



ComEd Home Energy Assessment PY7 Evaluation Report

FINAL

**Energy Efficiency/Demand Response Plan:
Plan Year 7
(6/1/2014-5/31/2015)**

**Presented to
Commonwealth Edison Company**

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E. Executive Summary

The Home Energy Assessment (HEA) Program is an assessment and direct install program jointly implemented by Commonwealth Edison Company (ComEd) and Peoples Gas/North Shore Gas (PG/NSG) with Franklin Energy Services implementing the program in the PG/NSG territory and jointly implemented by ComEd and Nicor Gas with CLEAResult implementing the program in the Nicor Gas territory. This report focuses solely on the electric savings from the program. Savings from natural gas measures are included in separate evaluation reports. The PY7 HEA Program savings planning target was to achieve net savings of 2,139 megawatt-hours (MWh)¹. The primary objective of this residential direct install program is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation, programmable thermostats, and compact florescent lamps (CFLs) at eligible single family residences. Measures with verified electric savings were CFLs, programmable thermostats, and hot water heating savings (when the hot water was electrically heated). In addition, the installation teams performed services with verified electric savings, including programming new thermostats and reprogramming existing thermostats. The secondary objective of this program is to function as the “gateway” for homeowners to participate in other residential programs. HEA performs a brief assessment of the major retrofit opportunities (e.g., furnace, boiler, air conditioning, insulation, and air sealing) and brings heightened awareness to the homeowners about available additional efficiency programs offered by ComEd, Peoples Gas, North Shore Gas, and Nicor Gas. The biggest change for PY7 was that the target savings goal for the joint program with Nicor Gas Direct Install expanded when the Home Energy Savings program function split into Home Energy Assessment and the Weatherization programs.

E.1. Program Savings

Table E-1 summarizes the electricity savings from the ComEd/PG/NSG and ComEd/Nicor Gas programs.

The combined electricity savings from both joint programs is shown in Table-E 1 and includes verified net energy savings of 4,283 MWh, verified net demand reduction of 4.95 MW, and verified net peak demand reduction of 0.44 MW

¹ From “PY7 Goals.xlsx” email attachment from ComEd, April 9, 2015.

Table-E 1. EPY7 Total Program Electric Savings

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)*
Ex Ante Gross Savings	5,354	-	0.54
Verified Gross Savings	5,354	6.19	0.54
NTGR†	0.80	0.80	0.80
Verified Net Savings	4,283	4.95	0.44

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

*The ComEd/PG/NSG program claimed ex ante peak demand savings for only CFLs but not the water measures, and there are no peak demand savings for programmable thermostats. In addition, the ComEd/PG/NSG program did not claim ex ante demand savings for any measures. The ComEd/Nicor program claimed ex ante peak demand savings for both CFLs and water measures, however did not claim ex ante demand savings for any measures.

Source: ComEd tracking data and Navigant team analysis.

Table-E 2 contains the ComEd/PG/NSG program’s verified net energy savings of 3,432 MWh, verified net demand reduction of 3.82 MW, and verified net peak demand reduction of 0.35 MW.

Table-E 2. PY7 Total Program Electric Savings – ComEd/PG/NSG

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)*
Ex Ante Gross Savings	4,291	-	0.43
Verified Gross Savings	4,290	4.78	0.43
NTGR†	0.80	0.80	0.80
Verified Net Savings	3,432	3.82	0.35

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

*The ComEd/PG/NSG program claimed ex ante peak demand savings for only CFLs but not the water measures, and there are no peak demand savings for programmable thermostats. In addition, the ComEd/PG/NSG program did not claim ex ante demand savings for any measures.

Source: ComEd tracking data and Navigant team analysis.

Table-E 3 contains the ComEd/Nicor Gas program’s verified net energy savings of 851 MWh, verified net demand reduction of 1.13 MW, and verified net peak demand reduction of 0.09 MW.

Table-E 3. PY7 Total Program Electric Savings – ComEd/Nicor Gas

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)*
Ex Ante Gross Savings	1,063	-	0.11
Verified Gross Savings	1,064	1.41	0.11
NTGR†	0.80	0.80	0.80
Verified Net Savings	851	1.13	0.09

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

*The ComEd/Nicor program claimed ex ante peak demand savings for both CFLs and water measures, however did not claim ex ante demand savings for any measures.

Source: ComEd tracking data and Navigant team analysis.

E.2. Program Savings by Measure Category

Table-E 4, Table-E 5, and Table-E 6 summarize the program gross and net savings by measure category. The tables present savings at the measure group level and are extended to three decimal places in order to illustrate savings.

Table-E 4. PY7 Program Results by Measure Category

Savings Category	CFL	Hot Water	Thermostats	Total
Ex Ante Gross Savings (MWh)	4,958	101	295	5,354
Ex Ante Gross Demand Reduction (MW)	-	-	-	-
Ex Ante Gross Peak Demand Reduction (MW)*	0.527	0.009	N/A	0.54
Verified Gross Savings (MWh)	4,958	101	295	5,354
Verified Gross Demand Reduction (MW)	5.542	0.648	N/A	6.19
Verified Gross Peak Demand Reduction (MW)	0.527	0.017	N/A	0.54
Verified Gross Realization Rate	100%	100%	100%	100%
Net to Gross Ratio (NTGR)†	0.80	0.80	0.80	0.80
Verified Net Savings (MWh)	3,966	81	236	4,283
Verified Net Demand Reduction (MW)	4.433	0.518	N/A	4.95
Verified Net Peak Demand Reduction (MW)	0.422	0.013	N/A	0.44

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

*The ComEd/PG/NSG program claimed ex ante peak demand savings for only CFLs but not the water measures, and there are no peak demand savings for programmable thermostats. In addition, the ComEd/PG/NSG program did not claim ex ante demand savings for any measures. The ComEd/Nicor program claimed ex ante peak demand savings for both CFLs and water measures, however did not claim ex ante demand savings for any measures.

