



**ComEd**

# **Multi-Family Assessment Program Evaluation Report**

**FINAL**

**Energy Efficiency / Demand Response Plan:  
Plan Year 8 (PY8)  
(6/1/2015-5/31/2016)**

**Presented to  
Commonwealth Edison Company**

November 23, 2016

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## E. EXECUTIVE SUMMARY

This report presents a summary of the findings and results from the impact and process evaluation of the PY8<sup>1</sup> Multi-Family Assessment (Multi-Family) program. The program is jointly implemented by Commonwealth Edison Company (ComEd) and Peoples Gas (PGL) and North Shore Gas (NSG) companies, and ComEd and Nicor Gas Company. The PY8 ComEd/PGL/NSG joint program was implemented by Franklin Energy Services and the ComEd/Nicor Gas joint program was implemented by CLEAResult. This evaluation report includes total ComEd electric savings from both the jointly implemented programs. Navigant will present gas savings in separate documents.

The Multi-Family program did not change substantially from PY7 in terms of scope and measure types. The PY8 program continued to offer free direct install tenant space measures such as water efficient faucet aerators and showerheads, programmable thermostats, domestic hot water pipe insulation and CFL bulbs. ComEd plans to introduce new direct install tenant space measures in PY9, including Smart Power Strips and LEDs. ComEd is phasing out CFLs during PY9 and is introducing specialty LEDs.<sup>2</sup>

Navigant’s evaluation involved verifying the compliance of the PY8 program gross savings with the Illinois Technical Reference Manual version 4.0 (TRM v4.0)<sup>3</sup> and applying research adjustments to non-deemed savings in the tracking database. Navigant also calculated the verified net impact savings using the approved net to gross ratio (NTGR) deemed through Illinois Stakeholder Advisory Group (SAG) consensus.<sup>4</sup> In addition, Navigant interviewed program staff to verify information about the tracking system inputs.

### E.1. Program Savings

Table E-1 summarizes the electricity savings from the Multi-Family Assessment program.

**Table E-1. PY8 Total Program Electric Savings**

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex Ante Gross Savings	3,269	7.36	0.32
Verified Gross Savings	3,268	7.36	0.32
Verified Net Savings	3,123	7.08	0.31

Source: ComEd tracking data and Navigant team analysis.

Table E-2 summarizes the breakdown of the electricity savings by utility in the jointly implemented programs. Table E-3 disaggregates the electricity savings by measure.

<sup>1</sup> The EPY8/GPY5 joint program year began June 1, 2015 and ended May 31, 2016.

<sup>2</sup> PY9 is a transition year from CFLs to LEDs. Standard wattage CFLs will still be installed during PY9, but the overall number of CFLs will be lower due to the inclusion of specialty LEDs. Starting in PY10, ComEd anticipate that all lighting measures will be LEDs.

<sup>3</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency Version 4.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

<sup>4</sup><http://ilsag.info/net-to-gross-framework.html>

## E.2. Program Savings by Channel and Measure

**Table E-2. PY8 Program Results by Utility**

Savings Category	ComEd & PGL/NSG	ComEd & Nicor Gas	Overall Total
Ex Ante Gross Savings (MWh)	1,706	1,563	3,269
Ex Ante Gross Peak Demand Reduction (MW)	0.16	0.16	0.32
Verified Gross Savings (MWh)	1,704	1,563	3,268*
Verified Gross Peak Demand Reduction (MW)	0.16	0.16	0.32
Verified Gross Realization Rate	100%‡	100%‡	100%‡
Verified Net Savings (MWh)	1,651	1,471	3,123*
Verified Net Demand Reduction (MW)	0.16	0.15	0.31

Source: ComEd tracking data and Navigant team analysis.

\*Total does not sum exactly due to rounding.

‡ Based on evaluation research findings.

**Table E-3. PY8 Program Results by Measure**

Measure	Ex Ante Gross Savings (MWh)	Ex ante Gross Peak Demand Reduction (MW)	Verified Gross Savings (MWh)	Verified Gross Peak Demand Reduction (MW)	Verified Gross kWh Realization Rate ‡	NTGR †	Verified Net Savings (MWh)	Verified Net Peak Demand Reduction (MW)
Lighting (CFLs)	1,998	0.22	1,997	0.22	100%	0.98	1,957	0.21
Faucet Aerators and Showerheads	584	0.11	584	0.11	100%	0.94/ 1.00 /0.92*	547	0.10
DHW Pipe Insulation	13	<0.01	13	<0.01	100%	0.95	12	<0.01
Programmable Thermostat & Gas Fan Savings	674	-	674	-	100%	0.90	607	-
<b>PY8 Total</b>	<b>3,269</b>	<b>0.32</b>	<b>3,268</b>	<b>0.32</b>	<b>100%</b>	<b>N/A</b>	<b>3,123</b>	<b>0.31</b>

Source: ComEd tracking data and Navigant team analysis.

‡ Based on evaluation research findings.

