or below 300% of Federal Poverty Guidelines.

The Initiative will collaborate with federal, state, and municipal government agencies within the AIC service territory and housing authorities to identify and weatherize eligible properties.

Table 6 shows the proposed tasks for this effort over the next 4-year period.

Table 6. Public Housing Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Process Model Development	✓			
	In-Depth Housing Authority Interviews	✓		✓	
	Historical Participation Analysis				✓

We proposed the evaluation activities included in Table 6 for the following reasons:

- 2020 and 2021: Beyond the annual evaluation activities, we plan to conduct in-depth interviews with housing authorities in 2020 as part of a cross-cutting research activity. In 2021, we will conduct a historical participation analysis to identify gaps in Initiative coverage and therefore savings opportunities for future years.

3.4 Residential Behavioral Modification Initiative

AIC has offered the Residential Behavioral Modification Initiative since 2010 to help reduce residential customers' energy consumption. In particular, the program seeks to (1) reduce energy consumption by encouraging energy-efficient behaviors, (2) boost customer engagement and education by helping customers understand energy efficiency and how to save energy in their homes, and (3) educate customers about no-cost and low-cost energy-saving measures and behaviors.

Traditionally, the Initiative has offered three forms of treatment: a hard-copy printed home energy report (HER) mailed four times a year to customer billing addresses; an electronic HER (eHER) sent once per billing cycle to all customers with email addresses; and an online portal, which customers can log onto to view the report and access additional information. While we anticipate that the Initiative will be implemented in a consistent manner in 2018, AIC has selected a new program implementer and as such, the evaluation team will verify program design details with them as a first step in the 2018 evaluation.

Finally, it is important to note that the contribution to savings of the Residential Behavioral Modification Initiative declines significantly in the 2018 Plan period compared to prior AIC Plan periods. As a result, the evaluation team has focused almost exclusively on determining program impacts as opposed to conducting process evaluation research as shown in Table 7.

Table 7. Residential Behavioral Modification Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓		TBD
	Initiative Staff Interviews	✓	✓		
	Treatment/Control Randomization and Equivalency Analysis	✓	✓		
	Consumption Analysis	✓	✓		
	Joint Savings Analysis and Savings Adjustments	✓	✓		
Phased	Evaluability Assessment	✓			
	Persistence Study	Ongoing Throughout			
	Internet Survey	✓			
	Statewide Methods Coordination	As Needed			

As noted above, in addition to answering core impact related research questions, the evaluation team will conduct a persistence study to understand whether and how savings degrade in the absence of a program intervention, as well as to provide more accurate lifetime savings estimates. We will answer the following research questions through our persistence study efforts:

- What is the difference in program savings between customers experiencing a *stoppage* in treatment compared to those who continue to receive regular treatment?
- What is the difference in program savings for *dual-fuel or gas-only* customers receiving a reduction or stoppage in treatment compared to those who continue to receive regular treatment?
- What is the difference in program savings between *customers who have received the report for longer (e.g., duration)* than customers who have received the report for a shorter duration (i.e., are there differences across cohorts)?

In general, the evaluation team will conduct consumption analyses to determine energy savings since the treatment was stopped, as well as any decay in savings. The consumption analysis will be conducted at the program and cohort level in order to understand the total impacts of the cessation of program treatment. Findings from the persistence study will be used to inform updates to the IL-TRM. In coordination with the AIC implementation contractor, two cohorts last treated in the Transition Period have been preserved and will be used to conduct regular persistence research throughout the 2018-2021 cycle. We also expect that AIC will stop treatment of the 2018 cohort at the close of the 2018 calendar year, and we will also examine this cohort for persistence.

As part of the 2020 evaluation planning process, we have learned that AIC does not intend to offer the Residential Behavioral Modification Initiative in 2020, and do not expect to conduct our evaluation activities in this year. We do plan to continue our persistence study to take advantage of the natural experiment presented above.