Source: ComEd tracking data and Navigant team analysis.

Table-E 5. PY7 Program Results by Measure Category - ComEd/PG/NSG

Savings Category	CFL	Hot Water	Thermostats	Total
Ex Ante Gross Savings (MWh)	4,037	46	208	4,291
Ex Ante Gross Demand Reduction (MW)	-	-	-	-
Ex Ante Gross Peak Demand Reduction (MW)*	0.425	-	N/A	0.43
Verified Gross Savings (MWh)	4,037	46	207	4,290
Verified Gross Demand Reduction (MW)	4.471	0.310	N/A	4.78
Verified Gross Peak Demand Reduction (MW)	0.425	0.008	N/A	0.43
Verified Gross Realization Rate	100%	100%	100%	100%
Net to Gross Ratio (NTGR)†	0.80	0.80	0.80	0.80
Verified Net Savings (MWh)	3,230	37	166	3,432
Verified Net Demand Reduction (MW)	3.576	0.248	N/A	3.82
Verified Net Peak Demand Reduction (MW)	0.340	0.006	N/A	0.35

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

*The ComEd/PG/NSG program claimed ex ante peak demand savings for only CFLs but not the water measures, and there are no peak demand savings for programmable thermostats. In addition, the ComEd/PG/NSG program did not claim ex ante demand savings for any measures.

Source: ComEd tracking data and Navigant team analysis.

Table-E 6. PY7 Program Results by Measure Category - ComEd/Nicor Gas

Savings Category	CFL	Hot Water	Thermostats	Total
Ex Ante Gross Savings (MWh)	921	55	87	1,063
Ex Ante Gross Demand Reduction (MW)	-	-	-	-
Ex Ante Gross Peak Demand Reduction (MW)*	0.102	0.009	N/A	0.11
Verified Gross Savings (MWh)	921	55	88	1,064
Verified Gross Demand Reduction (MW)	1.071	0.338	N/A	1.41
Verified Gross Peak Demand Reduction (MW)	0.102	0.009	N/A	0.11
Verified Gross Realization Rate	100%	100%	100%	100%
Net to Gross Ratio (NTGR)†	0.80	0.80	0.80	0.80
Verified Net Savings (MWh)	737	44	70	851
Verified Net Demand Reduction (MW)	0.857	0.270	N/A	1.13
Verified Net Peak Demand Reduction (MW)	0.082	0.007	N/A	0.09

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

*The ComEd/Nicor program claimed ex ante peak demand savings for both CFLs and water measures, however did not claim ex ante demand savings for any measures.

Source: ComEd tracking data and Navigant team analysis

E.3. Impact Estimate Parameters for Future Use

This evaluation did not have any additional research on parameters used in impact calculations or for deeming in future versions of the Illinois TRM.

E.4. Program Volumetric Detail

Overall, the HEA Program had 12,229 participants in PY7 and installed 170,122 measures. The ComEd/PG/NSG program had 8,894 participants in PY7 and installed 136,232 measures and the ComEd/Nicor Gas program had 3,335 participants in PY7 and installed 33,890 measures as shown in the following tables.

Table-E 7. PY7 Volumetric Findings Detail

Participation	Total Participants or Measure Installed
Participants ²	12,229
Total Installed Measures	170,122
Direct Install Measures (non-CFLs)	5,856
CFL Installations	164,266
Showerheads	229
Kitchen Faucet Aerators	85
Bathroom Faucet Aerators	245
Pipe Insulation (Linear Foot)	515
Programmable Thermostats	3,133
Reprogramming Thermostats	1,649

Source: ComEd tracking data and Navigant team analysis.

² Participants are defined as project ID.

Table-E 8. PY7 Volumetric Findings Detail for ComEd/PG/NSG Program

Participation	Total Participants or Measure Installed
Participants	8,894
Total Installed Measures	136,232
Direct Install Measures (non-CFLs)	4,032
CFL Installations	132,200
Showerheads	108
Kitchen Faucet Aerators	43
Bathroom Faucet Aerators	116
Pipe Insulation (Linear Foot)	134
Programmable Thermostats*	2,496
Reprogramming Thermostats**	1,135

Source: ComEd tracking data and Navigant team analysis.

*Navigant identified 2,567 total programmable thermostats, but 2,496 total customers receiving programmable thermostats with savings.

**Navigant identified 1,181 total reprogrammable thermostats, but 1,135 total customers receiving reprogrammable thermostats with savings.

Table-E 9. PY7 Volumetric Findings Detail for ComEd/Nicor Gas Program

Participation	Total Participants or Measure Installed
Participants	3,335
Total Installed Measures	33,890
Direct Install Measures (non-CFLs)	1,824
CFL Installations	32,066

Source: ComEd tracking data and Navigant team analysis.

*Navigant identified 637 total programmable thermostats, but 586 total customers receiving programmable thermostats with savings.

**Navigant identified 514 total reprogramming thermostats installs, 504 customers receiving reprogramming thermostats with savings.

E.5. Results Summary

Table-E 10, Table-E 11 and Table-E 12 summarize the key metrics from PY7 for the overall program and the joint programs with PG/NSG and Nicor respectively that reflect allowable savings using Illinois TRM v3.0 methods. These savings and installation values include electric participants and measures installed in households with electric heating and/or electric hot water heaters.