† A deemed value. Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-26\_Final\_EMV\_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

\*Bathroom Aerator NTGR=0.94, Kitchen Aerator NTGR=1.0, and Showerhead NTGR=0.92

## E.3. Impact Estimate Parameters for Future Use

The PY8 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

The PY8 program had 14,452 unique Work Order records provided in the tracking system, including 12,702 participants (tenant units or projects) which received direct install products and realized energy savings. The program distributed 92,981 direct install measures as shown in the following table. A total of 8,047 unique projects or work orders and 64,451 measures were completed through the

ComEd/PGL/NSG joint program. A total of 4,655 unique projects and 28,530 measures were completed through the ComEd/Nicor Gas joint program.

**Table E-4. PY8 Volumetric Findings Detail**

Participation	Lighting	Non-Lighting	Unique Total
Participants (Tenant Unit or Project)	11,832	3402	12,702†
Total Measures	86,072	6,909	92,981
Number of Measures/Projects	7	2	7
Projects (Measures) from ComEd/PGL/NSG	7,606 (62,551)	1,695 (1,900)	8,047 (64,451)
Projects (Measures) from ComEd/Nicor Gas	4,226 (23,521)	1,707 (5,009)	4,655 (28,530)

Source: ComEd tracking data and Navigant team analysis.

† A total of 12,702 unique projects or work orders were completed in PY8. This includes 9,300 lighting only projects and 870 non-lighting only projects. The program had 2,532 projects identified to have both lighting and non-lighting measures installed.

## E.5. Results Summary

The following table summarizes the key metrics from PY8.

**Table E-5. PY8 Results Summary**

Participation	Units	PY8
Net Savings	MWh	3,123
Net Demand Reduction	MW	7.08
Net Peak Demand Reduction	MW	0.31
Gross Savings	MWh	3,268
Gross Demand Reduction	MW	7.36
Gross Peak Demand Reduction	MW	0.32
Program Realization Rate‡	%	100%
Program NTG Ratio†	#	Lighting=0.98 Bathroom Aerators=0.94 Kitchen Aerators=1.00 Showerheads=0.92 Pipe Insulation=0.95 Thermostats=0.90
Lighting Measures Installed	#	86,072
Non-Lighting Measures Installed	#	6,909
Participants (Tenant Units or Projects)	#	12,702
Customers Touched (Property Accounts)	#	N/A

Source: ComEd tracking data and Navigant team analysis.

† A deemed value. Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-26\_Final\_EMV\_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

‡ Based on evaluation research findings.

## E.6. Findings and Recommendations

The following describes key program findings and recommendations.

### Verified Gross Impacts and Realization Rate

**Finding 1.** The Multi-Family Assessment program in PY8 achieved verified gross energy savings of 3,268 MWh and verified gross summer coincidence peak demand reduction of 0.32 MW. The verified gross realization rate is 100 percent for both energy savings and demand reduction. The program is accurately tracking gross savings for most measures. Navigant adjusted the savings for flood-type CFLs, which is not deemed in the TRM. The CFL flood bulbs are removed from program measures in PY9. We also applied minor rounding adjustment to the savings from some measures. Tracking the deemed savings for the Multi-Family Assessment program has refined and improved from prior years. No major recommendation from research is needed at this time. Navigant expects that the program staff and the evaluation team will continue to collaborate in real time to address situations that would improve the program operations, especially as new measures and baselines are introduced and CFLs are phased out.

### Verified Net Impacts & NTGR

**Finding 2.** The evaluation used deemed NTG estimates to calculate verified net savings of 3,123 MWh, verified net demand reduction of 7.08 MW and verified net summer coincidence peak demand reduction of 0.32 MW. The ComEd/PGL/NSG joint program realized net energy savings of 1,651 MWh, representing 53 percent of the total net savings. The ComEd/Nicor joint program realized net energy savings of 1,563 MWh, representing 47 percent of the total net savings.

**Finding 3.** The PY8 net 3,123 MWh savings is 21 percent less than PY7. This is partly due to lower participation in PY8 (29 percent less of projects and 28 percent less of measures). While the ComEd/Nicor joint program realized a significant increase in net savings (26 percent more from PY7), the ComEd/PGL/NSG joint program realized a decrease in net savings from PY7 by approximately the same percentage, particularly from lighting projects.

**Recommendation 1.** Navigant recommends adopting the NTG value assigned to CFLs in the Multi-Family program for LEDs in PY9, since the program delivery method is the same for both technologies. Navigant plans to conduct NTG research in the future to address NTG ratios for LEDs and Smart Power Strips introduced into the program. This research will include coordination with other ComEd programs with similar measures.

### Program Volumetric Findings

**Finding 4.** The PY8 Multi-Family Assessment program had 12,702 participants with realized savings (tenant units or projects) and distributed 92,981 measures (including 86,072 CFL bulbs and 6,909 non-lighting measures). Lighting projects constituted 93 percent of the project and measure counts, and the remaining 7 percent from non-lighting projects. Projects with both lighting and non-lighting measures constituted 20 percent of the project count in PY8. On average, there were seven measures installed per project.

