

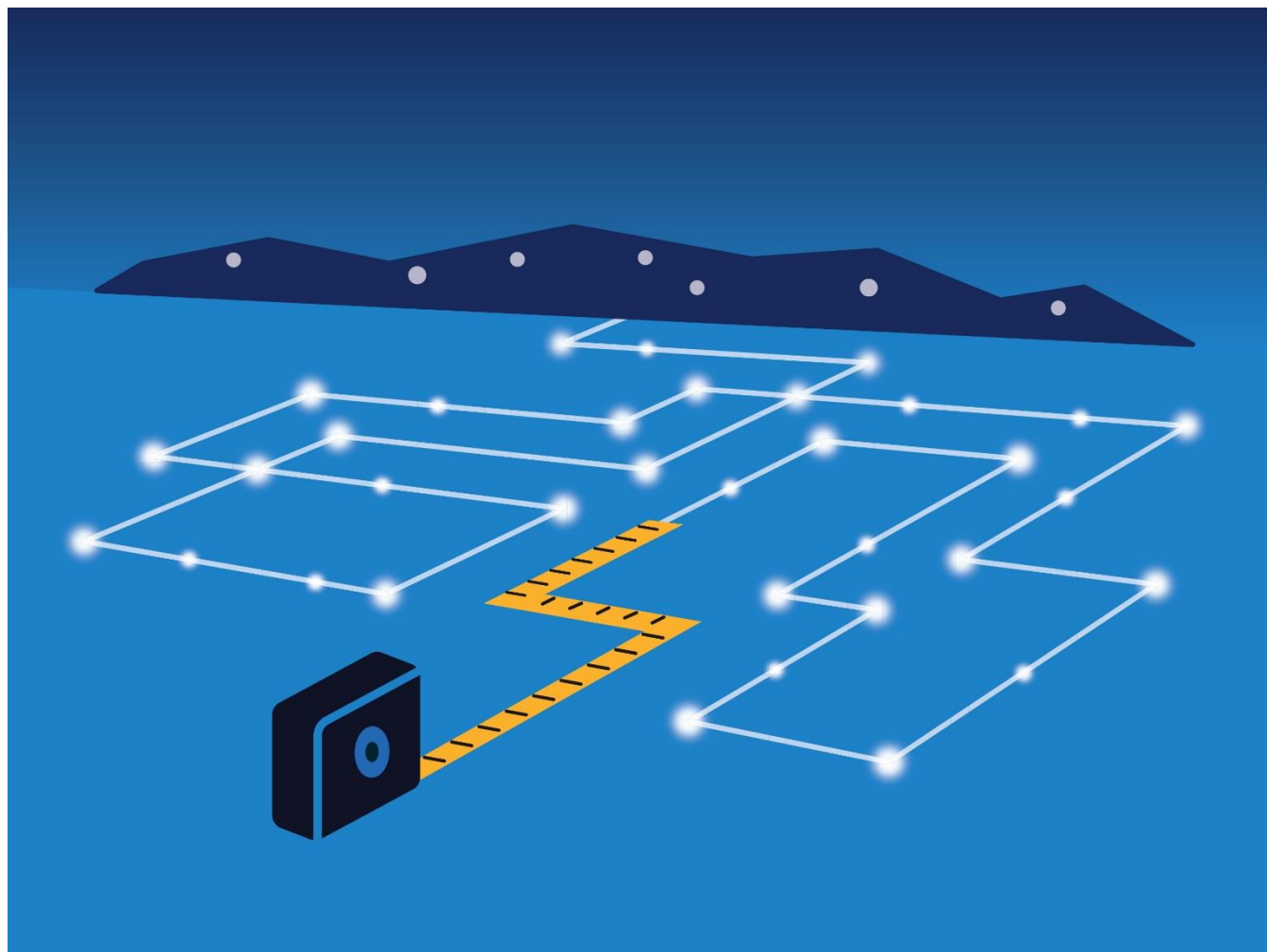


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Impact and Process Evaluation of 2015 (PY8) Illinois Power Agency Moderate Income Customer Kit Program

Final

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CADMUS

NAVIGANT



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1. Executive Summary

This report presents results from the Program Year 8 (PY8) Residential Moderate Income Customer Kit (MICK) Program, one of seven stand-alone Illinois Power Agency (IPA) energy efficiency programs implemented from June 2015 to May 2016. PY8 represents the first year of the MICK Program's operation.

AM Conservation Group (AMCG) implemented the MICK Program in PY8, while Leidos Engineering provided program oversight on behalf of Ameren Illinois Company (AIC). AMCG subcontracted with Direct Options to deliver marketing services, including the recruitment letter and marketing materials contained in the kit. AMCG recruited participants and distributed kits containing energy-efficient items via direct mail to residential customers with household incomes ranging from 0% to 300% of the federal poverty levels. The kits contained CFLs, faucet aerators, and shower heads, along with installation instructions. The program seeks to increase sales and awareness of ENERGY STAR®-qualified lighting products, along with other IPA and AIC program offerings that reduce energy consumption.

Program Impacts

Table 1 shows the PY8 MICK Program's net energy and demand savings of 1,233 MWh and 0.161MW.¹ To determine gross savings and net realization rates, the evaluation team applied deemed per-unit gross savings inputs, set forth in the Illinois Statewide Technical Reference Manual (IL-TRM) V4.0. In addition, the evaluation team applied installation rates from secondary research from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.² for non-lighting measures, TRM values for lighting measures, and the Stakeholder Advisory Group (SAG) approved net-to-gross ratio (NTGR) for this program. Overall, the low gross realization rates are primarily due to considerably higher ex ante installation rates than ex post installation rates for non-CFL measures.

Table 1. PY8 Moderate Income Customer Kit Program Net Impacts

	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR	Ex Post Net
Energy Savings (MWh)					
Total MWh	1,626	76%	1,233	1.00	1,233
Demand Savings (MW)					
Total MW	0.252	64%	0.161	1.00	0.161

Key Findings and Recommendations

As determined through the evaluation team's process review, utility, Leidos, and implementation staff reported high satisfaction levels with the program's performance in PY8, although some customers were confused with the enrollment process. Though these stakeholders reported that the program was successful, they wanted the program to do more to encourage MICK Program participants to also participate in other AIC energy efficiency programs. As PY9 will be the MICK Program's final year, however, program staff do not plan significant modifications to the program—which exceeded PY8's 10,000 kit distribution goal by 740 kits. The

¹ While the purpose of this report is to summarize the IPA electric savings, the program achieved some gas savings due to participants with natural gas water heat. Appendix A of this report presents those savings.

² Except CFLs, where the evaluation team applied the prescribed 66% first-year installation rate from the IL-TRM V4.0.

implementer will utilize a portion of PY9's budget and participation goals to cover the overage. Stakeholders also reported that operations ran smoothly, without encountering significant issues.

In the program's first year of operation, program staff experimented with messaging to effectively motivate customers to participate in the program. The program experienced a 25% higher response rate from customers who received a letter promoting free kits over those who received a letter promoting the kits' energy savings. Although utility and implementation staff reported satisfaction with the program, the evaluation team identified opportunities for improvements and recommends considering the following actions:

- **Key Finding #1:** Additional customer follow-up could increase cross-program participation.
 - **Recommendation:** Identify opportunities to follow up with MICK Program participants to remind them of other energy efficiency programs. On the enrollment form, for example, implementers could designate a location for participants to note interest in other such programs. The program implementer could also perform follow-up calls to interested MICK Program participants to cross-promote low-cost residential efficiency programs (e.g., Home Efficiency Income Qualified Program). Outreach activities and customer conversions should be tracked to measure the follow-up efforts' success.
- **Key Finding #2:** The program could measure the effectiveness of its marketing efforts.
 - **Recommendation:** Implement a method to track whether the program influences recipients' participation in other energy efficiency programs (i.e., customer cross-participation). For example, program materials could include a MICK Program-specific (i.e., vanity) URL or phone number to track program-generated interest in AIC's other programs through the Act on Energy website and call center. The program could also include a coupon or discount code in the kit for a free or discounted Home Efficiency Program energy audit. The coupon or code would provide a record of customer cross-participation.
 - **Recommendation:** Following participation, conduct surveys with customers to determine whether kit installation rates differ for customers receiving the solicitation letter that promotes a *free* kit and customers receiving the solicitation letter that promotes *energy savings*.
- **Key Finding #3:** The program kits do not include CFL disposal instructions. Additional customer education may encourage proper disposal of CFLs.
 - **Recommendation:** Include educational materials in the kits to provide participants with instructions for proper CFL disposal, along with locations of CFL collection and recycling centers.
- **Key Finding #4:** Customers experienced confusion with the enrollment process.
 - **Recommendation:** Include a phone number with the solicitation letter to allow customers to seek follow-up assistance to answer their questions regarding the program or the enrollment process. Consider using a postage-paid postcard rather than the tear-off enrollment form to minimize customers' confusion with the enrollment process.
- **Key Finding #5:** The primary driver of the low gross realization rates for non-CFL measures is the ex ante installation rates being higher than the ex post installation rates. The evaluation team used installation rates derived from secondary research from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014 to calculate ex post savings.

- **Recommendation:** Calculate future ex ante savings using the ex post installation rates from this evaluation report or the most current relevant evaluation.
- **Key Finding #6:** The implementer did not calculate separate savings estimates for different aerator types and used IL-TRM V4.0 inputs associated with an “Unknown” aerator type, thus overestimating bathroom faucet aerator savings and underestimating kitchen faucet aerator savings.
- **Recommendation:** Calculate separate ex ante per-unit savings for bathroom faucet aerators and kitchen faucet aerators.

2. Introduction

2.1 Program Description

The Moderate Income Customer Kit (MICK) Program seeks to serve Ameren Illinois Company's (AIC) low- to moderate-income residential customers, who may not be able to afford energy-efficient products. The program recruits residential customers through a direct-mail campaign, targeting specific areas of AIC's service territory to reach targeted customers and to avoid overlap with the Rural Efficiency Kits Program (another Illinois Power Agency [IPA] program). Targeted customers return an enrollment form to request an energy-efficient kit.

