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Impact and Process Evaluation of 2015 (PY8) Ameren Illinois Company Residential Energy Efficiency School Kits Program

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1. Executive Summary

This report summarizes the results for the Residential Energy Efficiency School Kits (School Kits) Program for Program Year 8 (PY8). Through this program, Ameren Illinois Company (AIC) distributes kits (containing energy-efficient items) during on-site presentations to fifth through eighth grade students. Beginning in PY8, Leidos Engineering contracted with AIC to provide program oversight. Leidos subcontracts with CLEAResult to implement the program and Energy Federation Incorporated (EFI) to compile and deliver kits to schools. The program seeks to increase sales and awareness of ENERGY STAR®-qualified lighting products, along with other AIC energy efficiency offerings. The School Kits Program provided energy efficiency kits to 7,539 students in PY8 (June 1, 2015–May 31, 2016).

As shown in Table 1, the kits contained CFLs, faucet aerators, and shower heads, along with instruction materials explaining how to properly set water heater temperatures. School Kits Program materials also asked student participants to complete a (program-administered) web-based student participant survey to verify the installation of energy-efficient items based on an activity worksheet that they take home to complete with the assistance of their parent or guardian.[1]

Table 1. PY8 School Kits Products

Product	Quantity per Kit
13-Watt CFL	2
1.0 Gallons per Minute (GPM) Bath Faucet Aerator	1
2.0 GPM Kitchen Faucet Aerator	1
1.75 GPM High-Efficiency Shower Head	1
Hot Water Temperature Card Thermometer	1
Instructional Materials	N/A

Leidos' implementation plan assumed energy savings of 235 annual net kWh and 9.55 annual net therms per kit, for a combined 7,500-kit net savings goal of 1,763 MWh and 71,625 therms.[2] The plan specified the following program objectives:

- Increase awareness of energy efficiency and conservation
- Increase energy efficiency for targeted students and their families through simple home energy efficiency tools and measures

Program Impacts

Table 2 summarizes the PY8 School Kits Program's net energy and demand savings of 728 MWh, 0.135 MW, and 24,518 therms. 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 combination with the following:

- PY8 School Kits Program installation rates and water heater fuel saturations (derived from the implementer-administered web-based student participant survey results)[3] for program measures

[1] For the remainder of this report, "parent" will be used to refer to either "parent" or "guardian."

[2] Program Year Eight Implementation Plan, "School Kits Program Plan." Received July 27, 2016. Page 1.

[3] Except CFLs, where the evaluation team applied the prescribed 61% first-year installation rate from IL-TRM V4.0.

- Application of the Stakeholder Advisory Group's (SAG) approved net-to-gross ratio (NTGR) for this program
- Additionally for PY8,[4] the evaluation team included net savings for delayed CFL installations attributed to the PY7 School Kits Program.

As a result, the program achieved the gross and net savings shown in Table 2. 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, which are based on evaluated results (from PY7).

Table 2. PY8 Net School Kits Program Impacts

	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR	Initial PY8 Ex Post Net	PY7 Ex Post CFL Net Savings Realized in PY8	PY8 Ex Post Net
Energy Savings (MWh)							
Total MWh	1,163	64%	745	0.98	728	54	782
Demand Savings (MW)							
Total MW	0.207	65%	0.135	1.01	0.135	0.006	0.141
Energy Savings (therms)							
Total therms	40,252	59%	23,592	1.04	24,518	0	24,518

Key Findings and Recommendations

The PY8 School Kits Program delivered 7,539 kits to students, exceeding its PY8 goal by 1%. In its third year, nearly half of the program's participating schools (31 of 66) also participated during PY7, and most teachers completing the implementer's teacher survey expressed interest in participating in the PY9 program. AIC, Leidos, and CLEAResult program staff coordinated planning and implementation efforts, frequently communicating throughout the program year.

During the evaluation team's process review, utility and implementation staff reported that they were highly satisfied with PY8 program performance. These stakeholders reported that the program was successful and that they do not plan to change the program for PY9. Stakeholders also reported that operations ran smoothly, without significant issues.

Based on this research, the evaluation team provides the following key findings and recommendations:

- **Key Finding #1:** While the implementer-administered web-based student participant survey response rate increased to 33% in PY8 (from 23% in PY7), this remains lower than the 55% response rate for PY6 and lower in comparison with other similar Midwestern programs. Student response rates typically depend on teachers' encouragement levels and associated completion requirements. As student survey data directly inform program impacts (e.g., installation rates and water heater saturations), increased response rates will lead to more-accurate savings calculations.
  - **Recommendation:** Consider revising incentives for student survey completions. Instead of providing incentives to schools with the best response rates, provide incentives to individual teachers whose classroom (i.e., students) meets a minimum response rate. For teachers who have participated in the past, consider offering incentives for improved response rates. A tiered incentive (e.g., $20 for returning any surveys, $50 for returning 50% of a classroom's surveys, and

[4] Delayed 13-watt installations by PY7 School Kits Program participants, estimated as installed during the PY8 program year (in accordance with IL-TRM V3.0), were credited to the final PY8 School Kits Program net impacts.

$100 for returning 80% of a classroom's surveys) may encourage teachers to emphasize the importance of student survey completion.

  - **Recommendation:** Program staff could revise delivery tactics to increase response rates (e.g., emailing teachers directly to remind them to complete the student survey activity or encouraging teachers to consider using the activity worksheet and installations as homework assignments).

- **Key Finding #2:** Implementation staff struggled with recruiting new schools, particularly in the territory's underserved regions (i.e., rural schools). Teachers in rural areas may not attend the teacher conferences used to recruit schools, and difficulties arise in cost-effectively reaching rural schools (with fewer students) and schools bordering the service territory.

  - **Recommendation:** Develop participation targets to focus program staff on reaching new, underserved markets.

  - **Recommendation:** Consider conducting special, direct outreach with rural school administrators to target new schools in underserved regions.

- **Key Finding #3:** As recommended in the PY6 and PY7 evaluation reports, the program implementer updated the implementer-administered web-based student participant survey to collect water heater saturation and demographic data for PY9. However, the revised student survey does not include all information useful in assessing program free-ridership, such as parents' likelihood to change water heater temperature settings or purchase the kit's contents in the absence of the program. Cadmus developed parent postcards to obtain permission to collect this information, but few parents have returned the postcards to date.

  - **Recommendation:** To evaluate program free-ridership, consider including a request in the parent letter to return the postcard. Stress to teachers the importance of collecting the parent postcard in order to evaluate the program's energy savings.

- **Key Finding #4:** The low gross realization rates for shower heads and hot water temperature card thermometers 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 the PY8 School Kits Program implementer-administered web-based student participant survey, in accordance with the PY8 Evaluation Plan, 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 #5:** 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 bath faucet aerator savings and underestimating kitchen faucet aerator savings.

  - **Recommendation:** Calculate separate ex ante per-unit savings for bath faucet aerators and kitchen faucet aerators.

2. Evaluation Approach

The PY8 assessment of the School Kits Program included process and impact analyses.

2.1 Research Objectives

The PY8 School Kits Program impact evaluation sought to provide estimates of the program's gross and net electricity savings. Specifically, the evaluation team researched the following impact questions:

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

A process evaluation, exploring how the program performed in its third year, researched the following process-related questions:

- What, if any, implementation challenges occurred in PY8?
- Did the program operate effectively?
- How did staff market the program?
- What participation challenges existed for school-based customers?
- What program changes could improve program effectiveness?

2.2 Evaluation Tasks

Table 3 summarizes PY8 evaluation activities conducted for the School Kits Program.

Table 3. PY8 School Kits Program Evaluation Methods

Activity	PY8 Process	PY8 Impact	Forward Looking	Details
Program Staff In-Depth Interviews	✓			Interviewed three program and implementation staff to gain insights into the program's design and delivery
Review of Program Materials and Data	✓			Reviewed implementation plan, program marketing materials, and instructional materials
Impact Analysis: Database Analysis	✓	✓	✓	Summarized database information to determine participation, key program statistics, and savings
Review of Implementer's Student Participant Survey Instrument	✓	✓	✓	Reviewed implementer-administered web-based student participant survey instrument for data needs to assess installation rates and water heater fuel saturation rates
Parent Postcard for Future Participating Household Survey			✓	Requested permission through parent postcard to survey student households to assess the program's process and future program years' net-to-gross ratios (NTGRs)

2.2.1 Program Staff In-Depth Interviews

The evaluation team conducted three interviews with AIC and with the implementation staff responsible for

managing, marketing, and delivering the program. As shown in Table 4, the team interviewed program staff to assess program design, implementation, communications, and strengths and weaknesses.

Table 4. Program Staff Interviews

Company	Number of Staff Interviewed
AIC	1
CLEAResult	1
Leidos	1

2.2.2 Review of Program Materials and Data

The evaluation team reviewed the following program data:

- Program database
- Implementer's web-based student participant survey results
- Program collateral
- Implementation plan

2.2.3 Database Analysis

The evaluation team reviewed the program-tracking database to determine participation levels and installation rates.

2.2.4 Review of Implementer's Student Participant Survey

As recommended in the PY6 and PY7 evaluation reports, the evaluation team reviewed the program implementer-administered web-based student participant survey to revise the survey to collect data needed to better estimate program savings. The team provided recommendations for changes to the activity sheet to collect the data necessary to assess water heater saturations and to estimate the NTGR in future years. The program implementer did not update the activity sheet due to time constraints, but Leidos did revise the web-based survey to include the water heater saturation questions to inform PY8 program impacts. Because students enter information from the activity sheet into the implementer's web-based survey in the classroom, the implementer did not incorporate the NTGR questions into the web-based student survey.

2.2.5 Parent Postcard for Future Participating Household Survey

To capture data relevant for estimating the program's future NTGR planning, the evaluation team plans to conduct a telephone survey with PY8 and PY9 participating student households as part of the PY9 evaluation. To collect appropriate contact data for this survey effort, the evaluation team worked with the program implementer to develop a parent contact postcard for distribution, along with the PY8 energy efficiency kits (see Appendix B). The postcard requested participating parents' contact information and permission to contact these participants for follow-up research. The team will use the resulting parent contact information to construct the survey sample frame.

All schools receiving kits between April 2016 and December 2016 received the parent contact postcards. We will target a sample of 70 completed PY8 participating student household surveys to achieve the 90/10 level of confidence and precision.

In PY9, the evaluation team will design a participating household telephone survey to assess free-ridership, spillover, and program participation process. The process-related issues examined will include participant awareness, decision making, and satisfaction. The team anticipates fielding the survey in January 2017, after the close of the 2016 fall semester, provided a sufficient sample is available for survey fielding. The team will submit the resulting NTGR as part of the PY10 NTGR recommendations process.

2.2.6 Impact Analysis

Gross Impacts

To estimate gross electric savings values for program measures, 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 deemed per-unit gross savings inputs, in combination with the implementer-administered web-based student participant survey results for installation rates and water heater fuel saturation. The team used home-type information from the U.S. Energy Information Administration 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 the IL-TRM V4.0.[5] To estimate electric energy savings associated with the program, the evaluation team applied a 50% electric water heater saturation rate (based on the implementer-administered web-based student participant survey data) to verified installations of energy kit measures.[6] Table 5 lists the ex post gross electric savings.

Table 5. PY8 School Kits Program Ex Post Gross Electric Savings—Per Unit Installed

Measure	Gross kWh	Gross kW
13-Watt CFL	24.0	0.0023
1.0 Gallons per Minute (GPM) Bath Faucet Aerator	18.8	0.0251
2.0 GPM Kitchen Faucet Aerator	129.9	0.0322
1.75 GPM High-Efficiency Shower Head	177.1	0.0196
Hot Water Temperature Card Thermometer	81.6	0.0093

The evaluation team applied a gas water heating saturation of 50% (based on the implementer-administered web-based student participant survey data) to verified installations to estimate gas energy savings associated with the program (shown in Table 6). We used IL-TRM V4.0 deemed per-unit gross savings inputs for program measures to calculate the gross per-unit gas savings shown in Table 6.

