

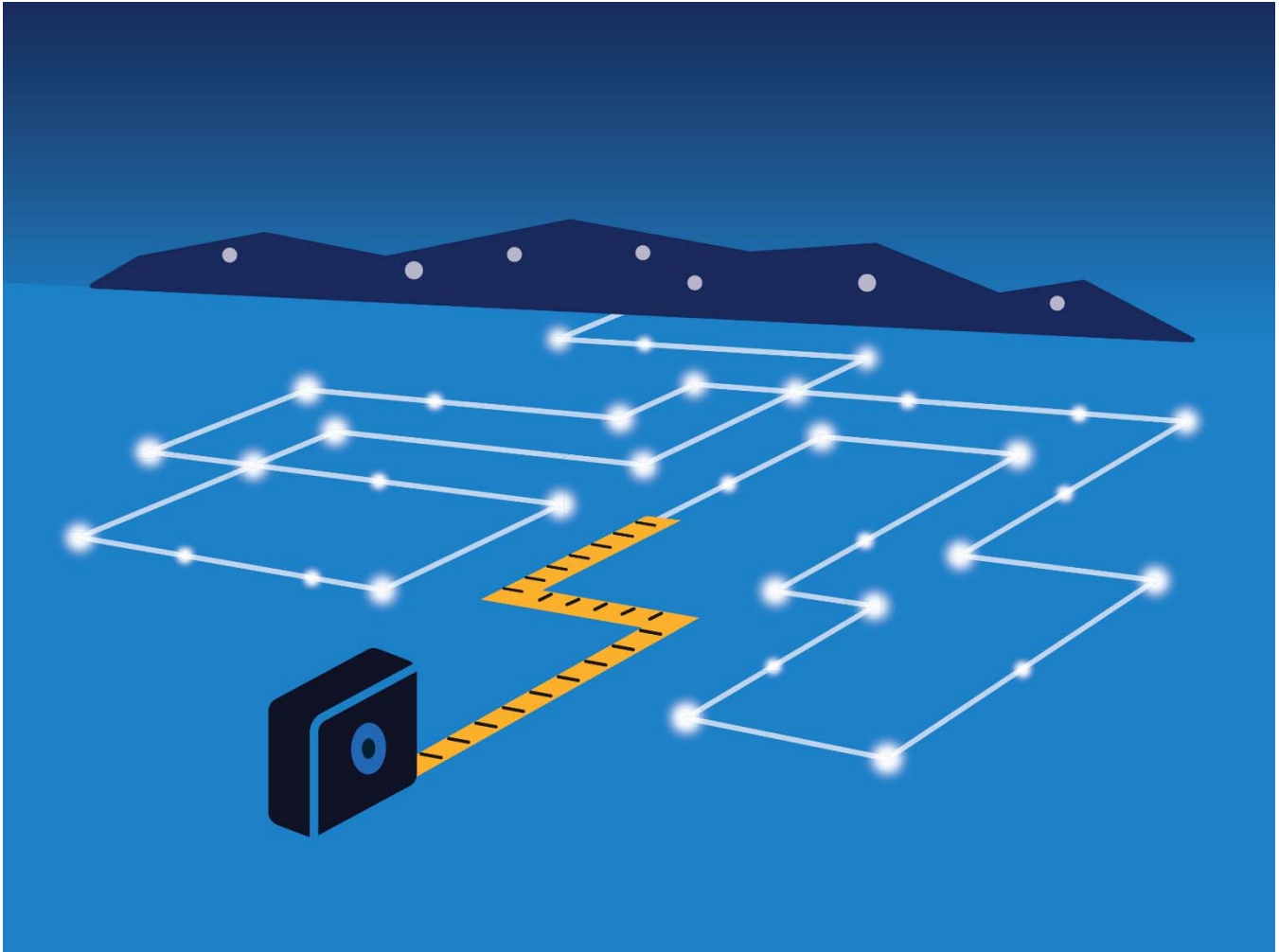


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Evaluation of the 2016 (PY9) Illinois Power Agency Residential Multifamily Program

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CADMUS

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1. Executive Summary

This report presents results from Program Year 9 (PY9) of the Illinois Power Agency (IPA) Multifamily Program, which was implemented from June 1, 2016 to May 31, 2017. The IPA Multifamily Program offers financial incentives and technical services that enable multifamily housing property owners and property managers¹ to save electricity and lower operating costs via energy efficient upgrades. The program's incentives are priced to offset the entire cost of the upgrade, essentially making the upgrades free to the property owner. Most measures are provided with a full direct-install service,² and administrators implement the program using a hybrid approach that leverages both the staff from the program's implementation vendor, CLEARresult, and program allies, which are local and regional insulation and air sealing contractors.

The IPA Multifamily Program was expected to achieve 19,798 MWh of electric savings in PY9. This goal represents a decrease relative to PY8. In addition, this program was part of the Illinois Power Authority (IPA)/8-103 expansion and we provide results from the evaluation of the AIC Multifamily Program in a separate report. Hereafter, except where noted, "Ameren Illinois Multifamily Program" refers to both the IPA and Ameren Illinois Company (AIC) Multifamily Programs and "IPA Multifamily Program" refers exclusively to the IPA Program. Program specifics are discussed in more detail later in this report.

PY9 evaluation activities for the Ameren Illinois Multifamily Program include interviews with program allies, a program benchmarking review and an impact evaluation. We also reviewed program materials and program-tracking data, and interviewed program administrators and implementation staff. Given the recent passage of the Illinois Future Energy Jobs Bill (SB 2814) and the potential for program changes, many of our PY9 evaluation activities include reflections on the program's historical performance, as well as suggestions for best practices to carry forward into future program years. Below we present the key findings of the PY9 IPA Multifamily Program evaluation.

Program Impacts

Overall, the ex post net savings from the PY9 IPA Multifamily Program were 13,780 MWh and 1.58 MW (Table 1). The evaluation team verified all program measures through a review of the program-tracking database and application of the Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0³ (IL-TRM V5.0). Based on this review, the IPA Multifamily Program achieved a 102% realization rate for gross electric MWh savings and a 108% realization rate for gross demand (MW) savings. Differences between ex ante gross and ex post gross savings calculations are due to variances in savings assumptions for specific measures.

¹ We use the term "property manager" to refer to both property managers and property owners.

² The exception is programmable thermostats, which the implementer leaves for the property maintenance staff to install.

³ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0. Effective June 2016.

Table 1. PY9 Gross and Net IPA Multifamily Program Impacts

	Ex Ante Gross	Gross Realization Rate	Ex Post Gross	NTGR ^a	Ex Post Net
Energy Savings (MWh)					
Total MWh	14,480	102%	14,741	0.93	13,780
Demand Savings (MW)					
Total MW	1.55	108%	1.68	0.94	1.58

^a The NTGR are estimated at a measure level but are shown in aggregate for the program here.

The IPA Multifamily Program achieved 70% of the 19,798 MWh electric goal. According to program staff, electric savings were more difficult to achieve in PY9 because the delayed program start left the implementer with two fewer months to achieve savings goals. As discussed above, the IPA program implementer reported that program allies had to shift or lay off work crews in response to the delayed program start. As a result, the implementer felt there were not enough program allies participating in the program to meet IPA savings goals when the program began two months late.

The lower IPA savings goals in PY9 and difficulty achieving these goals in the shorter time period meant that the PY9 IPA Multifamily Program achieved significantly lower savings relative to the PY8 IPA program, which achieved ex post net energy and demand savings of 33,973 MWh and 3.01 MW respectively. Compared to PY8, the PY9 IPA Multifamily Program energy savings declined by 42%, demand savings fell by 48%.

Key Findings

Findings from our PY9 process research identified similar broad areas of program success and possible improvement, which may be helpful to Ameren Illinois as it looks towards some design and funding changes upcoming in the transition period. Key findings come from in-depth interviews with program allies (n=5) and a program benchmarking review that compares the Ameren Illinois Multifamily Program to similar offerings in other parts of the country.

Specifically, Ameren Illinois had significantly expanded its offerings over the last nine years, leveraging expanded budgets to achieve increased savings among properties that were unlikely to install energy efficient upgrades without the program. As a testament to this successful growth, all allies are satisfied with their PY9 experiences and recall that their air sealing and insulation business in the AIC service territory has expanded over their tenure with the program. Program allies noted that it is becoming more difficult to efficiently serve remaining cost-effective savings opportunities, but suggested ways to overcome this emerging challenge, such as expanding funding for market segments that they see as still having savings opportunities (e.g., low-income multifamily buildings, small towns, and smaller complexes), modifying program guidelines, and/or adding additional measures. The benchmarking and best practices review does suggest that the program is already doing most of the best practices for multifamily programs serving dual-fuel customers; however, possible ways to improve the program include expanding current efforts to coordinate program providers, partnering with similar organizations to expand reach, and communicating all energy and non-energy upgrade benefits to property managers. Ameren Illinois may also have an opportunity to act on other best practices in coming years, like standardizing data tracking over the program lifespan to better enable cross-year comparisons, and working longer-term to identify opportunities for timing upgrades with larger building renovation projects. Overall, comparing Ameren Illinois’ day-to-day practices with best practices recommended by industry groups suggest that Ameren Illinois’ program is well-positioned to overcome traditional and emerging market barriers in its service territory.

- **Key Finding #1:** Ex ante savings analysis applied average assumptions for all inputs, rather than location- or project-specific values as recommended in the IL-TRM v5.0. For example, the implementer assumed Springfield, IL for all location-dependent variables, which simplifies analysis but does not accurately reflect the location of each PY9 participant. The ex post analysis utilized each individual project's location to attribute inputs such as Cooling Degree Days (CDD), Heating Degree Days (HDD), and Full Load Cooling Hours (FLHcooling). Additionally, ex ante analysis applied weighted average inputs based on an assumed mix of heating and cooling equipment because primary heating equipment data were not available to the implementation team at the beginning of PY9. A secondary database with HVAC equipment data provided by the implementer for evaluation purposes allowed the evaluation team to apply site-specific assumptions reflecting each site's equipment, such as Seasonal Energy Efficiency Ratio (SEER) and Coefficient of Performance (COP).
 - **Recommendation #1:** The evaluation team recommends that the implementer thoroughly review location-specific and equipment savings assumptions to update these inputs for the next program year. In the case of HVAC equipment, the implementer should apply the appropriate assumptions for savings based on the equipment type and age, if it is available during the program year. With the application of location specific inputs and actual HVAC equipment data, calculated savings will be more representative of actual savings at the project level, and ultimately at the program level.
- **Key Finding #2:** Ex ante gross energy savings for lighting measures, LED exit signs, and occupancy sensors include the waste heat penalties associated with the measure. However, the ex post gross savings analyses, per previous agreements between ICC staff and AIC staff regarding the treatment of waste heat factors, do not include waste heat factors.
 - **Recommendation #2:** We recommend calculating waste heat penalties separate from overall savings to better align with both the IL-TRM V5.0 and ex post analysis.
- **Key Finding #3:** While the Ameren Illinois Multifamily program relies on program allies to deliver its major measures program offering, a program best practice identified in the program benchmarking exercise, some allies are facing challenges in serving the program as a result of midyear program funding disruptions (PY9 and in past years) and an increasingly-saturated marketplace.
 - **Recommendation #3:** Program staff should work closely with program allies and program implementers in the transition period (if possible) and early in PY2018 to help the allies and implementers plan for and navigate changes. Clear and timely communication is an opportunity to enable the program allies to plan for any adaptations needed so they can rely on the program as a dependable part of their business and serve customers in an efficient and effective manner.
- **Key Finding #4:** Most program allies feel that they have already worked through many of the easier-to-serve properties in AIC's service territory and view the remaining buildings as more scattered throughout the territory and less cost-effective to serve. The program benchmarking process identified best practices for addressing saturated markets including expanding offerings for comprehensive upgrades, and promoting them through escalating incentives and financing options.
 - **Recommendation #4:** Consider expanding program offerings or guidelines to open-up new cost-effective savings opportunities for program allies. Also consider whether new incentive structures, such as financing options, could help balance the program's budgetary constraints with the need to continue addressing property owners' split incentives.
- **Key Finding #5:** Engaging with organizations that are also involved in multifamily energy efficiency is a best practice for ratepayer-funded programs seeking to expand their reach. Program staff continue to

attend annual landlord association meetings in the Peoria, IL area and have identified leads from these venues. In addition, program allies have had success marketing the program by actively recruiting property managers at rental property professional association meetings.

- **Recommendation #5:** Program staff should continue to build on efforts to market the Multifamily Program via existing networks of multifamily organizations by placing advertisements in housing trade association publications or developing new partnerships with organizations that can provide program staff with a single point of access to a wide variety and number of properties, such as regional housing companies and financial institutions.

2. Evaluation Approach

The Program Year 9 (PY9) evaluation of the Illinois Power Agency (IPA) Multifamily Program involved both process and impact assessments. In general, the team coordinated evaluation activities between the AIC Multifamily Program and the IPA Multifamily Program.⁴

Starting in January 2018, the program's tenth year will bring another suite of regulatory and funding changes that will again reshape program design and implementation. With the passage of the Illinois Future Energy Jobs Bill (SB 2814), the 8-103/8-104 expansion will end, and thus, IPA program funding will also end. Additionally, the bill carries a requirement for Illinois energy efficiency programs to mark success in terms of persistent savings, rather than first-year savings as administrators have done from PY1 through PY9. These regulatory and funding changes hint that administrators will be considering substantial program redesigns. During this redesign, program administrators and implementers may want to consider the best elements of the PY1-PY9 efforts, in addition to responding to changing regulations. As such, many of our PY9 IPA Multifamily Program evaluation activities incorporate reflections on the program's historical performance as well as suggestions for best practices to carry forward into the AIC Multifamily Program in future program years.

2.1 Research Objectives

The objective of the PY9 Multifamily Program evaluation was to provide estimates of gross and net electric savings associated with the program. In particular, the PY9 impact evaluation answered the following questions:

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

The evaluation team also explored process-related research questions as part of the PY9 evaluation.⁵ Through these questions, we benchmarked the Multifamily Program (AIC and IPA components) against other multifamily programs and explored the program design and implementation process and potential opportunities to improve program participation.

Program Participation

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

Program Design and Implementation

4. Has the program changed compared to PY8? If so, how, why, and was this an advantageous change?
5. What implementation challenges have occurred in PY9, and how has the program overcome them?
6. Program Allies
 - a. Did program ally participation meet expectations? If not, how different is it and why?

⁴ Hereafter, except where noted, "Ameren Illinois Multifamily Program" refers to both the AIC and IPA Multifamily Programs.

⁵ The evaluation team conducted these activities in conjunction with our evaluation of the IPA Multifamily Program.

- b. How do program allies work with property managers to select and install measures?
 - c. How satisfied were program allies with different aspects of the program?
 - d. What was the impact of program participation on program allies’ business and practices?
 - e. What changes would program allies suggest to improve the program?
7. Program Benchmarking
- a. To set a baseline for benchmarking, what progress towards program goals have the AIC and IPA Multifamily Programs (combined) made since inception? To frame the benchmarking results, what changes are anticipated for PY10?
 - b. How do the AIC and IPA Multifamily Programs’ outcomes compare to other multifamily programs throughout the United States with respect to such factors as multifamily market characteristics, program goals, and program design and implementation?
 - c. What best practices and lessons learned from other programs could enhance the programs’ design and implementation to achieve additional savings?

2.2 Evaluation Tasks

Table 2 summarizes the evaluation activities conducted for the PY9 evaluation of the Multifamily Program.

Table 2. Summary of PY9 Multifamily Program Evaluation Activities

Activity	PY9 Impact	PY9 Process	Forward Looking	Details
Program Staff Interviews		✓		Conducted interviews with AIC, CLEAResult, and Leidos program managers to understand changes in program design and implementation.
Program Materials Review		✓		Reviewed the PY9 database, relevant administrative program reports, and marketing and outreach materials to document program design and changes since PY8.
Program Ally Interviews		✓	✓	Conducted interviews with a sample of program allies to investigate program participation levels, program participation processes, program ally satisfaction, barriers to participation, and impacts of program participation on program ally business and practices.
Program Benchmarking Review			✓	Compiled changes made to AIC/IPA programs since inception; reviewed multifamily program best-practices in secondary literature; gathered secondary information about peer programs; and, compared AIC/IPA Multifamily Programs to peer programs.
Impact Analysis	✓			Conducted an engineering analysis of all measures installed during PY9.

Note: All activities were conducted in conjunction with the AIC Multifamily Program.

2.2.1 Program Staff Interviews

In June 2017, the evaluation team conducted in-depth interviews with the AIC program manager, two Leidos oversight managers, and two CLEAResult program managers. The interviews provided the evaluation team with insights about program performance and program changes during PY9.

2.2.2 Review of Program-Tracking Data and Materials

In addition to program staff interviews, the evaluation team reviewed program materials, including the PY9 Multifamily Program Implementation Plan and program marketing materials. The team also reviewed the program-tracking database to examine the type of data that was tracked and to obtain data for both the process and impact analysis.

2.2.3 Program Ally Interviews

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

2.2.4 Program Benchmarking Assessment

Program benchmarking is the “process of gathering, tracking, and assessing a program’s current performance against past results in order to measure progress over time, or to compare results to a peer group.” The team completed a secondary literature review in support of benchmarking the Multifamily Program. In contrast to the impact analysis, the benchmarking activity considered the combination of both AIC and IPA components in order to facilitate a comprehensive view of multifamily offerings in the AIC service area over time. Specifically, the team documented the AIC/IPA Multifamily Program’s evolution over time and compared the PY8 program to other multifamily direct-install programs in the United States. Key sources of information included American Council for an Energy Efficient Economy (ACEEE) multifamily energy efficiency program best practice reports and recent program evaluation reports of comparable multifamily programs.

The team also focused on benchmarking specific program elements, including context (e.g., multifamily market saturation), program design and implementation (e.g., program ally networks, customer marketing strategies, incentives), measure offerings, and evaluated outcomes (i.e., results of impact and process evaluations). Based on the benchmarking results, we recommend best practices and lessons-learned that can enhance the programs’ design and implementation to achieve additional savings moving forward. Please see Appendix D for a description of the Program Benchmarking Report detailed methods.

2.2.5 Impact Analysis

Gross Impact Analysis

To determine the gross impacts for the IPA Multifamily Program, we applied the savings algorithms and input assumptions from the IL-TRM V5.0 to the information provided in the program-tracking database. We outline

the algorithms used to calculate all evaluated gross program savings along with all input variables in Appendix B.