3.5 HVAC Initiative

Through the HVAC Initiative, AIC offers incentives for the purchase of high-efficiency heating and cooling equipment, heat pump water heaters and advanced thermostats to both single- and multifamily homes. AIC

implementation staff will work directly with manufacturers, wholesalers and trade allies/installers to educate them about the incentives available, as well as to train them on promoting the program to AIC customers. Consistent with past HVAC offerings, it is likely that the Initiative will require registered program allies to install some equipment incentivized by AIC. The overall goal of this Initiative is to persuade customers to purchase higher-efficiency equipment than they might otherwise purchase.

Measures offered through this Initiative include: programmable and advanced thermostats, air source heat pumps, central air conditioners, ECM motor blower retrofits in existing furnaces, new furnaces with an ECM blower motor, and heat pump water heaters.

Table 8. HVAC Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Trade Ally Interviews (Process & NTG)		✓		✓
	Participant Survey (Process & NTG)		✓		✓

We proposed the evaluation activities included in Table 8 for the following reasons:

- **2020 and 2021:** In 2020 and 2021, the evaluation team will conduct regular annual impact and process evaluation research.

3.6 Appliance Recycling Initiative

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

Table 9. Appliance Recycling Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Retailer Interviews	✓		✓	

Timing	Activity	2018	2019	2020	2021
	Participant Survey (Process & NTG)	✓		✓	

Across each year, we will base gross impacts on program tracking data and the IL-TRM. As part of this process, we will review the program tracking database to verify participation, as well as to review the application of deemed savings inputs specified in the IL-TRM. We will also conduct research with participating AIC customers, as well as retailers, over the course of the four-year plan period to accomplish the following:

- In 2020, we will gather data to update the Initiative's NTGR. The survey will be administered by telephone, and the NTG algorithm will be developed based on the IL NTG Protocols. Final sample sizes will be determined based on program participation.
  - Through the participant survey, the evaluation team will also ask questions to understand the extent which ARP is inducing customers to reduce the number of refrigerators in their home. By exploring how many refrigerators a customer had prior to Initiative participation and how many they have at the time of the interview, the research will provide updated insight into the appliance replacement scenario.
- In 2020, we will also conduct research with retailers to explore actions taken with regard to recycled units, particularly the proportion of units picked up by retailers that get resold, recycled, or disposed. These estimates inform the NTG estimate as the proportion of customers indicating they would have recycled through retailers, absent the program, will be adjusted by whether retailers would resell, dispose, or recycle the unit.

3.7 Multifamily Initiative

The Multifamily Initiative offers incentives and services that enable energy savings and lower operating costs in market-rate multifamily housing (buildings with four or more units and managed by a private entity). To serve multiple properties through one point of contact, the Initiative's target audience includes property management companies with multiple properties, but the program will also reach out to individual property owners as necessary. AIC's implementation contractor will conduct all outreach and recruitment, perform audits to identify installation opportunities, and provide direct installation of energy-saving measures for building common areas and tenant units. Measures are provided free-of-charge. The provided measures are as follows:

- **In-Unit:** Program offerings for tenant units include LEDs, low-flow showerheads, faucet aerators, programmable thermostats, pipe wrap, and Tier 2 advanced power strips.
- **Common Areas:** Common area offerings include light bulb replacements. The implementer offers properties medium screw-based standard and specialty LED upgrades to replace incandescent or halogen lamps in interior and exterior settings.

AIC will also use the Multifamily Initiative to cross-promote other energy-saving opportunities as appropriate, including the Appliance Recycling, HVAC, and Business Program Initiatives.

Table 10. Multifamily Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓

Timing	Activity	2018	2019	2020	2021
	Engineering Desk Review	✓	✓	✓	✓
	IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Participating Property Manager/Owner Survey (Process & NTG)	✓		✓	
	Participating Tenant Survey (Process)	✓			

- **2020:** We will conduct research with property managers in 2020 as part of a cross-cutting research activity. We do not expect to conduct previously planned tenant surveys in 2020 due to the Initiative's fairly small size.
- **2021:** The evaluation team will conduct annual process and impact evaluation activities in 2021.

