



**Energy Efficiency/Demand Response
ComEd Plan Year 4
Peoples Gas and North Shore Gas
Plan Year 1
(6/1/2011-5/31/2012)**

**Evaluation Report:
Multi-Family Home Energy Savings
Program**

FINAL

**Presented to:
Commonwealth Edison Company
Peoples Gas and North Shore Gas**

June 5, 2013

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E. Executive Summary

E.1 Evaluation Objectives

Navigant's report includes impact and process evaluations for the Multi-Family Home Energy Savings (MFHES) Program in the first year of jointly implemented program delivery, which is electric program year 4 (EPY4) and gas program year 1 (GPY1).¹ The MFHES program provides natural gas energy efficiency measures to Nicor Gas, Peoples Gas, and North Shore Gas customers and electric energy efficiency measures to ComEd customers. Honeywell Smart Grid Solutions (Honeywell) delivers the program to customers of both ComEd and Nicor Gas. The Wisconsin Energy Conservation Corporation (WECC) provides program administration support to Nicor Gas. Franklin Energy Services, LLC (Franklin Energy) delivers the program to customers served by ComEd and Peoples Gas or North Shore Gas. This evaluation report covers total ComEd electric impacts from all of the gas service territories, the gas impacts for Peoples Gas and North Shore Gas, and the process evaluation for the ComEd/Peoples Gas and North Shore Gas program, implemented by Franklin Energy. A separate report includes the impact and process evaluation of the ComEd/Nicor Gas program, delivered by Honeywell.

The objectives of the MFHES Program evaluation are to: (1) to quantify gross and net savings impacts for the program, (2) to determine key process-related program strengths and weaknesses, and (3) to identify ways the program can potentially be improved.

The process evaluation is designed to review the program's administration and delivery for the purpose of overall program improvement. Process evaluation tasks include reviewing program marketing and outreach materials, evaluating customer satisfaction (including tenants and decision-makers) with the program and identifying potential barriers to program participation.

The purpose of the impact evaluation is to determine the gross impacts and the net impacts of the program, to review the reasonableness of the program's default (or ex-ante) values and to determine if the MFHES Program met its program goals.

E.2 Evaluation Methods

Navigant coordinated the ComEd EPY4 program evaluation with the Peoples Gas and North Shore Gas GPY1 program evaluation where implementation activities overlapped between the utilities. Navigant interviewed the program's implementation contractor, Franklin Energy, to develop a complete understanding of this program. Impact evaluation methods included a review of the program's design, tracking system and measure savings estimates. Navigant's initial findings were presented to the utilities in a memorandum in May 2012, a copy of which is included in Section 5.6 of this report. Navigant used an extract from the program's tracking information to verify measure counts and conducted an engineering file review for a sample of program files to review examples of the program's implementation records. Navigant conducted a telephone survey with participating tenants to research customer satisfaction and investigate measure persistence. Navigant interviewed participating decision-makers (e.g., property managers or program points of contact) to research customer satisfaction and

¹ ComEd has offered a multi-family program since EPY1. ComEd offered jointly implemented pilot programs with Nicor Gas and Peoples Gas in EPY3.

collect information about potential free ridership and spillover. Navigant calculated free ridership for this evaluation using an algorithm approach based on survey self-report data. The analysis relied on interview results from participating multifamily decision-makers. The existence of participant spillover was examined using survey self-report data and follow up telephone interviews with respondents. The process evaluation for this assignment included reviewing program participation accomplishments, administration and delivery, marketing and outreach and customer satisfaction.

The ComEd EPY4 program design and delivery methods did not substantially change since EPY3 and so, according to the Net-to-Gross (NTG) Framework, we believe it is appropriate to use the NTG ratio calculated in the EPY2 evaluation research as a deemed value for EPY4. The ComEd EPY4 program falls under the following condition from the NTG Framework²: *“Where a program design and its delivery methods are relatively stable over time, and an Illinois evaluation of that program has estimated a NTG ratio, that ratio can be used prospectively until a new evaluation estimates a new NTG ratio.”*

The Peoples Gas and North Shore Gas GPY1 program has not been evaluated before and so according to the NTG Framework,³ the NTG ratio is to be applied retroactively. The Peoples Gas and North Shore Gas GPY1 program falls under the following condition from the NTG Framework: *“For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes — either in the program design or delivery, or changes in the market itself⁴ — NTG ratios established through evaluations would be used retroactively, but could also then be used prospectively if the program does not undergo continued significant changes.”*

E.3 Key Impact Findings and Recommendations

As shown in Table E-1, GPY1 evaluation research gross energy savings⁵ were nearly equal to ex-ante gross energy savings reported in the program tracking system, resulting in realization rates of 99.9 percent for Peoples Gas and 100.0 percent for North Shore Gas.⁶ The program level Net-to-Gross ratio for gas measures was 0.90 based on evaluation research findings using the NTG Framework.⁷

² “Proposed Framework for Counting Net Savings in Illinois.” Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

³ Ibid.

⁴ Ibid. “An example of a market change might be where baselines have improved significantly and the likely free riders are growing substantially because of it.”

⁵ The September 14, 2012 final version of the first State of Illinois Energy Efficiency Technical Reference Manual (TRM) (effective as of June 1, 2012) has been agreed to by Illinois Stakeholder Advisory Group (SAG) participants and was by the Illinois Commerce Commission in Docket No. 12-0528 on January 9, 2013. The verified gross savings shown in Table E-1 reflect that gas measures covered by the TRM are deemed for evaluation purposes in GPY1. Since the TRM was not final until after the end of GPY1, the TRM is applicable for evaluation purposes, but not GPY1 implementation.

⁶ Realization rate = verified gross / ex-ante gross from the tracking system.

⁷ “Proposed Framework for Counting Net Savings in Illinois.” Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

Table E-1. Peoples Gas and North Shore Gas GPY1 Energy Savings

Savings Estimates	Peoples Gas Energy Savings (therms)	North Shore Gas Energy Savings (therms)
Ex-Ante Gross	512,400	88,033
Ex-Ante Net	477,387	81,924
Verified Gross	512,251	88,076
Research Findings Net	460,280	79,254
GPY1 Program NTGR	0.90	0.90

Source: Navigant analysis of program tracking data

Table E-2 presents energy and demand savings induced through the ComEd EPY4 program. These results include energy and demand savings through installation of CFLs in all natural gas service territories. The program also installed water efficiency measures in dwelling units with electric water heat in all natural gas service territories. For water efficiency measures, Navigant noted that deemed savings from water efficiency measures were estimated by residence instead of by each individual measure. For example, the deemed energy impact would be the same whether the MFHES program installed one or two bathroom faucet aerators in a residence. Navigant applied the deemed unit savings to calculate verified gross energy savings found in this report. For ComEd, Navigant used deemed realization rates (96.0 percent for CFLs and 67.0 percent for water efficiency measures; resulting in a program-level realization rate of 90.7 percent for electric measures) to calculate verified gross savings. Using the NTG Framework⁸, Navigant applied deemed Net-to-Gross ratios (0.81 Net-to-Gross for CFLs and 0.93 Net-to-Gross for water efficiency measures). The program average NTG ratio (using net savings/verified gross savings) was 0.83 for energy savings and 0.82 for demand savings.

Table E-2. ComEd EPY4 Ex-Ante & Verified Electric & Demand Savings

Savings Estimates	Energy Savings (MWh)	Demand Savings (MW)
Ex-Ante Gross	12,618	1.1
Ex-Ante Net	10,497	1.0
Verified Gross	11,446	1.1
Verified Net	9,456	1.0
EPY4 Program NTGR	0.83	0.82

Source: Navigant analysis of ComEd Frontier database (9-25-12 extract) and program tracking data

Key impact evaluation findings and recommendations follow:

⁸ "Proposed Framework for Counting Net Savings in Illinois." Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

Finding: The Multi-Family Home Energy Savings Program recruited eligible properties and that applications were backed with supporting documentation.

Finding: For Peoples Gas and North Shore Gas, the program savings values for bathroom and kitchen aerators are consistent with Illinois TRM savings values. The program included current Illinois TRM savings values for these measures in the program tracking system.

Finding: For Peoples Gas and North Shore Gas, the program savings values for water efficient showerheads and hot water pipe wrap insulation are different from those found by Navigant in the Illinois TRM. The program tracking system includes different values for water efficient showerheads and hot water pipe wrap insulation than those found by Navigant.

Recommendation:

- Navigant recommends updating the Peoples Gas and North Shore Gas program tracking system to match TRM savings values by making minor adjustments to program measure savings estimates for water efficient showerheads (from 26.22 therms/unit to 26.21 therms/unit) and hot water pipe wrap insulation (from 0.91 therms/linear ft. to 1.06 therms/linear ft.) based on algorithms and inputs found in the Illinois TRM.

Finding: While the Peoples Gas and North Shore Gas tracking system is currently tracking necessary information to report the program’s participation and energy savings achievements, the program can make an incremental improvement to the program tracking system by adding data fields. Additional detailed tracking system review findings and recommendations are included in Section 3.1.2 and in the Section 5.6.

Recommendations:

- Navigant recommends that the program track whether a building has a central or individual domestic hot water system and track savings separately from each;
- Include a unique identifier for individual projects in the program tracking system to facilitate transfer between the implementation contractor’s tracking system and ComEd’s tracking system.

Finding: Navigant found that the Multi-Family Home Energy Savings Program’s Operations Manual provides a reasonable quality control and quality assurance framework to direct program activities, but the program could benefit from additional post-installation QA/QC steps. For example, currently the Field Supervisor performs post-installation inspections immediately after measures are installed. This process, although cost-effective, may overlook some quality controls and introduce bias or the potential appearance of bias, because the Field Supervisor is reviewing direct installation work immediately after the work is performed.

Recommendations:

- To the extent feasible, the program should attempt to minimize hand-written data entry and the possibility of data entry errors from transposing hand-written information into the program tracking database. For example, in GPY2, the implementation contractor is rolling out the use of hand held tablets to facilitate on-site data collection and document customer satisfaction survey results; Navigant recommends that the program staff update their quarterly reports to include additional program performance metrics, including information on participation, quantity of installed measures, marketing and outreach activities and challenges;

- Some resident reports indicated that DI Techs were unable to install energy efficiency measures due to “PC” or “poor condition”. Navigant recommends that the program develop a definition for this term and include it in the program Operations Manual. Additionally, the program should periodically check resident reports for consistent terms as found in the Operations Manual;
- The implementation contractor should consider modifications to the Operations Manual and Property Enrollment Form regarding the baseline GPM of showerheads and aerators. The Operations Manual should identify the minimum rating for baseline GPM required to be eligible for the direct installation of showerheads and aerators (e.g. 2.5 GPM or greater), and the Property Enrollment Form should indicate that recorded values are “rated” GPMs. The Operations Manual should describe procedures and frequency for conducting water-flow testing during the pre-installation site survey, if water flow testing will occur in GPY2.
- Navigant recommends that the program consider implementing an additional level of post-installation QA/QC, such as a series of spot-checks by program staff at convenient times and places. For example, a program staff member who is not part of the installation team could select dwelling units for post-installation inspection on a periodic basis, such as when the program staff member is geographically proximate to a particular location; and
- The program may also consider implementing a peer review process where field teams check a sample of work performed by other field teams.

E.4 Key Process Findings and Recommendations

The EPY4/GPY1 Multi-Family Home Energy Savings Program impacted 20,032 residential dwelling units, exceeding its participation goals for North Shore Gas by 5 percent and for Peoples Gas by 12 percent. The program installed measures at an additional 413 dwelling units with electric water heating for a total of 20,447 dwelling units, exceeding ComEd’s EPY4 participation goal for the program implemented in Peoples Gas and North Shore Gas service territory by 14 percent. Table E-3 presents this information.

Table E-3. ComEd EPY4 and Peoples Gas and North Shore Gas GPY1 Multi-Family Home Energy Savings Program Participation Achievements

Program	Participation Goal (dwelling units)	Actual Participation (dwelling units)	Completion Rate
Peoples Gas	15,300	17,188	112%
North Shore Gas	2,700	2,844	105%
Electric Units/ComEd	-	413	-
ComEd sub-total	18,000	20,447	114%

Source: Navigant analysis of program tracking data

Key process evaluation findings and recommendations follow:

Finding: Overall, the Multi-Family Home Energy Savings Program appears to be designed and implemented to achieve the goals set forth for the program, exceeding its energy savings and

participation goals during the first full year of collaboration among ComEd, Peoples Gas and North Shore Gas and the implementation contractor, Franklin Energy Services, LLC. The program's first year success can be attributed to solid program design, program activities that were well aligned with anticipated outcomes and cooperation between the program's utility sponsors and implementation contractor. Throughout the course of the first year, the program's implementation team and utility program staff appear to have worked out manageable communication and program reporting that satisfies the needs of the parties. The parties appear to have a solid understanding of their roles and responsibilities to successfully deliver the multi-family program for Peoples Gas and North Shore Gas and ComEd.