Net Impact Analysis

The evaluation team calculated PY9 ex post net impacts by applying SAG-approved NTGRs to ex post gross savings by measure. Table 3 summarizes the measure-level NTGRs used to calculate PY9 IPA Multifamily Program net savings.

Table 3. NTGRs by Measure Category

Measure Category	NTGR
Common Area Lighting	0.83
Air Sealing	0.96
Attic Insulation	0.88

2.3 Sources and Mitigation of Error

Table 4 provides a summary of possible sources of error associated with the research activities conducted for this evaluation. We discuss each item in detail below.

Table 4. Potential Sources of Error

Research Task	Survey Error		Non-Survey Error
	Sampling	Non-Sampling	
Program Staff Interviews	▪ n/a	▪ n/a	▪ n/a
Program Ally Interviews	▪ No, census attempt	<ul style="list-style-type: none"> ▪ Measurement error ▪ Non-response and self-selection bias ▪ Data processing error ▪ External validity 	▪ n/a
Secondary Data Review	▪ n/a	▪ n/a	▪ Data processing error
Impact Analysis	▪ n/a	▪ n/a	▪ Data processing error

The evaluation team took a number of steps to mitigate against potential sources of error throughout the planning and implementation of the PY9 evaluation.

Survey Error

- **Non-Sampling Error:**
 - **Measurement Error:** We addressed both the validity and reliability of qualitative data from the program ally interviews through multiple strategies. First, we relied upon the experience of the evaluation team to create questions that, at face value, appear to measure the idea or construct that they are intended to measure. We reviewed the questions to ensure that we did not ask double-barreled questions (i.e., questions that ask about two subjects, but with only one response) or loaded questions (i.e., questions that are slanted one way or the other). We also checked the overall logical flow of the questions so as not to confuse respondents, which would decrease

reliability. Key members of the evaluation team, as well as AIC and ICC Staff had the opportunity to review the interview guide and all interviews were conducted by an experienced interviewer.

- **Non-Response Bias:** Given the response rate of 83% for program ally interviews, the potential for non-response bias is minimal.
- **Data Processing Error:** The team addressed processing error through organizing interview responses in an Excel tracking file and conducting quality checks on this data.
- **External Validity:** Given that we attempted a census of the program allies, we did not need to worry about having a sample that was representative of program allies who participated in the program.

Non-Survey Error

- **Data Processing Error**
 - **Gross Impact Calculations:** We applied IL-TRM V5.0 calculations to the participant data in the tracking database to calculate gross impacts. To minimize data processing error, the evaluation team had all calculations reviewed by a separate team member to verify accurate calculations.
 - **Net Impact Calculations:** We applied the deemed NTGRs to estimate the program's net impacts. To minimize data processing error, the evaluation team had all calculations reviewed by a separate team member to verify accurate calculations.

3. Detailed Evaluation Findings

3.1 Program Description

The Multifamily Program offers incentives and services that enable energy savings and lower operating costs in market-rate multifamily housing. For the past two years, Multifamily Program offerings in AIC service territory have been split between the AIC Multifamily Program and the IPA Multifamily Program⁶. There are three main components offered through the AIC and IPA programs: measures for tenant units, lighting for buildings' common areas, and major measures for air sealing and attic insulation (also referred to as shell measures). The AIC Multifamily Program sponsors all of the measures installed in tenant units (CFLs for permanent light fixtures, faucet aerators, low-flow shower heads, and programmable thermostats), some types of common area lighting (standard and specialty CFLs), and major measures for buildings with gas heat. Additionally, while LEDs were not part of the PY9 program offering, the implementer installed LED bulbs at the end of the PY9 program year, in a few complexes where owners refused to take CFLs.⁷ The IPA Multifamily Program does not sponsor any in-unit measures, but does sponsor the remaining types of common area measures (occupancy sensors and LED exit signs) and major measures for buildings with electric heat.

Program administrators deliver measures using a hybrid approach that leverages program implementation staff from CLEARresult, as well as program allies. Program delivery still differs somewhat by program component within the IPA Multifamily Program. Specifically, the program implementer conducts outreach and recruitment of participants for the direct installation components of the program (in-unit and common area). The implementer installs all common area lighting and most of the in-unit measures. The exception is programmable thermostats, which the implementer provides to participating property managers for installation by property staff. In contrast, program allies (recruited by the implementer) are responsible for generating leads, bringing customers into the major (shell) measures component of the program, and performing all major measure installations. Table 5 provides a summary of the multifamily offerings available in the AIC service area. Note that the program implementer and program allies present all offerings as a single program to the customer. Major measure offerings are provided at no cost to the property manager, and the discounts for common area lighting and in-unit measures cover measure costs for those aspects of the program.

Where applicable, program allies share leads for direct install components with CLEARresult, so that property managers are exposed to all applicable measures. Although the implementer follows up on all potential direct installation opportunities identified through program allies' major measures site reports, some allies take a more proactive approach to cross-component participation and invite the implementer to join them at on-site meetings where there may be an opportunity to complete direct install measures. A third-party oversight team from Leidos conducts Quality Assurance/Quality Control (QA/QC) processes for the IPA program.

⁶ In reference to process evaluation research, "Ameren Illinois Multifamily Program" refers to both the AIC and IPA programs except where noted.

⁷ The AIC Multifamily Program is installing LEDs during the transition period from PY9 to PY10, and plans to fully switch from CFLs to LEDs in PY10.

Table 5. Multifamily Program Offerings in the AIC Service Area

Program Component	AIC Program	IPA Program
In-Unit Measures <i>CFLs for permanent light fixtures, faucet aerators, low-flow shower heads, and programmable thermostats</i>	Available to any AIC multifamily customer CLEAResult recruits participants and installs all measures except thermostats, which property manager installs	Not offered
Major Measures <i>Air sealing and attic insulation</i>	Available to AIC Multifamily customers with gas heat Program allies recruit participants and install all measures	Available to AIC Multifamily customers with electric heat Program allies recruit participants and install all measures
Common Area Lighting <i>Lighting measures vary by program</i>	Available to any AIC Multifamily customer CLEAResult recruits participants and installs lighting (standard CFLs, specialty non-modular CFLs)	Available to any AIC Multifamily customer CLEAResult recruits participants and installs common area measures (LED exit signs, occupancy sensors)

3.2 Program Design and Implementation

The Ameren Illinois Multifamily Program focuses on the market-rate multifamily housing sector. The program’s objective is to provide a range of services and incentives that result in lower operating costs and better bottom lines for property managers, as well as lower costs of living and increased comfort for their tenants. Starting in 2018, the program will begin serving low-income multifamily properties. As such, research findings relevant to supporting low income multifamily programs are also presented in this report to provide the program staff with ideas ahead of this change.

Program Design Changes

The IPA Multifamily Program underwent two program design changes in PY9 related to program offerings and guidelines:

- In PY9, the program’s savings goals decreased relative to PY8. Additionally, the IPA program stopped offering T8s and modular CFLs through the common area lighting offering.
- The program set stricter guidelines for insulation in PY9. In PY8, allies could upgrade properties with an R-value of R-19 or less and PY9 guidelines specified that allies could upgrade buildings with an insulation value of R-11 or less to a minimum of R-49.

Program Participation and Goal Achievement

Both program implementers and program allies faced two program implementation challenges in PY9:

- In PY9, the IPA oversight team found that one program ally was performing insulation projects on buildings that did not meet the program requirement. When oversight staff realized this issue, they enforced stricter QA/QC processes for insulation and program staff noticed that most allies stopped completing insulation projects after this point.
- In addition, program implementation staff reported the IPA Multifamily Program began two months late in PY9 due to negotiations between AIC and the program implementer about how to offer the

program in a cost-effective way. The program implementer reported that program allies had to shift or lay off work crews in response to the delayed program start.

In PY9, the program implementer voluntarily lowered the IPA electric savings goal (19,798 MWh) to about half of the PY8 electric savings goal (36,335 MWh) in efforts to have the savings goal reflect the shorter implementation period.

Overall, the ex post net savings from the PY9 IPA Multifamily Program were 13,780 MWh, 1.58 MW. Program staff achieved the PY9 Multifamily Program savings through implementation of 1,327 unique projects at 1,079 buildings.⁸ Most participants completed projects through the major measures component (n=1,304 projects), with fewer completing LED exit sign upgrades or occupancy sensor installs (n=23 projects).

By completing these projects, the program achieved 70% of the 19,798 MWh electric goal. According to program staff, electric savings were more difficult to achieve in PY9 because the delayed program start left the implementer with two fewer months to achieve savings goals. As discussed above, the program implementer reported that program allies had to shift or lay off work crews in response to the delayed program start. As a result, the implementer felt there were not enough program allies participating the program to meet savings goals when the program began two months late.

The lower savings goals in PY9 and difficulty achieving these goals in the shorter time period meant that the PY9 program achieved significantly lower net savings relative to the PY8 program, which achieved ex-post net energy and demand savings of 33,973 MWh and 3.01 MW respectively. PY9 energy savings declined by 42%, demand savings fell by 48% in comparison to PY8. Almost all of the savings PY9 IPA electric savings (99%) were achieved through the major measures offering of the program (Table 6).

Table 6. PY9 IPA Multifamily Program Participation and Projected Savings by Component

Project Type	Measures	Ex Ante Gross Electric Savings		Ex Ante Gross Demand Savings ^b	
	#	kWh	%	kW	%
Direct Install - Common Area Lighting	232	90	1%	0.03	2%
Major Measures ^c	9,980,624	14,650	99%	1.66	98%
Total^a	9,980,856	14740	100%	1.69	100%

Note: The number of projects is based on unique Project ID. In some cases, there are multiple projects completed at a given property.

a. Totals may not sum due to rounding.

b. Ex ante program tracking data provided to the evaluation team did not report PY9 demand savings.

c. Units of air sealing are in CFM and insulation is in square feet

3.2.1 Program Benchmarking Key Findings

In this section, we present results of the benchmarking efforts, including an assessment of multifamily program barriers, assessments of the program’s historical performance, comparisons to peer multifamily programs from Illinois and other states, and recommendations for multifamily program best practices and lessons learned that can enhance the program’s design and implementation to achieve additional savings moving forward. We discuss benchmarking results in terms of annual ex post savings, participation, measure

⁸ The number of buildings is smaller than the number of projects because some project IDs encapsulated upgrades at multiple units within a singular building.

offerings, and program delivery models. For a detailed explanation of the benchmarking process and methodology please see Appendix D.

Program Barriers Assessment

As has been extensively documented, several characteristics of multifamily properties and their ownership structure pose unique barriers to increased energy efficiency, compared to the single-family marketplace. We refer readers to detailed compilations provided by ACEEE.⁹ For this benchmarking report, we recapped the main barriers and commented on the extent to which each is a factor for the Ameren Illinois Multifamily Program, based on our knowledge of the program from interviews with program stakeholders in PY7, PY8, and PY9 (including program managers, the implementer, program allies, participating property owners, and tenants). We also drew on this understanding to assess the relative effectiveness of Ameren Illinois’ strategies in overcoming pertinent barriers.

Table 7 summarizes common multifamily program barriers reported by ACEEE and others. Results of our comparisons show that while the Ameren Illinois Multifamily Program does face a variety of typical barriers, most are already being addressed as part of the program design and implementation strategy.

Table 7. Program Barriers Assessment

Barrier to Multifamily Energy Efficiency	Description	Presence and Status in AIC Service Territory
Split incentives	<ul style="list-style-type: none"> ▪ Tenants are commonly responsible for paying the electricity bills in multifamily units, while property managers are responsible for the cost of upgrades to multifamily buildings. ▪ Therefore, property managers must pay to finance energy efficient upgrades but their tenants realize the economic benefits from the upgrades, creating a barrier to program participation known as split incentives.¹⁰ 	<p>Present; Addressed. Many tenants (79%) in AIC’s service area are responsible for paying their own electricity bills,¹¹ indicating that the split incentive issue is present. AIC addresses this issue by offering no-cost upgrades and measures installed in spaces for which property managers are responsible.</p>
Market Saturation	<ul style="list-style-type: none"> ▪ Savings can be more time consuming and costly to achieve for multifamily programs that have already served a high proportion of eligible customers. Market saturation is more common for direct install measures.¹² 	<p>Emerging; Not Yet Addressed. In PY9, program staff and program allies identified market saturation as an emerging issue. Staff say that they are in the process of understanding the issue to find a solution.</p>
Lack of capital, financing, or resources	<ul style="list-style-type: none"> ▪ Extensive upgrades call for access to capital, which can be a challenge for 	<p>Present; Addressed. AIC program staff and implementers recognize that resource constraints are a given. Over time, staff have</p>

⁹ ACEEE (2014); K. Farley & Mazur-Stommen (2014); Johnson (2013); McKibbin (2013); Ross et al. (2016); Vermont Energy Research Organization (2014) and a literature review conducted for Southern California Edison (Opinion Dynamics, 2014).

¹⁰ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

¹¹ Opinion Dynamics. (2017). Evaluation of the 2016 (PY8) Illinois Power Agency Residential Multifamily Program. Retrieved from http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU_Eval_Reports_PY8/PY8_AIC_Multifamily_Evaluation_Report_FIN_AL_2017-02-21.pdf

¹² Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

Barrier to Multifamily Energy Efficiency	Description	Presence and Status in AIC Service Territory
	<p>some property managers. Affordable housing managers are generally not allowed to pass capital costs on to tenants by raising rents.¹³</p> <ul style="list-style-type: none"> Property managers must determine how to allocate their limited upgrade resources between energy efficient upgrades and other capital improvements.¹⁴ 	<p>noticed that property managers face the common constraints of time, capital resources, and capacity to schedule upgrades in a way that minimizes tenant disruption. To work around these barriers, the program offerings include no cost measures (addressing capital cost barriers) and staff attempt to complete streamlined visits (to minimize management and tenant burden).</p>
Property manager uncertainty about the benefits of installing upgrades	<ul style="list-style-type: none"> Property managers may have difficulty predicting the full benefits of installing energy efficiency upgrades. This includes challenges of uncertain external factors like fluctuating fuel prices¹⁵ as well as incomplete information on possible non-energy benefits like increased tenant comfort and reduced tenant turnover.¹⁶ 	<p>Extent of Issue Unknown; Procedures in Place to Address as Needed. AIC created outreach materials to discuss non-energy benefits. In PY9, some allies reported not being aware of these materials.</p>
Challenges meeting program cost-effectiveness requirements	<ul style="list-style-type: none"> Multifamily programs tend to offer multiple non-energy benefits to both tenants and property managers including reduced tenant turnover, reduced water usage, and increased tenant comfort. These non-energy benefits are generally not considered in cost effectiveness testing, for most utility-run energy efficiency programs. Non-energy benefits are especially relevant for multifamily programs because they provide such a multitude of benefits and these benefits are shared between managers and tenants.^{17,18} 	<p>Occasionally Present; Addressed as Needed. The IPA Multifamily Program struggled to meet cost-effectiveness requirements in PY9 and the program began two months late due to negotiations about program implementation and cost effectiveness requirements. AIC has addressed this as needed through re-negotiating high-level program design to better meet requirements.</p>
Complex decision-making structures	<ul style="list-style-type: none"> Multifamily projects generally need to go through layers of ownership/manager approval before they can be initiated. Decision-making about multifamily property upgrades requires time and resources from multiple stakeholders including not only the program 	<p>Ongoing Challenge, Addressed to Extent Practical AIC PY9 program staff reported that scheduling time to meet with property managers can be challenging. Furthermore, property managers must then work with tenants to schedule a time for staff to complete upgrades in tenant units, which</p>

¹³ Ibid.

¹⁴ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

¹⁵ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

¹⁶ Ibid.

¹⁷ Cluett, R., & Amann, J. (2015). Multiple Benefits of Multifamily Energy Efficiency for Cost-Effectiveness Screening. Retrieved from <http://aceee.org/research-report/ie1502>

¹⁸ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

Barrier to Multifamily Energy Efficiency	Description	Presence and Status in AIC Service Territory
	implementer, but also the property manager, property maintenance staff, and/or tenants. <ul style="list-style-type: none"> More stakeholders are involved when access to tenant units is required. 	adds a layer of complexity. To address this issue, allies and implementers work closely with property managers to promote the program.

Program Delivery Model

Historical Performance

Ameren Illinois’ overall program design and delivery have stayed relatively constant from year to year, with periodic changes within individual components over time, such as the incentive amounts, installation services, and measures offered through common area, in unit, and major measures components of the program. Table 8 summarizes additional details of the Ameren Illinois Multifamily program’s evolution over time; below the table, we detail some of the key changes.

Table 8. Ameren Illinois Multifamily Program Delivery Models by Program Year

Component	PY1	PY2	PY3	PY4	PY5	PY6	PY7	PY8	PY9
Tenant Units									
<i>Incentives</i>	No cost to property								
<i>Installation</i>	Program ships measures to property manager, who installs them				Implementer installs		AIC implementer installs (IPA does not offer in-unit measures)		
Common Areas									
<i>Incentives</i>	Property manager applies for a prescriptive rebate				No cost to property				
<i>Installation</i>	Property manager coordinates installation by his/her staff or a contractor				Implementer installs		AIC or IPA implementer installs, depending on the measure		
Major Measures									
<i>Incentives</i>	Custom	None offered		No cost to property					
<i>Installation</i>	Custom	n/a		Program allies install all measures and are paid by based on CFM reduction for air sealing and square footage of installation installed					

Note: Changes in measure mix are discussed in Table 10
 Source: PY1-PY8 AIC and IPA Multifamily Program Evaluations.

Notable program changes have been:

- A PY7 change in the Multifamily Program’s funding.** With the 8-103/8-104 expansion, the program began receiving additional funding from the Illinois Power Agency (IPA) and, accordingly, program administrators changed the program contracting and accounting practices to accommodate new funding for the in-unit and common area components.
- A PY5 change in the in-unit and common area components’ recruitment, incentives, and installation procedures.** From PY1 to PY4, property managers were responsible for installing in-unit measures; starting in PY5, the program implementer took over this responsibility. The motivations behind this change were to increase participation in the program and to increase the percentage of distributed in-unit measures that were installed. Common area lighting measures also have been a consistent component of the program since PY1. From PY1 to PY4, property managers were responsible for installing common area

lighting measures and then applying for rebates from the program; in PY5, the implementer began installing common area lighting measures directly and the program moved to a no-cost model.

