



Residential Education and Outreach Program Evaluation Report

Elementary Energy Education Joint Program

FINAL

**Energy Efficiency Plan:
Gas Plan Year 5
(6/1/2015-5/31/2016)**

**Presented to
Peoples Gas and North Shore Gas**

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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 joint Commonwealth Edison (ComEd), Peoples Gas (PG), and North Shore Gas (NSG) GPY5¹ Elementary Energy Education (EEE) program. Branded as “SUPER SAVERS, the EEE Program’s primary focus is to produce natural gas and electricity 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 PG and NSG programs via cross-marketing and increased customer awareness of energy efficiency issues. Because the utilities and the implementation contractor Resource Action Programs (RAP) invested significant time and resources into re-designing the program in GPY4, there were no significant changes made in GPY5.

E.1 Program Savings

Table E-1 summarizes the natural gas and electricity savings from the Peoples Gas EEE Program.

Table E-1. GPY5 Peoples Gas EEE Program Energy Savings

| Category | Energy Savings (Therms) | Energy Savings (kWh) | Demand Savings (kW) | Peak Demand Savings (kW) |
|---------------------------------|-------------------------|----------------------|---------------------|--------------------------|
| Ex-Ante Gross Savings | 45,191 | N/A | N/A | N/A |
| Verified Gross Realization Rate | 1.16 | N/A | N/A | N/A |
| Verified Gross Savings | 52,334 | 706,225 | 2,071 | 65.09 |
| Net to Gross Ratio | 1.05 | Varies by Measure | Varies by Measure | Varies by Measure |
| Verified Net Savings | 54,950 | 692,248 | 2,102 | 63.51 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract) and Illinois Statewide Technical Reference Manuals.²

Table E-2 summarizes the natural gas and electricity savings from the GPY5 North Shore Gas EEE Program.

¹ The GPY5 program year began June 1, 2015 and ended May 31, 2016.

² Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM). The effective TRM for GPY5 is Version 4.0, available from the Illinois Energy Efficiency Stakeholder Advisory Group web site: http://www.ilsag.info/il_trm_version_4.html. The list of TRM Version 4.0 errata in effect for GPY5 is provided in TRM Version 5.0, available at: http://www.ilsag.info/il_trm_version_5.html

Table E-2. GPY5 North Shore Gas EEE Program Energy Savings

| Category | Energy Savings (Therms) | Energy Savings (kWh) | Demand Savings (kW) | Peak Demand Savings (kW) |
|---------------------------------|-------------------------|----------------------|---------------------|--------------------------|
| Ex-Ante Gross Savings | 9,655 | N/A | N/A | N/A |
| Verified Gross Realization Rate | 0.82 | N/A | N/A | N/A |
| Verified Gross Savings | 7,875 | 119,933 | 380 | 11.64 |
| Net to Gross Ratio | 1.05 | Varies by Measure | Varies by Measure | Varies by Measure |
| Verified Net Savings | 8,269 | 118,218 | 388 | 11.41 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract) and Illinois Statewide Technical Reference Manuals.

The reason for discrepancies in savings is some difference in the custom inputs calculated by Navigant and the custom inputs provided by the implementer. There was variation in the in-service rates and the percentage of participants with gas hot water heating. The variation for each input ranged from 2% to 80%. A comparison of the inputs is provided in the Appendix of the report. Navigant found that often the variation is due to the implementer using one set of assumptions for both Peoples Gas and North Shore Gas, where Navigant calculates these inputs separately for the utilities. There was also a large difference in the reported setback for the water heater temperature setback. NSG participants reported an average setback of 1.0 degrees and the PG participants reported an average setback of 8.2 degrees. This resulted in a large variation in the realization rate for this measure. The ex-ante savings were calculated using 4.83 people per household and the ex-post savings were calculated using 4.99 (Peoples Gas) and 4.89 (North Shore Gas) for multifamily and 4.85 (Peoples Gas) and 4.75 (North Shore Gas) for single family people per household. This variation resulted in an increase in realization rate. The implementer provided assumptions of 71.2% single family and 28.8% multifamily, while Navigant found the split to be 73.2% single family and 26.8% multifamily for North Shore Gas and 56.2% single family and 43.8% multifamily for Peoples Gas.

E.2 Program Savings by Measure

Table E-3 summarizes the natural gas and electricity savings from the Peoples Gas EEE Program by measure.

Table E-3. GPY5 Peoples Gas EEE Program Energy Savings

| Savings Type | Measure | Ex-Ante Gross Savings | Verified Gross RR | Verified Gross Savings | NTGR | Verified Net Savings |
|--------------|-------------------------|-----------------------|-------------------|------------------------|---------------|----------------------|
| Therms | Low Flow Showerhead | 25,212 | 1.13 | 28,589 | 1.05 | 30,018 |
| | Kitchen Faucet Aerators | 10,278 | 1.16 | 11,946 | 1.05 | 12,544 |
| | Bathroom Faucet Aerator | 2,197 | 1.16 | 2,549 | 1.05 | 2,677 |
| | Water Heater Set-Back | 534 | 4.27 | 2,279 | 1.05 | 2,393 |
| | Shower Timer | 6,970 | 1.00 | 6,970 | 1.05 | 7,319 |
| | Total | | 45,191 | 1.16 | 52,334 | |
| kWh | Low Flow Showerhead | N/A | N/A | 224,787 | 1.05 | 236,027 |
| | Kitchen Faucet Aerators | N/A | N/A | 85,381 | 1.04 | 88,796 |
| | Bathroom Faucet Aerator | N/A | N/A | 22,870 | 1.04 | 23,85 |
| | Water Heater Set-Back | N/A | N/A | 6,414 | 1.00 | 6,414 |
| | CFLs | N/A | N/A | 173,797 | 0.83 | 144,252 |
| | Shower Timer | N/A | N/A | 192,976 | 1.00 | 192,976 |
| Total | | | | 706,225 | | 692,248 |
| Peak kW | Low Flow Showerhead | N/A | N/A | 12.17 | 1.05 | 12.77 |
| | Kitchen Faucet Aerators | N/A | N/A | 10.41 | 1.04 | 10.82 |
| | Bathroom Faucet Aerator | N/A | N/A | 12.62 | 1.04 | 13.13 |
| | Water Heater Set-Back | N/A | N/A | 0.73 | 1.00 | 0.73 |
| | CFLs | N/A | N/A | 18.30 | 0.83 | 15.19 |
| | Shower Timer | N/A | N/A | 10.86 | 1.00 | 10.86 |
| Total | | | | 65.09 | | 63.51 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

Table E-4 summarizes the natural gas and electricity savings from the GPY5 North Shore Gas EEE by measure.