Finding: The Multi-Family Home Energy Savings Program could potentially increase participation rates at properties and installation rates in residential dwelling units to increase program effectiveness.

Recommendations:

- Emphasize the importance of installing the maximum number of eligible direct install measures in dwelling units to field teams;
- Track reasons why dwelling units are not available to field teams during direct installation activities. Take appropriate steps to reduce the number of unavailable units; and
- Track reasons why measures are not installed in dwelling units during direct installation activities. Determine appropriate steps to reduce the number of times that field teams enter a dwelling unit but are unable to install measures.

Finding: The Multi-Family Home Energy Savings Program could potentially collaborate more closely with other utility-sponsored programs to target common area efficiency opportunities in participating multifamily buildings, thereby potentially improving overall portfolio effectiveness.

Recommendations:

- Place a greater emphasis on completing common area assessments;
- Track common area referrals to other programs and participation rates from referrals;
- Target common area energy efficiency opportunities through increased communication and/or co-marketing with other energy efficiency programs;
- Develop a script for follow up calls that could include ongoing customer satisfaction with direct install measures, any action items from the property manager customer survey and a request for referrals; and
- Follow up with property managers that have received common area recommendations using the script.

Finding: Initial customer satisfaction surveys indicate that customers appear to be satisfied with the Multi-Family Home Energy Savings Program, but the program should conduct additional customer satisfaction research, including larger sample sizes of tenants and decision-makers. Navigant's analysis indicated that 75 percent of tenants responded that they were satisfied or very satisfied with the program. Decision-makers were also satisfied with the program, with 94 percent of respondents indicating that they were satisfied or very satisfied with the program. The most frequent cause of customer dissatisfaction was the performance of direct install measures. Navigant included the following recommendations to potentially increase customer satisfaction and to potentially obtain additional information about customer satisfaction.

Recommendations:

- The program should consider revising the tenant customer satisfaction survey to include more questions about customer satisfaction with each of the individual direct install measures;
- The program should include additional emphasis on encouraging decision-makers to return their customer satisfaction surveys;
- The program should consider following up with decision-makers that have received customer satisfaction surveys during the past program year. These follow up conversations may increase the response rate. These brief touch points could include an opportunity for program staff to follow up on common area energy efficiency recommendations (as applicable), to gauge ongoing satisfaction with direct install measures and to request referrals; and
- The program should consider sending customer satisfaction surveys to an independent third-party, such as Navigant or other parties, for collection and reporting to avoid bias or the potential appearance of bias in collecting customer survey feedback.

1. Introduction to the Program

1.1 Program Description

The Multi-Family Home Energy Savings Program (MFHES) program provides natural gas energy efficiency measures to Nicor Gas, Peoples Gas, and North Shore Gas customers and electric energy efficiency measures to Commonwealth Edison Company (ComEd) customers. The lead utilities for this program are Nicor Gas and Peoples Gas and North Shore Gas. Honeywell Smart Grid Solutions (Honeywell) delivers the program to customers of served by ComEd and Nicor Gas. The Wisconsin Energy Conservation Corporation (WECC) provided program administration support to Nicor Gas. Franklin Energy Services, LLC (Franklin Energy) delivers the program to customers served by ComEd and Peoples Gas or North Shore Gas.

The program’s primary objective is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficiency measures and CFLs, at eligible multifamily residences. A secondary objective of this program is to identify energy saving opportunities in the common areas of multifamily buildings through a brief visual inspection of central water heating, space heating plants and common area lighting equipment to channel customers to other programs offered by the utilities. This program is targeted to building owners/property managers (collectively “decision-makers”) of buildings with three or more residential dwelling units and to residential customers who live in these buildings. Multifamily buildings with individual heating systems and individual meters and buildings with central heat and central meters are both eligible to participate.

ComEd has offered a multi-family program since EPY1; including offering jointly implemented pilot programs with Nicor Gas and Peoples Gas in EPY3. Electric program year 4 (EPY4) and gas program year 1 (GPY1)⁹ was the first full year of jointly implemented program delivery.

Key performance metrics for this program include the number of participating residential dwelling units that received direct installation measures, the measures installed and corresponding gross and net energy savings, and the levels of customer satisfaction with the program reported by participating tenants and decision-makers through program customer satisfaction surveys.

PJM Compliance: This evaluation report is intended to comply with the measurement and verification requirements of PJM Manual 18B (Revision 01, March 1, 2010), Section 7.1 Option A: Partially Measured Retrofit Isolation/Stipulated Measurement.

1.2 Evaluation Questions

Navigant’s evaluation report is designed to answer the following researchable questions. Navigant will address some research questions (*designated by italics*) in future evaluation efforts.

Impact Questions

1. What were the evaluation-verified gross impacts from this program?

⁹ The Peoples Gas and North Shore Gas program year 1 (GPY1) and ComEd’s program year 4 (EPY4) both began June 1, 2011 and concluded May 31, 2012.

2. What were the evaluation-verified net impacts from this program?
3. Did the program meet its energy saving goals?
4. Are the deemed savings values used by the program consistent with the Illinois TRM?

Process Questions

Administration and Delivery

1. Are program administrative and delivery processes effective for delivering efficient scheduling and installation of measures?
2. What areas could the program improve to create a more effective program for customers and help increase the energy impacts?
3. Has the MFHES program effectively channeled customers to other programs sponsored by ComEd, Peoples Gas or North Shore Gas to implement common area efficiency measures as identified in common area audits?
4. *What are the main barriers to and motivation for adopting recommended common area measures?*
5. Does the application/enrollment process present any barriers to program participation?
6. Is the program implementation contractor effectively coordinating with ComEd for electric measures and reporting?

Customer Satisfaction

1. Are customers satisfied with the aspects of program implementation in which they have been involved?
2. Are customer surveys completed and reviewed by the program?

Marketing and Participation

1. *How did customers become aware of the program? What marketing strategies could be used to boost program awareness?*
2. *Has the program effectively recruited professional organizations or trade associations to promote the program to customers? Is the program effectively leveraging its industry and trades network to promote the program to customers?*

2. Evaluation Methods

2.1 Primary Data Collection

Navigant collected data for the impact evaluation from the program tracking system, program documentation, and by reviewing deemed savings estimates used by the program. Navigant interviewed utility program staff, consultants, and implementation contractors and conducted telephone surveys with participating customers to inform the process evaluation.

Gross impact analysis included the following activities:

1. Engineering review of default savings assumptions and calculation of claimed savings as found in the program’s tracking system.
2. Participating customer and decision-makers telephone surveys to verify participation and gather site-specific measure data.
3. Engineering review for a sample of projects to verify participation, adequate documentation of program activities and compliance with default savings assumptions and calculations.

Navigant estimated program-level free ridership using an algorithm approach based on telephone survey self-report data from participating decision-makers. If a respondent indicated that they may have taken action that would result in spillover, Navigant conducted follow up telephone interviews to determine whether the reported action would qualify as spillover for evaluation purposes. Detailed NTG methods for calculating free ridership and participant spillover are included in Section 5.2.2.

Navigant’s process evaluation included interviewing program managers, surveying participating decision-makers and participating tenants, and reviewing program documentation. The survey instruments and in-depth interview guide are included in Section 5.8.

Table 2-1 below includes a summary of data collection activities.

Table 2-1. Primary Data Collection Efforts

Collection Method	Subject Data	Sample Size	Gross Impacts	Net Impacts	Process
Measure Savings Review	Deemed savings estimates	All	X		
Program Tracking Data	Program participants	All	X		
Engineering Desk Review	Program files	3 properties – PG/NSG/ComEd 6 properties – Nicor Gas/ComEd	X		
Telephone Surveys	Participating decision-makers	41 total 21 – PG/NSG/ComEd 20 – Nicor Gas/ComEd	X	X	X
Telephone Surveys	Participating tenants	161 total 81 – PG/NSG/ComEd 80 -- Nicor Gas/ComEd	X		X
Documentation Review	Operations, marketing and administrative documents	All	X		X
In-Depth Telephone Interviews	Utility Program Staff and Consultants, Implementation Contractors	2– PG/NSG/ComEd 3– Nicor Gas/ComEd			X

Source: Navigant

2.1.1 Tracking Data

Navigant performed a review of both tracking systems used for the EPY4/GPY1 Multi-Family Home Energy Savings Program, one from the implementation contractor and another from ComEd. The final data extract from the implementation contractor program tracking system was dated August 27, 2012 and the final data extract from ComEd’s program tracking system was dated September 25, 2012.

2.1.2 In-Depth Interviews with Utility Program Managers, Program Implementer Staff

Navigant interviewed the ComEd Multi-Family Home Energy Savings Program manager and representatives from the ComEd, Peoples Gas and North Shore Gas implementation contractor, Franklin Energy. The purpose of these interviews was to discuss information about program operations and to request information about the program. Navigant developed interview guides using an open-ended format that allowed for a free-flowing discussion between interviewer and respondent, based on the respondents’ knowledge of and experience with the program. Interview topics included program staff roles and responsibilities, program goals, marketing and promotion, program participation and customer satisfaction, data tracking and quality assurance and quality control activities.

2.1.3 Telephone Surveys and Sampling Plan

Navigant implemented two Computer-Assisted Telephone Interviewing (CATI) surveys for this evaluation. One telephone survey was administered to residents of dwelling units where the MFHES program conducted direct install activity and included measure verification and persistence questions and customer satisfaction questions. The sampling strategy for this survey was a simple random selection of participating tenants from the program’s tracking database. The goal for this survey was to produce a ± 10 precision (at a 90 confidence level) for program-level savings estimates. Navigant completed tenant interviews with 81 participants in ComEd/Peoples Gas and North Shore Gas territory and 80 participants in ComEd/Nicor Gas territory, which represented a statistically significant number of completed interviews for this evaluation.

Additionally, Navigant implemented a CATI survey with program contacts and decision-makers, including property managers, onsite managers or maintenance staff, as applicable. This survey was designed to gauge customer satisfaction and to test for free-ridership and spillover. Navigant completed decision-maker interviews with 21 participants in ComEd/Peoples Gas and North Shore Gas territory and 20 participants in ComEd/Nicor Gas territory. The relative precision at a 90% confidence interval was $\pm 2.5\%$ for Peoples Gas/North Shore Gas, $\pm 2.1\%$ for Nicor Gas and $\pm 3.9\%$ for ComEd.

2.1.4 Project File Review

Navigant requested project files from Franklin Energy including three site locations where the program conducted direct installation activity. Project files included program applications, information about direct install measure installation and post-installation inspection reports, as applicable. Navigant requested project documentation files for three randomly chosen buildings, including the following dwelling unit project IDs: North Shore Gas project 21016, and Peoples Gas projects 26717 and 24865. Information was provided to Navigant by the program implementation contractor. Navigant reviewed information included in the project files and compared entries in the project files to corresponding entries in the program tracking database.

2.2 Impact Evaluation Methods

Navigant estimated program savings by comparing measure savings estimates for each program measure using impact algorithm sources found in the State of Illinois Energy Efficiency Technical Reference Manual (TRM)¹⁰ with those used by the program’s implementation contractor, reviewing measure counts found in the program tracking system and applying verified savings estimates to verified measure counts. Prior to estimating program savings, Navigant performed a verification and due diligence and tracking system review of the program’s operations and administration. This task included an analysis of the program’s operations, documentation and internal quality control and quality assurance procedures.

2.2.1 Verification and Due Diligence Procedure Review

Navigant performed a verification and due diligence review for the Multi-Family Home Energy Savings Program, including a review of the program’s quality assurance, program tracking, and savings

¹⁰ Illinois Statewide Energy Efficiency Technical Reference Manual (TRM), effective as of June 1, 2012 and dated September 14, 2012.

verification procedures. To conduct the best practices benchmarking assessment, Navigant compared the implementation contractor’s practices with the Best Practices Self-Benchmarking Tool¹¹ from the National Energy Efficiency Best Practices Study. The benchmarking categories used were Quality Control and Verification, and Reporting and Tracking. The complete Verification and Due Diligence Memo can be found in Section 5.6.