- **Program disruptions in the major measures component.** Ameren Illinois first offered major measures on a custom basis in PY1, including energy audits and incentives for custom measures identified during the audit. Ameren Illinois stopped offering major measures for two years (PY2 and PY3), and reintroduced them again in PY4 as a prescriptive suite of measures (Table 10 in Section 5.2).

Peer Comparison

The selected multifamily programs all offer a range of program design and implementation elements (Table 9). Most programs—including the AIC and IPA Multifamily Programs—use a mix of tactics including direct install services, discounted or free program ally services and equipment, and product rebates. In its current form, the Multifamily Program offers three of the distinguishing features: direct installation, free program ally services, and rebates. As mentioned elsewhere, the IPA Multifamily Program’s rebates are implemented as direct incentives that fully offset measure costs and make the installation no-cost to the property owner.

The IPA Multifamily Program differs from comparison programs in several ways. A number of programs are open to both income-qualified and market-rate properties, although the IPA Multifamily Program has historically only been offered to the market-rate segment. Financing for energy upgrades tends to be a less popular option, and the IPA Multifamily Program does not currently offer this because the no-cost incentives make it unnecessary. Additionally, as detailed in Table 11 below, the programs offering financing offer custom measures and some higher-cost offerings than the IPA Multifamily Program currently does.

Table 9. Comparison of Multifamily Program Delivery Models

Program	Open to Income-Qualified Properties	Direct Install	Discounted or Free Program ally Services	Equipment and Product Rebates	Financing Options
Ameren Illinois (combined AIC and IPA) ⁴		✓	✓	✓	
BayREN ³	✓			✓	✓
Con Ed ¹	✓	✓	✓	✓	
National Grid MA ¹	✓	✓		✓	✓
National Grid RI ¹	✓		✓	✓	
Puget Sound Energy ¹		✓	✓	✓	
ComEd, Nicor Gas, and People's Gas ¹		✓	✓	✓	
CNT Energy Savers Program (now Elevate Energy Program) ²	✓				✓

Notes: Check marks indicate element is part of the program design.

Sources:

1. Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>
2. Farley, J., & Ruch, R. (2013). Evaluation of CNT Energy Savers Retrofit Packages Implemented in Multifamily Buildings, (September). Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Evaluation_of_CNT_Energy_Savers_Retrofit_Packages_Implemented_in_Multifamily_Buildings.pdf
3. Energy Upgrade California. (2015). Bay Area Multifamily Building Enhancements. Retrieved from http://bayareamultifamily.org/sites/default/files/BAMBE_workshop_fall_2015.pdf
4. PY8 AIC and IPA Multifamily Program Evaluations

Measure Mix

The Ameren Illinois Multifamily Program has offered a relatively constant suite of high-efficiency measures over the years, including low-cost measures for tenant units, standard and specialty lighting for building common areas, and major measures (Table 10). Over time, Ameren Illinois has offered most of the industry-standard upgrades and installations we observed in other administrators' programs, but does not currently provide some measures that are common among other programs (Table 11). For example, the Ameren Illinois Multifamily Program does not offer energy audits (7 of 7 other programs), HVAC (5 of 7 other programs), appliance replacements (4 of 7 other programs), or custom products and services (4 of 7 other programs). The remainder of this section provides additional detail on how the Ameren Illinois Multifamily Program's measure mix evolved over time and additional details on how the program's current measure mix compares to seven other reference programs.

Historical Performance

The Ameren Illinois Multifamily Program has offered a relatively constant suite of high-efficiency measures since PY4 (Table 10). Participating property manager and tenant surveys in PY5, PY6, PY7, and PY8 suggest that participants have been satisfied with measure quality and the available offerings. A minor area of dissatisfaction has been measure installation quality.

Table 10. Ameren Illinois Multifamily Program Measure Offerings by Program Year

Measure	PY1	PY2	PY3 ^a	PY4	PY5	PY6	PY7	PY8
In-Unit Measures								
CFLs ^c	✓	✓	✓	✓	✓	✓	AIC	AIC
Faucet Aerators	✓	✓	✓	✓	✓	✓	AIC	AIC
Low-flow Showerheads	✓	✓	✓	✓	✓	✓	AIC	AIC
Pipe Insulation	✓	✓	✓					
Programmable Thermostats			✓	✓	✓	✓	AIC	AIC
Water Heater Setbacks					✓			
Common Area Measures								
General Lighting ^d	✓	✓	✓	✓	✓	✓	AIC & IPA	AIC & IPA
Major Measures								
Air Sealing				✓	✓	✓	AIC & IPA	AIC & IPA
Insulation				✓	✓	✓	AIC & IPA	AIC & IPA
HVAC ^b				✓				
Custom Measures	✓							
Energy Audits	✓							
Programmable Thermostats				✓	✓	✓		

Notes:

Check marks indicate measures offered during the program year. For PY7 and PY8, program funders are listed for measures offered during those years.

^a. In PY3, no customers completed shell measures or installed programmable thermostats

^b. In PY4, no customers installed natural gas furnaces or boilers through the Multifamily Program. Since that date, multifamily properties have had access to incentives for HVAC upgrades through the AIC Heating and Cooling Program for single units and through the AIC Business Program at the building level.

^c. The Ameren Illinois Multifamily program plans to switch from CFLs to LEDs in PY10

^d. General lighting includes: LED exit signs, T8 lighting, CFLs and occupancy sensors

Sources:

PY1-PY8 Ameren Illinois Multifamily Program Evaluations

As shown in Table 10, Ameren Illinois has not offered boilers or furnaces since PY4. While Ameren offered incentives for natural gas furnaces and boilers under that year’s major measures component, property managers did not install any of these measures. Exploring why that had been the case, the implementer learned that multifamily furnaces and boilers are generally replaced on failure, and that early replacements for heating and cooling equipment were not cost-effective. In response, Ameren Illinois stopped offering HVAC and boiler equipment through the program. As discussed below, as part of the multifamily program best practices that the program could consider for the future, there may be ways to bring larger, less-common measures back into the program with financing, flexible timing, or other approaches.

Peer Comparison

Table 11 shows that the PY9 Ameren Illinois Multifamily Program offers an industry-standard mix of measures. This is especially true in the case of tenant units and common area lighting, where most programs offer a small set of two to four direct install measures with the most common being lighting, water saving measures, and thermostats. In terms of major measures, however, Ameren Illinois’ program offers a relatively small share of the measures that other IOUs have incentivized. Whereas most of the reference programs are offering

approximately four to eight types of major measures, the Ameren Illinois Multifamily Program offers one type (building shell, which includes air sealing and insulation).

Additional major measure offerings offered by other programs include pool pumps, appliance replacements, and upgrades for HVAC systems and domestic hot water systems (e.g., National Grid Rhode Island, Puget Sound Energy, BayRen and the joint program between ComEd, Nicor, and Peoples' Gas). Additionally, several programs (The CNT Energy Savers Program, BayREN, ConEd, and the joint program between ComEd, Nicor, and Peoples') offer customers a free energy audit, during which customers can receive incentives for suggested customized measures. Ameren Illinois did offer custom audits in PY1, but removed them from the program once they switched to prescriptive major measures in PY2.

Table 11. Comparison of Multifamily Program Measure Offerings

Measure	Ameren Illinois PY9	BayREN ²	Con Ed ¹	National Grid MA ⁴	National Grid RI ⁴	Puget Sound Energy ⁴	ComEd, Nicor Gas, and People's Gas ¹	CNT Energy Savers ³
In unit Measures								
Lighting	✓	✓	✓	✓	✓	✓	✓	
Water saving measures	✓	✓	✓	✓	✓	✓	✓	
Programmable thermostats	✓	✓	✓	✓	✓		✓	
Pipe insulation		✓		✓		✓	✓	
Common area measures								
Lighting	✓	✓	✓		✓		✓	
Lighting controls/sensors	✓	✓	✓		✓		✓	
Major Measures								
Building shell measures ^a	✓	✓	✓	✓	✓	✓	✓	
Energy audit		✓	✓	✓	✓	✓	✓	✓
HVAC		✓	✓	✓		✓	✓	
Domestic hot water		✓	✓	✓		✓	✓	
Appliance replacements		✓		✓	✓	✓		
Custom products/services		✓	✓	✓			✓	✓
Boilers		✓	✓			✓	✓	
Pool pumps		✓			✓			
Building EMS ^b			✓					

Notes:

Check marks indicate measures offered through the program.

^aBuilding shell measures include attic insulation, wall insulation, and/or air sealing.

^bBuilding energy management systems (EMS).

Sources:

1. ConEd. (2017). 10 Tips to Help You Go Green and Save Some Green. Retrieved from <https://www.coned.com/-/media/files/coned/documents/save-energy-money/rebates-incentives-tax-credits/rebates-incentives-for-multifamily-customers/mf-fact-sheet-basic.pdf>
2. Energy Upgrade California. (2015). Bay Area Multifamily Building Enhancements. Retrieved from http://bayareamultifamily.org/sites/default/files/BAMBE_workshop_fall_2015.pdf
3. Farley, J., & Ruch, R. (2013). Evaluation of CNT Energy Savers Retrofit Packages Implemented in Multifamily Buildings, (September). Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Evaluation_of_CNT_Energy_Savers_Retrofit_Packages_Implemented_in_Multifamily_Buildings.pdf
4. Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

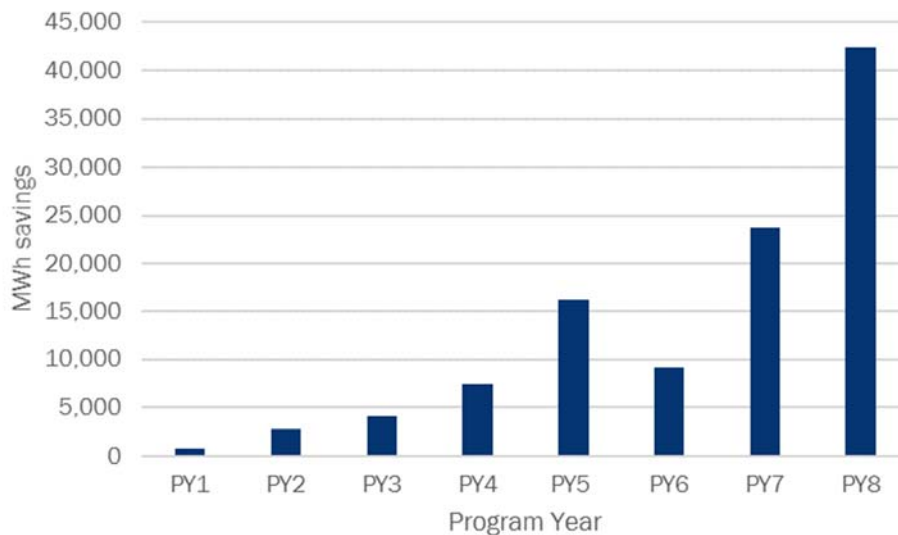
Program Performance

Historical Performance

Program Budgets and Savings

Program implementers and evaluators can use annual program spending, participation, and savings to measure program success. The Ameren Illinois Multifamily Program budget has dramatically increased over time, from approximately \$260,000 in PY1 to over \$17 million in PY8 (including funding for both gas and electric savings measures and from both AIC and IPA programs).¹⁹ At the same time, the Ameren Illinois Multifamily Program’s electric savings have seen similarly dramatic growth, from 817 MWh in PY1 (ex post net) to nearly 42,400 MWh in PY8 (Figure 1). PY6 program savings dipped somewhat due to program budgets and implementation timeframe that were reduced relative to adjacent years; in particular, the major measures component was only open for three months in PY6²⁰. Then, in PY7 and PY8, the program’s electric savings further increased when the program received additional funding from IPA to serve electric customers.²¹

Figure 1. Ameren Illinois Multifamily Program Ex Post Net Electric Savings by Program Year



Source: PY1-PY8 Ameren Illinois Multifamily Program evaluation reports

Notes: Data for PY7 and PY8 reflect combined savings from the IPA and AIC programs

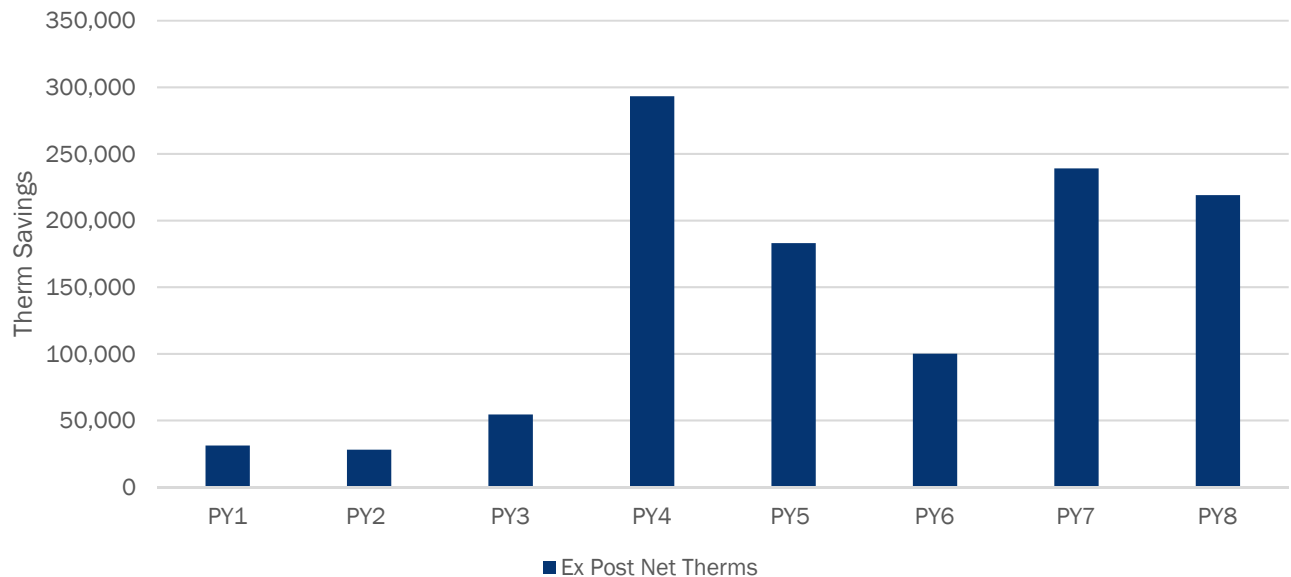
¹⁹ As indicated by the PY1 program evaluation report and program implementation plans for the Ameren Illinois (AIC and IPA) programs in PY4, PY5, PY6, PY7 and PY8.

²⁰ Opinion Dynamics. (2015). Impact and Process Evaluation of the 2013 (PY6) Ameren Illinois Company Residential Multifamily Program. Retrieved from http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU_Evaluation_Reports_EPY6/AIC_PY6_Multifamily_Report_FINAL_2015-03-06.pdf

²¹ Program activities funded by AIC worked towards distinct energy savings goals and were tracked separately from those funded by IPA. The IPA funding supported program activities for a total of three years (PY7, PY8, and PY9) but will discontinue for PY10. All Ameren Illinois Multifamily program savings reported in this section are combined figures for both the AIC and IPA programs.

Gas program budgets have grown from \$270,000 in PY4 to over \$700,000 in PY8. During that time, however, gas budgets have declined as a share of total budget, from a high of 25% in PY4 to about 4% to 14% in recent years. Further, some years have seen funding reductions relative to the prior year (PY6, PY7) or shortened implementation timeframes. Accordingly, gas savings have fluctuated over the years (Figure 2). For example, as major measures drive most of the gas savings, savings dipped in PY5 when the program suspended the major measures component midway through the program year when program funding ran out.²² Additionally, in PY6, the implementation period for the major measures component was only three months.

Figure 2. Ameren Illinois Ex Post Net Therms Savings by Program Year



Source: PY1-PY8 Ameren Illinois Multifamily Program evaluation reports

Program Influence on Customer Decision-making

Multifamily Program attribution analyses completed as part of annual program evaluations show that, for the most part, the program is reaching property owners who would not have completed energy efficient upgrades outside of the program. Per the Illinois TRM, multifamily program attribution is assessed in terms of a NTGR comprised of self-reported participant free-ridership (FR) and spillover (SO). SAG-approved NTGRs for the program have ranged from 80% to 100% in recent years. These NTGR are within a reasonable range of those used in other multifamily programs.²³

²² Ameren Illinois closed the program early because the budgeted funds were exhausted prematurely. At that point, Ameren Illinois made a portfolio-level decision to not shift funds from other programs to continue offering major measures.

²³ NTGRs often vary across programs, reflecting the multiple ways in which regional markets, attribution methods, and program designs influence resulting values. Additionally, NTGRs for a given program may change over time due to shifts in approved attribution methods and algorithms as well as program design changes and market factors.

Peer Comparison

Table 12 compares annual dual-fuel spending, participation, savings between Ameren Illinois and the selected multifamily programs. In comparison to these selected other programs, the Ameren Illinois program appears to serve a relatively smaller multifamily market and reaches a moderate number of tenant units each year, yet produces a relatively large share of its annual impact via electric savings. Although there are some uncertainties in how well tenant unit counts provided by Ross et al. (2016) correspond to Ameren Illinois tenant unit counts, dividing reported total savings by the number of tenant units served suggests that Ameren Illinois may be achieving relatively greater savings per unit than other programs.²⁴ Moreover, the program seems to achieve this by spending somewhat more per-unit than other programs; this may be because the averaging includes spending on major measures. These assessments are provided for directional suggestion only, and are not meant to imply a rigorous comparison due to uncertainties in the reporting conventions from the ACEEE report.