Table 6. PY8 School Kits Ex Post Gross Gas Savings—Per Unit Installed

Measure	Gross Therms
1.0 GPM Bath Faucet Aerator	0.8

[5] Note: 69% of customers live in single-family homes and 31% live in multifamily homes: https://www.eia.gov/consumption/residential/data/2009/hc/hc2.9.xls.

[6] The Ameren Illinois Energy Efficiency Market Potential Assessment found 19% of single family homes and 49% of multifamily units use electric water heating. Available online: https://www.illinois.gov/sites/ipa/Documents/AppendixB-4vol1-5AmerenPotentialStudy.pdf.

2.0 GPM Kitchen Faucet Aerator	5.9
1.75 GPM High-Efficiency Shower Head	8.0
Hot Water Temperature Card Thermometer	3.7

Net Impacts

The evaluation team applied NTGRs (approved by the Stakeholder Advisory Group [SAG]) to PY8 program savings. Table 7 summarizes NTGRs used in the net impact analysis. Applying the NTGRs to the School Kits Program resulted in an overall savings-weighted PY8 School Kits Program NTGR of 0.98 for kWh, 1.01 for kW, and 1.04 for therms.

Table 7. SAG-Approved PY8 School Kits Program NTGRs

Measure Type	Electric NTGR	Gas NTGR
CFLs	0.83	—
Faucet Aerators	1.04	1.04
Shower Heads	1.05	1.05
Hot Water Temperature Card Thermometers	1.00	1.00
Program-Level Energy Savings Weighted NTGR	0.98	1.04
Program-Level Demand Savings Weighted NTGR	1.01	N/A

Table 8 lists ex post per-unit gross, SAG-approved NTGRs and ex post net electric savings values. With the exception of the 13-watt CFL, measure-level ex post per-unit net savings are equal to or more than the ex post per-unit gross savings.

Table 8. PY8 School Kits Program Ex Post Net Electric Savings—Per Unit Installed

Measure	Gross kWh	Gross kW	NTGR	Net kWh	Net kW
13-Watt CFL	24.0	0.0023	0.83	19.9	0.002
1.0 GPM Bath Faucet Aerator	18.8	0.0251	1.04	19.6	0.026
2.0 GPM Kitchen Faucet Aerator	129.9	0.0322	1.04	135.1	0.034
1.75 GPM High-Efficiency Shower Head	177.1	0.0196	1.05	185.9	0.021
Hot Water Temperature Card Thermometer	81.6	0.0093	1.00	81.6	0.009

Table 9 lists ex post per-unit gross, SAG-approved NTGRs and ex post per-unit net gas savings values. Ex post per-unit net gas savings are equal to or more than the ex post per-unit gross gas savings for every gas measure installation.

Table 9. PY8 School Kits Ex Post Net Gas Savings—Per Unit Installed

Measure	Gross Therms	NTGR	Net Therms
1.0 GPM Bath Faucet Aerator	0.8	1.04	0.9
2.0 GPM Kitchen Faucet Aerator	5.9	1.04	6.1
1.75 GPM High-Efficiency Shower Head	8.0	1.05	8.4
Hot Water Temperature Card Thermometer	3.7	1.00	3.7

2.3 Sources and Mitigation of Error

Table 10 summarizes of possible error sources associated with data collection conducted for the School Kits Program. A detailed discussion of each item follows.

Table 10. Possible Error Sources

Research Task	Survey Error		Non-Survey Error
	Sampling Error	**Non-Sampling Survey Error**	
Student Participant Surveys[a]	N/A – Census attempt	Non-response bias	N/A
Gross Impact Calculations	N/A	N/A	Data processing error
Net Impact Calculations	N/A	N/A	Data processing error

[a] Survey designed and data collected by the implementer, not the evaluator.

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

Survey Error

- **Implementer-Administered Web-Based Student Participant Survey:** In fielding surveys to school-based participants, the implementer attempted a census; therefore, no sampling errors occurred. The 33% survey response rate means that there is the potential for nonresponse bias. The implementer conducted the surveys, and the evaluation team did not have information about the extent of this potential bias or how the implementer attempted to mitigate it.

Non-Survey Error

- **Gross Impact Calculations:** The evaluation team applied deemed per-unit savings values to participant data in the tracking database to calculate gross impacts. To minimize data processing errors, the team had different team members review all calculations to verify their accuracy.
- **Net Impact Calculations:** The evaluation team applied the deemed NTGRs (shown in Table 7) to estimate the program's net impacts. To minimize data processing errors, the team had different team members review all calculations to verify their accuracy.

3. Detailed Evaluation Findings

3.1 Program Description

The Residential Energy Efficiency School Kits (School Kits) Program provides in-class energy education presentations to fifth- through eighth-grade students. Energy Federation Incorporated (EFI) assembles and sends energy efficiency kits to these students' schools, and CLEAResult (the program implementer) distributes the kits at the start of each presentation. The kits include energy-saving measures that students are asked to take home and install with their families.

CLEAResult recruited schools primarily through direct-mail outreach and conference presentations. The program design sought to provide a positive experience for participating school administrators and teachers by offering a program that was easy to schedule and receive. In addition, the program implementer designed the presentation to be informative yet enjoyable for the students. The presentation and kit materials also provided opportunities to increase customer awareness of other Ameren Illinois Company (AIC) energy efficiency programs.

In Program Year 8 (PY8), the School Kits Program provided education and materials to 7,539 students from 66 different schools. According to the program implementer's tracking database, the number of kits distributed to each school ranged from 21 to 504.[7]

3.2 Process Findings

3.2.1 Program Operations

AIC contracted with Leidos and CLEAResult to deliver the program and to achieve the program's energy savings goals. Leidos managed the program's implementation team and provided reporting to AIC on program activities. CLEAResult:

- Developed the State Board of Education-approved presentation and activity sheet
- Recruited schools
- Scheduled the school presentations
- Notified its subcontractor (EFI) of the schedule and of the number of kits needed at the schools in time for the presentations
- Presented the program to fifth- through eighth-grade classrooms in the schools

EFI assembled and mailed the AIC-branded kits and marketing materials directly to schools about 2 weeks before scheduled presentations.

[7] One school had 13 kits remaining from the previous year's presentation. In this school, the implementer presented to a class of 12 students, but did not distribute additional kits in PY8. While included in the total number of schools served, the implementer did not claim savings from serving this school in PY8, as the program claimed these savings in PY7.

3.2.2 Program Goals

In addition to the energy savings achieved through the kit, the program sought to have students take home lessons that they learned from the presentations so that they could educate their families. The kit's activity worksheet engaged parents in the kit installation process and informed them of additional energy efficiency program opportunities available through AIC. Parents and students completed household and measure installation information on the activity sheet, and students entered this information into the program implementer-administered web-based student participant survey.

During the interviews, program and implementation staff stated that the program's original goals included distributing at least 5,000 kits. The program implementer determined that the budget supported a 7,500 kit goal in PY7, and staff agreed to increase the PY8 goal to 7,500 kits distributed. In total, the program distributed 7,539 kits in PY8, exceeding the increased goal by 1%. Interviewees reported also achieving the increased goal without exceeding the program budget.

3.2.3 Marketing and Outreach

The School Kits Program used direct-mail outreach and conference presentations to market the program and to recruit schools within AIC's dual-fuel (electric and gas) service territory. Implementation staff reported that a school occasionally could be located within AIC's electric-only service territory, but its students' addresses primarily fell within the dual-fuel territory.

Marketing at teacher- and school-focused conferences raised new participants' interest in the program. CLEAResult displayed materials and program kits during reading and science conferences. The program raffled gift baskets to collect contact information for recruitment, but implementation staff commonly enrolled teachers on site.

CLEAResult sent mass mailings to schools a few times a year, focusing the marketing campaign on middle and junior high schools, and then on elementary schools. Through this method, the program targeted teachers who participated in past years and who indicated their interest in participating in future school years.

The primary program marketing challenge arose from the large size of AIC's service territory and the rural areas within that territory. In rural areas, the program implementer considered how many children attending the school likely lived within AIC's service territory. Because many AIC rural service areas are also near other cooperative utilities' jurisdictions, school attendees might not be AIC customers. Implementers used school zip codes to assess the likelihood that students were AIC customers.

Once the program recruited teachers, the implementer communicated via a primary contact within the school to determine and confirm presentation dates, kit deliveries, and student and teacher survey completions.

3.2.4 The Program Presentation

The presenter, an employee of CLEAResult, arrived at the school at least 40 minutes ahead of schedule to set up. This allowed the presenter to meet with the principal and to gather kits previously shipped to the school by EFI. The implementer typically conducted three or four presentations at a school during a day. Though the presentation followed a PowerPoint slide deck, it included items that children could see and touch, such as a lighted panel showing meter readings of various bulb types' energy use.

Students received an activity worksheet to review during the presentation. The implementer described the importance of energy conservation and pointed out that much of the energy produced is derived from non-

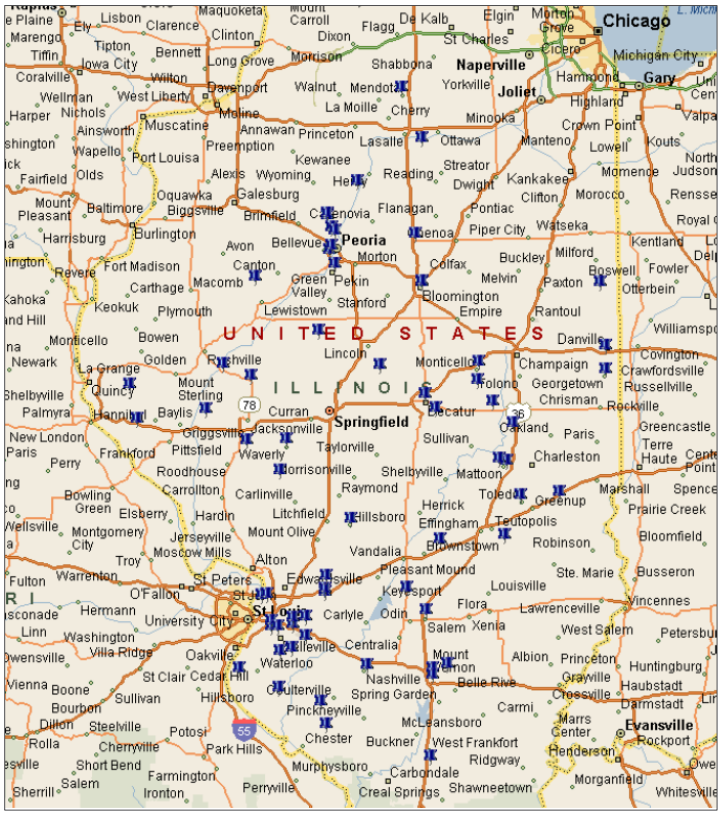
renewable, limited, and polluting sources. The implementer presented each item in the kit, detailing lighting and water heating energy usage, along with the expected energy savings potential from installing the kit's measures. The presenter encouraged students to learn more about energy efficiency, visit the program website ActOnEnergy.com, and to take action in their homes, starting with the provided energy efficiency kit.

The implementer advised students to work with a parent to install the measures, complete the activity sheet, and, as of April 2016, complete a postcard that requests the parent's permission to opt into follow-up program research. Parents responded to the evaluation team's request in limited ways. As of October 2016, only 18 households returned the postcard, and, of those, only 8 agreed to a follow-up survey to collect additional program feedback.