Table E-4. GPY5 North Shore Gas EEE Program Energy Savings

| Savings Type | Measure | Ex-Ante Gross Savings | Verified Gross RR | Verified Gross Savings | NTGR | Verified Net Savings |
|--------------|-------------------------|-----------------------|-------------------|------------------------|--------------|----------------------|
| Therms | Low Flow Showerhead | 5,185 | 0.70 | 3,606 | 1.05 | 3,786 |
| | Kitchen Faucet Aerators | 2,114 | 0.63 | 1,322 | 1.05 | 1,388 |
| | Bathroom Faucet Aerator | 452 | 0.43 | 196 | 1.05 | 206 |
| | Water Heater Set-Back | 472 | 0.05 | 22 | 1.05 | 23 |
| | Shower Timer | 1,433 | 1.90 | 2,730 | 1.05 | 2,867 |
| | Total | | 9,655 | 0.82 | 7,875 | |
| kWh | Low Flow Showerhead | N/A | N/A | 51,503 | 1.05 | 54,078 |
| | Kitchen Faucet Aerators | N/A | N/A | 21,458 | 1.04 | 22,316 |
| | Bathroom Faucet Aerator | N/A | N/A | 3,952 | 1.04 | 4,110 |
| | Water Heater Set-Back | N/A | N/A | 226 | 1.00 | 226 |
| | CFLs | N/A | N/A | 31,218 | 0.83 | 25,911 |
| | Shower Timer | N/A | N/A | 11,576 | 1.00 | 11,576 |
| Total | | | | 119,933 | | 118,218 |
| Peak kW | Low Flow Showerhead | N/A | N/A | 2.87 | 1.05 | 3.01 |
| | Kitchen Faucet Aerators | N/A | N/A | 2.69 | 1.04 | 2.79 |
| | Bathroom Faucet Aerator | N/A | N/A | 2.11 | 1.04 | 2.20 |
| | Water Heater Set-Back | N/A | N/A | 0.03 | 1.00 | 0.03 |
| | CFLs | N/A | N/A | 3.29 | 0.83 | 2.73 |
| | Shower Timer | N/A | N/A | 0.65 | 1.00 | 0.65 |
| Total | | | | 11.64 | | 11.41 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

E.3 Impact Estimate Parameters for Future Use

The net-to-gross (NTG) values for natural gas savings were deemed by program in this program year (GPY5) as well as next program year, based on the Illinois Stakeholder Advisory Group’s consensus process and from previous evaluation research. For GPY6, every measure’s NTG was deemed at 1.0.

Table E-5. Impact Estimate Parameters for GPY6

| Parameter | Value | Data Source |
|-----------|-------|-------------|
| NTG | 1.00 | Deemed† |

† A deemed value.

Source: NTG Values from Illinois Energy Efficiency Stakeholder Advisory Group. http://www.ilsag.info/ntg_2016.html

E.4 Program Volumetric Detail

Table E-6 and Table E-7 below present GPY5 program participation reported by the implementation contractor RAP for the Peoples Gas and North Shore Gas EEE program. The program distributed 4,250 kits in the PG territory and 874 kits in the NSG territory. Detailed volumetric breakdown of the measure type and savings quantity are provided in the program-level analysis in Section 3.

Table E-6. GPY5 Peoples Gas EEE Program Primary Participation Detail

| Metric | Measures Distributed |
|--|----------------------|
| Number of Total Kits Distributed | 4,250 |
| Number of Measures/Kit | 9 |
| Number of Showerheads Distributed | 4,250 |
| Number of CFLs Distributed | 12,750 |
| Number of Bathroom Aerators Distributed | 8,500 |
| Number of Kitchen Aerators Distributed | 4,250 |
| Water Heater Set Back Instructions Distributed | 4,250 |
| Number of Shower Timers Distributed | 4,250 |
| Number of Total Measures Distributed | 38,250 |

Source: Navigant analysis of GPY5 program tracking data (June 16, 2016 data extract).

Table E-7. GPY5 North Shore Gas EEE Program Primary Participation Detail

| Metric | Measures Distributed |
|--|----------------------|
| Number of Total Kits Distributed | 874 |
| Number of Measures/Kit | 9 |
| Number of Showerheads Distributed | 874 |
| Number of CFLs Distributed | 2,622 |
| Number of Bathroom Aerators Distributed | 1,748 |
| Number of Kitchen Aerators Distributed | 874 |
| Water Heater Set Back Instructions Distributed | 874 |
| Number of Shower Timers Distributed | 874 |
| Number of Total Measures Distributed | 7,866 |

Source: Navigant analysis of GPY5 program tracking data (June 16, 2016 data extract).

E.5 Findings and Recommendations

The following provides insight into key program findings and recommendations.³ The program performed well in GPY5, exceeding participation targets for the year with high marks for customer satisfaction.

Program Participation

Finding 1. The program distributed 4,250 kits in the Peoples Gas service area, meeting the participation target, and 874 kits in the North Shore Gas service area, exceeding the participation target of 750 kits.

Finding 2. The return rate of the student survey forms for the program overall was 44 percent, exceeding the target of 40 percent. The return rate is statistically significant to calculate the custom inputs that are allowed when determining unit savings for each measures.

Verified Gross Savings and Realization Rate.

Finding 3 Navigant’s review of the ex-ante calculations for the GPY5 Elementary Energy Education Program resulted in verified gross energy savings of 52,334 therms in Peoples Gas territory, a gross realization rate of 116 percent, and 7,875 therms in North Shore Gas territory, reflecting a gross realization rate of 82 percent for NSG.

Finding 4. Navigant calculated different ex-post values for custom inputs using the parent-guardian take-home survey responses - including in the number of people per household and in-service rates. The custom inputs differed significantly between PG and NSG. In particular, the custom input differences resulted in a much lower gross realization rate for NSG.

Recommendation 1. If the program desires a higher degree of accuracy in ex-ante savings estimates, the program could calculate savings separately for the NSG and PG utility territories.⁴

Process Evaluation.

Finding 5. The program is performing well. Comments about the program from parents and teachers are generally uniformly positive. Of the 47 teachers in the PG and NSG service territories who responded to the educator evaluation questions asked by RAP (31 percent of participating teachers), 95 percent of them said they would participate in the program again.

³ The Executive Summary presents the most important of the Section 6 Findings and Recommendations. Findings and Recommendations in the Executive Summary are numbered to match Section 6 for consistent reference to individual findings and recommendations. Therefore, gaps in numbering may occur in the Executive Summary.

⁴ After the recommendations were released in the November 4, 2016 draft evaluation report, the implementation contractor Resource Action Programs indicated they will separate the survey results by utility for GPY6.