**Finding 5.** A total of 8,047 unique projects and 64,451 measures were completed through the ComEd/PGL/NSG joint program. A total of 4,655 unique projects and 28,530 measures were completed through the ComEd/Nicor Gas joint program. Projects and measures implemented in the ComEd/Nicor Gas joint program increased significantly in PY8 from PY7 (19 percent more projects and 14 percent more measures). Coincidentally, project and measure counts decreased by the same percentages for the ComEd/PGL/NSG joint program, particularly from lower participation of CFL lighting installation.



## 1. INTRODUCTION

### 1.1 Program Description

The Multi-Family Assessment (Multi-Family) program provides multi-family property owners, managers and tenants with a variety of ways to save electricity and natural gas. The program is designed to generate immediate energy savings through the direct installation of low-cost energy-efficient products. The PY8 program measures included direct install tenant space measures such as water efficient faucet aerators and showerheads, programmable thermostats, domestic hot water pipe insulation and CFL lighting measures. Multi-family common area measures are implemented through applicable Smart Ideas for Your Business programs.

The Multi-Family program is jointly implemented by Commonwealth Edison Company (ComEd) and Peoples Gas (PGL) and North Shore Gas (NSG) companies, and ComEd and Nicor Gas Company. The PY8 ComEd/PGL/NSG joint program was implemented by Franklin Energy Services and the ComEd/Nicor Gas joint program was implemented by CLEAResult. This evaluation report includes total ComEd electric savings from both the jointly implemented programs. Navigant will present gas savings in separate documents.

Navigant's evaluation involved verifying the compliance of the PY8 program gross savings with the Illinois Technical Reference Manual version 4.0 (TRM v4.0)<sup>5</sup> and applying research adjustments to non-deemed savings in the tracking database. Navigant also calculated the verified net impact savings using the approved net to gross ratio (NTGR) deemed through Illinois Stakeholder Advisory Group (SAG) consensus.<sup>6</sup> In addition, Navigant interviewed program staff to verify information about the tracking system inputs.

### 1.2 Evaluation Objectives

The evaluation team identified the following key researchable questions for PY8.

#### 1.2.1 Impact Questions

1. What are the program's verified gross savings?
2. What are the program's verified net savings?
3. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

#### 1.2.2 Process Questions

The PY8 process evaluation for the Multi-Family program was limited to interviews with program staff and the implementation contractor staff to discuss program performance and verify information about the tracking system inputs.

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<sup>5</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency Version 4.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

<sup>6</sup><http://ilsag.info/net-to-gross-framework.html>

## 2. EVALUATION APPROACH

This evaluation of the Multi-Family program covers the eighth full-scale year of program operation (June 1, 2015 through May 31, 2016). To determine verified gross savings, the evaluation team verified per unit savings for each program measure using the Illinois Technical Reference Manual (TRM v4.0) for deemed input parameters or through evaluation research to verify any custom inputs used in the ex ante calculations. Navigant multiplied measure quantities reported in the program tracking system data by the verified per unit savings values. The verified net savings were calculated using a net-to-gross ratio (NTGR) that was deemed for PY8. Navigant interviewed program staff and the implementation contractor staff to verify information about the tracking system inputs.

### 2.1 Overview of Data Collection Activities

The core data collection activities included review of the program’s tracking data and verification of direct install measure savings against the TRM v4.0. The full set of data collection activities is shown in the following table.

**Table 2-1. Primary Data Collection Activities**

What	Who	Target Completes	Completes Achieved	When
Tracking System & Desk Review	Participants Completed Projects	All	All	August- September 2016
In Depth Interviews	Program Management	2	2	April 2016

### 2.2 Verified Savings Parameters

Navigant calculated the verified gross and net savings (energy and coincident peak demand) using deemed impact algorithm sources found in the TRM v4.0. Table 2-2 presents the parameters that were used in the verified gross and net savings calculations, indicating which were examined through evaluation activities and which were deemed.

**Table 2-2 Verified Savings Parameter Data Sources**

Savings Input Parameters	Data Source	Deemed † or Evaluated?
NTGR	SAG Agreement†	Deemed
Gross Realization Rate <sup>7</sup>	Tracking data and evaluation research	Evaluated
CFL Lighting	Illinois TRM, v4.0, section 5.5.1†	Deemed
Faucet Aerator	Illinois TRM, v4.0, section 5.4.4†	Deemed
Showerhead	Illinois TRM, v4.0, section 5.4.5†	Deemed
Pipe Insulation	Illinois TRM, v4.0, section 5.4.1†	Deemed
Programmable Thermostat	Illinois TRM, v4.0, section 5.3.11†	Deemed

Source: Navigant analysis

† Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-26\_Final\_EMV\_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

† Illinois Statewide Technical Reference Manual for Energy Efficiency Version 4.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

### 2.2.1 Verified Gross Program Savings Analysis Approach

Navigant used the TRM v4.0 methodology to calculate verified gross savings for measures with deemed savings. Navigant estimated verified unit savings values for each program measure and made adjustments to ex ante unit savings values based on the measure savings input assumptions found in the TRM v4.0. Navigant reviewed the program tracking system and procedures to verify that the program accurately reported measure counts. The verified gross savings are the product of verified unit savings values (energy and demand savings) and verified measure quantities.