Table-E 10. PY7 Results Summary

Participation	Units	PY7
Verified Net Savings	MWh	4,283
Verified Net Demand Reduction	MW	4.95
Verified Net Peak Demand Reduction	MW	0.44
Verified Gross Savings	MWh	5,354
Verified Gross Demand Reduction	MW	6.19
Verified Gross Peak Demand Reduction	MW	0.54
Program MWh Realization Rate	%	100
Program NTG Ratio †	#	0.80
CFLs Installed	#	164,266
Showerheads Installed	#	229
Kitchen Aerators Installed	#	85
Bathroom Aerators Installed	#	245
Pipe Insulation Installed (Linear Feet)	#	515
Programmable Thermostats	#	3,133
Reprogramming Thermostats	#	1,649

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Source: ComEd tracking data and Navigant team analysis.

Table-E 11. PY7 Results Summary for ComEd/PG/NSG Program

Participation	Units	PY7
Verified Net Savings	MWh	3,432
Verified Net Demand Reduction	MW	3.82
Verified Net Peak Demand Reduction	MW	0.35
Verified Gross Savings	MWh	4,290
Verified Gross Demand Reduction	MW	4.78
Verified Gross Peak Demand Reduction	MW	0.43
Program MWh Realization Rate	%	100
Program NTG Ratio †	#	0.80
CFLs Installed	#	132,200
Showerheads Installed	#	108
Kitchen Aerators Installed	#	43
Bathroom Aerators Installed	#	116
Pipe Insulation Installed (Linear Feet)	#	134
Programmable Thermostats	#	2,496
Reprogramming Thermostats	#	1,135

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Source: ComEd tracking data and Navigant team analysis.

Table-E 12. PY7 Results Summary for ComEd/Nicor Gas Program

Participation	Units	PY7
Verified Net Savings	MWh	851
Verified Net Demand Reduction	MW	1.13
Verified Net Peak Demand Reduction	MW	0.09
Verified Gross Savings	MWh	1,064
Verified Gross Demand Reduction	MW	1.41
Verified Gross Peak Demand Reduction	MW	0.11
Program MWh Realization Rate	%	100
Program NTG Ratio †	#	0.80
CFLs Installed	#	32,066
Showerheads Installed	#	121
Kitchen Aerators Installed	#	42
Bathroom Aerators Installed	#	129
Pipe Insulation Installed (Linear Feet)	#	381
Programmable Thermostats	#	637
Reprogramming Thermostats	#	514

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Source: ComEd tracking data and Navigant team analysis.

E.6. Key Findings and Recommendations

The following provides insight into key program findings and recommendations.³

Program Savings Achievement

Finding 1. Overall, the HEA Program achieved verified gross savings of 5,354 MWh with a corresponding verified gross realization rate of 100 percent for energy savings. For the ComEd/PG/NSG program, the verified gross savings were 4,290 MWh. For the ComEd/Nicor program, the verified gross savings were 1,064 MWh.

Finding 2. Overall, the program achieved 200 percent of its planning target of 2,139 net MWh with verified net savings of 4,283 MWh. For the ComEd/PG/NSG program, the verified net savings were 3,432 MWh. For the ComEd/Nicor program the verified net savings were 851 MWh.

Finding 3. Overall, the verified net peak demand reduction was 0.44 MW and the verified total demand reduction was 4.95 MW. For the ComEd/PG/NSG program, the verified net peak demand reduction was 0.35 MW and verified net total demand reduction was 3.82 MW. For the ComEd/Nicor program, the verified net peak demand reduction was 0.09 MW and verified net total demand reduction was 1.13 MW.

³ Numbered findings and recommendations in this section are the same as those found in the Findings and Recommendations section of the evaluation report for ease of reference between each section.

Gross Realization Rates

Finding 4. For energy savings, overall verified gross realization rate was 100 percent for PY7 and all of the measure-specific realization rates were 100 percent, except for programmable thermostats (101 percent) and reprogramming thermostats (98 percent).: For the ComEd/PG/NSG program, Navigant identified 23 projects in the tracking database with ex ante savings claimed for multiple programmable thermostat installations in one household or multiple reprogramming thermostat in one household. For the ComEd/Nicor program, Navigant also identified 23 projects with ex ante savings claimed for multiple programmable thermostat installations in one household or multiple reprogramming thermostat in one household. Navigant capped ex ante deemed savings at one programmable thermostat per household, per the Illinois TRM v3.0. If the household had claimed savings for more than one programmable thermostat installed or more than one thermostat reprogrammed, Navigant applied savings for the single programmable thermostat. Also, Navigant identified 27 programmable thermostat projects in the ComEd/Nicor program that only claimed therms savings for the project. The Navigant evaluation team added electric savings (furnace fan savings) to these 27 projects, resulting in a realization rate above 100 percent for these projects.

Recommendation 1: To increase the accuracy of the savings claimed, Navigant recommends that the IC should claim ex ante savings based on one thermostat per household, and should not claiming savings for multiple thermostats or reprogramming thermostats. The IC should include both gas savings and electric furnace fan savings for all programmable thermostat measures, where applicable.

Program Participation

Finding 5. The HEA Program had a total of 12,229 participants and installed 170,122 measures in PY7. The ComEd/PG/NSG program had 8,894 participants in PY7 and installed 136,232 measures. The ComEd/Nicor Gas program had 3,335 participants in PY7 and installed 33,890 measures.

Program Tracking Database

Finding 6. The ComEd/PG/NSG program did not claim ex ante peak demand savings for several electric-based measures, including showerheads, faucet aerators, and pipe insulation.