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 joint Peoples Gas (PG), and North Shore Gas (NSG) Gas Plan Year 5 (GPY5) Elementary Energy Education (EEE) program.⁵ ComEd offered this program jointly with Nicor Gas, Peoples Gas, and North Shore Gas. The EEE program is implemented by Resource Action Programs (RAP) and is branded "SUPER SAVERS." In GPY5, the program targeted fifth grade students in public and private schools that are customers of Nicor Gas or jointly ComEd and Peoples Gas, ComEd and North Shore Gas and ComEd and Nicor Gas. Schools received an invitation to participate and register to receive program materials; 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 previously participated in the program were also invited to participate. The program used a "teacher-lead instruction" program model where the teacher could 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 included water conservation measures; instruments to measure water and ambient temperature, as well as water flow rates; CFLs; shower timers; and a student survey form where participants used the form to report details of their family's participation. Students and teachers were incentivized to return the student survey forms with a \$50 mini-grant for each class that completed and returned 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 natural gas and electricity 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 Peoples Gas, North Shore Gas, ComEd and Nicor Gas programs via cross-marketing and increased customer awareness of energy efficiency issues.

1.2 Evaluation Objectives

The objectives for the GPY5 evaluation were to determine the program's verified gross and net savings and determine if the program met its energy and demand savings targets. Navigant conducted limited process research for the EEE program in GPY5.

⁵ This program is jointly administered with ComEd, Nicor Gas, Peoples Gas and North Shore Gas. The GPY5 program year began June 1, 2015 and ended May 31, 2016 which is the same time period as Electric Plan Year 8 (EPY8).
Peoples Gas and North Shore Gas EEE GPY5 Evaluation Report – Final

2. EVALUATION APPROACH

This section provides an overview of the data collection methods, gross and net impact evaluation approaches, and process evaluation approaches that occurred for the GPY5 evaluation. 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 v4.0 and (2) cross-checking totals with the tracking system. Navigant calculated verified net savings using a deemed net-to-gross (NTG) ratio based on previous evaluation research and approved through the Illinois Stakeholder Advisory Group (IL SAG) consensus process.⁶ Navigant conducted a limited process evaluation that included in-depth interviews with program staff.

2.1 Overview of Data Collection Activities

The core data collection activities included in-depth interviews with program staff and review of the program tracking database. The primary data collection activities are shown in the following tables.

Table 2-1. Primary Data Collection Activities

| What | Who | Target Completes | Completions Achieved | When | Comments |
|---------------------------|-----------------------------------|------------------|----------------------|--------------------|--|
| Program Tracking Database | Participants | All | All | July – August 2016 | Source of information for verified gross analysis |
| In Depth Interviews | Program Manager/Implementer Staff | 4 | 4 | September 2016 | Included staff from ComEd, Nicor Gas, Peoples Gas, North Shore Gas, and RAP. |

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 | |
| Teacher Survey Responses | From RAP | Process Analysis | | X |
| Parent-Guardian Survey Responses | From RAP | Process Analysis | | X |

⁶ Illinois Stakeholder Advisory Group, ilsag.info
Peoples Gas and North Shore Gas EEE GPY5 Evaluation Report – Final

2.2 Verified Savings Parameters

Navigant calculated verified gross and net program impacts for six types of measures with deemed savings values: low-flow showerheads, kitchen and bathroom faucet aerators, CFLs, water heater setback, and shower timers. These measures account for all quantifiable GPY5 natural gas and electric savings.

2.2.1 Verified Gross Program Savings Analysis Approach

Verified gross and net savings resulting from the GPY5 program were calculated by multiplying the total quantity of kits by the measure level unit savings.

Unit savings are calculated using the algorithms from the Illinois TRM v4.0 and total quantity is the number of each type of measure distributed. The Illinois TRM deems most input parameters for showerheads, faucet aerators, water heater setback, 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. The Illinois TRM v4.0 allows for custom values to be used for household size, in-service rate, single- vs multi-family housing type split, and % domestic hot water, and Navigant based verified 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. GPY5 Verified Gross Savings Parameter Data Sources

| Gross Savings Input Parameters | Deemed Input Data Source |
|--------------------------------------|-----------------------------------|
| Showerheads | Illinois TRM v4.0 – Section 5.4.5 |
| Kitchen Aerators | Illinois TRM v4.0 – Section 5.4.4 |
| Faucet Aerators | Illinois TRM v4.0 – Section 5.4.4 |
| CFLs | Illinois TRM v4.0 – Section 5.5.1 |
| Hot Water Heater Temperature Setback | Illinois TRM v4.0 – Section 5.4.6 |
| Shower Timers | Custom Calculation |

Source: Evaluation analysis of programs data and Illinois TRM documents.

‡ Source: State of Illinois Technical Reference Manuals. PG&NSG MMDB PY5 - 04122016, produced by Franklin Energy;

2.2.2 Verified Net Program Savings Analysis Approach

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a deemed net-to-gross ratio (NTGR) of 1.05 for gas measures and 1.0 for electric measures. In GPY5, the NTGR estimates used to calculate the verified net savings were based on past evaluation research and approved through a consensus process managed through the Illinois Energy Efficiency Stakeholder Advisory Group (SAG)⁷.

⁷ Source: Deemed NTGR values are available on the Illinois Energy Efficiency Stakeholder Advisory Group web site.

http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Peoples_Gas_and_North_Shore_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

2.3 Process Evaluation

A limited process evaluation was conducted for GPY5. It was based on interviews with program staff and the implementation contractor and the analysis of parent and teacher survey responses collected by RAP.

Navigant conducted interviews with ComEd, Nicor Gas, Peoples Gas and North Shore Gas program managers as well as with the RAP implementation staff in the summer of 2016. These interviews discussed the program's energy savings and participation, as well as changes implemented in GPY5.

3. GROSS IMPACT EVALUATION

Navigant's review of the ex-ante calculations for the GPY5 Elementary Energy Education Program resulted in verified gross energy savings of 52,334 therms in Peoples Gas territory, a gross realization rate of 116 percent, and 7,875 therms in North Shore Gas territory, reflecting a gross realization rate of 82 percent for NSG.

3.1 Program Tracking Data Review

RAP's tracking system and savings documentation for GPY5/EPY8 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 to derive each of the unit savings, was a 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. Navigant calculated savings separately for NSG and PG. Generally, this resulted in a downwards adjustment for the NSG territory and upwards adjustment for the PG territory.
4. The largest discrepancy was in the reported setback for the water heater temperature setback. NSG participants reported an average setback of 1.0 degrees and the PG participants reported an average setback of 8.2 degrees. This resulted in a large variation in the realization rate for these measures.

3.2 Program Volumetric Findings

As shown in Table 3-1 and Table 3-2, the Peoples Gas EEE Program distributed 4,250 kits and 38,250 total measures. The North Shore Gas EEE Program distributed 874 kits and 7,866 total measures.