3.2.5 School and Customer Participation

Implementation staff reported satisfaction with the PY8 participation levels, and program staff expressed confidence in the School Kits Program's continued success into PY9, thanks to teachers' enthusiasm for the program. In PY8, the program implementer reported performing 214 presentations in 66 schools (out of approximately 250 eligible schools within AIC's service territory). The School Kits Program implemented presentations at the school locations shown in Figure 1.[8]

Figure 1. PY8 School Presentation Distribution



Participating teachers encouraged students to install the kit's contents and to complete the activity sheet with a parent after taking their kits home. Using information collected from the activity sheet, students completed

[8] Source: CLEAResult's report to Leidos. File name: "Student Energy Education Kit Program Year End 2014-2015.pdf."

the implementer-administered web-based student participant survey in the classroom. The two schools with the highest response rates to the implementer's online student survey received $250 gift cards from the program for their efforts.[9]

Program staff also encouraged the school's primary contact to complete an online satisfaction survey, and 26 of the 66 schools submitted responses to the implementer's teacher survey. All respondents (100%, n=26) reported that the kits arrived on time and found the presentations relevant and the guidelines for completing the worksheet and measure installations thorough. The majority of respondents (88%, n=26) provided contact information to participate in the program in PY9.[10]

The implementer reported that teachers seemed excited about the program and that they planned to use the materials as a starting point for future energy topic discussions. Additionally, implementation staff reported that working with the same fifth- to eighth-grade teachers year-over-year gave schools experience and familiarity with the program, which encouraged repeat participation from PY7 to PY8. The program records indicated that 31 out of 66 schools visited in PY7 (47%) were again visited in PY8, allowing the program to be offered to new students entering the targeted grades. AIC and the implementation program staff noted some difficulties in recruiting schools in underserved regions, but once teachers enrolled, program staff were able to keep teachers engaged throughout the process.

3.2.6 Implementer's Student Participant Survey

The program implementer-administered web-based student participant surveys directly informed program impacts (e.g., installation rates and water heater saturations). For the PY6 and PY7 evaluation reports, the evaluation team recommended that the program collect several additional data points to best estimate program savings. In early 2016, the implementer revised its web-based student participant survey to ask participants to verify usage parameters and water heating fuel types, as recommended in the PY6 and PY7 evaluation reports. The revised student survey collects the following additional participant data:

- Water heater fuel type
- Household size
- Number of shower heads
- Number of bath faucets
- Number of bath faucets with an existing aerator

The evaluation team analyzed data from the implementer-administered web-based student participant surveys to assess installation rates, applying the installation rates to program participation totals to estimate program savings for PY8. In total, 2,522 of 7,539 (33%) reported participants in the school-based program returned surveys.

Implementer's Student Participant Survey Response Rate

Though the PY8 implementer-administered web-based student participant surveys' response rate was higher in PY8 (33%) than in PY7 (23%), the PY8 response rate was lower than PY6's response rate (55%), while the survey's availability or incentives offered did not appear to change. The evaluation team conducted a high-

[9] According to CLEAResult's Year End PY8 report, two schools achieved 100% survey response rates.

[10] Source: CLEAResult's report to Leidos. File name: "Student Energy Education Kit Program Year End 2014-2015.pdf."

level benchmarking analysis of four similar Midwestern school education kit programs to provide insights for program improvements (see Appendix E).

All benchmarked programs relied on responses from student take-home surveys to estimate the number of measures installed from the energy efficiency kits. Through the surveys, students reported on how many kit measures they installed. Comparison program surveys also collected basic household and demographic information, such as heating and cooling system types, family size, and type of home (e.g., single-family, multifamily). As in this evaluation, benchmarked program survey data proved critical for conducting impact evaluations, as variables like installation rate, water heater fuel type, and family size could directly inform electric and/or gas savings for each kit.

As shown in Table 11, all comparison programs included a paper survey in the energy efficiency kits. Teachers instructed their students to complete these paper surveys by hand with their families and to return the completed surveys. In the case of Dayton Power & Light/Vectren Ohio, students and their families were invited to complete a web- or paper-based student survey. Students participating in AIC's program completed a web-based student survey after filling out an activity sheet at home.

Table 11. Comparison of Student Survey Data Collection Methods

Paper Survey Only	Online Survey	Paper or Online Survey
• Consumers Energy • Energizing Indiana • Vectren Indiana	• AIC	• Dayton Power & Light and Vectren Ohio*

* Dayton Power & Light and Vectren Ohio jointly administer the Be E3 SMART Program, sharing program costs and savings.

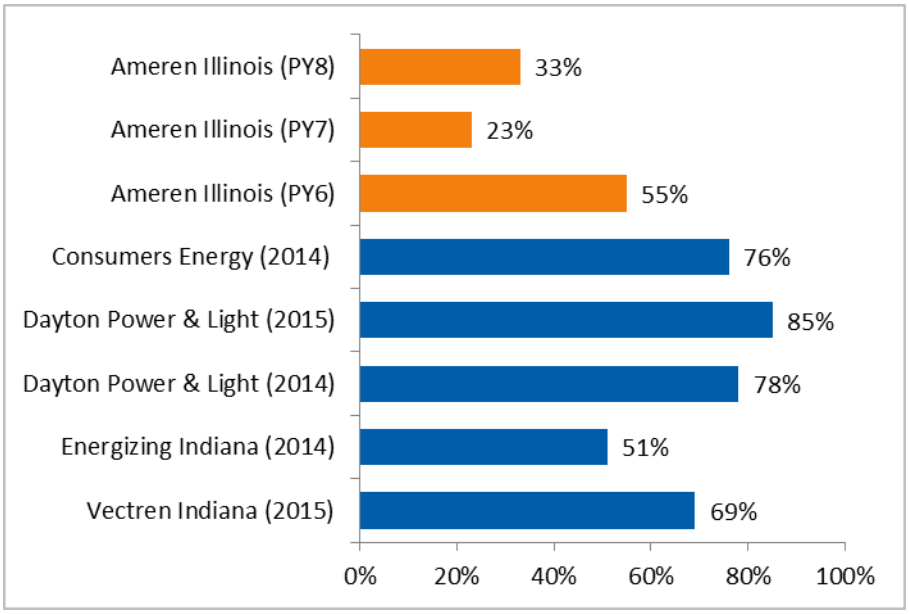
Table 12 shows AIC and comparison program sponsors offered a variety of incentives to participating teachers and schools. AIC offered a $250 gift card to the two schools with the highest student survey response rates. All the benchmarked programs required teachers to return a threshold percentage of their classroom's student surveys.

Table 12. Comparison of Program Incentives

Program Sponsor(s)	Incentive	Recipient	Requirements
AIC	$250	School	Two schools with highest student survey response rates
Consumers Energy	$100	Teacher	Returning 80% of classroom's student surveys
Dayton Power & Light/ Vectren Ohio	$100	Teacher	Returning 50% of classroom's student surveys
Energizing Indiana	$50	Teacher	Returning 80% of classroom's student surveys
Vectren Indiana	$50	Teacher	Returning 80% of classroom's student surveys

The evaluation team compared the AIC student survey results to the benchmarked comparison programs' response rates reported. As shown in Figure 2, although the program increased its response rate in PY8 over PY7, it produced the lowest response rates in PY8 among the school programs compared. Student survey response rates among similar school programs ranged from 51% to 85%.

Figure 2. Comparison of Student Survey Response Rate, PY6–PY8



3.2.7 Communications and Cooperation

The implementation team used a number of processes to ensure ongoing and effective communication. First, CLEAResult implementation staff held two monthly meetings with program partners (Leidos, EFI, and, on occasion, AIC) to review issues, goals, progress, and upcoming events. AIC also met with CLEAResult every 2 weeks to discuss program details. CLEAResult and Leidos provided AIC with monthly reports of program activity regarding presentations, kit delivery, student and teacher survey responses, and budget goals.

EFI and CLEAResult also had communication protocols and program checks in place to ensure that they delivered the correct number of kits to schools on time. Importantly, the presenter always brought a few extra kits to the school, in case the number of students changed since scheduling the presentation.

Finally, CLEAResult management regularly met with the presenter to ensure a smooth and efficient travel schedule. All interviewees reported that these scheduled meetings worked well in updating everyone on activities and promptly resolving any issues.

Program staff identified consistent planning and implementation communications as the reasons for their successful working relationships. AIC and Leidos staff reported a thorough understanding of program activities, and they expressed pleasure with the involvement level afforded them. Implementation staff also noted the program's checklist for teachers (which included standardized email communications) as an effective element in conveying the program's process and expectations.

3.3 Impact Assessment

3.3.1 Gross Impacts

The evaluation team used results from the implementer-administered web-based student participant survey to estimate installation rates for kit items, except the CFL measures (which, as discussed, used the prescribed

value in IL-TRM V4.0). Table 13 lists reported ex ante and evaluated ex post installation rates[11] for each kit measure used in the electric and gas savings calculations. The ex ante savings calculations produced by the implementer-used installation rates derived from multiple sources, including the IL-TRM V4.0, the IL-TRM V1.0, and internal implementer estimates. Ex ante and ex post savings used the same installation rate for the CFL measure, derived from the IL-TRM V4.0. The ex post installation rates for the bath and kitchen faucet aerator measures, developed from the implementer-administered web-based student participant survey, are 12–13 percentage points lower than the installation rates used to calculate ex ante savings. The ex post installation rates for the shower head and hot water temperature card thermometer, also developed from the implementer-administered web-based student participant survey, are each about half the estimated installation rates used to calculate ex ante savings. The low gross realization rates for shower heads and hot water temperature card thermometers are primarily because the ex ante installation rates are considerably higher than the ex post installation rates.

Table 13. PY7 School Kits Program Installation Rates

Measure	Reported Ex Ante Installation Rate	Evaluated Ex Post Installation Rate
13-Watt CFL	61%	61%
1.0 GPM Bath Faucet Aerator	48%	36%
2.0 GPM Kitchen Faucet Aerator	48%	35%
1.75 GPM High-Efficiency Shower Head	81%	38%
Hot Water Temperature Card Thermometer	50%	24%

Gross Electric Impacts

Table 14 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 bath 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 14. PY8 School Kits 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	24.4	24.0	0.003	0.002
1.0 GPM Bath Faucet Aerator	72.2	18.8	0.031	0.025
2.0 GPM Kitchen Faucet Aerator	72.2	129.9	0.031	0.032
1.75 GPM High-Efficiency Shower Head	171.6	177.1	0.018	0.020
Hot Water Temperature Card Thermometer	81.6	81.6	0.009	0.009

Based on reported program participation and ex post savings values, the program achieved total gross electric savings of 745 MWh and demand savings of 0.135 MW. Table 15 shows ex ante and ex post gross electric and demand impacts. The difference between reported and verified measures resulted from the application

[11] Rates developed from the implementer-administered web-based student participant survey, collected as part of the PY8 School Kits Program evaluation.

of installation rates, developed from the implementer-administered web-based student participant survey and the IL-TRM V4.0.[12] The low gross realization rate for bath faucet aerators is primarily due to the implementer calculating only a single aerator savings value and applying it to both bath and kitchen faucet aerators, thus overestimating bath faucet aerator ex ante gross savings. The low gross realization rates for shower heads and hot water temperature card thermometers are primarily because the ex ante installation rates are considerably higher than the ex post installation rates.

Table 15. PY8 School Kits Program Ex Ante and Ex Post Gross Electric Impacts

Measure	Reported Ex Ante Installation Rate	Ex Ante Gross Impacts		Reported Measures[a]	Evaluated Installation Rate[b]	Verified Measures[c]	Ex Post Gross Impacts		Gross Realization Rate[d]	
		MWh	MW				MWh	MW	MWh	MW
13-watt CFL	61%	224	0.024	15,078	61%	9,198	221	0.022	98%	90%
1.0 GPM Bath Faucet Aerator	48%	131	0.055	3,769.5	36%	1,357	26	0.034	20%	62%
2.0 GPM Kitchen Faucet Aerator	48%	131	0.055	3,769.5	35%	1,319	171	0.043	131%	77%
1.75 GPM High-Efficiency Shower Head	81%	524	0.055	3,769.5	38%	1,432	254	0.028	48%	51%
Hot Water Temperature Card Thermometer	50%	154	0.018	3,769.5	24%	905	74	0.008	48%	48%
Total*	**59%**	**1,163**	**0.207**	**30,156**	**47%**	**14,211**	**745**	**0.135**	**64%**	**65%**

* Totals may not sum due to rounding.
[a] Based on the implementer-administered web-based student participant survey data, the evaluation team assumed that 50% of total, verified water-saving measures were installed in homes with electric water heating.
[b] Reported percentages are rounded from their true values.
[c] The differences between reported measures and verified measures resulted from the application of installation rates derived from the implementer-administered web-based student participant survey effort and the IL-TRM V4.0.
[d] Realization rates differing from 100% resulted 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 gross electric savings estimates from the School Kits Program implementer and compared them to the ex post electric 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. The discrepancies for each program measure are addressed in the following descriptions:

[12] For the 13-watt CFL measure, the evaluation team used the IL-TRM V4.0's prescribed installation rate of 61% for school kits.