As shown in Table 2, program kits include an array of energy-efficient products, along with instructions for proper product installation and information on energy-saving opportunities available through other AIC programs. (See Appendix C, Program Collateral, for images of kit materials.)

Table 2. Project Year 8 (PY8) Moderate Income Customer Kit Program Products

Product	Quantity per Kit
13-Watt CFL	2
23-Watt CFL	2
1.5 gallon-per-minute (GPM) Bath Faucet Aerator	1
1.5 GPM Kitchen Faucet Aerator	1
1.5 GPM High-Efficiency Shower Head	1
Instructional Materials	N/A

AMCG delivers the program and tracks its progress toward its energy-savings goals. Direct Options, AMCG's subcontractor, provides marketing services support, including development of the recruitment letters and materials included in the kit. In coordination with CLEAResult, the Rural Efficiency Kits Program implementer, AMCG created and screened the MICK and Rural Kits programs' targeted customer lists to avoid duplication. AMCG mailed the branded kits and marketing materials directly to customers. AMCG reports delivery activities and results to the Leidos IPA oversight team.

2.2 Research Objectives

The PY8 MICK Program impact evaluation sought to provide estimates of gross and net electric and natural gas savings associated with the program. The evaluation team researched the following impact questions:

- How many kits did the program distribute?
- What were the program's estimated gross energy and demand impacts?
- What were the program's estimated net energy and demand impacts?

A limited process evaluation, which investigated how the program performed in its first year, addressed the following questions:

- What, if any, implementation challenges occurred in PY8?
- Did the program operate effectively?

- How was the program marketed?
- Did the program achieve its PY8 participation, energy, and demand savings goals?
- What program changes could improve program effectiveness?

3. Evaluation Tasks

The PY8 MICK Program assessment included process and impact analyses. Table 3 summarizes the PY8 evaluation activities.

Table 3. PY8 Moderate Income Customer Kit Program Evaluation Methods

Activity	PY8 Process	PY8 Impact	Forward Looking	Details
Program Staff In-Depth Interviews	✓			Interviewed three program and implementation staff members to gain insights into the program's design and delivery, challenges, and future plans.
Review of Program Materials and Data	✓			Reviewed the implementation plan, program marketing materials, and kit instructional materials.
Impact Analysis: Database Analysis	✓	✓	✓	Summarized database information to determine participation, key program statistics, savings, and delayed CFL installations credited to future program years.

The following activities informed the MICK Program's PY8 evaluation.

3.1.1 Program Staff In-Depth Interviews

The evaluation team conducted three interviews with AIC, Leidos, and implementation staff who were responsible for managing, marketing, and delivering the program. Table 4 lists program stakeholders interviewed to assess the program's design, implementation, communications, strengths, and weaknesses.

Table 4. Program Staff Interviews

Company	Number of Staff Interviewed
AMCG	1
Leidos Engineering	1
AIC	1

3.1.2 Review of Program Materials and Data

The evaluation team reviewed the following program data:

- Program database
- Program marketing and outreach collateral
- Implementation and marketing plans

3.1.3 Impact Analysis

Gross Impact Analysis

The evaluation team used the program-tracking database to verify the reported distribution of kits and to apply the Illinois Statewide Technical Reference Manual (IL-TRM) V4.0 per-unit gross savings inputs. The evaluation team used secondary research from a kits program with similar outreach and delivery implemented by Ameren

Missouri in 2014 for non-lighting measure installation rates along with TRM values for lighting measures.³ For estimates of electric water heater saturations to estimate gross electric savings values for program measures, the evaluation team used PY7 Rural Kits Program participant survey results. The evaluation team used home-type information from the 2013 Ameren Illinois Energy Efficiency Market Potential Assessment⁴ to estimate single-family and multifamily weighted averages for ex post gross per-unit savings parameters, in conjunction with parameter values prescribed for single-family and multifamily participants in IL-TRM V4.0.⁵ Further, to estimate electric energy savings associated with the program, the evaluation team applied a 16% electric water heater saturation rate (based on IL-TRM V4.0) to verified installations of energy kit measures. Table 5 lists the ex post per-unit electric savings.

Table 5. PY8 Moderate Income Customer Kit Program Ex Post Gross Electric Savings—Per Unit Installed

Measure	Gross kWh	Gross kW
13-Watt CFL	24.0	0.002
23-Watt CFL	39.3	0.004
1.5 GPM Bath Faucet Aerator	18.2	0.025
1.5 GPM Kitchen Faucet Aerator	132.4	0.032
1.5 GPM High-Efficiency Shower Head	248.2	0.027

The evaluation team applied the deemed gas water heating saturation of 84% (based on IL-TRM V4.0) to verified installations to estimate the gas installations associated with the program. The evaluation team used IL-TRM V4.0 deemed per-unit gross gas savings inputs for program measures to calculate the gross gas savings shown in Table 6. As previously noted, Appendix A provides details of the gas savings.

Table 6. PY8 Moderate Income Customer Kit Program Ex Post Gross Gas Savings—Per Unit Installed

Measure	Gross Therms
1.5 GPM Bath Faucet Aerator	0.8
1.5 GPM Kitchen Faucet Aerator	5.9
1.5 GPM High-Efficiency Shower Head	11.0

Net Impact Analysis

The evaluation team applied a net-to-gross ratio (NTGR) of 1 (approved by the Stakeholder Advisory Group [SAG]) to PY8 ex post gross savings to determine PY8 ex post net savings. Table 7 shows NTGRs used in the net impact analysis.

Table 7. SAG-Approved PY8 NTGRs

Measure Type	Electric NTGR	Gas NTGR
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³ Ameren Missouri Efficient Products Impact and Process Evaluation: Program Year 2014. Available online: <https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935933387>

⁴ Ameren Illinois Energy Efficiency Market Potential Assessment. Report Number 1404. Volume 2: Market Research. June 10, 2013. http://ilsagfiles.org/SAG_files/Potential_Studies/Ameren/Appendix%204_AIC%20DSM%20Potential%20Study%202013%20Volume%202%20Market%20Research.docx.

⁵ Note: 79% of customers live in single-family homes and 21% live in multifamily homes. The IL-TRM V4.0 reports the average number of people per household in single-family homes is 2.56 and the average number of people in multi-family homes is 2.10. The evaluation team used this information to create a weighted average number of people per household value of 2.46. Mathematically this is expressed as $((79\% \times 2.56) + (21\% \times 2.10)) = 2.46$.

All Measures	1.00	1.00
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Table 8 lists the SAG-approved NTGR and ex post per-unit net electric savings values.

Table 8. PY8 Moderate Income Customer Kit Program Ex Post Net Electric Savings—Per Unit Installed

Measure	NTGR	Net kWh	Net kW
13-Watt CFL	1.00	24.0	0.002
23-Watt CFL	1.00	39.3	0.004
1.5 GPM Bath Faucet Aerator	1.00	18.2	0.025
1.5 GPM Kitchen Faucet Aerator	1.00	132.4	0.032
1.5 GPM High-Efficiency Shower Head	1.00	248.2	0.027

Table 9 lists the SAG-approved NTGR and ex post per-unit net gas savings values.

Table 9. PY8 Moderate Income Customer Kit Program Ex Post Net Gas Savings—Per Unit Installed

Measure	NTGR	Net Therms
1.5 GPM Bath Faucet Aerator	1.00	0.8
1.5 GPM Kitchen Faucet Aerator	1.00	5.9
1.5 GPM High-Efficiency Shower Head	1.00	11.0

3.2 Sources and Mitigation of Error

Table 10 summarizes possible error sources associated with data collection conducted for the MICK Program. Discussion follows, addressing each item in detail.

Table 10. Possible Sources of Error

Research Task	Survey Error		Non-Survey Error
	Sampling Error	Non-Sampling Error	
Gross Impact Calculations	N/A	N/A	Data processing error
Net Impact Calculations	N/A	N/A	Data processing error

Throughout the PY8 evaluation's planning and implementation process, the evaluation team took a number of steps to mitigate potential sources of error. To minimize data processing errors, different evaluation team members reviewed all calculations to verify their accuracy.

Non-Survey Error

■ Data Processing Errors

- **Gross Impact Calculations:** In calculating gross impacts, the evaluation team applied deemed per-unit savings values to participant data in the tracking database.
- **Net Impact Calculations:** To estimate the program's net impacts, the evaluation team applied the deemed NTGRs to the gross impact calculations.

4. Detailed Evaluation Findings

4.1 Process Assessment

4.1.1 Program Operations

Leidos Engineering provides IPA oversight for the program, serving as the point of contact for day-to-day operational activities, process issues, and program status tracking. AMCG's program manager is responsible for program implementation and reporting activities to Leidos. Direct Options subcontracts with AMCG to provide program marketing and outreach.

In PY8, AMCG produced a list of approximately 150,000 customers, predicted to fall within 0% to 300% of federal poverty levels, and randomly selected 50,000 customers for kit solicitation. In October 2015, Direct Options mailed the solicitation letter and began managing the enrollment process. AMCG assembled and shipped kits to enrolled customers.

4.1.2 Marketing and Outreach

The program encourages prospective customers to use the kit items to achieve no-cost simple energy savings and to seek opportunities through other AIC programs. Direct Options, with AMCG and AIC input, developed the recruitment letters and marketing materials contained in the kit. The evaluation team reviewed the PY8 marketing plan and customer-facing marketing materials used to generate program awareness and to encourage future energy efficiency activity through AIC.

To meet the kit enrollment and fulfillment goal while testing two different marketing messages, the implementer developed a mailing list and solicitation letters with two message themes: "free" versus "energy savings." AMCG reported a 25% higher response rate from customers receiving the letter promoting free kits over those receiving a letter promoting kits' energy savings.

