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# 3-Year Evaluation Plan for the Ameren Illinois Company Electric and Gas Residential and Business Portfolios

Final

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CADMUS

NAVIGANT



**Michaels**Energy

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# 1. Overview of the AIC Portfolio

This document presents the 3-year evaluation plan for the Plan 3 (June 1, 2014 through May 31, 2017) Ameren Illinois Company (AIC) portfolio of residential and business energy efficiency resources. Opinion Dynamics, along with its subcontractors, The Cadmus Group, Navigant Consulting, and Michael’s Energy (“the evaluation team” or “the team”), has been contracted by AIC to provide an independent evaluation of the Plan 3 electric and natural gas energy efficiency programs. In this document, we provide a high-level overview of the planned evaluation activities for each program year. The team will supplement this document each year with a detailed program-year-specific evaluation plan, which we will provide as a separate document. While the 3-year plan will serve as the foundation of our annual plans, program and evaluation priorities may change from year to year, with subsequent changes in evaluation activities from what we describe in this document.

## 1.1 AIC’s Portfolio of Energy Efficiency Resources

AIC began its electric energy efficiency programs in 2007,<sup>1</sup> followed by gas programs in 2009. As such, June 2008 through May 2011 marked the first 3-year cycle for energy efficiency resources in the AIC service territory (Plan 1).<sup>2</sup> Following that, AIC implemented a range of energy efficiency programs during the Plan 2 period, which covered June 1, 2011 through May 31, 2014. The current plan, Plan 3, consists of the next three program years, which began on June 1, 2014 and will end on May 31, 2017.

As stated in its filed plan, AIC’s portfolio comprises measures bundled into 12 programs (and a single pilot) that provide a range of opportunities for customers of all rate classes (Table 1). It is also important to note that, over the course of Plan 3, some of the programs included in Table 1 will be transferred to the Illinois Power Agency (IPA), whose programs are implemented under a different Illinois Commerce Commission (ICC) docket with a different budget. As such, while the team includes these programs in this current 3-year plan, we will may ultimately document them in distinct IPA evaluation plans and reports.

**Table 1. Description of Plan 3 Portfolio Programs**

Name of Program	Program Description
<b>Residential Portfolio Programs</b>	
Residential Lighting*	Incentives are provided to manufacturing and retail partners to increase sales of standard spiral CFLs whereby the end-user receives a discount on the price of ENERGY STAR®-qualified products, achieving electric energy savings.
Residential HVAC	Heating, Ventilation, and Air Conditioning (HVAC) retrofit and replacement upgrades for air conditioners, heat pumps, and cooling systems, achieving electric energy savings.
Residential Appliance Recycling	An incentive is provided to a customer for removing an inefficient refrigerator or freezer whereby a turnkey appliance recycling company verifies customer eligibility, schedules pickup appointments, picks up appliances, recycles and disposes units, and performs incentive processing, achieving electric energy savings.
Residential Home Performance with ENERGY STAR (HPwES)	HPwES includes a home energy audit, direct install measures, and follow-up sealing and insulation measures, achieving both gas and electricity energy savings.
Residential ENERGY STAR New Homes	Targets builders with a package of training, technical and marketing assistance, and incentives for construction of both ENERGY STAR and non-ENERGY STAR homes, achieving both gas and electric energy savings.

<sup>1</sup> Section 8-103(f) and 8-104(f) of the Public Utilities Act (Act), 220 ILCS 5/1-101 et seq.

<sup>2</sup> Note that all AIC programs begin on June 1 and end the following calendar year on May 31.

Name of Program	Program Description
Residential Multifamily In-Unit	Provides installation of measures in tenant spaces, as well as envelope measures for gas-heated properties, achieving both gas and electric energy savings.
Residential Behavioral Modification*	Home Energy Reports provide customers with a profile of their energy use, energy efficiency tips, portfolio program information, and a comparison of their energy usage to their “neighbors,” thereby encouraging reduced energy use, achieving both gas and electric energy savings.
Residential Moderate Income (Subset of HPwES)	Provides increased incentives for energy efficiency improvements and retrofits in low to moderate-income households, achieving both gas and electric energy savings.
Residential Energy Efficiency School Kits (School Kits)	Distributes energy efficiency kits to children in grades 5–8 who live in homes served by AIC, achieving both gas and electric energy efficiency savings.
<b>Business Portfolio Programs</b>	
Business Standard	Incentivizes customers to purchase energy-efficient measures with predetermined savings values and fixed incentive levels, achieving both gas and electric energy savings.
Business Custom	Applies to energy-efficient measures that do not fall into the Standard Program. These projects are normally complex and unique, requiring separate incentive applications and calculations of estimated energy savings, achieving both gas and electric energy savings.
Business Retro-Commissioning	Provides options and incentives for businesses to improve operations and maintenance practices for buildings, systems, and processes, achieving both gas and electric energy savings.
Business Large Commercial and Industrial (C&I)**	Pilot electric program offering incentives to large C&I facilities.

Source: AIC Order 13-0498, dated January 28, 2014 (Plan 3 Order).

<http://www.icc.illinois.gov/downloads/public/edocket/367603.pdf>

\* These programs or components of these programs will move to the IPA over the course of Plan 3.

\*\* Note that this program had no participants and was therefore inactive in PY7.

## 1.2 Key Considerations Guiding Evaluation Priorities

There are a number of criteria informing the evaluation approach for the portfolio overall, as well as for specific programs. In particular, the following guidelines have shaped the team’s tactics and the timing of various evaluation activities:

- The evaluation team must perform at least one process and one impact evaluation for each program at some point in the Plan 3 period.<sup>3</sup>
- The evaluation team must perform savings verification for all programs for each year.
- As much as possible, the evaluation team will conduct research to inform AIC’s Plan 4 filing. This includes the prioritization of research related to net-to-gross ratios (NTGRs) and the Illinois Statewide Technical Reference Manual for Energy Efficiency (IL-TRM).

As noted in relation to the last factor above, the team must balance the relative contribution of programs to AIC’s portfolio savings with the evaluation efforts proposed. As shown in Table 2, prior to any changes due to

<sup>3</sup> Note that the team will conduct additional process, impact, and/or market research as budget allows.

adjustable goals, the portfolio has PY7 energy goals of around 200 GWh and 5 million therms.<sup>4</sup> Note that these goals are subject to change and may vary from what is listed in the program implementation plans.

**Table 2. Portfolio Planned Net Savings by Program Year**

Program	Annual MWh Savings			Annual Therm Savings		
	PY7	PY8	PY9	PY7	PY8	PY9
RES Lighting	26,359	5,841	4,968	--	--	--
RES Behavioral Modification	29,350	--	--	1,887,500	1,887,500	1,887,500
RES Multifamily In-Unit	5,517	5,517	5,517	112,521	112,521	112,521
RES HVAC	4,492	4,492	4,492	--	--	--
RES HPwES	5,346	5,346	5,346	768,779	768,779	768,779
RES Appliance Recycling	4,010	3,702	3,329	--	--	--
RES Moderate Income	1,194	6,604	6,604	219,987	462,778	462,778
RES ENERGY STAR New Homes	791	791	791	25,663	25,663	25,663
RES School Kits	388	388	388	54,986	54,986	54,986
<b>Residential Portfolio Total</b>	<b>77,447</b>	<b>32,681</b>	<b>31,435</b>	<b>2,565,214</b>	<b>2,565,214</b>	<b>2,565,214</b>
BUS Standard	78,548	85,378	93,178	851,087	851,087	851,087
BUS Custom	32,716	32,544	32,372	1,139,309	1,135,436	1,131,575
BUS Retro-Commissioning	17,254	17,196	17,137	135,089	134,629	134,172
BUS Large C&I	17,480	17,480	17,480	--	--	--
<b>Business Portfolio Total</b>	<b>145,999</b>	<b>152,598</b>	<b>160,168</b>	<b>2,125,485</b>	<b>2,121,152</b>	<b>2,116,833</b>
<b>AIC PORTFOLIO TOTAL</b>	<b>223,446</b>	<b>185,278</b>	<b>191,603</b>	<b>5,194,921</b>	<b>5,433,380</b>	<b>5,429,061</b>

Source: AIC Plan 3 Corrected Compliance Filing, p. 13, Docket 13-0498 (Filed February 28, 2014).  
<http://www.icc.illinois.gov/downloads/public/edocket/370747.pdf>

Table 3 provides AIC’s annual portfolio costs, which are close to \$57 million each year.

**Table 3. Portfolio Planned Costs by Program Year**

Program	Combined Electric and Gas Costs (\$)		
	PY7	PY8	PY9
RES Lighting	\$6.35	\$0.00	\$0.00
RES HPwES	\$6.18	\$6.18	\$6.22
RES HVAC	\$2.84	\$2.84	\$2.84
RES Moderate Income	\$2.30	\$9.68	\$9.68
RES Behavior Modification	\$1.97	\$0.98	\$0.98
RES Appliance Recycling	\$1.58	\$1.46	\$1.31
RES Multifamily In-Unit	\$1.37	\$1.37	\$1.37
RES ENERGY STAR New Homes	\$1.02	\$1.02	\$1.02

<sup>4</sup> AIC has goals for energy savings (in MWh and therms), but no statutory required goals for demand.

Program	Combined Electric and Gas Costs (\$)		
	PY7	PY8	PY9
RES School Kits	\$0.24	\$0.24	\$0.24
<b>RESIDENTIAL PORTFOLIO TOTAL</b>	<b>\$23.85</b>	<b>\$23.78</b>	<b>\$23.67</b>
BUS Standard	\$13.15	\$13.92	\$14.30
BUS Custom	\$7.43	\$7.40	\$7.37
BUS RCx	\$2.01	\$2.00	\$2.00
BUS Large C&I	\$1.71	\$1.71	\$1.71
<b>BUSINESS PORTFOLIO TOTAL</b>	<b>\$24.30</b>	<b>\$25.03</b>	<b>\$25.37</b>
AIC - Portfolio Admin Costs	\$2.42	\$2.46	\$2.47
AIC - EM&V Costs	\$1.69	\$1.71	\$1.72
AIC - Education	\$1.21	\$1.23	\$1.23
AIC - Marketing	\$1.21	\$1.23	\$1.23
R&D Budget (Emerging Technologies)	\$1.69	\$1.71	\$1.72
<b>AIC PORTFOLIO TOTAL</b>	<b>\$56.39</b>	<b>\$57.15</b>	<b>\$57.42</b>

Source: AIC Plan 3 Corrected Compliance Filing, p. 13, Docket 13-0498 (Filed February 28, 2014). <http://www.icc.illinois.gov/downloads/public/edocket/370747.pdf>

## 1.3 Commission-Specified Evaluation Efforts

The evaluation team has carefully reviewed the ICC’s Order for AIC (Order 13-0498, dated January 28, 2014)<sup>5</sup> (Plan 3 Order) and notes a few central items related to evaluation below. Overall, since the Plan 2 Order, there have been numerous discussions and efforts made to define structures for net-to-gross (NTG) application, as well as impact assessment through the IL-TRM.