Recommendation 2. Navigant recommends the IC track comprehensive demand reduction estimates in future program data extracts to increase the completeness of the ex ante savings information.

1 Introduction

1.1 Program Description

The Home Energy Assessment (HEA) Program is an assessment and direct install program jointly implemented by Commonwealth Edison Company (ComEd) and Peoples Gas/North Shore Gas (PG/NSG) with Franklin Energy Services implementing the program in the PG/NSG territory and jointly implemented by ComEd and Nicor Gas with CLEAResult implementing the program in the Nicor Gas territory. This report focuses solely on the electric savings from the program. Savings from natural gas measures are included in separate reports. The PY7 HEA Program savings planning target was to achieve net savings of 2,139 megawatt-hours (MWh)⁴. The primary objective of this residential direct install program is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation, programmable thermostats, and compact florescent lamps (CFLs) at eligible single family residences. Measures with verified electric savings were CFLs, programmable thermostats, and hot water heating savings (when the hot water was electrically heated). In addition, the installation teams performed services with verified electric savings, including programming new thermostats and reprogramming existing thermostats. The secondary objective of this program is to function as the “gateway” for homeowners to participate in other residential programs. HEA performs a brief assessment of the major retrofit opportunities (e.g., furnace, boiler, air conditioning, insulation, and air sealing) and bring heightened awareness to the homeowners about available additional efficiency programs offered by ComEd, Peoples Gas, North Shore Gas, and Nicor Gas. The biggest change for PY7 was that the target savings goal for the joint program with Nicor Gas Direct Install expanded when the Home Energy Savings program split into Home Energy Assessment and the Weatherization programs.

1.2 Evaluation Objectives

In PY7, Navigant Consulting, Inc.’s (Navigant’s) evaluation objectives were: (1) verifying program tracking system data, (2) verifying gross savings impacts based on the Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0 (Illinois TRM v3.0), and (3) quantifying net savings impacts. For this evaluation, Navigant conducted limited process research through telephone interviews with program managers at both ComEd and the implementation contractors to understand the program’s performance and changes in PY7.

⁴ From “PY7 Goals.xlsx” email attachment from ComEd, April 9, 2015.

2 Evaluation Approach

Navigant reviewed ex-ante gross savings estimates by totaling all Home Energy Assessment measures from the program tracking database. Navigant compared ex ante to ex post savings to find the measure- and program-level realization rates. The net-to-gross ratio (NTGR) for this program year was approved through the Illinois Stakeholder Advisory Group (IL SAG) stakeholder consensus process.

2.1 Overview of Data Collection Activities

The core data collection activities included review of program tracking data and verification of direct install savings according to the Illinois TRM v3.0. Table 2-1 and Table 2-2 show the full set of data collection activities.

Table 2-1. Primary Data Collection Activities

What	Who	Target Completes	Completes Achieved	When	Impact/Process
Review Program Tracking Database	Program Tracking Database(s)	All	All	June-August 2015	Impact
In Depth Interviews	Program Manager/Implementer Staff	4	4	May - October	Impact/Process

Source: Navigant

Table 2-2. Additional Resources Used in Evaluation

Reference Source	Author	Application	Impact	Process
Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0	Illinois Stakeholder Advisory Group	HEA measure impact analysis	X	

Source: Navigant

2.2 Verified Savings Parameters

Navigant calculated verified gross direct install savings for the PY7 HEA Program using algorithms, assumptions, and parameters defined in the Illinois TRM v3.0. A net to gross (NTG) ratio is applied to verified gross savings to quantify verified net savings. Table 2-3 shows the key parameters used in the verified gross and net savings analysis.

Table 2-3. Verified Savings Parameter Data Sources

Verified Gross and Net Input Parameters	Value	Data Source	Deemed † or Evaluated?
NTGR-CFLs	0.80	IL SAG Consensus Process†	Deemed
NTGR-Hot Water Measures	0.80	IL SAG Consensus Process†	Deemed
NTGR-Thermostats	0.80	IL SAG Consensus Process†	Deemed
CFL In Service Rate	0.97	Illinois TRM, v3.0, Section 5.5.1	Deemed
Showerhead in Service Rate	0.98	Illinois TRM, v3.0, Section 5.4.5	Deemed
Faucet Aerators in Service Rate	0.95	Illinois TRM, v3.0, Section 5.4.4	Deemed

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

2.2.1 Verified Gross Program Savings Analysis Approach

Navigant evaluated gross savings by (1) reviewing the tracking system, (2) reviewing measure algorithms, if applicable, and their respective values in the tracking system to ensure that they are appropriately applied, and (3) cross-checking totals. Navigant compared ex ante savings and ex post savings to calculate the verified realization rate for both program and measure level. Navigant verified ex post measure savings for all direct install measures using the IL TRM v3.0. ComEd provided tracking data for the program.⁵

2.2.2 Verified Net Program Savings Analysis Approach

Verified net energy and demand (coincident peak and overall) savings were calculated by multiplying the verified gross savings estimates by a predetermined net-to-gross ratio (NTGR). In PY7, the NTGR estimates used to calculate the net verified savings were based on past evaluation research and approved through a consensus process by the Illinois Stakeholder Advisory Group.⁶

2.3 Process Evaluation

Navigant conducted limited process research in PY7 through telephone interviews with program managers at ComEd and the implementation contractors to understand the program's performance and changes.

⁵ ComEd spreadsheet, "PY7 Single Family HEA-WCx-CAC," received August 1, 2015.