- **CFLs:** The ex ante 13-watt CFL per-unit savings estimates of 24.4 kWh and 0.00261 kW were slightly higher than the ex post per-unit savings estimates of 24.0 kWh and 0.0023 kW, calculated in accordance with the IL-TRM V4.0. The lower ex post per-unit savings estimates primarily resulted from the implementer using an "unknown" location hours-of-use value of 847 from the IL-TRM V4.0, while the evaluation team used the most current hours-of-use value (759) from the IL-TRM V4.0. Additionally, the lower ex post per-unit demand savings resulted from the implementer using a coincidence factor value of 8.1% for an "unknown" location from the IL-TRM V4.0, while the evaluation team used the "Interior single-family or multifamily in unit" coincidence factor value of 7.1% from the IL-TRM V4.0.

- **Bath Faucet Aerators:** The ex ante bath faucet aerator per-unit savings estimate of 72.2 kWh is higher than the ex post per-unit savings estimate of 18.8 kWh, calculated in accordance with the IL-TRM V4.0. The implementer did not calculate separate savings estimates for the different aerator types, using 72.2 kWh and 0.0306 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. The lower overall ex post gross savings is also a result of differences in installation rates used for ex post and ex ante gross savings. Ex ante savings used an in-service rate (ISR) of 48%,[13] while the evaluation team used the bath faucet aerator-specific ISR of 36%, calculated from the implementer-administered web-based student participant survey, in accordance with the PY8 AIC Evaluation Plan.

- **Kitchen Faucet Aerators:** An ex ante kitchen faucet aerator per-unit savings estimate of 72.2 kWh fell below the ex post per-unit savings estimate of 129.9 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 72.2 kWh and 0.0306 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 TRM inputs associated with an "Unknown" aerator type, underestimating kitchen aerator gross savings. The lower overall ex post gross savings are also a result of differences in installation rates used for ex post and ex ante gross savings. Ex ante savings used an ISR of 48%,[14] while the evaluation team used the kitchen faucet aerator-specific ISR of 35%, calculated from the implementer-administered web-based student participant survey and in accordance with the PY8 AIC Evaluation Plan.

- **Shower Heads:** The ex ante shower head per-unit savings estimates of 171.6 kWh and 0.0179 kW are slightly less than the ex post per-unit savings estimates of 177.1 kWh and 0.0196 kW, which the evaluation team calculated in accordance with the IL-TRM V4.0. Ex ante and ex post per-unit savings estimates differed in that the ex post per-unit savings estimate used Illinois-specific home-type information from the U.S. Energy Information Administration, in conjunction with prescribed single-family and multifamily values in the IL-TRM V4.0, to estimate weighted values for average shower heads per household (1.64) and the number of people per household (2.42). The ex ante per-unit savings values used prescribed single-family values from the IL-TRM V4.0 for shower heads per household (1.79) and the number of people per household (2.56). The lower overall ex post gross savings are also a result of differences in installation rates used for ex post and ex ante savings. The ex ante gross savings used an ISR of 81%,[15] while the evaluation team used an 38% ISR, calculated

[13] IL-TRM V1.0.

[14] IL-TRM V1.0.

[15] IL-TRM V1.0.

from the implementer-administered web-based student participant survey, in accordance with the PY8 AIC Evaluation Plan.

- **Hot Water Temperature Card Thermometers:** Ex ante and ex post hot water temperature card thermometer per-unit savings estimates were the same, at 81.6 kWh and 0.0093 kW, respectively. Therefore, the lower overall ex post gross savings are solely due to different installation rates used for ex post and ex ante gross savings. The ex ante savings used an ISR of 50%, estimated by the implementer, while the evaluation team used the hot water temperature card thermometer-specific ISR of 24%, calculated from the implementer-administered web-based student participant survey, in accordance with the PY8 Evaluation Plan.

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, the IL-TRM V4.0 assumed consumers would install 86% of kit CFLs within 3 years. Table 16 shows savings from bulbs provided to participants in PY8 and realized in PY8, as well as in PY9 and PY10, given later installations.

Table 16. 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	221	47	40	0.022	0.005	0.004
Total	221	47	40	0.022	0.005	0.004

The evaluation team will include PY9 and PY10 savings in future evaluation reports.

The evaluation team credited the PY8 School Kits Program with the PY7 School Kits Program's 64 MWh gross energy savings and 0.004 MW gross demand savings derived from delayed CFL installations realized in PY8.[16] The evaluation team applied these savings in the Net Impacts section by multiplying the gross savings by the PY7 School Kits CFL-specific NTGR of 0.85 to arrive at 53 MWh net energy savings and 0.003 MW net demand savings for PY7 delayed CFL installations realized in PY8.

Gross Gas Impacts

Table 17 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 bath 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 shower heads and hot water temperature card thermometers is relatively small.

[16] Delayed 13-watt installations by PY7 School Kits Program participants, estimated as installed during PY8 (in accordance with IL--TRM V3.0), were credited to the final PY8 School Kits Program net impacts.

Table 17. PY7 School Kits Ex Ante and Ex Post Per-Unit Gas Savings

Measure	Reported Ex Ante Gross (therms)	Evaluated Ex Post Gross (therms)
1.0 GPM Bath Faucet Aerator	3.1	0.8
2.0 GPM Kitchen Faucet Aerator	3.1	5.9
1.75 GPM High-Efficiency Shower Head	7.3	8.0
Hot Water Temperature Card Thermometer	3.5	3.7

To estimate gas savings associated with the program, the evaluation team applied a 50% gas water heater saturation rate (based on the implementer-administered web-based student participant survey data) to verified installations of energy kit measures. 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 team used those to calculate the ex ante gross population therm savings shown in Table 18.

Based on verified program participation, the School Kits Program achieved total gross gas energy savings of 23,592 therms. Table 18 shows ex ante and ex post gross gas impacts. The low gross realization rate for bath faucet aerators is primarily due to the implementer calculating only a single aerator savings value and applying it to both bath and kitchen faucet aerators, thus severely overestimating bath faucet aerator ex ante gross savings. The low gross realization rates for shower heads and hot water temperature card thermometers are primarily because the ex ante installation rates are considerably higher than the ex post installation rates.

Table 18. PY8 School Kits Program Ex Ante and Ex Post Gross Gas Impacts

Measure	Reported Ex Ante Installation Rate	Ex Ante Gross Impacts (therms)	Reported Measures[a]	Evaluated Installation Rate	Verified Measures[b]	Ex Post Gross Impacts (therms)	Gross Realization Rate[c]
1.0 GPM Bath Faucet Aerator	48%	5,617	3,769.5	36%	1,357	1,151	20%
2.0 GPM Kitchen Faucet Aerator	48%	5,617	3,769.5	35%	1,319	7,721	137%
1.75 GPM High-Efficiency Shower Head	81%	22,429	3,769.5	38%	1,432	11,413	51%
Hot Water Temperature Card Thermometer	50%	6,590	3,769.5	24%	905	3,308	50%
Total*	**57%**	**40,252**	**15,078**	**33%**	**5,013**	**23,592**	**59%**

* Totals may not sum due to rounding.

[a] Based on the implementer-administered web-based student participant survey data, the evaluation team assumed 50% 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 the implementer-administered web-based student participant survey effort and the IL-TRM V4.0.

[c] Realization rates other than 100% 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 gas savings estimates resulted from differences in ex ante and ex post gross per-unit savings assumptions and installation rates for gas. Discrepancies for each program measure are addressed in the following descriptions:

- **Bath Faucet Aerators:** The ex ante bath faucet aerator per-unit savings estimate of 3.1 therms was higher 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 instead used a 3.1 therms gross per-unit savings estimate for both the bath and kitchen 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, thus overestimating bath faucet aerator gross savings. Lower overall ex post gross savings are also a result of differences in installation rates used for ex post and ex ante gross savings. Ex ante savings used an ISR of 48%,[17] while the evaluation team used the bath faucet aerator-specific 36% ISR, calculated from the implementer-administered web-based student participant survey, in accordance with the PY8 AIC Evaluation Plan.

- **Kitchen Faucet Aerators:** The 3.1 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, instead using a 3.1 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 IL-TRM inputs associated with an "Unknown" aerator type, and underestimated the kitchen aerator gross savings. Lower overall ex post gross savings are also a result of differences in installation rates used for ex post and ex ante gross savings. Ex ante savings used an ISR of 48%,[18] while the evaluation team used the kitchen faucet aerator-specific ISR of 35%, calculated from the implementer-administered web-based student participant survey, in accordance with the PY8 AIC Evaluation Plan.

- **Shower Heads:** The 7.3 therm ex ante shower head per-unit savings estimate was less than the ex post per-unit savings estimate of 8.0 therms, calculated by the evaluation team in accordance with the IL-TRM V4.0. Ex ante and ex post per-unit savings estimates differed, in that the ex post per-unit savings estimate used Illinois-specific, home-type information from the U.S. Energy Information Administration, in conjunction with prescribed single-family and multifamily values in the IL-TRM V4.0, to estimate weighted values for average shower heads per household (1.64) and the number of people per household (2.42).[19] The ex ante per-unit savings values used prescribed single-family values from the IL-TRM V4.0 for shower heads per household (1.79) and the number of people per household (2.56). Further, overall ex post gross savings are lower than overall ex ante gross savings because of a difference in installation rates used for ex post and ex ante savings. The ex ante gross savings used an ISR of 81%,[20] while the evaluation team used the ISR of 38% calculated from the implementer-administered web-based student participant survey, in accordance with the PY8 AIC Evaluation Plan.

- **Hot Water Temperature Card Thermometers:** The ex ante hot water temperature card thermometer per-unit savings estimate of 3.5 therms fell below than the ex post per-unit savings estimate of 3.7 therms, calculated in accordance with the IL-TRM V4.0. Ex ante and ex post per-unit savings estimates differed in that the ex post per-unit savings estimate used Illinois-specific, home-type information from the U.S. Energy Information Administration, in conjunction with prescribed single-family and multifamily values in the IL-TRM V4.0, to estimate a weighted value for recovery efficiency of a gas water heater (0.746). The ex ante per-unit savings values used a prescribed single-family value from the IL-TRM V4.0 for recovery efficiency of a gas water heater (0.78). Further, overall ex post gross

[17] IL-TRM V1.0.

[18] IL-TRM V1.0.

[19] Note: 69% of customers live in single-family homes and 31% live in multifamily homes: https://www.eia.gov/consumption/residential/data/2009/hc/hc2.9.xls.

[20] IL-TRM V1.0.

savings are lower than overall ex ante gross savings because of a difference in installation rates used for ex post and ex ante gross savings. Ex ante savings used an ISR of 50%, estimated by the implementer, while the evaluation team used the hot water temperature card thermometer-specific ISR of 24% (calculated from the implementer-administered web-based student participant survey and in accordance with the PY8 AIC Evaluation Plan) to calculate ex post gross savings.

3.3.2 Net Impacts

The evaluation team used SAG-approved NTGRs to estimate net program savings.