### 2.2.2 Verified Net Program Savings Analysis Approach

Navigant calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a net-to-gross ratio (NTGR). In PY8, the NTGR estimates used to calculate the net verified savings were based on past evaluation research and defined through a consensus process through SAG as documented in a spreadsheet.<sup>8</sup>

## 2.3 Process Evaluation

The PY8 process evaluation activities for the Multi-Family program was limited to interviews with program staff and the implementation contractor staff to verify information about the tracking system inputs and data requirements for the evaluation.

<sup>7</sup> The verified gross realization rate is the ratio of verified gross savings to ex ante gross savings from the program tracking system.

<sup>8</sup> Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-26\_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

Navigant reviewed the tracking database of the Multi-Family program to examine the values used to calculate program savings from measures installed through the program. Navigant estimated that the Multi-Family program achieved verified gross savings of 3,268 MWh and verified peak demand reduction of 0.32 MW. Minor adjustments were applied to the savings verification from flood CFLs which resulted in one MWh less verified savings compared to the ex ante. These adjustments did not affect the overall verified gross realization rate of 100 percent for energy and demand.

#### 3.1 Tracking System Review

Navigant reviewed the tracking data<sup>9</sup> to verify the completeness and accuracy of the tracking system data and to identify any issues that would affect the impact evaluation of the program. Navigant verified that the program tracking system was accurately recording most measure counts and savings. Navigant made a minor adjustment to the savings assumptions for the 14W flood CFL. Navigant also found that the tracking system did not include program demand reduction.

Key findings from the tracking system review include:

- **CFL 14W (Flood): 90 Percent Realization Rate (RR), 0.2 Percent of Program Net Savings.** The savings assumption for flood-type CFL is not deemed in the TRM v4.0. The ex ante 44.3 kWh unit savings assumes approximately 950 hours of use (HOU), which is comparable to assumptions in the TRM v3.0. Navigant determined that the TRM v4.0 value of 861 hours for interior reflector is a reasonable value to use for flood-type CFLs. Navigant estimated 39.91 kWh as the verified gross unit savings.
- **DHW Pipe Insulation: 100 Percent RR, 0.4 Percent of Program Net Savings.** The ex ante unit savings for domestic hot water pipe insulation is 23.49 kWh. This is based on an R value of 3.2 for determining the heat loss coefficient of the pipe insulation. Navigant verified this input to be reasonable and maintained a 100 percent gross realization rate.
- **Thermostats, Showerheads and Aerators: 100 Percent RR, 99.4 Percent of Program Net Savings.** Navigant verified that the unit savings for all other program measures; thermostats, low flow showerheads and aerators were reasonable. Minor rounding adjustments were applied to specific measures.

#### 3.2 Program Volumetric Findings

As shown in Table 3-1, the Multi-Family program had 12,702 participants with realized savings (tenant units or projects) in PY8 and distributed 92,981 measures. A total of 8,047 unique projects and 64,451 measures were completed through the ComEd/PGL/NSG joint program. A total of 4,655 unique projects and 28,530 measures were completed through the ComEd/Nicor Gas joint program.

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<sup>9</sup>MultiFamily\_PY8\_EOY\_Evaluation\_Data\_Rev1\_07112016.xlsx. Accessed from ShareFile: July 18, 2016.

**Table 3-1. PY8 Volumetric Findings Detail**

Participation	Lighting	Non-Lighting	Unique Total
Participants (Tenant Units or Project)	11,832	3402	12,702†
Total Measures	86,072	6,909	92,981
Number of Measures/Projects	7	2	7
Projects (Measures) from ComEd/PGL/NSG	7,606 (62,551)	1,695 (1,900)	8,047 (64,451)
Projects (Measures) from ComEd/Nicor Gas	4,226 (23,521)	1,707 (5,009)	4,655 (28,530)

Source: ComEd tracking data and Navigant team analysis.

† A total of 12,702 unique projects or work orders were completed in PY8. This includes 9,300 lighting only projects and 870 non-lighting only projects. There were 2,532 projects identified with both lighting and non-lighting measures.

Table 3-2 provides additional measure details by count. The ex ante and verified measure counts were the same.