### 1.3.1 Net-to-Gross Ratio Values

#### Spillover

As part of the Plan 3 Order, the ICC directed the evaluation team to consider spillover whenever possible, while being mindful of any excessive costs to measure spillover in relation to the predicted impacts of such measurements. Based on this conclusion and consistent with our evaluation efforts in prior years, the evaluation team has presented a number of proposals to assess both participant spillover and non-participant spillover.

<sup>5</sup> <http://www.icc.illinois.gov/downloads/public/edocket/367603.pdf>



## Net-to-Gross Framework

Similar to the last 3-Year Plan, the evaluation team will apply NTGRs based on the NTG framework outlined in the December 21, 2010, *Order*,<sup>6</sup> p. 72, Docket No. 10-0568 and May 24, 2011, *Order on Rehearing*, p. 20, Docket No. 10-0568.<sup>7</sup> We provide the general framework from the Order below:

1. Where a program design and its delivery methods are relatively stable over time, and an Illinois evaluation of that program has an estimated NTGR, that ratio can be used prospectively until a new evaluation estimates a new NTGR.
2. In cases that fall under the paragraph above, once new evaluation results exist, these would be used going forward, to be applied in subsequent program years following their determination until the next evaluation, and so on.
3. For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes—either in the program design or delivery, or changes in the market itself—NTGRs established through evaluations would be used retroactively, but could also then be used prospectively if the program does not undergo continued significant changes, similar to the first paragraph above.
4. For programs falling under the third paragraph above, deeming a NTGR prospectively may be appropriate if: the program design and market are understood well enough to estimate with reasonable accuracy an initial NTGR (e.g., based on evaluated programs elsewhere); or it is determined that the savings and benefits of the program are not sufficient to devote the evaluation resources necessary to better estimate a NTGR.
5. Recommendations of the Stakeholder Advisory Group (SAG) to the Commission regarding application of this framework shall be submitted in adequate time for Commission review. If the SAG is not in unanimous agreement in its recommendation, the Commission requests that any recommendation that has the support of more than a majority of SAG members be submitted to the Commission along with a discussion and enumeration of the dissenting opinions.

Based on the framework, the evaluation team previously created, and continues to implement, a set of rules to guide evaluation activities based on the language above. The rules are as follows:

1. If the program design and delivery methods are stable over time and a previous Illinois evaluation has estimated a NTGR, that NTGR is used prospectively until a new value is calculated. When the new value is calculated, we will apply the value prospectively following a similar timeline as the per-unit values. For example, if a PY6 NTGR is calculated for a program that has had an evaluation and the program and market are stable, we will apply the new NTGR in PY8.
2. For existing programs that have been evaluated previously, but are undergoing significant changes in program design or in the market served by that program, or for existing and new programs that have not yet had an evaluation, a NTGR will be calculated and applied retroactively (i.e., for the year in which program participants are included in the research).

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<sup>6</sup> <http://www.icc.illinois.gov/downloads/public/edocket/282454.pdf>

<sup>7</sup> <http://www.icc.illinois.gov/downloads/public/edocket/294725.pdf>

3. If a previous Illinois evaluation has not been conducted, it is possible to deem a NTGR based on secondary research showing other NTGR values from similar programs. This approach is used in two cases:
  - a. If the program design and market is well understood
  - b. If the savings of the program are not sufficient to devote evaluation resources.

## NTG Recommendations

Within Section VI.A of the Plan 3 Order, the Commission directed the evaluation team to present proposed NTG values for each program for the next program year to the SAG prior to March 1 of each year. In the SAG meeting(s), we will present our rationale for each value and provide the SAG, in its advisory role, with an opportunity to question, challenge, and suggest modifications to the independent evaluator's proposed values. The team will then review this feedback and make the final determination on the proposed values.

Our team presented NTG values for PY7 to the SAG in February 2014 and for PY8 in February 2015. The PY7 and PY8 recommendations are included in Appendix A.

## Cost Effectiveness Evaluation

As stated in the Plan 3 Order, the Commission found that an independent evaluator must perform AIC's cost-effectiveness evaluation. However, a second independent evaluator selected by AIC will perform the required annual and three-year cost-effectiveness evaluations. The Opinion Dynamics evaluation team will continue to review the results of the annual analyses, as well as the three-year analysis performed by AIC's outside consultant. We have outlined this process in Section 5.2.

### 1.3.2 Aligning the Timing of NTG Framework and SW TRM Application

In Section VI.C of the Plan 3 Order, the Commission set specific requirements for when EM&V information should become available, as shown below. These timing requirements support updates to the IL-TRM and to recommended NTGRs.

- TRM Updates
  - July 1: The TRM Technical Committee informs evaluators and others about which measures are high or medium priority, and which need work papers prepared.
  - August 1: Updates to existing measure work papers intended to clarify terms or approaches will be completed.
  - October 1: New work papers for new measures will be completed.
- NTG Updates
  - November 1: Draft residential NTG estimates will be completed for the program year that ended on May 31.
  - December 1: Draft C&I NTG estimates will be completed for the program year that ended on May 31.

### **1.3.3 Contracting with Independent Evaluators**

In Section VI.I of the Plan 3 Order, the evaluation team is directed to “file...an annual report (a reasonable time after evaluations for each Plan Year have been completed) to apprise the Commission of its ability to conduct itself independently.” This report will include information on any direction provided to the team by AIC, stakeholders, and ICC staff. The annual report from the team’s third party auditor/evaluator (Dr. Rick Ridge) will also be filed in docket 13-0498.

### **1.3.4 Evaluation Cycle**

In Section VI.J of the Plan 3 Order, the Commission specified that the evaluation team must conduct one impact evaluation and one process evaluation for each program within each 3-year plan cycle. Additionally, the Commission directed AIC to include ICC staff in the development of its evaluation plans, and required its evaluators to collaborate with the evaluators of other utilities in the state to reach consensus on the best approaches to assessing NTG in particular markets for both residential and non-residential energy efficiency programs.

While the ICC specified the need for collaboration in the past, the requirement to reach consensus on the best approaches to NTG research represents a larger level of effort than previously undertaken. As such, we plan to increase the level of funding for non-program evaluation efforts to align with this directive.

## 2. Summary of Evaluation Studies by Year

As noted above, AIC is implementing 12 programs in PY7.<sup>8</sup> The following table provides a high-level summary of the planned evaluation activities across each of these programs. Subsequent sections of this document provide detailed information on the program-specific approaches.

**Table 4. Plan 3 Evaluation Activities by Program**

Activity	Year	Residential									Business		
		Lighting	HVAC	Behavioral Modification	HPwES	Appliance Recycling	Multifamily In-Unit	Moderate Income	School Kits	ENERGY STAR New Homes	Standard	Custom	Retro-Commissioning
Program Material Review	PY7	Every Year and Every Program											
	PY8												
	PY9												
Program Manager and Implementer Interviews	PY7	Every Year and Every Program											
	PY8												
	PY9												
Energy Advisor or Key Account Executive Interviews	PY7												
	PY8										●	●	
	PY9												
Market Actor/Program Ally/Retailer Interviews	PY7		●		●	●	●	●		●			●
	PY8	●	●							●	●	●	
	PY9						●						●
Customer Intercepts	PY7												
	PY8	●											
	PY9												
Participant Survey	PY7			●			●				●		●
	PY8		●	●	●	●	●	●	●		●	●	
	PY9										●		●

<sup>8</sup> The Large C&I Program was inactive in PY7 and is not included in the plan at this time.

Summary of Evaluation Studies by Year

Activity	Year	Residential									Business		
		Lighting	HVAC	Behavioral Modification	HPwES	Appliance Recycling	Multifamily In-Unit	Moderate Income	School Kits	ENERGY STAR New Homes	Standard	Custom	Retro-Commissioning
Non-Participant Survey	PY7			●							●	●	●
	PY8			●									
	PY9				●								
Site Visits	PY7										●	●	●
	PY8	●	●									●	●
	PY9		●								●	●	●

● Activity the evaluation team plans to perform

### 3. Residential Program Evaluations

In this section, we present the multiyear view of each residential program evaluation. We present the programs in order of savings (in MBTUs) to the residential portfolio, from highest to lowest.

#### 3.1 Residential Behavioral Modification Program

The Behavioral Modification Home Energy Report (HER) Program began mid-year in PY3 with a pilot group of approximately 50,000 dual-fuel customers. Since that time, the program has grown to reach almost one-third of AIC’s 1 million residential customers as of PY6. Most of the approximately 224,000 participants are in their third year with the program, although about 26,000 residential customers participated for the first time in PY6.

As part of the most recent evaluation, the evaluation team completed an assessment of energy impacts (including equivalency analysis, adjustment for double-counted savings, and historical channeling review) coupled with a survey of treatment and control customers. Our evaluation approach for the Plan 3 cycle will build on prior evaluation findings, provide additional insights regarding program effects, and address key questions regarding the benefits of offering behavioral programs over time.

Table 5 shows the proposed tasks and budgets for this effort over the next 3-year period. It is important to note that beginning in PY8, the Behavioral Modification Program will be offered through the IPA for electric and offered within the 8-103/8-104 portfolio for gas.

**Table 5. Planned Behavioral Modification Program Evaluation Activities by Program Year**

Activity*	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=2)	X (n=2)	X (n=2)
Equivalency Analysis	X	X	X (if new cohort added)
Treatment and Control Group Survey	Rolling Internet surveys with treatment and control groups to identify select energy savings actions taken	Rolling Internet surveys with treatment and control groups to identify select energy savings actions taken	
Modeling	Multi-level modeling to provide individual-level savings estimates from high to low to negative savers		
Net Analysis	Billing analysis for electric and gas	Billing analysis for gas	Billing analysis for gas
Additional Net Analysis	Application of net savings adjustment from PY6 evaluation	Participation lift and channeling analysis for gas	Application of adjusted net savings value from PY7 for gas
<b>Budget</b>	<b>\$110,000</b>	<b>\$47,500</b>	<b>\$26,000</b>

\* Should a change in implementation occur whereby participants are dropped from the program, the team would also recommend conducting a persistence study.

Below we provide the rationale for the proposed evaluation activities.

