



# **Elementary Energy Education 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

This report presents a summary of the findings and recommendations from the impact and process evaluation of the joint Commonwealth Edison Company (ComEd) Plan Year 7 (PY7) Elementary Energy Education (EEE) program.<sup>1</sup> The EEE program’s primary focus is to produce electricity and natural gas savings in the residential sector by motivating fifth grade students and their families to reduce energy consumption from water heating and lighting in their home. Additionally, the EEE program aims to increase participation in other ComEd programs via cross-marketing and increased customer awareness of energy efficiency issues. The program underwent several changes in PY7. ComEd began implementation with Peoples Gas and North Shore Gas in addition to Nicor Gas. The program had a new implementation contractor, Resource Action Programs (RAP) and was re-branded as “SUPER SAVERS”, and implemented a “teacher-lead instruction” program model. The program adjusted its participation target from 26,000 kits in the previous year to 13,725 kits during this year.

### E.1. Program Savings

Table E-1 summarizes the electric impacts from the ComEd PY7 EEE Program.

**Table E-1. PY7 Program Electric Impacts**

Savings Category	Energy Savings (kWh)	Demand Savings (kW)	Peak Demand Savings (kW)
Ex Ante Gross Savings	1,944,113	NA	204.56
Verified Gross Savings	1,745,554	5,571	187.79
Verified Net Savings	1,326,621	4,234	142.72

Source: ComEd tracking data and Navigant team analysis.

<sup>1</sup> This program is jointly administered with Nicor Gas, Peoples Gas and North Shore Gas. The PY7 program year began June 1, 2014 and ended May 31, 2015. This report includes electric impacts only. Impacts from natural gas measures are included in separate evaluation reports.

## E.2. Program Savings by Measure

Table E-2 summarizes PY7 EEE program savings by measure type.

**Table E-2. PY7 Program Results by Measure**

Research Category	Ex-Ante Gross Savings (kWh)	Ex-Ante Gross Peak Demand Red. (kW)	Verified Gross Savings (kWh)	Verified Gross Demand Red. (kW)	Verified Gross Peak Demand Red. (kW)	Verified Gross RR	NTGR	Verified Net Savings (kWh)	Verified Net Demand Red. (kW)	Verified Net Peak Demand Red. (kW)
Showerheads	807,364	41.34	704,577	1,400	38.92	87%	0.76†	535,479	1,064	29.58
Kitchen Aerators	339,070	39.01	280,062	1,580	34.76	83%	0.76†	212,847	1,201	26.42
Bathroom Aerators	70,727	47.08	61,649	1,824	40.14	87%	0.76†	46,853	1,387	30.51
CFL	681,019	71.89	681,576	765	71.96	100%	0.76†	517,998	581	54.69
Water Heater Temperature Setback	45,933	5.24	17,690	2	2.02	39%	0.76†	13,444	1.5	1.53
Total.	1,944,113	204.56	1,745,554	5,571	187.79	90%	0.76†	1,326,621	4,234	142.72

Source: ComEd tracking data and Navigant team analysis.

† A deemed value. Source: ComEd\_NTG\_History\_and\_PY7\_Recommendation\_2014-02-28\_Final\_EMV\_Recommendations.xlsx, which is on the IL SAG website: <http://ilsag.info/net-to-gross-framework.html>

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

The net-to-gross value for electric savings was deemed in this program year, based on the Illinois Stakeholder Advisory Group’s (IL SAG) consensus process and from previous evaluation research. The evaluation included a participant survey to estimate NTG values that can be used for deeming in the future. Those values are presented in the following table.

**Table E-3. Impact Estimate Parameters for Future Use**

Parameter	Description	Value	Data Source
NTGR	CFL	TBD	Participant survey
	Showerhead	TBD	
	Aerator	TBD	

Source: Participant survey.

#### E.4. Program Volumetric Detail

The program distributed 14,254 kits in ComEd service area, as shown in the following table.

**Table E-4. PY7 Volumetric Findings Detail**

Metric	Measures Distributed
Number of Total Kits Distributed	14,254
Number of Measures/Kit	7
Number of Showerheads Distributed	14,254
Number of CFLs Distributed	42,762
Number of Bathroom Aerators Distributed	28,508
Number of Kitchen Aerator Distributed	14,254
Number of Total Measures Distributed	99,778

Source: ComEd tracking data and Navigant team analysis.

#### E.5. Results Summary

The following table summarizes the key metrics from PY7.

**Table E-5. PY7 Results Summary**

Participation	Units	PY7
Verified Net Savings	kWh	1,326,621
Verified Net Demand Reduction	kW	4,234
Verified Net Peak Demand Reduction	kW	142.72
Verified Gross Savings	kWh	1,745,554
Verified Gross Demand Reduction	kW	5,571
Verified Gross Peak Demand Reduction	kW	187.79
Program Realization Rate	%	90%
Program NTG Ratio*	#	0.76
CFLs Distributed	#	42,762
Showerheads Distributed	#	14,254
Faucet Aerators Distributed	#	28,508
Kitchen Aerators Distributed	#	14,254
Total Kits Distributed	#	14,254

Source: ComEd tracking data and Navigant team analysis.

\* A deemed value. Source: ComEd\_NTG\_History\_and\_PY7\_Recommendation\_2014-02-28\_Final\_EMV\_Recommendations.xlsx, which is on the IL SAG website: <http://ilsag.info/net-to-gross-framework.html>



## ***E.6. Findings and Recommendations***

The following section includes key program findings and recommendations.<sup>2</sup> The program performed well in PY7, exceeding energy savings and participation targets for the year with high marks for customer satisfaction.

### **Program Participation**

**Finding 1.** The program distributed 14,254 joint kits to schools in the ComEd service area, exceeding the original participation target of 13,725 joint kits.

**Finding 2.** The return rate of the student survey forms for the program overall was 43.6 percent exceeding the target of 40 percent.

### **Verified Gross Program Savings and Realization Rate**

**Finding 3.** Navigant’s review of the ex-ante calculations for the ComEd PY7 Elementary Energy Education program resulted in verified gross savings of 1,745,554 kWh, verified gross demand reduction of 5,571 kW and verified gross peak demand reduction of 187.79 kW. The verified gross realization rate for energy savings was 90 percent. The verified gross realization rate for peak demand savings was 92 percent.

**Finding 4.** Navigant calculated different ex-post values for custom inputs used to calculate in unit savings (calculated from the parent-guardian take-home survey responses - including in the number of people per household and in-service rates). A comparison of the custom inputs is provided in section 3.3.

**Recommendation 1.** If the program desires a higher degree of accuracy in ex-ante savings estimates, the program could provide Navigant additional detail on how the ex-ante custom inputs were derived.

**Finding 5.** The implementation contractor did calculate savings separately for single-family and multi-family housing types and correctly utilized the applicable deemed inputs from the TRM. However, the implementer did not calculate the custom inputs separately for single-family and multi-family housing types, although not doing so did not have a big impact on the program’s realization rate.

**Recommendation 2.** The program should calculate custom inputs for CFLs, aerators, and showerheads for single family homes separately from multi-family homes to increase the degree of accuracy of its ex-ante savings estimates.

**Finding 6.** The ex-ante estimate for the water heater setback measure was 86.4 kWh for any household which reported lowering their water heater temperature. This ex-ante number assumes the participant lowered the water heater temperature by 15 degrees. However, the temperature differential reported by participants was 5.06 degrees, resulting in lower than expected savings and a realization rate of 39 percent for this measure. Additionally, the program reported a savings penalty for those who reported raising their water heater

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<sup>2</sup> Numbered findings and recommendations in this section are the same as those found in the Findings and Recommendations section of the report for ease of reference between each section.

temperature after participating; Navigant does not count a penalty because those participants become ineligible for consideration within the methodology of the TRM.

**Recommendation 3.** The implementer should update savings estimates for the water heater setback measure using the Tpre and Tpost inputs from the parent-guardian take-home survey.

**Finding 7.** The EEE program does not currently claim ex ante savings from programmable thermostat measures. Approximately 2.9 percent of single family participants and 1.1 percent of multifamily participants reported programming their programmable thermostat based on the educational materials provided in the kits. Within the written program materials, there are directions to set the thermostat to 78F in warm weather and 68F in cool weather. The TRM energy savings methodology is specified for programmable thermostats which were previously set to override mode.

**Recommendation 4.** In the future, if the program chooses to claim savings for this measure, it should provide participants instructions on how to properly use a programmable thermostat (that is, how to use four programmed settings for daytime, night time, summer, and winter), in order to qualify under the TRM.

#### Tracking System Review

**Finding 8.** The implementation contractor provided all applicable materials needed for the impact analysis, including a listing of kits distributed and responses to the take-home survey. Additionally, the implementation contractor provided energy savings calculations with custom inputs where allowed by the IL TRM. This streamlined Navigant's identification of variance between ex-ante and ex-post savings.

#### Verified Net Savings

**Finding 9.** The program achieved verified net savings of 1,326,621 kWh, verified net demand reduction of 4,234 kW and verified net peak demand reduction of 142.72 kW. The net-to-gross ratio for this program was deemed through the Illinois Stakeholder Advisory Group consensus process at 0.76. Navigant conducted NTG evaluation research jointly with gas companies' research as part of the PY7 evaluation and will report these results in a separate memo.

#### Process Evaluation

**Finding 10.** The program is performing well, exceeding participation and savings goals. Comments about the program from parents and teachers are generally uniformly positive. Of the 150 teachers in the ComEd service territory who responded to the educator evaluation questions asked by RAP, 94 percent of them said they would participate in the program again.

## 1 Introduction

### 1.1 Program Description

This report includes Navigant Consulting Inc.'s (Navigant's) findings and recommendations from the impact and process evaluation of the Commonwealth Edison Company (ComEd) Plan Year 7 (PY7) Elementary Energy Education (EEE) program.<sup>3</sup> The EEE program is implemented by Resource Action Programs (RAP) and is branded "SUPER SAVERS." In PY7, the program targeted fifth grade students in public and private schools that are customers of Nicor Gas or jointly ComEd and Nicor Gas, ComEd and Peoples Gas, and ComEd and North Shore Gas. Schools received an invitation to participate and register to schedule the interactive presentations; alternatively, schools could register on the program website to join a waiting list if the program was fully-enrolled when they registered. Schools that had participated in the PY6 program were also invited to participate. New to PY7 was the "teacher-lead instruction" program model, as opposed to the previous model that incorporated a single, contractor-led presentation. The teacher can choose to teach the curriculum over five or ten days and focus on one kit measure per day. After the lesson, students took home a kit that includes water conservation measures; instruments to measure water and ambient temperature, as well as water flow rates, CFLs, and a student survey form where participants used the form to report details of their family's participation. Students and teachers are incentivized to return the student survey forms with a \$50 mini-grant for each class that completes and returns 80 percent of the forms. RAP based the program's savings on the installation rate of implemented measures reported in the student survey form against the number of kits that were reported taken home.

The EEE program's primary focus is to produce electricity and natural gas savings in the residential sector by motivating students and their families to take steps through reducing energy consumption for water heating and lighting in their home; a secondary goal of the program is to reduce residential use of water. Additionally, the EEE program aims to increase participation in other ComEd, Nicor Gas, Peoples Gas and North Shore Gas programs via cross-marketing and increased customer awareness of energy efficiency issues.