Table 12. Multifamily Programs' Participation and Savings

Program	Program Year	Total Number of Eligible Units	Tenant Units Served Annually ¹	% of Units Served Annually	Ex Post Savings (MMBtu) ²	% Savings from Electric	Approx. Budget Spent/Tenant Unit ¹	MMBtu/Tenant Unit ¹
Ameren Illinois ³	2016	156,103	11,797	8%	166,570	87%	\$1,450	14.1
BayREN ⁴	2015	700,000	7,512	1%	37,526	34%	\$1,200	5.0
Con Ed ⁴	2015	2,380,000	38,800	2%	251,862	21%	\$300	6.5
National Grid MA ⁴	2014	339,698	54,198	16%	259,815	40%	\$810	4.8
National Grid RI ⁴	2014	76,419	19,867	26%	78,274	51%	\$390	3.9
Puget Sound Energy ⁴	2014	245,000	31,000	13%	85,044	98%	\$440	2.7
ComEd, Nicor Gas, and People's Gas ⁵	2013	1,200,000	88,750	7%	622,386	21%	\$210	7.0
CNT Energy Savers ⁵	2012-2013	401,083	4,126	1%	108,175	8%	\$12,770	26.2

Notes and Sources:

1. Figures for the Ameren Illinois Multifamily Program do not include units in buildings that only received major measure upgrades, but we were unable to determine whether other programs included tenant units in major measures-only properties. Therefore, MMBTU/unit figures contain some uncertainties and are presented for directional effects only.
2. All savings are first-year ex post incremental savings. ACEEE was not able to clarify whether savings for non-Ameren programs are gross or net, noting that their source data contained some uncertainties.
3. Eligible units are based on market characterization study completed as part of the PY7 evaluation. All other Ameren Illinois values are from the PY8 IPA and AIC Multifamily Program evaluations. Reports are available at http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren.
4. Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>
5. Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

Review of Best Practices

²⁴ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

By reviewing secondary materials including Ross et al. 2016’s review²⁵, we identified 13 best practices for multifamily energy efficiency program design. We classified recommendations into three groups:

1. Program considerations that Ameren Illinois is already addressing through “current practice”,
2. Implementation techniques that Ameren Illinois may be able to start using with a low to moderate level of modification, which we have termed “short-term opportunities,” and
3. Program design elements that are not relevant given Ameren Illinois’ current regulatory environment, funding, and implementation plans, but which could be good to keep in mind if the situation changes and there is a need/opportunity to redesign program’s core structure.

Table 13 summarizes the best practices that we identified and shows our suggested classification.

Table 13. Ameren Illinois Program Progress Towards ACEEE Multifamily Program Best Practices

ACEEE Multifamily Program Best Practice	AIC Status
Partner with program allies to implement and market the program	Current Practice
Integrate direct install measures with more comprehensive program offerings	Current Practice
Offer rebates and program offerings to overcome split incentives	Current Practice
Conduct market characterization surveys; target marketing to appropriate market segments	Current Practice
Coordinate program providers and streamline program offerings to simplify customer access to the program	Current Practice (Could Expand)
Partner with organizations with similar missions to market and support the Multifamily Program	Current Practice (Could Expand)
Effectively communicate the benefits of energy efficiency upgrades to property managers and owners	Current Practice (Could Expand)
Standardize data tracking and reporting methods over the program lifespan	Short-Term Opportunity
Identify opportunities for aligning energy efficiency upgrades with larger building renovation projects	Short-Term Opportunity
Offer an energy audit paired with upgrades that are customized to the participant	Opportunity Would Require Redesign
Expand offerings for comprehensive upgrades through escalating incentives and offering financing options	Opportunity Would Require Redesign
Develop program offerings for both market rate and low income buildings	Opportunity Would Require Redesign

As Table 13 shows, the program is doing a good job of addressing industry-standard best practices for multifamily program design and implementation. The program is currently incorporating 8 of the 10 recommendations, and 6 are part of the program’s core design (e.g., developing a program ally network to market the program, targeting marketing to property managers and owners, offering generous product rebates that cover 100% of measure costs to overcome split incentives). Some of the best practices are incorporated to a lesser extent, and might be expanded if budget allows, such as expanding the program’s presence to

²⁵ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

more organizations with similar missions, and better disseminating existing outreach materials to all program allies so each ally can best promote the discussed non-energy benefits of the program.

The best practices findings that hold the greatest potential for program improvement are outlined below. For additional details on the best practices that Ameren Illinois is currently following, please see Appendix E.

Practices that Ameren Illinois Could Expand or Consider Adding

The ACEEE best practice reports offered several recommendations, which Ameren Illinois is not currently following or is following in limited scope but could feasibly adopt or improve in the near future. We discuss these recommendations below.

Partner with organizations with similar missions to market and support multifamily programs

Ameren Illinois is currently attending annual landlord association meetings in the Peoria, IL area, and has identified leads from these venues. However, program administrators noted that the program has not yet partnered with other types of organizations that may be open to working with Ameren Illinois, including housing trade groups or regional property management companies. Through PY9, working with affordable housing groups has not been relevant for the Ameren Illinois program because the Illinois Department of Commerce and Economic Opportunity (DCEO) served income-qualified housing in Illinois. However, those types of groups may become relevant in PY10 when the program assumes responsibility for serving these properties. Collaborating with organizations that property managers trust, such as state and local housing organizations to market or even fund the program can be a way of increasing program reach.²⁶ Organizations that may be of assistance to program administrators include:

- **Financial institutions:** These organizations typically know when multifamily property managers are ready to make upgrades and can serve as a recruitment mechanism for the program.²⁷
- **Affordable housing organizations:** Organizations that typically assist low-income customers include affordable housing groups, housing finance agencies, housing trust funds, and community development financing institutions (CDFIs).²⁸ These organizations also have knowledge about local multifamily markets and the needs of multifamily customers, which can help support marketing efforts.²⁹ In addition, local housing organizations have connections to a network of property managers and program allies and they may be able to alert program administrators when large retrofit projects come down the pipeline.³⁰
- **Housing trade organizations:** Ross et al. (2016) suggest that program administrators should reach property managers through sources they trust, such as housing trade associations as a way to increase program participation.³¹ Midwest-based CenterPoint and Colorado-based Xcel follow this practice by

²⁶ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

²⁷ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

²⁸ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

²⁹ Ibid.

³⁰ Ibid.

³¹ Ibid.

marketing their multifamily programs in their local Multifamily Housing Association’s monthly magazine.³² In PY8, Ameren Illinois began presenting information about the Ameren Illinois Multifamily property manager associations’ meetings. According to program staff, these meetings were a “target-rich environment” that generated several new leads for the Multifamily Program.

- **Regional housing companies:** Arizona Public Service (APS) has achieved high participation rates by marketing specifically to owners of multifamily housing companies that operate in their region.³³ Indiana Power and Light (IPL) networks with the Indianapolis Apartment Association and build relationships with regional managers and property owners in addition to individual property managers.

Considerations

- Ameren Illinois should continue to build on efforts to market the Multifamily Program through housing trade associations by advertising in publications developed by these associations. Ameren Illinois could increase program reach by partnering with new organizations that have access to a wide variety of properties, such as regional housing companies and financial institutions.
- When the program begins offering a low income component in PY10, Ameren Illinois and its customers may benefit from the utility reaching out to partner with agencies that serve low income customers such as affordable housing groups and CDFIs. Ameren Illinois can work with these organizations to market the program to low income customers and potentially leverage funds from these organizations for multifamily upgrades to expand savings and provide social benefits.

Effectively communicate the benefits of energy efficiency upgrades to property managers and owners.

The central goal of any program outreach and recruitment effort is to convey the program’s value proposition and entice interested customers in making efficient upgrades through the program. Comprehensive communications strategies will cover both energy benefits and non-energy benefits (see sidebar), and offer both pre-participation and post-participation contacts to nurture the client relationship to ensure sustained energy savings and customer satisfaction.

For example, program marketing materials are designed to clearly communicate the value of participating in a program and to provide instructions about how to participate in it. Including a discussion of non-energy benefits can enhance the “value proposition” messaging.³⁴

Revisiting property managers *after* upgrades have been installed can reinforce participants’ understanding of the savings associated with their upgrades and motivate them to

Non-Energy Benefits of Multifamily Programs

The benefits that programs can market to property managers and owners include reduced building maintenance costs, increased tenant comfort, reduced water usage, improved indoor air quality, improved fire safety, reduced tenant turnover, lower unit vacancy costs, and greater temperature control. Energy efficiency upgrades can also help make multifamily buildings more marketable and attract tenants. Furthermore, completing energy efficient upgrades can help prepare property managers for future code changes.

³² Ibid.

³³ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

³⁴ Ibid.

install more upgrades in the future.³⁵ This can be done by providing managers with their building energy use data. Building energy use benchmarking requirements are expected to become more common in the future, and giving property managers access to their data can help prepare them for benchmarking their buildings. In terms of follow up check-ins to market additional upgrades to property managers, follow-ups could be completed either as part of the QA/QC process or other, more informal follow ups. Mckibbin (2013) suggests doing a follow-up up to one or two years after the upgrades have been completed.³⁶

In line with this guidance, Ameren Illinois currently highlights several non-energy benefits in the brochures used to market the Multifamily Program to property managers. These benefits include lower operating costs, improved property value, increased comfort for tenants, and improved tenant retention. Additionally, Ameren Illinois, along with other utilities, recently joined an initiative led by the Department of Energy to facilitate sharing aggregated energy usage data with customers. This effort, called the Green Button Initiative, is designed to help share energy usage data with customers after upgrades have been completed.³⁷ Ameren Illinois currently does not share this information with properties that have completed program upgrades. Overall, while Ameren Illinois is currently taking several steps to communicate the benefits of energy upgrades with their multifamily customers, we identified opportunities for Ameren Illinois to further improve their communications:

Considerations

- Consider instituting a *formalized* process to follow up with multifamily customers about their energy usage after upgrades have been installed. Program administrators could use efforts like the Green Button Initiative to share aggregated energy usage data with customers.
- Program administrators should ensure *that* they advertise the full suite of non-energy benefits associated with installing energy efficient upgrades when they market the program to customers. The program should consider highlighting additional non-energy benefits in program marketing materials. These benefits include reduced water usage, improved indoor air quality, improved fire safety, greater temperature control, and proactive preparation for future code changes.

Standardize data tracking and reporting methods over the program lifespan and track participation data by market segment

Ross et al. (2016) reported that many utilities do not know the total number of multifamily units that are eligible for energy efficient upgrades in their service territories and that this is especially true for affordable housing units.³⁸ Furthermore, Ross et al. (2016) found that when program administrators need to turn customers away because they exhaust the measure offerings and budget for the program year, they rarely keep a waiting list for customers.³⁹

³⁵ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

³⁶ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

³⁷ Ibid.

³⁸ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

³⁹ Ibid.

A best practice for handling these situations is for program administrators to keep a waiting list of customers that enables them to re-contact interested parties in future program years. Some programs track participation by-unit for their direct install measures but by-project for their comprehensive measures. These tracking and reporting differences within programs make it difficult to make comparisons of participation data across programs. ACEEE suggests that program administrators should follow standard reporting procedures for all elements of their program, as well as over time (to the extent practicable) to allow for easy year-over-year comparisons as well as comparisons between programs.

Considerations

- Ameren Illinois reported needing to turn away customers from the AIC major measures component in PY9. If this happens again in the future, program administrators may want to keep a list of contact information for customers they turn away due to funding shortages.

Identify opportunities for aligning energy efficiency upgrades with larger building renovation projects

Comprehensive energy efficiency upgrades, such as upgrades to building shell measures, can be an inconvenience to tenants; additionally, deeper upgrades often require project financing.⁴⁰ As such, major energy-efficiency upgrades can be made more palatable to property managers and owners if the timeline can be adapted to coincide with other planned major building upgrades. Furthermore, reaching out to property managers during building renovation periods is especially important for affordable multifamily housing complexes because the financing available for these complexes often runs on strict timelines. For example, owners of multifamily complexes built using the Low Income Housing Tax Credit must wait for a period of 15 years after construction or renovation before they can change the financing structure of the project, which poses challenges to for securing capital to make energy efficient upgrades.⁴¹

Considerations

- Program administrators may benefit from maintaining contact with property managers to stay up to date about when properties are scheduled for major renovations. Keeping an updated pipeline of potential participants could also help the program identify additional opportunities for major measures upgrades.

Best Practices to Consider

The ACEEE best practice reports offered several additional recommendations that, although more extensive, are items that Ameren Illinois may be able to consider as part of a broader program redesign or modification. Because these recommendations are not immediately transferrable to the program as-implemented in PY9, we convey these best practices as information to consider for the future.

⁴⁰ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

⁴¹ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

Offer an energy audit paired with upgrades that are customized to the participant

Several program administrators, including Puget Sound Energy and Energy Trust of Oregon, offer a customized approach to their multifamily customers. These programs offer energy audits as well as incentives to complete measure upgrades suggested during the audit.⁴² In addition, the California IOUs are testing Energy Upgrade California pilots that provide custom comprehensive upgrades for multifamily buildings.⁴³ In those pilots, the customer is allowed to request incentives for any property upgrade that they install as part of a pre-approved package of upgrades that meets at least 10% building energy savings overall. Energy audits work well in combination with custom program approaches as they help deliver upgrades that are targeted to the customer. In addition, energy audits can be used as a tool to encourage customers to complete more extensive energy efficient upgrades as they can provide suggestions for low and no cost upgrades, while also providing customers with recommendations for deeper retrofits.⁴⁴

Considerations

- Ameren Illinois could consider using part of this best practice within the current design. Specifically, offering energy audits to customers before performing upgrades could help increase customer knowledge about energy efficient upgrades and provide a channel to getting the customer to complete more work down the line, on their own.

Develop program offerings for both market rate and low income buildings

Programs serving low-income multifamily residents should offer specific measures and technical assistance that meet unique needs of low-income customers.⁴⁵ Efficiency Vermont offers measures that specifically cater to low-income residents in addition to offerings for customers in market rate housing.⁴⁶ Efficiency Vermont's measure offerings targeted at low income customers include weatherization measures and deep retrofits. Furthermore, low income properties often have more opportunities to access financing for energy efficiency upgrades; program administrators can provide support to low income property managers by helping them identify and navigate these sources of funding.⁴⁷

The Ameren Illinois Multifamily Program will begin serving low-income customers in PY10, so has not yet needed to make use of this guidance. For more detailed guidance about designing programs to serve low income multifamily customers please see Opinion Dynamics' 2017 Literature Review of Low-Income Programs prepared for AIC.⁴⁸

Considerations

⁴² ACEEE. (2014). Recommendations and Best Practices for Revising Incentive Structure. Retrieved from <http://aceee.org/sites/default/files/pdf/revising-incentive-structure.pdf>

⁴³ Opinion Dynamics. (2014). SCE/SoCalGas Energy Upgrade California Multifamily Pilot Evaluation. Retrieved from http://www.calmac.org/publications/SCE_SoCalGas_EUC_MF_Pilot_Final_Report_2017-05-16.pdf

⁴⁴ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁴⁵ Ibid.

⁴⁶ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁴⁷ Ibid.

⁴⁸ Opinion Dynamics. (2017). Literature Review of Low-Income Programs. Memorandum delivered to AIC and ICC staff on August 25, 2017.

- As Ameren Illinois begins serving income-qualified properties, they may find it helpful to do some preliminary customer research with property owners in the area to learn their needs and constraints so that program design effectively provides the most-valued savings opportunities to this new sector. Ameren Illinois may also want to use its existing connections with landlord groups as an informal market research opportunity.

Expand offerings for comprehensive upgrades through escalating incentives and offering financing options

Several reports suggested offering retrofits that are more extensive, in that they require more time, expertise, and cost to complete, while providing higher savings per building.⁴⁹ These extensive retrofits include HVAC measures, whole building and building shell measures, and replacing outdated building systems.⁵⁰ Such retrofits are especially common among more mature programs that have been offering incentives for 20+ years.⁵¹ The Ameren Illinois Multifamily Program already offers air sealing and insulation through the Ameren Illinois major measures component. If Ameren Illinois is interested in expanding the major measures component of the Multifamily Program, the added cost may be a concern given that the program is currently designed to offer 100% rebates on major measures.

There are several options for financing these retrofits so that cost may be shared with the customer. First, programs can offer escalating incentives that vary with the savings potential of the retrofit.⁵² To some extent, the Ameren Illinois Multifamily Program already follows this method, offering rebates on the basis of measure quantity and efficiency level. Second, programs can assist customers with finding financing options for deeper retrofits. Providing customers with on-bill or low-cost financing can help customers take on more extensive upgrades and spread payments over the lifetime of the project than they would be able to do with conventional financing.⁵³

Considerations

- Ameren Illinois could consider offering financing for major measures as a pathway to increasing the number of customers the program is able to serve each year, or as a way to offer add-on major measures through the program such as HVAC measures, energy management systems, or custom upgrades. Although Ameren Illinois stopped offering incentives for some of these measures in previous program years, there may be opportunities to leverage other Ameren Illinois programs, such as the HVAC Program, to revisit the potential of offering these measures in a more cost-effective manner than was previously possible.
- If Ameren Illinois brings back larger replace-on-failure measures (e.g., HVAC systems) to find additional savings, consider building some temporal flexibility into the offering. Early program experience showed that property managers were not ready to replace their HVAC systems when they first learned of the Multifamily Program, but there may be value in exploring a design that leverages the first point of

⁴⁹ ACEEE. (2014). Recommendations and Best Practices for Revising Incentive Structure. Retrieved from <http://aceee.org/sites/default/files/pdf/revising-incentive-structure.pdf>

⁵⁰ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁵¹ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

⁵² Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁵³ Ibid.

contact with managers to make them aware of a stand-alone efficient HVAC offering that they could return to when they need to replace a failing unit.

3.2.2 Program Ally Interview Key Findings

Multifamily Program allies play an important role in marketing and implementing the Ameren Illinois Multifamily Program's major measure offerings including air sealing and insulation. Furthermore, program allies offer a key perspective on the multifamily property market. Program ally firms fell into two sets— "active" allies and "less-active" allies—based on their self-reported descriptions about their relative involvement in, and dependence on, the IPA program to generate business. In comparison to less active allies, active allies reported the program had a larger influence on their business practices as their multifamily work in the Ameren Illinois service territory increased greatly after they enrolled in the program. All program allies enrolled in the program have businesses that primarily offer building shell and HVAC upgrades to their customers.

Our July 2017 interviews with five program allies investigated program allies' success in bringing projects into the program, program ally satisfaction, any impacts of program participation on program ally business and practices, and program allies' suggestions for program improvement. We also asked program allies to think back over their tenure within the program to reflect on their experiences. The team used information from these interviews to understand energy efficient product saturation in the multifamily market from the program allies' perspective, and to learn how program changes over time may have affected allies. Overall, program allies were highly satisfied with the PY9 Ameren Illinois Multifamily Program. On a scale of 0 (not at all satisfied) to 10 (extremely satisfied), allies provided an average rating of 8.6, with the lowest rating being a 7 (n=5). Furthermore, all allies that reported the percentage of multifamily upgrade situations in which they complete air sealing and install high-efficiency insulation increased greatly after they began participating in the Multifamily Program. Furthermore, all allies reported the total volume of air sealing and high efficiency insulation projects they completed in AIC service territory also increased greatly after they joined the program.