■ **Studies by Year**

- For the PY7 evaluation report, we will conduct both process and impact analyses.
  - We will conduct three brief Internet quantitative surveys with pilot participants and the control group after HERs are sent to the home. Recent research suggests spikes in energy usage after reports are delivered. Our surveys would be designed to provide context to the energy savings actions that may drive these changes in usage (e.g., lighting, heating and cooling behaviors, equipment purchases). We will work with the program implementers to field the survey to coincide with when reports are delivered to each cohort (depending on fuel type and wave). We anticipate that these surveys will be conducted beginning in July, September, and November 2015.
  - We will conduct a multilevel model of all participants to provide individual-level savings estimates from high to low to negative savers. This analysis will produce both aggregate and individual-level estimates that isolate top-tier savers and lower-tier savers, to better understand who is driving savings, and potentially, through leveraging secondary data, what their characteristics are. This analysis will provide inputs to better understand who is driving savings estimates for the program. This effort will also help refine how to target future program participants, or remove existing participants, to achieve consistent savings and lower implementation costs. We anticipate conducting the modeling in August–September 2015.
  - As in prior years, we will also conduct a billing analysis of electric and gas savings for the program to provide net impacts. We anticipate conducting the modeling in August–September 2015.
  - We will apply net savings adjustments developed in our PY6 channeling analysis to provide an adjusted net impact value for PY7. We plan use this approach given that none of AIC’s programs were promoted through the PY7 Behavioral Modification Program, and there have been consistently small adjustments in savings due to channeling in past program years. We will also account for and remove channeling savings for current participants from prior program years (PY3-PY7). We anticipate conducting the analysis in September–October 2015.
- In PY8, our analysis will focus on estimating net gas impacts through billing analysis with a channeling analysis.<sup>9</sup>
  - We will conduct three brief Internet quantitative surveys with participants and the control group after HERs are sent to the home allowing for, when coupled with PY7 results, a full year (including multiple seasons) of data. We will work with the program implementers to field the survey to coincide with when reports are delivered to each cohort (depending on fuel type and wave). To capture a full year of data, we anticipate that these surveys will be conducted beginning in January, March, and May 2016.

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<sup>9</sup> Electric impacts will be assessed under the IPA.

- As in prior years, we will conduct a billing analysis of gas savings for the program to provide adjusted net impacts. In addition, we will conduct a participation lift and channeling analysis (incorporating historical trend analysis) to assess trends in program participation over time and adjusted net savings estimates. This analysis will also account for and remove channeling savings for current participants from prior program years (PY3-PY7). We anticipate conducting the modeling in August–September 2016, followed by the channeling analysis in September–October 2016, contingent on receiving other program databases.
- In PY9, we again perform a billing analysis of electric and gas savings for the program to provide net impacts. We anticipate conducting the modeling in August–September 2017.

### 3.2 Residential Home Performance with ENERGY STAR Program

The HPwES Program is a home energy diagnostic program offering audits to all AIC residential customers and retrofits to customers with AIC heating fuel. The HPwES evaluation effort will build on previous evaluation activities for the program. Past evaluations included engineering analysis of gross measure savings, billing analysis to assess IL-TRM savings assumptions, and participant surveys to calculate NTGRs. The process evaluation work consisted of in-depth interviews with program staff, a participant survey battery on program satisfaction, and a review of program documents and processes.

The evaluation team will incorporate key aspects of previous evaluations, including survey questions and analysis frameworks where appropriate in assessing HPwES during the Plan 3 period. In addition, we propose several new evaluation activities to assess barriers to customer and trade ally participation and to shed light on why the program conversion rates are relatively low.

**Table 6. Planned HPwES Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews (including Conservation Services Group [CSG] Auditors)	X (n=2 to 4)	X (n=2 to 4)	X (n=2 to 4)
Trade Ally Survey (Process and Spillover)	X (n=40)		
Participant Survey		X Installation Verification, Process, and NTG (n=200)	
Non-Participant Survey			X (n=125)
Predictive Analysis of Customer Conversion Rates	X		
Participant Focus Groups		X (n=4)	
Gross Impact Evaluation Approach	IL-TRM Application/ Engineering Analysis	IL-TRM Application/ Engineering Analysis	IL-TRM Application/ Engineering Analysis



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Net Impact Evaluation Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
<b>Budget</b>	<b>\$75,000</b>	<b>\$80,000</b>	<b>\$65,000</b>

Below we provide the rationale for the proposed evaluation activities.

### ■ Studies by Year

- For the PY7 evaluation, the evaluation team will conduct process research using both self-report trade ally surveys and predictive analytics to better understand program participation and customer conversion rates. To assess program impacts, we will conduct an engineering analysis using the IL-TRM to estimate gross savings and we will apply a deemed NTGR to calculate net savings.
  - In our PY6 evaluation, both interviews with program staff and our analysis of the program tracking data suggested that trade ally participation decreased, perhaps due to low trade ally satisfaction. To explore this further, the evaluation team will conduct a trade ally survey to assess program satisfaction and challenges faced and to explore the barriers to program participation for both customers and trade allies. The trade ally survey will also include a battery of questions to assess potential trade ally spillover. The evaluation team plans to conduct these interviews in July 2015.
  - The evaluation team will also conduct research to examine the predictors of customer conversions from audit to retrofit projects. Specifically, we will use a predictive analytics technique known as “random forests” to determine the relative influence of various project-specific and community-level demographic factors on predicting the likelihood of customer conversions from audits to retrofits. Using the past five years of program tracking data and incorporating additional secondary sources, the evaluation team will build a statistical model to determine what variables consistently predict customer conversion to retrofit projects.<sup>10</sup> These results can be used by AIC to understand barriers to program participation and to more effectively target their customers and maximize per project savings. The evaluation team plans to conduct this analysis starting in July of 2015.
- In PY8, we will continue to assess barriers to program participation and customer conversion. We will administer a participant survey to verify the installation of program measures, collect information to inform our process evaluation, and calculate a NTGR. We will also conduct a series of focus groups with audit-only program participants to understand the barriers for completing their audit recommendations.
  - The evaluation team will field a participant survey to assess program processes; audit and measure satisfaction; preferred methods for receiving energy efficiency information; actions taken; water use characteristics; installation of program measures, i.e., the number of measures received and installed; and a NTG battery to assess program attribution (to be applied in PY10). Our survey will also include a battery of questions covering on-bill financing to assess whether financing options help improve customer conversion rates. The evaluation team plans to field this survey in July 2016. The evaluation reports will include tables that

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<sup>10</sup> Random forests is a machine learning method used for classification and prediction. The method draws primarily from CART (classification and regression tree) modeling and involves creating (and averaging over) a large number of regression trees to produce stable and robust model coefficients. These model estimates are then used to make out-of-sample predictions.

outline number of participants that also received on-bill financing in addition to a rebate for the same measure/project.

- We will use the data collected in the participant survey to assess measure in-service rates and to possibly update ex ante savings assumptions.
- The evaluation team will also conduct a series of focus groups (four groups of 8 to 10 participants) with audit-only program participants to understand the barriers for completing their audit recommendations. These findings will help provide contextual information to support findings from the predictive analytics conducted in PY7. We anticipate conducting these focus groups in August 2016.
- In PY9, the evaluation team will conduct additional quantitative research on program barriers via a non-participant survey.

We will administer a non-participant survey to assess HPwES program awareness and reasons for non-participation. The survey instrument will allow us to compare participants and non-participants on energy management knowledge, concerns about energy usage, and key demographic characteristics. The evaluation team plans to conduct this survey in July 2017.

### **3.3 Residential Lighting Program**

AIC designed the Residential Lighting program to increase awareness and sales of ENERGY STAR lighting among residential customers. The program provides discounts through a variety of retail channels to reduce the cost of CFLs. The program is available throughout the entire AIC service territory through retail stores and an online store.

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

**Table 7. Planned Lighting Program Evaluation Activities by Program Year**

Activity	PY7
Program Material Review	X
Program Manager and Implementer Interviews	X (n=2 to 3)
Retailer Interviews (corporate buyers)	
Customer Intercepts	
In-Home Lighting Audits	
Installation and Usage Study	
Consumer Preference Study	
Leakage “In” Study	X
Gross Impact Approach	Application of IL-TRM V3.0
	Participation based on database review, leakage, and res/commercial split from PY6 intercepts.
Net Impact Approach	Value from Prior Evaluation
<b>Budget</b>	<b>\$45,000</b>

Below we provide the rationale for the proposed evaluation activities.

■ **Studies by Year**

- The PY7 evaluation will be more limited since the evaluation team put substantial effort into the evaluation of this program in PY6.
  - We will use the PY5 NTGR for the program in PY7 per the NTG framework.
  - We will also conduct a study to estimate the number of bulbs discounted by lighting programs in neighboring territories that AIC customers purchase and install in their homes. This estimate will serve as a leakage “in” rate, which we will combine with our leakage “out” rate from PY6 to produce an overall leakage rate.

The Multi-Year IPA Evaluation Plan outlines the evaluation activities planned for the Lighting Program in PY8 and PY9.

### 3.4 Residential Multifamily Program

The Multifamily Program encompasses three program components: direct install measures in tenant and common areas, common area lighting, and major measures. In PY7, the common area lighting component included replacing incandescent or halogen lamps with CFLs. The direct install channel focuses on the installation of CFLs, showerheads, faucet aerators, and programmable thermostats based on the available opportunities. The major measures portion of the program offers more expensive complex measures, such as insulation and air sealing.

Over the course of the last six program years, the evaluation team has performed both process and impact evaluations. The latter has involved the application of the IL-TRM algorithms, as well as onsite visits to assess measure installation. The team has also conducted interviews with participating property managers and tenants to develop NTGRs for each program component. We will continue to assess program impacts during the Plan 3 cycle, as well as perform assessments of key process and market issues.

It is important to note that beginning in PY7, components of the Multifamily Program will be implemented within the 8-103 and 8-104 portfolio and as a stand-alone IPA program. In particular, while CFLs will continue to be provided through the 8-103 program, all other common area lighting measures will be implemented only in the IPA program, while major measures will be implemented within the 8-103 and 8-104 portfolio and the stand-alone IPA program depending on heating fuel source. While the separation of program components across two distinct funding streams is not a problem for evaluation, the team plans to provide separate reports for the IPA and 8-103/8-104 programs and therefore will not provide overall program savings integrating the two sources in either report.

The following table summarizes planned evaluation activities for the 8-103/8-104 program.<sup>11</sup>

**Table 8. Planned Multifamily Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Staff Interviews	X (n=2)	X (n=2)	X (n=2)
Participating Trade Ally Interviews	X (n=10)		X (n=10)
Contractor Interviews	Market Characterization (n=100)*		
Property Manager Survey	Market Characterization (n=40)	NTG, Process, and Measure Installation (n=40)	
Tenant Survey		NTG and Water Usage Characteristics (n=100)	
Market Characterization	X		
Gross Impact Approach	Application of IL-TRM V3.0/Engineering Analysis	Application of IL-TRM V4.0/Engineering Analysis	Application of IL-TRM V5.0/Engineering Analysis
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
<b>Budget**</b>	<b>\$60,000</b>	<b>\$71,000</b>	<b>\$30,000</b>

\* The expected number of completes will be refined through the planning process. Based on conversations with the implementation team, we expect that this number may be lower.