### 1.2 Evaluation Objectives

Navigant identified the following key researchable questions for PY7.

#### 1.2.1 Impact Questions

1. What is the program's verified gross savings?
2. What is the program's verified net savings?
3. Did the program meet its energy and demand savings targets? If not, why?

#### 1.2.2 Process Questions

1. Has the program changed since PY6? If so, why and how?

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<sup>3</sup> This program is jointly administered with Nicor Gas, Peoples Gas and North Shore Gas. The PY7 program year began June 1, 2014 and ended May 31, 2015 which is the same time period as Gas Program Year 4 (GPY4). This report includes electric impacts only. Impacts from natural gas measures are included in separate evaluation reports.

## 2 Evaluation Approach

For this impact evaluation, gross savings were evaluated by (1) reviewing the implementer-submitted work papers to assure that savings were calculated correctly and in adherence with Illinois TRM v3.0 and (2) cross-checking totals with the tracking system. Navigant calculated verified net savings using a net-to-gross (NTG) ratio based on previous evaluation research and approved through the Illinois Stakeholder Advisory Group (IL SAG) consensus process.<sup>4</sup> Navigant conducted a limited process review that included in-depth interviews with program staff.

### 2.1 Overview of Data Collection Activities

The core data collection activities used in this evaluation included in-depth interviews with program staff and review of the program tacking database. Participant surveys were used to conduct NTG research to inform NTG recommendations for the future. The full set of data collection activities is shown in Table 2-1 and Table 2-2 below.

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

What	Who	Target Completes	Completes Achieved	When	Comments
Program Tracking Database	Participants	All	All	July – August 2015	Source of information for verified gross analysis
In Depth Interviews	Program Manager/Implementer Staff	4	4	June and September 2015	Included staff from ComEd, Nicor Gas, Peoples Gas, North Shore Gas, and RAP.
Participant Survey	Participating Customers	258	191	May – June 2015	NTG research conducted to be considered for future use.

Source: Navigant

**Table 2-2. Additional Resources**

Reference Source	Author	Application	Gross Impacts	Process
Illinois Technical Reference Manual	Illinois Energy Efficiency Stakeholder Advisory Group (SAG)	EEE Measure Impact Analysis	X	
Student Survey Form	From RAP	Impact Analysis	X	

Source: Navigant

### 2.2 Verified Savings Parameters

Verified Gross and Net Savings (energy and coincident peak demand) resulting from the PY7 program were calculated by multiplying the total quantity of units by the measure level unit savings.

Unit savings are calculated using the algorithms from the Illinois TRM v3.0 and total quantity is the number of each type of measure distributed. The Illinois TRM deems most input parameters for

<sup>4</sup> Illinois Stakeholder Advisory Group, [ilsag.info](http://ilsag.info)

showerheads, faucet aerators, and CFLs (for detailed description of engineering algorithms and inputs used, see Section 3.3).

Table 2-3 lists the source of the measures that Navigant used from the Illinois TRM v3.0. The Illinois TRM v3.0 allows for custom values to be used for household size, showerheads-per-household, faucets-per-household, and CFL baseline wattage, and Navigant based these values on student survey form data. Navigant also calculated savings for single family homes separately from multi-family homes given the different values for household size and showers per household.

**Table 2-3. Verified Savings Parameter Data Sources**

Measure	Deemed Input Data Source
Showerheads	Illinois TRM v3.0 – Section 5.4.5
Kitchen Aerators	Illinois TRM v3.0 – Section 5.4.4
Faucet Aerators	
CFLs	Illinois TRM v3.0 – Section 5.5.1
Hot Water Heater Temperature Setback	Illinois TRM v3.0 – Section 5.4.6

Source: <http://www.ilsag.info/technical-reference-manual.html>

## 2.3 Process Evaluation

The process evaluation for PY7 was based on interviews with program staff and the implementation contractor.

### 2.3.1 Program Staff Interviews

Navigant conducted interviews with the ComEd, Nicor Gas, Peoples Gas and North Shore Gas program managers, as well as with the RAP implementation staff in the summer of 2015. These interviews covered the program’s energy savings and participation, as well as changes implemented in PY7.

### 3 Gross Impact Evaluation

Navigant’s review of the ex-ante calculations for the ComEd PY7 EEE program resulted in verified gross savings of 1,745,554 kWh, verified gross demand reduction of 5,571 kW and verified gross peak demand reduction of 187.79 kW. The verified gross realization rate for energy savings is 90 percent. The verified gross realization rate for peak demand savings is 92 percent.

#### 3.1 Tracking System Review

RAP’s tracking system and savings documentation for PY7 consisted of (1) a spreadsheet containing energy savings estimates, including custom inputs; (2) the parent survey data which included contact information and select responses to process questions from parent/guardians; (3) the raw survey data, including all the responses from the parent-guardian take-home survey (additionally the implementer provided a copy of the survey which included a data map for these responses; and, (4) the teacher survey data which included responses to process questions provided by teachers. The algorithms and inputs for unit savings calculations were contained in the energy savings spreadsheet.

Key findings include:

1. Overall, Navigant received all applicable data needed in order to conduct the gross impact analysis. Navigant found the spreadsheets well-labeled and easy to follow.
2. The energy savings spreadsheet, which included algorithms and inputs which derive each of the unit savings was a new and useful piece of documentation.
3. There were some discrepancies in the custom inputs for each of the calculations between what the implementer provided and what Navigant calculated using the raw survey data, including number of people per household and in-service rates. A comparison of the custom inputs for the unit savings is provided in section 3.3.
4. RAP did calculate savings for single-family homes separately from multi-family homes and correctly used the deemed values from the TRM for these two housing types. However, RAP did not calculate the custom inputs separately for single-family homes and multi-family homes (e.g., number of people per household, in-service rates). This accounted for a small difference in ex-ante gross savings and verified gross savings.

### 3.2 Program Volumetric Findings

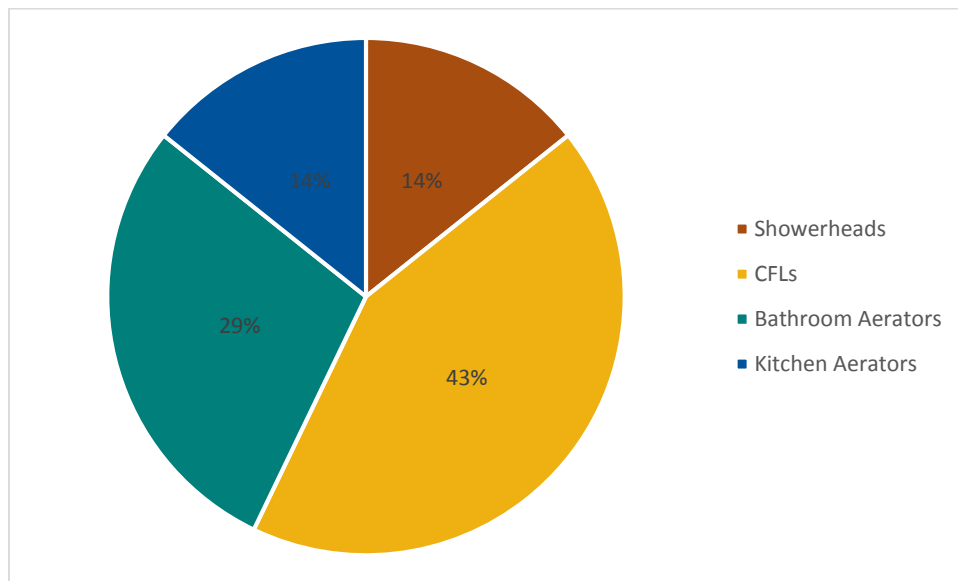
The EEE program distributed 14,254 kits in PY7. Table 3-1 shows the number of measures distributed and Figure 3-1 shows the same information, graphically.

**Table 3-1. PY7 Volumetric Findings Detail**

Metric	ComEd Measures Distributed
Number of Total Kits Distributed	14,254
Number of Measures/Kit	7
Number of Showerheads Distributed	14,254
Number of CFLs Distributed	42,762
Number of Bathroom Aerators Distributed	28,508
Number of Kitchen Aerator Distributed	14,254
Number of Total Measures Distributed	99,778

Source: ComEd tracking data and Navigant team analysis

**Figure 3-1. Number of Measures Installed by Type**



Source: Navigant

### 3.3 Gross Program Impact Parameter Estimates

As described in Section 2, energy and demand savings were estimated using Illinois TRM v3.0. The Illinois TRM deems most input parameters for showerheads, faucet aerators, CFLs and hot water heater setback.

Navigant used the student survey form data to calculate or adjust several input parameters. The tables below show each input variable by measure, values used by Navigant and the implementer, and whether that variable was deemed by the TRM or if a custom input was allowed. There was some difference in the custom inputs calculated by Navigant and the custom inputs provided by the implementer; the ex-ante savings were calculated using 5.2 people per household and the ex-post savings were calculated using 4.89 for multifamily and 4.81 for single family people per household. Because this variable has a direct correlation to unit savings, this approximate seven percent difference in the number of people per household, resulted in an overall seven percent reduction in savings for the measures which use this input (showerheads and aerators). Additionally, variation from Navigant’s inputs and the implementer’s inputs for the in-service rates calculated for the program ranged from one percent to 11 percent. Navigant has also included the equations from the TRM used for calculation of these variables.

**Equation 1. Showerhead Savings Equation and Inputs, IL TRM v3.0 Section 5.4.5**

$$\text{Verified Gross Annual kWh Savings} = \%ElectricDHW * ((GPM\_base * L\_base - GPM\_low * L\_low) * Household * SPCD * 365.25 / SPH) * EPG\_electric * ISR$$

$$\text{Verified Gross Annual kW Savings} = \text{Verified Gross Annual kWh Savings/Hours} * CF$$

Where:

- %ElectricDHW* = proportion of water heating supplied by electric resistance heating
- GPM\_base* = Flow rate of the baseline showerhead
- GPM\_low* = As-used flow rate of the low-flow showerhead
- L\_base* = Shower length in minutes with baseline showerhead
- Household* = Average number of people per household
  
- SPCD* = Showers Per Capita Per Day
- 365.25* = Days per year, on average.
- SPH* = Showerheads Per Household so that per-showerhead savings fractions can be determined
- EPG\_electric* = Energy per gallon of hot water supplied by electric
- ISR* = In service rate of showerhead
- Hours* = Annual electric DHW recovery hours for showerhead use
- CF* = Coincidence Factor for electric load reduction



**Table 3-2. Showerhead Inputs and Variables**

Value, Navigant	Value, Implementer	Variable	Source	Deemed/Custom
0.224	0.224	%ElectricDHW	Survey - HCU6 <sup>5</sup>	Custom
2.35	2.35	GPM_base	IL TRM 5.4.5	Deemed
1.5	1.5	GPM_low	Specifications	Actual
7.8	7.8	L_base	IL TRM 5.4.5	Deemed
7.8	7.8	L_low	IL TRM 5.4.5	Deemed
365.25	365.25	days/year	IL TRM 5.4.5	Deemed
4.817	5.222	Household SF	Survey - HCU2	Custom
4.886	5.222	Household MF	Survey - HCU2	Custom
0.6	0.6	SPCD	IL TRM 5.4.5	Deemed
1.79	1.79	SPH SF	IL TRM 5.4.5	Deemed
1.3	1.3	SPH MF	IL TRM 5.4.5	Deemed
0.117	0.117	EPG_electric	IL TRM 5.4.5	Deemed
0.430	0.464	ISR SF	Survey - HA1	Custom
0.437	0.464	ISR MF	Survey - HA1	Custom
0.723	0.729	%SF	Survey - HCU1	Custom
0.277	0.271	%MF	Survey - HCU1	Custom
501	497	Hours - SF	IL TRM 5.4.5	Custom (based on household)
508	504	Hours - SF	IL TRM 5.4.5	Custom (based on household)
0.0278	0.0278	CF	IL TRM 5.4.5	Deemed