⁶ Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

3 Gross Impact Evaluation

This section includes Navigant’s gross impact evaluation results. Navigant performed a tracking system review on the program tracking system and calculated verified gross program savings. The program reported ex ante gross savings of 5,354 MWh and ex ante peak demand reduction of 0.54 MW. Navigant reports verified gross savings of 5,354 MWh, verified gross peak demand reduction of 0.54 MW, and verified gross total demand reduction of 6.19 MW, with a corresponding verified gross realization rate of 100 percent for energy savings.

3.1 Tracking System Review

For the PY7 evaluation, Navigant reviewed the ComEd program tracking system to verify the completeness and accuracy of the tracking system data and to identify any issues that would affect the impact evaluation of the HEA Program. Navigant found the tracking data documents sufficient to complete the gross impact evaluation of the HEA program.

The key findings from the tracking system review include:

- For the ComEd/PG/NSG program, Navigant identified 23 projects in the tracking database with ex ante savings claimed for multiple programmable thermostat installations in one household or multiple reprogramming thermostat in one household. For the ComEd/Nicor program, Navigant also identified 23 projects with ex ante savings claimed for multiple programmable thermostat installations in one household or multiple reprogramming thermostat in one household. Navigant capped ex ante deemed savings at one programmable thermostat per household, per the Illinois TRM v3.0. If the household had claimed savings for more than one programmable thermostat installed or more than one thermostat reprogrammed, Navigant applied savings for the single programmable thermostat. Also, Navigant identified 27 programmable thermostat projects in the ComEd/Nicor program that only claimed therms savings for the project. The Navigant evaluation team added electric savings (furnace fan savings) to these 27 projects, resulting in a realization rate above 100 percent for these projects.
- The ComEd/PG/NSG program did not claim ex ante peak demand savings for several electric-based measures, including showerheads, faucet aerators, and pipe insulation.
- Navigant identified several projects without ex ante savings claimed for several installed CFLs measures, hot water measures, and thermostats measures.

3.2 Program Volumetric Findings

In PY7, 12,229 electric customers participated in the HEA Program. These are customers whose homes received a home assessment for this program. The HEA Program achieved 164,266 CFL installations in PY7, and a total of 5,856 direct install measures (not including CFLs) with attributable savings. Table 3-1 shows the full volumetric detail for PY7, and Table 3-2 and Table 3-3 show the detail for the ComEd/PG/NSG and the ComEd/Nicor program, respectively.

Table 3-1. PY7 Volumetric Findings Detail

Participation	Total Participants or Measure Installed
Participants ⁷	12,229
Total Installed Measures	170,122
Direct Install Measures (non-CFLs)	5,856
CFL Installations	164,266
Showerheads	229
Kitchen Faucet Aerators	85
Bathroom Faucet Aerators	245
Pipe Insulation	515
Programmable Thermostats	3,133
Reprogramming Thermostats	1,649

Source: ComEd tracking data and Navigant team analysis.

Table 3-2. PY7 Volumetric Findings Detail for ComEd/PG/NSG Program

Participation	Total Participants or Measure Installed
Participants	8,894
Total Installed Measures	136,232
Direct Install Measures (non-CFLs)	4,032
CFL Installations	132,200
Showerheads	108
Kitchen Faucet Aerators	43
Bathroom Faucet Aerators	116
Pipe Insulation	134
Programmable Thermostats*	2,496
Reprogramming Thermostats**	1,135

Source: ComEd tracking data and Navigant team analysis.

*Navigant identified 2,567 total programmable thermostats, but 2,496 total customers receiving programmable thermostats with savings.

**Navigant identified 1,181 total reprogrammable thermostats, but 1,135 total customers receiving reprogrammable thermostats with savings.

⁷ Participants are defined as unique account name and address.

Table 3-3. PY7 Volumetric Findings Detail for ComEd/Nicor Gas Program

Participation	Total Participants or Measure Installed
Participants	3,335
Total Installed Measures	33,890
Direct Install Measures (non-CFLs)	1,824
CFL Installations	32,066
Showerheads	121
Kitchen Faucet Aerators	42
Bathroom Faucet Aerators	129
Pipe Insulation	381
Programmable Thermostats*	637
Reprogramming Thermostats**	514

Source: ComEd tracking data and Navigant team analysis.

*Navigant identified 637 total programmable thermostats, but 586 total customers receiving programmable thermostats with savings.

**Navigant identified 514 total reprogramming thermostats installs, 504 customers receiving reprogramming thermostats with savings.

3.3 Gross Program Impact Parameter Estimates

Navigant calculated verified gross savings and demand reduction from the PY7 HEA Program using algorithms and parameters defined in the Illinois TRM v3.0 (see Table 3-4). Navigant used the Illinois TRM v3.0 for all direct install measures.

Table 3-4. Verified Gross Savings Parameters

Measure	Deemed Input Parameter Source
All CFL Types	Illinois TRM v3.0 – Section 5.5.1 and 5.5.2
Showerhead	Illinois TRM v3.0 – Section 5.4.5
Kitchen Faucet Aerator	Illinois TRM v3.0 – Section 5.4.4
Bathroom Faucet Aerator	Illinois TRM v3.0 – Section 5.4.4
Pipe Insulation	Illinois TRM v3.0 – Section 5.4.1
Hot Water Temperature Setback	Illinois TRM v3.0 – Section 5.4.6
Programmable Thermostat	Illinois TRM v3.0 – Section 5.3.11
Reprogramming Thermostat	Illinois TRM v3.0 – Section 5.3.11

Source: State of Illinois Technical Reference Manual Version 3.0 from <http://www.ilsag.info/technical-reference-manual.html>.