\*\* Note that cost for some evaluation activities related to Major Measures is split across 8-103/8-104 and the IPA.

Below we provide the rationale for the proposed evaluation activities.

■ **Studies by Year**

- In the PY7 evaluation period, we will focus on exploring the program’s remaining market potential, including property managers’ barriers to completing more energy-efficient upgrades.
- We plan to start the Plan 3 cycle with research to assess the program’s remaining market potential. The study will include an assessment of market size (i.e., number of properties, buildings, and units), geographic distribution, and supply side structure and operations. This

<sup>11</sup> A number of these activities will also support the evaluation of the IPA program. As a result, the evaluation team will allocate a portion of the cost of certain activities to the IPA program and associated budget.

effort will involve multiple data collection and analysis activities, including a review and analysis of AIC customer data, a review of census data, interviews with contractors working in AIC's service territory, and a survey of property managers on their perceptions of the market for these services. This research will help provide recommendations for the program's strategic direction that may help increase the program's savings potential. The team plans to begin this activity as soon as possible following approval of the plan so that results can help inform planning for PY8 and PY9.

- We will also calculate gross and net impacts consistently with prior program years. We will conduct an engineering analysis based on application of the IL-TRM V3.0 to calculate gross impacts, and will apply in-unit and major measures NTGRs from prior evaluations. We will complete this task as soon as final program tracking data become available, which is likely in July 2016.
- In PY8, the team will focus on inputs to the impact assessment of the program. In particular, we will prioritize research to inform the development of updated NTGRs, as well as an assessment of measure installation. The team will use the survey to ask about how households use water in their homes (i.e., household configuration etc.), which will help inform a determination about whether primary data collection for faucet aerators is needed.
  - We will again utilize self-reported data from program managers and tenants to update the program's NTGR for use prospectively in PY10. We will review and finalize our approach based on the program's design, as well as coordination across the Illinois evaluation teams on NTG methods. We will field the survey upon receipt of final program tracking data so that we have full participant population. We anticipate receipt of these data in early July 2016.
  - Surveys with participating property managers will also provide an opportunity to conduct a targeted process assessment of the program. At a minimum, we will inquire about satisfaction with program implementation and cross-participation between different program components. If feasible, we will also draw on findings from the market characterization and target property managers in certain geographic areas to see how their experiences with the program may differ.
- In the final year of the Plan 3 cycle (PY9), we anticipate conducting a limited evaluation focused on program impacts. We will also conduct a small number of targeted process activities.
  - Interviews with program staff and participating trade allies in PY9 will help the team gather updated information on program implementation and processes. We anticipate conducting these interviews in April 2018.
  - Although not currently budgeted, depending on the results of the PY7 market characterization and PY8 process research, the team may consider benchmarking the AIC program against other Multifamily programs throughout the country to identify best practices and lessons learned that could enhance implementation of the AIC program.

### 3.5 Residential Moderate Income Program

The Moderate Income Program is a home diagnostic and whole-house retrofit program that focuses on serving AIC gas and/or electric customers who do not qualify for low-income weatherization assistance, but who cannot afford to pay market prices for energy efficiency retrofit improvements to their homes. The target

market is existing single-family homes heated by a fuel source (electricity or natural gas) provided by AIC and owned by customers with a household income between 200% and 300% of federal poverty level guidelines for household size. However, starting in January 2015, the income requirement for the program changed to include all customers with a household income up to 300% of the federal poverty guidelines.

The Moderate Income evaluation effort will build on previous evaluation activities, which included an engineering analysis of gross measure savings, a billing analysis to assess IL-TRM savings assumptions, and participant surveys to assess program processes and installation verification. The process evaluation also included in-depth interviews with program staff and a review of program documents and processes.

The evaluation team will incorporate aspects of these previous evaluations, including survey questions and analysis frameworks where appropriate. In addition, we propose several new evaluation activities that will leverage planned evaluation efforts for the HPwES Program. This includes conducting trade ally and program participant surveys.

**Table 9. Planned Moderate Income Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews (including Energy Assistance Foundation staff and HPwES Energy Auditors)	X (n=3 to 5)	X (n=3 to 5)	X (n=3 to 5)
Trade Ally Survey*	X (n=40)		
Participant Survey		X Process and Installation Verification (n=100)	
Gross Impact Evaluation Approach	IL-TRM Application/ Engineering Analysis	IL-TRM Application/ Engineering Analysis	IL-TRM Application/ Engineering Analysis
Net Impact Evaluation Approach	Deemed Value	Deemed Value	Deemed Value
<b>Budget</b>	<b>\$40,000</b>	<b>\$55,000</b>	<b>\$35,000</b>

\* We will conduct trade ally surveys in conjunction with the HPwES Program.

Below we provide the rationale for the proposed evaluation activities.

■ **Studies by Year**

- For the PY7 evaluation period, we will leverage the HPwES Program research efforts and conduct a trade ally survey to learn about implementation successes and challenges for the Moderate Income Program, in addition to understanding barriers to participation for both contractors and participants. We anticipate conducting this survey in July 2015.
  - We will apply the IL-TRM for program measures to determine the gross impacts for the program. We will complete this task as soon as final program tracking data are available, which is likely in July 2015.
- In the PY8 evaluation period, we will administer a participant survey to verify the installation measures and collect information to inform our process evaluation.

- The evaluation team will leverage planned survey efforts as part of the PY8 HPwES evaluation and field a survey of Moderate Income Program participants to assess program processes, the effectiveness of marketing and outreach materials, barriers to participation, and key household characteristics to inform TRM application. Specifically, our survey will collect information on customer satisfaction with the home audits and measures installed, the preferred methods for receiving energy efficiency information, the quantity of measures installed and still in use, barriers to customer conversions to retrofits, and key demographics. The evaluation team will also use the survey to ask participants about key parameters in the TRM such as whether cooling is present in the home or not. This will improve the accuracy of IL-TRM application. In addition, the evaluation team will ask about heating fuel type, which will assist with the application of waste heat factors from the TRM for lighting. The evaluation team plans to field this survey in July 2016.
- We will use the data collected in the participant survey to assess measure in-service rates and to possibly update ex ante savings assumptions.
- Given the consistent implementation of this program over many years, the PY9 evaluation will focus only on documenting any changes and challenges to implementation, as well as impact estimation. We will complete this task as soon as final program tracking data become available, which is likely in July 2017.

### 3.6 Residential HVAC Program

The ActOnEnergy HVAC Program offers incentives for the purchase of high-efficiency air-source heat pumps (ASHPs), central air conditioners (CACs), and high efficiency blower motors <sup>12</sup> that are installed by an HVAC-registered Program Allies. Our earlier studies used engineering simulation modeling and metering to calculate savings and to update the IL-TRM where appropriate. Efforts across PY7, PY8, and PY9 will focus on heat pump and ECM studies to increase our knowledge of actual efficiency gains using these more complex systems and on exploration of the potential for bringing distributors into the program to play a formal role. The planned metering studies will also benefit other programs, such as All-Electric Homes, a stand-alone IPA program.

Table 10 shows the tasks and budgets for this effort.

**Table 10. Planned HVAC Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=3)	X (n=3)	X (n=3)
Participant Telephone Survey		Verification, Process and NTG; Meter Study Recruitment (n=200)	

<sup>12</sup> Residents can use ECMs instead of AC or DC permanent split capacitor (PSC) motors (for CAC or ASHPs) or furnace fans. ECMs use less energy and are quieter than the more commonly used AC motors and PSC motors. PSC efficiency is reduced to 12%–45% when the system is turned down, while ECMs maintain a high level (65%–75%) of efficiency at a variety of speeds. ECMs are cost and energy efficient, are not prone to overheating, and do not require additional measures to offset the generation of heat, as PSCs often do. Motors other than ECMs qualify, any brushless permanent magnet (BPM) motor should qualify.

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Activity	PY7	PY8	PY9
Participating Contractor Surveys		X (n=70)	
Non-Participating Contractor Surveys		X (n=up to 70)	
Distributor Interviews	X (n=up to 10))		
Dual-Fuel Heat Pump Analysis		Utility Bill Analysis and Surveys (contingent upon availability of AMI or AMR data): <ul style="list-style-type: none"> <li>▪ (70 w/ER, 70 w/gas)</li> </ul>	
Multi-Stage HP/CAC Metering		Meter Installation: ASHP (n=30 super high efficiency multi-stage HVAC systems)	Meter removals (n=30) and analysis
ECM Metering		Meter Installation: (n=30 ECM & 30 standard)	Meter removals (n=60) and analysis
Measure Verification/Check Invoices	X (n=70)		X (n=70)
Analyze Incremental Costs by SEER	X (n=240)		X (n=240)
Gross Impact Approach	Application of IL-TRM	Application of IL-TRM	Application of IL-TRM
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
<b>Budget</b>	<b>\$79,000</b>	<b>\$300,000</b>	<b>\$139,000</b>

Below we provide the rationale for the proposed evaluation activities.

■ **Studies by Year**

- In PY7, we will focus on obtaining input from distributors about their potential role as formal partners with AIC in promoting the HVAC Program and updating assumptions around the incremental costs of high-efficiency equipment.
  - We will verify participation by comparing a random sample of 70 invoices to the program database during summer 2015.
  - Concurrent with invoice verification and using the random sample of 70 plus approximately 170 additional invoices, we will document equipment costs for approximately 30 samples by SEER and equipment type (SEER 14.5, 16, 17, and 18 for each of ASHP and CAC).
  - We will base gross impacts on the application of the IL-TRM, as well as participation verification through a review of a sample of invoices checked against the tracking database.
  - We will calculate PY7 net impacts using the PY5 NTGR per the NTG framework.