Source: 2014\_MASTER\_Super\_Savers\_Raw Survey Data, 2014\_ComEd\_Nicor\_PG\_NS\_Energy\_Savings Estimates, IL TRM v3.0 and Navigant Analysis

**Equation 2. Aerator Savings Equation and Inputs, IL TRM v3.0 Section 5.4.4**

$$\text{Verified Gross Annual kWh Savings} = \%ElectricDHW * ((GPM\_base * L\_base - GPM\_low * L\_low) * Household * 365.25 * DF / FPH) * EPG\_electric * ISR$$

$$\text{Verified Gross Annual kW Savings} = \text{Verified Gross Annual kWh Savings} / \text{Hours} * CF$$

Where:

- %ElectricDHW* = proportion of water heating supplied by electric resistance heating
- GPM\_base* = Flow rate of the baseline aerator
- GPM\_low* = As-used flow rate of the low-flow aerator
- L\_low* = Average retrofit length faucet use per capita for all faucets in minutes
- L\_base* = Average baseline length faucet use per capita for all faucets in minutes
- Household* = Average number of people per household
- 365.25* = Days per year, on average.
- DF* = Drain Factor
- FPH* = Faucets Per Household
- EPG\_electric* = Energy per gallon of hot water supplied by electric
- ISR* = In service rate of aerator
- Hours* = Annual electric DHW recovery hours for faucet use per faucet
- CF* = Coincidence Factor for electric load reduction

<sup>5</sup> The numbering designation is provided by the Implementer for the parent-guardian take-home survey.

**Table 3-3. Kitchen Aerator Inputs and Variables**

Value, Navigant	Value, Implementer	Variable	Source	Deemed/Custom
0.224	0.224	%ElectricDHW	Survey - HCU6	Custom
1.39	1.39	GPM_base	IL TRM 5.4.4	Deemed
0.94	0.94	GPM_low	Specifications	Deemed
4.5	4.5	L_base	IL TRM 5.4.4	Deemed
4.5	4.5	L_low	IL TRM 5.4.4	Deemed
365.25	365.25	days/year	IL TRM 5.4.4	Deemed
4.817	5.222	Household SF	Survey - HCU2	Custom
4.886	5.222	Household MF	Survey - HCU2	Custom
0.75	0.75	DF	IL TRM 5.4.4	Deemed
1	1	KFPH	IL TRM 5.4.4	Deemed
0.097	0.097	EPG_electric	IL TRM 5.4.4	Deemed
0.313	0.379	ISR SF	Survey - HA2	Custom
0.399	0.379	ISR MF	Survey - HA2	Custom
0.723	0.729	%SF	Survey - HCU1	Custom
0.277	0.271	%MF	Survey - HCU1	Custom
176.41	191.24	Hours - SF	IL TRM 5.4.4	Custom (based on household)
178.94	191.24	House - MF	IL TRM 5.4.4	Custom (based on household)
0.022	0.022	CF	IL TRM 5.4.4	Deemed

Source: 2014\_MASTER\_Super\_Savers\_Raw Survey Data, 2014\_ComEd\_Nicor\_PG\_NS\_Energy\_Savings Estimates, IL TRM v3.0 and Navigant Analysis

**Table 3-4. Bathroom Aerator Inputs and Variables**

Value, Navigant	Value, Implementer	Variable	Source	Deemed/Custom
0.224	0.224	%ElectricDHW	Survey - HCU6	Custom
1.39	1.39	GPM_base	IL TRM 5.4.4	Deemed
0.94	0.94	GPM_low	Specifications	Deemed
1.6	1.6	L_base	IL TRM 5.4.4	Deemed
1.6	1.6	L_low	IL TRM 5.4.4	Deemed
365.25	365.25	days/year	IL TRM 5.4.4	Deemed
4.817	5.222	Household SF	Survey - HCU2	Custom
4.886	5.222	Household MF	Survey - HCU2	Custom
0.9	0.9	DF	IL TRM 5.4.4	Deemed
2.83	2.83	BFPH - SF	IL TRM 5.4.4	Deemed
1.5	1.5	BFPH - MF	IL TRM 5.4.4	Deemed
0.079	0.079	EPG_electric	IL TRM 5.4.4	Deemed
0.127	0.125	ISR SF, Installed both aerators	Survey - HA2	Custom
0.108	0.125	ISR MF, Installed both aerators	Survey - HA2	Custom
0.208	0.265	ISR SF, Installed one aerator	Survey - HA2	Custom
0.290	0.265	ISR MF, Installed one aerator	Survey - HA2	Custom
0.723	0.729	%SF	Survey - HCU1	Custom
0.277	0.271	%MF	Survey - HCU1	Custom
26.60	33.04	Hours - SF	IL TRM 5.4.4	Custom (based on household)
50.90	33.04	Hours - MF	IL TRM 5.4.4	Custom (based on household)
0.022	0.022	CF	IL TRM 5.4.4	Deemed

Source: 2014\_MASTER\_Super\_Savers\_Raw Survey Data, 2014\_ComEd\_Nicor\_PG\_NS\_Energy\_Savings Estimates, IL TRM v3.0 and Navigant Analysis

**Equation 3. CFL Savings Equation and Inputs, IL TRM v3.0 Section 5.5.1**

$$\text{Verified Gross Annual kWh Savings} = ((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{ISR} * \text{Hours} * \text{WHFe}$$

$$\text{Verified Gross Annual kW Savings} = ((\text{WattsBase} - \text{WattsEE}) / 1000) * \text{ISR} * \text{WHFd} * \text{CF}$$

Where:

- WattsBase* = Baseline wattage, based on lumens of CFL bulb and program year installed
- WattsEE* = Actual wattage of CFL purchased / installed
- ISR* = In Service Rate, the percentage of units rebated that are actually in service.
- Hours* = Average hours of use per year
- WHFe* = Waste heat factor for energy to account for cooling energy savings from efficient lighting
- WHFd* = Waste heat factor for demand to account for cooling savings from efficient lighting.

**Table 3-5. CFL Inputs and Variables**

Value, Navigant	Value, Implementer	Variable	Source	Deemed/Custom
43	43	WattsBase	IL TRM 5.5.1	Deemed
13	13	WattsEE	Specifications	Actual
938	938	Hours	IL TRM 5.5.1	Deemed
1.06	1.06	WHFe - SF	IL TRM 5.5.1	Deemed
1.04	1.04	WHFe - MF	IL TRM 5.5.1	Deemed
0.629	0.619	ISR - SF 1	Survey - HA4	Custom
0.597	0.619	ISR - MF 1	Survey - HA4	Custom
0.535	0.528	ISR - SF 2	Survey - HA5	Custom
0.508	0.528	ISR - MF 2	Survey - HA5	Custom
0.475	0.464	ISR - SF 3	Survey - HA6	Custom
0.434	0.464	ISR - MF 3	Survey HA6	Custom
0.723	0.729	%SF	Survey - HCU1	Custom
0.277	0.271	%MF	Survey - HCU1	Custom
1.11	1.11	WHFd - SF	IL TRM 5.5.1	Deemed
1.07	1.07	WHFd - MF	IL TRM 5.5.1	Deemed
0.095	0.095	CF	IL TRM 5.5.2	Deemed

Source: 2014\_MASTER\_Super\_Savers\_Raw Survey Data, 2014\_ComEd\_Nicor\_PG\_NS\_Energy\_Savings Estimates, IL TRM v3.0 and Navigant Analysis

**Equation 4. Hot Water Temperature Setback Savings Equation and Inputs, IL TRM v3.0 Section 5.4.6**

$$\text{Verified Gross Annual kWh Savings} = 86.4 \text{ kWh} * (T_{pre} - T_{post}) / 15 * \% \text{electric DHW}$$

$$\text{Verified Gross Annual kW Savings} = \Delta \text{kWh} / \text{Hours} * CF$$

Where:

- 86.4 kWh = Estimate of savings derived in UL and CLP Program Savings Documentation, 2010.
- $T_{pre}$  = Actual hot water setpoint prior to adjustment
- $T_{post}$  = Actual new hot water setpoint, which may not be lower than 120 degrees
- 15 = Delta watts used to derive the UL and CLP Program Savings Documentation estimate.
- Hours = 8766
- CF = Summer Peak Coincidence Factor for measure

**Table 3-6. Hot Water Temperature Setback Inputs and Variables**

Value, Navigant	Value, Implementer	Variable	Source	Deemed/Custom
86.4	86.4	UL/CLP Savings	IL TRM 5.4.6	Deemed
5.06	15	(Tpre-Tpost)	Survey - HA8/HA9	Custom
15	15	Delta Temperature UL/CLP Savings	IL TRM 5.4.6	Deemed
0.190	0.225	ISR	Survey - HA7	Custom
8766	8766	Hours	IL TRM 5.4.6	Deemed
0.224	0.224	%ElectricDHW	Survey - HCU6	Custom

*Source: 2014\_MASTER\_Super\_Savers\_Raw Survey Data, 2014\_ComEd\_Nicor\_PG\_NS\_Energy\_Savings Estimates, IL TRM v3.0 and Navigant Analysis*

### **3.4 Verified Gross Program Impact Results**

The program achieved verified gross savings of 1,745,554 kWh, verified gross demand reduction of 5,571 kW and verified gross peak demand reduction of 187.79 kW. Table 3-7 below presents program savings at the measure group level.

**Table 3-7. PY7 Verified Gross Impact Savings Estimates by Measure Type**

	Sample Size	Gross Energy Savings (kWh)	Gross Peak Demand Savings (kW)	Gross Demand Savings (kW)
<b>CFLs</b>				
Ex-Ante Gross Savings		681,019	71.89	N/A
Verified Gross Realization Rate	Census	100%	100%	N/A
Verified Gross Savings		681,576	71.96	765
<b>Kitchen Aerators</b>				
Ex-Ante Gross Savings		339,070	39.01	N/A
Verified Gross Realization Rate	Census	83%	89%	N/A
Verified Gross Savings		280,062	34.76	1,580
<b>Bathroom Aerators</b>				
Ex-Ante Gross Savings	Census	70,727	47.08	N/A
Verified Gross Realization Rate		87%	85%	N/A
Verified Gross Savings		61,649	40.14	1,824
<b>Showerheads</b>				
Ex-Ante Gross Savings		807,364	41.34	N/A
Verified Gross Realization Rate	Census	87%	94%	N/A
Verified Gross Savings		704,577	38.92	1,400
<b>Water Heater Setback</b>				
Ex-Ante Gross Savings	Census	45,933	5.24	N/A
Verified Gross Realization Rate		39%	38%	N/A
Verified Gross Savings		17,690	2.02	2
<b>Total</b>				
Ex-Ante Gross Savings		1,944,113	204.56	N/A
Verified Gross Realization Rate	Census	90%	92%	N/A
Verified Gross Savings		1,745,554	187.79	5,571

Source: Navigant

The table below shows the unit savings by measure as well as the total kit savings. These unit savings values contain in-service rate and are multiplied by the single family to multi-family proportion.