Table 3-1. GPY5 Peoples Gas EEE Program Primary Participation Detail

| Metric | Measures Distributed |
|--|----------------------|
| Number of Total Kits Distributed | 4,250 |
| Number of Measures/Kit | 9 |
| Number of Showerheads Distributed | 4,250 |
| Number of CFLs Distributed | 12,750 |
| Number of Bathroom Aerators Distributed | 8,500 |
| Number of Kitchen Aerators Distributed | 4,250 |
| Water Heater Set Back Instructions Distributed | 4,250 |
| Number of Shower Timers Distributed | 4,250 |
| Number of Total Measures Distributed | 38,250 |

Source: Navigant analysis of GPY5 program tracking data (June 16, 2016 data extract).

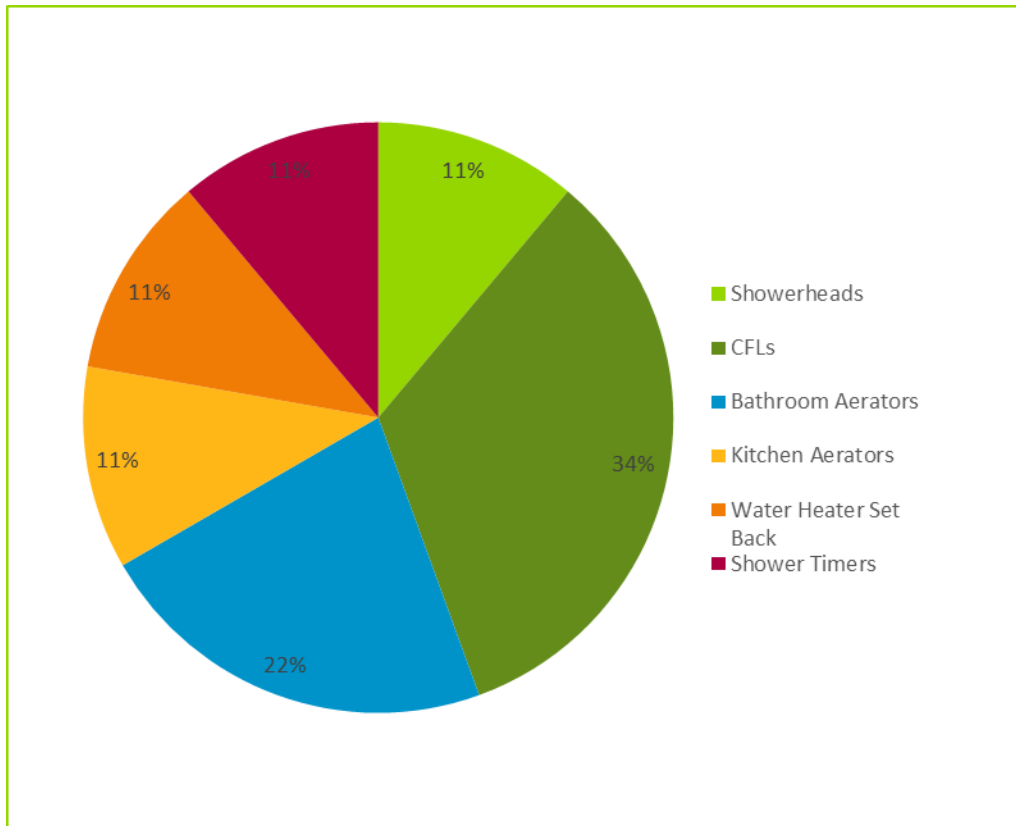
Table 3-2. GPY5 North Shore Gas EEE Program Primary Participation Detail

| Metric | Measures Distributed |
|--|----------------------|
| Number of Total Kits Distributed | 874 |
| Number of Measures/Kit | 9 |
| Number of Showerheads Distributed | 874 |
| Number of CFLs Distributed | 2,622 |
| Number of Bathroom Aerators Distributed | 1,748 |
| Number of Kitchen Aerators Distributed | 874 |
| Water Heater Set Back Instructions Distributed | 874 |
| Number of Shower Timers Distributed | 874 |
| Number of Total Measures Distributed | 7,866 |

Source: Navigant analysis of GPY5 program tracking data (June 16, 2016 data extract).

Figure 3-1 disaggregates the measure mix by type. Measures are distributed in the same proportion for both Peoples Gas and North Shore Gas

Figure 3-1. Peoples Gas and North Shore Gas: Number of Measures Distributed by Type



Source: Navigant Analysis

3.3 Gross Program Impact Parameter Estimates

As described in Section 2, energy savings were estimated using Illinois TRM v4.0. The Illinois TRM deems most input parameters for showerheads, faucet aerators, CFLs and hot water heater temperature setback. Navigant used the student survey form data to calculate or adjust several input parameters. Appendix 7.1 includes tables that 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 were some differences in the custom inputs calculated by Navigant and the custom inputs provided by the implementer.

3.4 Verified Gross Program Impact Results

As shown in Table 3-3, the GPY5 Peoples Gas EEE Program tracking data reported ex ante gross energy savings of 45,191 therms. Evaluation adjustments resulted in verified gross energy savings of 52,334 therms, reflecting the program’s gross realization rate of 116 percent.

Table 3-3. GPY5 Peoples Gas EEE Program Impact Results

| Measure Category | Quantity Unit | Verified Measure Quantity | Ex Ante Gross Savings (therms) | Verified Gross Realization Rate | Verified Gross Savings (therms) |
|----------------------------------|---------------|---------------------------|--------------------------------|---------------------------------|---------------------------------|
| Kit Measures | | | | | |
| Showerhead | Each | 4,250 | 25,212 | 1.13 | 28,589 |
| Kitchen Aerator | Each | 4,250 | 10,278 | 1.16 | 11,946 |
| Bathroom Aerator | Each | 8,500 | 2,197 | 1.16 | 2,549 |
| Water Heater Temperature Setback | Each | 4,250 | 534 | 4.27 | 2,279 |
| Shower Timer | Each | 4,250 | 6,970 | 1.00 | 6,970 |
| Total | | | 45,191 | 1.16 | 52,334 |

Source: Program tracking data and Navigant analysis

As shown in Table 3-4, the GPY5 North Shore Gas EEE Program tracking data reported ex ante gross energy savings of 9,655 therms. Evaluation adjustments resulted in verified gross energy savings of 7,875 therms, reflecting the program’s gross realization rate of 82%.