**Table 3-2. PY8 Volumetric Findings by Measure Count**

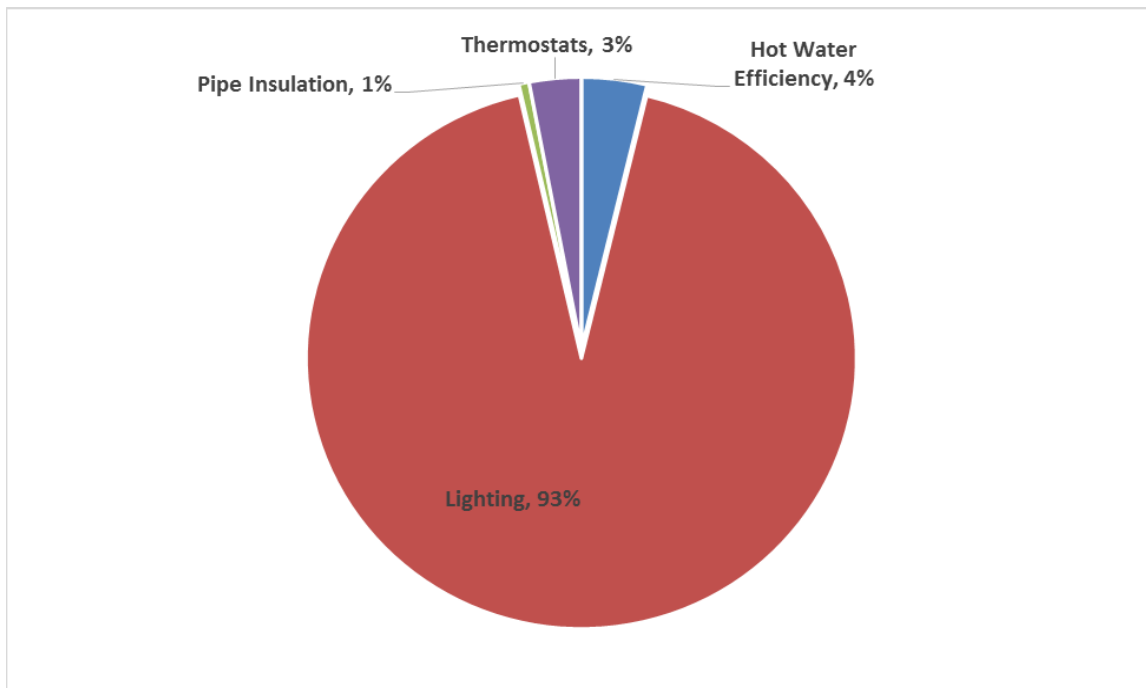
Measure	Unit	Install Type	Ex ante Measure Count	Verified Measure Count
9W CFL	Each	In-unit	1,575	1,575
9W CFL (Candelabra)	Each	In-unit	1,446	1,446
9W CFL (Globe)	Each	In-unit	23,472	23,472
13W CFL	Each	In-unit	39,602	39,602
14W CFL	Each	In-unit	15,513	15,513
14W CFL (Flood)	Each	In-unit	179	179
14W CFL (Globe)	Each	In-unit	1,968	1,968
18W CFL	Each	In-unit	147	147
19W CFL	Each	In-unit	1,137	1,137
23W CFL	Each	In-unit	1,033	1,033
Bathroom Aerator	Each	In-unit	1,228	1,228
Kitchen Aerator	Each	In-unit	1,089	1,089
Showerhead	Each	In-unit	1,228	1,228
DHW Pipe Insulation	Each	In-unit	547	547
Prog. T-Stat - Electric - Heat Pump	Each	In-unit	472	472
Prog. T-Stat - Electric - Resist. Heat	Each	In-unit	443	443
Prog. T-Stat - Gas Fan Savings	Each	In-unit	1,902	1,902
<b>PY8 Total</b>			<b>92,981</b>	<b>92,981</b>

Source: ComEd tracking data and Navigant team analysis.

Key findings include:

1. The PY8 program had 14,452 assessment participants including 12,702 participants (tenant units or projects) which received direct install products and realized energy savings. There were another 1,750 unit visits with no record of direct install measures or savings. The participants are counted based on the unique Work Order records with realized savings provided in the tracking system.
2. The program completed 9,300 lighting-only projects and 870 non-lighting projects. There were 2,532 project records which had both lighting and non-lighting measures.
3. Projects and measures implemented in the ComEd/Nicor Gas territory increased significantly in PY8 from PY7; projects increased by 19 percent and measures increased by 14 percent. Coincidentally, projects and measures decreased by the same margin for the ComEd/PGL/NSG territory, which experienced lower participation and lower CFL installations.
4. As shown in Figure 3-1, lighting projects comprised 93 percent of the project and measure counts, and non-lighting projects (including showerheads, faucet aerators, pipe insulation and thermostats) comprised seven percent of the project and measure counts.
5. Projects with both lighting and non-lighting measures comprised 20 percent of the project count in PY8. On average, there were seven measures installed per project.

Figure 3-1. Number of Measures Installed by Type



Source: Evaluation Analysis

### 3.3 Gross Program Impact Parameter Estimates

Navigant estimated verified unit savings for each program measure using impact algorithm sources found in the TRM v4.0. Table 3-3 presents the key parameters and the references used in the verified gross and net savings calculations (energy and coincident peak demand).