2.2.2 Tracking System Review

Navigant reviewed the Multi-Family Home Energy Savings Program tracking system. The primary purpose of the tracking system review and due diligence task was to determine:

- Whether project eligibility criteria have been properly adhered to and applications are backed with supporting documentation;
- Whether savings were calculated correctly and project information entered in an accurate and timely manner in the program tracking system; and
- If key quality assurance and verification activities were adequately implemented.

2.2.3 Defining Ex-Ante Measure Level Energy Savings

For Peoples Gas and North Shore Gas, the Illinois TRM provides the per unit savings for gas measures, with some exceptions for measures that were not included in the current TRM version. For measures not included in the Illinois TRM, the implementers provided ex-ante values and assumptions.

For ComEd, gross energy savings for CFLs were calculated from per-unit savings values defined by the document *Plan Year 4 Deemed Savings Values 31230.pdf*¹². For electric water efficiency measures, such as faucet aerators and showerheads, gross per-unit energy savings were provided by the utility. Navigant used gross per-unit values to calculate verified gross energy savings for the verification report.

2.2.4 Verification Method

Data collection for the impact analysis included an engineering review of measure unit savings assumptions and an examination of tracking system calculations of claimed savings. Measure counts were based on a tracking data extract from ComEd’s Frontier database dated September 25, 2012. Navigant reviewed the program implementation contractor’s tracking spreadsheets to inform our analysis where additional detail was needed to verify documentation in the Frontier database. Navigant interviewed a random sample of listed program participants to verify participation and measure installation. Navigant conducted an engineering review of project documentation for a sample of projects to verify that the program collected sufficient documentation of its activities.

2.2.5 Verified Gross Energy Savings Evaluation Methods – Natural Gas Measures

For natural gas measures, Navigant calculated verified gross energy savings (therms) using Illinois TRM methodology and algorithms. This section includes Navigant’s methodology, algorithms and impact parameters to derive verified gross savings values for each program measure.

¹¹ Energy Efficiency Best Practices Project, Best Practices Self-Benchmarking Tool:

<http://www.eebestpractices.com/benchmarking.asp>

¹² This document is on the ICC web site for docket 10-0570. (<http://www.icc.illinois.gov/docket/Documents.aspx?no=10-0570>)

Verified Gross Savings Algorithm – Water Efficient Showerheads (Natural Gas)

Navigant used the algorithm¹³ presented in Figure 2-1 to calculate verified gross savings for water efficient showerheads (natural gas).

Figure 2-1. Verified Gross Savings Algorithm - Water Efficient Showerheads (Natural Gas)

Gross Annual Therm Savings

$$\begin{aligned}
 &= \%FossilDHW \\
 &\times [(GPM_{base} \times L_{base} - GPM_{low} \times L_{low}) \times Household \times SPCD \times 365.25/SPH] \times EPG_{gas} \\
 &\times ISR \\
 &= 26.21 \text{ therms per unit}
 \end{aligned}$$

Where:

- %Fossil DHW = 100% of DHW is heated by natural gas
- GPM_{base} = Baseline showerhead gallons per minute = 2.67
- L_{base} = Shower length in minutes with baseline showerhead = 8.2
- GPM_{low} = Water efficient showerhead gallons per minute = 1.5
- L_{low} = Shower length in minutes with water efficient showerhead = 8.2
- Household = Average number of people per household = 2.1
- SPCD = Showers Per Capita Per Day = 0.75
- SPH = Showerheads Per Household = 1.3
- EPG_{gas} = Energy per gallon of hot water supplied by gas = 0.0063 therms/gal
- ISR = In service rate of showerhead = 0.98

Verified Gross Savings Algorithm – Water Efficient Kitchen and Bathroom Aerators (Natural Gas)

Navigant used the algorithm¹⁴ presented in Figure 2-2 to calculate verified gross savings for water efficient kitchen and bathroom faucet aerators (natural gas).

Figure 2-2. Verified Gross Savings Algorithm - Water Efficient Aerators (Natural Gas)

Gross Annual Therm Savings

$$\begin{aligned}
 &= \%FossilDHW \\
 &\times [(GPM_{base} \times L_{base} - GPM_{low} \times L_{low}) \times Household \times 365.25 \times DF/FPH] \times EPG_{gas} \times ISR \\
 &= 2.52 \text{ therms per unit (Kitchen)} \qquad = 3.02 \text{ therms per unit (Bathroom)}
 \end{aligned}$$

Where:

- %Fossil DHW = 100% of DHW is heated by natural gas
- GPM_{base} = Average flow rate, in gallons per minute, of the baseline faucet “as-used” = 1.2
- L_{base} = Average retrofit length faucet use per capita for all faucets in minutes = 9.85
- GPM_{low} = Average flow rate, in gallons per minute, of retrofit faucet aerator “as-used” = 0.94
- L_{low} = Average retrofit length faucet use per capita for all faucets in minutes = 9.85
- Household = Average number of people per household = 2.1
- DF = Drain Factor = 75% for Kitchen and 90% for Bathroom
- FPH = Faucets Per Household = 1 for Kitchen and 1.5 for Bathroom
- EPG_{gas} = Energy per gallon of hot water supplied by gas = 0.0045 therms/gal
- ISR = In service rate of faucet aerators = 0.95

¹³ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.5

¹⁴ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.4

Verified Gross Savings Algorithm – Hot Water Pipe Wrap Insulation (Natural Gas)

Navigant used the algorithm¹⁵ presented in Figure 2-3 to calculate verified gross savings for hot water pipe wrap insulation (natural gas).

Figure 2-3. Verified Gross Savings Algorithm – Hot Water Pipe Wrap Insulation (Natural Gas)

$$\text{Gross Annual Therm Savings} = \left[\left(\frac{1}{R_{\text{exist}}} - \frac{1}{R_{\text{new}}} \right) \times (L \times C) \times \Delta T \times 8,766 \right] / \eta_{\text{DHW}} / 100,000$$

= 1.06 therms per linear foot

Where:

- R_{exist} = Pipe heat loss coefficient of uninsulated pipe (existing) [(hr-°F-ft.)/Btu] = 1.0
- R_{new} = Pipe heat loss coefficient of insulated pipe (new) [(hr-°F-ft.)/Btu] = Actual (1.0 + R value of insulation) = 5
- L = Length of pipe from water heating source covered by pipe wrap (ft.) = 1
- C = Circumference of pipe (ft.) (Diameter (in) * $\pi/12$) = Actual = 0.196
- ΔT = Average temperature difference between supplied water and outside air temperature (°F) = 60
- η_{DHW} = Recovery efficiency of gas hot water heater = 0.78

2.2.6 Verified Gross Energy Savings Evaluation Methods – Electric Measures

Navigant calculated verified gross energy savings (kWh) using deemed gross per-unit energy savings provided by ComEd. The deemed gross per-unit energy savings were applied to verified measure counts to calculate ex-ante gross energy savings. Navigant applied deemed realization rates for CFLs (96 percent) and water efficiency measures (67 percent) to calculate verified gross energy savings.

Verified Gross Savings – Compact Fluorescent Lamps

Navigant calculated verified gross energy savings for CFL measure values in Table 2-2 from per-unit savings defined by the document *Plan Year 4 Deemed Savings Values 31230.pdf*⁶.

Table 2-2. CFLs Deemed Gross Measure Savings

Measure	Unit	Delta Watts	kWh /unit
9W replacing 40W	lamp	31	29.1
14W replacing 60W	lamp	46	43.2
19W replacing 75W	lamp	56	52.5
23W replacing 100W	lamp	77	72.2

Source: *ComEd Plan Year 4 Deemed Savings Values 31230.pdf*

¹⁵ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.1

¹⁶ This document is on the ICC web site for docket 10-0570. (<http://www.icc.illinois.gov/docket/Documents.aspx?no=10-0570>)

Verified Gross Savings – Water Efficiency Measures

Navigant calculated verified gross energy savings for water efficiency measures installed in dwelling units with electric water heating using gross per-unit energy savings provided by ComEd. For water efficiency measures in Table 2-3, Navigant noted that deemed savings from water efficiency measures were estimated by residence instead of by each individual measure. For example, the deemed gross energy savings impact would be the same whether the program installed one or two bathroom faucet aerators in a residence. Using this approach, Navigant verified measure counts from ComEd’s Frontier tracking database and program records. Navigant applied gross measure savings to verified measure counts to obtain ex-ante gross energy savings. Navigant then applied the deemed realization rate (67 percent) for water efficiency measures to calculate verified gross energy savings in the verification report.

Table 2-3. Electric Water Efficiency Gross Measure Savings

Measure	Unit	kWh/ unit
1.5 gpm Showerhead	residence	592.3
1.5 gpm Kitchen Aerator	residence	117.0
1.0 gpm Bathroom Aerator	residence	214.0

Source: ComEd PY4 Gross Residential Direct Install Measure Savings

2.2.7 Net Savings Approach

The primary objective of the net savings analysis was to determine the MFHES program’s net effect on customers’ energy usage. After gross program impacts have been assessed, net program impacts are derived by estimating a NTGR that quantifies the percentage of the gross program impacts that can be reliably attributed to the program. This includes an adjustment for free ridership (the portion of impact that would have occurred even without the program) and spillover (the portion of impact that occurred outside of the program, but would not have occurred in the absence of the program).

Navigant calculated free ridership for this evaluation using an algorithm approach based on survey self-report data. The analysis relied on interview results from participating multifamily decision-makers. The existence of participant spillover was examined using survey self-report data and follow up telephone interviews with respondents. The relative precision at a 90% confidence interval was ± 2.5% for Peoples Gas/North Shore Gas, ± 2.1% for Nicor Gas and ± 3.9% for ComEd. The interview guide is included in Section 5.8.3.

The final NTGR for each measure is calculated using the following algorithm, presented in Figure 2-4.

Figure 2-4. Net-to-Gross Ratio Algorithm

$$NTGR = 1 - Free\ Ridership + Spillover$$

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.

- *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.

2.2.8 Net Energy Savings Evaluation Methods – Natural Gas Measures

The Peoples Gas and North Shore Gas GPY1 MFHES program has not been evaluated before and so according to the NTG Framework,¹⁷ the NTG ratio is to be applied retroactively. The Peoples Gas and North Shore Gas GPY1 program falls under the following condition from the NTG Framework: *“For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes – either in the program design or delivery, or changes in the market itself¹⁸ – NTG ratios established through evaluations would be used retroactively, but could also then be used prospectively if the program does not undergo continued significant changes.”*

2.2.9 Net Energy Savings Evaluation Methods – Electric Measures

The ComEd EPY4 MFHES program design and delivery methods did not substantially change from EPY3 and so, according to the Net-to-Gross (NTG) Framework, we believe it is appropriate to use the NTG ratio calculated in the PY2 MFHES evaluation research. The ComEd EPY4 MFHES program falls under the following condition from the NTG Framework¹⁹: *“Where a program design and its delivery methods are relatively stable over time, and an Illinois evaluation of that program has estimated a NTG ratio, that ratio can be used prospectively until a new evaluation estimates a new NTG ratio.”*

2.3 Process Evaluation Methods

Navigant’s process evaluation of the ComEd and Peoples Gas and North Gas Multi-Family Home Energy Savings Program was organized around program participation accomplishments, administration and delivery, coordination and communication between utilities, and customer satisfaction. Navigant interviewed key personnel from the implementation contractor, ComEd utility program staff, and the ComEd implementation contractor to inform our process evaluation. Navigant implemented telephone surveys to gauge customer satisfaction with participating tenants and participating decision-makers and compared customer satisfaction responses from evaluation telephone surveys to those responses collected by the program’s implementation contractor through customer leave behind surveys distributed during direct install activities.

2.3.1 In-Depth Interviews with Utility Program Managers, Program Implementer Staff

Navigant interviewed the ComEd Multi-Family Home Energy Savings program manager and representatives from the ComEd, Peoples Gas and North Shore Gas implementation contractor, Franklin Energy. The purpose of these interviews was to discuss information about program operations and to request information about the program. Navigant developed interview guides using an open-ended format that allowed for a free-flowing discussion between interviewer and respondent, based on the respondents’ knowledge of and experience with the program. Interview topics included program staff

¹⁷ Ibid.

¹⁸ Ibid. “An example of a market change might be where baselines have improved significantly and the likely free riders are growing substantially because of it.”

¹⁹ “Proposed Framework for Counting Net Savings in Illinois.” Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

roles and responsibilities, program goals, marketing and promotion, program participation and customer satisfaction, data tracking and quality assurance and quality control activities. The interview guide is included in Section 5.8.1.