**Table 3-8. PY7 Unit Savings by Measure**

Measure	Energy Unit Savings (kWh)	Peak Demand Unit Savings (kW)	Demand Unit Savings (kW)
Showerhead (1.5 GPM) - Single Family	32.10	0.0018	0.0641
Showerhead (1.5 GPM) - Multi Family	17.33	0.0009	0.0341
Kitchen Aerator (1.5 GPM) - Single Family	13.14	0.0016	0.0745
Kitchen Aerator (1.5 GPM) - Multi Family	6.51	0.0008	0.0364
Bathroom Aerator (1.0 GPM) Installed one - Single Family	1.08	0.0009	0.0405
Bathroom Aerator (1.0 GPM) Installed one - Multi Family	1.10	0.0005	0.0217
Bathroom Aerator (1.0 GPM) Installed Both - Single Family	1.32	0.0011	0.0496
Bathroom Aerator (1.0 GPM) Installed Both - Multi Family	0.82	0.0004	0.0162
13-watt CFL 1 - Single Family	13.56	0.0014	0.0151
13-watt CFL 1 - Multi Family	4.84	0.0005	0.0055
13-watt CFL 2 - Single Family	11.53	0.0012	0.0129
13-watt CFL 2 - Multi Family	4.12	0.0004	0.0047
13-watt CFL 3 - Single Family	10.24	0.0011	0.0114
13-watt CFL 3 - Multi Family	3.52	0.0004	0.0040
Water Heater Temperature Set Back (Lowered)	1.24	0.0001	0.0001
Total Kit Savings	122.46	0.0132	0.3909
Number of Kits	14,254	14,254	14,254
Total Gross Savings	1,745,554	187.79	5,571

Source: Navigant Analysis

## 4 Net Impact Evaluation

SAG determined through a consensus process<sup>6</sup> that the NTG values for this program should be deemed prospectively and used to calculate verified net savings. Table 4-1 below shows the deemed NTG values and the PY7 verified net savings. Navigant conducted NTG evaluation research jointly with gas companies as part of the PY7 evaluation and will report these results in a separate memo.

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

	Net Energy Savings (kWh)	Net Peak Demand Savings (kW)	Net Demand Savings (kW)
<b>CFLs</b>			
Ex-Ante Gross Savings	681,019	71.89	N/A
Verified Gross Realization Rate	100%	100%	N/A
Verified Gross Savings	681,576	71.96	765
NTG	0.76	0.76	0.76
Verified Net Savings	517,998	54.69	581
<b>Kitchen Aerators</b>			
Ex-Ante Gross Savings	339,070	39.01	N/A
Verified Gross Realization Rate	83%	89%	N/A
Verified Gross Savings	280,062	34.76	1,580
NTG	0.76	0.76	0.76
Verified Net Savings	212,847	26.42	1,201
<b>Bathroom Aerators</b>			
Ex-Ante Gross Savings	70,727	47.08	N/A
Verified Gross Realization Rate	87%	85%	N/A
Verified Gross Savings	61,649	40.14	1,824
NTG	0.76	0.76	0.76
Verified Net Savings	46,853	30.51	1,387
<b>Showerheads</b>			
Ex-Ante Gross Savings	807,364	41.34	N/A
Verified Gross Realization Rate	87%	94%	N/A
Verified Gross Savings	704,577	38.92	1,400
NTG	0.76	0.76	0.76
Verified Net Savings	535,479	29.58	1,064
<b>Water Heater Setback</b>			
Ex-Ante Gross Savings	45,933	5.24	N/A
Verified Gross Realization Rate	39%	38%	N/A
Verified Gross Savings	17,690	2.02	2
NTG	0.76	0.76	0.76
Verified Net Savings	13,444	1.53	1.5
<b>Total</b>			
Ex-Ante Gross Savings	1,944,113	204.56	N/A
Verified Gross Realization Rate	90%	92%	N/A
Verified Gross Savings	1,745,554	187.79	5,571
NTG	0.76	0.76	0.76
Verified Net Savings	1,326,621	142.72	4,234

Source: Navigant

<sup>6</sup> Source: ComEd\_NTG\_History\_and\_PY8\_Recommendations\_2015-02-24\_v2\_clean.xlsx, which is found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>



## 5 Process Evaluation

This section includes changes made to the EEE program in PY7 as well changes planned for PY8.

### 5.1 Program Changes since PY6

The PY7 program has changed in several ways since PY6 as described below. Together these changes lead to an opportunity for savings by running the program more efficiently and greater outreach using the same resources.

#### 5.1.1 Program Delivery Method

The major change in PY7 was the use of a new implementation contractor, RAP, and the delivery method of the education component of the program. The change in implementation contractor was due to the utilities' desire to test a "teacher-led instruction" program model, as opposed to the previous model that incorporated a single, contractor-led presentation, which served as the totality of the form instruction provided to the students.

This model was also of special interest to Nicor Gas, which experienced significantly reduced program budgets in GPY4. The "teacher-led instruction" model provides the same type of quality materials and measures, but at a cost reduction, which will assist Nicor Gas in maximizing the program budget, while maintaining a robust program. The cost reduction is due to the elimination of the contractor-led presentation, which required travel and accommodations for contractor personnel.

The utilities and RAP worked together to completely re-brand and re-design the program from "Think! Energy" to "Super Savers". The energy efficiency kits have a different look and feel to them with the utilities' names more in the foreground than they were before. The delivery method of the education component of the program changed significantly. Teachers notified RAP when they wanted to begin teaching the program materials and RAP delivered the materials by that timeframe. The teachers then had the option of teaching the materials to their students over five or ten days, unlike in PY6, when the education component was taught to students during a single, contractor-led presentation.

After the five/ten day presentation of the educational materials, the students take home an energy efficiency kit that includes water conservation measures; instruments to measure water and ambient temperature, as well as water flow rates, CFLs, and a student workbook where participants used the pages to report details of their family's participation. Once the workbooks were completely filled out and brought back to class, teachers asked students to transfer their answers from the workbook onto a student survey form. These are the forms that teachers are incentivized to return back to RAP.

#### 5.1.2 Teacher Incentives

Teachers were incentivized with a \$50 mini grant for their classroom if they returned 80% of the completed survey forms by the middle of March 2015. This incentive is different than what was offered in PY6, where teachers were incentivized with a \$100 mini grant for returning 80% of the completed survey forms, as well as being entered into a drawing to win an iPad.

#### 5.1.3 Devices and Materials in Kits

No changes were made to number or type of measures included in the kits, but there were changes made to the make and model of high efficiency showerhead and CFLs included in the kits as shown in Table 5-1

below. There were also more print materials included in the kits detailing how to save energy and the utilities’ other energy efficiency program offerings.

**Table 5-1. PY6 and PY7 Devices Included in Kits**

Measure	Make and Model for PY6	Make and Model for PY7
Showerhead	Niagara Power 1.5 gpm	Intellishower 1.5 gpm
Kitchen Aerators	Niagara 1.5 gpm	Niagara 1.5 gpm
Bathroom Aerators	Niagara 1.0 gpm	Niagara 1.0 gpm
CFLs	14-watt	13-watt

Source: Navigant

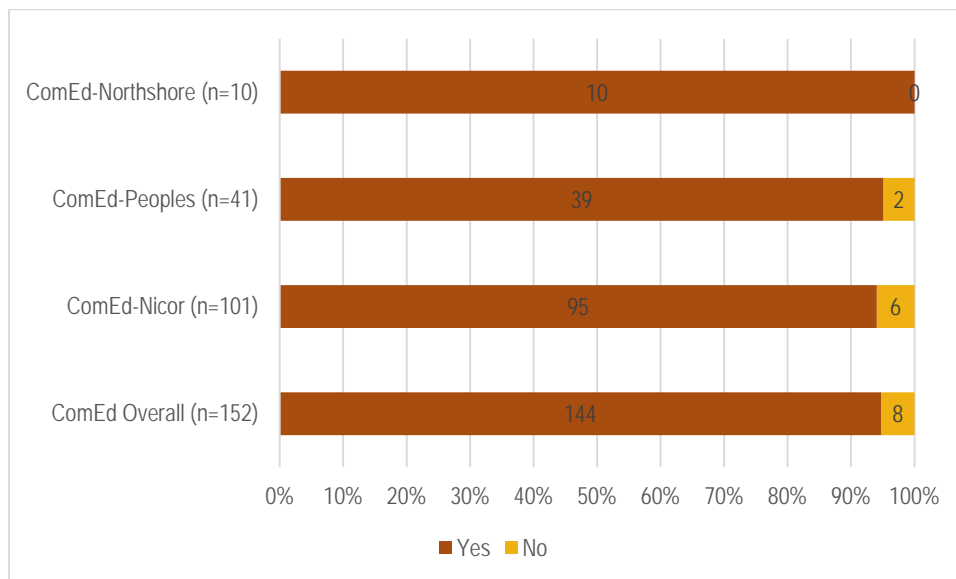
### 5.1.4 Participation

Another change in PY7 was the addition of Peoples Gas and North Shore Gas to the program. ComEd implemented the program with Nicor Gas as well as Peoples Gas and North Shore Gas. ComEd’s participation target was scaled back to 13,725 joint kits (as opposed to the 26,000 joint kits in PY6) to better reflect the program’s delivery method.

## 5.2 Participant Feedback

According to participants, this program is performing well. The program’s participation targets were exceeded, which suggests strong interest in the program. The program had such strong interest, that teachers began approaching RAP (via referrals) to participate in the program and had to be put on a waitlist. RAP began marketing and outreach for the program in the middle of October 2014 and the program was fully enrolled by early December 2014. Around 150 teachers in the ComEd service territory responded to the educator evaluation questions asked by RAP, and about 94 percent of respondents said they would participate in the program again (Figure 5-1).

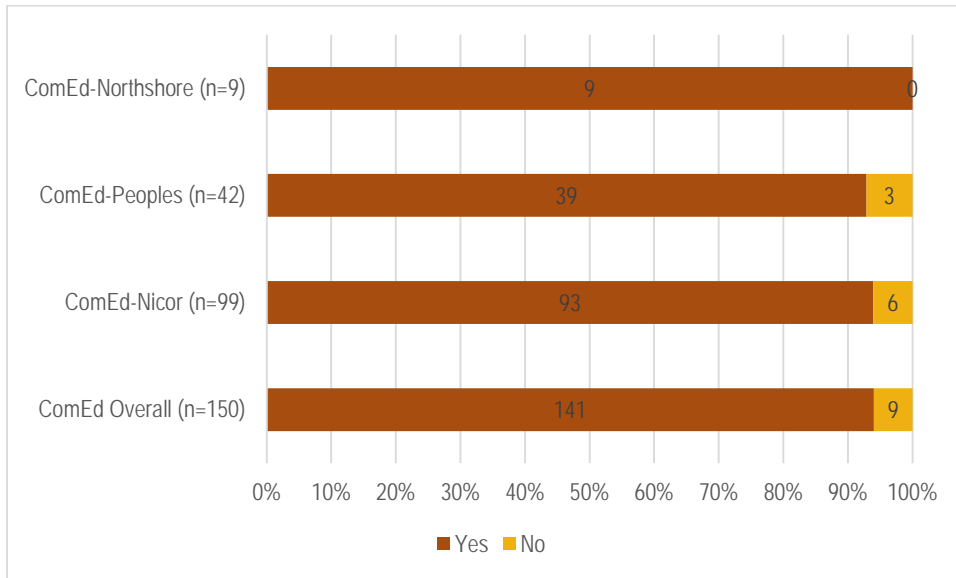
**Figure 5-1. Would you participate in this program again (%)?**



Source: Navigant Analysis

Ninety-one percent of teacher respondents said they would recommend this program to other colleagues (Figure 5-2).