**Table 3-3. Verified Gross Savings Parameters**

Measure	Ex Ante Gross Value (kWh/unit)	Verified Gross Value, (kWh/unit)	Verified Gross Value (kW/unit)	Deemed ‡ or Evaluated?	Source (TRM V4.0)
CFL 9W	15.98	15.98	0.002	Deemed	Section 5.5.1
CFL 13W	23.97 or 24.00	23.97	0.004	Deemed	
CFL 14W	23.18	23.18	0.002	Deemed	
CFL 18W	27.97	27.97	0.002	Deemed	
CFL 19W	27.17	27.17	0.003	Deemed	
CFL 23W	39.16	39.16	0.004	Deemed	
CFL 9W (Globe)	19.96	19.96	0.004	Deemed	Section 5.5.2
CFL 9W (Candelabra)	37.20	37.18	0.003	Deemed	
CFL 14W (Globe)	29.62	29.62	0.003	Deemed	
CFL 14W (Flood)	44.30	39.91	0.004	Partially Deemed	Section 5.5.2
Bathroom Aerator	25.00 or 25.03	25.03	0.025	Deemed	Section 5.4.4
Kitchen Aerator	102.70 or 102.72	102.72	0.029	Deemed	Section 5.4.4
Showerhead	359.09	359.09	0.040	Deemed	Section 5.4.5
Pipe Insulation	23.49	23.49	0.003	Deemed	Section 5.4.1
Prog. T-Stat - Electric - Heat Pump	492.20	492.39	-	Deemed	Section 5.3.11
Prog. T-Stat - Electric - Resist. Heat	836.80	837.07	-	Deemed	Section 5.3.11
Prog. T-Stat - Gas Fan Savings	37.25 or 37.30	37.26	-	Deemed	Section 5.3.11

Source: Navigant Analysis

‡ Deemed values are from Illinois TRM v4.0, available at <http://www.ilsag.info/technical-reference-manual.html>.

### 3.4 Verified Gross Program Impact Results

The total verified gross savings is 3,268 MWh and the total verified gross peak demand reduction is 0.32 MW as shown in Table 3-4. The table presents savings at the measure group level including groups where the estimate is not statistically significant at the 90/10 level. The program achieved a 100 percent gross realization rate on electricity savings and a 100 percent gross realization rate on demand reduction.

**Table 3-4. PY8 Verified Gross Impact Savings Estimates by Measure Type**

Measure	Ex Ante Gross Savings (MWh)	Ex ante Gross Peak Demand Reduction (MW)	Verified Gross Savings (MWh)	Verified Gross Peak Demand Reduction (MW)	Verified Gross kWh Realization Rate	Significance 90/10
Lighting (CFLs)	1,998	0.22	1,997	0.22	100%†	
Bathroom Aerators	31	0.03	31	0.03	100%†	
Kitchen Aerators	112	0.03	112	0.03	100%†	
Showerheads	441	0.04	441	0.04	100%†	†NA
DHW Pipe Insulation	13	<0.01	13	<0.01	100%†	
Programmable Thermostats	674	-	674	-	100%†	
<b>PY8 Total</b>	<b>3,269</b>	<b>0.32</b>	<b>3,268</b>	<b>0.32</b>	<b>100%†</b>	

Source: Evaluation Team analysis.

† NA when the TRM determines the gross savings.

Lighting measures represented 61 percent of the verified gross savings while non-lighting measures represented 39 percent. The ComEd/PGL/NSG joint program contributed 52 percent of the verified gross savings and the ComEd/Nicor joint program contributed 48 percent.



## 4. NET IMPACT EVALUATION

The table below shows the deemed NTG values.

**Table 4-1. PY8 Verified Net Impact Parameters**

Measure	Net to Gross Ratio (NRGR)	Source*
Direct Install Lighting (incl. standard & specialty CFLs)	0.98	IL SAG
Bathroom Aerator	0.94	IL SAG
Kitchen Aerator	1.00	IL SAG
Showerhead	0.92	IL SAG
DHW Pipe Insulation	0.95	IL SAG
Programmable Thermostats (incl. thermostats with gas fan savings)	0.90	IL SAG

ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-26\_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 presents the program net savings at the measure group level, including groups where the NTGR estimate is not statistically significant at the 90/10 confidence level. The PY8 Multi-Family program evaluation calculated verified net savings of 3,123 MWh and verified net peak demand reduction of 0.31 MW.