2.3.2 Telephone Surveys with Participating Tenants

Navigant implemented a CATI telephone survey to residents of dwelling units where the MFHES program conducted direct install activity, which included customer satisfaction questions. Navigant completed tenant interviews with 81 participants, which represented a statistically significant number of completed interviews for this evaluation. The survey instrument is included in Section 5.8.2.

2.3.3 Telephone Surveys with Participating Decision-Makers

Navigant implemented a CATI telephone survey with program decision-makers, including property managers, onsite managers or maintenance staff, as applicable. This survey was designed to gauge customer satisfaction for this group of participants. Navigant completed decision-maker interviews with 41 participants (20 for ComEd/Nicor Gas and 21 for ComEd/Peoples Gas and North Shore Gas). The survey instrument is included in Section 5.8.3.

2.3.4 Reviewing Program Documentation & Activities

Navigant reviewed program documents including printed and electronic program marketing and outreach materials, applications, direct installation notifications and program educational materials, as summarized in Table 2-4 below. Navigant collected data for this verification and due diligence task through interviews with program implementation staff and reviewing program documentation covering the period from January through April 2012. The program implementation contractor provided documentation to conduct the verification and due diligence review and for use in the evaluation report and provided a basis for Navigant's findings and recommendations included in this evaluation report.

Table 2-4. Multi-Family Home Energy Savings Program Documentation & Activities

Document or Activity	Method	Information Source
Interview with the program implementation contractor	Interview	Franklin Energy
Compliance Filing	Document review	North Shore Gas/Peoples Gas Compliance Filing Energy Efficiency Program Plan, June 1, 2011 – May 31, 2014, June 2011, Docket 10-0564 Attachment A.pdf
Operations Manual	Document review	Franklin Energy
Tracking System	Document review	Franklin Energy
Marketing and Outreach	Interview	Franklin Energy
Application and Incentive Worksheets	Document review	Franklin Energy
Project File Review	Document review	Franklin Energy
Best Practices Comparison	Document review and analysis	Navigant

Source: Navigant

3. Evaluation Results

3.1 Impact Evaluation Results

This section presents impact evaluation results from the GPY1/EPY4 Multi-Family Home Energy Savings Program evaluation. The section begins with a summary of key findings and recommendations from Navigant’s Verification, Due Diligence and Tracking System Review Memorandum, provided to the utilities on May 21, 2012. Gross and net program impact parameter estimates and impact results follow.

3.1.1 Verification and Due Diligence Procedure Review

The summary below details Navigant’s verification and due diligence review findings and recommendations. The main components of this review included analysis of program documentation and procedures as well as interviews with the program’s implementation contractors and utility program staff. The complete Verification and Due Diligence and Tracking System Review Memorandum can be found in Section 5.6. The implementation contractor’s response memorandum can be found in Section 5.7. Navigant notes that the implementation contractor has taken action on some of the recommendations included in this section.

To conduct the best practices benchmarking assessment, Navigant compared the Implementation Contractor’s practices with the Best Practices Self-Benchmarking Tool²⁰ from the National Energy Efficiency Best Practices Study for multifamily programs. The benchmarking categories used were Quality Control and Verification, and Reporting and Tracking. Primary research topics are included *in italics* below with corresponding findings and recommendations listed as such.

Research Topic:

Whether appropriate eligibility criteria have been properly adhered to and applications are backed with supporting documentation.

Finding: Navigant found that the Multi-Family Home Energy Savings Program recruited eligible properties and that applications were backed with supporting documentation.

Research Topic:

Are any Quality Assurance/Quality Control (QA/QC) activities biased?

Finding: Navigant found that the Multi-Family Home Energy Savings Program’s Operations Manual provides a reasonable quality control and quality assurance framework to direct program activities, but the program could benefit from additional post-installation QA/QC steps. For example, currently the installation team performs post-installation inspections immediately after measures are installed. This process, although cost-effective, may overlook some quality controls and introduce bias or the potential appearance of bias, because the same installation team is reviewing its own work immediately after the work is performed.

²⁰ Best Practices Self-Benchmarking Tool developed for the Energy Efficiency Best Practices Project: <http://www.eebestpractices.com/benchmarking.asp>

Recommendations:

- To the extent feasible, the program should attempt to minimize hand-written data entry and the possibility of data entry errors from transposing hand-written information into the program tracking database. For example, in GPY2, the implementation contractor is rolling out the use of hand held tablets to facilitate on-site data collection and document customer satisfaction survey results;
- Navigant recommends that the program staff update their quarterly reports to include additional program performance metrics, including information on participation, quantity of installed measures, marketing and outreach activities and challenges;
- Navigant recommends that the program consider implementing an additional level of post-installation QA/QC, such as a series of spot-checks by program staff at convenient times and places. For example, a program staff member who is not part of the installation team could select dwelling units for post-installation inspection on a periodic basis, such as when the program staff member is geographically proximate to a particular location;
- The program may also consider implementing a peer review process where field teams check a sample of work performed by other field teams; and
- The implementer should consider modifications to the Operations Manual and Property Enrollment Form regarding the baseline GPM of showerheads and aerators. The Operations Manual should identify the minimum rating for baseline GPM required to be eligible for the direct installation of showerheads and aerators (e.g. 2.5 GPM or greater), and the Property Enrollment Form should indicate that recorded values are “rated” GPMs. The Operations Manual should describe procedures and frequency for conducting water-flow testing during the pre-installation site survey, if water flow testing will occur in GPY2.

3.1.2 Tracking System Review

Research Topic:

Does the program’s tracking system contain all of the information needed for program evaluation purposes?

Finding: Navigant found that, overall, the Peoples Gas and North Shore Gas program tracking system (using the Bensight Data Management platform) captures the relevant data required to track the program’s actions for reporting and evaluation activities. While the program tracking system is currently tracking necessary information to report the program’s participation and energy savings achievements, the program can make an incremental improvement to the program tracking system by adding data fields.

Recommendations:

- Navigant recommends that the Peoples Gas and North Shore Gas program track whether a building has a central or individual domestic hot water system and track savings separately from each; and
- Include a unique identifier for individual projects in the Peoples Gas and North Shore Gas program tracking system to facilitate transfer between the implementation contractor’s tracking system and ComEd’s tracking system.

Research Topic:

Whether savings were calculated correctly and project information entered in an accurate and timely manner in the program tracking system.

Findings: Navigant found that the Peoples Gas and North Shore Gas program correctly applied TRM assumptions to calculate savings estimates for kitchen and bath faucet aerators. While Navigant found that the program staff entered project information accurately and timely in the program’s tracking system, Navigant identified opportunities to implement some changes as included in the following section.

Recommendations:

- Navigant recommends including additional information in the Peoples Gas and North Shore Gas program tracking system, including water flow testing results, results of common area surveys and referrals to the Peoples Gas, North Shore Gas or ComEd programs, responses from customer or property manager surveys, and post-installation inspection activity.
- To the extent feasible, the program should attempt to minimize hand-written data entry and the possibility of data entry errors from transposing hand-written information into the program tracking database. For example, using hand held tablets may facilitate on-site data collection and document customer satisfaction survey results.
- Navigant recommends that the program staff update their quarterly reports to include additional program performance metrics, including information on participation, quantity of installed measures, marketing and outreach activities and challenges.
- Some resident reports indicated that Energy Advisors were unable to install energy efficiency measures due to “PC” or “poor condition”. Navigant recommends that the program develop a definition for this term and include it in the program Operations Manual. Additionally, the program should periodically check resident reports for consistent terms as found in the Operations Manual.

3.1.3 Gross Program Impact Parameter Estimates – Natural Gas Measures

Navigant applied measure savings values as calculated in Section 2.2.5 to verified measure quantities found in the program tracking systems to calculate verified gross savings impacts for natural gas measures. This section includes gross impact parameter estimates for each program natural gas measure.

For natural gas measures, both Navigant and the implementation contractor calculated gross energy savings (therms) using Illinois TRM methodology and algorithms, as indicated above. Navigant’s verified gross values were the same as the implementation contractor’s measure values for kitchen and bathroom aerators. The values for showerheads and hot water pipe wrap insulation were different for each. In the case of showerheads, the difference was 0.01 therms/unit. In the case hot water pipe wrap insulation, the difference was 0.15 therms/linear foot. Table 3-1 below includes a comparison of ex-ante and verified gross impact parameter values for natural gas measures.

Table 3-1. Peoples Gas and North Shore Gas GPY1 Ex-Ante and Verified Gross Impact Parameters

Measure	Ex-Ante Gross Therms/Unit	Verified Gross Therms/Unit	Method	Source
1.5 gpm Showerheads	26.22	26.21	Deemed	State of Illinois TRM
1.5 gpm Kitchen Aerators	2.52	2.52		
1.0 gpm Bathroom Aerators	3.02	3.02		
Hot Water Pipe Wrap Insulation (Linear ft.)	0.91	1.06		

Source: Program documents, State of Illinois TRM

Navigant worked with the utilities and the implementation contractor to review and correct discrepancies found in the program tracking database. After reviewing final data extracts, Navigant made no additional adjustments to measure counts from the program tracking data. Table 3-2 and Table 3-3 below include ex-ante and verified gross measure counts used in this evaluation report.

Table 3-2. Peoples Gas GPY1 Ex-Ante and Verified Gross Impact Parameters

Measure	Ex-Ante Measures Installed	Verified Measures Installed
Showerhead	16,208	16,208
Kitchen Aerator	15,392	15,392
Bathroom Aerator	16,082	16,082
Pipe Wrap (linear ft.)	78	78
Total	47,760	47,760

Source: Navigant analysis of program tracking data (August 27, 2012 data extract)

Table 3-3. North Shore Gas GPY1 Ex-Ante and Verified Gross Impact Parameters

Measure	Ex-Ante Measures Installed	Verified Measures Installed
Showerhead	2,721	2,721
Kitchen Aerator	2,243	2,243
Bathroom Aerator	3,515	3,515
Pipe Wrap (linear ft.)	463	463
Total	8,942	8,942

Source: Navigant analysis of program tracking data (August 27, 2012 data extract)

3.1.4 Gross Program Impact Parameter Estimates – Electric Measures

Navigant applied measure savings values as calculated in Section 2.2.6 to verified measure quantities found in the program tracking systems to calculate verified gross savings impacts for electric measures. This section includes gross impact parameter estimates for each program electric measure.

The program’s CFL measure values were calculated from per-unit savings defined by the document *Plan Year 4 Deemed Savings Values 31230.pdf*²¹. Navigant applied the CFL measure values to verified measure counts to calculate ex-ante gross energy savings. Navigant then applied the deemed realization rate of 96 percent to arrive at verified gross savings for CFL measures.

For water efficiency measures, gross savings were estimated by residence instead of by each individual measure. For example, the gross energy impact would be the same whether the program installed one or two bathroom faucet aerators in a residence. Using this approach, Navigant verified residence counts from ComEd’s Frontier tracking database and program records. Navigant applied gross measure savings to verified residence counts to calculate ex-ante gross energy savings. Navigant applied the deemed realization rate of 67 percent for water measures to calculate verified gross energy savings in the verification report. Table 3-4 below includes ComEd EPY4 gross unit values.

Table 3-4. ComEd EPY4 Gross Unit Values

Measure	unit	Ex-Ante Gross kWh/unit	Ex-Ante Gross kW/unit	Method	Source
9W CFL	lamp	29.1	.0029	Deemed	ComEd Plan Year 4 Deemed Savings Values 31230.pdf
14W CFL	lamp	43.2	.0044		
19W CFL	lamp	52.5	.0053		
23W CFL	lamp	72.2	.0073		
1.5 gpm Showerhead	residence	592.3	.0150	Non-Deemed	ComEd PY4 Gross Residential Direct Install Measure Savings (document)
1.5 gpm Kitchen Aerator	residence	117.0	.0120		
1.0 gpm Bathroom Aerator	residence	214.0	.0120		

Source: ComEd Plan Year 4 documents

The Multi-Family Home Energy Savings Program installed CFLs in eligible dwelling units with either natural gas or electric water heat. Navigant verified CFL measure counts and measure counts for electric water efficiency measures installed in dwelling units with electric water heat. Measure counts shown in

²¹ This document is on the ICC web site for docket 10-0570. (<http://www.icc.illinois.gov/docket/Documents.aspx?no=10-0570>)

Table 3-5 below includes all CFL measures installed by the MFHES program, including Nicor Gas, North Shore Gas and Peoples Gas service territories.²²

Table 3-5. ComEd EPY4 Ex-Ante and Verified Unit Counts (CFLs)

Measure	Unit	Ex-Ante Units Installed	Verified Units Installed
9W CFL	lamp	59,740	59,740
14W CFL	lamp	164,459	164,459
19W CFL	lamp	25,876	25,876
23W CFL	lamp	1,566	1,566
Total		251,641	251,641

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

Table 3-6 includes all ComEd EPY4 water efficiency measures installed in dwelling units with electric water heat by the Multi-Family Home Energy Savings Program, including Nicor Gas, Peoples Gas and North Shore Gas service territories.²³ Navigant verified a total of 7,594 electric water efficiency measures (e.g. water efficiency measures installed in residential dwelling units with electric water heating) in 2,710 residential dwelling units. As noted in the table below, the per-unit measure for electric water savings measures is by residence.