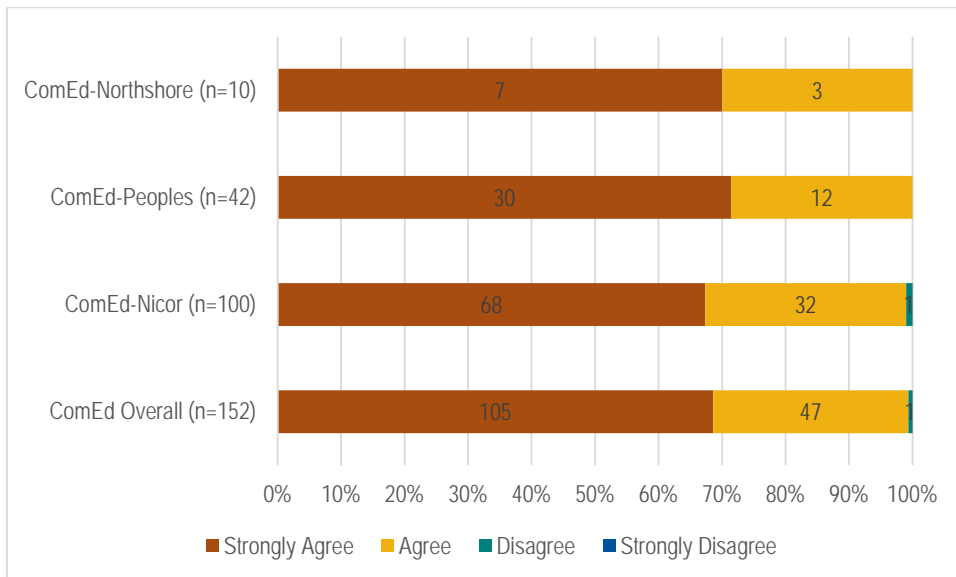
**Figure 5-2. Would you recommend this program to other colleagues (%)?**



Source: Navigant Analysis

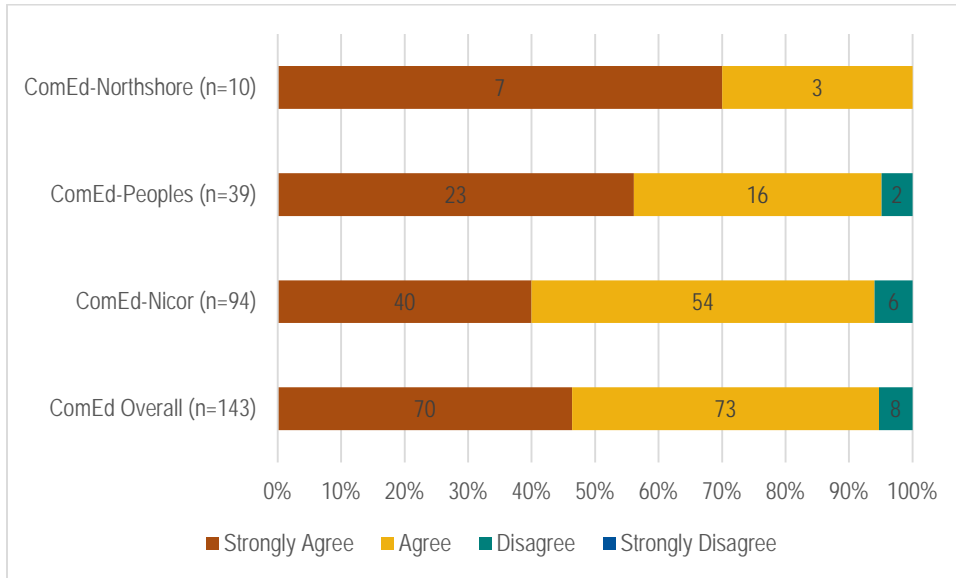
Additionally, 94 percent of teachers indicated the materials were clearly written and well-organized and ninety-five percent of teachers indicated the products in the kit were easy to use (Figure 5-3, Figure 5-4).

**Figure 5-3. The Materials were Clearly Written and Well-Organized**



Source: Navigant Analysis

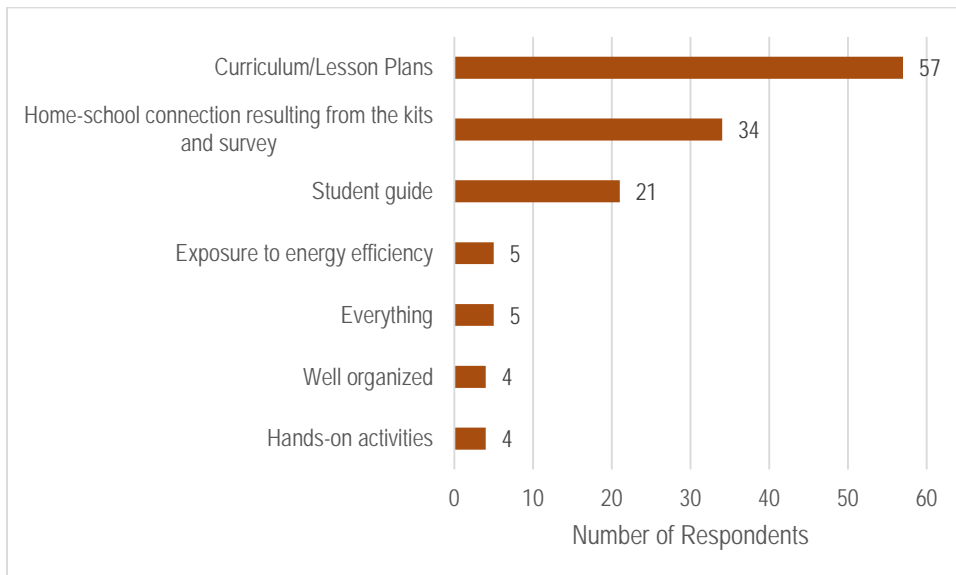
**Figure 5-4. The Products in the Kits were Easy for Students to Use**



Source: Navigant Analysis

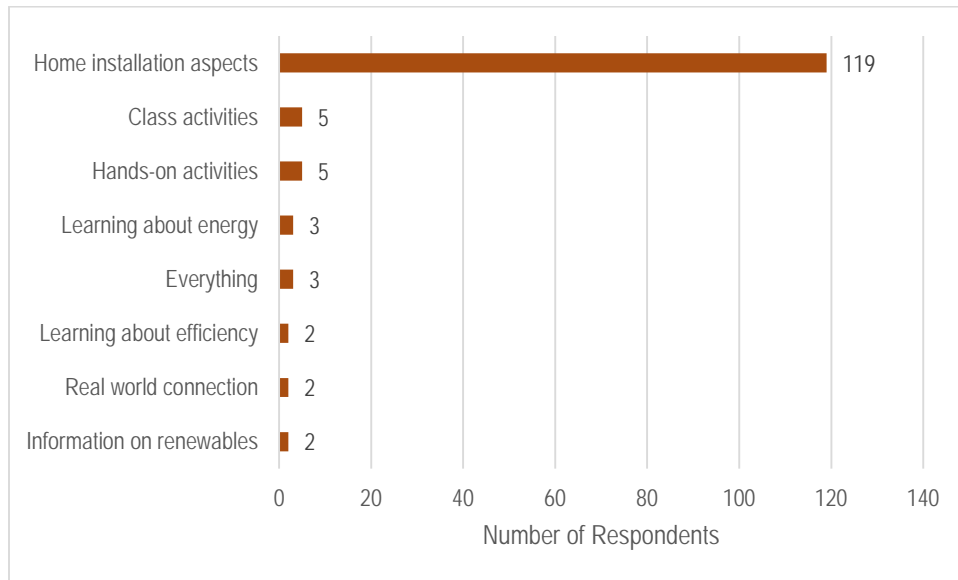
Teachers reported the curriculum/lesson plans, the home school connection resulting from the kits, and the student guides as the best program elements. Additionally, the majority of teachers (81 percent) reported the self-installation aspect of the kits was the best program element for students (Figure 5-5, Figure 5-6).

**Figure 5-5. What did you like best about the program? (n=149)**



Source: Navigant Analysis

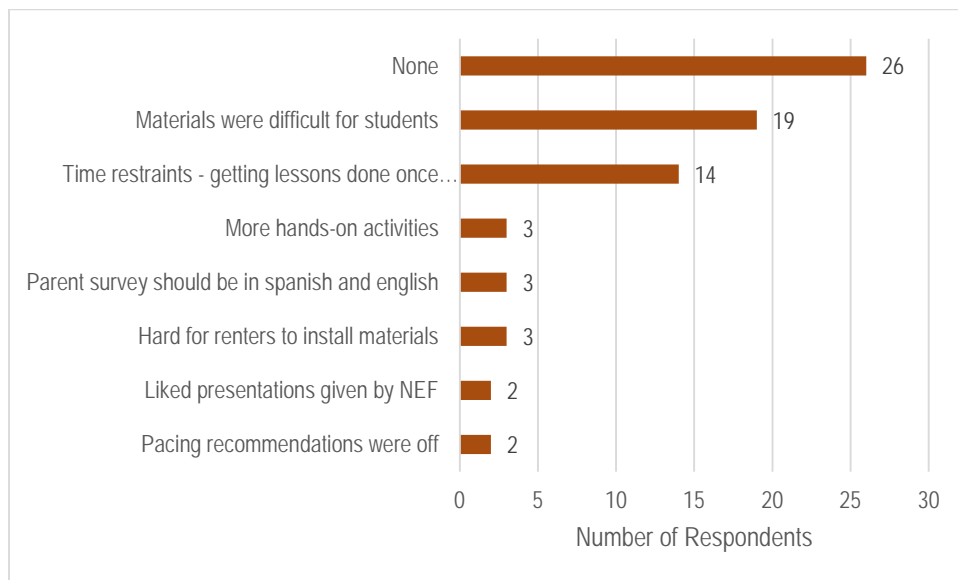
**Figure 5-6. What did students like best about the program? (n=147)**



Source: Navigant Analysis

When asked to provide possible changes to the program, most teachers had no response or responded “none”. Those who did respond with a change noted that some of the materials were too difficult for their students’ current reading levels and that it was difficult to complete all the program material within the time constraints of the academic year and testing/curriculum requirements (Figure 5-7).

**Figure 5-7. What would you change about the program? (n=66)**



Source: Navigant Analysis

Around 55 parents in the ComEd service territory responded to the parent comment card included in the kit box. About 94 percent of respondents said they would continue to use the contents in the kit and that the materials were easy for their child to use.