3.8 Direct Distribution of Efficient Products Initiative

The Direct Distribution of Efficient Products Initiative provides energy savings kits to students in participating 5th to 8th grade classrooms with a focus on low income communities that receive both electric and gas service from AIC. The kits contain LED light bulbs, an LED nightlight, low flow showerheads and faucet aerators, a Tier 1 advanced power strip, and a furnace filter tone alarm. By providing the kits in conjunction with energy conservation education in the classroom, AIC hopes to reduce energy use in participating student homes. To achieve its goals related to this Initiative, AIC will partner with the Illinois Board of Education, parent and teacher organizations, and public and private school systems.

Table 11. Direct Distribution of Efficient Products Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Parent Survey (Process & NTG)		✓		✓
	School Administrator and Teacher Interviews		✓		

We proposed the evaluation activities included in Table 11 for the following reasons:

- **2020 and 2021**: During the last two years of the 2018 Plan period, the evaluation team will alternate between a focus on initiative energy savings impacts (2020) and deeper dives into the participation process (2021). If changes are made to the Initiative in these years, the evaluation team may change the order in which this research is conducted. However, if implemented as planned, there will be a one year gap between detailed process evaluation activities.

4. Business Program Evaluation Efforts

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

4.1 Standard Initiative

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

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

The Standard Initiative is designed to serve business customers of all sizes including small, medium, and large businesses. However, the Initiative is a critical participation channel for AIC's small customers, who in past years were targeted by a series of stand-alone IPA-approved energy efficiency programs. In 2018, the Standard Initiative will newly include a Small Business offering, providing direct install energy efficiency measures to AIC's small (primarily DS-2 and/or GDS-2) customers

Table 12 outlines the planned evaluation activities for the Standard Initiative.

Table 12. Standard Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	IL-TRM Application Review	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Core Participant Survey (NTG)	✓		✓	
	Participant Survey (Process)				✓
	Small Business Participant Survey (NTG)	✓		✓	
	Small Business Participant Survey (Process)		✓		✓
	Small Business On-Site M&V	✓			
	Online Store Participant Survey (Process & NTG)		✓		✓

Timing	Activity	2018	2019	2020	2021
	Instant Incentives Survey (NTG)	✓		✓	

We proposed the evaluation activities included in Table 12 for the following reasons:

- **2020 and 2021**: During the last two years of the 2018 Plan period, the evaluation team will alternate between a focus on Initiative energy savings impacts and NTG for the core, Small Business, and Instant Incentive offerings (2020) as well as deeper dives into the participation process for the core and Small Business offerings and NTG for the Online Store (2021). If changes are made to the Initiative in these years, the evaluation team may adjust the timing of these evaluation activities.

4.2 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 Initiative. The availability of this Initiative allows customers to propose additional measures and tailor projects to their facility and equipment needs. Custom Incentives are available for electric measures, such as lighting, compressed air, energy management systems (EMS), and industrial process measures, among others. The Initiative also offers gas measures, including heat recovery, process heat, and improvements to steam systems.

The Custom Initiative also includes a number of incubator offerings such as Metering and Monitoring, Strategic Energy Management (SEM), Staffing Grant, Building Operator Certification, and Feasibility Studies.

- The Metering and Monitoring offering promotes customers' ability to review and curtail their energy use using sub-meters and software.
- The SEM offering is designed to help customers achieve ongoing energy and cost savings through motivating changes in participants' organizational culture and business practices to achieve energy reduction and cost savings goals.
- The Staffing Grant offering 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 Building Operator Certification offering is a nationally recognized training and certification program which was developed by the Northwest Energy Efficiency Council (NEEC) and focuses on energy-efficient building operations and preventative maintenance procedures.
- The Feasibility Study offering helps participants define project costs and energy savings opportunities, primarily targeting manufacturing/industrial facilities with compressed air systems.

Given these activities, we propose the following evaluation plan for the Custom Initiative.

Table 13. Custom Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	On-Site Measurement & Verification	✓	✓	✓	✓

Timing	Activity	2018	2019	2020	2021
	Staffing Grant Interviews	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Core Participant Survey (Process & NTG)	✓		✓	
	Incubator Offering Process Research	✓	As needed		
	Building Operator Certification Research	✓	✓	TBD	

We proposed the evaluation activities included in Table 13 for the following reasons:

- **2020 and 2021**: During the last two years of the 2018 Plan period, the evaluation team will alternate between a focus on deeper dives into the participation process and NTG (2020) and energy savings impacts (2021). If changes are made to the Initiative in these years, the evaluation team may change the order in which this research is conducted.