Net Electric Impacts

The program achieved total net electric and demand savings of 728 MWh and 0.135 MW, respectively, based on the following: verified program participation, IL-TRM V4.0 deemed per-unit gross savings inputs, installation rates in accordance with the PY8 AIC Evaluation Plan, and SAG-approved NTGRs. Table 19 shows net electric savings results by measure. Additionally, the evaluation team included the PY7 School Kits Program net savings, realized in PY8, which brought the totals to 782 MWh and 0.141 MW.[21] The low overall net realization rate for the program is partially due to the implementer calculating only a single aerator savings value and applying it to both bath and kitchen faucet aerators, thus severely overestimating bath faucet aerator ex ante gross savings. 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 for shower heads and hot water temperature card thermometers.

Table 19. PY8 School Kits Program Total Net Electric Savings by Measure

Measure	Ex Ante Net Savings (MWh)	Ex Ante Net Savings (MW)	Initial Ex Post Net Savings (MWh)	Initial Ex Post Net Savings (MW)	PY7 Ex Post Net Savings Realized in PY8 (MWh)	PY7 Ex Post Net Savings Realized in PY8 (MW)	PY8 Ex Post Savings (MWh)	PY8 Ex Post Savings (MW)
13-Watt CFL	186	0.020	183	0.018	54	0.006	237	0.024
1.0 GPM Bath Faucet Aerator	136	0.058	27	0.035	0	0	27	0.035
2.0 GPM Kitchen Faucet Aerator	136	0.058	178	0.044	0	0	178	0.044
1.75 GPM High-Efficiency Shower Head	550	0.058	266	0.029	0	0	266	0.029
Hot Water Temperature Card Thermometer	154	0.018	74	0.008	0	0	54	0.006
Total*	**1,162**	**0.210**	**728**	**0.135**	**54**	**0.006**	**782**	**0.141**
Net Realization Rate[a]			**63%**	**64%**			**67%**	**67%**

* Totals may not sum due to rounding.
[a] Net realization rate = ex post net savings ÷ ex ante net savings

Table 20 shows the gross and net savings associated with CFLs distributed in PY8 and installed in PY8 as well as the gross and net savings associated with CFLs distributed in PY7 that were installed during PY8.

[21] Delayed 13-watt installations by PY7 School Kits Program participants, estimated to have been installed during the PY8 program year (in accordance with IL-TRM V3.0), have been credited to final PY8 School Kits Program net impacts.

Table 20. PY8 School Kits Program Total Savings Claimed for CFL Measures by Program Year

Program Year	Reported CFLs Distributed	1st Year ISR	2nd Year ISR	CFLs Installed in PY8	Ex Post Gross Per-Unit kWh	Ex Post Gross Per-Unit kW	Ex Post Gross Impacts kWh	Ex Post Gross Impacts kW	NTGR	Ex Post Net Impacts kWh	Ex Post Net Impacts kW
PY8	15,078	61%	NA	9,198	24.0	0.0023	220,696	22	0.83	183,178	18
PY7	15,294	NA	13.9%	2,126	29.7	0.0031	63,076	7	0.85	53,615	6
Total							**283,772**	**28**		**236,793**	**24**

Net Gas Impacts

The program achieved total net gas savings of 24,518 therms, based on: verified program participation, IL-TRM V4.0 deemed per-unit gross savings inputs, installation rates calculated in accordance with the PY8 AIC Evaluation Plan, and SAG-approved NTGRs.

Table 21 shows net gas savings results by measure. The low overall net realization rate for the program is partially due to the implementer calculating only a single aerator savings value and applying it to both bath and kitchen faucet aerators, thus severely overestimating bath faucet aerator ex ante gross savings. 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 for shower heads and hot water temperature card thermometers.

Table 21. PY8 Total Program Net Gas Savings by Measure

Measure	Ex Ante Net Savings (therms)	Ex Post Net Savings (therms)
1.0 GPM Bath Faucet Aerator	5,841	1,197
2.0 GPM Kitchen Faucet Aerator	5,841	8,029
1.75 GPM High-Efficiency Shower Head	23,550	11,984
Hot Water Temperature Card Thermometer	6,590	3,308
Total*	**41,823**	**24,518**
	Net Realization Rate[a]	**59%**

* Totals may not sum due to rounding.
[a] Net realization rate = ex post net savings ÷ ex ante net savings.

4. Conclusions and Recommendations

The PY8 School Kits Program delivered 7,539 kits to students, exceeding its PY8 goal by 1%. In its third year, nearly half of the program's participating schools (31 of 66) also participated during PY7, and most teachers completing the implementer's teacher survey expressed interest in participating in the PY9 program. AIC, Leidos, and CLEAResult program staff coordinated planning and implementation efforts, frequently communicating throughout the program year.

Based on this research, the evaluation team provides the following key findings and recommendations:

- **Key Finding #1:** While the implementer-administered web-based student participant survey response rate increased to 33% in PY8 (from 23% in PY7), this remains lower than the 55% response rate for PY6 and lower in comparison with other similar Midwestern programs. Student response rates typically depend on teachers' encouragement levels and associated completion requirements. As student survey data directly inform program impacts (e.g., installation rates and water heater saturations), increased response rates will lead to more-accurate savings calculations.
  - **Recommendation:** Consider revising incentives for student survey completions. Instead of providing incentives to schools with the best response rates, provide incentives to individual teachers whose classroom (i.e., students) meet a minimum response rate. For teachers who have participated in the past, consider offering incentives for improved response rates. A tiered incentive (e.g., $20 for returning any surveys, $50 for returning 50% of a classroom's surveys, and $100 for returning 80% of a classroom's surveys) may encourage teachers to emphasize the importance of student survey completion.
  - **Recommendation:** Program staff could revise delivery tactics to increase response rates (e.g., emailing teachers directly to remind them to complete the student survey activity or encouraging teachers to consider using the activity worksheet and installations as homework assignments).
- **Key Finding #2:** Implementation staff struggled with recruiting new schools, particularly in the territory's underserved regions (i.e., rural schools). Teachers in rural areas may not attend the teacher conferences used to recruit schools, and difficulties arise in cost-effectively reaching rural schools (with fewer students) and schools bordering the service territory.
  - **Recommendation:** Develop participation targets to focus program staff on reaching new, underserved markets.
  - **Recommendation:** Consider conducting special, direct outreach with rural school administrators to target new schools in underserved regions.
- **Key Finding #3:** As recommended in the PY6 and PY7 evaluation reports, the program implementer updated the implementer-administered web-based student participant survey to collect water heater saturation and demographic data for PY9. However, the revised student survey does not include all information useful in assessing program free-ridership, such as parents' likelihood to change water heater temperature settings or purchase the kit's contents in the absence of the program. Cadmus developed parent postcards to obtain permission to collect this information, but few parents have returned the postcards to date.

  - **Recommendation:** To evaluate program free-ridership, consider including a request in the parent letter return the postcard. Stress to teachers the importance of collecting the parent postcard in order to evaluate the program's energy savings.

- **Key Finding #4:** The low gross realization rates for shower heads and hot water temperature card thermometers 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 the PY8 School Kits Program implementer-administered web-based student participant survey, in accordance with the PY8 Evaluation Plan, 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 #5:** 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 bath faucet aerator savings and underestimating kitchen faucet aerator savings.

  - **Recommendation:** Calculate separate ex ante per-unit savings for bath faucet aerators and kitchen faucet aerators.

Appendix A. School 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 22 provides assumptions used to estimate ex post savings for the 13W CFL measure.

Table 22. Ex Post Assumptions for ENERGY STAR CFL

Parameter	Value	Units	Notes/Reference
$Watts_{base}$	43	watts	Base watts incandescent equivalent (IL-TRM V4.0)
$Watts_{EE}$	13	watts	Actual wattage of CFL installed
1,000	1,000	W/kW	Conversion factor
ISR	61%	N/A	Installation rate (IL-TRM V4.0) – 'School Kits. Evaluation team applied the 61% 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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data[22] to calculate a weighted average waste heat factor for energy of 1.054.
WHFd	Single Family: 1.11 Multi Family: 1.07	N/A	Waste heat factor for demand (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 69% SF / 31% MF customer population distribution from the U.S. Energy

[22] Note: 69% of customers live in single-family homes and 31% live in multifamily homes: https://www.eia.gov/consumption/residential/data/2009/hc/hc2.9.xls.

Parameter	Value	Units	Notes/Reference
			Information Administration data to calculate a weighted average waste heat factor for demand of 1.098.
CF	7.1%	N/A	Summer peak coincidence factor (IL-TRM V4.0).

Bathroom and Kitchen Faucet Aerators

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

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

Equation 5. Faucet Aerator Demand Algorithm

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

Table 23 provides assumptions used to estimate ex post savings for bathroom faucet aerators.

Table 23. Ex Post Assumptions for Bathroom Faucet Aerators

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with the PY8 Evaluation Plan, we used the PY8 implementer-administered web-based student participant survey data to estimate an electric and gas water heater saturation rates. 50% of program measures were installed in residences with electric water heating and 50% 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}	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)

Parameter	Value	Units	Notes/Reference
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average people per household value of 2.42.
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average bathroom faucets per household value of 2.42.
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average EPG of hot water supplied by gas value of 0.00358.
ISR	36%	N/A	Evaluation team applied the 36% ISR calculated from the PY8 implementer-administered web-based student participant survey data, in accordance with the PY8 School Kits Evaluation Plan, 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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data 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 24 provides assumptions used to estimate ex post savings for kitchen faucet aerators.

Table 24. Ex Post Assumptions for Kitchen Faucet Aerators

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with the PY8 Evaluation Plan, we used the PY8 implementer-administered web-based student participant survey data to estimate an electric and gas water heater saturation rates. 50% of program measures were installed in residences with electric water heating and 50% 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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average people per household value of 2.42.
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average EPG of hot water supplied by gas value of 0.00436.
ISR	35%	N/A	Evaluation team applied the 35% ISR calculated from the PY8 implementer-administered web-based student participant survey data, in accordance with the PY8 School Kits Evaluation Plan, 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 69% SF / 31% MF customer population distribution from the U.S. Energy

Parameter	Value	Units	Notes/Reference
			Information Administration data to calculate a weighted average recovery hours per faucet value of 89.
CF	0.022	N/A	Coincidence Factor for electric load reduction (IL-TRM V4.0)

Shower Heads

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

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

Equation 8. Shower Head Demand Algorithm

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

Table 25 provides assumptions used to estimate ex post savings for shower heads.

Table 25. Ex Post Assumptions for Shower Heads

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with the PY8 Evaluation Plan, we used the PY8 implementer-administered web-based student participant survey data to estimate an electric and gas water heater saturation rates. 50% of program measures were installed in residences with electric water heating and 50% 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}	1.75	gal/min	Actual case flow
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)

Parameter	Value	Units	Notes/Reference
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average people per household value of 2.42.
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average shower heads per household value of 1.64.
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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average EPG of hot water supplied by gas value of 0.00526.
ISR	38%	N/A	Evaluation team applied the 38% ISR calculated from the PY8 implementer-administered web-based student participant survey data, in accordance with the PY8 School Kits Evaluation Plan, 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 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average recovery hours per faucet value of 251.
CF	0.0278	N/A	Coincidence Factor for electric load reduction (IL-TRM V4.0)

Hot Water Temperature Card Thermometer

The evaluation team used the following equations from the IL-TRM V4.0 to estimate energy and demand savings for hot water temperature card thermometers.

Equation 9. Hot Water Temperature Card Thermometer Electric Energy Algorithm

$$\Delta kWh = \left(\frac{(UA * (T_{pre} - T_{post}) * Hours)}{3{,}412 * RE\_electric}\right)$$

Equation 10. Hot Water Temperature Card Thermometer Gas Energy Algorithm

$$\Delta Therms = \left(\frac{(UA * (T_{pre} - T_{post}) * Hours)}{100{,}000 * RE\_gas}\right)$$

Equation 11. Hot Water Temperature Card Thermometer Demand Algorithm

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

Table 26 provides assumptions used to estimate ex post savings for hot water temperature card thermometers.