Table 3-6. ComEd EPY4 Ex-Ante and Verified Unit Counts (Water Efficiency Measures)

Measure	Unit	Ex-Ante Units Installed	Verified Units Installed
1.5 gpm Showerhead	residence	2,444	2,444
1.5 gpm Kitchen Aerator	residence	2,535	2,535
1.0 gpm Bathroom Aerator	residence	2,615	2,615
Total		7,594	7,594

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

Navigant applied gross measure savings to verified measure counts to calculate ex-ante gross savings. Realization rates were derived from previous evaluation research and included in ComEd program planning documents. Navigant applied ComEd’s deemed realization rates to calculate verified gross savings, as illustrated in Table 3-7.

²² Itemized ComEd electric measure counts by natural gas service territory are included in Appendix 5.4.

²³ Itemized ComEd electric measure counts by natural gas service territory are included in Appendix 5.4.

Table 3-7. ComEd EPY4 Deemed Gross Impact Parameters

Measure Type	Realization Rate	Method	Source
CFLs	96.0%	Deemed	ComEd Plan Year 4 Deemed Savings Values 31230.pdf; ComEd PY4 Gross Residential Direct Install Measure Savings (document)
Water efficiency measures	67.0%		

Source: ComEd PY4 values

3.1.5 Gross Program Impact Results

The Peoples Gas GPY1 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 512,400 therms. Evaluation adjustments described in the sections above resulted in verified gross energy savings of 512,251 therms. Table 3-8 illustrates that the overall program gross energy savings realization rate was 99.9 percent.

Table 3-8. Peoples Gas GPY1 Ex-Ante and Verified Gross Savings

Measure	Verified Unit Savings (therms)	Verified Measures Installed	Ex-Ante Gross Savings (therms)	Verified Gross Realization Rate	Verified Gross Savings (therms)
Showerhead	26.21	16,208	424,974	99.9%	424,812
Kitchen Aerator	2.52	15,392	38,788	100.0%	38,788
Bathroom Aerator	3.02	16,082	48,568	100.0%	48,568
Pipe Wrap (linear ft.)	1.06	78	71	116.9%	83
Total	n/a	47,760	512,400	99.9%	512,251

Source: Navigant analysis of program tracking data, Illinois TRM

The North Shore Gas GPY1 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 88,033 therms. Navigant calculated verified gross energy savings of 88,076 therms by applying the same methodology described above. Table 3-9 illustrates that the overall program verified gross energy savings realization rate was slightly greater than 100.0 percent but less than 100.1 percent and therefore rounded to 100.0 percent.

Table 3-9. North Shore Gas GPY1 Ex-Ante and Verified Gross Savings Estimates

Measure	Verified Unit Savings (therms)	Verified Measures Installed	Ex-Ante Gross Savings (therms)	Verified Gross Realization Rate	Verified Gross Savings (therms)
Showerhead	26.21	2,721	71,345	99.9%	71,317
Kitchen Aerator	2.52	2,243	5,652	100.0%	5,652
Bathroom Aerator	3.02	3,515	10,615	100.0%	10,615
Pipe Wrap (linear ft.)	1.06	463	421	116.6%	491
Total	n/a	8,942	88,033	100.0%	88,076

Source: Navigant analysis of program tracking data, Illinois TRM

The ComEd EPY4 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 12,618,404 kWh (12,618 MWh) and ex-ante gross demand reduction of 1,142 kW (1.1 MW). Navigant applied ComEd’s EPY4 deemed realization rates to calculate verified gross energy savings of 11,445,570 kWh (11,446 MWh) and verified gross demand reduction of 1,068 kW (1.1 MW), as shown in Table 3-10 and Table 3-11.

Table 3-10. ComEd EPY4 Ex-Ante²⁴ and Verified Gross Savings Estimates

Measure	Unit	Ex-Ante Unit Savings (kWh)	Verified Units Installed	Ex-Ante Gross Savings (kWh)	Ex-Ante Gross Realization Rate	Verified Gross Savings (kWh)
9W CFL	lamp	29.1	59,740	1,738,434	96.0%	1,668,897
14W CFL	lamp	43.2	164,459	7,104,629	96.0%	6,820,444
19W CFL	lamp	52.5	25,876	1,358,490	96.0%	1,304,150
23W CFL	lamp	72.2	1,566	113,065	96.0%	108,543
<i>sub-total CFL measures</i>	<i>n/a</i>	<i>n/a</i>	<i>251,641</i>	<i>10,314,618</i>	<i>96.0%</i>	<i>9,902,033</i>
Showerhead	residence	592.3	2,444	1,447,581	67.0%	969,879
Kitchen Aerator	residence	117.0	2,535	296,595	67.0%	198,719
Bathroom Aerator	residence	214.0	2,615	559,610	67.0%	374,939
<i>sub-total water measures</i>	<i>n/a</i>	<i>n/a</i>	<i>7,594</i>	<i>2,303,786</i>	<i>67.0%</i>	<i>1,543,537</i>
Total	<i>n/a</i>	n/a	259,235	12,618,404	90.7%	11,445,570

Source: Navigant analysis of program tracking data; ComEd EPY4 deemed savings estimates

²⁴ EPY4 CFL measure values were deemed. Water efficiency measure values were estimated. Realization rates for CFLs and for water efficiency measures were deemed.

Table 3-11. ComEd EPY4 Ex-Ante²⁵ and Verified Gross Demand Reduction Estimates

Measure	Unit	Ex-Ante Unit Savings (kW)	Verified Units Installed	Ex-Ante Gross Savings (kW)	Ex-Ante Gross Realization Rate	Verified Gross Reduction (kW)
9W CFL	lamp	.0029	59,740	176	96.0%	169
14W CFL	lamp	.0044	164,459	719	96.0%	690
19W CFL	lamp	.0053	25,876	138	96.0%	132
23W CFL	lamp	.0073	1,566	11	96.0%	11
<i>sub-total CFL measures</i>	<i>n/a</i>	<i>n/a</i>	<i>251,641</i>	<i>1,044</i>	<i>96.0%</i>	<i>1,002</i>
Showerhead	residence	.0150	2,444	37	67.0%	25
Kitchen Aerator	residence	.0120	2,535	30	67.0%	20
Bathroom Aerator	residence	.0120	2,615	31	67.0%	21
<i>sub-total water measures</i>	<i>n/a</i>	<i>n/a</i>	<i>7,594</i>	<i>98</i>	<i>67.0%</i>	<i>66</i>
Total	n/a	n/a	259,235	1,142	93.5%	1,068

Source: Navigant analysis of program tracking data; ComEd EPY4 deemed savings estimates

3.1.6 Net Program Impact Parameter Estimates

According to the NTG Framework²⁶, Navigant used evaluation research to calculate net-to-gross ratio values. Navigant conducted telephone interviews with participants who indicated potential spillover activity to attempt to quantify spillover. These interviews did not result in quantifiable spillover. Using these values, Navigant calculated evaluation research net savings for natural gas measures installed by the program, as found in Table 3-12.

Table 3-12. Peoples Gas and North Shore Gas GPY1 Program Net-to-Gross Ratios

Program	Program Level Research Findings Net-to-Gross Ratio	Relative Precision at 90% Confidence (two-tailed)
GPY1 PGL-NSG Multifamily Program	0.90	± 2.5%

Source: Navigant analysis of participating property decision-maker survey self-report data

According to the NTG Framework²⁷, Navigant used deemed Net-to-Gross Ratio values from evaluation research to calculate ComEd EPY4 verified net savings for electric measures (including CFLs and water

²⁵ EPY4 CFL measure values were deemed. Water efficiency measure values were estimated. Realization rates for CFLs and for water efficiency measures were deemed.

²⁶ "Proposed Framework for Counting Net Savings in Illinois." Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

²⁷ Ibid.

efficiency measures installed in residential dwelling units with electric water heating) installed by the program, as found in Table 3-13.

Table 3-13. ComEd EPY4 Program Deemed Net to Gross Ratios

Measure	Net-to-Gross Ratio	Source:
CFLs	0.81	<i>ComEd Plan Year 4 Deemed Savings Values 31230.pdf</i>
Water Efficiency Measures	0.93	

Source: ComEd Plan Year 4 Deemed Savings Values 31230.pdf

3.1.7 Net Program Impact Results

Navigant applied Net-to-Gross Ratio values to verified gross savings to calculate evaluation research net savings for natural gas measures. Table 3-14 and Table 3-15 below present ex-ante and evaluation research net savings.

Table 3-14. Peoples Gas GPY1 Ex-Ante and Evaluation Research Net Savings

Measure	Ex-Ante Net Savings (therms)	Evaluation Research Net Savings (therms)
Showerhead	395,226	378,083
Kitchen Aerator	36,461	36,461
Bathroom Aerator	45,654	45,654
Pipe Wrap (linear ft.)	48	83
Total	477,387	460,280

Source: Navigant analysis of program tracking data; GPY1 program planning assumptions

Table 3-15. North Shore Gas GPY1 Ex-Ante and Evaluation Research Net Savings

Measure	Ex-Ante Net Savings (therms)	Evaluation Research Net Savings (therms)
Showerhead	66,350	63,472
Kitchen Aerator	5,313	5,313
Bathroom Aerator	9,978	9,978
Pipe Wrap (linear ft.)	282	491
Total	81,924	79,254

Source: Navigant analysis of program tracking data; GPY1 program planning assumptions

Navigant applied ComEd’s EPY4 deemed Net-to-Gross values of 0.81 for CFLs and 0.93 for water efficiency measures to verified gross savings to calculate verified net energy savings of 9,456,136 kWh (9,456 MWh) and verified net demand savings of 873 kW (0.9 MW) for electric measures. The program average NTG ratio (using net savings/verified gross savings) was 0.83 for energy savings and 0.82 for demand savings. Verified net energy and demand savings estimates are included in Table 3-16 below.

Table 3-16. ComEd EPY4 Verified Net Savings

Measure	Verified Net Savings (kWh)	Verified Net Savings (kW)
9W CFL	1,351,806	137
14W CFL	5,524,559	559
19W CFL	1,056,362	107
23W CFL	87,919	9
<i>sub-total CFL measures</i>	<i>8,020,647</i>	<i>812</i>
Showerhead	901,988	23
Kitchen Aerator	184,808	19
Bathroom Aerator	348,693	20
<i>sub-total water measures</i>	<i>1,435,489</i>	<i>61</i>
Total	9,456,136	873

Source: Navigant analysis of program tracking data; EPY4 program planning assumptions

3.1.8 Goal Achievement

The Peoples Gas GPY1 program induced evaluation research net energy savings equal to 120 percent of its net energy savings goal. The North Shore Gas GPY1 program induced evaluation research net energy savings equal to 117 percent of its net energy savings goal. Table 3-17 illustrates program goal completion rates.

Table 3-17. Peoples Gas and North Shore Gas GPY1 Evaluation Research Net Savings Completion Rates

Program	Net Savings Goal (therms)	Evaluation Research Net Savings (therms)	Goal Completion Rate
Peoples Gas	382,612	460,280	120%
North Shore Gas	67,694	79,254	117%

Source: Navigant analysis, Program Operations Manual

The ComEd EPY4 program achieved verified net energy savings equal to 155 percent of its net energy savings goal. Appendix 5.1 includes itemized program goals for the ComEd MFHES program implemented in Nicor Gas, Peoples Gas and North Shore Gas service territory. Table 3-18 illustrates program goals and completion rates.

Table 3-18. ComEd EPY4 Verified Net Savings Completion Rates

Program	Net Savings Goal (MWh)	Verified Net Savings (MWh)	Goal Completion Rate
ComEd EPY4	6,110	9,456	155%

Source: Navigant analysis, ComEd documents

3.2 Process Evaluation Results

Overall, Navigant found that the EPY4/GPY1 MFHES program was successfully delivered, with the program exceeding its participation and energy savings goals. As previously noted, Navigant’s process evaluation was organized around program participation accomplishments, administration and delivery, coordination and communication between utilities and customer satisfaction. Navigant will research additional program process questions, including program outreach and marketing activities, in future evaluation efforts.