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- We will include in-depth interviews with distributors (n=up to 10) beginning in the summer 2015, to better understand what would be the most effective way for AIC to bring distributors fully into the program as program partners.
- Process evaluation will rely on materials review and stakeholder interviews during summer 2015, in addition to distributor research.
- In PY8, our effort will focus on obtaining an updated NTGR and process findings, as well as initiating two types of heat pump studies and one ECM metering study that will continue across PY8 and PY9 for prospective use within the IL-TRM.
  - During the summer of 2016, we will collect AMI/AMR data (residential utility meter interval data) and gas utility bills to assess cooling and heating energy consumption for two groups of heat pump participants: those with dual-fuel (natural gas furnace) and those that have electric resistance backup heat. We will conduct analysis of utility data for each sampled participant (we will not aggregate AMI or AMR data) and supplement the analysis with information collected from surveys of each participant. This study will allow us to understand how customers control heat pumps in the region and help identify control issues, such as overuse of natural gas or costly electric resistance heat (e.g., incorrect balance point temperature). We will also update equivalent full load hours (EFLH) and heating seasonal performance factor (HSPF) adjustment factors to inform the TRM once the study is complete in 2016. This study will also help us understand how contractors size heat pumps for both heating and cooling. We would be able to recommend best practices that are specific to the region.
  - During early fall 2015, we will install meters on a sample of standard furnace fans to compare to data collected for ECM fans through other metering studies. This will provide AIC with specific data to inform the TRM on ECM savings. Alternatively, we could work with implementers to conduct metering at customers' sites before and after ECM installations.
  - During fall, 2015, we will install meters for a metering study of dual stage (multi-speed) ACs and HPs to understand the actual seasonal operating efficiency for the region. AC and HP metering studies typically focus on any qualifying average participant systems (e.g. SEER 14.5 units are treated the same as a multi-speed high efficiency. 18+ SEER units). Operating efficiency can be very high in the first stage of these SEER 18+ units and the overall seasonal efficiency could be very different from the nameplate rated efficiency (SEER) that the TRM relies on to estimate savings.
  - We will use the PY6 NTGR for PY8 per the NTG framework.
  - We will conduct a telephone survey of participants (n=200) for participation verification and process evaluation input and to estimate a self-report NTGR. We will also use the contractor surveys to estimate spillover. We will combine the data and complete the analysis to estimate NTGR for application in PY9 (by March 1, 2017). We will conduct the survey in two waves to optimize customer recall. Wave 1 will occur in fall 2016 and wave 2 in spring 2017.
  - During early summer 2016, we will conduct active registered (AR) and non-active registered (NAR) contractor surveys to obtain feedback from contractors about program requirements and processes and design. NAR surveys will contribute to spillover studies and help understand why contractors are registered but do not participate.
  - We will obtain process information through program and implementer staff interviews

- The PY9 evaluation will continue the backup fuel heat pump and ECM metering studies. We will not conduct NTG analysis as the evaluation team will have collected these data in PY8.
- Much of our PY9 impact evaluation effort will be meter retrieval and data analysis (fall 2016) to update the savings assessments for prospective use within the IL-TRM.
- We will obtain process information through program and implementer staff interviews and a review of program materials.

### 3.7 Residential Appliance Recycling Program

The Appliance Recycling Program promotes the retirement and recycling of primary and secondary inefficient refrigerators and freezers from AIC’s electric households by offering a turn-in incentive and free pickup of working equipment, as well as information and education on the cost of keeping an inefficient unit in operation. The target market for this program is residential electric customers with working refrigerators and freezers that are between 10 and 27 cubic feet in size. This program has been in place for six years.

**Table 11. Planned Appliance Recycling Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=2)	X (n=2)	X (n=2)
Retailer Research and In-Depth ARCA Interviews	In-depth interview with ARCA (n=1) Optional task: Detailed retailer NTG research		
Participant Telephone Survey		Process, Verification, and NTGR (n=140)	
Gross Impact Approach	Application of IL-TRM	Application of IL-TRM	Application of IL-TRM
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
<b>Budget</b>	<b>\$60,000</b>	<b>\$56,000</b>	<b>\$32,000</b>

Below we provide the rationale for the proposed evaluation activities.

#### ■ Studies by Year

- Because the vintage of recycled models tends to change over time, we will update gross savings in each program year. In PY7, we will conduct market actor research to assess retailer actions with replaced units.
  - We will base gross impacts on the program tracking data for PY7 and self-report responses from PY6 participant survey, including verification. We will apply the current TRM algorithm to estimate gross savings.
  - We will apply the PY5 NTGR for PY7 to calculate net impacts.
  - We will obtain process information through program staff interviews and review of program materials.

- Starting in summer 2015, we will conduct retailer research with an approach aligned with ComEd’s recent research to calculate inputs to the NTG calculation as described in the NTG TRM protocols. This research identifies the proportion of units picked up by retailers that get resold, recycled, or disposed.
- Because the vintage of recycled models tends to change over time, we will update gross savings in PY8. In addition, we will conduct a participant survey to reassess the NTGR for prospective application.
  - We will verify participation through a review of the program tracking database. We will base gross impacts on the program tracking data for PY8 and self-report responses from the PY8 participant survey, including verification.
  - We will use the PY6 NTGR for PY8 per the NTG framework.
  - Our telephone survey of participants, to be conducted in fall 2015, will enable the calculation of an updated NTGR prior to March 1, 2016. As a result, we will apply the resulting NTGR prospectively to PY9.
- Because the vintage of recycled models tends to change over time, we will update gross savings in PY9.
  - We will base gross impacts on the program tracking data for PY9 and self-report responses from PY8 participant survey, including verification. We will apply the current TRM algorithm to estimate gross savings.
  - We will apply the PY8 NTGR to estimate PY9 impacts.
  - We will obtain process information through program staff interviews and review of program materials.

### 3.8 Residential Energy Efficiency School Kits Program

The Residential Energy Efficiency Schools Kits (School Kits) Program was implemented for the first time in PY6 as one of five IPA programs. The program provided kits containing energy-efficient items to eighth-grade students and their families by distributing the kits through schools.

School Kits was first evaluated in PY6, using deemed IPA gross and net per unit savings to attribute savings to the verified items distributed through the program. Given the small evaluation budget, the evaluation team used surveys issued by the implementer to calculate installation rates for application in future program years, and did not conduct participant surveys or primary NTG research. During PY7, the evaluation team will continue to utilize the ongoing implementer surveys to update installation rates for future evaluation and to capture feedback from participants. The team will also use PY7 to plan participant survey research to be facilitated by the implementer during PY8.

**Table 12. Planned School Kits Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=3)	X (n=3)	X (n=3)

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Participant Survey		Process, Installation Verification, and NTG (n=census)	
Gross Impact Evaluation Approach	Application of IL-TRM	Application of IL-TRM	Application of IL-TRM
Net Impact Evaluation Approach	Application of deemed NTG value	Application of deemed NTG value	Application of deemed NTG value
<b>Budget</b>	<b>\$15,000</b>	<b>\$29,000</b>	<b>\$16,000</b>

Below we provide the rationale for the proposed evaluation activities.

- **Studies by Year.** The evaluation team will continue to leverage data captured by the program implementer in PY7, applying the TRM for gross impacts and deemed NTG for net impacts.
  - Our plan for PY7 analysis is driven by the low budget and savings expected for this program.
    - The evaluation team will apply installation rates from the IL-TRM to the program tracking database to estimate the PY7 ex post gross savings for the School Kits Program. We will determine electric water heater saturation where possible, based on information in the tracking database, and use this to adjust ex post savings. We will determine net savings using the deemed NTGR.
    - The evaluation team will analyze a census of the implementer’s school-based surveys to assess installation of measures, i.e., number of measures received and installed. We will use installation rates to inform possible TRM updates.
  - In PY8, the team will design updated surveys for implementation through the schools.
    - In this evaluation period, we will recommend changes to the online survey used to collect data from participants. We will make these suggestions prior to April 2016, so that the surveys can collect data necessary to evaluate the program and so that the NTGR and electric water heater saturations can be applied to future years.
    - The evaluation team will use a census of the participant survey results from PY8 to evaluate the NTGR and propose a NTGR for future evaluations.
    - The evaluation team will analyze a census of the implementer’s updated participant surveys to assess program processes and experience with the program, actions taken, key demographics, and the number of measures received and installed.
    - The team will apply the PY8 survey-based electric water heater saturations and IL-TRM per-unit savings values and installation rates to estimate ex post gross electric savings. We will use the deemed NTGR to evaluate net savings.
  - In PY9, the team will conduct an evaluation consistent with the impact-focused evaluation planned for PY7.

### 3.9 Residential ENERGY STAR New Homes Program

The ENERGY STAR New Homes program works with HERS raters to target builders with a package of services, including training, technical information, and marketing assistance and incentives for construction of ENERGY

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STAR new homes or homes built to a specified maximum HERS rating. The incentive is intended to defray the cost of the required home energy rating. In addition, the program provides cooperative marketing support for builders.

Implemented by Conservation Services Group (CSG), the program targets builders of new single- and multifamily homes heated with a fuel (natural gas or electricity) provided by AIC.

**Table 13. Planned ENERGY STAR New Homes Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=2)	X (n=2)	X (n=2)
Market Actor Interviews	HERS Raters (n=5)	Builders (n=20)	
	Code Officials (n=up to 10)		
Market Studies	Market Share Assessment		Follow-Up Market Share Assessment
Gross Impact Approach	Review program records of participating homes and REM/Rate analysis of savings based on updated baseline	Review program records of participating homes and REM/Rate analysis of savings based on updated baseline	Billing Analysis (Calibration of PY7 and PY8 Homes)
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
<b>Budget</b>	<b>\$54,000</b>	<b>\$58,000</b>	<b>\$62,000</b>

Below we provide the rationale for the proposed evaluation activities.

- **Studies by Year.** Our 3-year approach focuses on following up on findings from earlier evaluations, such as the inconsistent application of the 2012 Illinois energy code by jurisdictions with program participation, low builder program awareness, and the need for a more robust NTG analysis.
- In PY7, our approach is driven by the low budgets and low expected savings for the program.
  - Gross impact evaluation will focus on review of program records and confirmation of ex ante savings through a limited engineering review. This will involve review of the REM/Rate files for some (or all depending on how low participation is) of the program homes (fall 2015). We will develop sets of baselines based on the information gathered from code official and HERS/Rater interviews. We will compare these data to the submitted REM/Rate files using the User Defined Reference Home feature in REM/Rate. The team will develop ex post savings based on a realization rate of the reviewed REM/Rate files.
  - The impact evaluation will also seek to assign an accurate energy code baseline for each program home. The evaluation team gathered preliminary information in PY6 from five code officials in AIC service territory, but a more expansive sample size is needed to confirm the appropriate baseline for program homes based on their jurisdiction. The evaluation team will conduct brief interviews with up to 10 code officials during summer 2015 to obtain this information. Our sampling plan will target areas of high program participation.

