

Evaluation of Illinois Energy Now Savings Through Efficient Products Program

June 2015 through May 2016

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Table of Contents

Executive Summary	ES-1
Introduction.....	1-1
Estimation of Gross Savings	2-1
Estimation of Net Savings	3-1
Process Evaluation	4-1

List of Tables

Table ES-1 Summary of kWh Savings for EPY8/GPY5 STEP Program.....	ES-2
Table ES-2 Summary of Therm Savings for EPY8/GPY5 STEP Program.....	ES-2
Table ES-3 Summary of Peak kW Savings for EPY8/GPY5 STEP Program.....	ES-2
Table 1-1 Total Measures Verified By Type and Year.....	1-2
Table 2-1 Illinois TRM Sections Applied to the STEP Program.....	2-2
Table 2-2 Summary of kWh Savings for STEP Program	2-2
Table 2-3 Summary of Therm Savings for STEP Program	2-3
Table 2-4 Summary of Peak kW Savings for STEP Program	2-3
Table 3-1 Summary of Net Ex Post kWh Savings.....	3-1
Table 3-2 Summary of Net Ex Post Therm Savings.....	3-1
Table 3-3 Summary of Net Ex Post Peak Demand Reductions.....	3-1

Executive Summary

This report presents the results of measurement and verification (M&V) of the Illinois Department of Commerce and Economic Opportunity (hereinafter referred to as the “Department of Commerce”) Savings Through Efficient Products (STEP) Program implemented in Illinois during electric program year eight (EPY8) and natural gas program year five (GPY5), from June 2015 to May 2016.

The STEP Program is a self-install program that provides free energy-saving measures to all Illinois public sector facilities (including schools), such as LED exit signs and lamps, CFLs, low-flow showerheads, faucet aerators, low-flow pre-rinse spray valves, occupancy sensors, and vending machine controls. The program differs from a traditional direct install program in that the equipment is self-installed by the participants.

Data for the study were collected through review of program materials, and interviews with Department of Commerce staff members, program implementation contractor staff members, program participants, and contractors.

The main features of the approach used for the evaluation are as follows:

- Verification of installation of STEP measures was completed through a review of program documentation substantiating that the measures were installed.
- An analytical review of program measures was performed to verify gross savings estimates. The algorithms and stipulated values outlined in the Illinois Statewide TRM Version 4.0 were used to estimate the gross savings for the STEP program.
- Interviews were conducted with program implementation staff from Midwest Energy Efficiency Association (MEEA) and University of Illinois at Chicago Energy Resources Center (ERC) to obtain information for the evaluation.
- The estimation of free ridership and net program savings was based on participant decision maker survey responses administered in EPY7/GPY4.

During EPY8/GPY5, no measures were distributed due to unavailability of STEP program funds during the 2015-2016 State of Illinois fiscal year. However, MEEA staff continued efforts to verify the installation of measures distributed in EPY7/GPY4. Of the 3,316 measures that were distributed and not verified as installed during EPY7/GPY4, 532 were verified as installed during EPY8/GPY5.

Program staff members reported that they have maintained contact with program participants that received measures during EPY7/GPY4 and that 2,784 measures had not been verified as installed during either EPY7/GPY4 or EPY8/GPY5. A significant share of the unverified measures was sent to a single participant under an exception to the program caps. This participant has been unable to install the measures because of a lack of staff to perform the self-installation.

The gross and net ex post electric savings for the STEP program measures verified during EPY8/GPY5 are summarized in Table ES-1. During the program year, gross ex post electric savings total 270,104 kWh. Net ex post electric savings total 259,773 kWh. The net-to-gross ratio is 96%.

Table ES-1 Summary of kWh Savings for EPY8/GPY5 STEP Program

<i>Utility</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Gross Realization Rate</i>	<i>Net Ex Post kWh Savings</i>	<i>Net-to-Gross Ratio</i>
Ameren	114,320	128,352	112%	123,929	97%
ComEd	125,491	141,752	113%	135,845	96%
Total	239,811	270,104	113%	259,773	96%

Gross and net ex post therm savings are summarized in Table ES-2. During EPY8/GPY5, net ex post natural gas savings total 1,998 therms. The net-to-gross ratio is 90%.