Table 3-4. GPY5 North Shore Gas EEE Program Impact Results

| Measure Category | Quantity Unit | Verified Measure Quantity | Ex Ante Gross Savings (therms) | Verified Gross Realization Rate | Verified Gross Savings (therms) |
|----------------------------------|---------------|---------------------------|--------------------------------|---------------------------------|---------------------------------|
| Kit Measures | | | | | |
| Showerhead | Each | 874 | 5,185 | 0.70 | 3,606 |
| Kitchen Aerator | Each | 874 | 2,114 | 0.63 | 1,322 |
| Bathroom Aerator | Each | 1,748 | 452 | 0.43 | 196 |
| Water Heater Temperature Setback | Each | 874 | 472 | 0.05 | 22 |
| Shower Timer | Each | 874 | 1,433 | 1.90 | 2,730 |
| Total | | | 9,655 | 0.82 | 7,875 |

Sources: Program tracking data and Navigant analysis

The reason for variation in realization rates is some difference in the custom inputs calculated by Navigant and the custom inputs provided by the implementer. The largest discrepancy was in the reported setback for the water heater temperature setback. NSG participants reported an average setback of 1.0 degrees and the PG participants reported an average setback of 8.2 degrees. This resulted in a large variation in the realization rate for these measures. The ex-ante savings were calculated using 4.83 people per household and the ex-post savings were calculated using 4.99 (Peoples Gas) and 4.89 (North Shore Gas) for multifamily and 4.85 (Peoples Gas) and 4.75 (North Shore Gas) for single family people per household. Additionally, there was variation from Navigant’s inputs and the implementer’s inputs for the in-service rates.

Table 3-5 below shows the unit savings by measure as well as the total kit savings. These unit savings values contain an in-service rate and are multiplied by the single family to multi-family proportion.

Table 3-5. GPY5 Measure Level Unit Savings

| Measure | Energy Unit Savings PG (Therms) | Energy Unit Savings NSG (Therms) |
|---|------------------------------------|-------------------------------------|
| Showerhead (1.5 GPM) - Single Family | 2.26 | 2.34 |
| Showerhead (1.5 GPM) - Multi Family | 4.47 | 1.79 |
| Kitchen Aerator (1.5 GPM) - Single Family | 1.27 | 1.01 |
| Kitchen Aerator (1.5 GPM) - Multi Family | 1.54 | 0.51 |
| Bathroom Aerator (1.0 GPM) Installed one - Single Family | 0.10 | 0.07 |
| Bathroom Aerator (1.0 GPM) Installed one - Multi Family | 0.19 | 0.06 |
| Bathroom Aerator (1.0 GPM) Installed Both - Single Family | 0.10 | 0.08 |
| Bathroom Aerator (1.0 GPM) Installed Both - Multi Family | 0.21 | 0.02 |
| Water Heater Temperature Setback (Lowered) | 0.54 | 0.02 |
| Shower Timers | 1.64 | 3.12 |
| Total Kit Savings | 12.31 | 9.01 |
| Number of Kits | 4,250 | 874 |
| Total Gross Savings | 52,334 | 7,875 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

4. NET IMPACT EVALUATION

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a NTG ratio of 1.05 for natural gas measures and 1.0 for electric measures. As noted in Section 2, the NTGR used to calculate the net verified savings for the GPY5 EEE Program was deemed through a consensus process managed by the Illinois SAG.

Table 4-1 below summarizes the net natural gas and electric savings from the GPY5 Peoples Gas EEE Program by measure.

Table 4-1. GPY5 Peoples Gas EEE Program Energy Savings

| Savings Type | Measure | Ex-Ante Gross Savings | Verified Gross RR | Verified Gross Savings | NTGR | Verified Net Savings |
|--------------|-------------------------|-----------------------|-------------------|------------------------|---------------|----------------------|
| Therms | Low Flow Showerhead | 25,212 | 1.13 | 28,589 | 1.05 | 30,018 |
| | Kitchen Faucet Aerators | 10,278 | 1.16 | 11,946 | 1.05 | 12,544 |
| | Bathroom Faucet Aerator | 2,197 | 1.16 | 2,549 | 1.05 | 2,677 |
| | Water Heater Set-Back | 534 | 4.27 | 2,279 | 1.05 | 2,393 |
| | Shower Timer | 6,970 | 1.00 | 6,970 | 1.05 | 7,319 |
| | Total | | 45,191 | 1.16 | 52,334 | |
| kWh | Low Flow Showerhead | N/A | N/A | 224,787 | 1.05 | 236,027 |
| | Kitchen Faucet Aerators | N/A | N/A | 85,381 | 1.04 | 88,796 |
| | Bathroom Faucet Aerator | N/A | N/A | 22,870 | 1.04 | 23,785 |
| | Water Heater Set-Back | N/A | N/A | 6,414 | 1.00 | 6,414 |
| | CFLs | N/A | N/A | 173,797 | 0.83 | 144,252 |
| | Shower Timer | N/A | N/A | 192,976 | 1.00 | 192,976 |
| | Total | | | 706,225 | | 692,248 |
| Peak kW | Low Flow Showerhead | N/A | N/A | 12.17 | 1.05 | 12.77 |
| | Kitchen Faucet Aerators | N/A | N/A | 10.41 | 1.04 | 10.82 |
| | Bathroom Faucet Aerator | N/A | N/A | 12.62 | 1.04 | 13.13 |
| | Water Heater Set-Back | N/A | N/A | 0.73 | 1.00 | 0.73 |
| | CFLs | N/A | N/A | 18.30 | 0.83 | 15.19 |
| | Shower Timer | N/A | N/A | 10.86 | 1.00 | 10.86 |
| | Total | | | 65.09 | | 63.51 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

Table 4-2 summarizes the natural gas and electric savings from the GPY5 North Shore Gas EEE Program by measure.

Table 4-2. GPY5 North Shore Gas EEE Program Energy Savings

| Savings Type | Measure | Ex-Ante Gross Savings | Verified Gross RR | Verified Gross Savings | NTGR | Verified Net Savings |
|--------------|-------------------------|-----------------------|-------------------|------------------------|--------------|----------------------|
| Therms | Low Flow Showerhead | 5,185 | 0.70 | 3,606 | 1.05 | 3,786 |
| | Kitchen Faucet Aerators | 2,114 | 0.63 | 1,322 | 1.05 | 1,388 |
| | Bathroom Faucet Aerator | 452 | 0.43 | 196 | 1.05 | 206 |
| | Water Heater Set-Back | 472 | 0.05 | 22 | 1.05 | 23 |
| | Shower Timer | 1,433 | 1.90 | 2,730 | 1.05 | 2,867 |
| | Total | | 9,655 | 0.82 | 7,875 | |
| kWh | Low Flow Showerhead | N/A | N/A | 51,503 | 1.05 | 54,078 |
| | Kitchen Faucet Aerators | N/A | N/A | 21,458 | 1.04 | 22,316 |
| | Bathroom Faucet Aerator | N/A | N/A | 3,952 | 1.04 | 4,110 |
| | Water Heater Set-Back | N/A | N/A | 226 | 1.00 | 226 |
| | CFLs | N/A | N/A | 31,218 | 0.83 | 25,911 |
| | Shower Timer | N/A | N/A | 11,576 | 1.00 | 11,576 |
| | Total | | | 119,933 | | 118,218 |
| Peak kW | Low Flow Showerhead | N/A | N/A | 2.87 | 1.05 | 3.01 |
| | Kitchen Faucet Aerators | N/A | N/A | 2.69 | 1.04 | 2.79 |
| | Bathroom Faucet Aerator | N/A | N/A | 2.11 | 1.04 | 2.20 |
| | Water Heater Set-Back | N/A | N/A | 0.03 | 1.00 | 0.03 |
| | CFLs | N/A | N/A | 3.29 | 0.83 | 2.73 |
| | Shower Timer | N/A | N/A | 0.65 | 1.00 | 0.65 |
| | Total | | | 11.64 | | 11.41 |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