## *Residential Program Evaluations*

- We will calculate net impacts per the NTG framework. For this program, the value is based on a planning value of 0.8. In PY7, the evaluation team will begin tasks associated with the PY8 NTG analysis, because we intend to conduct a survey with builders to be timed in January and February to improve the team's response rate among builders and to complete results by March 1, 2016. These tasks include planning, coordination with other evaluators, and questionnaire design.
- Process evaluation activities include interviews with AIC and implementer program managers to discuss program changes, program progress, trade ally interactions, and new home market observations. The evaluation team proposes to interview HERS raters in PY7 to gather their feedback for the first time as a part of an evaluation. We also propose to conduct an analysis of the market share of new homes obtained by the AIC program in the AIC service territory during summer 2015, with plans to follow up on the analysis in PY9.
- PY8 activities will build on PY7 activities and findings.
  - The gross and net impact approaches will be identical to PY7 except that NTG applied to PY8 will be updated based on the PY6 research. In this year, we will conduct a more robust NTG analysis by interviewing a larger sample of builders than in PY6 with a more detailed questionnaire.
  - Process evaluation activities in PY8 include surveys with builders during January 2016 for NTGR purposes and to obtain their feedback on the program, as well as interviews with AIC and implementer program staff. We will complete the NTGR analysis to estimate provide an estimate by March 1, 2017 and apply the results to PY10.
- PY9 activities will include a more robust impact evaluation through the use of billing analysis.
  - As a new approach in PY9, the evaluation team will conduct a billing analysis to obtain a more precise net impact calculation during the summer of 2017. The billing analysis will be based on a sample of PY7 and PY8 homes since PY9 homes will have been built too recently to provide meaningful data. The billing calibration will calibrate the energy simulations to real world usage.
  - Process evaluation activities will be limited to interviews with AIC and implementer program staff and a follow-up market share assessment.

## 4. Business Program Evaluations

The Business portfolio consists of four programs: Standard, Custom, Retro-Commissioning, and Large C&I. We present them here in order of the magnitude of overall savings. However, given that there were no participants in the Large C&I program in PY7, we will wait to develop an evaluation plan for this program.

### 4.1 C&I Standard Program

The C&I Standard Program offers AIC business customers fixed incentives for the installation of specific energy efficiency measures. The program covers lighting; variable frequency drives (VFDs), HVAC, refrigeration/grocery equipment, steam traps, and other measures. In addition, the program includes an online store available to all business customers that offers a variety of energy saving products, including CFLs, LEDs, and occupancy sensors.

The C&I Standard Program contributes a substantial share to the overall C&I portfolio savings and has received both impact and process evaluations since PY1. In past evaluations, we have performed impact evaluations through TRM review. In addition, we have used telephone interviews to verify measure installation for small and medium lighting projects and non-lighting projects, and on-site visits to verify measure installation and operation for large lighting projects.

Table 14 provides an overview of the evaluation activities planned by year.

**Table 14. Planned Standard Program Evaluation Activities by Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=4)	X (n=4)	X (n=4)
Energy Advisor or Key Account Executive Interviews*		X (n=5)	
Program Ally Interviews*		X (n=20)	
Participant Survey: Standard	Installation Verification, NTG, Process (n=180)	Installation Verification, Process (n=180)	Installation Verification, Process (n=180)
Participant Survey: Online Store		Installation Verification, NTG, Process (n=90)	
Non-Participant Survey**	X (n=200)		
Lighting Distributor Interviews	X (n=10)		
Mid-Stream Lighting Pilot Distributor and Participant Interviews		Process, NTG (n=5 distributors, n=60 participants)	
Training Participant Survey*			X (n=70)

*Business Program Evaluations*

Activity	PY7	PY8	PY9
Site Visits	X (n=10 non-participant spillover, if needed)		X (n=40 lighting installation verification)
Gross Impact Approach	TRM/Engineering Analysis	TRM/Engineering Analysis	TRM/Engineering Analysis, Site M&V
NTG Impact Approach	Value from prior evaluation	Value from prior evaluation	Value from prior evaluation
<b>Budget</b>	<b>\$170,000</b>	<b>\$130,000</b>	<b>\$175,000</b>

\* Shared activity with the Custom Program.

\*\* Shared activity across all C&I programs.

Below we describe the rationale for our planned activities.

- **Studies by Year.** Our 3-year approach will continue and build on the research efforts from the prior evaluation cycles. Based on high realization rates found in past evaluations, we will not conduct installation verification site visits for lighting in PY7 and PY8. New efforts during this cycle include a cross-cutting non-participant survey, interviews with lighting distributors, research into the Mid-Stream Lighting pilot, a cross-cutting evaluation of training efforts, and research into the effectiveness of program bonuses.
- The PY7 evaluation will include surveys of both program participants and non-participants, addressing both free-ridership and spillover, as well as other topics. We will also conduct interviews with lighting distributors and secondary research in support of the new SEM pilot.
  - In June/July 2015, we will conduct a telephone survey with participants in the core Standard program to verify installation of measures, update the NTGR (for prospective application), and address specific process-related questions of interest, such as value of bonuses.<sup>13</sup>
  - In June/July 2015, we will also conduct non-participant research to explore barriers to participation and program awareness among key sectors targeted by the ActOnEnergy program.
  - In July/August 2015, we will conduct research to determine the level of non-participant spillover, if any, that can be attributed to the program. We will first investigate this as part of the telephone survey and then conduct site visits with customers identified as having significant spillover to verify the savings.
  - In June/July 2015, the team will conduct “mystery shopper” calls with local lighting distributors to provide insight into the availability of T12 linear fluorescent bulbs.
  - In August/September 2015, we will estimate gross savings based on installation verification questions in the participant telephone survey and conduct an engineering analysis, based on the TRM.

<sup>13</sup> The PY7 evaluation will not include a full process evaluation, but instead will focus on specific topics that we will identify in conversations with program staff.



## *Business Program Evaluations*

- In August/September 2015, to determine net impacts in PY7, we will also apply the PY4 NTGR for motor, HVAC, and specialty equipment and the PY5 NTGR for lighting and steam traps, per the NTG framework.
- In addition to the impact assessment, the PY8 evaluation will include a process evaluation based on a survey with participants in the core Standard Program, interviews with Energy Advisors and Trade Allies, as well as NTG and process research with Online Store participants.
- In August/September 2015, in conjunction with the Custom program evaluation, we will interview trade allies to investigate such topics as program participation processes, trade ally and participant satisfaction, barriers to participation, and the impacts of program participation on trade ally business and practices. Of particular interest is exploring the effectiveness of bonuses and Trade Allies' perceptions of recent changes in the Ameren portfolio (e.g., new implementers in the IPA C&I portfolio) and any resulting confusion in the marketplace. We will conduct these interviews early in PY8 to provide Ameren with results for use in PY9 planning.
- In June/July 2016, we will conduct a targeted process evaluation of the core Standard program to provide actionable feedback to AIC program staff. We will develop the specific research questions based on the needs of the program staff.
- In July 2016, also in conjunction with the Custom Program evaluation, we will interview Energy Advisors to assess their performance in recruiting eligible customers, as well as explore perceived program satisfaction, barriers to participation, and changes to business practices.
- In June/July 2016, we will interview distributors participating in the Mid-Stream Lighting pilot to provide AIC with early insight into any barriers limiting participation, such as documenting customer information and keeping track of program-qualifying measures. We will supplement this information with surveys with participating customers to uncover barriers from their perspective as well as to estimate net-to-gross.
- In August/September 2016, the team will again estimate gross savings based on installation verification questions in the participant survey and an engineering analysis.
- As in PY7, in August/September 2016, we will also apply the PY4 NTGR for motor, HVAC, and specialty equipment and the PY5 NTGR for lighting and steam traps, per the NTG framework.
- In the final year of this evaluation cycle (PY9), the emphasis on impact analysis continues. However, we will also implement specific research and evaluation tasks aimed at the SEM pilot, the Mid-Stream Lighting pilot, and cross-cutting training efforts. The gross impact analysis in PY9 will once again include verification site visits for lighting.
  - The survey of participants in the core Standard Program will include installation verification questions and limited process research.<sup>14</sup>
  - Based on our findings from the SEM research in PY7 and the rollout of the pilot, we will conduct process and impact work in June/July 2017.

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<sup>14</sup> Similar to PY7, the PY9 evaluation will not include a full process evaluation, but instead will focus on specific topics that we will identify in conversations with program staff.

## Business Program Evaluations

- We will conduct a telephone survey of training participants to investigate actions following the trainings and the related savings in June/July 2017.
- The team will estimate gross impacts based on on-site visits and telephone-based verification in August/September 2017.
- To estimate net impacts, we will use the NTGR results from PY7 in August/September 2017.

## 4.2 C&I Custom Program

The C&I Custom Program allows AIC business customers to complete energy efficiency projects that involve the installation of equipment not covered through the Standard Program. The availability of this program 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 program also offers gas measures, including heat recovery, process heat, and improvements to steam systems.

Prior evaluations of this program utilized on-site measurement and verification (M&V) to provide estimates of gross savings, an approach that will continue throughout this evaluation cycle. In addition, the evaluation team will conduct targeted process evaluation to provide actionable feedback to AIC program staff. Table 15 provides an overview of the evaluation activities planned by year.

**Table 15. Planned Custom Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews*	X (n=4)	X (n=4)	X (n=4)
Energy Advisor Interviews*		X (n=5)	
Program Ally Interviews*		X (n=20)	
Participant Survey		Process and NTG (n=70)	
Staffing Grant Participant Interviews	NTG, Process (n=~10; census attempt)	NTG, Process (n=~10; census attempt)	NTG, Process (n=~10; census attempt)
Competitive Large Incentive Projects (CLIP) Participant Interviews	NTG, Process (n=~15; census attempt)	NTG, Process (n=~15; census attempt)	NTG, Process (n=~15; census attempt)
Non-Participant Survey**	X (n=200)		
Metering and Monitoring Pilot Participant Interviews		X (n=10)	
Strategic Energy Management (SEM) Pilot Research	Secondary Research		Impact and Process Evaluation
Training Participant Survey*			X (n=70)

## Business Program Evaluations

Activity	PY7	PY8	PY9
Site Visits	X (n=40)	X (n=40)	X (n=40)
Gross Impact Approach	Site M&V	Site M&V	Site M&V
Net Impact Approach	Value from prior evaluation	Value from prior evaluation	Value from prior evaluation
<b>Budget</b>	<b>\$210,000</b>	<b>\$240,000</b>	<b>\$210,000</b>

\* Shared activity with the Standard Program.

\*\* Shared activity across all C&I programs.

Below we describe the rationale for our planned activities.