4.3 Retro-Commissioning Initiative

The Retro-Commissioning (RCx) Initiative helps AIC business customers evaluate their existing mechanical equipment, energy management, and industrial compressed air systems to identify no-cost and low-cost efficiency measures to optimize existing energy-using systems. Over time, deferred maintenance and changing operating directives and practices can lead to inefficient operation of building systems. RCx 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. Most of the identified measures require little, if any, capital funds to implement.

Given these activities, we propose the following evaluation plan for the RCx Initiative.

Table 14. Retro-Commissioning Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	On-Site Measurement & Verification	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Participant Interviews (Process & NTG)		✓		✓
	RCx Service Provider Interviews	✓		✓	

We proposed the evaluation activities included in Table 14 for the following reasons:

- **2020 and 2021**: During the last two years of the 2018 Plan period, the evaluation team will alternate between explorations of the RSP perspective (2020) and that of the participating customers (2021). If warranted, the evaluation team may update this schedule to conduct research with both groups in the same year.

4.4 Streetlighting Initiative

New in 2018, the Streetlighting Initiative is designed to encourage municipalities to upgrade their streetlighting from HID to LED technology and will include streetlighting, area lighting, decorative lighting, and protective lighting. Program staff supporting AIC's public sector customers will be responsible for conducting outreach around this Initiative. AIC anticipates two types of participants in this offering; the first group of participants consists of municipalities that own their own streetlighting, while the second group consists of municipalities with AIC owned streetlighting. For the first group, AIC will offer incentives for municipalities to upgrade their existing streetlighting. For the second group, AIC will incentivize municipalities to update their streetlighting ahead of AIC planned upgrades upon burnout. If interested, these municipalities will pay a fee to upgrade their streetlighting early and AIC will offer an incentive to bring down that fee.

Table 15 outlines the planned evaluation activities for the Streetlighting Initiative.

Table 15. Streetlighting Initiative Evaluation Activities – Four Year Plan

Timing	Activity	2018	2019	2020	2021
Annual	Initiative Material & Database Review	✓	✓	✓	✓
	Initiative Staff Interviews	✓	✓	✓	✓
	Engineering Desk Review	✓	✓	✓	✓
	Gross Impact Analysis – Algorithm-Based	✓	✓	✓	✓
	Net Impact Analysis – SAG Approved NTGR	✓	✓	✓	✓
Phased	Process Model Development		✓		
	II-TRM Algorithm Development	✓			
	Participant Survey (Process & NTG)		✓		

We proposed the evaluation activities included in Table 15 for the following reasons:

- 2020 and 2021: During the last two years of the 2018 Plan period, the evaluation team plans to conduct basic process evaluation and impact evaluation only.

4.5 Cross-Cutting Business Program Research

As in past years, we will conduct cross-cutting Business Program evaluation activities to inform the overall implementation approach to serving non-residential customers in AIC territory. Given the change in eligible population and the types of offerings (e.g., integrated offerings for public sector and small businesses) there is a need for targeted research to support AIC's program implementation. We have begun a number of research tasks in the Transition Period and will continue these activities throughout the 2018-2021 cycle.

We plan to complete two types of cross-cutting evaluation activities during the 2018-2021 cycle.

- First, we plan on a year-by-year basis to complete research tasks that inform multiple Business Program initiatives. This will include a Business Program non-participant survey, interviews with Business Program Energy Advisors, Business Program trade allies, AIC Key Account Executives, and other ad hoc research as needed.

- Second, throughout the 2018-2021 cycle, we plan to complete targeted non-residential market assessments based on AIC and stakeholder interest, as well as the results of the various research activities we have presented here.

Table 16 presents currently planned cross-cutting research activities. The evaluation team will assess the need for each of these activities as we progress through the cycle and revise accordingly, but we will complete at least one assessment of Business Program non-participant spillover (NPSO) during this plan period.