5. PROCESS EVALUATION

A limited process evaluation was conducted for the EEE program in GPY5. This section includes changes made to the program in GPY5 as well as changes planned for GPY6.

5.1 Program Changes since GPY4

Because the utilities and RAP invested significant time and resources into re-designing the program in GPY4 and participation targets were met, there were very few changes made to the program in GPY5. The minor changes made to the program included a slight change in participation targets and the counting of energy savings from shower timers. Participation targets were increased slightly in GPY5 compared to GPY4 for North Shore Gas: 750 joint kits compared to 700 joint kits, respectively. There were no changes made to the number or make/model of the measures included in the energy savings kits. Ex-ante energy savings for the shower timers were counted this year (for the first time) due to the research Navigant conducted on this measure in the GPY4 evaluation.

5.2 Participant Feedback

According to respondents of RAP's teacher and parent surveys, this program performed well in GPY5. RAP sent an educator evaluation survey to every teacher who participated in GPY5. The evaluation team analyzed the raw results from these questions and found that around 47 teachers in the PG and NSG service territories (31 percent of participating teachers) responded to the survey. About 95 percent of respondents said they would participate in the program again, and 91 percent said they would recommend this program to other colleagues. Ninety-eight percent indicated the materials were clearly written and well-organized and that the products in the energy savings kit were easy to use.

Teachers reported the curriculum/lesson plans, home to school connection resulting from the program, and real-world applications as the best program elements. Additionally, the majority of teachers (about 62 percent) reported the self-installation aspect of the energy savings kits was the best program element for students. When asked to provide possible changes to the program, the majority of teachers had no response or responded "none". Those who did respond with a change noted that some of the materials and activities were too difficult for their students' current reading or math levels and some of the measures were hard to install.

Forty-three parents in the PG and NSG service territories responded to the parent comment card included in the energy savings kit box (less than one percent of participating parents). Every respondent said they would continue to use the contents in the kit and 98 percent said the materials were easy for their child to use.

5.3 Planned Changes for GPY6

There are several changes planned for the program in GPY6 including measures in the kits, program materials and participation goals.

5.3.1 Measures in Kits

One of the major changes planned for next year is the addition of LEDs to the energy savings kit. Currently the joint program offers three CFLs (along with water heating measures, shower timers and water heater setback instructions) where next year the program will offer one CFL and two LEDs. This is detailed in Table 5-1 below. This change is part of ComEd’s decision to stop incentivizing CFLs in GPY7/EPY10 and focus on offering LEDs.

Table 5-1. Items Included in Super Savers Energy Kit

| Measure | GPY5 | GPY6 |
|------------------------------------|-----------|-----------|
| Lighting Measures | | |
| CFLs | 3 13-Watt | 1 13-Watt |
| LEDs | NA | 2 |
| Non-Lighting Measures | | |
| Showerhead | 1 | 1 |
| Kitchen Faucet Aerator | 1 | 1 |
| Bathroom Faucet Aerator | 2 | 2 |
| Water Heater Set Back Instructions | 1 | 1 |
| Shower Timer | 1 | 1 |

5.3.2 Program Materials

Another change in GPY6 will be an update to some of the program materials used for this program. RAP conducted a teacher focus group to gather feedback on the program and explore ways to enhance the program. The focus group met in May 2016 in Chicago, Illinois. Nine teachers participated in the focus group. The teachers’ response to the program was highly positive. When asked about aspects of the program that could be improved, some of their responses included:

- Instructions in the student workbook are too “wordy”.
- The reading/math level in the workbook is too advanced for some fifth graders.
- The survey return deadline should be extended to allow more flexibility for when teachers want to present the program material.
- Include instructions in Spanish for ESL students.

RAP plans to update the student workbooks and student survey return forms in GPY6 to incorporate these suggestions.

5.3.3 Participation Targets

Finally, the last change in GPY6 will be the increase in participation targets for PG and NSG. As stated in Section 5.1 above, PG and NSG’s combined participation target for GPY5 was 5,000 kits while their combined participation target for GPY6 is 17,000 kits. This large increase is mostly due to the additional budget in their triennial program year.

6. FINDINGS AND RECOMMENDATIONS

This section summarizes the key impact and process findings and recommendations. This program performed well in GPY5, exceeding energy savings and participation targets for the year with high marks for customer satisfaction.

Program Participation

Finding 1. The program distributed 4,250 kits in the Peoples Gas service area, meeting the participation target, and 874 kits in the North Shore Gas service area, exceeding the participation target of 750 kits.

Finding 2. The return rate of the student survey forms for the program overall was 44 percent, exceeding the target of 40 percent. The return rate is statistically significant to calculate the custom inputs that are allowed when determining unit savings for each measures.

Verified Gross Savings and Realization Rate.

Finding 3. Navigant's review of the ex-ante calculations for the GPY5 Elementary Energy Education Program resulted in verified gross energy savings of 52,334 therms in Peoples Gas territory, a gross realization rate of 116 percent, and 7,875 therms in North Shore Gas territory, reflecting a gross realization rate of 82 percent for NSG.

Finding 4. Navigant calculated different ex-post values for custom inputs using the parent-guardian take-home survey responses - including in the number of people per household and in-service rates. The custom inputs differed significantly between PG and NSG. In particular, the custom input differences resulted in a much lower gross realization rate for NSG.

Recommendation 1. If the program desires a higher degree of accuracy in ex-ante savings estimates, the program could calculate savings separately for the NSG and PG utility territories.⁸

Process Evaluation.

Finding 5. The program is performing well. Comments about the program from parents and teachers are generally uniformly positive. Of the 47 teachers in the PG and NSG service territories who responded to the educator evaluation questions asked by RAP (31 percent of participating teachers), 95 percent of them said they would participate in the program again.

⁸ After the recommendations were released in the November 4, 2016 draft evaluation report, the implementation contractor Resource Action Programs indicated they will separate the survey results by utility for GPY6.