Direct Options developed the following program marketing materials:

- Trifold brochure with energy-saving tips, including a rationale for installing kit contents
- Kit content descriptions and installation instructions
- Home Efficiency Program fact sheet, describing program benefits and special incentive levels for income-qualified customers and including encouragements to visit the program website or to call Act on Energy
- Regrets postcard for waitlisted customers, notifying them to expect kit shipments in PY9

Program materials did not include guidelines for CFL disposal and recycling locations. Appendix C, Program Collateral, provides examples of these marketing materials.

During the program staff interviews, interviewees identified additional opportunities to improve the program through changes to marketing materials. AIC staff said some customers were confused about how and where to submit the tear-off portion of the solicitation letter, and suggested providing a program phone number on the solicitation letter, enabling customers to follow up with questions. Staff also suggested including a postage-paid postcard in lieu of the letter's tear-off section. AMCG's customer service log noted three instances where customers sent bill payments with their enrollment forms and five instances of customers inquiring about how to enroll in the program.

Program staff also indicated that opportunities exist to encourage participation in other AIC programs. Leidos staff reviewed MICK Program participants and found six who later participated in the Home Efficiency Program. While AIC staff said that this analysis did not reflect long-term effects, they expected more customers to engage in other energy efficiency opportunities over time. AMCG reported tracking customers who noted interest in other programs or measures by handwriting on the enrollment form. AMCG staff also reported interest in including more cross-promotional materials in the kit and, if the program budget allowed, proactively contacting customers following MICK Program participation to encourage customers to pursue other energy efficiency options.

4.1.3 Program Goals

AMCG exceeded the PY8 10,000 kit distribution goal set forth in its Implementation Plan,⁶ distributing 10,740 kits and utilizing some of its PY9 program budget to cover the overage.

AIC did not employ formal metrics to track the program's success in increasing moderate-income customers' energy awareness or participation in other AIC programs. While AIC program staff logged customer complaints (reporting very few of these), staff did not track visits to AIC's website for further information. Materials identified AIC's Act on Energy website and phone number, but the program did not maintain a customized URL or a specific phone number.

4.1.4 Screening and Participant Selection Process

AMCG produced an initial list of 150,000 potential participant residential AIC electric accounts, per the following characteristics:

- Zip codes located in urban areas (to avoid overlap with the Rural Efficiency Kits Program)
- Age, marriage status, education level, homeownership, length of residence, and those likely to fall within 0% to 300% of the federal poverty levels, based on publicly available information

From this population, AMCG selected a random list of 50,000 customers to receive a kit solicitation letter. As many as four mailings were planned to achieve PY8's 10,000 kit goal; about 15,000 customers requested a kit from this first mailing. AMCG delivered just under 11,000 kits to customers to stay within the program's 11,000 kit stretch goal. AMCG provided waitlisted customers (approximately 4,000) with a postcard, notifying them of their kits' status and anticipated delivery in PY9.

4.1.5 Communications and Cooperation

During the program's launch, AMCG met with Leidos weekly to ensure customer screening, marketing, and outreach met the program's needs. Once program materials had been developed and activities were under way, program staff reported monthly progress to maintain regular program communications among implementer, Leidos, and utility staff. AMCG reported that AIC was responsive and provided clear feedback. AIC found reporting and data tracking sufficient and reported good working relationships with Leidos and implementation staff.

⁶ AM Conservation's Program Year Eight Implementation Plan: *Residential Moderate Income Customer Kits Implementation Plan for IPA PY8*.

4.2 Impact Assessment

4.2.1 Gross Impacts

The evaluation team used results from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014 to estimate installation rates for kit items, except the CFL measures (which, as discussed, used the prescribed value in IL-TRM V4.0). Table 11 lists reported ex ante and evaluated ex post installation rates⁷ for each kit measure used in the electric and gas savings calculations.⁸ The ex ante savings calculations produced by the implementer used installation rates derived from multiple sources, including the IL-TRM V3.0, “Plan 3 default,” and internal implementer estimates. The low gross realization rates for non-CFL measures are primarily because the ex ante installation rates are higher than the ex post installation rates.

Table 11. PY8 Moderate Income Customer Kit Program Installation Rates

Measure	Reported Ex Ante Installation Rate	Evaluated Ex Post Installation Rate
13-Watt CFL	72.2%	66%
23-Watt CFL	72.2%	66%
1.5 GPM Bath Faucet Aerator	81.0%	52%
1.5 GPM Kitchen Faucet Aerator	81.0%	52%
1.5 GPM High-Efficiency Shower Head	81.0%	47%

Gross Electric Impacts

Table 12 lists the reported ex ante and evaluated ex post per-unit electric savings. There are large differences between ex ante and ex post per-unit gross savings for the bathroom and kitchen faucet aerators because the implementer did not calculate separate savings estimates for the different aerator types. The difference between ex ante and ex post per-unit gross savings for CFLs and shower heads is relatively small.

Table 12. PY8 Moderate Income Customer Kit Program Ex Ante and Ex Post Per-Unit Electric Savings

Measure	Reported Ex Ante Gross kWh	Evaluated Ex Post Gross kWh	Reported Ex Ante Gross kW	Evaluated Ex Post Gross kW
13-Watt CFL	26.5	24.0	0.003	0.002
23-Watt CFL	43.1	39.3	0.005	0.004
1.5 GPM Bath Faucet Aerator	71.7	18.2	0.031	0.025
1.5 GPM Kitchen Faucet Aerator	71.7	132.4	0.031	0.032
1.5 GPM High-Efficiency Shower Head	249.8	248.2	0.027	0.027

Based on reported program participation and ex post savings values, the program achieved total gross electric savings of 1,233 MWh and demand savings of 0.161 MW. Table 13 shows ex ante and ex post gross electric and demand impacts.

⁷ Ameren Missouri Efficient Products Impact and Process Evaluation: Program Year 2014. Available online: <https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935933387>

⁸ Gas savings are presented in Appendix A of this report.

Table 13. PY8 Moderate Income Customer Kit Program Ex Ante and Ex Post Gross Electric Impacts

Measure	Reported Ex Ante Installation Rate	Ex Ante Gross Impacts		Reported Measures ^{ab}	Evaluated Ex Post Installation Rate ^c	Verified Measures ^d	Ex Post Gross Impacts		Gross Realization Rate ^e	
		MWh	MW				MWh	MW	MWh	MW
13-Watt CFL	72.2%	410	0.049	21,480	66%	14,177	341	0.033	83%	67%
23-Watt CFL	72.2%	668	0.079	21,480	66%	14,177	557	0.054	83%	68%
1.5 GPM Bath Faucet Aerator	81.0%	100	0.043	1,718	52%	894	16	0.023	16%	53%
1.5 GPM Kitchen Faucet Aerator	81.0%	100	0.043	1,718	52%	894	118	0.029	119%	68%
1.5 GPM High-Efficiency Shower Head	81.0%	348	0.038	1,718	47%	808	200	0.022	58%	57%
Total*	73.0%	1,626	0.252	48,115	64%	30,948	1,233	0.161	76%	64%

* Totals may not sum due to rounding.

^a Based on IL-TRM V4.0, the evaluation team assumed 16% of total verified water-saving measures were installed in homes with electric water heating.

^b Reported measures represents measures distributed through the kits and is not adjusted for any installation rates.

^c Reported percentages are rounded from their true values.

^d The difference between reported measures and verified measures results from the application of installation rates derived from the PY15 Ameren Missouri Efficient Products Evaluation report and the IL-TRM V4.0.

^e Realization rates differing from 1.0 result from differences between ex ante and ex post installation rates and per-unit savings: gross realization rate = ex post gross savings ÷ ex ante gross savings.

The evaluation team received ex ante electric savings estimates from the Moderate Income Customer Kit Program implementer and reviewed the assumed estimates for comparisons with the ex post electric savings methodologies. The differences between total ex ante and ex post electric savings estimates resulted from differences in the ex ante and ex post gross electric per-unit savings assumptions and installation rates. Descriptions follow addressing discrepancies for each program measure:

- CFLs. The ex ante 13-watt CFL per-unit savings estimates of 26.5 kWh and 0.00319 kW were higher than the ex post per-unit savings estimates of 24.0 kWh and 0.00235 kW, calculated in accordance with IL-TRM V4.0. The ex ante 23-watt CFL per-unit savings estimates of 43.1 kWh and 0.00512 kW were also higher than the ex post per-unit savings estimates of 39.3 kWh and 0.00383 kW, calculated in accordance with IL-TRM V4.0. The lower ex post per-unit savings estimates for the CFL measures resulted primarily from the implementer using a lighting hours-of-use value of 938 from IL-TRM V3.0, while the evaluation team used the most current hours-of-use value of 759 from IL-TRM V4.0. Ex post gross population savings that were lower than savings for the ex ante gross population also resulted from differences in installation rates used for ex post and ex ante gross savings. The major driver in the ex ante gross population savings being less than ex post gross population savings is that the implementer used an ISR of 72.2%⁹ (based on Retail [Time of Sale] bulbs from IL-TRM V3.0) to calculate ex ante savings, while the evaluation team used an ISR of 66% (prescribed in IL-TRM V4.0 for Direct-Mail Kits) to calculate the ex post gross savings. Additionally, ex post per-unit demand savings are lower than ex ante per-unit demand savings because the implementer used a 9.5% coincidence factor value from IL-TRM V3.0, while the evaluation team used an updated coincidence factor value of 7.1% from IL-TRM V4.0.
- Bathroom Faucet Aerators. The ex ante bath faucet aerator per-unit savings estimate of 71.7 kWh was higher than the ex post per-unit savings estimate of 18.2 kWh, calculated in accordance with the IL-TRM V4.0. The implementer did not calculate separate savings estimates for the different aerator types, using 71.7 kWh and 0.031 kW gross per-unit savings estimates for both bath faucet aerator and kitchen faucet aerator ex ante gross savings calculations. In calculating the single aerator savings value, the implementer relied on IL-TRM V4.0 inputs associated with an “Unknown” aerator type, thus overestimating bath faucet aerator gross savings. Ex post gross population savings that were less than ex ante gross population savings also resulted from differences in installation rates used for the ex post and ex ante gross savings. The major driver in the ex ante gross population savings being less than ex post gross population savings is that the implementer used an ISR of 81%¹⁰ to calculate ex ante savings, while the evaluation team used the bath faucet aerator-specific ISR of 52%, calculated from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.
- Kitchen Faucet Aerators. An ex ante kitchen faucet aerator per-unit savings estimate of 71.7 kWh fell below the ex post per-unit savings estimate of 132.4 kWh, calculated in accordance with the IL-TRM V4.0. As noted, the implementer did not calculate separate savings estimates for the different aerator types, using 71.7 kWh and 0.031 kW gross per-unit savings estimates for both kitchen and bath faucet aerator ex ante gross savings calculations. In calculating the single aerator savings value, the implementer relied on IL-TRM inputs associated with an “Unknown” aerator type, underestimating kitchen aerator per-unit gross savings. However, ex post gross population savings that were less than ex ante gross population savings resulted from the difference in installation rates used for ex post and ex ante gross savings. The major driver in the ex ante gross population savings being less than ex post gross population savings is that the implementer used an ISR of 81%¹¹ to calculate ex ante savings,

⁹ IPA Program Assumptions.