### **5.3 *Planned Changes for PY8***

Because the utilities and RAP invested significant time and resources into re-designing the program in PY7 and the participation targets were met, there are no major changes planned for PY8. There is a minor update planned for the kit box which includes an update on the cross promotion of the utilities' other energy efficiency programs.

## 6 Findings and Recommendations

The following section includes key program findings and recommendations.<sup>7</sup> The program performed well in PY7, exceeding energy savings and participation targets for the year with high marks for customer satisfaction.

### Program Participation

**Finding 1.** The program distributed 14,254 joint kits to schools in the ComEd service area, exceeding the original participation target of 13,725 joint kits.

**Finding 2.** The return rate of the student survey forms for the program overall was 43.6 percent exceeding the target of 40 percent.

### Verified Gross Program Savings and Realization Rate

**Finding 3.** Navigant’s review of the ex-ante calculations for the ComEd PY7 Elementary Energy Education program resulted in verified gross savings of 1,745,554 kWh, verified gross demand reduction of 5,571 kW and verified gross peak demand reduction of 187.79 kW. The verified gross realization rate for energy savings was 90 percent. The verified gross realization rate for peak demand savings was 92 percent.

**Finding 4.** Navigant calculated different ex-post values for custom inputs used to calculate in unit savings (calculated from the parent-guardian take-home survey responses - including in the number of people per household and in-service rates). A comparison of the custom inputs is provided in section 3.3.

**Recommendation 1.** If the program desires a higher degree of accuracy in ex-ante savings estimates, the program could provide Navigant additional detail on how the ex-ante custom inputs were derived.

**Finding 5.** The implementation contractor did calculate savings separately for single-family and multi-family housing types and correctly utilized the applicable deemed inputs from the TRM. However, the implementer did not calculate the custom inputs separately for single-family and multi-family housing types, although not doing so did not have a big impact on the program’s realization rate.

**Recommendation 2.** The program should calculate custom inputs for CFLs, aerators, and showerheads for single family homes separately from multi-family homes to increase the degree of accuracy of its ex-ante savings estimates.

**Finding 6.** The ex-ante estimate for the water heater setback measure was 86.4 kWh for any household which reported lowering their water heater temperature. This ex-ante number assumes the participant lowered the water heater temperature by 15 degrees. However, the temperature differential reported by participants was 5.06 degrees, resulting in lower than expected savings and a realization rate of 39 percent for this measure. Additionally, the

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<sup>7</sup> 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.

program reported a savings penalty for those who reported raising their water heater temperature after participating; Navigant does not count a penalty because those participants become ineligible for consideration within the methodology of the TRM.

**Recommendation 3.** The implementer should update savings estimates for the water heater setback measure using the Tpre and Tpost inputs from the parent-guardian take-home survey.

**Finding 7.** The EEE program does not currently claim savings from programmable thermostat measures. Approximately 2.9 percent of single family participants and 1.1 percent of multifamily participants reported programming their programmable thermostat based on the educational materials provided in the kits. Within the written program materials, there are directions to set the thermostat to 78F in warm weather and 68F in cool weather. The TRM energy savings methodology is specified for programmable thermostats which were previously set to override mode.

**Recommendation 4.** In the future, if the program chooses to claim savings for this measure, it should include instructions on how to properly use a programmable thermostat (that is, how to use four programmed settings for daytime, night time, summer, and winter), in order to qualify under the TRM.

## Tracking System Review

**Finding 8.** The implementation contractor provided all applicable materials needed for the impact analysis, including a listing of kits distributed and responses to the take-home survey. Additionally, the implementation contractor provided energy savings calculations with custom inputs where allowed by the IL TRM. This streamlined Navigant's identification of variance between ex-ante and ex-post savings.

## Verified Net Savings

**Finding 9.** The program achieved verified net savings of 1,326,621 kWh, verified net demand reduction of 4,234 kW and verified net peak demand reduction of 142.72 kW. The net-to-gross ratio for this program was deemed through the Illinois Stakeholder Advisory Group consensus process at 0.76. Navigant conducted NTG evaluation research jointly with gas companies as part of the PY7 evaluation and will report these results in a separate memo.

## Process Evaluation

**Finding 10.** The program is performing well, exceeding participation and savings goals. Comments about the program from parents and teachers are generally uniformly positive. Of the 150 teachers in the ComEd service territory who responded to the educator evaluation questions asked by RAP, 94 percent of them said they would participate in the program again.



## 7 Appendix

### 7.1 Net-To-Gross Research

This section presents results from Navigant’s GPY4/EPY7 evaluation activities that will support our January 7, 2016 delivery of net-to-gross (NTG) values that will be used prospectively in GPY6/EPY9 for the Elementary Energy Education (EEE) program. This appendix presents net-to-gross values calculated using the approach Navigant used in GPY1/EPY4. The evaluation team will report on the Illinois draft statewide approach in a separate memo.

#### 7.1.1 Net-to-Gross Ratio Estimates

The evaluation team’s net-to-gross ratio (NTGR) and component estimates are shown in Table 7-1 below.

**Table 7-1. Program Net-to-Gross Ratio and Components from GPY1/EPY4 Approach**

	Free Ridership	Spillover	NTGR
Showerheads	0.19	0.14	0.95
Bathroom Faucet Aerators	0.13	0.15	1.01
Kitchen Faucet Aerator	0.13	0.14	1.01
CFL	0.62	0.10	0.48
Electric Measures	0.34	0.12	0.78
Gas Measures	0.17	0.14	0.97

*Source: Evaluation Analysis*

#### 7.1.2 Data Collection for Net-to-Gross Estimates

Table 7-2 below summarizes primary data sources that Navigant used to estimate the NTGR for the program. The survey achieved 5.9 percent precision at a 90 percent confidence interval.

**Table 7-2. Primary Data Sources**

Method	Subject	Combined Target Completes	Combined Actual Completes	Completed	Confidence Precision
Take-Home Survey	GPY4/EPY7 Program Participants	258 <sup>8</sup>	191	May 15, 2015	90/6

*Source: Evaluation Analysis*

<sup>8</sup> The sample goal was designed to reach statistical significance for each utility territory

### 7.1.3 GPY1/EPY4 Net-to-Gross Methodology

This section describes the free-ridership and spillover methodologies that were used in the GPY1/EPY4 approach. The evaluation team will report on the free-ridership and spillover methodologies used in the Illinois statewide draft approach in a separate memo.

The free-ridership and spillover rates were assessed using the same self-reported data gathered through Navigant’s participant survey. The participant survey included questions to identify installations that might have occurred if the utilities had not funded the EEE program. This data allows Navigant to estimate free-rider ratios—a factor that effectively deducts “free-riders” from the gross savings identified via the impact analysis. The survey also included questions to help identify participant spillover effects.

The final NTGRs for each measure are calculated as:

$$NTG = 1 - [Free Ridership] + [Spillover]$$

Where,

*Free ridership* is the energy savings that would have occurred even in the absence of program activities and sponsorship, expressed as a percent of gross impact.

And,

*Spillover* is the energy savings that occurred as a result of program activities and sponsorships, but was not included in the gross impact accounting, expressed as a percent of gross impact.

#### 7.1.3.1 Free Ridership – GPY1/EPY4 Approach

Free ridership cannot be measured directly due to absent empirical data regarding the counterfactual situation. Thus, free ridership is assessed as a probability score for each measure. The evaluation relies on self-reported data collected during participant paper-based surveys to assign free ridership probability scores to each measure. More specifically, for each measure, the following questions were posed to each measure recipient<sup>9</sup>:

CC1. Before you received the [measure] in the kit, was your family already planning to purchase the same high efficiency [measure] from the store?

FR1. On a scale of 0 to 10, with 0 meaning “No, I was not planning to buy this high efficiency item” and 10 meaning “Yes, I was planning to buy this high efficiency item.” Were you planning to buy the same items in the kit before you received the kit?

FR2. When were you planning to purchase and install them?

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<sup>9</sup> The survey instrument instructions directed an adult to complete the survey.

### 7.1.3.2 Free Ridership Scoring – GPY1/EPY4 Approach

The free ridership data was assembled into a probability score in a step-by-step fashion, applying the following logic:

If the participant reported that they were not planning on purchasing the measure before they received their kit, then the probability of free ridership for that participant is estimated to be zero (based on CC1 above). Similarly, if the participant reported likelihood of purchasing the same measures as provided in the kit less than or equal to 3 (on a 0-10 scale), then the probability of free ridership is estimated to be zero (based on the response to FR1).

If neither of the above criteria holds, then responses to question FR2 (the timing score) and FR1, likelihood of purchasing the measures in the absence of the program (the non-program score), were averaged and divided by 10 to calculate the probability of free ridership. The corresponding formula for calculating free ridership is shown below:

$$\begin{aligned} & \text{if } CC1 = \text{"No"} \text{ or } FR1 \leq 3, \text{ then } FR = 0, \\ & \text{else } FR = \text{Average}\left(\frac{FR1}{10}, FR2\right) \end{aligned}$$

Note that in the above formula, if CC1 is invalid (missing or “don’t know”) then the participant’s responses for NTG determination are disqualified.

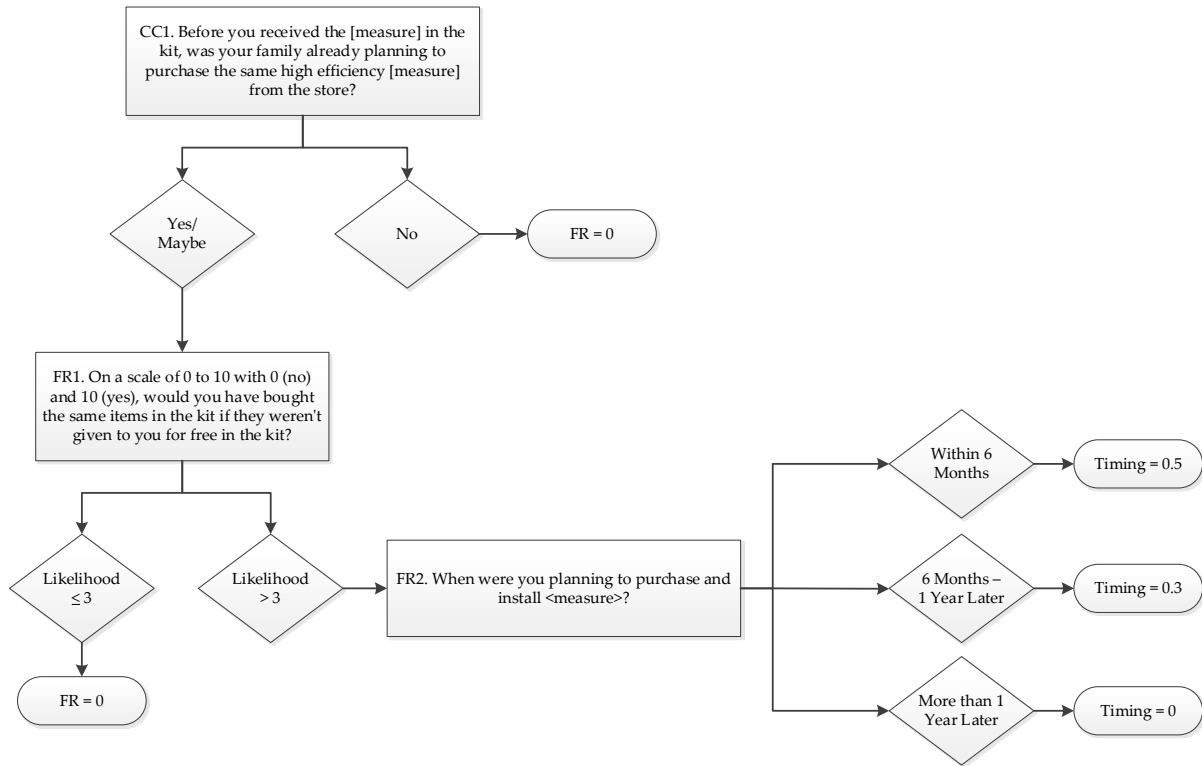
This approach is a modification of that used in the Nicor Gas R29 evaluation to add precision and to approximate the free ridership approaches currently proposed by the Illinois TRM working group<sup>10</sup>. The free ridership methodology is presented in Figure 7-1 below.