7. APPENDIX

7.1 Gross Program Impact Parameter Estimates

As described in Section 2.2.1, energy and demand savings were estimated using Illinois TRM v4.0. The Illinois TRM deems most input parameters for showerheads, faucet aerators, 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.

Equation 1. Showerhead Savings Equation and Inputs, IL TRM v4.0 Section 5.4.5

$$\Delta Therms = \%FossilDHW * ((GPM_base * L_base - GPM_low * L_low) * Household * SPCD * 365.25 / SPH) * EPG_gas * ISR$$

Where:

| | |
|-------------------|--|
| <i>%FossilDHW</i> | = proportion of water heating supplied by Natural Gas heating |
| <i>GPM_base</i> | = Flow rate of the baseline showerhead |
| <i>GPM_low</i> | = As-used flow rate of the low-flow showerhead |
| <i>L_base</i> | = Shower length in minutes with baseline showerhead |
| <i>Household</i> | = Average number of people per household |
| <i>SPCD</i> | = Showers Per Capita Per Day |
| <i>365.25</i> | = Days per year, on average. |
| <i>SPH</i> | = Showerheads Per Household so that per-showerhead savings fractions can be determined |
| <i>EPG_gas</i> | = Energy per gallon of hot water supplied by gas fuel |
| <i>ISR</i> | = In service rate of showerhead |

Table 7-1. Showerhead Custom and Deemed Values Comparison

| Value, Navigant NSG | Value, Navigant PG | Value, Implementer NSG, PG | Variable | Source | Deemed/ Custom | Discrepancy? |
|---------------------|--------------------|----------------------------|--------------|----------------|----------------|--------------|
| 0.54 | 0.61 | 0.63 | %FossilDHW | Survey - HCU6 | Custom | Yes |
| 2.35 | 2.35 | 2.35 | GPM_base | IL TRM 5.4.5 | Deemed | - |
| 1.50 | 1.50 | 1.50 | GPM_low | Specifications | Actual | - |
| 7.80 | 7.80 | 7.80 | L_base | IL TRM 5.4.5 | Deemed | - |
| 7.80 | 7.80 | 7.80 | L_low | IL TRM 5.4.5 | Deemed | - |
| 365.25 | 365.25 | 365.25 | days/year | IL TRM 5.4.5 | Deemed | - |
| 4.75 | 4.85 | 4.83 | Household SF | Survey - HCU2 | Custom | Yes |
| 4.89 | 5.00 | 4.83 | Household MF | Survey - HCU2 | Custom | Yes |
| 0.60 | 0.60 | 0.60 | SPCD | IL TRM 5.4.5 | Deemed | - |
| 1.79 | 1.79 | 1.79 | SPH SF | IL TRM 5.4.5 | Deemed | - |
| 1.30 | 1.30 | 1.30 | S PH MF | IL TRM 5.4.5 | Deemed | - |
| 0.01 | 0.01 | 0.01 | EPG_Gas_SF | IL TRM 5.4.5 | Deemed | - |
| 0.01 | 0.01 | 0.01 | EPG_Gas_MF | IL TRM 5.4.5 | Deemed | - |
| 0.31 | 0.33 | 0.41 | ISR SF | Survey - HA1 | Custom | Yes |
| 0.39 | 0.51 | 0.41 | ISR MF | Survey - HA1 | Custom | Yes |
| 0.73 | 0.56 | 0.71 | %SF | Survey - HCU1 | Custom | Yes |
| 0.27 | 0.44 | 0.29 | %MF | Survey - HCU1 | Custom | Yes |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

Equation 2. Aerator Savings Equation and Inputs, IL TRM v4.0 Section 5.4.4

$$\Delta\text{Therms} = \%FossilDHW * ((GPM_base * L_base - GPM_low * L_low) * Household * 365.25 * DF / FPH) * EPG_gas * ISR$$

Where:

- %FossilDHW* = proportion of water heating supplied by Natural Gas 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_gas* = Energy per gallon of Hot water supplied by gas
- ISR* = In service rate of aerator

Table 7-2. Kitchen Aerator Custom and Deemed Values Comparison

| Value, Navigant NSG | Value, Navigant PG | Value, Implementer NSG, PG | Variable | Source | Deemed/ Custom | Discrepancy? |
|---------------------|--------------------|----------------------------|--------------|-----------------------|----------------|--------------|
| 0.54 | 0.61 | 0.67 | %GasDHW | <i>Survey - HCU6</i> | Custom | Yes |
| 1.39 | 1.39 | 1.39 | GPM_base | <i>IL TRM 5.4.4</i> | Deemed | - |
| 0.94 | 0.94 | 0.94 | GPM_low | <i>Specifications</i> | Deemed | - |
| 4.50 | 4.50 | 4.50 | L_base | <i>IL TRM 5.4.4</i> | Deemed | - |
| 4.50 | 4.50 | 4.50 | L_low | <i>IL TRM 5.4.4</i> | Deemed | - |
| 365.25 | 365.25 | 365.25 | days/year | <i>IL TRM 5.4.4</i> | Deemed | - |
| 4.75 | 4.85 | 4.83 | Household SF | <i>Survey - HCU2</i> | Custom | Yes |
| 4.89 | 5.00 | 4.83 | Household MF | <i>Survey - HCU2</i> | Custom | Yes |
| 0.75 | 0.75 | 0.75 | DF | <i>IL TRM 5.4.4</i> | Deemed | - |
| 1.00 | 1.00 | 1.00 | KFPH | <i>IL TRM 5.4.4</i> | Deemed | - |
| 0.004 | 0.004 | 0.004 | EPG_gas_SF | <i>IL TRM 5.4.4</i> | Deemed | - |
| 0.005 | 0.005 | 0.005 | EPG_gas_MF | <i>IL TRM 5.4.5</i> | Deemed | - |
| 0.23 | 0.33 | 0.33 | ISR SF | <i>Survey - HA2</i> | Custom | Yes |
| 0.27 | 0.43 | 0.33 | ISR MF | <i>Survey - HA2</i> | Custom | Yes |
| 0.73 | 0.56 | 0.73 | %SF | <i>Survey - HCU1</i> | Custom | Yes |
| 0.27 | 0.44 | 0.27 | %MF | <i>Survey - HCU1</i> | Custom | Yes |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