3.4 Verified Gross Program Impact Results

This section details the results of Navigant’s verified gross impact analysis for the PY7 HEA Program.

The total program verified gross savings is 5,354 MWh, verified gross peak demand reduction is 0.54 MW, and verified gross total demand reduction is 6.19 MW, as shown in Table 3-5. Table 3-6 and Table 3-7 show the detail for the ComEd/PG/NSG and the ComEd/Nicor program, respectively. The table presents savings at the measure group level and are extended to three decimal places in order to illustrate savings.

Table 3-5. PY7 Verified Gross Impact Savings Estimates by Measure Type

Measures	Ex Ante Gross Savings (MWh)	Ex Ante Gross Peak Demand Reduction (MW)*	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Peak Demand Reduction (MW)	MWh Verified Gross Realization Rate**
9 Watt CFL	206	0.022	206	0.230	0.022	100%
14 Watt CFL	2374	0.252	2374	2.651	0.252	100%
19 Watt CFL	224	0.024	224	0.250	0.024	100%
23 Watt CFL	267	0.028	267	0.298	0.028	100%
9 Watt Candelabra CFL	431	0.032	431	0.340	0.032	100%
9 Watt Globe CFL	875	0.103	875	1.081	0.103	100%
14 Watt Flood CFL	219	0.023	219	0.244	0.023	100%
14 Watt Globe CFL	362	0.043	362	0.448	0.043	100%
Showerheads	75	0.004	75	0.248	0.007	100%
Bathroom Aerators	4	0.003	4	0.280	0.006	100%
Kitchen Aerators	11	0.001	11	0.119	0.003	100%
Pipe Insulation	11	0.001	11	0.001	0.001	100%
Programmable Thermostats	176	N/A	177	N/A	N/A	101%
Reprogramming Thermostat	94	N/A	92	N/A	N/A	98%
Programmable Thermostat – Heat Pump	1	N/A	1	N/A	N/A	100%
Programmable Thermostat – Resistant Heat	16	N/A	16	N/A	N/A	100%
Reprogramming Thermostat – Resistant Heat	9	N/A	9	N/A	N/A	100%
Program Total	5354	0.54	5354	6.19	0.54	100%

Source: ComEd tracking data and Navigant team analysis.

Table 3-6. PY7 Verified Gross Impact Savings Estimates by Measure Type– ComEd/PG/NSG

Measures	Ex Ante Gross Savings (MWh)	Ex Ante Gross Peak Demand Reduction (MW)*	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Peak Demand Reduction (MW)	MWh Verified Gross Realization Rate**
9 Watt CFL	124	0.013	124	0.139	0.013	100%
14 Watt CFL	2005	0.213	2005	2.239	0.213	100%
19 Watt CFL	171	0.018	171	0.191	0.018	100%
23 Watt CFL	210	0.022	210	0.234	0.022	100%
9 Watt Candelabra CFL	431	0.032	431	0.340	0.032	100%
9 Watt Globe CFL	642	0.075	642	0.794	0.075	100%
14 Watt Flood CFL	219	0.023	219	0.244	0.023	100%
14 Watt Globe CFL	235	0.028	235	0.291	0.028	100%
Shower Head	35	-	35	0.117	0.003	100%
Bathroom Aerator	2	-	2	0.133	0.003	100%
Kitchen Aerator	6	-	6	0.060	0.001	100%
Pipe Insulation	3	-	3	0.0003	0.0003	100%
Programmable Thermostats	143	N/A	143	N/A	N/A	100%
Reprogramming Thermostat	65	N/A	64	N/A	N/A	99%
Program Total	4291	0.43	4290	4.78	0.43	100%

Source: ComEd tracking data and Navigant team analysis.

Table 3-7. PY7 Verified Gross Impact Savings Estimates by Measure Type– ComEd/Nicor Gas

Measures	Ex Ante Gross Savings (MWh)	Ex Ante Gross Peak Demand Reduction (MW)*	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Peak Demand Reduction (MW)	MWh Verified Gross Realization Rate**
9 Watt CFL	81	0.008	81	0.091	0.008	100%
14 Watt CFL	369	0.040	369	0.412	0.040	100%
19 Watt CFL	53	0.006	53	0.060	0.006	100%
23 Watt CFL	57	0.006	57	0.064	0.006	100%
9 Watt Globe CFL	233	0.028	233	0.287	0.028	100%
14 Watt Globe CFL	127	0.015	127	0.157	0.015	100%
Shower Head	40	0.004	40	0.131	0.004	100%
Bathroom Aerator	2	0.003	2	0.148	0.003	100%
Kitchen Aerator	5	0.001	5	0.059	0.001	100%
Pipe Insulation	8	0.001	8	0.001	0.001	100%
Programmable Thermostats	33	N/A	34	N/A	N/A	104%
Reprogramming Thermostat	29	N/A	28	N/A	N/A	96%
Programmable Thermostat – Heat Pump	1	N/A	1	N/A	N/A	100%
Programmable Thermostat – Resistant Heat	16	N/A	16	N/A	N/A	100%
Reprogramming Thermostat – Resistant Heat	9	N/A	9	N/A	N/A	100%
Program Total	1063	0.11	1064	1.41	0.11	100%

Source: ComEd tracking data and Navigant team analysis.

4 Net Impact Evaluation

In PY7, the HEA Program verified net impact savings was 4,283 MWh, the verified net peak demand reduction was 0.44 MW, and the verified savings were based on past evaluation research and approved through a consensus process by the Illinois Stakeholder Advisory Group.⁸ The table below shows deemed NTGR and PY7 verified net savings.