3.2.1 Program Participation

The GPY1 Peoples Gas and North Shore Gas Multi-Family Home Energy Savings Program impacted 17,188 and 2,844 residential dwelling units, respectively, exceeding participation goals for North Shore Gas by five percent and for Peoples Gas by 12 percent. The program installed measures at an additional 413 dwelling units with electric water heating for a total of 20,447 dwelling units, exceeding ComEd’s

EPY4 participation goal for the program implemented in Peoples Gas and North Shore Gas service territory by 14 percent. Table 3-19 illustrates EPY4/GPY1 program participation rates.

Table 3-19. Peoples Gas and North Shore Gas GPY1 and ComEd EPY4 Program Participation

Program	Participation Goal (dwelling units)	Participation (dwelling units)	Completion Rate
Peoples Gas	15,300	17,188	112%
North Shore Gas	2,700	2,844	105%
All Electric Units (ComEd)	-	413	-
Total	18,000	20,447	114%

Source: Navigant analysis of program tracking data; compliance filing

3.2.2 Administration and Delivery

Navigant’s review of the Multi-Family Home Energy Savings Program’s first year operations indicated that the program’s administration and delivery mechanisms appeared to be working quite well for a newly implemented program. The program effectively leveraged institutional knowledge from ComEd, the implementation contractor and other parties. In so doing, the program was able to quickly recruit participants and schedule direct installation activities, thereby avoiding many common pitfalls of first year programs. The program’s first year success can be attributed to solid program design, program activities that were well aligned with anticipated outcomes and cooperation between the program’s utility sponsors and implementation contractor.

This section addresses the following process evaluation questions, *in italics*, with findings and recommendations indicated as such.

Research Topic:

Are program administrative and delivery processes effective for delivering efficient scheduling and installation of measures?

Findings: With the exception of the recommendation below, Navigant found that the Multi-Family Home Energy Savings Program had implemented effective procedures to schedule and install measures. Additional details can be found in Navigant’s Verification, Due Diligence and Tracking System Review included in Section 5.6. From a safety perspective, the program reported zero OSHA violations during the program year, achieving its safety goal. The program reported one safety incident to ComEd and the Companies during the week ending March 24, 2012. The program reported that the safety incident did not amount to an OSHA violation.

Recommendation:

- Set a mutually agreeable timeline or other check points for status updates on implementing recommendations found in Navigant’s Verification Due Diligence and Tracking System Review memorandum.

Research Topic:

What areas could the program improve to create a more effective program for customers and help increase the energy impacts?

Findings: Multifamily program effectiveness can be measured broadly by two key metrics, program participation rate (e.g. number of dwelling units at a site that receive measures divided by the total number of dwelling units at a site) and measure saturation (e.g. average number of measures installed per unit). Identifying and taking steps to address common participation and installation barriers will enable the program to increase its participation and installation rates, thereby creating a more effective program.

Although the program achieved its energy savings and participation goals during the past year, the Multi-Family program has some opportunities for improvement. For example, the program’s participation rate was approximately 88 percent, meaning that there were 2,843 dwelling units at sites where field teams were performing direct installation activity that did not receive measures because the dwelling units were not available to the field teams.

The program currently tracks CFL installation rates, with the program tracking report indicating an average installation of 5.2 CFLs per dwelling unit. The evaluation found a slightly higher average of 5.4 CFLs per dwelling unit. The addition of Globe CFLs successfully enabled the program to achieve greater lighting penetration in dwelling units. However, the program does not appear to track installation rates for water efficiency measures. Tracking this information with a greater emphasis on installing the maximum number of eligible measures in dwelling units may help the program increase the average number of measures installed and average savings per dwelling unit.

Recommendations:

- The program should track and review reasons why a dwelling unit is not available for direct installation activity at a given multi-family site. If there are recurring reasons why dwelling units are unavailable to the program, the program may be able to develop communications or other mechanisms to reduce the number of unavailable units;
- Similarly, the program should track and review reasons why field technicians are unable to install energy efficiency measures in a given unit. In so doing, the program may find that it can achieve higher installations per dwelling unit by adding different types or styles of measures (e.g. faucet aerators or globe CFLs), such as it has in the past; and
- Emphasize to field teams the importance of installing the maximum number of eligible direct install measures in dwelling units.

Research Topic:

Has the program effectively channeled customers to other programs sponsored by Peoples Gas and North Shore Gas to implement common area efficiency measures as identified in common area audits?

Findings: The program reported that it conducted 340 central plant surveys to inspect central water heating or space heating equipment for Peoples Gas and North Shore Gas. Navigant did not identify any multi-family properties that implemented common area energy efficiency measures in the program tracking database. During program staff interviews, program staff reported that direct installation activities were the top priority for the program and that common area audits, while performed, were not tracked after being referred to the applicable program(s).

Central plant surveys provide an excellent opportunity to follow up with property managers. The MFHES program could potentially collaborate more closely with other utility-sponsored programs to target common area efficiency opportunities in participating multifamily buildings, thereby potentially improving overall portfolio effectiveness.

Recommendations:

- Place a greater emphasis on completing common area assessments;
- Track common area referrals to other programs and participation rates from referrals;
- Target common area energy efficiency opportunities through increased communication and/or co-marketing with other energy efficiency programs;
- Develop a script for follow up calls that could include ongoing customer satisfaction with direct install measures, any action items from the property manager customer survey and to ask for referrals; and
- Follow up with property managers that have received common area recommendations using the script.

Research Topic:

What are the main barriers to and motivation for adopting recommended common area measures?

Finding: This question will be further addressed in future evaluation efforts.

Research Topic:

Are the program’s marketing plan and program promotional materials aligned with program benefits? Do they clearly communicate program benefits?

Findings: Navigant reviewed program materials supplied by the implementation contractor. Navigant reviewed the program’s operations manual, marketing plan and promotional materials and found that the materials are aligned with program benefits. The program materials clearly communicate the program’s benefits. Navigant found that program activities were generally consistent with the program’s operations plan and marketing approach.

Recommendation:

- After reviewing program opportunities to increase participation rates and measure saturation, update program materials to reflect the highest priority opportunities.

3.2.3 Coordination and Reporting Between Utilities

Research Topic:

Is the program effectively coordinating with ComEd for electric measures and reporting?

Findings: Overall, it appears that the parties responsible for jointly implementing the Multi-Family Home Energy Savings Program developed an effective process for coordination and reporting, primarily through regular coordination conference calls and frequent communication. The utility program staff and implementation contractors communicated frequently throughout the plan year, sharing ideas and experience to help enable this program’s ultimate success. The implementation contractor provided weekly activity updates to ComEd and other parties. Water efficiency measures installed at dwelling

units with electric water heating were tracked separately by the implementation contractor and included in weekly activity updates submitted to ComEd.

At the end of the program year, data transfer from the implementation contractor's system to ComEd's tracking system was encumbered by missing data. However, the implementation contractor worked closely with the utilities and evaluators to identify the missing data and reconcile the program tracking systems once these issues were discovered.

Recommendation:

- Navigant recommends assigning a unique identifier for each participating site or other data points that would streamline data transfer between the two tracking systems and facilitate program data review.

Research Topic:

Is information collected in the common area assessment sufficient to enable ComEd's implementation contractors to follow up with common area lighting recommendations?

Findings: The program reported that it conducted 110 common area lighting surveys for ComEd, referring 102 surveys to the Small Business Energy Savings Program. The program staff reported that common area lighting referrals were not tracked by the program. Navigant did not find examples of a customer implementing common area lighting retrofits in the program tracking database.

Recommendations:

- Follow up with property managers that have received common area lighting recommendations;
- Place a greater emphasis on completing common area lighting assessments;
- Track common area referrals to other programs and participation rates from referrals;
- Target common area lighting and energy efficiency opportunities through increased communication and/or co-marketing with other energy efficiency programs.
- Develop a script for follow up calls that could include ongoing customer satisfaction with direct install measures, any action items from the property manager customer survey and to ask for referrals; and
- Follow up with property managers that have received common area lighting surveys using the script.

3.2.4 Customer Satisfaction

Navigant reviewed customer survey results provided by the program from two different sources to gauge customer satisfaction with the program. The program implementation contractor included customer surveys as part of the program's educational information provided to residents of dwelling units that received direct install measures. The survey included six brief questions on a self-addressed, postage metered postcard returned to the implementation contractor. The implementation contractor also provided customer satisfaction surveys to property managers as part of the final report for the building's direct installation activities.

Navigant administered independent telephone surveys to participating tenants and to participating decision makers as part of our evaluation activities for this program. Telephone surveys were conducted via Computer Assisted Telephone Interview (CATI) technology from Navigant's sub-contractor, the

Blackstone Group. This section includes a summary of Navigant’s evaluation surveys. Navigant’s customer satisfaction findings and analysis, segmented by customer type and between the program delivery and direct install measures, are included below.

Research Topic:

Are customers satisfied with participation in the program and customer service experiences?

Finding: Overall, participants appear to be very satisfied with the Multi-Family Home Energy Savings Program. Navigant’s analysis indicated that 75 percent of tenants responded that they were satisfied or very satisfied with the program. Decision-makers were also satisfied with the program, with 94 percent of respondents indicating that they were satisfied or very satisfied with the program. The most frequent cause of customer dissatisfaction was the performance of direct install measures. Detailed findings from customer satisfaction evaluation interviews are included in Section 3.2.4.

Research Topic:

Are customer surveys completed and reviewed by the program?

Findings: The program distributed 8,642 tenant surveys and received 857 in return, achieving slightly under the program goal of a 10 percent response rate. The program’s customer satisfaction survey includes six statements, four of which ask for tenant feedback about the field technicians and one survey question asks tenants about “installed items.” The other question asks about overall program satisfaction. The average customer satisfaction score from the customer surveys was 4.8 on a scale of 5.0, indicating high levels of customer satisfaction and exceeding the program goal of 4.5 on a scale of 5.0.

Recommendations:

- The program should consider revising its tenant customer satisfaction survey to include more questions about customer satisfaction with direct install measures;
- The program should place a greater emphasis on encouraging tenants to return their implementation contractor customer satisfaction surveys; and
- The program should consider sending program customer satisfaction surveys to an independent third-party for collection and review to avoid potential bias or the appearance of potential bias in having the implementation contractor collect and report customer feedback.

Finding: The program distributed 74 property manager surveys and received four in return for a response rate of four percent.

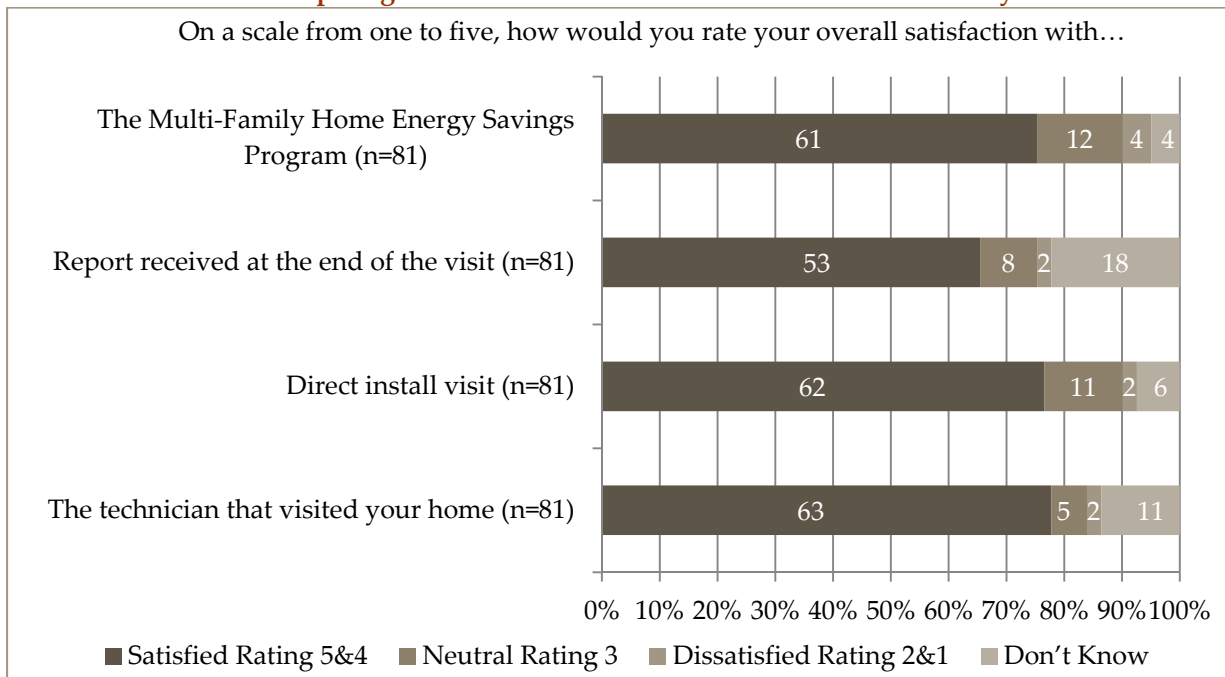
Recommendations:

- Navigant recommends including additional emphasis to property managers to return their program customer surveys;
- Navigant recommends that the program consider following up with property managers that have received program customer satisfaction surveys about returning the surveys to the program. These touch points could also include brief questions about common area energy efficiency opportunities, reports of ongoing customer satisfaction and to ask for referrals; and
- The program should consider sending program customer satisfaction surveys to an independent third-party, such as Navigant or another third-party, for collection and review to avoid bias or the potential appearance of bias by having the implementation contractor collect and report customer feedback.