Table ES-2 Summary of Therm Savings for EPY8/GPY5 STEP Program

<i>Utility</i>	<i>Ex Ante Therm Savings</i>	<i>Gross Ex Post Therm Savings</i>	<i>Gross Realization Rate</i>	<i>Net Ex Post Therm Savings</i>	<i>Net-to-Gross Ratio</i>
Ameren	745	594	80%	520	87%
Nicor	1,890	1,654	88%	1,478	89%
Total	2,635	2,248	85%	1,998	90%

The gross ex post peak kW savings for the STEP Program during EPY8/GPY5 are summarized in Table ES-3. During this period, gross ex post peak energy savings total 62.79 kW. Net ex post peak energy savings total 60.36 kW. The net-to-gross ratio is 96%.

Table ES-3 Summary of Peak kW Savings for EPY8/GPY5 STEP Program

<i>Utility</i>	<i>Ex Ante kW Savings</i>	<i>Gross Ex Post kW Savings</i>	<i>Gross Realization Rate</i>	<i>Net Ex Post kW Savings</i>	<i>Net-to-Gross Ratio</i>
Ameren	21.41	25.40	119%	24.53	97%
ComEd	34.38	37.39	109%	35.83	96%
Total	55.78	62.79	113%	60.36	96%

1. Introduction

This report presents the results of the impact and process evaluations of Illinois's Savings Through Efficient Products (STEP) Program offered by the Illinois Department of Commerce and Economic Opportunity (hereinafter referred to as the "Department of Commerce"). This report presents results for activity from the program during electric program year eight (EPY8) and natural gas program year five (GPY5), from June 2015 to May 2016.

1.1 Description of Program

The STEP Program offers qualified public facilities energy-saving equipment at no cost. The program was originally offered as a self-install component of the Lights for Learning® program, but has since been renamed and established as a separate program. Some products offered through the STEP Program include: LED exit signs, low-flow faucet aerators, low-flow showerheads, low-flow pre-rinse spray-valves, CFLs, vending machine controls, occupancy sensors, and exterior LED bulbs.

The participation process is as follows:

- STEP begins with a free onsite facility energy assessment to identify opportunities for upgrades.
- Midwest Energy Efficiency Alliance (MEEA) orders applicable products and provides a comprehensive report outlining the free upgrades and relevant information about additional statewide energy savings programs.
- Facility maintenance staff members install the energy-saving products within five months of delivery or by May 31, (whichever date comes first), resulting in energy and cost savings for the facility
- Following installation, program participants send MEEA signed verification forms and photographs of the energy saving measures.

The STEP Program is funded by the Department of Commerce and administered by the Midwest Energy Efficiency Alliance (MEEA), with assistance from Energy Resources Center (ERC) engineers and Green Home Experts, the product supplier

During EPY8/GPY5, no measures were distributed due to unavailability of STEP program funds during the 2015-2016 State of Illinois fiscal year. However, MEEA staff continued efforts to verify the installation of measures distributed in EPY7/GPY4. Of the 3,316 measures that were distributed and not verified during EPY7/GPY4, 532 were verified in EPY8/GPY5.

Staff reported that they have maintained contact with program participants that received measures in EPY7/GPY4 and that the remaining 2,784 unverified measures had not been installed at the time of reporting. A significant share of the unverified measures was sent to a single participant under an exception to the program caps. This participant has been unable to install the measures

because of a lack of staff to perform the self-installation. Table 1-1 summarizes the number of measures installed and verified in EPY8/GPY5.

Table 1-1 Total Measures Verified By Type and Year

<i>Program Measure Name</i>	<i>Distributed EPY7/GPY4</i>	<i>Verified and Evaluated in EPY7/GPY4</i>	<i>Verified and Evaluated EPY8/GPY5</i>
Aerator	2,141	1,836	111
CFL	1,751	1,640	42
LED Exit Sign	3,160	2,776	82
LED Screw-in Bulb	363	235	40
Low Flow Pre-Rinse Spray Valve	95	82	2
Low Flow Showerhead	2,284	2,149	8
Occupancy Sensor/Wall Switch	6,001	3,252	244
Vending Machine Control	202	179	3
Total	15,997	12,149	532

1.2 Overview of Evaluation Approach

The overall objective for the impact evaluation of the STEP Programs was to determine the EPY8/GPY5 gross and net electric energy savings, peak demand reductions, and natural gas savings resulting from the measures distributed by the program.