Program allies reported they face challenges finding cost-effective savings opportunities as many of the easier-to-serve properties have already received upgrades through the program. Program allies also cited program disruptions as a barrier to delivering the program. Program allies offered several suggestions for overcoming the current challenges they face with implementing the program. To address market saturation, allies identified low-income multifamily buildings, small towns, smaller complexes, and gas customers as market segments that still offer savings opportunities. Program allies noted that to capitalize on opportunities for achieving additional savings in multifamily buildings, program guidelines for qualifying air sealing and insulation projects would need to change, and/or the program would need to add additional measures. Additional measure suggestions included air source heat pumps, crawl space insulation, fans and air circulation measures, attic insulation with higher R-values, and insulating around "knob and tube" wires.

We delivered a stand-alone findings memo providing full details of these findings to AIC in August 2017; for convenience, a copy of this memo is presented in Appendix F.

3.3 Impact Assessment

To estimate ex post gross savings for the IPA Program⁵⁴, the evaluation team applied in-service rates and savings algorithms from the IL-TRM V5.0 to the program-tracking database. The evaluation team applied the SAG-approved NTGRs to ex post gross savings to determine ex post net impacts.

3.3.1 Measure Verification

The program offers a variety of measures to participants, including common area LED exit signs, occupancy sensors, and building shell retrofits. The evaluation team completed a thorough review of the program-tracking database to determine ex ante, audited, and verified quantities for each measure (Table 14). The ex ante quantity represents the original quantity provided by the implementer to the evaluation team while the audited quantity accounts for any corrections in measure quantities discovered by the evaluation team and confirmed by the implementation team during the database review. Overall, the audited measure quantities closely matched ex ante quantities. However, we adjusted the ex ante quantities for the air sealing measure which resulted in a 0.01% increase in the overall cubic feet per minute (CFM).⁵⁵ To determine the verified measure quantities, the evaluation team applied in-service rates provided in the IL-TRM V5.0 to audited measure quantities.

Table 14. PY9 IPA Multifamily Program Verified Measure Quantities

Measure	Unit	Ex Ante Quantity	Audited Quantity	In-Service Rate	Verified Quantity
Air Sealing - Electric Heat	CFM	5,847,736	5,848,336	100%	5,848,336
Ceiling Insulation R-11 to R-49 - Electric Heat	Sq. Ft.	4,133,288	4,133,288	100%	4,133,288
LED Exit Sign	Exit Sign	151	151	100%	151
Occupancy Sensor	Sensor	81	81	100%	81
Total		9,981,256	9,981,856	100%	9,981,856

3.3.2 Ex Post Gross Impact Results

The total ex post gross savings impacts for the PY9 IPA Multifamily Program are 14,741 MWh and 1.68 MW. As shown in Table 15, the gross realization rates of 102% for energy savings and 108% for demand savings indicate that there is close overall alignment between the program-wide ex ante and ex post gross energy and demand savings.

Table 15. Total PY9 IPA Multifamily Gross Savings and Realization Rates

Program	Ex Ante Gross ^a		Ex Post Gross		Gross Realization Rate ^b	
	MWh	MW	MWh	MW	MWh	MW
IPA Multifamily	14,480	1.55	14,741	1.68	102%	108%

^a Source of ex ante savings: PY9 program-tracking database

^b Gross Realization Rate = ex post gross value ÷ ex ante gross value.

⁵⁴ In reference to impact evaluation research, "IPA Program" and "The Program" refers exclusively to the IPA Multifamily Program

⁵⁵ The evaluation team corrected a data entry error based on discussions with the implementer.

As shown in Table 16 below, gross energy and demand realization rates vary by measure and range from 96% (insulation MWh) to 449% (occupancy sensor MWh). Realization rates for air sealing and ceiling insulation measures are the driving factors for the slightly elevated realization rates at the program level because these two types of measures collectively account for 99% of ex ante program savings.

Table 16. PY9 IPA Multifamily Gross Impacts by Measure

Measure	Verified Measure Quantity	Ex Ante Gross		Ex Post Gross		Gross Realization Rate ^a	
		MWh	MW	MWh	MW	MWh	MW
Air Sealing - Electric Heat	5,847,336	9,766	1.17	10,166	1.29	104%	110%
Ceiling Insulation R-11 to R-49 - Electric Heat	4,133,288	4,671	0.37	4,484	0.37	96%	100%
LED Exit Sign	151	34	0.01	49	0.01	143%	100%
Occupancy Sensor	81	9	0.005	41	0.02	449%	305%
Total	9,981,856	14,480	1.55	14,741	1.68	102%	108%

Note: Numbers may not total due to rounding.

^a Gross Realization Rate = ex post gross value ÷ ex ante gross value.

At the measure level, differences between ex post and ex ante gross savings stem primarily from the use of different input values for the measures' savings algorithms. Table 17 summarizes the source of differences between ex ante and ex post gross savings.

Table 17. Reasons for Realization Rates per Measure

Measure	Realization Rate		Source of Discrepancy			
	MWh	MW	Project-Specific Input Values	Heating Penalty	Operating Hours	Other
Air Sealing - Electric Heat	104%	110%	✓			
Ceiling Insulation R-11 to R-49 - Electric Heat	96%	100%	✓			
LED Exit Sign	143%	100%		✓		
Occupancy Sensor	449%	305%		✓	✓	<ul style="list-style-type: none"> • Ex post analysis used heating equipment type weights based on program data • Ex ante analysis assumed lower kW controlled, compared to ex post analysis

Through our discussions with the implementer, we identified the sources of differences between ex ante and ex post savings. In some cases, these differences mean that ex ante savings are higher than ex post savings, while in other cases, they mean that ex ante savings are lower than ex post savings. The combination of all inputs brings about the overall realization rate for a specific measure. We describe the differences in ex ante and ex post savings calculations in detail below.

■ **Air Sealing and Attic Insulation Discrepancies:**

■ **Project Specific Input Assumptions:**

- **Location Specific Input Assumptions:** Ex ante analysis was based on Cooling Degree Days (CDD), Heating Degree Days (HDD), Latent Multiplier (LM), and Full Load Cooling Hours (FLH) for the city of Springfield, IL, regardless of the actual project location. In the ex post savings analysis, the evaluation team used CDD, HDD, LM and FLH values specific to each property's city and number of stories, as provided in the program-tracking database. In comparison to the city-specific analysis, the inputs for Springfield were not representative of the population in PY9; for example, the average HDD for the PY9 population was 3,988, which is lower than the Springfield value of 4,379. Accordingly, ex ante analyses based on Springfield, IL overestimated savings.
- **Heating Equipment Specific Input Assumptions:** The implementer assumed a weighted average value for inputs dependent on heating equipment type or age, such as SEER, COP, and Coincidence Factor (CF). The ex ante weights assumed a heating equipment mix of 55% electric resistance, 40% gas heating, and 5% heat pumps (unsourced). Alternatively, the evaluation team utilized project-specific heating equipment data to develop the relevant input assumptions. For instance, where the implementer assumed an average SEER of 11.05 across all projects based on the assumed ex ante weights, the evaluation team estimated savings using equipment age and efficiency at the individual project level. The average SEER, informed by the PY9 project data was 10.86, a 2% decrease from the assumed ex ante value. This ex post change resulted in a slight increase in savings.

■ **Lighting Measure Issues:**

- **Electric Heating Penalties:** In calculating ex ante savings, the implementer included electric heating penalties for LED exit signs and occupancy sensors. However, consistent with past evaluations, and per agreements between ICC staff and AIC staff regarding the treatment of waste heat factors, we did not include waste heat factor heating penalties for lighting in the calculation of ex post savings. As a result, ex post savings are higher than those claimed by ex ante.
- **kW Controlled for Occupancy Sensors:** The implementer assumed that each occupancy sensor was connected to a total lighting load of 0.100 kW (the program minimum), while for our ex post analysis, we applied 0.305 kW per the IL TRM V5.0 recommendation for wall-mounted occupancy sensors. Increasing the kW controlled increased ex post kWh savings relative to ex ante kWh savings, and was the key driver to the large realization rates for occupancy sensors.
- **Heating Equipment Specific Input Assumptions:** The implementer assumed weighted averages for inputs dependent on the project heating type, such as waste heat factors (IFkWh). As noted above for air sealing and attic insulation savings calculations, the implementer developed weighted average inputs assuming a mix of 55% electric resistance, 40% gas heating, and 5% heat pumps. The evaluation team calculated new heating weights based upon the HVAC data that was provided for PY9 evaluation and the electric and gas heating weights from the previous year's (PY8) program tracking data. Thus, the evaluation team's ex post weighted averages were based on the true mix of heating types at participating properties: 68% gas heating, 30% electric resistance heating, and 2% heat pump heating. A more detailed calculation methodology is provided in Appendix B.
- **Hours of Use for Occupancy Sensors:** The program implementer applied screw-based hours of use from the IL-TRM V5.0 (5,950 hours/year) instead of the IL-TRM V5.0's recommended fixture-based hours of use (6,138 hours/year) for occupancy sensor measures. As a result, ex post energy savings were higher than ex ante savings.

3.3.3 Ex Post Net Impact Results

The evaluation team calculated PY9 ex post net savings by applying SAG-approved NTGRs to ex post gross savings (see Table 18). Notably, there is a slight difference between gross (102% MWh and 108% MW) and net (101% MWh and 109% MW) realization rates because ex ante savings are rounded when they are reported to the evaluation team.

Table 18. PY9 IPA Multifamily Program Net Impacts

Program	Ex Ante Net		Ex Post Net	
	MWh	MW	MWh	MW
IPA Multifamily	13,584	1.45	13,780	1.58
Net Realization Rate ^a			101%	109%

^a Net Realization Rate = ex post net value ÷ ex ante net value.

4. Key Findings and Recommendations

- **Key Finding #1:** Ex ante savings analysis applied average assumptions for all inputs, rather than location- or project-specific values as recommended in the IL-TRM v5.0. For example, the implementer assumed Springfield, IL for all location-dependent variables, which simplifies analysis but does not accurately reflect the location of each PY9 participant. The ex post analysis utilized each individual project's location to attribute inputs such as Cooling Degree Days (CDD), Heating Degree Days (HDD), and Full Load Cooling Hours (FLHcooling). Additionally, ex ante analysis applied weighted average inputs based on an assumed mix of heating and cooling equipment because primary heating equipment data were not available to the implementation team at the beginning of PY9. A secondary database with HVAC equipment data provided by the implementer for evaluation purposes allowed the evaluation team to apply site-specific assumptions reflecting each site's equipment, such as Seasonal Energy Efficiency Ratio (SEER) and Coefficient of Performance (COP).
 - **Recommendation #1:** The evaluation team recommends that the implementer thoroughly review location-specific and equipment savings assumptions to update these inputs for the next program year. In the case of HVAC equipment, the implementer should apply the appropriate assumptions for savings based on the equipment type and age, if it is available during the program year. With the application of location specific inputs and actual HVAC equipment data, calculated savings will be more representative of actual savings at the project level, and ultimately at the program level.
- **Key Finding #2:** Ex ante gross energy savings for lighting measures, LED exit signs, and occupancy sensors include the waste heat penalties associated with the measure. However, the ex post gross savings analyses, per previous agreements between ICC staff and AIC staff regarding the treatment of waste heat factors, do not include waste heat factors.
 - **Recommendation #2:** We recommend calculating waste heat penalties separate from overall savings to better align with both the IL-TRM V5.0 and ex post analysis.
- **Key Finding #3:** While the IPA Multifamily program relies on program allies to deliver its major measures program offering, a program best practice identified in the program benchmarking exercise, some allies are facing challenges in serving the program as a result of midyear program funding disruptions (PY9 and in past years) and an increasingly-saturated marketplace.
 - **Recommendation #3:** Program staff should work closely with program allies and program implementers in the transition period (if possible) and early in PY2018⁵⁶ to help the allies and implementers plan for and navigate changes. Clear and timely communication is an opportunity to enable the allies to plan for any adaptations needed so they can rely on the program as a dependable part of their business and serve customers in an efficient and effective manner.
- **Key Finding #4:** Most program allies feel that they have already worked through many of the easier-to-serve properties in AIC's service territory and view the remaining buildings as more scattered throughout the territory and less cost-effective to serve. The program benchmarking process identified best practices for addressing saturated markets including expanding offerings for comprehensive upgrades, and promoting them through escalating incentives and financing options.

⁵⁶ PY2018 indicates the program year beginning in 2018.

- **Recommendation #4:** Consider expanding program offerings or guidelines to open-up new cost-effective savings opportunities for program allies. Also consider whether new incentive structures, such as financing options, could help balance the program's budgetary constraints with the need to continue addressing property owners' split incentives.
- **Key Finding #5:** Engaging with organizations that are also involved in multifamily energy efficiency is a best practice for ratepayer-funded programs seeking to expand their reach. Program staff continue to attend annual landlord association meetings in the Peoria, IL area and have identified leads from these venues. In addition, program allies have had success marketing the program by actively recruiting property managers at rental property professional association meetings.
- **Recommendation #5:** Program staff should continue to build on efforts to market the Multifamily Program via existing networks of multifamily organizations by placing advertisements in housing trade association publications or developing new partnerships with organizations that can provide program staff with a single point of access to a wide variety and number of properties, such as regional housing companies and financial institutions.

Appendix A. Data Collection Instruments



PY9 Ameren Illinois
MF Program Ally IDI



PY9 Ameren Illinois
MF Staff Guide.pdf

Appendix B. Engineering Analysis Algorithms

In PY9, the impact evaluation efforts estimated gross impact savings for the IPA Multifamily Program by applying savings algorithms from the IL-TRM V5.0 to the information in the program-tracking database.

We present the algorithms and input variables used to calculate all evaluation program savings below.

Lighting Algorithms

LED Exit Sign

The evaluation team determined ex post LED exit sign savings using the algorithms below. All variable assumptions are from the IL-TRM V5.0 unless otherwise referenced.

Equation 1. LED Exit Sign Algorithms

$$\text{Energy Savings: } \Delta kWh = ((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{Hours} * \text{WHF}_e$$

$$\text{Demand Savings: } \Delta kW = ((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{WHF}_d * \text{CF}$$

Where:

WattsBase	= Wattage of existing incandescent exit sign = 35W
WattsEE	= Wattage of installed LED exit sign = 2.4W
Hours	= Annual operating hours = 8,766 hours/year
WHF _e	= Waste heat factor for energy (accounts for cooling savings from efficient lighting) = 1.14
WHF _d	= Waste heat factor for demand (accounts for cooling savings from efficient lighting) = 1.32
CF	= Summer Peak Coincidence Factor = 1.0

Occupancy Sensor

The evaluation team determined ex post occupancy sensor savings using the algorithms below. All variable assumptions are from the IL-TRM V5.0 unless otherwise referenced.

Equation 2. Lighting Control Occupancy Sensor Algorithms

$$\text{Energy Savings: } \Delta kWh = kW_{\text{controlled}} * \text{Hours} * \text{ESF} * \text{WHF}_e$$

$$\text{Demand Savings: } \Delta kW = kW_{\text{controlled}} * \text{WHF}_d * (\text{CF}_{\text{baseline}} - \text{CF}_{\text{occupancy}})$$

Where:

kW _{controlled}	= Total wattage controlled by each occupancy sensor = 0.305 kW
Hours	= Annual operating hours of light fixtures being controlled = 6,138 hours/year

- ESF = Energy savings factor that represents the reduction in operating hours = 24% (Wall mounted occupancy sensors)
- WHF_e = Waste heat factor for energy (accounts for cooling savings from efficient lighting) = 1.14
- WHF_d = Waste heat factor for demand (accounts for cooling savings from efficient lighting) = 1.32
- CF_{baseline} = Summer Peak Coincidence Factor for fixtures without occupancy sensors = 0.64
- CF_{occupancy} = Summer Peak Coincidence Factor for fixtures controlled by occupancy sensors = 0.15

Lighting Measures Heating Penalty

The evaluation team determined heating penalties using the algorithms below. Based on the agreement between the ICC and AIC, we do not include heating penalties in the ex post energy savings, but include this in the data for the PY9 cost-effectiveness analysis.

Calculation of Heating Equipment Type Shares

Table 19 presents the mixes of heating equipment types provided by the implementer and calculated by the evaluation team during ex post analyses. The evaluation team combined PY9 project level HVAC data with PY8 program tracking data to reach the percentages outlined in Table 19. The team referenced PY8 program tracking data to obtain the share of projects that had electric (32%) or gas (68%) heat. To further break down electric heating types, the team referenced a PY9 file of HVAC data provided by the implementer that showed 95% of properties with electric heat had electric resistance, while 5% had heat pumps. Table 19 represents the combination of these data and compares results to the ex ante assumptions.

Table 19. Heating Equipment Type Shares

Heating Type	Ex Ante Assumed Percent of Projects ^a	Ex Post Assumed Percent of Projects
Gas	40%	68%
Electric Resistance	55%	30%
Heat Pump	5%	2%
Total	100%	100%

^a Ex ante heating type percentages provided by the program implementer

LED Exit Sign Heating Penalties

The evaluation team calculated heating penalties for each type of heating equipment, per the algorithms presented in the IL-TRM V5.0, including the percentage of projects assumed to have that type of equipment, as outlined in Table 19.

Table 20 below includes the specific algorithms.

Table 20. Heating Penalty Algorithms for CAL LED Exit Signs

Measure	Heating Type	Heating Penalty Algorithm
LED Exit Sign	Gas	$\Delta\text{therms} = ((\text{WattsBase}-\text{WattsEE})/1000)*\text{Hours}*\text{-IFTherms}*\%\text{Gas Heat}$
	Electric Resistance	$\Delta\text{kWh} = ((\text{WattsBase}-\text{WattsEE})/1000)*\text{Hours}*\text{-IFkWh ER}*\%\text{Electric Resistance}$
	Heat Pump	$\Delta\text{kWh} = ((\text{WattsBase}-\text{WattsEE})/1000)*\text{Hours}*\text{-IFkWh HP}*\%\text{Heat Pump}$

Where:

- WattsBase = Wattage of existing equipment = 35 W
- WattsEE = Wattage of installed equipment = 2.4 W
- Hours = Annual operating hours = 8,766 hours/year
- IFTherms = Waste heat factor that accounts for the increase in gas space heating due to the decrease in rejected heat from efficient lighting = 0.025
- IFkWh ER = Waste heat factor that accounts for the increase in electric resistance space heating due to the decrease in rejected heat from efficient lighting = 0.596
- IFkWh HP = Waste heat factor that accounts for the increase in heat pump space heating due to the decrease in rejected heat from efficient lighting = 0.259
- %Gas Heat = Percent of projects assumed to have gas heat (Table 19)
- %Electric Resistance Heat = Percent of projects assumed to have electric resistance heat (Table 19)
- %Heat Pump = Percent of projects assumed to have heat pumps (Table 19)

Table 21 summarizes the ex post gross heating penalties for the LED exit signs installed in common areas.