Table 7-3. Bathroom Aerators Custom and Deemed Values Comparison

| Value, Navigant NSG | Value, Navigant PG | Value, Implementer NSG, PG | Variable | Source | Deemed/ Custom | Discrepancy ? |
|---------------------|--------------------|----------------------------|------------------------|----------------|----------------|---------------|
| 0.54 | 0.61 | 0.67 | %GasDHW | Survey - HCU6 | Custom | Yes |
| 1.39 | 1.39 | 1.39 | GPM_base | IL TRM 5.4.4 | Deemed | - |
| 0.94 | 0.94 | 0.94 | GPM_low | Specifications | Deemed | - |
| 1.60 | 1.60 | 1.60 | L_base | IL TRM 5.4.4 | Deemed | - |
| 1.60 | 1.60 | 1.60 | L_low | IL TRM 5.4.4 | Deemed | - |
| 365.25 | 365.25 | 365.25 | days/year | IL TRM 5.4.4 | Deemed | - |
| 4.75 | 4.85 | 4.83 | Household SF | Survey - HCU2 | Custom | Yes |
| 4.89 | 5.00 | 4.83 | Household MF | Survey - HCU2 | Custom | Yes |
| 0.90 | 0.90 | 0.90 | DF | IL TRM 5.4.4 | Deemed | - |
| 2.83 | 2.83 | 2.83 | BFPH - SF | IL TRM 5.4.4 | Deemed | - |
| 1.50 | 1.50 | 1.50 | BFPH - MF | IL TRM 5.4.4 | Deemed | - |
| 0.003 | 0.003 | 0.003 | EPG_gas_SF | IL TRM 5.4.4 | Deemed | - |
| 0.004 | 0.004 | 0.004 | EPG_gas_MF | IL TRM 5.4.5 | Deemed | - |
| 0.13 | 0.22 | 0.23 | ISR SF, installed one | Survey - HA2 | Custom | Yes |
| 0.16 | 0.27 | 0.23 | ISR MF, installed one | Survey - HA2 | Custom | Yes |
| 0.07 | 0.10 | 0.11 | ISR SF, installed both | Survey - HA2 | Custom | Yes |
| 0.02 | 0.14 | 0.11 | ISR MF, installed both | Survey - HA2 | Custom | Yes |
| 0.73 | 0.56 | 0.73 | %SF | Survey - HCU1 | Custom | Yes |
| 0.27 | 0.44 | 0.27 | %MF | Survey - HCU1 | Custom | Yes |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

Equation 3. Hot Water Temperature Setback Savings Equation and Inputs, IL TRM v4.0 Section 5.4.6

$$\Delta \text{Therms} = 6.4 \text{ therms} * (T_{pre} - T_{post}) / 15$$

Where:

- 6.4 Therms = 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.

Table 7-4. Hot Water Temperature Setback Custom and Deemed Values Comparison

| Value, Navigant NSG | Value, Navigant PG | Value, Implementer | Variable | Source | Deemed/ Custom | Discrepancy ? |
|---------------------|--------------------|--------------------|----------------------------|------------------|----------------|---------------|
| 6.4 | 6.4 | 6.4 | UL/CLP Savings | IL TRM 5.4.6 | Deemed | - |
| 1.0 | 8.2 | 2.01 | (T_{pre} - T_{post}) | Survey - HA8/HA9 | Custom | Yes |
| 15 | 15 | 15 | UL/CLP Savings | IL TRM 5.4.6 | Deemed | - |
| 0.11 | 0.25 | 0.20 | ISR | Survey - HA7 | Custom | Yes |
| 0.54 | 0.61 | 0.67 | %GasDHW | Survey - HCU6 | Custom | Yes |

Source: Evaluation analysis of GPY5 program tracking data (June 16, 2016 data extract).

Equation 4. Shower Timer Energy Savings Equation

$$\Delta \text{therms} = \% \text{Fossil DHW} \times \text{Water Flow (GPM)} \times (\text{Baseline Shower Time} - \text{EEM Shower Time}) \times \text{Household Users} \times \text{Days per year} \times \text{SPCD} \times \text{Usage Factor} \times \text{EPG}_{\text{Gas}}$$

Table 7-5. Shower Timer Inputs and Variables – Peoples Gas

| Value, Navigant | Variable | Notes on values |
|-----------------|-------------------------------|---|
| 2.01 | GPM Water Flow | Average for sample calculated using base case GPM (from the TRM) and efficient case (GPM from the low-flow shower head in the kit) multiplied by the participant reported in-service rate (ISR) of the efficient showerhead supplied in the kit |
| 7.80 | Baseline shower time, minutes | Assumed value from TRM v3.0 |
| 2.18 | Household Users | Calculated from Q10B, how many family members use the shower timer? |
| 0.47 | %FossilDHW (natural gas) | Calculated from reported values on the NTG survey, this factor adjusts for shower timers that were distributed to houses with electric water heaters. |
| 0.60 | SPCD | Showers Per Capita per Day. Assumed value from TRM v3.0 |
| 0.34 | Usage Factor | Calculated from survey question Q10, provides the percent of time shower timers were used by the sample of respondents. A response of “Always” is assigned a Usage Factor of 100%, or 1.00. Other responses: “Often” (0.50), “Occasionally” (0.15); “Never” (0.00). |
| 5.65 | EEM Shower time, minutes | Calculated based on shower timer specifications and reported usage calculated from NTG survey question Q10C. For this sample of users, the shower timer saves 2.15 minutes (7.80 – 5.65) |
| 365.25 | days/year | Assumed value from TRM v3.0 |
| 0.005 | EPG_gas | Assumed value from TRM v3.0 |

Sources: GPY4 Survey responses, Illinois TRM v3.0, and Navigant analysis

Table 7-6. Shower Timer Inputs and Variables – North Shore Gas

| Value, Navigant | Variable | Notes on values |
|-----------------|-------------------------------|---|
| 1.77 | GPM Water Flow | Calculated using base case GPM (from the TRM) and efficient case (GPM from the low-flow shower head in the kit) multiplied by the participant reported ISR of the efficient showerhead supplied in the kit |
| 7.8 | Baseline shower time, minutes | Assumed value from TRM v3.0 |
| 2.71 | Household Users | Calculated from Q10B, how many family members use the shower timer? |
| 0.77 | %FossilDHW (natural gas) | Calculated from reported values on the NTG survey, this factor adjusts for shower timers that were distributed to houses with electric water heaters. |
| 0.60 | SPCD | Showers Per Capita per Day. Assumed value from TRM v3.0 |
| 0.35 | Usage Factor | Calculated from survey question Q10, provides the percent of time shower timers were used by the sample of respondents. A response of “Always” is assigned a Usage Factor of 100%, or 1.00. Other responses: “Often” (0.50), “Occasionally” (0.15); “Never” (0.00). |
| 5.61 | EEM Shower time, minutes | Calculated based on shower timer specifications and reported usage calculated from NTG survey question Q10C. For this sample of users, the shower timer saves 2.19 minutes (7.80 – 5.61) |
| 365.25 | days/year | Assumed value from TRM v3.0 |
| 0.005 | EPG_gas | Assumed value from TRM v3.0 |

Sources: GPY4 Survey responses, Illinois TRM v3.0, and Navigant analysis