The approach for the impact evaluation was based on the following features:

- Verifications of installation for the STEP program were completed through a review of program documentation substantiating that the measures were installed in EPY8/GPY5.
- An analytical review of program measures was performed to verify gross savings estimates. The algorithms and stipulated values outlined in the Illinois Statewide Technical Resource Manual (TRM) Version 4.0 were used to estimate the gross savings for the STEP Program.
- Relevant MEEA and ERC program implementation staff members were interviewed to obtain information for the evaluation.
- Due to limited participation, the net-to-gross ratios calculated as part of the EPY7/GPY4 were applied to the EPY8/GPY5 gross energy savings to estimate net savings.

1.3 Organization of Report

This report on the impact and process evaluation of the STEP Program for EPY8/GPY5 is organized as follows:

- Chapter 2 presents and discusses the analytical methods and results of estimating gross savings for measures installed under each program.

- Chapter 3 presents and discusses the analytical methods and results of estimating net savings of each program.
- Chapter 4 presents and discusses the analytical methods and results of the process evaluation of each program.

2. Estimation of Gross Savings

This chapter discusses the estimation of gross electric and natural gas energy savings resulting from measures installed through the STEP Program during EPY8/GPY5, the period from June 2015 through May 2016. Section 2.1 describes the methodology used for estimating gross savings. Section 2.2 presents the results from the calculation of savings for measures distributed through the program.

2.1 Methodology for Estimating Gross Savings

The M&V approach for the STEP Program is aimed at the following:

- Verifying the total number of program participants;
- Verifying the number of program participants with eligible savings for the EPY8/GPY5 program year;
- Determining the number of measures installed as a result of the program; and
- Estimating energy savings in accordance with the Illinois Statewide Technical Reference Manual (TRM) Version 4.0.

2.1.1 Review of Documentation

Department of Commerce's program implementation contractor, MEEA, provided in-depth documentation pertaining to all measures distributed through the program. The first step in the evaluation effort was to review this documentation and other program materials relevant to the evaluation effort. The count of measures entered in the program database was verified through a review of participant signed verification forms. In cases where discrepancies existed, MEEA staff was contacted in order to resolve the issue. Evaluation staff also cross checked previous years' measure data to ensure that double counting was not occurring.

For each energy efficient measure installed, the available documentation was reviewed, with particular attention given to the calculation procedures and documentation for savings estimates.

The savings calculations for each public facility were reviewed to determine the following:

- The methodology used to estimate savings;
- The assumptions used in the calculations and their sources; and
- The correctness of calculations.

2.1.2 Analytical Desk Review

ADM reviewed the energy savings algorithms used by program staff to estimate gross kWh and therm savings of the measures distributed through the program. This review was performed to verify that ex ante saving estimates are calculated using the appropriate assumptions and

algorithms outlined in the Illinois Statewide TRM. Ex ante savings calculations were checked to verify that calculation errors were not made and that the reported results are replicable.

2.1.3 Procedures for Estimating Savings

ADM applied the algorithms and stipulated values outlined in the TRM to estimate the gross energy savings of the STEP Program. ADM utilized input values specific to each participant in the calculation methodologies, where applicable. Table 2-1 displays each program measure and the corresponding section of the TRM.