¹⁰ Plan 3 default value.

¹¹ Plan 3 default value.

while the evaluation team used the kitchen faucet aerator-specific ISR of 52% to estimate ex post savings, calculated from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.

- **Shower Heads.** The ex ante shower head per-unit savings estimates of 249.8 kWh and 0.0274 kW were more than the ex post per-unit savings estimates of 248.2 kWh and 0.0270 kW, which the evaluation team calculated in accordance with IL-TRM V4.0. Ex ante and ex post per-unit savings estimates differed as the ex post per-unit savings estimate used home-type information from the 2013 AIC Potential Study, in conjunction with prescribed single-family and multifamily values in IL-TRM V4.0, to estimate weighted values for average shower heads per household (1.69) and the number of people per household (2.46). The ex ante per-unit savings values used prescribed single-family values from IL-TRM V4.0 for shower heads per household (1.79) and the number of people per household (2.56). Ex post gross population savings that were less than ex ante gross population savings also resulted from the difference in installation rates used for ex post and ex ante savings. The major driver in the ex ante gross population savings being less than ex post gross population savings is that the implementer used an ISR of 81%¹² to calculate ex ante savings, while the evaluation team used an ISR of 47% calculated from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.

In addition to gross savings achieved from measure installations in PY8, the evaluation team calculated gross savings from delayed CFL installations, per the IL-TRM V4.0. In particular, IL-TRM V4.0 assumed consumers would install 93% of kit CFLs within 3 years. Table 14 shows savings from bulbs, provided to participants in PY8 and realized in PY8, as well as in PY9 and PY10, given later installations.

Table 14. Yearly Gross Impact of PY8 Residential Lighting Measures by Assumed Installation Year

Measure	Energy (MWh)			Demand (MW)		
	PY8	PY9	PY10	PY8	PY9	PY10
13-Watt CFL	341	72	62	0.033	0.007	0.006
23-Watt CFL	557	118	101	0.054	0.012	0.010
Total	897	190	163	0.088	0.019	0.016

The evaluation team will include PY9 savings in future evaluation reports.¹³

4.2.2 Net Impacts

To develop net savings for PY8, the evaluation team applied an NTGR of 1.00 (SAG approved) to ex post gross savings.

The program achieved total net electric and demand savings of 1,233 MWh and 0.161 MW, respectively. Table 15 shows net electric savings results by measure. The low overall net realization rate for the program is partially due to the implementer only calculating a single aerator savings value and applying it to both bathroom and kitchen faucet aerators, thus severely overestimating bathroom faucet aerator ex ante gross savings. In addition, the low overall net realization rate for the program is also due to the fact that the ex ante installation rates are considerably higher than the ex post installation rates for non-CFL measures.

¹² Plan 3 default value.

¹³ PY10 savings will not be included in a future evaluation as the MICK Program will end after PY9.

Table 15. PY8 Total Moderate Income Customer Kit Program Net Electric Savings by Measure

Measure	Ex Ante Net Savings (MWh)	Ex Ante Net Savings (MW)	Ex Post Net Savings (MWh)	Ex Post Net Savings (MW)
13-Watt CFL	410	0.049	341	0.033
23-Watt CFL	668	0.079	557	0.054
1.5 GPM Bath Faucet Aerator	100	0.043	16	0.023
1.5 GPM Kitchen Faucet Aerator	100	0.043	118	0.029
1.5 GPM High-Efficiency Shower Head	348	0.038	200	0.022
Total*	1,626	0.252	1,233	0.161
Net Realization Rate ^a			76%	64%

* Totals may not sum due to rounding.

^a Net realization rate = ex post net savings ÷ ex ante net savings.

5. Conclusions and Recommendations

The PY8 MICK Program delivered 10,740 kits to moderate-income residential customers, exceeding its PY8 participation goal by 7%. In the program's first year of operation, program staff experimented with messaging to effectively motivate customers to participate in the program. The program experienced a 25% higher response rate from customers who received a letter promoting *free* kits over those who received a letter promoting kits' *energy savings*. Although utility and implementation staff reported satisfaction with the program, the evaluation team identified opportunities for improvements, and recommends considering the following actions.

- **Key Finding #1:** Additional customer follow-up could increase cross-program participation.
 - **Recommendation:** Identify opportunities to follow up with MICK Program participants to remind them of other energy efficiency programs. On the enrollment form, for example, implementers could designate a location for participants to note interest in other such programs. The program implementer could also perform follow-up calls to interested MICK Program participants to cross-promote low-cost residential efficiency programs (e.g., Home Efficiency Income Qualified Program). Outreach activities and customer conversions should be tracked to measure the follow-up efforts' success.
- **Key Finding #2:** The program could measure the effectiveness of its marketing efforts.
 - **Recommendation:** Implement a method to track whether the program influences recipients' participation in other energy efficiency programs (i.e., customer cross-participation). For example, program materials could include a MICK Program-specific (i.e., vanity) URL or phone number to track program-generated interest in AIC's other programs through the Act on Energy website and call center. The program could also include a coupon or discount code in the kit for a free or discounted Home Efficiency Program energy audit. The coupon or code would provide a record of customer cross-participation.
 - **Recommendation:** Following participation, conduct surveys with customers to determine whether kit installation rates differ for customers receiving the solicitation letter that promotes a *free* kit and customers receiving the solicitation letter that promotes *energy savings*.
- **Key Finding #3:** The program kits do not include CFL disposal instructions. Additional customer education may encourage proper disposal of CFLs.
 - **Recommendation:** Include educational materials in the kits to provide participants with instructions for proper CFL disposal, along with locations of CFL collection and recycling centers.
- **Key Finding #4:** Customers experienced confusion with the enrollment process.
 - **Recommendation:** Include a phone number with the solicitation letter to allow customers to seek follow-up assistance to answer questions regarding the program or the enrollment process. Consider using a postage-paid postcard rather than the tear-off enrollment form to minimize customers' confusion with the enrollment process.
- **Key Finding #5:** The low gross realization rates for non-CFL measures are primarily because the ex ante installation rates are considerably higher than the ex post installation rates. The evaluation team used installation rates derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014. .

- **Recommendation:** Calculate future ex ante savings using the ex post installation rates from this evaluation report or the most current relevant evaluation.
- **Key Finding #6:** The implementer did not calculate separate savings estimates for different aerator types and used IL-TRM V4.0 inputs associated with an “Unknown” aerator type, thus overestimating bathroom faucet aerator savings and underestimating kitchen faucet aerator savings.
- **Recommendation:** Calculate separate ex ante per-unit savings for bathroom faucet aerators and kitchen faucet aerators.

Appendix A. Moderate Income Kits Program Assumptions and Algorithms

Compact Fluorescent Lights

The evaluation team used the following equations from the IL-TRM V4.0 to estimate energy and demand savings for compact fluorescent lights (CFLs).

Equation 1. ENERGY STAR CFL Energy Algorithm

$$\Delta kWh = \left(\frac{Watts_{base} - Watts_{EE}}{1,000} \right) \times ISR \times Hours \times WHFe$$

Equation 2. ENERGY STAR CFL Demand Algorithm

$$\Delta kW = \left(\frac{Watts_{base} - Watts_{EE}}{1,000} \right) \times ISR \times WHFd \times CF$$

Table 16 provides assumptions used to estimate ex post savings for CFL measures.

Table 16. Ex Post Assumptions for ENERGY STAR CFL

Parameter	Value	Units	Notes/Reference
Watts _{base}	13W CFL: 43 23W CFL: 72	watts	Base watts incandescent equivalent (IL-TRM V4.0)
Watts _{EE}	13W CFL: 13 23W CFL: 23	watts	Wattage of CFL installed (IL-TRM V4.0)
1,000	1,000	W/kW	Conversion factor
ISR	66%	N/A	Installation rate (IL-TRM V4.0) – ‘Direct Mail Kits’. Evaluation team applied the 66% ISR to reported measures distributed and did not apply any ISR to the per-unit savings values reported in the evaluation report.
Hours	759	Hours	IL-TRM V4.0 – ‘Residential Interior and in-unit Multi Family’
WHFe	Single Family: 1.06 Multi Family: 1.04	N/A	Waste heat factor for energy (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21%MF customer population distribution from the 2013 AIC Potential Study Market Research Report ¹⁴ to calculate a weighted average waste heat factor for energy of 1.056.
WHFd	Single Family: 1.11	N/A	Waste heat factor for demand (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21%MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average waste heat factor for demand of 1.102.