The free-ridership rate was calculated for each individual kit component and participant. The individual free-ridership rates were then averaged to calculate the free-ridership rate per component and weighted by individual savings, for measures where the quantity is greater than one. The program free-ridership rate was calculated using a weighted average by component savings. The component savings were calculated using Illinois TRM deemed values and the specific component values, where appropriate. The free-ridership rates were then weighted by program savings in order to calculate overall free-ridership for each fuel type (gas or electric).

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<sup>10</sup> IL-TRM\_Attach A\_IL-NTG Methods\_10\_02\_15\_DRAFT.docx

**Figure 7-1. GPY1/EPY4 Participant Free-Ridership Algorithm**



### 7.1.3.3 Spillover – GPY1/EPY4 Approach

The objective of the spillover assessment is to estimate the impact arising from efficient measures installed as a result of the program that were not incented by the program. The evaluation relied on self-reported data collected during the paper-based participant survey to identify these measures and assess the role of the program in the decision to install.

For each measure installed through the program, the following questions are posed to each measure recipient:

- SP1. AFTER the program came to your school, did you BUY and INSTALL any showerheads, faucet aerators, or CFLs like the ones in the kit?
- SP2. How many additional measures did you install?
- SP3. If you bought more showerheads, aerators, or CFLs after the program, how likely was it that you bought them because of the program? (0-10 scale)

### 7.1.3.4 Spillover Scoring – GPY1/EPY4 Approach

The survey data was assembled into an assessment of spillover impact through application of the following method:

If the customer installed additional units of the measure following their participation, and the program was highly influential in the decision to install those measures, the adoption is considered to be potentially program spillover:

*[If SP1=1 and SP3 is greater than 7, then adoption is spillover]*

Any savings associated with spillover were weighted against the total savings of the participant sample for the particular measure to establish a measure-specific spillover rate. The spillover methodology is shown in Figure 7-2 below. The spillover rate was calculated for each individual kit component and participant. The individual spillover rates were then averaged to calculate the spillover rate per component. The spillover rate by fuel type (gas or electric) was calculated using a weighted average by component savings. The component savings were calculated using Illinois TRM deemed values and the specific component values, where appropriate. The participants with spillover had an assigned spillover value based on their influence score, and the fraction of the measure savings out of the total program measure savings.

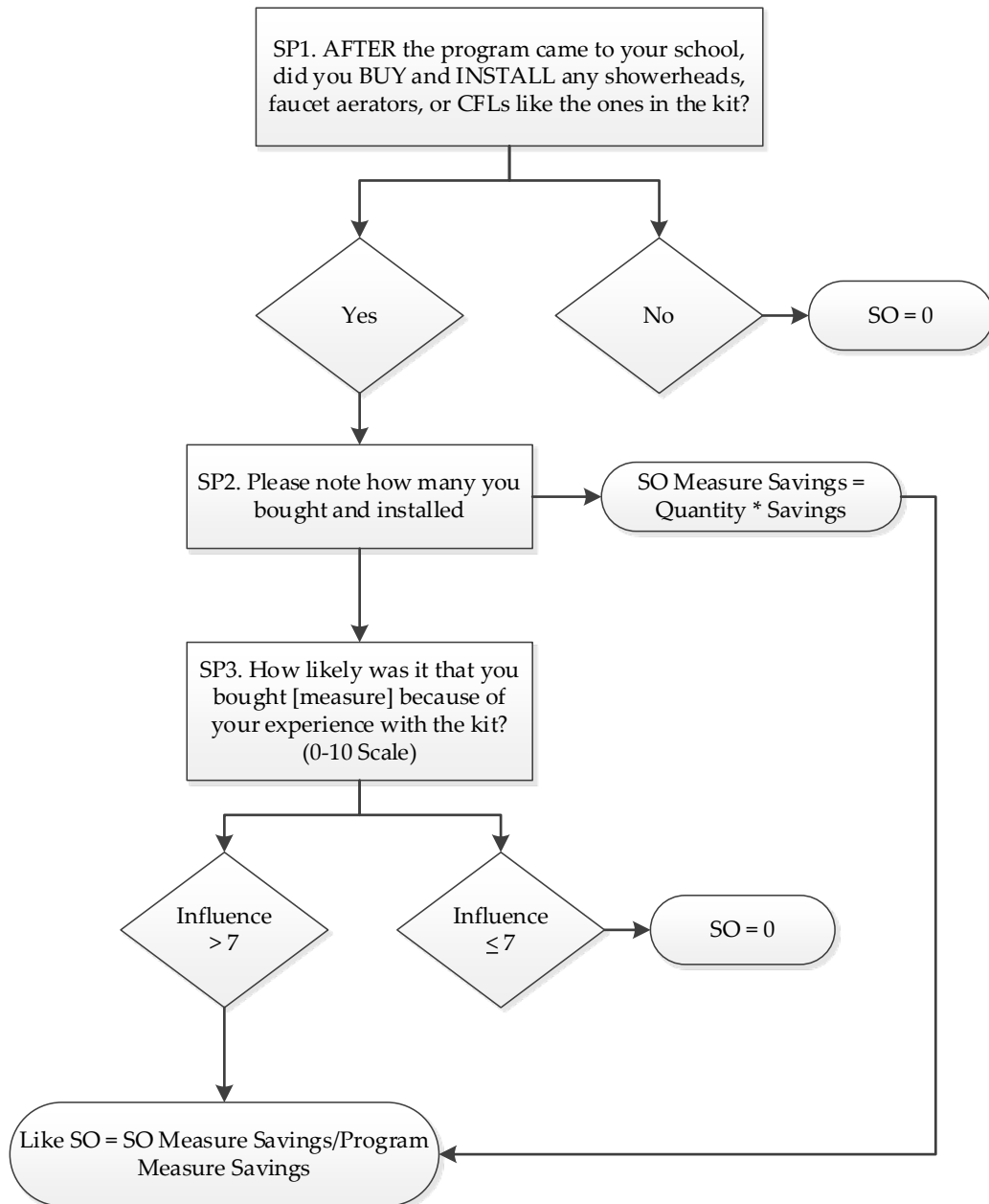
#### **7.1.3.5 CFL-Specific Adjustments to Spillover—GPY1/EPY4 Approach**

The impact credit granted for CFL spillover adoptions must avoid double counting the impact credit accrued already through the ComEd midstream residential lighting program. Navigant uses the approach established in the ComEd Single Family PY3 evaluation that assumes that 1) the market share of program bulbs is not a readily available number and 2) the residential lighting program PY3 evaluation results indicated a substantial amount of free ridership (41%), and there is no reason that one program’s free ridership cannot be another program’s net impact. Thus, it is not necessary that bulbs be un-incented for them to legitimately qualify for credit under the Single Family Program.<sup>11</sup> Due to the uncertainty in this area, the evaluation team takes the conservative approach used in the PY3 Single Family evaluation and assumes that only 50% of the impact arising from CFL spillover adoptions is creditable to the program. Again, even if these customers purchased a discounted bulb, the purchase decision was either influenced by both programs (making the 50% assumption reasonable) or influenced by only the EEE program (making the 50% assumption conservative).

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<sup>11</sup> There is some available evidence regarding the CFL market share of residential lighting program bulbs. The PY3 residential lighting general population survey revealed that 87% of CFLs are purchased at stores participating in the ComEd lighting program. Among program stores, the shelf space dedicated to ComEd program CFL bulbs is 53% of the overall shelf space dedicated to CFLs (for standard bulbs), and 62% for specialty bulbs. If we assume shelf space relates directly to sales share, then 46% of standard CFLs and 54% of specialty bulbs are Residential Lighting program bulbs.

**Figure 7-2. GPY1/EPY4 Participant Spillover Algorithm**



### 7.1.3.6 NTGR Sampling Approach

Navigant conducted a paper survey with a stratified random sample with a goal of 258 participating customers from GPY4/EPY7. The actual number of surveys returned from participating customers was 191 providing a 6% precision at a 90% confidence interval at the program level.

7.1.3.7 EEE Super Savers NTG Survey

**Super Savers Program Survey**

**Dear Parents and Guardians:** Earlier this school year, your child participated in the Super Savers program, which included a take-home kit to help your child teach the family about energy and energy efficiency. The purpose of this survey is to help the sponsors (Nicor Gas, ComEd, Peoples Gas, and North Shore Gas) improve this program. **Please complete this form** and have your child return it to their classroom teacher. **Your child’s classroom will receive a \$100 check if at least 10 students return this form.**

Name	Date
School	Teacher

Please check the box next to your answer or write your answer on the blank line.

- I am the person most familiar with the Super Savers program and items in the kit.
  - Yes
  
- Do you have your own water heater that heats water for just your home?
  - Yes
  - No
  - Not Sure
  
- How is your water heated?
  - Electricity
  - Natural Gas
  - Propane
  - Don't Know
  - Other: \_\_\_\_\_
  
- Did your child receive a Super Savers energy efficiency kit through the Super Saver program?
  - Yes
  - No
  
- Did the kit include 3 CFLs?
  - Yes
  - No

**IF YOU ANSWERED “NO” TO QUESTION 4, YOU ARE DONE WITH THE SURVEY. PLEASE RETURN THIS SURVEY TO YOUR CHILD’S TEACHER. THANK YOU!!**

- Did you fill out and return a survey (the “Student Survey Form”) to your child’s teacher?

- Yes                       No                                       Not Sure

7. Did you successfully install the 1.5 gallons per minute (GPM) High Efficiency Showerhead like the one in this picture?



- Yes                       No

**IF YOU ANSWERED "NO": Fill in the main reasons why not:**

- |  |  |
|--|--|
| <input type="checkbox"/> It did not fit                      | <input type="checkbox"/> Haven't gotten around to it |
| <input type="checkbox"/> Already had an efficient showerhead | <input type="checkbox"/> Didn't have tools           |
| <input type="checkbox"/> Landlord won't allow                | <input type="checkbox"/> Didn't know how to install  |
|  | <input type="checkbox"/> We liked our showerhead     |
|  | <input type="checkbox"/> Other: _____                |

**IF YOU ANSWERED "YES":**

a) Are you still using the efficient showerhead?