Tenant Customer Satisfaction with the Program

The evaluation telephone survey asked respondents to rate their satisfaction with MFHES program, the report received, the direct install visit and the field technicians that performed direct install activity. The population was comprised of 81 respondents. When responding to the MFHES program overall, 67 percent of respondents gave the program a satisfaction rating of four or higher on a scale of one to five, where one means very dissatisfied and five means very satisfied. The direct install visit received a satisfaction rating of four or higher from 77 percent of respondents. The technician that performed the installations received a satisfaction rating of four or higher from 78 percent of respondents. Results indicate that respondents were slightly less satisfied with reports left behind by the program, with 65 percent of respondents reporting a satisfaction rating of four or higher with the program’s summary report. Those who reported being unsatisfied said that they had either not received a report or educational materials at the end of the visit or found that it wasn’t helpful. Responses from Navigant’s tenant survey are included in Figure 3-1 below.

Figure 3-1. GPY1/EPY4 Multi-Family Home Energy Savings Program Participating Tenant Customer Satisfaction – Evaluation Survey



Source: Navigant analysis of participating tenant survey self-report data

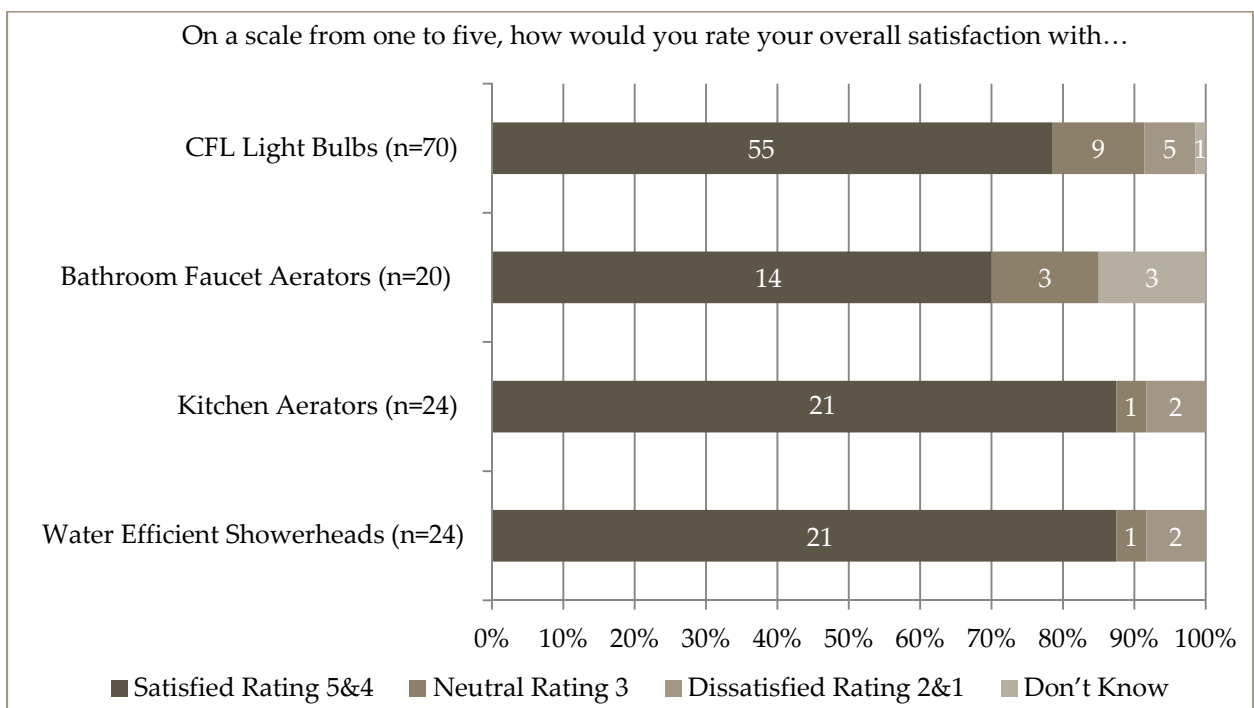
Participating Tenant Satisfaction with Individual Measures

The evaluation telephone survey asked respondents about their satisfaction with each of the direct install measures, including CFLs, bathroom and kitchen aerators, water efficient showerheads, and water heater temperature turndown. Respondents were asked to rate their satisfaction with the measures installed on a scale of one to five, where one means very dissatisfied and five means very satisfied. Respondents reported satisfaction ratings of four or higher for direct install measures between a low of 70 percent and a high of 88 percent. Water efficient showerheads and kitchen faucet aerators both received satisfaction ratings of four or higher from 88 percent of respondents. CFL measures received a

satisfaction rating of four or higher from 79 percent of respondents. Bathroom faucet aerators received a satisfaction rating of four or higher from 70 percent of respondents.

Respondents who reported dissatisfaction with bathroom and kitchen aerators most frequently reported they didn't like the water flow or that the aerator didn't fit their faucet correctly. Similarly, respondents who reported dissatisfaction with water efficient showerheads most frequently reported that they were dissatisfied with the water flow or cited other personal preference reasons for removal. No tenants included in the evaluation survey responded as receiving the hot water tank temperature turn down service. Responses from Navigant's tenant survey are included in Figure 3-2 below.

Figure 3-2. Peoples Gas and North Shore Gas GPY1 Multi-Family Home Energy Savings Program Participating Tenant Customer Satisfaction – Evaluation Survey



Source: Navigant analysis of participating tenant survey self-report data

Participating Decision-Maker Satisfaction with Program Participation & Measures

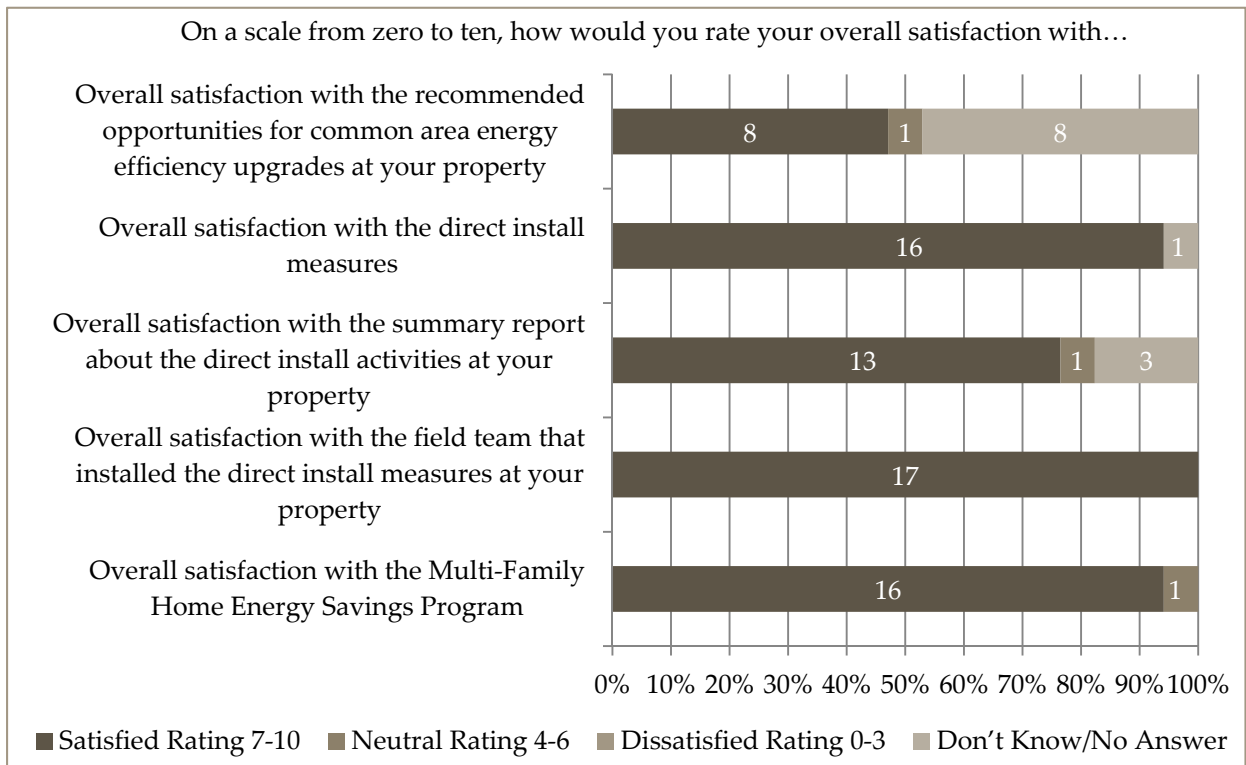
Participating decision-makers indicated that they were satisfied with the Multi-Family Home Energy Savings Program. In the evaluation telephone survey, participating decision-makers were asked to rate their satisfaction with several aspects of the Multi-Family Home Energy Savings Program using a scale of 0-10, with 0 being very dissatisfied and 10 being very satisfied. The evaluation survey population was made up of 41 respondents (20 in ComEd/Nicor Gas and 21 in ComEd/Peoples Gas and North Shore Gas).

Navigant's analysis indicated that decision-makers were satisfied with the program, with 94 percent of respondents indicating that they were satisfied or very satisfied with the program. Only two respondents indicated concerns about the direct install measures. One indicated that tenants reported dissatisfaction with bathroom aerators. Another reported that tenants were unhappy that the replaced

equipment (e.g. the old showerhead and/or faucet aerator) were not removed from the apartments by the field technicians after the new equipment was installed.

Although the evaluation survey included a small sample size, responses indicate that decision-makers were satisfied with the direct install measures and the field team, each yielding 100 percent of respondents reporting satisfaction levels of 7 or higher in both cases. Responses from Navigant’s decision-maker survey are included in Figure 3-3 below.

Figure 3-3. Peoples Gas and North Shore Gas GPY1 Multi-Family Home Energy Savings Program Participating Decision-Maker Customer Satisfaction – Evaluation Survey



Source: Navigant analysis of participating decision maker survey self-report data

4. Findings and Recommendations

4.1 Key Impact Findings and Recommendations

The Peoples Gas GPY1 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 512,400 therms. Evaluation adjustments resulted in verified gross energy savings of 512,251 therms. The North Shore Gas GPY1 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 88,033 therms. Navigant calculated verified gross energy savings of 88,076 therms. GPY1 verified gross energy savings were nearly equal to ex-ante gross energy savings reported in the program tracking system, resulting in realization rates of 99.9 percent for Peoples Gas and 100.0 percent for North Shore Gas. Navigant calculated free ridership for this evaluation using an algorithm approach based on survey self-report data using the NTG Framework²⁸. The analysis relied on interview results from participating multifamily decision-makers. The existence of participant spillover was examined using survey self-report data and follow up telephone interviews with respondents. The program level Net-to-Gross ratio for gas measures was 0.90 based on evaluation research findings. Peoples Gas and North Shore Gas Energy savings are shown in Table 4-1.

Table 4-1. GPY1 Peoples Gas and North Shore Gas Multi-Family Home Energy Savings Energy Savings (therms)

Program	Ex-Ante Gross Energy Savings (therms)	Verified Gross Realization Rate	Verified Gross Energy Savings (therms)	Evaluation Research NTG Ratio	Evaluation Research Net Energy Savings (therms)
Peoples Gas	512,400	99.9%	512,251	0.90	460,280
North Shore Gas	88,033	100.0%	88,076	0.90	79,254

Source: Navigant analysis

The ComEd EPY4 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 12,618,404 kWh (12,618 MWh) and ex-ante gross demand reduction of 1,142 kW (1.1 MW). These results include energy and demand savings through installation of CFL measures and electric water efficiency measures (e.g. water efficiency measures in dwelling units with electric water heat) in Nicor Gas, Peoples Gas and North Shore Gas service territories. For water efficiency measures, Navigant noted that gross savings estimates from water efficiency measures were estimated by residence. For example, the gross energy impact would be the same whether the MFHES program installed one or two bathroom faucet aerators in a residence. Navigant applied the gross energy impacts to calculate verified gross energy savings found in this report.