Table 4-1. PY7 Verified Net Impact Savings Estimates by Measure Type

Measure	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Peak Demand Reduction (MW)	Deemed NTGR†	Verified Net Savings (MWh)	Verified Net Demand Reduction (MW)	Verified Net Peak Demand Reduction (MW)
9 Watt CFL	206	0.230	0.022	0.80	165	0.184	0.017
14 Watt CFL	2,374	2.651	0.252	0.80	1,899	2.121	0.202
19 Watt CFL	224	0.250	0.024	0.80	179	0.200	0.019
23 Watt CFL	267	0.298	0.028	0.80	213	0.238	0.023
9 Watt Candelabra CFL	431	0.340	0.032	0.80	345	0.272	0.026
9 Watt Globe CFL	875	1.081	0.103	0.80	700	0.865	0.082
14 Watt Flood CFL	219	0.244	0.023	0.80	175	0.195	0.019
14 Watt Globe CFL	362	0.448	0.043	0.80	290	0.358	0.034
Shower Head	75	0.248	0.007	0.80	60	0.198	0.005
Bathroom Aerator	4	0.280	0.006	0.80	3	0.224	0.005
Kitchen Aerator	11	0.119	0.003	0.80	9	0.095	0.002
Pipe Insulation	11	0.001	0.001	0.80	9	0.001	0.001
Programmable Thermostats	177	N/A	N/A	0.80	142	N/A	N/A
Reprogramming Thermostats	92	N/A	N/A	0.80	73	N/A	N/A
Programmable Thermostat – Heat Pump	1	N/A	N/A	0.80	1	N/A	N/A
Programmable Thermostat – Resistant Heat	16	N/A	N/A	0.80	13	N/A	N/A
Reprogramming Thermostat– Resistant Heat	9	N/A	N/A	0.80	7	N/A	N/A
Program Total	5,354	6.19	0.54	0.80	4,283	4.95	0.44

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Source: ComEd tracking data and Navigant team analysis.

⁸ Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Table 4-2. PY7 Verified Net Impact Savings Estimates by Measure Type– ComEd/PG/NSG

Measure	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Peak Demand Reduction (MW)	Deemed NTGRT	Verified Net Savings (MWh)	Verified Net Demand Reduction (MW)	Verified Net Peak Demand Reduction (MW)
9 Watt CFL	124	0.139	0.013	0.80	99	0.111	0.011
14 Watt CFL	2,005	2.239	0.213	0.80	1,604	1.791	0.170
19 Watt CFL	171	0.191	0.018	0.80	137	0.153	0.014
23 Watt CFL	210	0.234	0.022	0.80	168	0.187	0.018
9 Watt Candelabra CFL	431	0.340	0.032	0.80	345	0.272	0.026
9 Watt Globe CFL	642	0.794	0.075	0.80	513	0.635	0.060
14 Watt Flood CFL	219	0.244	0.023	0.80	175	0.195	0.019
14 Watt Globe CFL	235	0.291	0.028	0.80	188	0.233	0.022
Shower Head	35	0.117	0.003	0.80	28	0.094	0.003
Bathroom Aerator	2	0.133	0.003	0.80	2	0.106	0.002
Kitchen Aerator	6	0.060	0.001	0.80	4	0.048	0.001
Pipe Insulation	3	0.0003	0.0003	0.80	2	0.0003	0.0002
Programmable Thermostats	143	N/A	N/A	0.80	114	N/A	N/A
Reprogramming Thermostat	64	N/A	N/A	0.80	51	N/A	N/A
Program Total	4,290	4.78	0.43	0.80	3,432	3.82	0.35

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Source: ComEd tracking data and Navigant team analysis.

Table 4-3. PY7 Verified Net Impact Savings Estimates by Measure Type– ComEd/Nicor Gas

Measure	Verified Gross Savings (MWh)	Verified Gross Demand Reduction (MW)	Verified Gross Peak Demand Reduction (MW)	Deemed NTGR†	Verified Net Savings (MWh)	Verified Net Demand Reduction (MW)	Verified Net Peak Demand Reduction (MW)
9 Watt CFL	81	0.091	0.008	0.80	65	0.073	0.007
14 Watt CFL	369	0.412	0.040	0.80	295	0.330	0.032
19 Watt CFL	53	0.060	0.006	0.80	43	0.048	0.005
23 Watt CFL	57	0.064	0.006	0.80	46	0.051	0.005
9 Watt Globe CFL	233	0.287	0.028	0.80	186	0.230	0.022
14 Watt Globe CFL	127	0.157	0.015	0.80	102	0.126	0.012
Shower Head	40	0.131	0.004	0.80	32	0.105	0.003
Bathroom Aerator	2	0.148	0.003	0.80	2	0.118	0.003
Kitchen Aerator	5	0.059	0.001	0.80	4	0.047	0.001
Pipe Insulation	8	0.001	0.001	0.80	6	0.001	0.001
Programmable Thermostats	34	N/A	N/A	0.80	27	N/A	N/A
Reprogramming Thermostats	28	N/A	N/A	0.80	22	N/A	N/A
Programmable Thermostat – Heat Pump	1	N/A	N/A	0.80	1	N/A	N/A
Programmable Thermostat – Resistant Heat	16	N/A	N/A	0.80	13	N/A	N/A
Reprogramming Thermostat– Resistant Heat	9	N/A	N/A	0.80	7	N/A	N/A
Program Total	1,064	1.41	0.11	0.80	851	1.13	0.09

†A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Source: ComEd tracking data and Navigant team analysis.

5 Process Evaluation

For PY7, Navigant conducted telephone interviews with the program managers and implementation contractors to learn about the changes for PY7 and how the changes affected the program's participation and participant satisfaction.