**Table 4-2. PY8 Verified Net Impact Savings Estimates by Measure Type**

Measure	Ex Ante Gross Savings (MWh)	Ex ante Gross Peak Demand Reduction (MW)	Verified Gross Savings (MWh)	Verified Gross Peak Demand Reduction (MW)	Verified Gross kWh Realization Rate	NTGR	Verified Net Savings (MWh)	Verified Net Peak Demand Reduction (MW)
Lighting (CFLs)	1,998	0.22	1,997	0.22	100%‡	0.98†	1,957	0.21
Bathroom Aerators	31	0.03	31	0.03	100%‡	0.94†	29	0.03
Kitchen Aerators	112	0.03	112	.03	100%‡	1.00†	112	0.03
Showerheads	441	0.04	441	0.04	100%‡	0.92†	406	0.04
DHW Pipe Insulation	13	<0.01	13	<0.01	100%‡	0.95†	12	<0.01
Programmable Thermostats	674	-	674	-	100%‡	0.90†	607	-
<b>PY8 Total</b>	<b>3,269</b>	<b>0.32</b>	<b>3,268</b>	<b>0.32</b>	<b>100%‡</b>	<b>N/A</b>	<b>3,123</b>	<b>0.31</b>

Source: ComEd tracking data and Navigant team analysis.

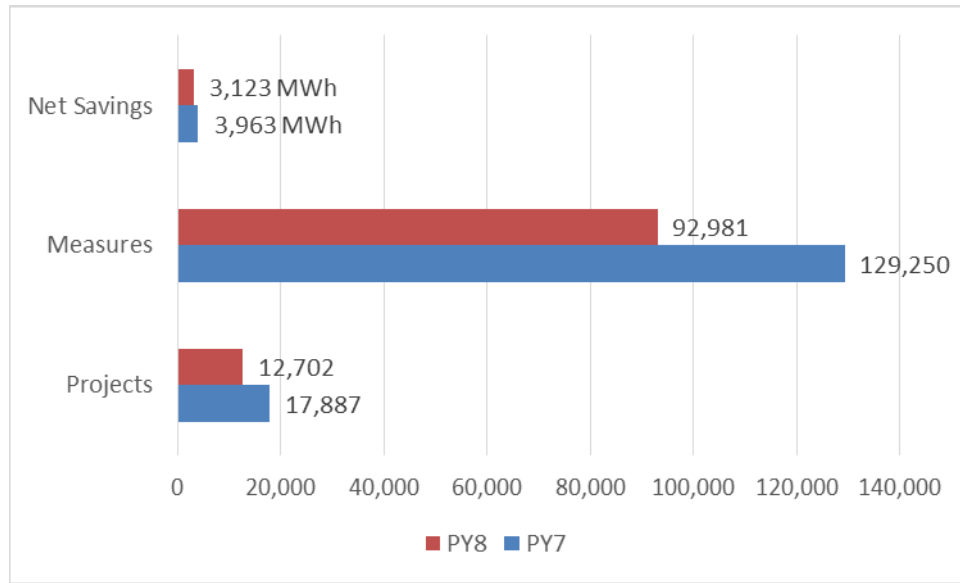
† A deemed value. Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-26\_Final\_EMV\_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

‡ Based on evaluation research findings.

The ComEd/PGL/NSG joint program realized net energy savings of 1,651 MWh, representing 53 percent of the total net savings, and the ComEd/Nicor Gas joint program realized net energy savings of 1,563 MWh, representing 47 percent of the total net savings.

Figure 4-1 provides a comparison of the year over year performance of the Multi-Family program.

Figure 4-1. PY7-PY8 Yearly Comparison



Source: ComEd tracking data and Navigant team analysis.

The net MWh savings is 21 percent less than PY7, partly due to lower number of projects and measures completed in PY8; there were 29 percent fewer projects and 28 percent fewer measures. Although, the ComEd/Nicor joint program realized a significant increase in net savings with an increase of 26 percent from PY7, the ComEd/PGL/NSG joint program realized a decrease in net savings from PY7 by approximately the same percentage, particularly from lighting projects.

## 5. PROCESS EVALUATION

Navigant conducted a limited process review in PY8. Process research was through interviews with program staff and the implementation contractor staff, and a review of program materials to verify information about program measures and the program tracking system. Navigant conducted interviews with the program staff in April 2016. We also had periodic discussions with program staff over the program year to discuss program forecasts and strategies for future program cycles.

Navigant believes that the real-time collaboration with ComEd to promptly address evaluation issues enhanced the program—an example is the discussion about the net-to-gross recommendation for LEDs in PY9.<sup>10</sup> Navigant plans to conduct process research in the future to gauge customer satisfaction with the program due to introduction of direct install specialty LEDs and Smart Power Strips in tenant spaces. The research may be designed to illuminate how the program changes and marketing and outreach strategies are influencing customer interests and participation.

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<sup>10</sup> Email exchanges with program staff on May 2, 2016. Navigant recommended the use of the CFL NTG ratio for LEDs in PY9.