Table 21. Heating Fuel Penalties for LED Exit Signs

Measure	Heating Equipment	ΔkWh	Δtherms
LED Exit Sign	Gas	n/a	-4.86
	Electric Resistance	-50.57	n/a
	Heat Pump	-2.49	n/a

Occupancy Sensor Heating Penalties

The evaluation team determined heating penalties for lighting with reduced hours of use due to the installation of lighting controls. Occupancy sensors installed through this program were fixture-based and placed within interior common areas. Table 22 presents the algorithms used in the ex post analysis to calculate heating penalties for electric resistance heating, heat pump heating, and gas heating types.

Table 22. Heating Penalty Algorithms for Occupancy Sensors

Measure	Heating Type	Heating Penalty Algorithm
Occupancy Sensor	Gas	$\Delta\text{therms} = \text{KW}_{\text{Controlled}}*\text{Hours}*\text{ESF}*\text{-IFTherms}*\%\text{Gas Heat}$
	Electric Resistance	$\Delta\text{kWh} = \text{KW}_{\text{Controlled}}*\text{Hours}*\text{ESF}*\text{-IFkWh ER}*\%\text{Electric Resistance}$
	Heat Pump	$\Delta\text{kWh} = \text{KW}_{\text{Controlled}}*\text{Hours}*\text{ESF}*\text{-IFkWh HP}*\%\text{Heat Pump}$

Where:

- kW_{controlled} = Total wattage controlled by each occupancy sensor = 0.305 kW
- Hours = Annual operating hours = 6,138 hours/year
- ESF = Energy savings factor that represents the reduction in operating hours = 24% (Wall mounted occupancy sensors)
- IFTherms = Waste heat factor that accounts for the increase in gas space heating due to the decrease in rejected heat from efficient lighting = 0.025
- IFkWh ER = Waste heat factor that accounts for the increase in electric resistance space heating due to the decrease in rejected heat from efficient lighting = 0.596
- IFkWh HP = Waste heat factor that accounts for the increase in heat pump space heating due to the decrease in rejected heat from efficient lighting = 0.259
- %Gas Heat = Percent of projects assumed to have gas heat (Table 19)
- %Electric Resistance Heat = Percent of projects assumed to have electric resistance heat (Table 19)
- %Heat Pump = Percent of projects assumed to have heat pumps (Table 19)

Table 23 summarizes the ex post gross heating penalties for lighting controlled by occupancy sensors.

Table 23. Heating Fuel Penalties for Fixtures with Occupancy Sensors

Measure	Heating Equipment	ΔkWh	Δtherms
Occupancy Sensors	Gas Heating	n/a	-7.61
	Electric Resistance	-2,836.16	n/a
	Heat Pump	-3.92	n/a

Air Sealing Algorithms

The evaluation team determined ex post air sealing savings using the algorithms below. All of the assumed input values are from the IL-TRM V5.0 unless otherwise referenced. Since the program only offers air sealing for customers with electric heating, we did not include air sealing savings algorithms for gas heating.

Equation 3. Air Sealing Algorithms

Energy Savings: $\Delta kWh = \Delta kWh_{cooling} + \Delta kWh_{heating}$

$$\Delta kWh_{cooling} = [(((CFM50_{existing} - CFM50_{new})/N_{cool}) * 60 * 24 * CDD * DUA * 0.018) / (1000 * \eta_{Cool})] * LM$$

$$\Delta kWh_{heating} = [(((CFM50_{existing} - CFM50_{new})/N_{heat}) * 60 * 24 * HDD * DUA * 0.018) / (3,412 * \eta_{Heat})]$$

Demand Savings: $\Delta kW = (\Delta kWh_{cooling} / FLH_{cooling}) * CF$

Where:

CFM_existing = Infiltration at 50 Pascals as measured by blower door before air sealing (actual value from database)

CFM_new = Infiltration at 50 Pascals as measured by blower door after air sealing (actual value from database)

N_Cool = Conversion factor from leakage at 50 Pascal to leakage at natural conditions (applied per participant based on location and number of stories listed in IPA program-tracking data)

Table 24. N_Cool by Climate Zone

Climate Zone	N_Cool (by number of stories)			
	1	1.5	2	3
1 (Rockford)	39.5	35	32.1	28.4
2 (Chicago)	38.9	34.4	31.6	28
3 (Springfield)	41.2	36.5	33.4	29.6
4 (Belleville)	40.4	35.8	32.9	29.1
5 (Marion)	43.6	38.6	35.4	31.3

CDD = Cooling Degree Days (applied per participant based on location)

Table 25. Cooling Degree Days by Climate Zone

Climate Zone	CDD 65
1 (Rockford)	820
2 (Chicago)	842
3 (Springfield)	1,108
4 (Belleville)	1,570
5 (Marion)	1,370

DUA = Discretionary Use Adjustment = 0.75

η_{Cool} = Seasonal Energy Efficiency Ratio (SEER) of cooling system (applied per participant based on existing equipment age provided in database)

Table 26. η_{Cool} for Air Sealing Measures

Cooling Equipment Age	CAC/Heat Pump SEER
Before 2006	10.0
After 2006	13.0
Unknown ^a	10.86

^a For measures where the cooling equipment age is not provided in the database (n=8), we calculated an average cooling efficiency based on SEER values derived from measures with cooling equipment age information (n=1,314).

LM = Latent Multiplier to account for latent cooling demand (applied per participant based on project location)

Table 27. Latent Multiplier by Climate Zone

Climate Zone	Latent Multiplier
1 (Rockford)	3.3
2 (Chicago)	3.2
3 (Springfield)	3.7
4 (Belleville)	3.6
5 (Marion)	3.7

N_{heat} = Conversion factor from leakage at 50 Pascal to leakage at natural conditions (applied per participant based on project location and number of stories)

Table 28. N_{Heat} by Climate Zone

Climate Zone	N_{Heat} (by number of stories)			
	1	1.5	2	3
1 (Rockford)	23.8	21.1	19.3	17.1
2 (Chicago)	23.9	21.1	19.4	17.2
3 (Springfield)	24.2	21.5	19.7	17.4
4 (Belleville)	25.4	22.5	20.7	18.3
5 (Marion)	27.8	24.6	22.6	20

HDD = Heating Degree Days (applied per participant based on project location)

Table 29. Heating Degree Days by Climate Zone

Climate Zone	HDD 60
1 (Rockford)	5,352
2 (Chicago)	5,113
3 (Springfield)	4,379
4 (Belleville)	3,378
5 (Marion)	3,438

η_{Heat} = Efficiency of space heating equipment (used actual from database when available)

Table 30. η_{Heat} for Air Sealing Measures

Existing Heating Equipment	Equipment Age	Coefficient of Performance (COP)
Heat Pump	Before 2006	1.70
	2006 - 2014	1.92
	2015 on	2.40
Electric Resistance	n/a	1.00

FLH_cooling = Full Load Cooling Hours of air conditioning (applied per participant based on project location)

Table 31. FLH_cooling by Climate Zone

Climate Zone	FLH_cooling
1 (Rockford)	467
2 (Chicago)	506
3 (Springfield)	663
4 (Belleville)	940
5 (Marion)	820

CF = Summer Peak Coincidence Factor (varies by cooling equipment type)

Table 32. Coincidence Factors by Cooling Equipment

Cooling Equipment	CF
Central Air Conditioner	0.68
Heat Pump	0.72

Attic Insulation Algorithms

The evaluation team determined ex post attic insulation savings using the algorithms below. All input assumptions are from the IL-TRM V5.0 unless otherwise referenced. Since the program only offers air sealing for customers with electric heating, we did not include air sealing savings algorithms for gas heating.

Equation 4. Attic Insulation Algorithms

Energy Savings: $\Delta kWh = \Delta kWh_{cooling} + \Delta kWh_{heating}$

$$\Delta kWh_{cooling} = (((1/R_{old} - 1/R_{new}) * A_{attic} * (1-Framing_factor)) * 24 * CDD * DUA) / (1000 * \eta_{Cool})$$

$$\Delta kWh_{heating} = (((1/R_{old} - 1/R_{new}) * A_{attic} * (1-Framing_factor) * ADJ_{attic}) * 24 * HDD) / (\eta_{Heat} * 3412)$$

Demand Savings: $\Delta kW = (\Delta kWh_{cooling} / FLH_{cooling}) * CF$

Where:

R_{old} = Total attic assembly R-value prior to installing insulation (assumed R-11 or R-19 per implementer. For attic insulation we added R-0.68 (indoor air film) and R-0.15 (3/4" plaster) to account for total assembly R-value.⁵⁷

R_{new} = Total attic assembly R-value after the installation of additional insulation (assumed R-49 per implementer). For attic insulation we added R-0.68 (indoor air film) and R-0.15 (3/4" plaster) to account for total assembly R-value.

Table 33. R-value for Attic Insulation

Measure	Pre R-value	Post R-value
Attic Insulation (R-11 to R-49)	11.83	49.83

A_{attic} = Total area of insulated attic (ft²)

Framing_factor = Adjustment to account for area of framing = 0.07

ADJ_{attic} = Adjustment for attic insulation to account for prescriptive engineering algorithms over claiming savings = 80% (cooling) and 60% (heating)

CDD = Cooling Degree Days (applied per participant based on project location)

Table 34. Cooling Degree Days by Climate Zone

Climate Zone	CDD 65
1 (Rockford)	820
2 (Chicago)	842
3 (Springfield)	1,108
4 (Belleville)	1,570
5 (Marion)	1,370

DUA = Discretionary Use Adjustment = 0.75

⁵⁷ We used the ASHRAE Isothermal Planes method (page 27.3, ASHRAE Fundamentals, 2013) to determine the R-values for indoor air film and 3/4" plaster.

η_{Cool} = Seasonal Energy Efficiency Ratio (SEER) of cooling equipment (applied per participant based on existing equipment age provided in database)

Table 35. η_{Cool} for Attic Insulation Measures

Cooling Equipment Age	CAC/Heat Pump SEER
Before 2006	10.00
After 2006	13.00
Unknown ^a	10.86

^a For measures where the cooling equipment age is not provided in the database (n=8), we calculated an average cooling efficiency based on SEER values derived from measures with cooling equipment age information (n=1,314).

HDD = Heating Degree Days (applied per participant based on project location)

Table 36. Heating Degree Days by Climate Zone

Climate Zone	HDD 60
1 (Rockford)	5,352
2 (Chicago)	5,113
3 (Springfield)	4,379
4 (Belleville)	3,378
5 (Marion)	3,438

η_{Heat} = Efficiency of space heating equipment (applied per participant based on existing heating equipment type and age)

Table 37. η_{Heat} for Attic Insulation Measures

Existing Heating Equipment	Equipment Age	Coefficient of Performance (COP)
Heat Pump	Before 2006	1.70
	2006 - 2014	1.92
	2015 on	2.40
Electric Resistance	n/a	1.00

FLH_cooling = Full Load Cooling Hours of air conditioning (applied per participant based on project location)

Table 38. FLH_cooling by Climate Zone

Climate Zone	FLH_cooling
1 (Rockford)	467
2 (Chicago)	506
3 (Springfield)	663

Climate Zone	FLH_cooling
4 (Belleville)	940
5 (Marion)	820

CF = Summer Peak Coincidence Factor (varies by cooling equipment type)

Table 39. Coincidence Factors by Cooling Equipment

Cooling Equipment	CF
Central Air Conditioner	0.68
Heat Pump	0.72

Appendix C. Cost Effectiveness Inputs

Table 40 presents total gross impacts for IPA Multifamily Program cost-effectiveness calculations. These values differ from those included in the main report due to the inclusion of heating penalties for lighting measures. This approach was taken based on discussions with IPA and past agreements between AIC and ICC staff that heating penalties would not be included in savings calculations for goal attainment. After the application of waste heat factors, a heating penalty of 14,768 kWh reduced the overall gross program savings to 14,725,734 kWh and included a 1,352 therms heating penalty.

Table 40. PY9 WNCF Gross Impacts (Including Heating Penalties)

	kWh	kW	Therms
Gross Savings	14,740,502	1,682	n/a
Heating Penalty	-14,768	n/a	-1,352
Gross Savings with Heating Penalty	14,725,734	1,682	-1,352

Lighting Heating Penalty

The inclusion of waste heat factors for lighting is based on the concept that heating loads are increased to supplement the reduction in heat that was once provided by the existing, less-efficient lamp type (in the case of bulb replacement) or by the lamps previously used for more hours per day when space was unoccupied (in the case of occupancy sensors). The heating fuel types for interior common areas were assumed to be 68% gas, 30% electric, and 2% heat pump per ex post calculated assumptions, outlined in Appendix B. The evaluation team calculated heating penalties for 151 LED Exit Signs, and 81 occupancy sensors resulting in total gross heating penalties of 14,725,734 kWh and 1,352 therms. Table 41 summarizes the heating penalties for these two measures.

Table 41. Total Heating Penalties by Measure

Measure	kWh	Therms
CAL LED Exit Sign	-8,011	-734
Occupancy Sensor	-6,757	-619
Total Heating Penalty	-14,768	-1,352

Note: Numbers may not total due to rounding

Appendix D. Benchmarking Literature Review Detailed Methods

Benchmarking Approach

The evaluation team saw the conclusion of the program's ninth year of operation as an opportunity to reflect on the program's successes over time and determine which lessons-learned can help shape the path forward for the program. We completed a program benchmarking exercise by synthesizing past performance reports, assessing current performance in light of past results, and comparing the program to its peers—all with the goal of arming program administrators with knowledge to enhance program design and implementation in the future.

This memo reports draft results of an Ameren Illinois Multifamily program benchmarking analysis covering the eight program years spanning 2008 through May 2016 (PY1 through PY8). Benchmarking can draw on a variety of sources at any level of detail; given our PY9 evaluation resources, we used secondary sources identified through a review of the literature and focused on high-level program metrics.

We focused on answering the following research questions:

- What progress towards program goals has the Ameren Illinois Multifamily Program made since PY1?
- How does Ameren Illinois' Multifamily Program compare to other ratepayer-funded multifamily programs from other parts of the United States, in terms of factors like market and housing characteristics, program goals, and program design and implementation?
- How do the Ameren Illinois Multifamily Program's outcomes compare to those achieved by similar multifamily programs?
- What best practices have been key to the Ameren Illinois Multifamily Program's success over time (and therefore may be important to carry forward)?
- Are there any lessons-learned from other programs that Ameren Illinois could start following to enhance program design and implementation to achieve additional persistent savings?

Methods

We followed best practices for program benchmarking.⁵⁸ These best practices include using program objectives to guide the benchmarking process, selecting metrics to measure progress towards these objectives, developing a plan for data collection, and comparing the program's processes and outcomes to those of other similar programs. Benchmarking can be completed from a variety of perspectives. For this analysis, we completed benchmarking in terms of the program's historical performance and in terms of its relative performance in the multifamily sector. Throughout the report, we summarize these two types of assessments:

- **Historical Performance:** We reviewed the program's achievements over time in the context of any changes in its goals and budget. To complete this, we reviewed Ameren Illinois Multifamily Program implementation

⁵⁸ For example, the U.S. DOE Better Buildings 2015 white paper, "Guide for Benchmarking Residential Energy Efficiency Program Progress with Examples," available at <https://www.veic.org/documents/default-source/resources/reports/veic-guide-for-benchmarking-residential-energy-efficiency-program-progress.pdf?sfvrsn=2>

plans and program evaluations from PY1 (2008) through PY8 (2015/2016). We compiled historical performance metrics that were available for each program year, including budget, participation, savings, measure mix, and researched net-to-gross (NTG) ratios.⁵⁹

- Peer Comparisons:** We compared the Ameren Illinois Multifamily Program to “peer” programs (i.e., other administrators’ programs that serve multifamily markets in other parts of the country). To complete this, we gathered reports by the American Council for an Energy Efficient Economy (ACEEE).⁶⁰ The ACEEE reports identified and compared several multifamily programs from New England, California, and other parts of the country that ACEEE determined were “representative” programs. To these, we also added recent program evaluation reports from other Illinois multifamily programs. We focused our attention on cases where lessons-learned seemed transferrable to Ameren Illinois based on similarity in programs’ scope, funding, regulation, and other attributes that influence program design and goals.

Additionally, we selected a set of high-level program metrics to compare over time and across programs. We used our research questions, suggestions for metrics of interest from program and implementation staff, and a review of metrics reported in ACEEE benchmarking reports to select benchmarking metrics. The metrics cover program design, implementation, and results across programs. Table 42 shows the metrics we used.

Table 42. Program Metrics Used for Internal and External Benchmarking

Category	Metric	Historical Performance	Peer Comparisons
Context	Multifamily markets (eligible units and units served)		✓
Program Design and Implementation	Delivery model	✓	✓
	Budget	✓	✓
	Measure offerings	✓	✓
Achievements	Annual savings	✓	✓
	Annual participation	✓	✓
	Cumulative participation as a percentage of building stock		✓
	Net-to-Gross Ratios	✓	

Finally, during our assessment, we took note of best practices for designing and implementing multifamily programs and later assessed Ameren Illinois’ progress towards adopting each one. This best-practice review serves as a list of action items that Ameren Illinois may be able to take to ensure continued success.

Selecting Peer Programs for Comparison

A brief search for multifamily energy efficiency programs in the United States shows that 32 of the 51 largest U.S. electric utilities offer multifamily energy efficiency programs.⁶¹ It was beyond the scope of our effort to review each of these 32 programs. As a result, we relied on existing program syntheses to identify

⁵⁹ For program administrators that track individual programs’ goal achievement as a performance metric, reviewing historical goal achievement can be part of this exercise. However, given that AIC manages to a portfolio-level goal as opposed to program specific goals, we do not report on program year goal achievement over time.