The ComEd/PG/NSG program used an outreach strategy that proved to be highly effective at generating new leads: offering participants a chance to win a monthly raffle prize by referring friends and family to the program. Fifteen percent of the participants enter the program through the raffle.⁹ The ComEd/Nicor program decided that the outreach at community events and other outreach such as emails and newsletters was sufficient to generate leads for the program without a participant referral incentive.¹⁰ In addition, the ComEd/Nicor program targeted communities in the southwest suburbs of Chicago where additional gas lines were being installed which also proved to be an effective strategy to generate participant leads for the program.¹¹ ComEd sent a bill insert to 10,000 customers in the ComEd/ Nicor territory.¹²

The assessments offered to homeowners were similar: a 60-90 minute home energy assessment followed by a report provided to the homeowner in the ComEd/Nicor territory¹³ and a similar assessment in the ComEd/PG/NSG territory.¹⁴

Regarding participant satisfaction, both the ComEd/PG/NSG and the ComEd/Nicor programs used a leave-behind postcard requesting that customers either fill it out and send it in or enter their feedback online via a web site. Overall the participant satisfaction was high. Participants in the ComEd/PG/NSG gave the program a satisfaction rating of 4.9 out of 5.¹⁵ Participants in the ComEd/Nicor program gave the program a satisfaction rating of 4.7 out of 5.¹⁶

⁹ Interview with Franklin Energy Services Program Manager, May 21, 2015.

¹⁰ Interview with ComEd Program Manager, November 17, 2015.

¹¹ Interview with Nicor Program Manager, November 16, 2015.

¹² Interview with Nicor Program Manager, May 29, 2015.

¹³ Interview with CLEAResult Program Manager, November 16, 2015.

¹⁴ Interview with Franklin Energy Services Program Manager, May 21, 2015.

¹⁵ Interview with Franklin Energy Services Program Manager, May 21, 2015 and Excel file "Customer Satisfaction Cards PY4 HEJ.xlsx" received, November 20, 2015 which included ComEd and PG/NSG customers

¹⁶ Excel file "HEA SurveySummary06115.xlsx" received November 17, 2015 from ComEd which included ComEd and Nicor customers. The two questions which most closely matched the program satisfaction question in the postcard survey conducted by Franklin Energy Services were "Overall I am satisfied with the energy-saving products installed" and "Overall I am satisfied with the energy-saving products installed." The participants' average rating for both of these questions was 4.7 out of 5.

6 Findings and Recommendations

This section summarizes the key impact and process findings and recommendations.

Program Savings Achievement

Finding 1. Overall, the HEA Program achieved verified gross savings of 5,354 MWh with a corresponding verified gross realization rate of 100 percent for energy savings. For the ComEd/PG/NSG program, the verified gross savings were 4,290 MWh. For the ComEd/Nicor program, the verified gross savings were 1,064 MWh.

Finding 2. Overall, the program achieved 200 percent of its planning target of 2,139 net MWh with verified net savings of 4,283 MWh. For the ComEd/PG/NSG program, the verified net savings were 3,432 MWh. For the ComEd/Nicor program the verified net savings were 851 MWh.

Finding 3. Overall, the verified net peak demand reduction was 0.44 MW and the verified total demand reduction was 4.95 MW. For the ComEd/PG/NSG program, the verified net peak demand reduction was 0.35 MW and verified net total demand reduction was 3.82 MW. For the ComEd/Nicor program, the verified net peak demand reduction was 0.09 MW and verified net total demand reduction was 1.13 MW.

Gross Realization Rates

Finding 4. For energy savings, overall verified gross realization rate was 100 percent for PY7 and all of the measure-specific realization rates were 100 percent, except for programmable thermostats (101 percent) and reprogramming thermostats (98 percent). For the ComEd/PG/NSG program, Navigant identified 23 projects in the tracking database with ex ante savings claimed for multiple programmable thermostat installations in one household or multiple reprogramming thermostat in one household. For the ComEd/Nicor program, Navigant also identified 23 projects with ex ante savings claimed for multiple programmable thermostat installations in one household or multiple reprogramming thermostat in one household. Navigant capped ex ante deemed savings at one programmable thermostat per household, per the Illinois TRM v3.0. If the household had claimed savings for more than one programmable thermostat installed or more than one thermostat reprogrammed, Navigant applied savings for the single programmable thermostat. Also, Navigant identified 27 programmable thermostat projects in the ComEd/Nicor program that only claimed therms savings for the project. The Navigant evaluation team added electric savings (furnace fan savings) to these 27 projects, resulting in a realization rate above 100 percent for these projects.

Recommendation 1: To increase the accuracy of the savings claimed, Navigant recommends that the IC claims ex ante savings based on one thermostat per household, and not claiming savings for multiple thermostats or reprogramming thermostats. Also, Navigant recommends that the IC include both gas savings and electric furnace fan savings for all programmable thermostat measures, where applicable.

Program Participation

Finding 5. The HEA program had a total of 12,229 participants and installed 170,122 measures in PY7. The ComEd/PG/NSG program had 8,894 participants in PY7 and installed 136,232 measures. The ComEd/Nicor Gas program had 3,335 participants in PY7 and installed 33,890 measures.

Program Tracking Database

Finding 6. The ComEd/PG/NSG program did not claim ex ante peak demand savings for several electric-based measures, including showerheads, faucet aerators, and pipe insulation.

Recommendation 2. Navigant recommends the IC track comprehensive demand reduction estimates in future program data extracts to increase the completeness of the ex ante savings information.