Table 2-1 Illinois TRM Sections Applied to the STEP Program

<i>Program Measure Name</i>	<i>TRM Measure Name</i>	<i>Section in Illinois TRM</i>
Aerator	Low Flow Faucet Aerators	4.3.2
CFL	Commercial ENERGY STAR Compact Fluorescent Lamp (CFL)	4.5.1
LED Exit Sign	Commercial LED Exit Signs	4.5.5
LED Screw-in Bulb	LED Bulbs and Fixtures	4.5.4
Low Flow Pre-Rinse Spray Valve	High Efficiency Pre-Rinse Spray Valve	4.2.11
Low Flow Showerhead	Low Flow Showerheads	4.3.3
Occupancy Sensor/Wall Switch	Occupancy Sensor Lighting Controls	4.5.10
Vending Machine Control	Beverage and Snack Machine Controls	4.6.2

2.2 Results of Gross Savings Estimation

The STEP Program verified the installation of 532 energy efficiency measures during the EPY8/GPY5 program year. Gross ex post electric savings are summarized in Table 2-2. The gross and electric savings during the June 2015 through May 2016 period is 270,104 kWh.

Table 2-2 Summary of kWh Savings for STEP Program

<i>Utility</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Gross Realization Rate</i>
Ameren	114,320	128,352	112%
ComEd	125,491	141,752	113%
Total	239,811	270,104	113%

Gross ex post natural gas savings are summarized in Table 2-3. The gross ex post natural gas savings during the June 2015 through May 2016 period are 2,248 therms. The realization rate is 113%.

Table 2-3 Summary of Therm Savings for STEP Program

<i>Utility</i>	<i>Ex Ante Therm Savings</i>	<i>Gross Ex Post Therm Savings</i>	<i>Gross Realization Rate</i>
Ameren	745	594	80%
Nicor	1,890	1,654	88%
Total	2,635	2,248	85%

Gross ex post peak electric savings are summarized in Table 2-4. The gross ex post peak electric savings during the June 2015 through May 2016 period are 62.79 kW. The realization rate is 113%.

Table 2-4 Summary of Peak kW Savings for STEP Program

<i>Utility</i>	<i>Ex Ante kW Savings</i>	<i>Gross Ex Post kW Savings</i>	<i>Gross Realization Rate</i>
Ameren	21.41	25.40	119%
ComEd	34.38	37.39	109%
Total	55.78	62.79	113%

Lifetime savings for program activity verified in EPY8/GPY5 are 2,268,994 kWh and 17,828 therms.

2.2.1 Discussion of Realization Rate

The difference between ex ante and gross ex post kWh savings is attributable to the change in wattage for CFL screw-in bulbs, LED exit signs, and LED screw-in bulbs. Additionally, a 100% installation rate was applied to all measures where an installation rate is present in the savings algorithm as measure installation was verified through program documentation.

The discrepancy between ex ante and gross ex post therms is attributable to differences in specific gallons per minute ratings in savings calculations. Additionally, a 100% installation rate was applied to all measures where an installation rate is present in the savings algorithm as measure installation was verified through program documentation.

3. Estimation of Net Savings

This chapter reports the results of estimating the net impacts of the STEP Program during EPY8/GPY5, the period June 2015 through May 2016. Due to limited participation, the net-to-gross ratios calculated as part of the EPY7/GPY4 are applied to the EPY8/GPY5 gross energy savings.

3.1 Summary of Net Savings

Table 3-1 summarizes the net ex post kWh savings during the period June 2015 through May 2016. The net electricity savings achieved during the period are 259,773 kWh. The net-to-gross ratio is 96%.

Table 3-1 Summary of Net Ex Post kWh Savings

<i>Utility</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Gross Realization Rate</i>	<i>Net Ex Post kWh Savings</i>	<i>Net-to-Gross Ratio</i>
Ameren	114,320	128,352	112%	123,929	97%
ComEd	125,491	141,752	113%	135,845	96%
Total	239,811	270,104	113%	259,773	96%

Table 3-2 summarizes the net ex post therm savings during EPY8/GPY5. The net natural gas savings achieved during the period are 1,998 therms. The net-to-gross ratio is 90%.

Table 3-2 Summary of Net Ex Post Therm Savings

<i>Utility</i>	<i>Ex Ante Therm Savings</i>	<i>Gross Ex Post Therm Savings</i>	<i>Gross Realization Rate</i>	<i>Net Ex Post Therm Savings</i>	<i>Net-to-Gross Ratio</i>
Ameren	745	594	80%	520	87%
Nicor	1,890	1,654	88%	1,478	89%
Total	2,635	2,248	85%	1,998	90%

Table 3-3 summarizes the net ex post peak demand reductions during the period of June 2015 through May 2016. The net peak demand reduction during the period is 60.36 kWh. The net-to-gross ratio is 96%.