⁶⁰ See ACEEE’s series of reports published under their Multifamily Energy Efficiency Project. <http://aceee.org/multifamily-project>

⁶¹ Relf, G., S. Nowak, and B. Baatz. (2017). Utility Energy Efficiency Scorecard. Retrieved from: <http://aceee.org/research-report/u1707>

representative energy efficiency programs against which we could compare the Ameren Illinois Multifamily Program.

We reviewed seven synthesis reports on multifamily energy efficiency program best practices^{62,63,64,65,66,67,68}. From these, we determined whether the programs summarized in the reports were comparable to the Ameren Illinois Multifamily Program. We retained programs that met at least one of two criteria:

- the program serves multifamily properties in the state of Illinois, and/or
- the program was identified as a best-in-class program by Ross et al. (2016).⁶⁹

Table 43 contains the seven programs that we compared to the Ameren Illinois Multifamily Program.

⁶² ACEEE. (2014). Recommendations and Best Practices for Revising Incentive Structure. Retrieved from <http://aceee.org/sites/default/files/pdf/revising-incentive-structure.pdf>

⁶³ Cluett, R., & Amann, J. (2015). Multiple Benefits of Multifamily Energy Efficiency for Cost-Effectiveness Screening. Retrieved from <http://aceee.org/research-report/ie1502>

⁶⁴ Farley, K., & Mazur-stommen, S. (2014). Saving Energy with Neighborly Behavior: Energy Efficiency for Multifamily Renters and Homebuyers. ACEEE White Paper. Retrieved from <http://aceee.org/sites/default/files/pdf/white-paper/saving-energy-with-neighborly-behavior.pdf>

⁶⁵ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁶⁶ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

⁶⁷ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

⁶⁸ Vermont Energy Research Organization. (2014). Guide for Benchmarking Residential Energy Efficiency Program Progress. Retrieved from <https://energy.gov/eere/better-buildings-residential-network/downloads/guide-benchmarking-residential-energy-efficiency>

⁶⁹ Ross et al.'s paper focused on programs that embody typical multifamily program characteristics seen throughout the United States, in terms of program design, budget and participation. We determined that the programs which Ross et al. (2016) identified are all similar enough to the Ameren Illinois program to provide a good basis of comparison: notably, like the Ameren Illinois' Multifamily Program, all have dual fuel offerings, offer direct install and major measure components, and realize a high energy savings per unit.

Table 43. Ameren Illinois' and Comparison Multifamily Programs and Budgets

Utility, Program, and State	Year Compared	Total Annual Budget	Marketing Budget
Ameren Illinois: AIC and IPA Multifamily (IL)	2016	\$17,176,270	\$25,807
BayREN: Multifamily Building Enhancements (CA)	2015	\$9,003,227	\$146,339
Con Edison: Multifamily Energy Efficiency Program (NY)	2015	\$12,000,000	\$325,000
National Grid: Multifamily Retrofit + Low Income Retrofit (MA)	2014	\$44,023,522	\$459,301
National Grid: Energywise Multifamily + Income Eligible Multifamily (RI)	2014	\$7,697,800	Unknown
Puget Sound Energy: Multifamily Existing (WA)	2014	\$13,697,885	Unknown
ComEd, Nicor Gas, and People's Gas: Multifamily Comprehensive Energy Efficiency Program (IL)	2013	\$19,000,000	\$300,00
CNT Energy Savers Program (IL)	2012-2013	\$5,269,0942	\$2,505,951

Sources:

BayREN, ConEd, DCSEU, NGRID MA, NGRID RI, Puget Sound Energy: Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

Ameren Illinois: Opinion Dynamics. (2017). Evaluation of the 2016 (PY8) Illinois Power Agency Residential Multifamily Program. Retrieved from http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU_Eval_Reports_PY8/PY8_AIC_Multifamily_Evaluation_Report_FINAL_2017-02-21.pdf

CNT Energy Savers and ComEd, Nicor, and People's: Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

Best Practice Compilation

The evaluation team organized and analyzed reports in the qualitative data analysis software NVIVO. Before starting the qualitative analysis, we selected specific themes to look for in each report. These themes corresponded with the research objectives and included:⁷⁰

- General best practices and strategies to overcome barriers aggregated from multiple programs (without specific relevance to Ameren Illinois)
- Strategies for increasing program participation in saturated markets
- Best practices with relevance for Ameren Illinois' Multifamily Program
- Case studies of how other individual multifamily programs employ best practices

We did not record best practices that fall outside Ameren Illinois' decision-making authority. For example, we did not include best practice suggestions for changing cost effectiveness test requirements because the Illinois Commerce Commission (ICC) has jurisdiction over cost-effectiveness testing requirements, not Ameren Illinois.

⁷⁰ Additional themes were added throughout the literature review process so there may be some overlap between themes.

Appendix E. Additional Benchmarking Report Best Practices

Practices that Ameren Illinois is Currently Following

The ACEEE best practice reports offered several recommendations, which Ameren Illinois is currently following with the implementation of their Multifamily Program. In this section, we discuss how the Multifamily Program is currently following each best practice recommendation as well as include suggestions for how the program can continue moving forward with each best practice. These best practices include:

Partner with program allies to implement and market the program

Collaborating with program allies can increase the program's reach and provide mutual benefit to both the allies and the administrator. Allies often bring access to a network of customers in the program administrator's service territory, and through their process of reaching out to customers to market the program, the allies boost program engagement and generate additional business for their company.⁷¹ The Ameren Illinois Multifamily Program follows this best practice and relies on program allies to deliver the major measures program offering. Program allies are responsible for generating leads, enrolling customers and completing installations for the major measures component of the Ameren Illinois Multifamily Program.

Mckibbin (2013) emphasizes that once a program is using program allies, their ability to foster relationships with multifamily customers becomes a vital way to encourage program participation. Given the importance of ally-driven participation, it benefits the administrator to consider program ally perspectives when considering a design change⁷². Where program changes are needed, minimizing funding disruptions and providing program allies and other implementers time to adapt to the new format can minimize risks of the program not meeting its annual goals or, in the long term, hurting relationships with these vital program partners.

Considerations

- Ameren Illinois should continue to use program allies to market and deliver the program to customers.
- Ameren Illinois program administrators should work closely with program allies and program implementers in PY10 when the program is expected to undergo changes. Coordinating with implementers and program allies will help ensure that program changes appear seamless from the customer's perspective.

Integrate direct install measures with more comprehensive program offerings

Multifamily properties involve a variety of building systems, each of which presents a different type of energy-saving opportunity. Programs that offer upgrades for only one building system miss the opportunity to achieve a complete upgrade while they are on site. Additionally, multifamily properties may have a challenge securing capital and this poses a barrier to achieving deep savings beyond simple retrofits for easily-accessible systems, like common areas and tenant units.

⁷¹ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

⁷² McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

These are sector-wide challenges throughout the country. Some California utilities have tried to achieve deeper savings by offering customers a more custom approach for delivering upgrades. However, early pilots show that designing incentive structures to encourage retrofits that are deeper than what could have been achieved through a simple prescriptive program requires strategic thinking.⁷³ Johnson (2013) recommends an intermediate approach, which could bundle direct install measures with more comprehensive ones (such as building shell measures).⁷⁴ This makes use of early interactions with customers who may initially come into the program via their interest in well-known measures, to encourage them to achieve deeper savings. Direct install components tend to be more palatable for property managers because they are often free or no cost and less intrusive to tenants than more comprehensive upgrades.⁷⁵ Once customers begin to see benefits of direct install measures, they are more likely to install more comprehensive measures or seek out more efficient upgrades when their equipment fails.⁷⁶ The Ameren Illinois Multifamily Programs currently offers both direct install measures and major measure upgrades, effectively capitalizing the opportunity to reach multiple building systems at once.

Considerations

- Ameren Illinois should continue to offer both major measures and direct install offerings to customers.

Offer rebates and program offerings to overcome split incentives

Mckibbin (2013) suggests multifamily programs should offer incentives that are substantial enough to motivate property managers and owners to participate in the program even when they do not directly receive the financial benefits of participating in the program. The Ameren Illinois Multifamily Program offers incentives that essentially cover the entire cost of the upgrades, which addresses the split incentive issue. Furthermore, the program offers measures that result in energy saving benefits in parts of the building where property managers are responsible for paying the energy bills. These measures include common area and major measure upgrades.

Considerations

- Ameren Illinois should continue to offer program measures to overcome split incentives, as this best-practice seems to be working well. This includes offering measures at a rate that is free or low cost to customers and continuing to offer measures that result in economic benefits for property managers.

Conduct market characterization surveys and target marketing to appropriate market segments

Multifamily programs tend to serve a variety of property arrangements, including small, medium, and large complexes. These different property arrangements have implications for program delivery as buildings can vary in terms of important delivery factors such as key decision maker contacts and levels of approval and this

⁷³ Opinion Dynamics. (2014). SCE/SoCalGas Energy Upgrade California Multifamily Pilot Evaluation. Retrieved from http://www.calmac.org/publications/SCE_SoCalGas_EUC_MF_Pilot_Final_Report_2017-05-16.pdf

⁷⁴ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁷⁵ ACEEE. (2014). Recommendations and Best Practices for Revising Incentive Structure. Retrieved from <http://aceee.org/sites/default/files/pdf/revising-incentive-structure.pdf>

⁷⁶ McKibbin, A. (2013). Engaging as Partners in Energy Efficiency: A Primer for Utilities on the Energy Efficiency Needs of Multifamily Buildings and Their Owners. Retrieved from http://www.elevateenergy.org/wp/wp-content/uploads/2014/01/Engaging_as_Partners_in_Energy_Efficiency_Primer_for_Utilities_on_the_Energy_Efficiency_Needs_of_Multifamily_Buildings.pdf

can complicate program marketing and outreach strategies.⁷⁷ Market characterization surveys can help program administrators better understand the market segments in their service territory. Program administrators can then use this information to target each segment by demonstrating the value of the program to the specific segment. In PY7, Ameren Illinois commissioned a characterization of the multifamily housing market within Ameren Illinois' service territory. The market characterization report presents detailed information about the number of multifamily buildings within AIC's service territory as well as the location of these buildings.⁷⁸ Major findings are as follows:

- There are approximately 156,103 multifamily units (3+ occupancy) in the AIC service territory and these units are primarily located in large urban areas. Buildings targeted by the program (3+ units and market rate) tend to be both located on the outskirts of major metropolitan areas (i.e., the suburbs) or in more rural communities and also tend to be smaller (i.e., contain 9 or fewer units). A vast majority (96%) of units in multifamily buildings in Ameren Illinois service territory are occupied by renters, rather than owners.
- According to participating property managers, electricity is the most common space heating (74%) and water heating (67%) fuel type in multifamily buildings within Ameren Illinois' service area.

Considerations

- Ameren Illinois should disseminate findings from the PY7 market characterization report to program allies.

Coordinate program providers and streamline program offerings to simplify customer access to the program

Dual-fuel customers can find it burdensome to participate in separate electric and gas multifamily energy efficiency programs.⁷⁹ As such, developing programs that encompass both gas and electric offerings streamlines the program participation process for property managers.⁸⁰ In addition, program implementers that coordinate back-end systems (e.g., ally networks, marketing materials, tracking datasets, etc.) may be able to improve program effectiveness and achieve efficiencies.

Johnson (2013) also suggests making customer access to the program and technical services offered by the program as simple as possible by providing customers with a single point of contact throughout the program participation process.⁸¹ A single point of contact or "one stop shop" can help customers with application, QA/QC, rebate, and EM&V processes. Furthermore, a single point of contact can help ensure that a program run by multiple utilities or implementers appears as one coordinated program to the customer.

The Ameren Illinois Multifamily Program currently serves both gas both gas and electric customers through the AIC program and electric-only customers through the IPA program. In line with guidance about streamlining customer experience, the program markets the AIC and IPA programs as a singular integrated program.

⁷⁷ Ross, L., Jarrett, M., & York, D. (2016). Reaching More Residents: Opportunities for Increasing Participation in Multifamily Energy Efficiency Programs. Retrieved from <http://aceee.org/research-report/u1603>

⁷⁸ Opinion Dynamics. (2016). Evaluation of the 2014 (PY7) Ameren Illinois Company Residential Multifamily Program. Retrieved from http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU_Eval_Reports_PY7/PY7_AIC_MF_Report_FINAL_2016-01-19.pdf

⁷⁹ Johnson, K. (2013). Apartment Hunters: Programs Searching for Energy Savings in Multifamily Buildings. Retrieved from <http://aceee.org/research-report/e13n>

⁸⁰ Ibid.

⁸¹ Ibid.

While Ameren Illinois' program attempts to streamline the four different actors (Leidos, AIC, ClearResult, and program allies) which currently work together to operate the Ameren Illinois Multifamily Program, the number of actors mean that customers may not always have a single point of contact as they upgrade different building systems. When needed, customers have the option of calling the AIC call center if they have a question during the program participation process, but a true "single point of contact" approach would mean that each customer can reliably call one entity for information from the beginning to the end of their participation.

Considerations

- Ameren Illinois should consider the ways in which it can further enhance customer experience in the program, especially with respect to channeling properties from the implementer to the allies. According to allies, it is becoming more difficult to identify leads and find new savings opportunities. Any additional communication between actors could ensure that no savings opportunities are slipping through the cracks. Without a redesign, it may not be possible to take the most extensive streamlining step of consolidating implementation to a single point of contact that would can usher customers through all stages and elements of the Ameren Illinois program.

Appendix F. Program Ally Research Memo

Memorandum

To: Jonathon Jackson, Ameren Illinois Company; David Brightwell, ICC Staff
From: The Opinion Dynamics Evaluation Team
Date: August 24, 2017
Re: PY9 Multifamily Program Ally Research Findings

Introduction

As the Ameren Illinois Multifamily Program⁸² wraps up its ninth year of operation and Ameren Illinois Company (AIC) looks ahead to the next plan cycle, there is an opportunity to reflect on program successes over time, as well as the future path forward for the program. In particular, program administrators and implementers will need to identify best practices from prior program years, while responding to the new framework established by the Illinois Future Energy Jobs Bill.

Within this context, the evaluation team conducted research with Multifamily Program allies, who play an important role in marketing and implementing the Ameren Illinois Multifamily Program's major measure offerings including air sealing and insulation. Furthermore, program allies offer a key perspective on the multifamily property market. Opinion Dynamics completed interviews with five of the six program allies active in the program during PY9 (i.e., which enrolled at least one property). We used the interviews to investigate program allies' success in bringing projects into the program, program ally satisfaction, any impacts of program participation on program ally business and practices, and program allies' suggestions for program improvement. We also asked program allies to think back over their tenure within the program to reflect on their experiences. The team used information from these interviews to understand energy efficient product saturation in the multifamily market from the program allies' perspective, and to learn how program changes over time may have affected allies.

This memo summarizes the findings from these interviews. Due to the small population of allies, we report all findings in terms of absolute prevalence (e.g., 3/5 indicates 3 of 5 interviewees). We recommend that readers keep the small number of respondents in mind when reviewing the findings.

Program Ally Participation and Firmographics

Program Ally Participation

Program implementation staff reported that the level of program ally participation was adequate to meet program goals for the AIC program, but that the IPA program could have benefitted from enrolling additional

⁸² Funding for major measure upgrades is provided by Ameren Illinois Company (AIC) on the gas side and through the Illinois Power Agency (IPA) procurement process on the electric side. We refer to both the IPA and AIC components together as the "Ameren Illinois" Multifamily Program.

program allies.⁸³ In addition, program implementation staff reported the IPA Multifamily Program began two months late in PY9 due to negotiations between AIC and the program implementer about how to offer the program in a cost-effective way. The program implementer reported that program allies had to shift or lay off work crews in response to the delayed program start. As such, the implementer reported that it would have been beneficial to have additional allies enrolled in the program when the program came back online.

Program allies had varying reasons for becoming involved in the program. Most allies (3/5) were primarily looking for business opportunities after they became Building Performance Institute (BPI) certified. Two allies were introduced to the program at an industry group meeting (a conference and a trade show) and began completing projects through the program shortly thereafter. Individual allies also mentioned that they got involved with the program as a result of previous experience with the program through a different organization (1/5) or because they viewed the program as a good business opportunity (1/5). As of today, most allies (4/5) are requesting program incentives for all of the multifamily projects they complete in AIC service territory. One ally serves additional types of multifamily buildings that do not qualify for incentives through the multifamily program.

Program Ally Firmographics

Ameren Illinois Multifamily program allies all operate relatively similar types of businesses, with all interviewed allies (5/5) primarily offering building shell and HVAC upgrades to their customers. Three allies only offer insulation, air sealing, and air infiltration measures. The remaining two allies also offer additional services including roofing, HVAC, plumbing and pool services. Interviewed allies complete all or most of their work in the residential sector, with three of the five also working on projects in light commercial buildings. In addition, most (4/5) allies serve slightly more urban communities than rural communities; specifically, allies reported that urban customers are 50% to 75% of their customer base. Table 44 presents additional characteristics of Multifamily Program allies.

Table 44. Characteristics of Ameren Illinois Program Allies

	Average	Range
Firm size	27 employees	9 to 50 employees
Years active in the program	6 years	3 to 8 years

Program ally firms appear to fall into two sets– “active” allies and “less-active” allies– based on their self-reported descriptions about their relative involvement in, and dependence on, the AIC program to generate business:

- The group of relatively more “active” allies consists of two companies who completed PY9 projects throughout the entire AIC service territory. The active allies both reported that the program had a large influence on their decision to complete upgrades in multifamily buildings in the AIC service territory. Specifically, both of these allies reported that their work in this sector and territory was negligible before they began participating in the program (less than 2% of all work completed in AIC service territory), but that the share of work they complete in multifamily properties jumped to 85% and 99% of their projects in the AIC service territory after they began participating the program. In addition, these two allies also reported their businesses are reliant on air sealing and insulation projects, as they do not offer additional services besides these offerings.

⁸³ In PY9, four program allies completed projects through both the AIC and IPA programs and two additional allies completed projects strictly through the IPA program.

- The other group of allies consists of three companies that are each headquartered within AIC service territory and which generally complete projects within a more limited radius of their headquarters. For these allies, multifamily projects are a smaller share (<10%, on average) of their total projects in AIC service territory. These allies also reported that the share of work they complete in multifamily properties has not changed much since they started participating in the Multifamily Program. Some of these allies have business models that are less-reliant on air sealing and insulation projects, with two out of these three allies offering services besides air sealing and insulation.