¹⁴ Ameren Illinois Energy Efficiency Market Potential Assessment. Report Number 1404. Volume 2: Market Research. June 10, 2013. http://ilsagfiles.org/SAG_files/Potential_Studies/Ameren/Appendix%204_AIC%20DSM%20Potential%20Study%202013%20Volume%202%20Market%20Research.docx

Parameter	Value	Units	Notes/Reference
	Multi Family: 1.07		
CF	7.1%	N/A	Summer peak coincidence factor (IL-TRM V4.0).

Bathroom and Kitchen Faucet Aerators

Installation Rates

To align the MICK program installation rates with a program of similar design, the evaluation team used single family participant survey findings for a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014, which were presented 2014 and used in the 2014 and 2015 evaluation reports.¹⁵

Savings Assumptions

The evaluation team used the following equations from the IL-TRM V4.0 to estimate energy and demand savings for faucet aerators.

Equation 3. Faucet Aerator Electric Energy Algorithm

$$\Delta kWh = \%ElectricDHW \left(\frac{(GPM_{base} * L_{base} - GPM_{low} * L_{low}) * Household * 365.25 * DF}{FPH} \right) \times EPG_{electric} \times ISR$$

Equation 4. Faucet Aerator Gas Energy Algorithm

$$\Delta kWh = \%FossilDHW \left(\frac{(GPM_{base} * L_{base} - GPM_{low} * L_{low}) * Household * 365.25 * DF}{FPH} \right) \times EPG_{gas} \times ISR$$

Equation 5. Faucet Aerator Demand Algorithm

$$\Delta kW = \left(\frac{\Delta kWh}{Hours} \right) \times CF$$

Table 17 provides assumptions used to estimate ex post savings for bathroom faucet aerators.

Table 17. Ex Post Assumptions for Bathroom Faucet Aerators

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with IL-TRM V4.0 for an 'Unknown' fuel type, we assumed 16% of program measures were installed in residences with electric water heating and 84% installed in homes with gas water heating. This evaluation used these fuel saturations and applied it to installed measures to create separate analyses for electric and gas.

¹⁵ Ameren Missouri Efficient Products Impact and Process Evaluation: Program Year 2014 details survey methodology and findings. Available online: <https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935933387>

Parameter	Value	Units	Notes/Reference
%FossilDHW	100%	N/A	
GPM _{base}	1.39	gal/min	Base case flow (IL-TRM V4.0)
GPM _{low}	0.94	gal/min	Low case flow (IL-TRM V4.0)
L _{base}	1.6	min/day	Base case use length (IL-TRM V4.0)
L _{low}	1.6	min/day	Low case use length (IL-TRM V4.0)
Household	Single family: 2.56 Multi Family: 2.10	# of people	Average number of people per household (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average people per household value of 2.46.
365.25	365.25	Average days in a year	Days in a year, on average (IL-TRM V4.0)
DF	90%	Percent	Drain factor (IL-TRM V4.0) – ‘Bath’
FPH	Single Family: 2.83 Multi Family: 1.50	Faucets per household	Bath faucets per household (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average bathroom faucets per household value of 2.55.
EPG _{electric}	0.0795	kWh/gal	Energy per gallon of hot water supplied by electricity (IL-TRM V4.0) – ‘Bath’
EPG _{gas}	Single Family: 0.00341 Multi Family: 0.00397	Therm/gal	Energy per gallon of hot water supplied by gas (IL-TRM V4.0) – ‘Bath’. Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average EPG of hot water supplied by gas value of 0.00353.
ISR	52%	N/A	Installation rate– ‘Bathroom faucet aerator’. Evaluation team applied the 52% ISR, derived from the PY15 Ameren Missouri Efficient Products Program report, to reported measures distributed and did not apply any ISR to the per-unit savings values reported in the evaluation report.
Hours	Single Family: 14 Multi Family: 22	Hours/Year	Annual electric water heating recovery hours for faucet use per faucet (IL-TRM V4.0) – ‘Bathroom’. Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average recovery hours per faucet value of 16.
CF	0.022	N/A	Coincidence Factor for electric load reduction (IL-TRM V4.0)

Table 18 provides assumptions used to estimate ex post savings for kitchen faucet aerators.

Table 18. Ex Post Assumptions for Kitchen Faucet Aerators

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with IL-TRM V4.0 for an 'Unknown' fuel type, we assumed 16% of program measures were installed in residences with electric water heating and 84% installed in homes with gas water heating. This evaluation used these fuel saturations and applied it to installed measures to create separate analyses for electric and gas.
%FossilDHW	100%	N/A	
GPM _{base}	1.39	gal/min	Base case flow (IL-TRM V4.0)
GPM _{low}	0.94	gal/min	Low case flow (IL-TRM V4.0)
L _{base}	4.5	min/day	Base case use length (IL-TRM V4.0)
L _{low}	4.5	min/day	Low case use length (IL-TRM V4.0)
Household	Single family: 2.56 Multi Family: 2.10	# of people	Average number of people per household (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average people per household value of 2.46.
365.25	365.25	Average days in a year	Days in a year, on average (IL-TRM V4.0)
DF	75%	Percent	Drain factor (IL-TRM V4.0) – 'Bath'
FPH	1.0	Kitchen faucets per household	Kitchen faucets per household (IL-TRM V4.0).
EPG _{electric}	0.0969	kWh/gal	Energy per gallon of hot water supplied by electricity (IL-TRM V4.0) – 'Kitchen'
EPG _{gas}	Single Family: 0.00415 Multi Family: 0.00484	Therm/gal	Energy per gallon of hot water supplied by gas (IL-TRM V4.0) – 'Kitchen'. Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average EPG of hot water supplied by gas value of 0.00429.
ISR	52%	N/A	Installation rate– 'Kitchen faucet aerator'. Evaluation team applied the 52% ISR, derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014, to reported measures distributed and did not apply any ISR to the per-unit savings values reported in the evaluation report.
Hours	Single Family: 94 Multi Family: 77	Hours/Year	Annual electric water heating recovery hours for faucet use per faucet (IL-TRM V4.0) – 'Kitchen'. Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average recovery hours per faucet value of 90.
CF	0.022	N/A	Coincidence Factor for electric load reduction (IL-TRM V4.0)

Showerheads

Installation Rates

To align the MICK program installation rates with a program of similar design, the evaluation team used single family participant survey findings for a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014, which were presented 2014 and used in the 2014 and 2015 evaluation reports.¹⁶

Savings Assumptions

The evaluation team used the following equations from the IL-TRM V4.0 to estimate energy and demand savings for shower heads.

Equation 6. Shower Head Electric Energy Algorithm

$$\Delta kWh = \%ElectricDHW \left(\frac{(GPM_{base} * L_{base} - GPM_{low} * L_{low}) * Household * SPCD * 365.25}{SPH} \right) \times EPG_{electric} \times ISR$$

Equation 7. Shower Head Gas Energy Algorithm

$$\Delta kWh = \%FossilDHW \left(\frac{(GPM_{base} * L_{base} - GPM_{low} * L_{low}) * Household * SPCD * 365.25}{SPH} \right) \times EPG_{gas} \times ISR$$

Equation 8. Shower Head Demand Algorithm

$$\Delta kW = \left(\frac{\Delta kWh}{Hours} \right) \times CF$$

Table 19 provides assumptions used to estimate ex post savings for shower heads.

Table 19. Ex Post Assumptions for Shower Heads

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with IL-TRM V4.0 for an 'Unknown' fuel type, we assumed 16% of program measures were installed in residences with electric water heating and 84% installed in homes with gas water heating. This evaluation used these fuel saturations and applied it to installed measures to create separate analyses for electric and gas.
%FossilDHW	100%	N/A	
GPM _{base}	2.35	gal/min	Base case flow (IL-TRM V4.0)
GPM _{low}	1.5	gal/min	Low case flow (IL-TRM V4.0)

¹⁶ Ameren Missouri Efficient Products Impact and Process Evaluation: Program Year 2014 details survey methodology and findings. Available online: <https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935933387>

Parameter	Value	Units	Notes/Reference
L _{base}	7.8	min/day	Base case use length (IL-TRM V4.0)
L _{low}	7.8	min/day	Low case use length (IL-TRM V4.0)
Household	Single family: 2.56 Multi Family: 2.10	# of people	Average number of people per household (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average people per household value of 2.46.
SPCD	0.6	Showers per capita per day	Showers per capita per day (IL-TRM V4.0)
365.25	365.25	Average days in a year	Days in a year, on average (IL-TRM V4.0)
SPH	Single family: 1.79 Multi Family: 1.30	Shower heads per household	Shower heads per household (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average shower heads per household value of 1.69.
EPG _{electric}	0.117	kWh/gal	Energy per gallon of hot water supplied by electricity (IL-TRM V4.0)
EPG _{gas}	Single Family: 0.00501 Multi Family: 0.00583	Therm/gal	Energy per gallon of hot water supplied by gas (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average EPG of hot water supplied by gas value of 0.00518.
ISR	47%	N/A	Installation rate- 'Shower heads'. Evaluation team applied the 47% ISR, derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014, to reported measures distributed and did not apply any ISR to the per-unit savings values reported in the evaluation report.
Hours	Single Family: 266 Multi Family: 218	Hours/Year	Annual electric water heating recovery hours for showerhead use (IL-TRM V4.0) - 'EE Kits'. Evaluation team used SF/MF values in conjunction with the 79% SF / 21% MF customer population distribution from the 2013 AIC Potential Study Market Research Report to calculate a weighted average recovery hours per faucet value of 256.
CF	0.0278	N/A	Coincidence Factor for electric load reduction (IL-TRM V4.0)

Appendix B. Natural Gas Impacts

Within the following sections we provide natural gas impacts from the program.

Gross Impacts

Table 20 lists the reported ex ante and evaluated ex post per-unit gas savings. There are large differences between ex ante and ex post per-unit gross savings for the bathroom and kitchen faucet aerators because the implementer did not calculate separate savings estimates for the different aerator types.