Table 26. Ex Post Assumptions for Hot Water Temperature Card Thermometers

Parameter	Value	Units	Notes/Reference
%ElectricDHW	100%	N/A	In accordance with the PY8 Evaluation Plan, we used the PY8 implementer-administered web-based student participant survey data to estimate an electric and gas water heater saturation rates. 50% of program measures were installed in residences with electric water heating and 50% 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	
U	0.083	Btu/Hr-°F-ft^2	Overall heat transfer coefficient of tank (IL-TRM V4.0)
A	24.99	Square Feet	Surface area of storage tank (IL-TRM V4.0)
T_{pre}	135	Degrees °F	Deemed hot water set point prior to adjustment (IL-TRM V4.0)
T_{post}	120	Degrees °F	Deemed new hot water set point (IL-TRM V4.0)
Hours	8,766	Hours	Number of hours in a year
3412	3412	N/A	Conversion from Btu to kWh (IL-TRM V4.0)
RE_electric	0.98	kWh/gal	Recovery efficiency of electric hot water heater (IL-TRM V4.0)
RE_gas	Single Family: 0.78 Multi Family: 0.67	Therm/gal	Recovery efficiency of gas water heater (IL-TRM V4.0). Evaluation team used SF/MF values in conjunction with the 69% SF / 31% MF customer population distribution from the U.S. Energy Information Administration data to calculate a weighted average recovery efficiency of gas water heater value of 0.746.
ISR	24%	N/A	Evaluation team applied the 24% ISR

Parameter	Value	Units	Notes/Reference
			calculated from the PY8 implementer-administered web-based student participant survey data, in accordance with the PY8 School Kits Evaluation Plan, to reported measures distributed and did not apply any ISR to the per-unit savings values reported in the evaluation report.
CF	1	N/A	Coincidence Factor for electric load reduction (IL-TRM V4.0)

Appendix B. Parent Postcard

We provide the parent postcard on the next page.

ATTN. PARENT/GUARDIAN: In order to improve the Ameren Illinois Student Energy Education Kit program, we would like to know what you think. Simply fill out this postage-paid postcard and drop it in the mail. THANK YOU!

Ameren ILLINOIS

SCHOOL: _____

PARENT/GUARDIAN NAME: _____

CITY: _____ ZIP: _____ PHONE: (_____) _____ - _____

1. Were the kit products easy for you and your child to install and use? ☐ Yes ☐ No
2. Will you continue to use the kit products after completion of the program? ☐ Yes ☐ No
3. Would you like to see this program continued in local schools? ☐ Yes ☐ No
4. Do you have comments about the program you would like to share (your favorite aspect, a new idea, etc.)? _____

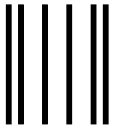
_____

_____

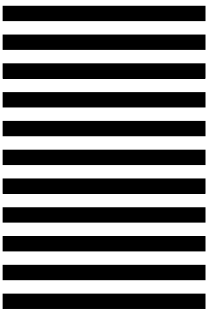
5. If you would like information on additional energy-saving programs offered by your utility, please provide your email address: _____

☐ I am willing to participate in a short follow-up interview on my experience with this program.

☐ I do not wish to be contacted in the future for additional feedback on this program.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

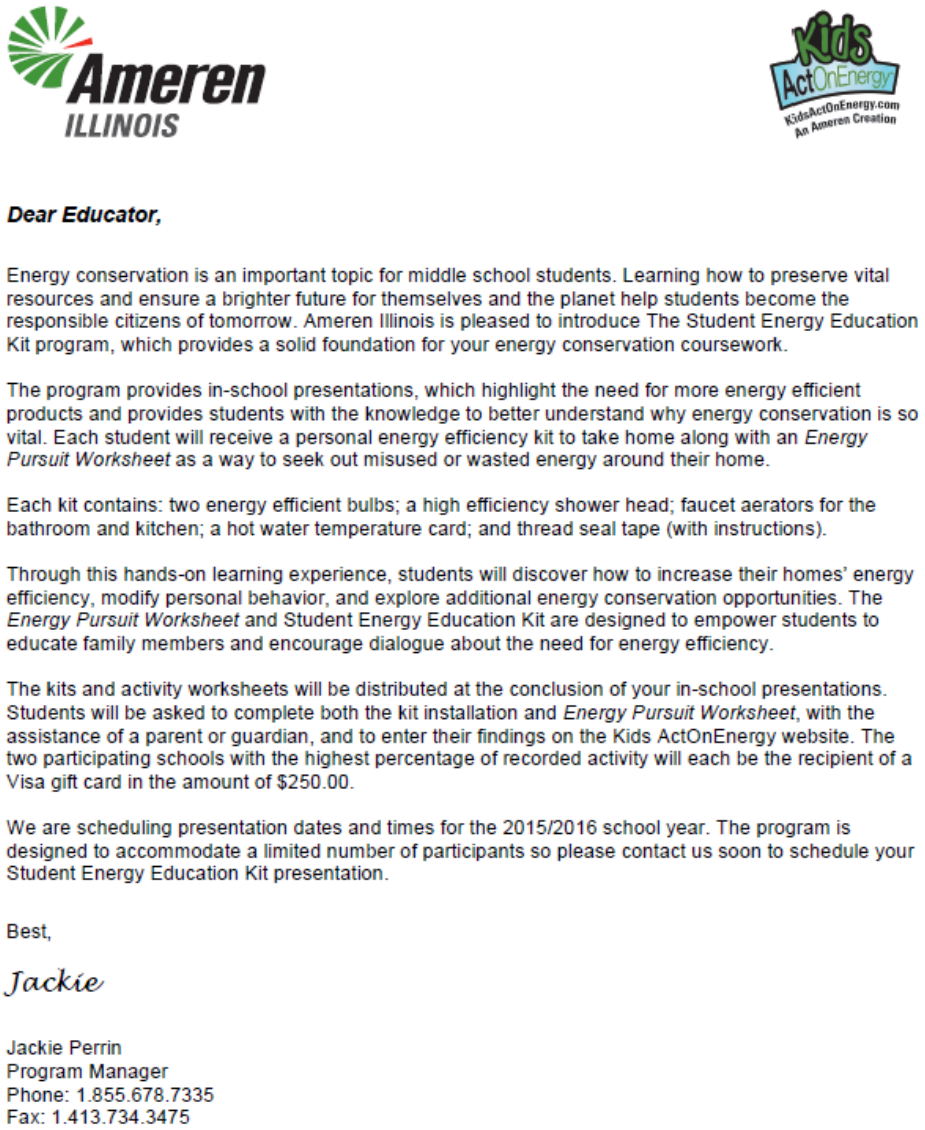
FIRST-CLASS MAIL PERMIT NO. 191 PEORIA IL

POSTAGE WILL BE PAID BY ADDRESSEE

AMEREN ILLINOIS ENERGY EFFICIENCY
RESIDENTIAL PROGRAM PROMOTION
5TH FLOOR
300 LIBERTY ST
PEORIA IL 61602-9996

Appendix C. Program Collateral

Figure 3. Educator Letter



Dear Educator,

Energy conservation is an important topic for middle school students. Learning how to preserve vital resources and ensure a brighter future for themselves and the planet help students become the responsible citizens of tomorrow. Ameren Illinois is pleased to introduce The Student Energy Education Kit program, which provides a solid foundation for your energy conservation coursework.

The program provides in-school presentations, which highlight the need for more energy efficient products and provides students with the knowledge to better understand why energy conservation is so vital. Each student will receive a personal energy efficiency kit to take home along with an *Energy Pursuit Worksheet* as a way to seek out misused or wasted energy around their home.

Each kit contains: two energy efficient bulbs; a high efficiency shower head; faucet aerators for the bathroom and kitchen; a hot water temperature card; and thread seal tape (with instructions).

Through this hands-on learning experience, students will discover how to increase their homes' energy efficiency, modify personal behavior, and explore additional energy conservation opportunities. The *Energy Pursuit Worksheet* and Student Energy Education Kit are designed to empower students to educate family members and encourage dialogue about the need for energy efficiency.

The kits and activity worksheets will be distributed at the conclusion of your in-school presentations. Students will be asked to complete both the kit installation and *Energy Pursuit Worksheet*, with the assistance of a parent or guardian, and to enter their findings on the Kids ActOnEnergy website. The two participating schools with the highest percentage of recorded activity will each be the recipient of a Visa gift card in the amount of $250.00.

We are scheduling presentation dates and times for the 2015/2016 school year. The program is designed to accommodate a limited number of participants so please contact us soon to schedule your Student Energy Education Kit presentation.

Best,

Jackie

Jackie Perrin
Program Manager
Phone: 1.855.678.7335
Fax: 1.413.734.3475

Ameren Illinois ActOnEnergy Residential Programs
300 Liberty Street, 5th Floor, Peoria, IL 61602
Toll-free: 1.866.838.6918 • ***Act****OnEnergy.com*

Figure 4. Parent or Guardian Letter

Dear Parent or Guardian,

Today your middle school student was introduced to an exciting learning project sponsored by Ameren Illinois. The Student Energy Education Kit program is designed to instruct students on simple yet important home energy conservation measures to perform around the home. Your student was provided with an in-school presentation, a personal energy efficiency kit and an *Energy Pursuit Worksheet*.

Through this hands-on learning experience, your student will discover how to increase your home's energy efficiency, modify personal habits, and explore additional energy conservation opportunities as well as encourage dialogue with family members on the importance of energy conservation.

Each kit contains: two energy efficient bulbs; a high efficiency shower head; faucet aerators for the bathroom and kitchen; a hot water temperature card: and thread seal tape (with instructions).

Students have been asked to complete the kit installation and the *Energy Pursuit Worksheet* with the assistance of a parent or guardian and enter their findings on the Kids ActOnEnergy® website once completed. Please note, while some household information may be necessary to complete the online process, no personal information will be requested.

Students should enter the information online at: **KidsActOnEnergy.com/SEEkit**

We are excited about your student's commitment to preserving vital resources and ensuring a brighter future for themselves and the planet! Please contact us with any questions you may have about the Student Energy Education Kit program or other ActOnEnergy efficiency programs offered by Ameren Illinois.