- **Studies by Year.** Our 3-year approach will continue and build on the research efforts from the prior evaluation cycles. Beginning in PY8, we will conduct site visits and NTG research for large custom projects on a *quarterly* basis. We will continue annual interviews with Competitive Large Incentive Projects (CLIP) and Staffing Grant participants, which began during the PY4–PY6 evaluation cycle. New efforts during this cycle include a cross-cutting non-participant survey, as well as research into the Metering and Monitoring pilot, which began in PY6.
- Our PY7 evaluation effort will focus on impact analysis given the Custom Program’s strong performance over the prior three years and the relative consistency in its design and implementation. This year’s evaluation will include a cross-cutting non-participant survey. We will also conduct research into the new Strategic Energy Management (SEM) pilot.
  - In June/July 2015, coordinating with the evaluations for the other C&I programs, we will conduct non-participant research to explore such topics as program awareness, barriers to participation, and non-participant spillover among key sectors targeted by the ActOnEnergy program.
  - During spring/summer 2015, we will perform site visits to support the impact assessment of the Custom Program since the program does not use fixed per-unit savings values. As part of this task, we will provide AIC with site M&V plans for up to 10 sites included in our sample. We expect these to be the sites with the highest level of savings. During PY7, we will continue our two-wave sampling approach.
  - The team will apply the PY5 NTGR for PY7 per the NTG framework. As in prior evaluations, we will also use interviews with Staffing Grant participants to focus specifically on the potential spillover from this program offering, during August/September 2015.
  - Due to the high level of savings and different incentive structure of the CLIP offering compared to other Custom projects, in June 2015, we will conduct NTG interviews with CLIP participants to develop a NTGR specific to CLIP. This NTGR will be applied retrospectively to PY7 CLIP savings.
  - In summer 2015, we will conduct secondary research to support the SEM pilot to help AIC understand potential changes in participant behavior and to lay the groundwork for future evaluation efforts.
- The PY8 evaluation will continue to allocate resources to on-site M&V, but will also allow the team to revisit the program’s processes and NTGR through customer, Energy Advisor, and Trade Ally research. In PY8, we will also take a first look at the new Metering and Monitoring pilot.

- In August/September 2015, in conjunction with the Standard Program evaluation, we will interview trade allies to investigate such topics as program participation processes, trade ally and participant satisfaction, barriers to participation, and the impacts of program participation on trade ally business and practices. Of particular interest is exploring Trade Ally perceptions of recent changes in the Ameren portfolio (e.g., new implementers in the IPA C&I portfolio) and any resulting confusion in the marketplace. We will conduct these interviews early in PY8 to provide Ameren with results for use in PY9 planning.
- We will conduct a targeted process evaluation of the Custom Program to provide actionable feedback to AIC program staff. We will develop the specific research questions based on the needs of the program staff.
- We will gather free-ridership and spillover information via telephone surveys with participating customers to use prospectively in future years. We will apply the PY5 electric NTGR and PY6 gas NTGR per the NTG framework, apply project-specific NTGR from CLIP participant interviews, and also include any spillover found in Staffing Grant NTG interviews. This activity will be ongoing for large projects; otherwise it will be conducted in August 2016.
- In July 2016, also in conjunction with the Standard Program evaluation, we will interview Energy Advisors to assess their performance in recruiting eligible customers and will explore perceived program satisfaction, barriers to participation, and changes to business practices.
- Throughout PY8, we will estimate gross impacts based on on-site M&V. We will continue our two-wave sampling approach, but will conduct site visits for projects with the largest savings on a quarterly basis.
- In July 2016, we will interview participants of the Metering and Monitoring pilot to explore program processes. Given the small number of participants to date, we will likely interview participants from prior program years as well as PY7 participants.
- Emphasis on site-based M&V will continue in PY9.
  - Throughout PY9, as in prior years, the team will estimate gross impacts based on on-site M&V.
  - In August/September 2017, we will apply the fixed NTGR from the Order for PY5 for electric projects and PY6 for gas projects. As in prior years, we will also develop project-specific NTGRs based on the CLIP participant interviews and include any spillover found in Staffing Grant NTG interviews.

### **4.3 C&I Retro-Commissioning Program**

The ActOnEnergy Retro-Commissioning Program helps customers evaluate their existing mechanical equipment, energy management, and industrial compressed air systems to identify no-cost and low-cost efficiency measures to optimize energy use. Customers contract with pre-approved Retro-Commissioning Service Providers (RSPs) to perform an energy survey, resulting in a written report detailing the savings opportunities. AIC pays incentives following verified implementation of measures with a payback of less than 12 months.

Prior to PY4, the program focused on health care customers and compressed air for large industrial customers. In PY4, AIC expanded outreach to the commercial buildings and industrial refrigeration markets. Relatively few

projects were completed in these markets in PY4 and PY5, but in PY6, more than one-third of all projects were commercial buildings or industrial refrigeration.

Participation has remained relatively flat for the past three years, and retro-commissioning remains a small contributor to the overall portfolio goals. As such, the program has a smaller scope and budget in this (and past) evaluation cycles compared to the C&I Custom and Standard programs. For the Plan 3 cycle, the evaluation focus will be on impacts. However, we will assess such topics as program awareness and barriers to participation as part of a cross-cutting non-participant survey in PY7. In addition, interviews with key program staff will continue annually, and the team will conduct process-focused interviews with participating customers in PY9. Table 16 shows the planned activities for the Plan 3 cycle.

**Table 16. Planned Retro-Commissioning Program Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Program Material Review	X	X	X
Program Manager and Implementer Interviews	X (n=2)	X (n=2)	X (n=2)
RSP Interviews	Process (n=7-9)		NTG (n=7-9)
Participant Survey	Process (n=10-16)		NTG (n=10-16)
Non-Participant Survey*	X (n=200)		
Site Visits	X (n=6)	X (n=8)	X (n=8)
Gross Impact Approach	Engineering Desk Review and Site M&V	Engineering Desk Review and Site M&V	Engineering Desk Review and Site M&V
Net Impact Approach	Value from Prior Evaluation	Value from Prior Evaluation	Value from Prior Evaluation
<b>Budget</b>	<b>\$96,000</b>	<b>\$75,000</b>	<b>\$95,000</b>

\* Shared activity across all C&I programs.

Below we describe the rationale for our planned activities.

■ **Studies by Year**

- In addition to continuing on-site verification and engineering desk reviews, PY7 includes a detailed process analysis to investigate, among other topics, program awareness and barriers to participation.
  - The cross-cutting non-participant survey will include a module focused on retro-commissioning, to be fielded with customers eligible for this program. We will gather data on program awareness and barriers to participation, among other topics, in June/July 2015.
  - In PY7, the participating customer survey and the RSP interviews (both July 2015) will focus on process-related topics, including satisfaction with the program, barriers to participation, and areas for improvement. Findings from these surveys will supplement the non-participant research. In addition, the participant survey might include targeted questions to address questions related to the gross impact analysis.

## *Business Program Evaluations*

- The gross impact effort will consist of engineering desk reviews. We will also perform on-site verification and metering as appropriate to confirm short-term persistence and performance of measures. This will take place as soon as final program tracking data are available, likely in August or September 2015.
- We plan to focus PY8 evaluation efforts on program gross impacts with an expanded emphasis on on-site verification. Our on-site work will include grocery customers, a segment that was added in late PY7 on a pilot basis.
  - The gross impact effort will consist of engineering desk reviews with targeted calls to customers to clarify any questions. This will take place as soon as final program tracking data are available, likely in August or September 2016.
  - We will also perform on-site verification and metering as appropriate to confirm short-term persistence and performance of measures. PY8 site visits will include grocery stores. The timing of these activities is consistent with the gross impact work.
- The PY9 evaluation will again focus on gross impacts, but will also include NTG research.
  - The gross impact effort will consist of engineering desk reviews with targeted calls to customers to clarify any questions. We will also perform on-site verification and metering as appropriate to confirm short-term persistence and performance of measures. This will take place as soon as final program tracking data are available, likely in August or September 2017.
  - In July 2017, we will conduct NTG interviews with both participating customers and RSPs. The data will enable the team to update the PY6 NTG results. Specific process questions might be explored as part of these surveys.

## 5. Portfolio-Level Evaluation Activities

As part of the annual evaluation process, the team will perform a number of portfolio-level activities. We describe these tasks in detail in the following subsections.

### 5.1 Statewide Technical Reference Manual

#### 5.1.1 Participation and Review

The team will continue its involvement in the Illinois Statewide Technical Reference Manual (TRM) process, including participation in Technical Advisory Committee (TAC) meetings and NTG Methodology Working Group meetings. For the former, this will include participation in weekly calls, as well as reviewing and commenting on 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 latter, 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 TRM.

#### 5.1.2 Research to Update the IL-TRM

Over the course of the Plan 3 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 17. Planned TRM Research Activities**

Program	Measure Description	Measure #	TRM Research Activity	Research Timing		
				PY7	PY8	PY9
<b>Planned</b>						
HPwES	Faucet Aerators	5.4.4	Participant Survey - Water Usage Characteristics		•	
Multifamily In-Unit			Participant Survey - Water Usage Characteristics		•	
Moderate Income			Participant Survey - Water Usage Characteristics		•	
HVAC	Air Source Heat Pumps	5.3.1	Invoice Analysis of Incremental Cost	•		
			Metering - Seasonal Operating Efficiency		•	
			Utility Data Analysis - EFLH and HSPF Update		•	•
	Central Air Conditioning	5.3.3	Invoice Analysis of Incremental Cost	•		
			Metering - Seasonal Operating Efficiency		•	
	Ground Source Heat Pump	5.3.8	Metering - Seasonal Operating Efficiency		•	
			Utility Data Analysis - EFLH and HSPF Update		•	•
ECM Fans (Furnace Blower Motor)	5.3.5	Metering		•	•	
Standard	High Performance and Reduced Wattage T8 Fixtures	4.5.3	T-12 Baseline Research	•		
	Stream Traps	4.4.16	Secondary Research on algorithm inputs		•	
	LED Bulbs and Fixtures	4.5.4	LED Incremental Cost Assessment			TBD

## 5.2 Cost Effectiveness Analysis

As in prior program years, the evaluation team will work with AIC, as needed, to audit the company’s cost-effectiveness analysis based on PY7 programs’ results.<sup>15</sup> As part of this process, we will first prepare the model inputs, which consist of evaluated program savings as determined through the PY7 evaluation effort. Next, we will review AIC’s assumptions for avoided costs, discount rates, measure cost information, administrative costs, and other relevant data. Below we present a discussion of the Total Resource Cost (TRC) test used by AIC.