Table 20. PY7 Moderate Income Customer Kit Program Ex Ante and Ex Post Per-Unit Gas Savings

Measure	Reported Ex Ante Gross (therms)	Evaluated Ex Post Gross (therms)
1.5 GPM Bath Faucet Aerator	3.2	0.8
1.5 GPM Kitchen Faucet Aerator	3.2	5.9
1.5 GPM High-Efficiency Shower Head	11.1	11.0

The implementer did not estimate ex ante gas population savings for the program, as it assumed 100% of the kits were distributed to homes using electricity as their primary water heating energy source. The evaluation team used the 84% deemed gas water heater saturation from IL-TRM V4.0 to estimate gas measure installations and gas savings achieved by the program. Given the implementer's assumptions, the evaluation team did not receive ex ante gross population therm savings values. Rather, the implementer provided ex ante per-unit therm savings estimates, and the evaluation team used those to calculate the ex ante gross population therm savings, presented in Table 21. Based on verified program participation, the MICK Program achieved total gross natural gas energy savings of 77,933 therms. Table 21 shows ex ante and ex post gross gas impacts. The low gross realization rates are primarily because the ex ante installation rates are considerably higher than the ex post installation rates.

Table 21. PY8 Moderate Income Customer Kit Program Ex Ante and Ex Post Gross Gas Impacts

Measure	Reported Ex Ante Installation Rate	Ex Ante Gross Impacts (therms)	Reported Measures ^a	Evaluated Ex Post Installation Rate	Verified Measures ^b	Ex Post Gross Impacts (therms)	Gross Realization Rate ^c
1.5 GPM Bath Faucet Aerator	81%	18,999	9,022	52%	4,691	3,783	20%
1.5 GPM Kitchen Faucet Aerator	81%	18,999	9,022	52%	4,691	27,533	145%
1.5 GPM High-Efficiency Shower Head	81%	65,767	9,022	47%	4,240	46,617	71%
Total*	81%	103,766	27,065	50%	13,623	77,933	75%

* Totals may not sum due to rounding.

^a Based on IL-TRM V4.0, the evaluation team assumed 84% of total verified water-saving measures were installed in homes with gas water heating.

^b The difference between reported measures and verified measures resulted from the application of installation rates derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014 and the IL-TRM V4.0.

^c Realization rates different from 1.0 resulted from differences between ex ante and ex post installation rates and per-unit savings. Reported results have been rounded. Gross realization rate = ex post gross savings ÷ ex ante gross savings.

The evaluation team received ex ante gas savings estimates from the program implementer and reviewed the assumed estimates for comparisons to the ex post gas savings methodologies. The differences between total

ex ante and ex post electric savings estimates resulted from differences in ex ante and ex post gross electric per-unit savings assumptions and installation rates. Descriptions follow addressing discrepancies for each program measure:

- Bathroom Faucet Aerators. The ex ante bath faucet aerator per-unit savings estimate of 3.2 therms was more than the ex post per-unit savings estimate of 0.8 therms, calculated in accordance with the IL-TRM V4.0. As noted, the implementer did not calculate separate savings estimates for the different aerator types, and used a 3.2 therms gross per-unit savings estimate for both the bath and kitchen faucet aerators' ex ante gross savings calculations. In calculating the single aerator savings value, the implementer relied on IL-TRM V4.0 inputs associated with an "Unknown" aerator type, thus overestimating bath faucet aerator gross savings. Differences in installation rates used for the ex post and ex ante gross savings also resulted in ex post gross population savings being less than ex ante gross population savings. Ex ante savings used an ISR of 81%,¹⁷ while the evaluation team used the bath faucet aerator-specific ISR of 52%, derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.
- Kitchen Faucet Aerators. The 3.2 therm ex ante kitchen faucet aerator per-unit savings estimate was less than the 5.9 therm ex post per-unit savings estimate, calculated in accordance with the IL-TRM V4.0. The implementer did not calculate separate savings estimates for the different aerator types, using a 3.2 therm gross per-unit savings estimate for both kitchen and bath faucet aerator ex ante gross savings calculations. In calculating the single aerator savings value, the implementer relied on TRM inputs associated with an "Unknown" aerator type, underestimating kitchen aerator per-unit gross savings. Ex post gross population savings were less than ex ante gross population savings because of differences in installation rates used for ex post and ex ante gross savings. Ex ante savings used an ISR of 81%,¹⁸ while the evaluation team used the kitchen faucet aerator-specific ISR of 52%, derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.
- Shower Heads. The 11.1 therm ex ante shower head per-unit savings estimate was slightly more than the ex post per-unit savings estimate of 11.0 therms, calculated by the evaluation team in accordance with IL-TRM V4.0. A difference between the ex ante and ex post per-unit savings estimates resulted from the ex post per-unit savings estimate using home-type information from the 2013 AIC Potential Study, in conjunction with the prescribed single-family and multifamily values in IL-TRM V4.0, to estimate weighted values for average shower heads per household (1.69) and the number of people per household (2.46). The ex ante per-unit savings values used prescribed single-family values from IL-TRM V4.0 for shower heads per household (1.79) and the number of people per household (2.56). Further, ex post gross population savings being less than ex ante gross population savings resulted from differences in installation rates used for ex post and ex ante savings. The ex ante gross savings used an ISR of 81%,¹⁹ while the evaluation team used an ISR of 47%, derived from a kits program with similar outreach and delivery implemented by Ameren Missouri in 2014.

Net Impacts

The program achieved total net gas savings of 77,933 therms, based on the following: verified program participation, the IL-TRM V4.0 deemed per-unit gross savings values, installation rates in accordance with the

¹⁷ Plan 3 default value.

¹⁸ Plan 3 default value.

¹⁹ Plan 3 default value.

PY8 IPA Evaluation Plan, and the SAG-approved NTGRs. Table 22 shows net gas savings results by measure. The low overall net realization rate for the program is partially due to the implementer only calculating a single aerator savings value and applying it to both bathroom and kitchen faucet aerators, thus severely overestimating bathroom faucet aerator ex ante gross savings. In addition, the low overall net realization rate for the program is also because the ex ante installation rates are considerably higher than the ex post installation rates.

Table 22. PY8 Total Moderate Income Customer Kit Program Net Gas Savings by Measure

Measure	Ex Ante Net Savings (therms)	Ex Post Net Savings (therms)
1.5 GPM Bath Faucet Aerator	18,999	3,783
1.5 GPM Kitchen Faucet Aerator	18,999	27,533
1.5 GPM High-Efficiency Shower Head	65,767	46,617
Total*	103,766	77,933
Net Realization Rate^a		75%

* Totals may not sum due to rounding.

^a Net realization rate = ex post net savings ÷ ex ante net savings.

Appendix C. Program Collateral

Figure 1. Solicitation Letter—"Free" Messaging



Mr. John Q. Sample
1234 Main Street
Anytown, US 56789-0123

Your FREE Energy Efficiency Kit from Ameren Illinois is available for a limited time.

Ameren Illinois is offering you a FREE Energy Efficiency Kit to help you save money on your energy bills. These easy-to-install items reduce water usage and save energy used for water heating and lighting, which can lower your monthly energy bill. In fact, these small changes save over \$200* over the lifetime of the products. It couldn't be easier!

Your FREE energy efficiency kit (valued at \$40) includes:

- 1 - Low-flow Fixed Chrome Showerhead
- 1 - Kitchen Swivel Dual-Spray Faucet Aerator
- 1 - Standard Bath Aerator
- 2 - 13-watt Spiral CFLs (equivalent to a 60w Incandescent)
- 2 - 23-watt Spiral CFLs (equivalent to a 100w Incandescent)

Plus, receive more energy-saving tips and information on other energy efficiency programs available through Ameren Illinois to reduce your energy bills even more.

Simply return the enrollment card below and your kit will be shipped to you within four weeks. The sooner you respond, the quicker you start saving!

P.S. Supplies of these FREE kits are limited.

*Savings based on average Ameren Illinois customers electric and gas rates over the full modeled life of the products. The kit is provided as is without any guarantee or warranty. Its association with the kit, Ameren Illinois and its subsidiaries of any kind, either express or implied, including but not limited to the use of merchandise, services for a particular purpose, of sale or of non-shipment of third party rights. Use of products in the kit by a user is at user's risk.

Send a FREE Energy Efficiency Kit for my Home!



Mr. John Q. Sample
1234 Main Street
Anytown, US 56789-0123

Account No.: 1234567890



☐ YES, Send me a FREE Energy Efficiency Kit valued at \$40⁰⁰ to help me save on my energy bills.
Limit one kit per household.

If address to the left is incorrect for shipping, please write in a new address below.

A \$40⁰⁰ Value is yours FREE to help you save!



Return the enrollment card below for your Energy Efficiency Kit!

We want to help you save on your energy bill!



Figure 2. Solicitation Letter—"Savings" Messaging



**Over \$200 in
Lifetime Savings!**

Mr. John Q. Sample
1234 Main Street
Anytown, US 56789-0123

**Save now and in the years to come with a FREE
Energy Efficiency Kit from Ameren Illinois**

Finding ways to save on things you always use really adds up. That's why Ameren Illinois is offering a FREE Energy Efficiency Kit to help you save money on your energy bills. These easy-to-install items reduce water usage and save energy used for water heating and lighting, which can lower your monthly energy bill. In fact, these small changes save over \$200* over the lifetime of the products, all while maintaining the comfort in your home.

Your FREE energy efficiency kit (valued at \$40) includes:

- 1 - Low-flow Fixed Chrome Showerhead
- 1 - Kitchen Swivel Dual-Spray Faucet Aerator
- 1 - Standard Bath Aerator
- 2 - 13-watt Spiral CFLs (equivalent to a 60w Incandescent)
- 2 - 23-watt Spiral CFLs (equivalent to a 100w Incandescent)

Plus, receive more energy-saving tips and information on other energy efficiency programs available through Ameren Illinois to reduce your energy bills even more.