Best,

Jackie

Jackie Perrin
Program Manager
Phone: 1.855.678.7335
Fax: 1.413.734.3475

Ameren Illinois ActOnEnergy Residential Programs
300 Liberty Street, 5th Floor, Peoria, IL 61602
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Figure 5. Educator Enrollment Flyer

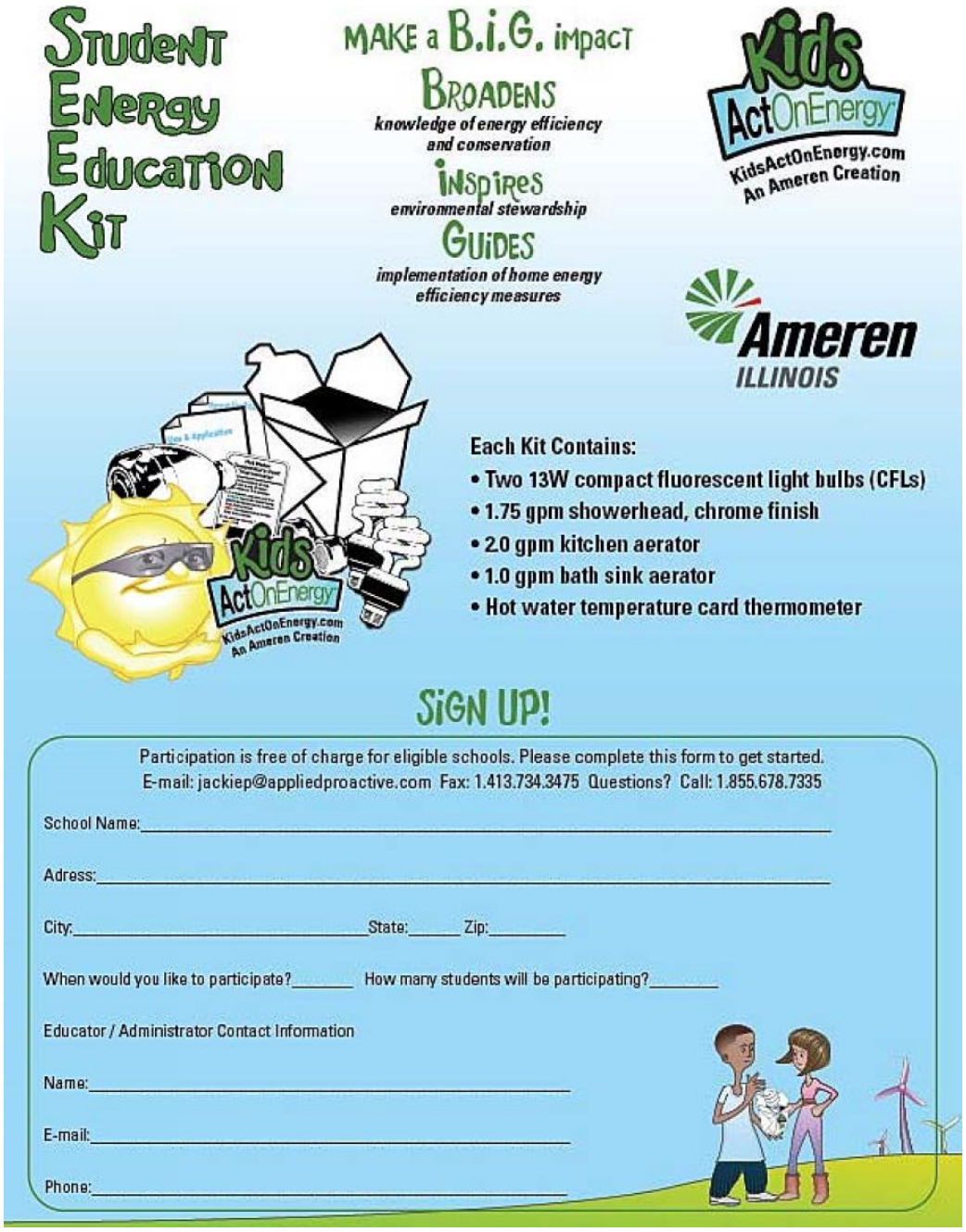


Figure 6. Educator Enrollment Trifold Brochure, Side A

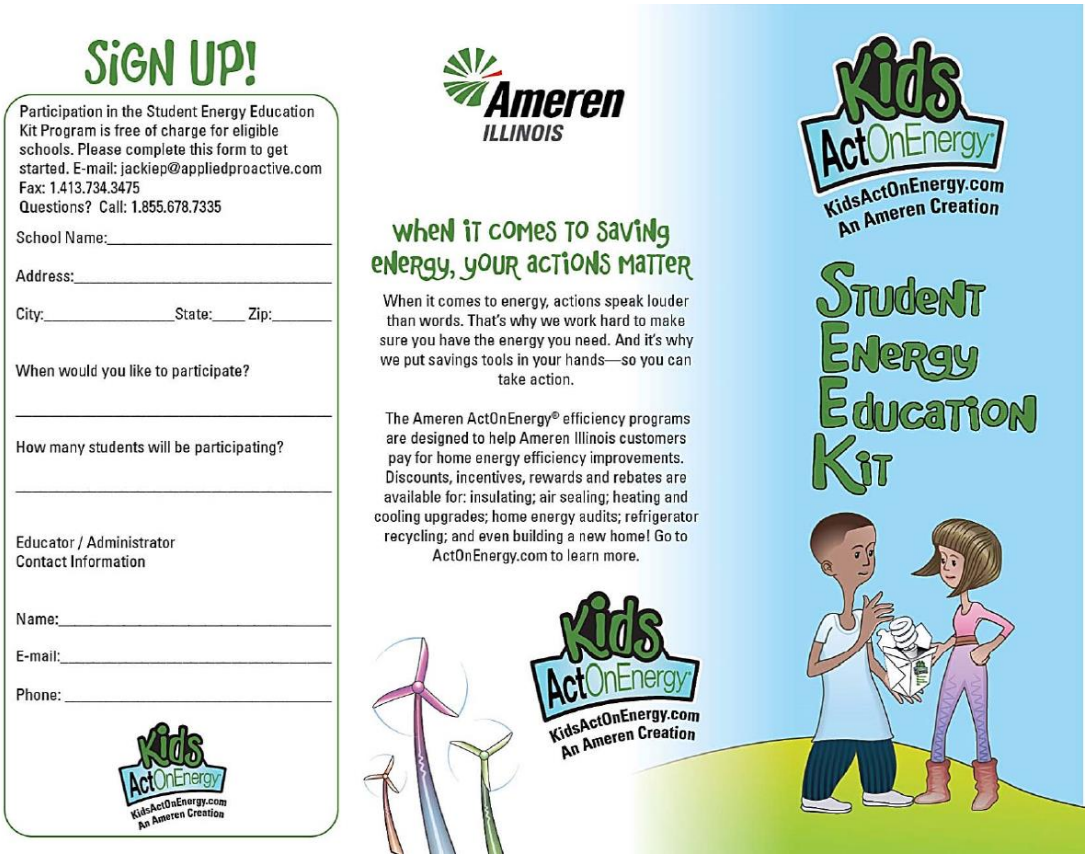


Figure 7. Educator Enrollment Trifold Brochure, Side B

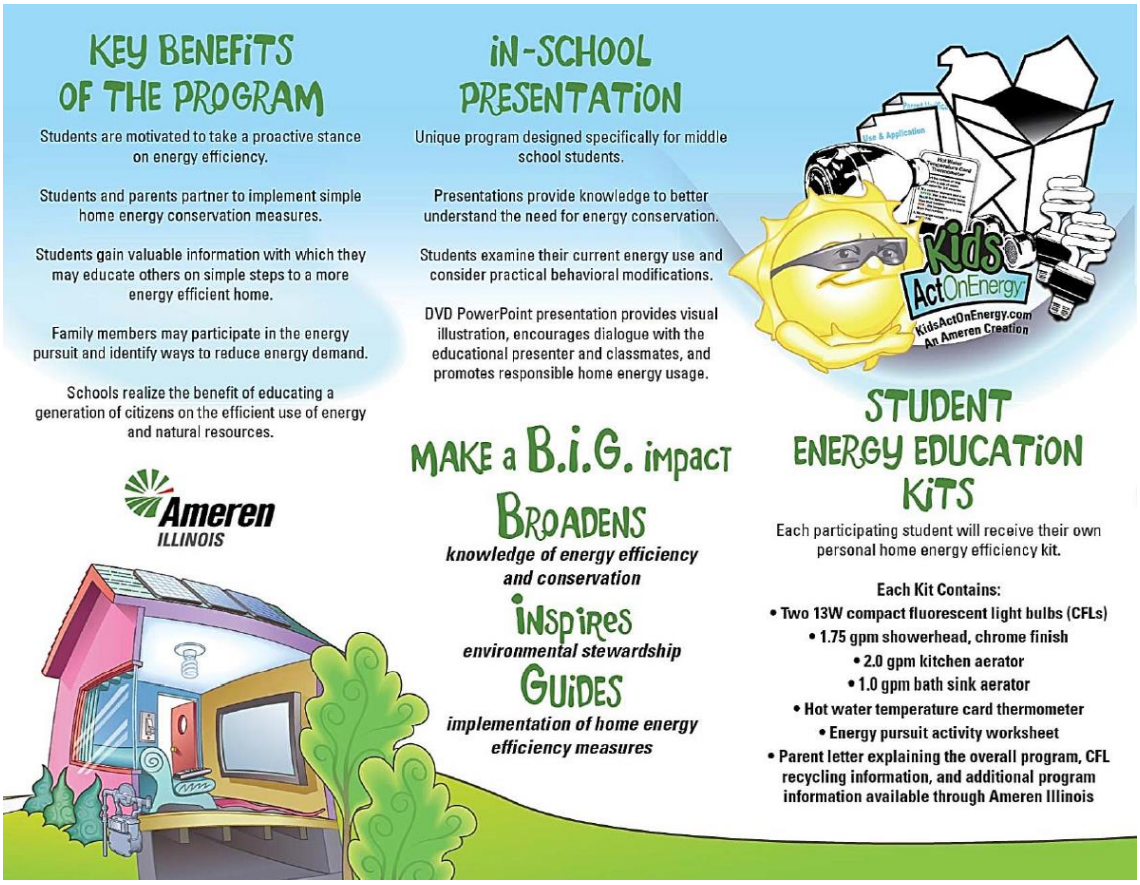
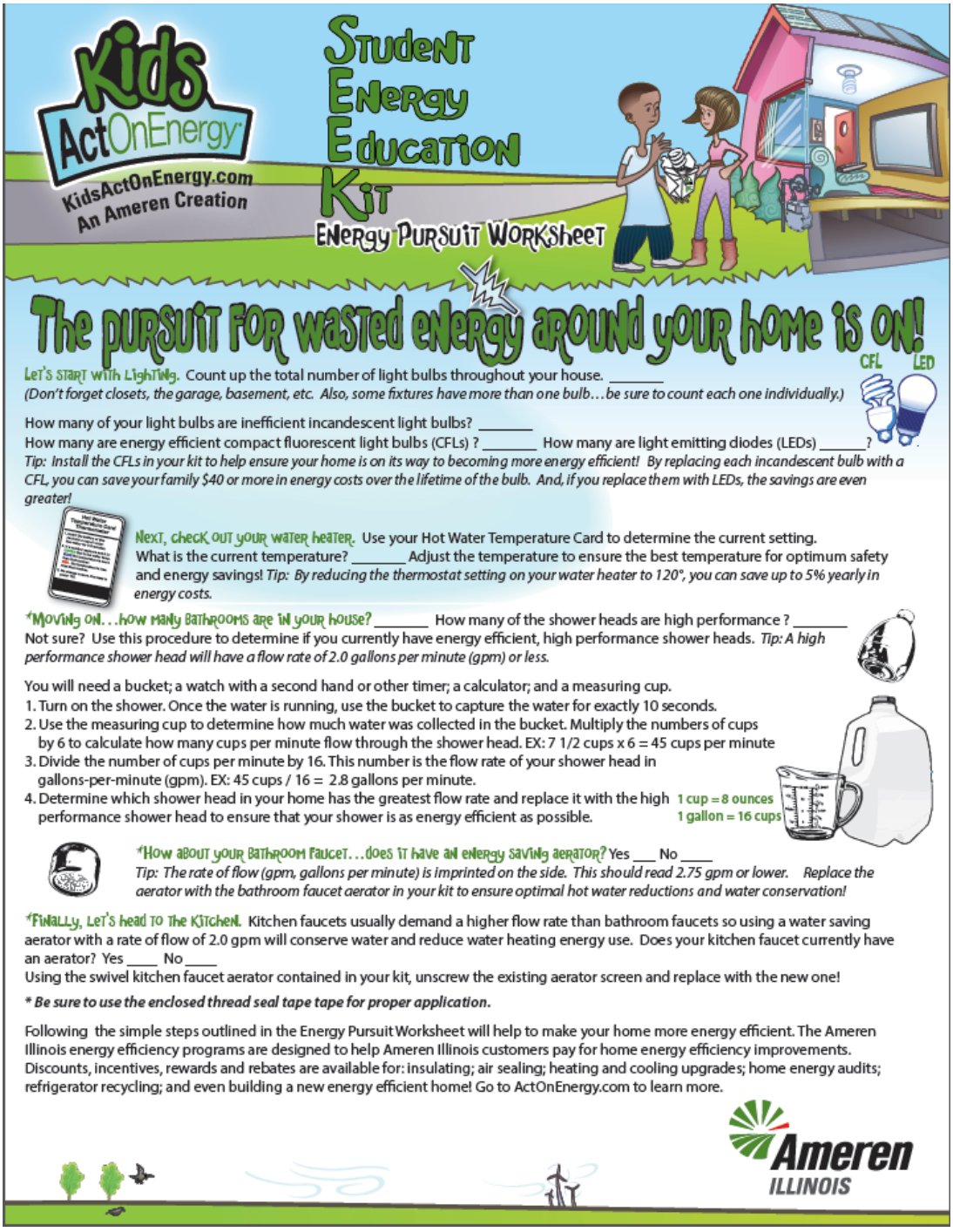


Figure 8. Student Activity Sheet, Side A



Kids ActOnEnergy
KidsActOnEnergy.com
An Ameren Creation

Student Energy Education Kit

Energy Pursuit Worksheet

The pursuit for wasted energy around your home is on!