Table 16. Cross-Cutting Business Program Research Activities by Year

Activity	2018	2019	2020	2021
Targeted Market Assessments	✓		✓	✓
Non-Participant Survey (including NPSO)	✓			
Energy Advisor Interviews	✓			
Trade Ally Interviews	✓			
Key Account Executive Interviews				✓
Historical Participation Analysis	✓			
Customer Profiling				

5. Voltage Optimization Program

Voltage optimization (VO) 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. As part of 2018 implementation activities, AIC installed hardware, software, and communications components[2] on a subset of 1,047 eligible feeders[3] on a phased basis, with 19 circuits deployed in 2018 and culminating in 1047[4] circuits deployed by 2024. In 2019, evaluation activities will evaluate the impacts of the circuits deployed in 2018, in addition to calculating impacts from "on/off testing," which will commence in 2019.

Table 17 outlines the planned evaluation activities for the Voltage Optimization Initiative.

Table 17. Voltage Optimization Evaluation Activities – Three Year Plan

Timing	Activity	2019	2020	2021
Annual	Program Staff Interviews	✓	✓	✓

[2] Ameren Illinois identified multiple technology upgrades required to successfully deploy a VO program. These technology upgrades have hardware, software and communication components.

[3] 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).

[4] 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.

Timing	Activity	2019	2020	2021
	Data Request and Materials Review	✓	✓	✓
	Verification of VO Deployment to Date	✓	✓	✓
	Impact Evaluation – Application of Energy Savings Algorithm	✓	✓	✓
Phased	Impact Evaluation – Regression Analysis using On/Off Testing Approach	✓		✓

In each year, we will conduct interviews with program staff and a standard impact evaluation approach using an algorithmic method. In addition, in 2019, we will conduct on/off testing to verify AIC's deemed conservation voltage reduction factor (CVR_f) and will provide an update to the Illinois TRM if necessary.

6. Portfolio-Level Evaluation Activities

As part of the evaluation process, the team will also perform a number of annual portfolio-level activities. We describe each of these activities within the following sections.

6.1 Statewide Technical Reference Manual

6.1.1 Participation and Review

The team will continue its involvement in the IL-TRM process, including participation in TAC meetings and NTG Methodology Working Group meetings. For the TAC, this will include participation in weekly calls, as well as reviewing and commenting on IL-TRM update items presented to the TAC and reviewing and providing feedback on updated drafts of the IL-TRM that are released to SAG for comment. For the NTG Working Group, this includes participation in bi-monthly, monthly, and at times weekly calls with working group members, as well as drafting methodological protocols for inclusion in the IL-TRM as needed.

6.1.2 Research to Update the IL-TRM

Over the course of the 2018 Plan cycle, the evaluation team will conduct research to inform updates to the IL-TRM. The following table summarizes currently planned research activities associated with specific IL-TRM measures. The team has also reserved funds within each program year to support research into priority measures. We plan to review and determine which measures to study based on ongoing discussions with AIC and ICC staff, as well as through participation in the TAC.

Table 18. Planned IL-TRM Research Activities

Research	2018	2019	2020	2021
Residential Advanced Thermostat Study		✓	✓	✓
Business Advanced Thermostat Study	TBD - Based on SW Collaboration and Measure Adoption			
Steam Trap Impact Research	✓			
Behavioral Persistence Study	✓	✓	✓	✓
Effective Useful Life Research			As needed	

In addition to the measure specific research outlined in Table 18, the evaluation team will submit work papers with updated IL-TRM assumptions and inputs based on program- and initiative-specific research efforts outlined elsewhere in this plan. Further, we will continue to coordinate with other evaluation teams in the state on research related to Effective Useful Life (EUL).

6.2 Cost Effectiveness Analysis

On a yearly basis, we conduct a cost-effectiveness analysis of AIC's energy efficiency portfolio. As directed by SB2814, we conduct a total resource cost (TRC) test to determine if AIC's portfolio is cost-effective. A program is cost-effective if its net total resource benefits are positive:

Equation 1. Definition of Cost-Effectiveness

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

In addition, we conduct the program administrator cost test (PA/UCT) to support SAG requested reporting

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.