Simply **return the enrollment card below** and your kit will be shipped to you within four weeks. The sooner you respond, the quicker you start saving!

P.S. Supplies of these FREE kits are limited.



**We want to help
you save on your
energy bill!**

*Savings based on average Ameren Illinois customer's electric and gas rates over the full useful life of the products. The kit is provided as is without any guarantees or warranties. It is your responsibility to ensure proper installation and use of the products. Ameren Illinois makes no representation or warranty, including but not limited to the use of the products for a particular purpose, of title or of non-infringement of third party rights. Use of products in this kit by a user is at user's risk.

Send a FREE Energy Efficiency Kit for my Home!



☐ **YES, I want to start saving now!**
Please send me a free Energy Efficiency kit.
Limit one kit per household.



Mr. John Q. Sample
1234 Main Street
Anytown, US 56789-0123

Account No.: 1234567890

If address to the left is incorrect for shipping,
please write in a new address below.




Figure 3. Program Trifold Brochure, Side A



About Ameren Illinois

Ameren Illinois delivers energy to 1.2 million electric and 816,000 natural gas customers in Illinois. Our mission is to power the quality of life. Our service territory covers more than 1,200 communities and 43,700 square miles. For more information, visit AmerenIllinois.com, find us on Twitter @AmerenIllinois or Facebook.



Find more energy saving information at
ActOnEnergy.com

Energy Efficiency Kit

Your **FREE** energy efficiency kit (valued at \$40) includes:

- **1** - Low-flow Fixed Chrome Showerhead
- **1** - Kitchen Swivel Dual-Spray Faucet Aerator
- **1** - Standard Bath Aerator
- **2** - 13-watt Spiral CFLs (equivalent to a 60w incandescent)
- **2** - 23-watt Spiral CFLs (equivalent to a 100w incandescent)




Figure 4. Program Trifold Brochure, Side B



Save Water During Extreme Weather

Extreme cold and heat can put temperature control devices and programs into overdrive. Air conditioners, fans and central climate control can all be taxed to their limit. And of consequence to you, it can have a significant impact on your energy bill.

The thermostat is the easiest piece of technology to lose track of during summer and winter. The best way to combat putting your thermostat into overdrive is to set it as close to the outside temperature as possible while still remaining comfortable.

A ceiling fan can be used along with an air conditioner to spread cool air. It will also allow you to raise your thermostat an additional 4°F. Additionally, fans can help you remove excess heat and humidity after a shower by venting the warm air outside, which lowers the temperature of your home.

Disclaimer

This kit is provided as is without any guarantees or warranty. In association with this kit, Ameren Illinois makes no warranties of any kind, either express or implied, including but not limited to warranties of merchantability, fitness for a particular purpose, of title or of non-infringement of third party rights. Use of products in this kit by a user is at the user's risk.

Little Steps Lead to Big Impacts

Every choice toward conservation makes that much of a difference in larger efforts to save energy. Initial steps, no matter how small, can add up over time to significant energy savings. Taking shorter showers, turning off lights and air conditioners in empty rooms, and using less energy are just some of the physical efforts you can make to help save on energy.

Items found in this Energy Efficiency Kit are effective parts of your energy saving arsenal. By choosing the right energy efficient products you can play a significant role in saving energy.

Energy Saving Checklist

- ✓ **LED & CFL Light Bulbs** - Lighting that is energy-efficient are a must-have for a great beginning in energy savings
- ✓ **Water Usage & Water Related Energy Efficiency Products** - Add bath & kitchen aerators and adapters or replace showerheads with higher efficiency models.
- ✓ **Take Advantage of Weather** - Look at the elements. Sealing open areas (around windows, floors & baseboards, doors, and poorly insulated areas) is another step of increasing the efficiency of energy inside a home.
- ✓ **Use This Kit to Improve Energy Savings** - Installing products from this kit will provide some of the essentials to maintain a more energy efficient home.

The Do's & Don'ts of Energy Efficiency

Do's

Switch from incandescent light bulbs to compact fluorescent lights (CFLs) or LEDs.

Use a programmable thermostat.

Use ENERGY STAR® appliances and power strips.

Don'ts

Leave lights or appliances on in empty rooms.

Hold on to old second fridges or freezers.

Forget to change your air filters.

Figure 5. Kit Product Descriptions

Product Descriptions



CFL Light Bulbs

The 13 and 23 watt CFL light bulbs are developed to be environmentally friendly, have a long life, high lumens per watt and great energy savings. They fit most places incandescent bulbs do.



Water Efficient Showerhead

The Earth® Showerhead saves money by using up to 75% less water than traditional "low-flow" showerheads. It ensures drastic water usage reductions, while maintaining consistent flow rate regardless of available water pressure. This showerhead can alternate from a gentle needle spray to a forceful jet.



Standard Faucet Aerator

This faucet aerator increases spray velocity, reduces splash, saves energy used for water heating and reduces water usage. It has a dual threading to fit most male and female faucets.



Swivel Faucet Aerator

The Dual Spray Swivel Aerator offers a 360 degree swivel that lets you direct the water flow where it is needed and is an outstanding water conservation device that improves your dish washing and rinsing efficiency. Pull down for the aerator for a wide full-force stream spray and pull up for a splash-free bubble stream.

Find more energy saving information at

ActOnEnergy.com



Figure 6. Kit Product Installation Instructions

Installation Instructions

Showerhead



STEP 1: Remove old showerhead with pliers or a wrench by turning counter clockwise. Use the cloth to protect the showerhead neck from scratching (see illustration).



STEP 2: Wipe the threads clean on the shower arm, then wrap pipe tape clockwise around the arm three times covering the threads.



STEP 3: Carefully thread on the new showerhead clockwise, tightening by hand. Finish tightening with the pliers, covering the neck to protect the finish. **DO NOT OVER-TIGHTEN.**



STEP 4: Turn the water on all the way to test the connection. If it leaks, tighten it more or remove, re-tape, then reinstall the showerhead.

Aerators



STEP 1: Remove the old aerator with pliers or wrench by turning counterclockwise. Use a cloth to protect the finish from scratching.

STEP 2: Clean off the faucet threads. This aerator fits both outside & inside threaded faucets. Depending on whether it fits inside or outside, you will either use one or two washers.

STEP 3: Tighten finger tight. If the aerator leaks, use pliers or a wrench to gently tighten, using a cloth to protect the finish.

Find more energy saving information at
ActOnEnergy.com



Figure 7. Kit Content Description



The graphic is a promotional flyer for an Energy Efficiency Kit. At the top left is the Ameren Illinois logo, which consists of a green fan-like icon and the text "Ameren ILLINOIS". To the right of the logo is a photograph of an elderly woman and a young girl smiling and washing their hands at a kitchen sink. Below the logo, on a white background, is the text "This Energy Efficiency Kit is valued at \$40". To the right of this, on a blue background, is the title "Energy Efficiency Kit" in large white letters, with "provided by Ameren Illinois" in smaller white letters below it. Below the title, still on the blue background, is the slogan "Little Steps Lead to BIG IMPACTS" in large blue letters. Underneath the slogan, it says "Find more energy saving information at ActOnEnergy.com". At the bottom, there is a green section titled "Included In This Kit" in a blue box. Below this title are five items listed with icons: "Low-Flow Showerhead" (showerhead icon), "Standard Bath Aerator" (aerator icon), "Kitchen Swivel Aerator" (aerator icon), "13-Watt Spiral CFLs" (CFL bulb icon), and "23-Watt Spiral CFLs" (CFL bulb icon). On the left side of this green section is a photograph of a woman holding two CFL bulbs. On the right side is the Ameren Illinois logo.

Ameren ILLINOIS

This Energy Efficiency Kit is valued at \$40

Energy Efficiency Kit

provided by Ameren Illinois

Items found in this Energy Efficiency Kit are effective parts of your energy saving arsenal. By choosing the right energy efficient products you can play a significant role in saving energy and saving money on your monthly energy bill.

Little Steps Lead to BIG IMPACTS

Find more energy saving information at ActOnEnergy.com

Included In This Kit

- [Low-Flow Showerhead](#)
- [Standard Bath Aerator](#)
- [Kitchen Swivel Aerator](#)
- [13-Watt Spiral CFLs](#)
- [23-Watt Spiral CFLs](#)