Let's start with lighting. Count up the total number of light bulbs throughout your house. _____
(Don't forget closets, the garage, basement, etc. Also, some fixtures have more than one bulb…be sure to count each one individually.)

CFL LED

How many of your light bulbs are inefficient incandescent light bulbs? _____
How many are energy efficient compact fluorescent light bulbs (CFLs) ? _____ How many are light emitting diodes (LEDs) _____?
Tip: Install the CFLs in your kit to help ensure your home is on its way to becoming more energy efficient! By replacing each incandescent bulb with a CFL, you can save your family $40 or more in energy costs over the lifetime of the bulb. And, if you replace them with LEDs, the savings are even greater!

Next, check out your water heater. Use your Hot Water Temperature Card to determine the current setting. What is the current temperature? _____ Adjust the temperature to ensure the best temperature for optimum safety and energy savings! *Tip: By reducing the thermostat setting on your water heater to 120°, you can save up to 5% yearly in energy costs.*

***Moving on…how many bathrooms are in your house?** _____ How many of the shower heads are high performance ? _____
Not sure? Use this procedure to determine if you currently have energy efficient, high performance shower heads. *Tip: A high performance shower head will have a flow rate of 2.0 gallons per minute (gpm) or less.*

You will need a bucket; a watch with a second hand or other timer; a calculator; and a measuring cup.
1. Turn on the shower. Once the water is running, use the bucket to capture the water for exactly 10 seconds.
2. Use the measuring cup to determine how much water was collected in the bucket. Multiply the numbers of cups by 6 to calculate how many cups per minute flow through the shower head. EX: 7 1/2 cups x 6 = 45 cups per minute
3. Divide the number of cups per minute by 16. This number is the flow rate of your shower head in gallons-per-minute (gpm). EX: 45 cups / 16 = 2.8 gallons per minute.
4. Determine which shower head in your home has the greatest flow rate and replace it with the high performance shower head to ensure that your shower is as energy efficient as possible.

1 cup = 8 ounces
1 gallon = 16 cups

***How about your bathroom faucet…does it have an energy saving aerator?** Yes ___ No ____
Tip: The rate of flow (gpm, gallons per minute) is imprinted on the side. This should read 2.75 gpm or lower. Replace the aerator with the bathroom faucet aerator in your kit to ensure optimal hot water reductions and water conservation!

***Finally, let's head to the kitchen.** Kitchen faucets usually demand a higher flow rate than bathroom faucets so using a water saving aerator with a rate of flow of 2.0 gpm will conserve water and reduce water heating energy use. Does your kitchen faucet currently have an aerator? Yes ____ No ____
Using the swivel kitchen faucet aerator contained in your kit, unscrew the existing aerator screen and replace with the new one!

**** Be sure to use the enclosed thread seal tape tape for proper application.***

Following the simple steps outlined in the Energy Pursuit Worksheet will help to make your home more energy efficient. The Ameren Illinois energy efficiency programs are designed to help Ameren Illinois customers pay for home energy efficiency improvements. Discounts, incentives, rewards and rebates are available for: insulating; air sealing; heating and cooling upgrades; home energy audits; refrigerator recycling; and even building a new energy efficient home! Go to ActOnEnergy.com to learn more.

Ameren ILLINOIS

Figure 9. Student Activity Sheet, Side B

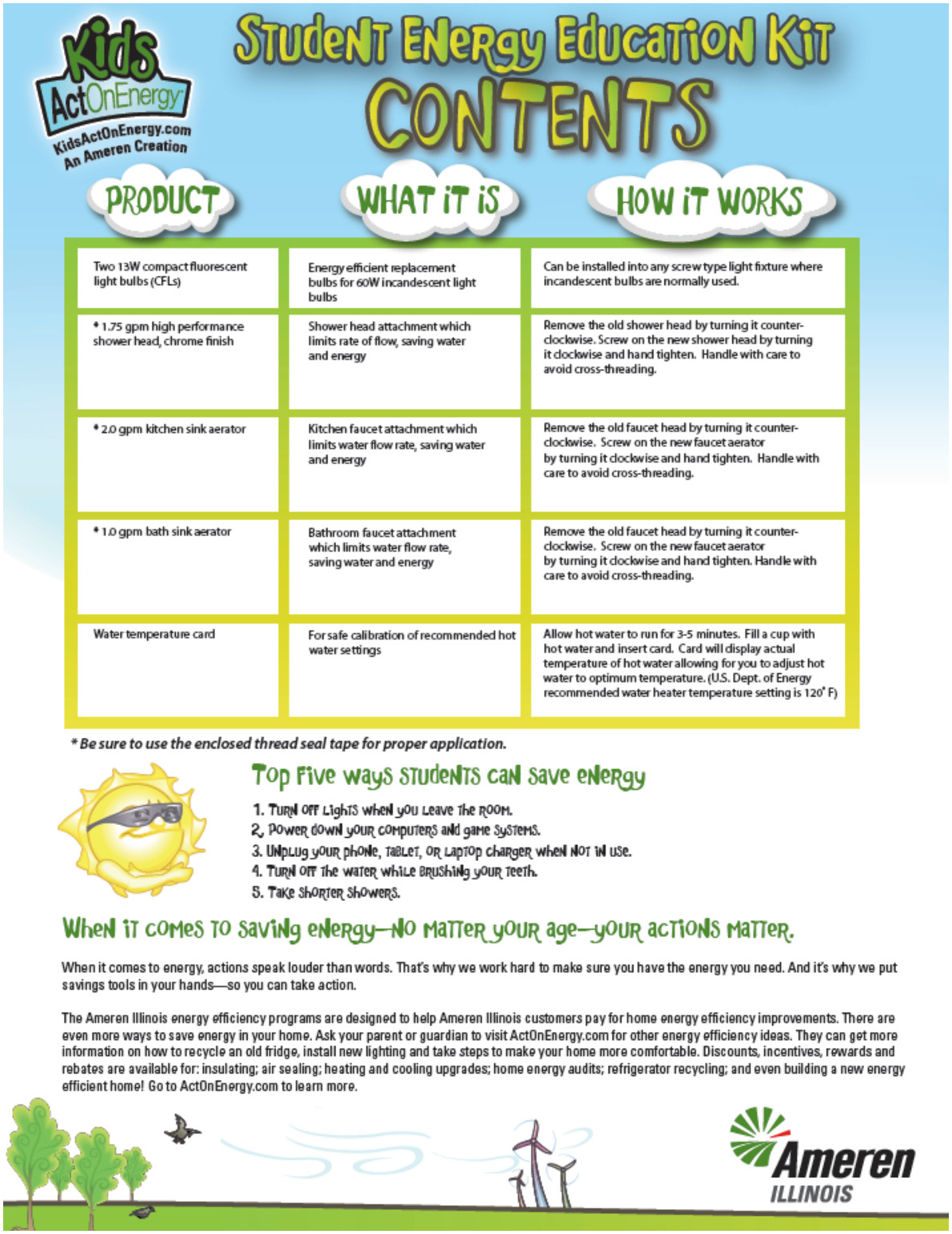


Figure 10. Pipe Thread Tape Installation Instructions

Thread seal tape is a great way to ensure that you get a watertight seal on pipe joints. When used correctly, thread seal tape can help ensure that threaded connections come together smoothly as well as preventing leaks. To help get the most out of your thread seal tape, you need to make sure you are using it correctly.

1. Start by cleaning the male threads at the end of the pipe with a clean rag.
2. Place the end of the thread seal tape on the second thread in and hold it in place with one hand. **(A)**
3. Wrap the tape in the same direction of the threads.
4. Keep tension on the tape and wrap it several times working away from the end of the pipe.
5. When you have finished wrapping the tape, smooth the loose end down into the threads. **(B)**

A

B

Thread seal tape is a great way to ensure that you get a watertight seal on pipe joints. When used correctly, thread seal tape can help ensure that threaded connections come together smoothly as well as preventing leaks. To help get the most out of your thread seal tape, you need to make sure you are using it correctly.

1. Start by cleaning the male threads at the end of the pipe with a clean rag.
2. Place the end of the thread seal tape on the second thread in and hold it in place with one hand. **(A)**
3. Wrap the tape in the same direction of the threads.
4. Keep tension on the tape and wrap it several times working away from the end of the pipe.
5. When you have finished wrapping the tape, smooth the loose end down into the threads. **(B)**

A

B

Thread seal tape is a great way to ensure that you get a watertight seal on pipe joints. When used correctly, thread seal tape can help ensure that threaded connections come together smoothly as well as preventing leaks. To help get the most out of your thread seal tape, you need to make sure you are using it correctly.

1. Start by cleaning the male threads at the end of the pipe with a clean rag.
2. Place the end of the thread seal tape on the second thread in and hold it in place with one hand. **(A)**
3. Wrap the tape in the same direction of the threads.
4. Keep tension on the tape and wrap it several times working away from the end of the pipe.
5. When you have finished wrapping the tape, smooth the loose end down into the threads. **(B)**

A

B

Appendix D. Benchmarking Study Sources

Cadmus for Dayton Power and Light. *2014 Evaluation, Measurement and Verification Report*. May 12, 2015.

Cadmus for Dayton Power and Light. *2015 Evaluation, Measurement and Verification Report*. May 12, 2016.

Cadmus for Vectren Indiana. *2015 DSM Portfolio Evaluation Report.* April, 2016.

Cadmus. *Think! ENERGY® Program Evaluation Report, 2014 Program Year.* April 13, 2015.

The Indiana Statewide Core Program Evaluation Team. 2014 Energizing Indiana Evaluation Report. May 1, 2015. Available online: http://www.scribd.com/doc/268402714/Energizing-Indiana-2014-Report#scribd

Appendix E. Cost-Effectiveness Inputs

Heating Penalty

Efficient lighting products generate less waste heat than baseline lighting products. When customers replace baseline products with more-efficient lighting, they must use more space heating to compensate for "lost" heat from lighting. The heating penalty represents this increased gas usage for space heating,[23] a figure 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, the IL-TRM V4.0 assumed consumers would install 86% of kit CFLs within 3 years. Table 27 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 27. Yearly Gross Heating Penalty Impact of Lighting Measures by Assumed Installation Year

Measure	Heating Penalty (therms)		
	PY8	PY9	PY10
13-Watt CFL	−5,002	−1,066	−902
Total	**−5,002**	**−1,066**	**−902**

The evaluation team will include the PY9 and PY10 heating penalty in future evaluation reports. Table 28 shows the gross gas impacts for cost-effectiveness inputs.

Table 28. Gross Gas Impacts

Measure	Gross Gas Impacts (Therms)		
	PY8	PY9	PY10
13-watt CFL	−5,002	−1,066	−902
1.0 GPM Bath Faucet Aerator	1,151	*	*
2.0 GPM Kitchen Faucet Aerator	7,721	*	*
1.75 GPM High-Efficiency Shower Head	11,413	*	*
Hot Water Temperature Card Thermometer	3,308	*	*
Total	**18,590**	**-1,066**	**-902**

[23] The evaluation team followed IL-TRM V4.0's direction, assuming all homes used gas heating, given the missing information on heating fuels in customers' homes. Thus, this study calculated only a gas-heating penalty.

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