### Total Resource Cost Test

To assess cost-effectiveness, the team will begin with a valuation of each program’s net total resource benefits, as measured by: (1) the avoided electric costs, (2) the total incremental costs of measures installed (detailed definition provided in Appendix B), and (3) administrative costs associated with the program. A program is cost-effective if its net total resource benefits are positive:

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

where:

$$\text{Total Resource Benefits} = PV \left( \sum_{\text{year} = 1}^{\text{measure life}} \left( \sum_i^{i = 8760} (\text{impact}_i \times \text{avoided cost}_i) \right) \right)$$

and

$$\text{Total Resource Cost} = PV \left( \text{Incremental Measure Costs} + \text{Utility Costs} \right)$$

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 also accounts for avoided line losses and other quantifiable societal benefits, including avoided natural gas 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 considered 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

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<sup>15</sup> Beginning in PY7, an outside consultant will conduct this analysis for AIC.



as well as customer contributions. Utility costs include any customer payments and the expenses associated with program development, marketing, delivery, operation, and evaluation, monitoring, and verification.

Table 5-18 outlines our understanding of the allocation of savings as incentive payments by fuel type. We understand that, from a goal attainment perspective, the AIC programs' savings by fuel type are driven by the type of customer account. From a cost-effectiveness perspective, however, AIC counts all measure savings regardless of the type of customer account. The team will assign saving credits according to the following table.

**Table 5-18. Savings by Fuel Type**

Type of Account with AIC	Electric Measures		Natural Gas Measures	
	Incentive Paid	Accrue Electric Savings	Incentive Paid	Accrue Therm Savings
Electric Only	Yes	Yes	No	For TRC only
Natural Gas Only	No	For TRC only	Yes	Yes
Both Electric and Natural Gas	Yes	Yes	No	Yes
	No	Yes	Yes	Yes

For purposes of the cost-effectiveness analysis, we will discuss with AIC the assignment of cost to the primary fuel targeted, ensuring that the primary fuel incentive is cost-effective for the primary fuel savings.

### 5.3 Residential Cross-Cutting Evaluation Efforts

The evaluation team will conduct two evaluation tasks each year that cut across all residential programs:

- A general population survey to 1) assess spillover effects from AIC's ongoing marketing and education efforts in the nonparticipating population and 2) collect process-related data
- A market transformation/market effects analysis

Table 19 presents a summary of these tasks and their associated budgets.

**Table 19. Planned Cross-Cutting Evaluation Activities by Program Year**

Activity	PY7	PY8	PY9
Non-Participant Survey	n=350	n=350	n=350
Market Transformation Analysis	Identify indicators/track historical and current data	Track indicators/quantify impacts	Track indicators/quantify impacts
<b>Budget</b>	<b>\$86,000</b>	<b>\$84,000</b>	<b>\$85,000</b>

Below we describe the rationale for our planned activities.

- **Proposed Studies:** Overall, PY7 will be the first year of the general population survey and the market transformation analysis. We will coordinate the nonparticipant survey design and spillover analysis with other evaluators and seek to include the protocol in the NTG TRM. We will establish the market transformation approach in PY7, gaining concurrence with other evaluators, and then apply it to PY8 and PY9, which will ensure some economies of scale, and therefore cost savings.

- **General Population Survey:** AIC is currently in its seventh year of program operation and conducts general marketing and education in addition to providing incentives. This marketing and education, over time, can itself create spillover. We are recommending a general population survey to quantify spillover and collect additional general information that may be beneficial (marketing preferences, existing saturations, etc.). Since spillover is usually very small in the general population, we will need a large sample of about 350 to ensure a high level of confidence and precision (e.g., 95% ± 5%). The team will draw the general population sample from AIC's residential customer database, using customer ID numbers to remove any who have participated in any of the energy efficiency programs (including behavioral modification and On Bill Financing). While we cannot exclude lighting program participants because of the transparent nature of the program, we will exclude lighting measures from spillover calculations as these have a high likelihood of being program bulbs. The general non-participant survey will contain modules with questions about all of AIC's residential energy efficiency programs. Residential respondents will be asked individual program module questions based on whether they have made the necessary program upgrade and why they did not participate in that program. We will use survey responses to identify motivators and barriers, preferred communications channels and existing level awareness, satisfaction with AIC, and likelihood to recommend an AIC program to a friend. We will explore whether any of this spillover has the potential to overlap with other measured spillover, and will minimize savings overlap across different data sources.

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

- **Market Transformation/Market Effects Analysis:** During the evaluation planning stages, the evaluation team will work with AIC to identify the most appropriate indicators of market transformation across and within each of the nine residential programs. We will select indicators that prior evaluations have tracked through survey questions consistently over the implementation years and identify which questions the evaluators should include in all program or non-participant surveys each year for the PY7–PY9 cycle.

The PY7 analysis will look back to earlier years to gather available data for indicators chosen. In PY8 and PY9, we will develop methods to analyze the data and quantify, where possible, the AIC's impact on market transformation and convert the data into quantified energy savings or market effects.

## 6. Budget Allocations by Year

Table 20 provides an overview of the budget allocations by year ordered by planned spending in PY7. The team developed these budgets through consultation with AIC staff on planned evaluation activities, and the total evaluation budget by year aligns with the EM&V contract.

**Table 20. Budget Allocations by Program Year**

	Program	PY7	PY8	PY9
<b>Program-Level Budgets</b>				
1	C&I Custom	\$210,000	\$240,000	\$210,000
2	C&I Standard	\$170,000	\$130,000	\$175,000
3	Residential Behavioral Modification	\$110,000	\$47,500	\$26,000
4	C&I Retro-Commissioning	\$96,000	\$75,000	\$95,000
5	Residential HVAC	\$79,000	\$300,000	\$139,000
6	Residential HPwES	\$75,000	\$80,000	\$65,000
7	Residential Appliance Recycling	\$60,000	\$56,000	\$32,000
8	Residential Multifamily In-Unit	\$60,000	\$71,000	\$30,000
9	Residential ENERGY STAR New Homes	\$54,000	\$58,000	\$62,000
10	Residential Moderate Income	\$40,000	\$55,000	\$35,000
11	Residential Lighting	\$45,000	N/A - IPA	N/A - IPA
12	Residential School Kits	\$15,000	\$29,000	\$16,000
<b>Total Program-Level Efforts</b>		<b>\$1,014,000</b>	<b>\$1,141,500</b>	<b>\$885,000</b>
<b>Non-Program-Level Budgets</b>				
	Other Evaluation Activities	\$185,270	\$80,000	\$340,000
	Evaluation Planning	\$65,000	\$60,000	\$60,000
	Cross-Cutting Research	\$60,000	\$60,000	\$60,000
	Technical Reference Manual	\$60,000	\$70,000	\$70,000
<b>Total Non-Program-Level Efforts</b>		<b>\$370,270</b>	<b>\$270,000</b>	<b>\$530,000</b>
	Contingency	\$4,811	\$11,644	\$14,864
<b>TOTAL</b>		<b>\$1,389,081</b>	<b>\$1,423,144</b>	<b>\$1,429,864</b>

## **A. Appendix – Net-to-Gross Recommendations**

The following documents contain the evaluation team’s PY7 and PY8 recommendations.



Ameren PY7 NTGR  
Guidance FINAL 201



Ameren PY8 NTGR  
Recommendations f

## B. Appendix - Incremental Cost Definition

Incremental Costs means the difference between the cost of the efficient Measure and the cost of the most relevant baseline measure that would have been installed (if any) in the absence of the efficiency Program. Installation costs (material and labor) and Operations and Maintenance (O&M) costs shall be included if there is a difference between the efficient Measure and the baseline measure. In cases where the efficient Measure has a significantly shorter or longer life than the relevant baseline measure (e.g., LEDs versus halogens), the avoided baseline replacement measure costs should be accounted for in the TRC analysis. The Customer's value of service lost, the Customer's value of their lost amenity, and the Customer's transaction costs shall be included in the TRC analysis where a reasonable estimate or proxy of such costs can be easily obtained (e.g., Program Administrator payment to a Customer to reduce load during a demand response event, Program Administrator payment to a Customer as an inducement to give up duplicative functioning equipment). This Incremental Cost input in the TRC analysis is not reduced by the amount of any Incentives (any Financial Incentives Paid to Customers or Incentives Paid to Third Parties by a Program Administrator that is intended to reduce the price of the efficient Measure to the Customer). Incremental Cost calculations will vary depending on the type of efficient Measure being implemented, as outlined in the examples provided below and as set forth in the IL-TRM.

Examples of Incremental Cost calculations include:

- The Incremental Cost for an efficient Measure that is installed in new construction or is being purchased at the time of natural installation, investment, or replacement is the additional cost incurred to purchase an efficient Measure over and above the cost of the baseline/standard (i.e., less efficient) measure (including any incremental installation, replacement, or O&M costs if there is a difference between the efficient Measure and baseline measure).
- For a retrofit Measure where the efficiency Program caused the Customer to update their existing equipment, facility, or processes (e.g., air sealing, insulation, tank wrap, controls), where the Customer would not have otherwise made a purchase, the appropriate baseline is zero expenditure, and the Incremental Cost is the full cost of the new retrofit Measure (including installation costs).
- For the early replacement of a functioning measure with a new efficient Measure, where the Customer would not have otherwise made a purchase for a number of years, the appropriate baseline is a dual baseline that begins as the existing measure and shifts to the new standard measure after the expected remaining useful life of the existing measure ends. Thus, the Incremental Cost is the full cost of the new efficient Measure (including installation costs) being purchased to replace a still-functioning measure less the present value of the assumed deferred replacement cost of replacing the existing measure with a new baseline measure at the end of the existing measure's life. This deferred credit may not be necessary when the lifetime of the measure is short, the costs are very low, or for other reasons (e.g., certain Direct Install Measures, Measures provided in Kits to Customers).
- For study-based services (e.g., facility energy audits, energy surveys, energy assessments, retro-commissioning) that are truly necessary for a Customer to implement efficient Measures, as opposed to being principally intended to be a form of marketing, the Incremental Cost is the full cost of the study-based service. Even if the study-based service is performed entirely by a Program Administrator's implementation contractor, the full cost of the study-based service charged by the implementation contractor is the Incremental Cost, because this is assumed to be the cost of the study-based service that would have been incurred by the Customer if the Customer were to have the study-based service performed in the absence of

## *Appendix - Incremental Cost Definition*

the efficiency Program. If the Customer implements efficient Measures as a result of the study-based service provided by the efficiency Program, the Incremental Cost for those efficient Measures should also be classified as Incremental Costs in the TRC analysis.

- For the early retirement of duplicative functioning equipment before its expected life is over (e.g., appliance recycling Programs), the Incremental Costs are composed of the Customer's value placed on their lost amenity, any Customer transaction costs, and the pickup and recycling cost. The Incremental Costs include the actual cost of the pickup and recycling of the equipment (often paid for by a Program Administrator to an implementation contractor) because this is assumed to be the cost of recycling the equipment that would have been incurred by the Customer if the Customer were to recycle the equipment on their own in the absence of the efficiency Program. The payment a Program Administrator makes to the Customer serves as a proxy for the value the Customer places on their lost amenity and any Customer transaction costs.

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