Ameren ILLINOIS

Figure 8. Home Efficiency Program Cross-Promotional Fact Sheet, Side A

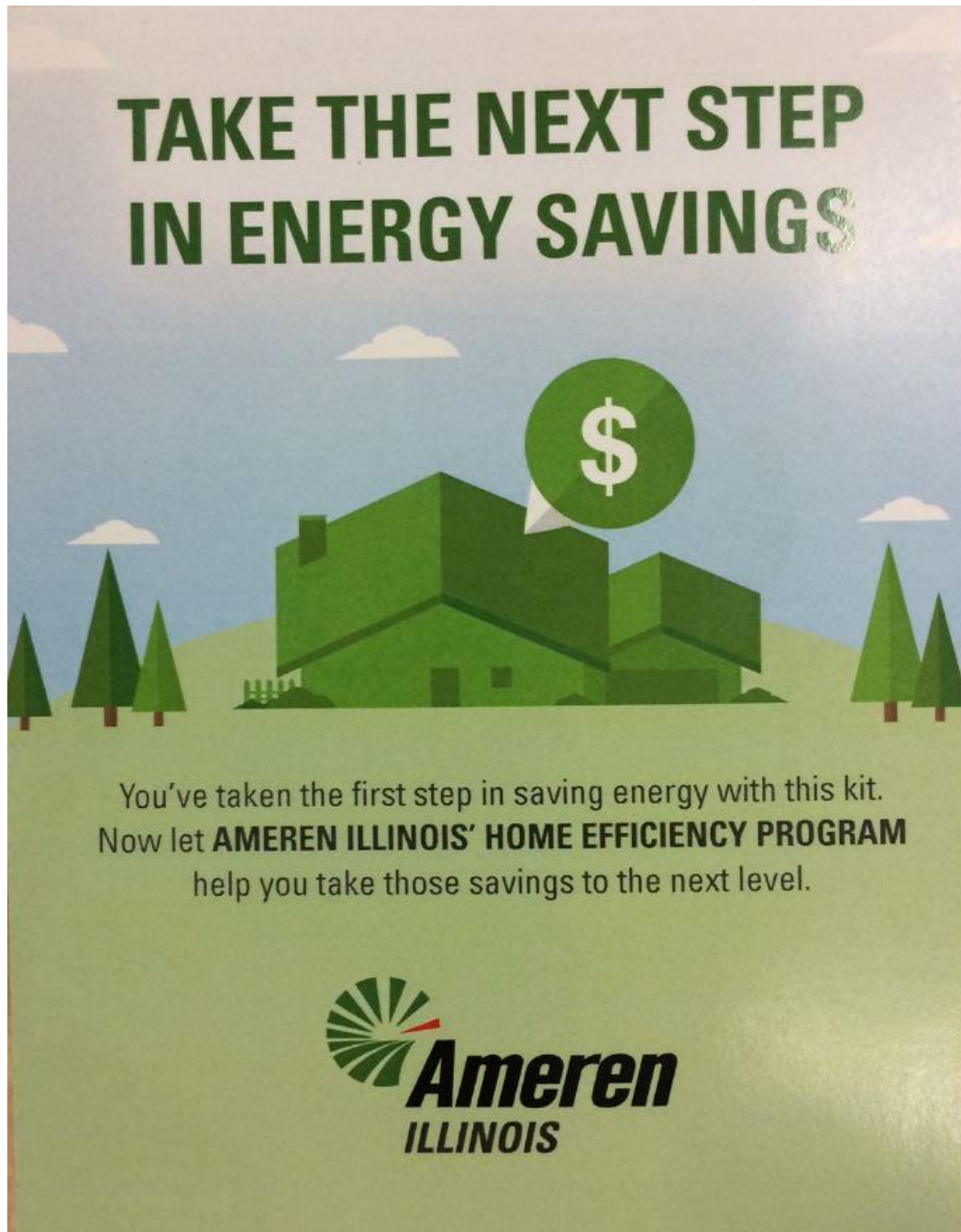


Figure 9. Home Efficiency Program Cross-Promotional Fact Sheet, Side B

Through our **HOME EFFICIENCY PROGRAM**, we can pinpoint areas where your home is wasting energy and provide generous incentives to help offset the cost of making energy-saving improvements. In addition, Ameren Illinois customers that meet specific income requirements may qualify for increased incentives and discounts through our Income-Qualified program.

PROGRAM BENEFITS:

- » Typical savings of 20% or more on utility bills
- » Generous incentives can cover a large percentage of your project costs
- » Convenient on-bill financing available
- » Fewer drafts and more comfortable rooms
- » Increased long-term value of the home
- » Specially-trained Program Allies perform the work

READY TO LEARN MORE?

Contact us at **1.866.838.6918**
or visit ***ActOnEnergy.com/NextStep***

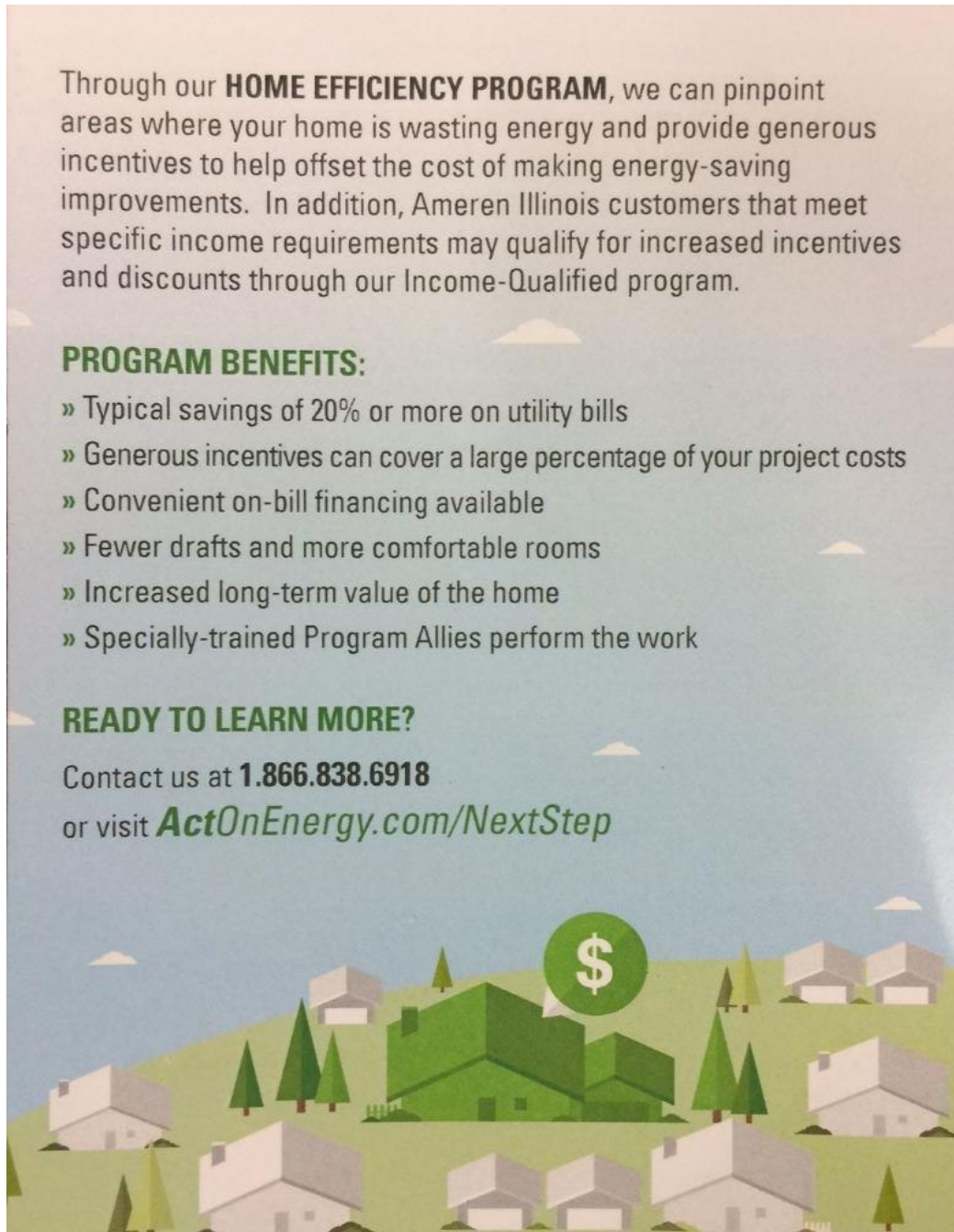
The illustration at the bottom of the fact sheet depicts a peaceful suburban neighborhood. Several houses of varying sizes and colors (light beige, grey, and green) are scattered across a rolling green landscape. Interspersed among the houses are several green coniferous trees. In the center of the illustration, a large, vibrant green circle containing a white dollar sign (\$) is superimposed over the scene, symbolizing financial savings or investment. The background of the entire fact sheet is a soft, light blue sky with a few wispy white clouds.

Figure 10. Regrets Postcard, Side A



We ran out!

Due to an overwhelming response, requests for a **FREE ENERGY EFFICIENCY KIT** have exceeded the limited supply.

But, you will be one of the first to receive your kit when more become available **June 1, 2016!**

Figure 11. Regrets Postcard, Side B



Appendix D. Cost-Effectiveness Inputs

Heating Penalty

Efficient lighting products generate less waste heat compared to baseline lighting products. When customers replace baseline products with more-efficient lighting, they must use more space heating to compensate for the “lost” heat from the previous lighting. The heating penalty represents this increased gas usage for space heating.²⁰ The penalty is used in analyzing program cost-effectiveness.

Heating Penalty Results

In addition to the gross gas-heating penalty from measure installations in PY8, the evaluation team calculated the gross gas-heating penalty from delayed CFL installations, per the IL-TRM V4.0. In particular, IL-TRM V4.0 assumed consumers would install 93% of kit CFLs within 3 years. Table 23 shows the gross gas-heating penalty resulting from efficient lighting installations provided to participants in PY8 and realized in PY8, as well as in PY9 and PY10, given later installations.

Table 23. Yearly Gross Gas-Heating Penalty Impact of Lighting Measures by Assumed Installation Year

Measure	Heating Penalty (Therms)		
	PY8	PY9	PY10
13-Watt CFL	-7,710	-1,635	-1,402
23-Watt CFL	-12,593	-2,671	-2,290
Total	-20,303	-4,307	-3,691

The evaluation team will include the PY9 gas-heating penalty in future evaluation reports.²¹ Table 24 shows the gross gas impacts for cost-effectiveness inputs.

Table 24. Gross Gas Impacts

Measure	Gross Gas Impacts (Therms)		
	PY8	PY9	PY10
13-Watt CFL	-7,710	-1,635	-1,402
23-Watt CFL	-12,593	-2,671	-2,290
1.5 GPM Bath Faucet Aerator	3,783	*	*
1.5 GPM Kitchen Faucet Aerator	27,533	*	*
1.5 GPM High-Efficiency Shower Head	46,617	*	*
Total	57,630	-4,307	-3,691

* To be determined in future evaluations

²⁰ We follow IL-TRM V4.0 direction and assume all homes are gas heated since we do not have information on the heating fuel of customers' homes. Thus, we calculate only a gas-heating penalty.

²¹ A PY10 gas-heating penalty will not be included in a future evaluation, as the MICK Program will end after PY9.

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