## 6. FINDINGS AND RECOMMENDATIONS

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

### Verified Gross Impacts and Realization Rate

**Finding 1.** The Multi-Family Assessment program in PY8 achieved verified gross energy savings of 3,268 MWh and verified gross summer coincidence peak demand reduction of 0.32 MW. The verified gross realization rate is 100 percent for both energy savings and demand reduction. The program is accurately tracking gross savings for most measures. Navigant adjusted the savings for flood-type CFLs, which is not deemed in the TRM. The CFL flood bulbs are removed from program measures in PY9. We also applied minor rounding adjustment to the savings from some measures. Tracking the deemed savings for the Multi-Family Assessment program has refined and improved from prior years. No major recommendation from research is needed at this time. Navigant expects that the program staff and the evaluation team will continue to collaborate in real time to address situations that would improve the program operations, especially as new measures and baselines are introduced and CFLs are phased out.

### Verified Net Impacts & NTGR

**Finding 2.** The evaluation used deemed NTG estimates to calculate verified net savings of 3,123 MWh, verified net demand reduction of 7.08 MW and verified net summer coincidence peak demand reduction of 0.32 MW. The ComEd/PGL/NSG joint program realized net energy savings of 1,651 MWh, representing 53 percent of the total net savings. The ComEd/Nicor joint program realized net energy savings of 1,563 MWh, representing 47 percent of the total net savings.

**Finding 3.** The PY8 net 3,123 MWh savings is 21 percent less than PY7. This is partly due to lower participation in PY8 (29 percent less of projects and 28 percent less of measures). While the ComEd/Nicor joint program realized a significant increase in net savings (26 percent more from PY7), the ComEd/PGL/NSG joint program realized a decrease in net savings from PY7 by approximately the same percentage, particularly from lighting projects.

**Recommendation 1.** Navigant recommends adopting the NTG value assigned to CFLs in the Multi-Family program for LEDs in PY9, since the program delivery method is the same for both technologies. Navigant plans to conduct NTG research in the future to address NTG ratios for LEDs and Smart Power Strips introduced into the program. This research will include coordination with other ComEd programs with similar measures.

### Program Volumetric Findings

**Finding 4.** The PY8 Multi-Family Assessment program had 12,702 participants with realized savings (tenant units or projects) and distributed 92,981 measures (including 86,072 CFL bulbs and 6,909 non-lighting measures). Lighting projects constituted 93 percent of the project and measure counts, and the remaining 7 percent from non-lighting projects. Projects with both lighting and non-lighting measures constituted 20 percent of the project count in PY8. On average, there were seven measures installed per project.

**Finding 5.** A total of 8,047 unique projects and 64,451 measures were completed through the ComEd/PGL/NSG joint program. A total of 4,655 unique projects and 28,530 measures were completed through the ComEd/Nicor Gas joint program. Projects and measures implemented in the ComEd/Nicor Gas joint program increased significantly in PY8 from PY7 (19 percent more projects and 14 percent more measures). Coincidentally, project and measure counts decreased by the same percentages for the ComEd/PGL/NSG joint program, particularly from lower participation of CFL lighting installation.

## 7. APPENDIX

### 7.1 Evaluation Research Impact Approaches and Findings

Verified gross and net savings (energy and coincident peak demand) resulting from the PY8 Program lighting were calculated using the following algorithms as defined by the Illinois TRM version 4

**Verified Gross Annual  $\Delta kWh$**  = Delta Watts/1000 \* ISR \* (1-Leakage) \* HOU \* IEe

**Verified Gross Annual  $\Delta kW$**  = Delta Watts/1000 \* ISR \* (1-Leakage)

**Verified Gross Annual Summer Peak  $\Delta kW$**  = Gross Annual  $\Delta kW$  \* Summer Peak CF \* IEd

**Verified Gross Annual Winter Peak  $\Delta kW$**  = Gross Annual  $\Delta kW$  \* Winter Peak CF \* IEd

**Where:**

- Delta Watts = Difference between Baseline Wattage (incandescent wattage) and CFL Wattage
- HOU = Annual Hours of Use
- IEe = Energy Interactive Effects
- Leakage = % of Program Bulbs installed outside of ComEd Service Territory
- Peak Load CF = Peak load coincidence factor, the percentage of program bulbs turned on during peak hours (Central Time Zone weekdays from 1 to 5 p.m. for summer and between 6am-8am and 5pm-7pm for winter)
- Winter Peak CF = Peak load coincidence factor, the percentage of Program Bulbs turned on during the PJM Winter Peak hours<sup>11</sup>
- IEd = Demand Interactive Effects (applied to summer Peak kW estimates only<sup>12</sup>)

The savings assumptions and algorithm for the non-lighting program measures (showerheads, aerators, thermostats and DHW pipe insulation) can be referred to from the IL-TRM version 4.0.

<sup>11</sup> The Winter Peak Period is defined by PJM as the period from 6-8 am and 5-7 pm, Central Time Zone, between January 1 and February 28.

<sup>12</sup> Summer interactive effects represent the increased energy savings due to the cooler operating temperatures at which CFLs and LEDs operate and thus a reduction in cooling electric loads. In the winter the cooler operating temperature of efficient bulbs results in an increase in gas heating loads (often referred to as “heating penalties”). Since ComEd is an electric utility these heating penalties is included in the summer peak kW savings estimates.