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

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

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

SB2814 indicates that AIC's requirement is for its energy efficiency portfolio to be cost-effective at the portfolio level. Nevertheless, to the degree possible, our analysis will provide insight into the cost-effectiveness of various components of AIC's portfolio to provide further insight for program planning. In addition, our analysis will comply with all Illinois-specific guidance, including the Illinois TRC provisions included in the Illinois Energy Efficiency Policy Manual. We will report results of our analysis in an annual verified cost-effectiveness report to be delivered after yearly program impacts have been finalized. The final annual verified cost-effectiveness report will be delivered no later than September 30 of the year following the program year under consideration.

6.3 QA/QC Process

Per our contract, the team must also 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. For the last two cycles, the team has worked with Dr. Richard Ridge, who has an extensive background in energy efficiency evaluation. In recent years, Dr. Ridge has used his expertise to help write evaluation protocols and oversee other firms in their evaluation efforts, as well as continuing to perform evaluations across the country. For several years, Dr. Ridge was a consultant to the California Public Utilities Commission (CPUC) evaluation staff, where he worked with them to understand evaluation needs, review contractor plans, and participate in many aspects of a multi-million-dollar evaluation effort. Since 2008, he has been providing similar support to the New York State Department of Public Service.

As part of the 2018 Plan evaluation effort, Dr. Ridge will continue to (1) discuss portfolio evaluation plans with the evaluation team, providing advice as needed; (2) participate in ongoing sampling and evaluation design efforts as requested; (3) review draft evaluation reports to ensure quality and accuracy; and (4) provide the ICC with a report on the efforts in which he was involved at the end of each year.

6.4 Reporting

Opinion Dynamics plans to provide four major types of reports that meets the Illinois statutory requirements for independent evaluation.

- Annual program impact evaluation reports
- Annual integrated impact evaluation report
- Process and forward-looking evaluation memos
- Annual integrated process/forward looking evaluation report

6.4.1 Annual Program Impact Evaluation Reports

As outlined in this plan, AIC's 2018-2021 Energy Efficiency Plan is comprised of two programs; the Residential Program and the Business Program. Within each program, multiple initiatives target different technologies and groups of customers. As such, we will issue two program-level impact evaluation reports (one each for the Residential and Business Programs). These reports will summarize the following information for each program:

- First-Year Savings
  - Ex ante gross and net savings (electric energy, electric demand, and gas energy)
  - Verified gross and net savings (electric energy, electric demand, and gas energy)
  - Program-level gross realization rates (electric energy, electric demand, and gas energy)
  - Program-level NTGRs (electric and gas)
  - Gas savings to electric savings conversion where relevant
- Cumulative Persisting Annual Savings
  - Program-level weighted average measure life (WAML)
  - Measure-level effective useful life (EUL)
  - Year-by-year incremental verified net savings
- Participation and program touch (where relevant)
  - Project counts
  - Participant counts

- Ex ante and verified measure quantities

Where appropriate, the annual program impact evaluation reports will also present the information listed above broken down by program initiative. Additionally, the annual program impact evaluation reports will include appendices containing the following:

- Impact evaluation methodology
- Methodology and results for impact parameter estimates derived from the evaluation (e.g., updated in-service rates [ISRs] or hours of use [HOU] for lighting measures), where relevant. These estimates may be used to inform recommendations for future IL-TRM updates, or, where prescribed by the IL-TRM, to inform evaluation impact estimates.

6.4.2 Annual Integrated Impact Evaluation Report

Results from the two annual program impact evaluation reports will be combined in a single integrated impact evaluation report for each year. This report will include information around CPAS to allow for an overall assessment of whether or not statutory goals were met by the programs, namely:

- Yearly expired persisting savings
- Deemed cumulative annual persisting savings

6.4.3 Process and Forward-Looking Evaluation Memos and Report

When process or other forward-looking evaluations (including updated research around NTGRs) are conducted, the evaluation team will issue separate memos summarizing the results of these evaluations as needed. These memos may be issued at the program or initiative level depending on the research conducted.

On an annual basis, the evaluation team will also combine results from process and other forward-looking evaluation activities in an annual integrated report.

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