Marketing and Outreach

Lead Generation and Marketing

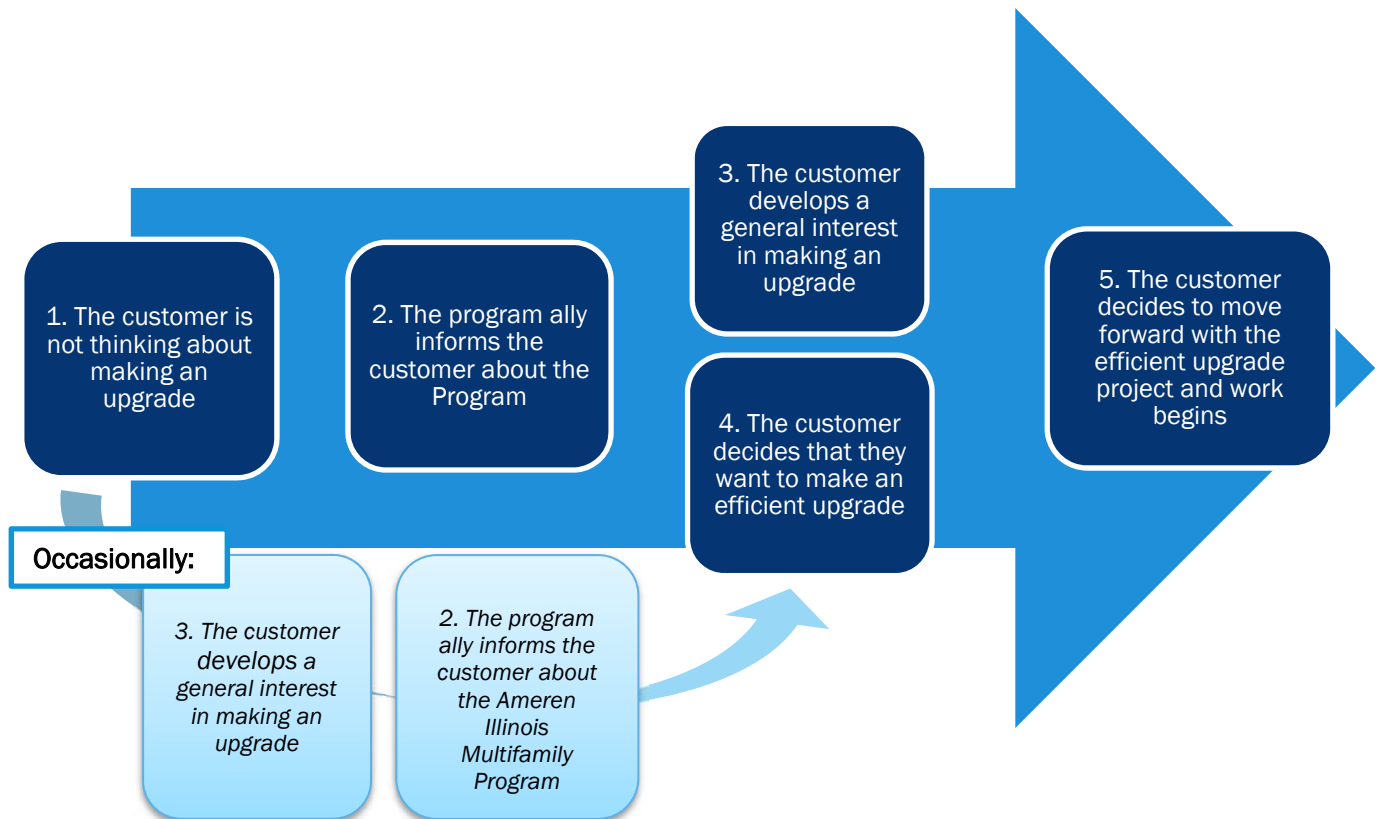
According to CLEAResult, the program relies almost exclusively on program allies to market the major measures program offerings. When we asked allies about their marketing and outreach strategies, all allies confirmed that they do market the program to customers and further noted that they have developed their own strategies for identifying and recruiting customers to the program.

- **Program Ally Responsibilities:** The Ameren Illinois Multifamily Program design splits program outreach and delivery across program allies and the implementer. Allies focus on major measures, while the implementer focuses on in-unit and common area upgrades. However, since a building may qualify for multiple types of upgrades, the program design relies on informal lead sharing between program allies and the implementer. Program ally feedback suggests that lead sharing tends to flow from allies to the implementer, rather than the other direction. Allies reported that they do most of their own marketing, and only get a negligible share (<2% on average) of their new customers from CLEAResult referrals. All allies reported that they market the Multifamily Program to every one of their customers in the AIC service territory whom they think may qualify for the program.
- **Outreach Strategies:** Program allies are using a wide variety of different outreach approaches to promote the program. Program allies, for example, identify customers by attending landlord association meetings (1/5), identifying properties on Google Maps (2/5), leveraging existing relationships with property managers (1/5), searching for opportunities via “For Rent” ads on the internet or in person (1/5), becoming involved with community associations (1/5), featuring the program on their webpage (1/5), and searching through county tax assessor data (1/5). After leads are identified, most (3/5) program allies market the program through door-to-door outreach, driving up to complexes which they previously identified and knocking on doors. One ally markets the program by actively recruiting property managers at rental property professional association meetings.

Property Manager Decision-Making

To further understand the customer journey to installing major measures through the program, we asked the PY9 allies to further describe their outreach to, and marketing interactions with, property managers. Based on program ally responses, we developed Figure 3 to show the steps that program allies believe customers take when they make the decision to complete specific energy-efficient upgrades through the Multifamily Program. As noted above, program allies generate most of their leads by cold calling and going door-to-door, instead of fielding inbound phone calls from already-interested customers. This means that allies are recruiting from a pool of all types of property managers, not just those who are interested in energy efficiency. As such, not all property managers are aware of the program when program allies first approach them, and not all have been actively thinking of doing an upgrade. According to allies, customers generally develop an interest in making multifamily upgrades after the program ally tells them about the upgrades (Figure 3).

Figure 3. Program Ally Perceptions of Pathways to Property Manager Participation



Occasionally, steps two and three occur in opposite order (2/3), as indicated by the lighter arrows. In these cases, customers approach allies with a general interest in making an upgrade and then the ally then tells them about the multifamily program. All allies (5/5) felt that informing their customers about the incentives available through AIC or IPA specifically leads their customers to choose energy efficient upgrades. Program allies who market to customers with no prior interest in making upgrades indicated that steps 3 and 4 often happen simultaneously because these allies only market efficient upgrades that qualify for incentives from AIC to the customer.

PY9 Program Implementation

PY9 Program Successes & Challenges

In general, allies felt that the program operated in an efficient manner once it was up and running. We discussed CLEAResult’s responsiveness with 3 of 5 interviewees; in all 3 cases, interviewees pointed out that CLEAResult was very timely and responsive in terms of processing applications and paying out incentives, which allowed the allies to continue to seek out new jobs. One program ally identified the reservation system as a particularly well-functioning process, because it helped keep them up to date about the status of the program budgets and the amount of incentive left. In addition, another ally reported that their interactions with AIC were very positive, and highlighted the training and application process as specific aspects of the program that functioned well.

Overall, program allies reported that the largest challenges they faced in delivering the program in PY9 were a result of program disruptions and changes. As discussed previously, the PY9 IPA Multifamily Program began two months late due a renegotiation process to make the program cost-effective. Of the two “active allies,” both reported that this program delay limited the amount of time they had to recruit participants to the program. Additionally, these two allies felt that program delays made it hard to determine how to allocate staff resources: specifically, the challenge was in terms of keeping enough staff employed so that the company could be prepared take full advantage of the program once it was opened, while avoiding having staff sit idle until that point. One ally also identified turnover in one of the program manager positions at CLEAResult halfway through the year as another challenging program change.

Satisfaction

PY9 Program Satisfaction

Overall, program allies were satisfied with the PY9 Ameren Illinois Multifamily Program. On a scale of 0 (not at all satisfied) to 10 (extremely satisfied), allies provided an average rating of 8.6, with the lowest rating being a 7 (n=5). When prompted to discuss reasons for rating their satisfaction as less than a 10, program allies tended to cite challenges related to funding disruptions and the way that the program handled and communicated those changes to program allies. Allies felt that once the program was up and running, the implementation process ran smoothly and they recalled having positive interactions with AIC and CLEAResult.

Long-term Program Satisfaction

As discussed previously, the Ameren Illinois Multifamily Program is entering its tenth year of operation. We asked allies to characterize their experience with the Multifamily Program as it evolved over time. Allies highlighted a variety of program aspects that have changed since they began serving customers through the program and which influenced their satisfaction with the program. Each ally was able to provide a limited perspective based on their own experiences, but collectively the allies recalled changes in four key program elements: applications, training, guidelines, and program budgets.⁸⁴

Allies noted the program guidelines dictating the type of properties that qualify for the program have become more stringent over time. Program guidelines in the PY9 Program Implementation Plan specify that allies can upgrade properties with a ceiling insulation value of R-11 or less to a minimum of R-49. The PY9 insulation guidelines were stricter than PY8, when allies could upgrade properties with an R-value of R-19 or less. For some allies, the change reportedly makes it more challenging to find buildings to serve through the program. In addition, allies highlighted that multifamily program budgets have increased over time. Program allies had differing views about the effect of the budget increases on their experience with the program. One ally viewed the increased program budgets as a positive change, because the program frequently ran out of funding in early program years. In contrast, most (3/5) allies, particularly the less active ones, perceived that multifamily upgrade opportunities began dwindling after the program increased the budget for incentives. In addition, in PY6 program staff implemented a reservation system that allocated 60% of all multifamily upgrade jobs to one contractor and kept the remaining jobs open to bids by other contractors. There was some sense among the less-active allies that the exclusive contract setup had made it difficult for the less-active allies to really contribute to program savings.

⁸⁴ Each program aspect represents the views of one program ally.

Impacts on Allies' Business Practices

The evaluation team asked allies to reflect on whether their participation in the Multifamily Program affected their business practices over time, and if so, how.⁸⁵ Overall, program allies reported that the program has had a positive impact on their business, and has helped them increase the quantity of air sealing and insulation projects they complete. Specifically:

- All program allies (5/5) reported the percentage of multifamily upgrade situations in which they complete air sealing and install high-efficiency insulation in AIC service territory increased greatly after they began participating in the Multifamily Program.
- Similarly, all program allies (5/5) reported the total volume of air sealing and insulation projects they complete for multifamily buildings in AIC service territory increased greatly after participating in the program. One ally's explanation of the influence of the program on their business practices was representative of the views of several program allies, noting that:

"It gave us the opportunity to do work that we wouldn't otherwise do because of the rebates. We did a dramatic amount more work due to the rebates that were available. We were able to offer these rebates to folks that would not otherwise seek out these energy efficient upgrades, but once they were made aware of them they wanted to have them done. The volume of our work and the type of work that we were able to do went up significantly in the last three years due to the Multifamily Program."

- Furthermore, most program allies (4/5) felt that they have a somewhat- or greatly increased sense of comfort in discussing the benefits of air sealing and high-efficiency insulation with multifamily property managers and owners since participating in the program.
- Fewer program allies reported a notable change in their knowledge of air sealing and high efficiency insulation in multifamily buildings due to program involvement. Three of five said their knowledge did not increase, noting that they had received training in this area before they began participating in the program. Remaining (2/5) allies said that the program did greatly increase their knowledge in this area.

Future Opportunities

When asked to consider remaining potential for continued energy savings in the AIC multifamily market, allies reported that it has become more difficult for them to identify upgrade opportunities. Most (4/5) allies feel that almost all the larger buildings that qualify for the program have already received eligible upgrades. Further, program allies believe the large property market is especially saturated with respect to the so-called "low-hanging fruit." Program allies generally expressed frustration with the lack of opportunities left in the market under current guidelines, with one commenting:

"Quite honestly, the market is extremely saturated with the current guidelines set for the electric program"

During the evaluation team's interview with program implementation staff, the staff expressed concern that program allies may have limited interest in serving the remaining eligible properties, which tend to be smaller

⁸⁵ When allies were asked about how their business volume of work changed, they were given the following response options; "did not increase", "increased somewhat", and "increased greatly."

properties and/or those located in rural areas. Further, the program staff wondered whether allies may react to this challenge by choosing to refocus their efforts on other programs. To gather more information on this topic, we asked program allies about their main considerations when deciding whether to pursue opportunities in urban vs. rural markets in AIC service territory. Most of the allies say they work in both urban and rural areas (4/5) and all of those who do (4/4) said they do not take the community type into consideration when they decide whether to take a job. Allies expressed a willingness to work wherever there are jobs available.

Despite the perception of overall market saturation, program allies identified low-income multifamily buildings, small towns, smaller complexes, and gas customers as market segments that still offer savings opportunities. Overall, allies feel that many of the smaller towns and complexes have been passed over by companies in pursuit of easier opportunities, but that these smaller towns and complexes do present savings opportunities. In addition, AIC will likely offer upgrades to low income multifamily customers in 2018 and one program ally specifically mentioned this as an important opportunity to continue generating new business. Program allies also suggested that demand for upgrades in gas-fuel buildings exceeds the available incentives. Implementation staff also echoed that they see a demand for upgrades from customers on the gas side.

Program allies noted that to capitalize on opportunities for achieving additional savings in multifamily buildings, program guidelines for qualifying air sealing and insulation projects would need to change, and/or the program would need to add additional measures. Additional measure suggestions included air source heat pumps, crawl space insulation, fans and air circulation measures, attic insulation with higher R-values, and insulating around “knob and tube” wires. Implementing any of these recommendations would require changes in program design, as well as consideration of cost-effectiveness. These changes may or may not be feasible from a program design standpoint. Outside of changing program design, one ally suggested that program staff could assist allies in finding the remaining opportunities for serving multifamily buildings by sharing market research and segmentation studies with them. This would reduce allies’ search costs of finding and marketing to the harder-to-serve properties.

Program Allies’ Vision for the Future of the Program

As program allies reflected on the program evolution over time, we asked them to highlight ongoing challenges they feel should be addressed in future program years, and to highlight aspects of the program that they would like to see carried forward to future years based on their history of success. Below is a summary of their comments, blended with recommendations.

Successful Program Elements to Continue

- **Incentive Levels:** Overall, most (3/5) program allies identified the incentive level for major measures as a key factor to the success of the program. Major measures offerings are offered at no cost to property owners and program allies feel the no-cost upgrades attract property managers to the program. Allies believe the program should continue to offer major measures for free. Program allies expressed concern that property owners would not participate in the program if they had to pay for upgrades. As two allies said:

“We’ve seen it time and time again in other markets that they have offered even a 75% incentive, and because the owners do not pay the utility cost, they just won’t spend the money on something that is not visible. They’re running a business, and I get why they won’t do it, but we’ve seen failure time and time again when it is not subsidized 100% in multifamily.”

"I think the incentive levels are really generous, really good. I would like to see them stay where they are."

Challenges and Suggested Solutions to Address Them

- **Challenge: Dwindling cost-effective savings opportunities:** Most allies feel that as they have already worked through many of the easier-to-serve properties, they are now seeing remaining buildings that are more scattered throughout the territory than before, and are seeing properties that are less cost-effective for them to work with. In addition, one ally reported that the rate the program pays program allies has not changed since the program began, which suggests allies are expending more effort to receive the same compensation. Reportedly, allies perceive that it is becoming harder make a profit by serving customers through the program as program saturation is increasing. One ally explained the challenge of serving customers in the current market:

"We're just not able to be cost effective as a company and operate in that territory with only trying to survive on the few, far and in between."

- **Suggested Solution:** Consider taking a holistic look at program design and operations to identify a path to sustained cost-effective savings for the program. One path forward involves assisting allies with identifying remaining eligible multifamily buildings. If regulatory requirements and portfolio considerations allow for it, additional paths could include bringing new measures into the program and/or modifying program guidelines. For example, to market new measures, allies could utilize existing networks of past participants and revisit these easy-to-find properties.
- **Challenge: Program disruptions and changes in program guidelines:** As mentioned previously, program allies identified dealing with incentive disruptions and guideline changes as the most challenging aspect of delivering the program in PY9. Allies mentioned that this issue was not unique to PY9 and, in fact, noted this has been an ongoing challenge. Previous Multifamily Program evaluations revealed the major measures component of the program also operated for a limited time window in both PY5 and PY6.

In addition, program allies identified the continual tightening of program guidelines as an ongoing challenge for program delivery. Because their strategy is to recruit customers ahead of time, some allies say that delayed program year launch and midyear changes in guidelines can result in customers no longer qualifying for upgrades after guidelines change or program incentives run out. Some allies have strong feelings about these impacts, expressing a sense of wasted effort in years that there have been big disruptions. Program allies who rely on business created by the multifamily program as part of their business model noted that program disruptions and changes have made it difficult to stay committed to the program over the years.

- **Suggested Solution:** To the extent possible, program staff should continue to clearly and proactively communicate with allies well in advance of anticipated program changes. Two allies recommended that it would be helpful if program staff gave allies plenty of advance notice about changes in program guidelines and program structure. Providing allies with clear communications well ahead of program changes helps allies to plan for adaptation, such as ensuring that they will have the labor capacity to meet program goals once the program launches.
- **Challenge: Barriers to market entry among less active allies:** A few allies (3/5) felt pushed out of the market by more active allies that previously had exclusive contracts with Ameren Illinois. These allies felt that the incentives often ran out by the time that they began signing up participants for the

program. In general, these allies also had a more difficult time navigating program processes including keeping up with guideline changes, finding customers to qualify for the program and figuring out how to market the program. One ally in particular felt that their firm had the bandwidth to be more active in the program but the incentives were generally gone by the time they found participants that qualified.

- **Suggested Solution:** If maintaining a diverse pool of multiple allies continues to be a priority, consider ways to level the playing field, like providing assistance to all allies with respect to lead generation and marketing. Interviewees identified several opportunities for program staff to assist allies regarding customer recruitment, especially the less active allies who may have fewer in-house administrative staff or less-frequent interaction with program staff, compared to more-active allies. One ally also suggested that it would be helpful if the program adopted a certification process to help property managers market their units as energy efficient; in turn, this could provide another marketing opportunity for allies to promote when selling the program. In addition, another ally suggested that it would be helpful if program administrators provided allies with a brochure describing both the monetary and non-energy benefits of the program that the ally could use for program marketing. Program staff should redouble efforts to ensure all allies receive the marketing materials designed for them.

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