- Yes, still using it                                       No, no longer using it

i. If you answered "No, no longer using it," fill in the one main reason why not:

- |  |   |
|--|---|
| <input type="checkbox"/> Water pressure was too weak | <input type="checkbox"/> I didn't like it |
| <input type="checkbox"/> It leaked                   | <input type="checkbox"/> Other: _____     |

8. Did you successfully install the 1.5 GPM Kitchen Faucet Aerator like the one in this picture?

- Yes                       No



**IF YOU ANSWERED "NO": Fill in the main reasons why not:**

- |  |   |
|--|---|
| <input type="checkbox"/> It did not fit                | <input type="checkbox"/> Didn't have tools          |
| <input type="checkbox"/> Already had a kitchen aerator | <input type="checkbox"/> Didn't know how to install |
| <input type="checkbox"/> Landlord won't allow          | <input type="checkbox"/> We liked our own           |
| <input type="checkbox"/> Haven't gotten around to it   | <input type="checkbox"/> Other: _____               |

**IF YOU ANSWERED "YES":**

a) Are you still using the Kitchen Aerator?

- Yes, still using it                                       No, no longer using it

i. If you answered "No, no longer using it," fill in the main reason why not:

- |  |                                       |
|--|---------------------------------------|
| <input type="checkbox"/> Water pressure was too weak | <input type="checkbox"/> It leaked    |
| <input type="checkbox"/> I didn't like it            | <input type="checkbox"/> Other: _____ |



9. Did you successfully install the 1.0 GPM Bathroom Faucet Aerators like the one in this picture?



- Yes, installed both       Yes, installed one       No

**IF YOU ANSWERED "NO":** Fill in the main reasons why not:

- |   |   |
|---|---|
| <input type="checkbox"/> It did not fit                 | <input type="checkbox"/> Didn't have tools          |
| <input type="checkbox"/> Already had a bathroom aerator | <input type="checkbox"/> Didn't know how to install |
| <input type="checkbox"/> Landlord won't allow           | <input type="checkbox"/> We liked our own           |
| <input type="checkbox"/> Haven't gotten around to it    | <input type="checkbox"/> Other: _____               |

**IF YOU ANSWERED "YES":**

a) Are you still using the Bathroom Aerators?

- Yes, still using both       Yes, still using one       No

**IF YOU ANSWERED "NO":** fill in the main reason why not:

- Water pressure was too weak  
 I didn't like it  
 It leaked  
 Other: \_\_\_\_\_



10. Did your family successfully use the shower timer like the one in the picture to the right?

- Yes, Always       Yes, Often       Yes, Occasionally       No, We don't use it

a) How many family members live in the household? \_\_\_\_\_

b) If you use it, how many family members use the shower timer? \_\_\_\_\_

c) Do you turn off the shower as soon as five minutes on the timer is up?

- Yes       No

**IF YOU ANSWERED "NO":** Do you extend your showers by:

- One minute
- Two minutes
- Three or more minutes

The following questions are about the three CFL light bulbs that may have been included in your kit. If your kit included three CFLs, answer the questions under the bulb you installed. If your kit did not include CFLs, skip to Question 11.

	<u>CFL 1</u>	<u>CFL 2</u>	<u>CFL 3</u>
Did you install the following CFLs in your kit?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
If you said "NO", are you ever going to use the CFL?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
If you won't use it, why not? Write an answer here →			
If you are going to use it, will it replace another CFL, an LED, a regular (non-CFL) light bulb or all three?	<input type="checkbox"/> CFL Bulb <input type="checkbox"/> LED Bulb <input type="checkbox"/> Regular Light Bulb <input type="checkbox"/> All Types	<input type="checkbox"/> CFL Bulb <input type="checkbox"/> LED Bulb <input type="checkbox"/> Regular Light Bulb <input type="checkbox"/> All Types	<input type="checkbox"/> CFL Bulb <input type="checkbox"/> LED Bulb <input type="checkbox"/> Regular Light Bulb <input type="checkbox"/> All Types
Was the old bulb you took out and replaced a regular (non-CFL) bulb?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Do you still use the CFL?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
If you are not still using the CFL, please answer why:	<input type="checkbox"/> Burned out <input type="checkbox"/> Other _____	<input type="checkbox"/> Burned out <input type="checkbox"/> Other _____	<input type="checkbox"/> Burned out <input type="checkbox"/> Other _____
About how many hours a day on average is the light on?	_____ Hours	_____ Hours	_____ Hours

11. Before you received the showerhead in the kit, was your family already planning to purchase the same high efficiency showerhead from the store? That is, a showerhead with a flow rate of 1.5 GPM or lower.

- Yes                                       No                                       Maybe

12. Before you received the bathroom faucet aerators in the kit, was your family already planning to purchase the same high efficiency faucet aerators from the store? That is, a bathroom faucet aerator with a flow rate of 1.0 GPM or lower.

Yes

No

Maybe

13. **Before you received the kitchen faucet aerator in the kit, was your family already planning to purchase the same high efficiency faucet aerator from the store? That is, a kitchen faucet aerator with a flow rate of 1.5 GPM or lower.**

Yes

No

Maybe

14. **Before you received the CFLs in the kit, was your family planning to purchase the same CFLs from the store? That is, a CFL light bulb with a wattage rating of 13 watts or lower.**

Yes

No

Maybe

15. **Use the scale below to put a check mark under the number the best describes you for each item in the kit-**

On a scale of 0 to 10, with 0 meaning "No, I was not planning to buy this high efficiency item" and 10 meaning "Yes, I was planning to buy this high efficiency item."

Were you planning to buy the same items in the kit before you received the kit?

Put a ✓	<i>No, not planning to buy it</i>			<i>Maybe we were planning to buy it</i>					<i>Yes, we were planning to buy it</i>		
	0	1	2	3	4	5	6	7	8	9	10
Efficient Showerhead (1.5 GPM)											
Kitchen Faucet Aerator (1.5 GPM)											
Bathroom Faucet Aerators (1.0 GPM)											
CFLs (13 watt)											

i. **FOR EACH ITEM RATED 3 OR HIGHER ABOVE, when were you planning to purchase and install them?**

Efficient Showerhead (1.5 GPM)	Kitchen Faucet Aerator (1.5 GPM)	Bathroom Faucet Aerators (1.0 GPM)	CFLs (13 watt)
<input type="checkbox"/> Within 6 months	<input type="checkbox"/> Within 6 months	<input type="checkbox"/> Within 6 months	<input type="checkbox"/> Within 6 months
<input type="checkbox"/> 6 months to 1 year later	<input type="checkbox"/> 6 months to 1 year later	<input type="checkbox"/> 6 months to 1 year later	<input type="checkbox"/> 6 months to 1 year later
<input type="checkbox"/> More than 1 year later	<input type="checkbox"/> More than 1 year later	<input type="checkbox"/> More than 1 year later	<input type="checkbox"/> More than 1 year later

ii. **Were you planning to purchase the same number of CFLs as in the kit (3 CFLs) on your own?**

The Same Number of CFLs

More CFLs

Fewer CFLs

- None
- Don't know

iii. Were you planning to purchase the same number of bathroom aerators as in the kit (2 bathroom aerators) on your own?

- The Same Number of Bathroom Aerators
- More Bathroom Aerators
- Fewer Bathroom Aerators
- None
- Don't know

16. BEFORE the Super Savers program came to your school and you received your kit, did you BUY and INSTALL any efficient showerheads, faucet aerators, or CFLs like the ones in the kit?

- Yes
- No

i. If you answered "Yes" above, please note how many you bought and installed:

Efficient Showerhead (1.5 GPM)	Kitchen Faucet Aerator (1.5 GPM)	Bathroom Faucet Aerators (1.0 GPM)	CFLs (13 watt)
<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1 - 3
<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 4 - 7
<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 8 - 11
<input type="checkbox"/> 4 or more	<input type="checkbox"/> 4 or more	<input type="checkbox"/> 4 or more	<input type="checkbox"/> 12 or more
<input type="checkbox"/> None	<input type="checkbox"/> None	<input type="checkbox"/> None	<input type="checkbox"/> None

17. AFTER the program came to your school and you received your kit, did you BUY and INSTALL any showerheads, faucet aerators, or CFLs like the ones in the kit?

- Yes
- No

i. If you answered "Yes" above, please note how many you bought and installed:

Efficient Showerhead	Kitchen Faucet Aerator	Bathroom Faucet Aerator	CFLs
<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1 - 3
<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 4 - 7
<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 8 - 11
<input type="checkbox"/> 4 or more	<input type="checkbox"/> 4 or more	<input type="checkbox"/> 4 or more	<input type="checkbox"/> 12 or more
<input type="checkbox"/> None	<input type="checkbox"/> None	<input type="checkbox"/> None	<input type="checkbox"/> None

18. If you bought more showerheads, aerators or CFLs after receiving your kit, did you receive a rebate from your gas or electric utility for your purchase?

Efficient Showerhead (1.5 GPM)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Maybe	<input type="checkbox"/> N/A
Kitchen Faucet Aerator (1.5 GPM)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Maybe	<input type="checkbox"/> N/A

Bathroom Faucet Aerator (1.0 GPM)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Maybe	<input type="checkbox"/> N/A
CFLs (13 watt)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Maybe	<input type="checkbox"/> N/A

19. Use the scale below to put a check mark under the number that best describes you for each item in the list.

If you bought more showerheads, aerators or CFLs after receiving a kit from the Super Savers program, how likely was it that you bought them because of your experience with the kit? (0 means *not at all due to the kit*, 10 means *very much due to the kit*)

Put a ✓ to indicate program influence	NOT because of the kit			Partly because of the kit				Because of the kit				Did not buy
	0	1	2	3	4	5	6	7	8	9	10	
Efficient Showerhead												
Kitchen Faucet Aerator												
Bathroom Faucet Aerator												
CFLs												

20. Did you complete any additional energy efficiency upgrades after receiving the kit (for example, purchase LED bulbs, weatherize your home, or purchase a high efficiency appliance)?

- Yes  
 No

a) If yes, please describe here:

---

b) Did you receive an incentive from your gas or electric utility for your upgrade?

Energy efficiency upgrade:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't Know
----------------------------	------------------------------	-----------------------------	-------------------------------------

21. If you completed energy efficiency upgrades after receiving the kit, how likely was it that you bought them because of the kit?

(0 means not at all due to the program, 10 means very much due to the program)

Put a ✓ to indicate program influence	NOT because of the kit			Partly because of the kit				Because of the kit			
	0	1	2	3	4	5	6	7	8	9	10
Energy efficiency upgrade											

22. Did you cancel or delay any intended energy efficiency upgrades as a result of your experience with the Super Savers program or kit?

- Yes  
 No

a) If yes, please describe here:

---

23. Use the scale below to put a check mark under the number the best describes your satisfaction of the Super Savers kit and educational program-

i. On a scale of 0 to 10, with 0 meaning "I was not at all satisfied" and 10 meaning "I was very satisfied", how satisfied were you with the Super Savers kit and educational program?

Put a ✓ to indicate program influence	NOT at all satisfied			Partly satisfied				Very satisfied			
	0	1	2	3	4	5	6	7	8	9	10
Energy efficiency upgrade											

ii. Why did you give it that rating?

24. How can the Super Savers kit and educational program be improved?

Thank you for your input. If you would like more information about other conservation programs available to you, please provide us with your email address or phone number:

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

Parents, please sign below to indicate that you filled out or assisted your child in filling out the survey:

PARENT SIGNATURE: \_\_\_\_\_

**THANK YOU FOR YOUR PARTICIPATION!**