Table 3-3 Summary of Net Ex Post Peak Demand Reductions

<i>Utility</i>	<i>Ex Ante kW Savings</i>	<i>Gross Ex Post kW Savings</i>	<i>Gross Realization Rate</i>	<i>Net Ex Post kW Savings</i>	<i>Net-to-Gross Ratio</i>
Ameren	21.41	25.40	119%	24.53	97%
ComEd	34.38	37.39	109%	35.83	96%
Total	55.78	62.79	113%	60.36	96%

4. Process Evaluation

This chapter presents the results of the process evaluation for the Savings Through Efficient Products Program (STEP Program) during electric program year eight (EPY8) and natural gas program year five (GPY5). Because of the lack of funds available during the EPY8/GPY5 program year, no additional measures were distributed during this period.

4.1 Process Evaluation Methodology and Objectives

The purpose of the process evaluation of the EPY8/GPY5 program year was to document program's staffs' activities. The documentation of these activities was accomplished through review of reporting provided by MEEA staff and an interview with the MEEA program manager.

4.2 Summary of EPY8/GPY5 Program Activities

The primary EPY8/GPY5 STEP Program activities were:

- Supporting the evaluation of the EPY7/GPY4 program year.
- Outreach to EPY7/GPY4 participants to verify additional installations of measures that were not verified by the end of the EPY7/GPY4 program year.
- A review of program design, implementation procedures, and materials with the goal of improving program operations in EPY9/GPY6 and the following program cycle.
- Ongoing maintenance of the program infrastructure.

4.2.1 Support of the EPY7/GPY4 Evaluation

Staff provided support to the Evaluator to facilitate the evaluation of EPY7/GPY4 program activity during EPY8/GPY5. This support included participating in interviews, responding to inquiries, and providing documentation as requested.

4.2.2 EPY7/GPY4 Verification Activities

A significant share of the measures distributed during EPY7/GPY4 had not been verified as installed at the end of EPY8/GPY5 – primarily because the measures had not been installed at the time. During EPY8/GPY5, program staff verified additional installations of EPY7/GPY4 measures, which comprise the program activity reported herein. As part of this verification effort, staff developed a customized version of the program form that listed the number of measures sent to the customer. This form differed from the standard form that requires the customer to enter the number of measures installed and was intended to facilitate the verification process.

Despite the EPY8/GPY5 verification efforts, some projects were not yet completed at the time of this reporting. In particular, 1,987 occupancy sensors distributed to one program participant had not been installed. Program staff reported that this participant had not installed these measures

because of a lack of available staff at the organization and a requirement to use a union electrician to install the measures. Staff is maintaining regular contact with the organization to verify those measures when they are installed.

4.2.3 Review of Program Design and Implementation

Program staff reviewed the program design and implementation procedures during the EPY8/GPY4 period to improve program processes. The activities reported by staff included:

- Completion of a review of program best practices;
- Review of prior evaluation reports;
- Completion of an analysis of program processes to identify opportunities for efficiency improvements; and
- Review of measure savings potential and cost effectiveness under the Illinois Statewide TRM Version 5.0.

Based on this review, staff reported that modifications were made to the program measure offerings and operational procedures. A key change discussed by staff was a reduction in the time between the completion of the walkthrough assessment and the shipment of the energy efficiency measures. Previously, staff submitted monthly orders for fulfillment by the supplier, but now measures are shipped within two weeks of completing the walkthrough assessment. Additionally, staff reported that they reduced the time allowed for participants' installation of the measures and completion of the verification form. The objective of this program design change is to increase the verification rate by preventing participants from losing "momentum" in completing the installation of the measures.

4.2.4 Ongoing Maintenance of Program Infrastructure

Ongoing program maintenance was undertaken during the EPY8/GPY5 program year to facilitate the eventual re-launch of the program. This activity included updating of expected savings calculators; maintenance of the email lists, waitlists, and the program website to provide updates on the program status to potential participants; and responding to requests for information related to planning for the next cycle.