Navigant used deemed realization rates (96.0 percent for CFLs and 67.0 percent for water efficiency measures) to calculate verified gross savings of 11,445,570 kWh (11,446 MWh) and verified gross demand reduction of 1,068 kW (1.1 MW). Navigant used deemed NTG ratios according to the NTG

²⁸ "Proposed Framework for Counting Net Savings in Illinois." Memorandum March 12, 2010 from Philip Mosenthal, OEI, and Susan Hedman, OAG.

Framework (0.81 NTG for CFLs and 0.93 NTG for water efficiency measures) to calculate verified net savings of 9,456 kWh (9,456 MWh) and 873 kW (0.9 MW). The program average NTG ratio (using net savings/verified gross savings) was 0.83 for energy savings and 0.82 for demand savings. Results are shown in Table 4-2 and Table 4-3.

Table 4-2. ComEd EPY4 Multi-Family Home Energy Savings Program Energy Savings (kWh)

Program	Ex-Ante Gross Energy Savings (kWh)	Gross Realization Rate ²⁹	Verified Gross Energy Savings (kWh)	NTG Ratio ³⁰	Verified Net Energy Savings (kWh)
CFLs	10,314,618	96.0%	9,902,033	0.81	8,020,647
Water Efficiency	2,303,786	67.0%	1,543,537	0.93	1,435,489
Total	12,618,404	90.7%	11,445,570	0.83	9,456,136

Source: Navigant analysis

Table 4-3. ComEd EPY4 Multi-Family Home Energy Savings Program Demand Savings (kW)

Program	Ex-Ante Gross Energy Savings (kW)	Gross Realization Rate ³¹	Verified Gross Energy Savings (kW)	NTG Ratio ³²	Verified Net Energy Savings (kW)
CFLs	1,044	96.0%	1,002	0.81	812
Water Efficiency	98	67.0%	66	0.93	61
Total	1,142	93.5%	1,068	0.82	873

Source: Navigant analysis

Key impact evaluation findings and recommendations follow:

Finding: The Multi-Family Home Energy Savings Program recruited eligible properties and that applications were backed with supporting documentation.

Finding: For Peoples Gas and North Shore Gas, the measure savings values for bathroom and kitchen aerators are consistent with Illinois TRM savings values. The program included current Illinois TRM savings values for these measures in the program tracking system.

Finding: For Peoples Gas and North Shore Gas, the measure savings values for water efficient showerheads and hot water pipe wrap insulation are different from those found by Navigant in the Illinois TRM. The program tracking system includes different values for water efficient showerheads and hot water pipe wrap insulation than those found by Navigant.

²⁹ Realization rate deemed in EPY4.

³⁰ NTGR deemed in EPY4.

³¹ Realization rate deemed in EPY4.

³² NTGR deemed in EPY4.

Recommendation:

- Navigant recommends updating the Peoples Gas and North Shore Gas program tracking system to match TRM savings values by making minor adjustments to measure savings estimates for water efficient showerheads (from 26.22 therms/unit to 26.21 therms/unit) and hot water pipe wrap insulation (from 0.91 therms/linear ft. to 1.06 therms/linear ft.) based on algorithms and inputs found in the Illinois TRM.

Finding: While the Peoples Gas and North Shore Gas tracking system is currently tracking necessary information to report the program’s participation and energy savings achievements, the program can make an incremental improvement to the program tracking system by adding data fields.

Recommendations:

- Navigant recommends that the program staff update their quarterly reports to include additional program performance metrics, including information on participation, quantity of installed measures, marketing and outreach activities and challenges; and
- Include a unique identifier for individual projects in the program tracking system to facilitate transfer between the implementation contractor’s tracking system and ComEd’s tracking system.

Finding: Navigant found that the Multi-Family Home Energy Savings Program’s Operations Manual provides a reasonable quality control and quality assurance framework to direct program activities, but the program could benefit from additional post-installation QA/QC steps. For example, currently the installation team performs post-installation inspections immediately after measures are installed. This process, although cost-effective, may overlook some quality controls and introduce bias or the potential appearance of bias, because the same installation team is reviewing its own work immediately after the work is performed.

Recommendations:

- To the extent feasible, the program should attempt to minimize hand-written data entry and the possibility of data entry errors from transposing hand-written information into the program tracking database. For example, using hand held tablets may facilitate on-site data collection and document customer satisfaction survey results;
- Some resident reports indicated that Energy Advisors were unable to install energy efficiency measures due to “PC” or “poor condition”. Navigant recommends that the program develop a definition for this term and include it in the program Operations Manual. Additionally, the program should periodically check resident reports for consistent terms as found in the Operations Manual;
- The implementation contractor should consider modifications to the Operations Manual and Property Enrollment Form regarding the baseline GPM of showerheads and aerators. The Operations Manual should identify the minimum rating for baseline GPM required to be eligible for the direct installation of showerheads and aerators (e.g. 2.5 GPM or greater), and the Property Enrollment Form should indicate that recorded values are “rated” GPMs. The Operations Manual should describe procedures and frequency for conducting water-flow testing during the pre-installation site survey, if water flow testing will occur in GPY2.
- Navigant recommends that the program consider implementing an additional level of post-installation QA/QC, such as a series of spot-checks by program staff at convenient times and places. For example, a program staff member who is not part of the installation team could select

- dwelling units for post-installation inspection on a periodic basis, such as when the program staff member is geographically proximate to a particular location; and
- The program may also consider implementing a peer review process where field teams check a sample of work performed by other field teams.

4.2 Key Process Findings and Recommendations

The GPY1/EPY4 Multi-Family Home Energy Savings Program impacted 20,032 residential dwelling units with natural gas service, exceeding participation goals for North Shore Gas by 5 percent and for Peoples Gas by 12 percent. The program installed measures at an additional 413 dwelling units with electric water heating for a total of 20,447 dwelling units, exceeding ComEd’s EPY4 participation goal for the program implemented in Peoples Gas and North Shore Gas service territory by 14 percent. Table 4-4 presents this information.

Table 4-4. GPY1/EPY4 Multi-Family Home Energy Savings Program Participation Achievements

Program	Participation Goal (dwelling units)	Participation (dwelling units)	Completion Rate
Peoples Gas	15,300	17,188	112%
North Shore Gas	2,700	2,844	105%
Electric Units/ComEd	-	413	-
ComEd sub-total	18,000	20,447	114%

Source: Navigant analysis of program tracking data

Key process evaluation findings and recommendations follow:

Finding: Overall, the Multi-Family Home Energy Savings Program appears to be designed and implemented to achieve the goals set forth for the program, exceeding its energy savings and participation goals during the first full year of collaboration among ComEd, Peoples Gas and North Shore Gas and the implementation contractor, Franklin Energy Services, LLC. The program’s first year success can be attributed to solid program design, program activities that were well aligned with anticipated outcomes and cooperation between the program’s utility sponsors and implementation contractor. Throughout the course of the first year, the program’s implementation team and utility program staff appear to have worked out manageable communication and program reporting that satisfies the needs of the parties. The parties appear to have a solid understanding of their roles and responsibilities to successfully deliver the multi-family program for Peoples Gas and North Shore Gas and ComEd.

Finding: The Multi-Family Home Energy Savings Program could potentially increase participation rates at properties and installation rates in residential dwelling units to increase program effectiveness.

Recommendations:

- Emphasize the importance of installing the maximum number of eligible direct install measures in dwelling units to field teams;

- Track reasons why dwelling units are not available to field teams during direct installation activities. Take appropriate steps to reduce the number of unavailable units; and
- Track reasons why measures are not installed in dwelling units during direct installation activities. Determine appropriate steps to reduce the number of times that field teams enter a dwelling unit but are unable to install measures.

Finding: The Multi-Family Home Energy Savings Program could potentially collaborate more closely with other utility-sponsored programs to target common area efficiency opportunities in participating multifamily buildings, thereby potentially improving overall portfolio effectiveness.

Recommendations:

- Place a greater emphasis on completing common area assessments;
- Track common area referrals to other programs and participation rates from referrals;
- Target common area energy efficiency opportunities through increased communication and/or co-marketing with other energy efficiency programs;
- Develop a script for follow up calls that could include ongoing customer satisfaction with direct install measures, any action items from the property manager customer survey and a request for referrals; and
- Follow up with property managers that have received common area recommendations using the script.

Finding: Initial customer satisfaction surveys indicate that customers appear to be satisfied with the Multi-Family Home Energy Savings Program, but the program should conduct additional customer satisfaction research, including larger sample sizes of tenants and decision-makers. Navigant’s analysis indicated that 75 percent of tenants responded that they were satisfied or very satisfied with the program. Decision-makers were also satisfied with the program, with 94 percent of respondents indicating that they were satisfied or very satisfied with the program. The most frequent cause of customer dissatisfaction was the performance of direct install measures. Navigant included the following recommendations to potentially increase customer satisfaction and to potentially obtain additional information about customer satisfaction.

Recommendations:

- The program should consider revising the tenant customer satisfaction survey to include more questions about customer satisfaction with each of the individual direct install measures;
- The program should include additional emphasis on encouraging decision-makers to return their customer satisfaction surveys;
- The program should consider following up with decision-makers that have received customer satisfaction surveys during the past program year. These follow up conversations may increase the response rate. These brief touch points could include an opportunity for program staff to follow up on common area energy efficiency recommendations (as applicable), to gauge ongoing satisfaction with direct install measures and to request referrals; and
- The program should consider sending customer satisfaction surveys to an independent third-party, such as Navigant or other third-parties, for collection and reporting to avoid bias or the potential appearance of bias in collecting customer survey feedback.

5. Appendix

5.1 Glossary

ComEd, Nicor Gas, Peoples Gas, and North Shore Gas EM&V Reporting

Program Year

- EPY1, EPY2, etc. Electric Program Year where EPY1 is June 1, 2008 to May 31, 2009, EPY2 is June 1, 2009 to May 31, 2010, etc.
- GPY1, GPY2, etc. Gas Program Year where GPY1 is June 1, 2011 to May 31, 2012, GPY2 is June 1, 2012 to May 31, 2013.

There are two main tracks for reporting impact evaluation results, called Verified Savings and Impact Evaluation Research Findings, summarized in Table 5-1 below.

Verified Savings composed of

- Verified Gross Energy Savings
- Verified Gross Demand Savings
- Verified Net Energy Savings
- Verified Net Demand Savings

These are savings using deemed savings parameters when available and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals. Parameters that are subject to retrospective adjustment will vary by program but typically will include the quantity of measures installed. In EPY4/GPY1 ComEd's deemed parameters were defined in its filing with the ICC. The Gas utilities agreed to use the parameters defined in the TRM, which came into official force for EPY5/GPY2.

Application: When a program has deemed parameters then the Verified Savings are to be placed in the body of the report. When it does not (e.g., Business Custom, Retrocommissioning), the evaluated impact results will be the Impact Evaluation Research Findings.

Impact Evaluation Research Findings composed of

- Research Findings Gross Energy Savings
- Research Findings Gross Demand Savings
- Research Findings Net Energy Savings
- Research Findings Net Demand Savings

These are savings reflecting evaluation adjustments to any of the savings parameters (when supported by research) regardless of whether the parameter is deemed for the verified savings analysis. Parameters that are adjusted will vary by program and depend on the specifics of the research that was performed during the evaluation effort.

Application: When a program has deemed parameters then the Impact Evaluation Research Findings are to be placed in an appendix. That Appendix (or group of appendices) should be labeled Impact Evaluation Research Findings and designated as "ER" for short. When a program does not have deemed

parameters (e.g., Business Custom, Retrocommissioning), the Research Findings are to be in the body of the report as the only impact findings. (However, impact findings may be summarized in the body of the report and more detailed findings put in an appendix to make the body of the report more concise.)

Table 5-1. Program-Level Savings Estimates Terms

N	Term Category	Term to Be Used in Reports‡	Application†	Definition	Otherwise Known As (terms formerly used for this concept)§
1	Gross Savings	Ex-ante gross savings	Verification and Research	Savings as recorded by the program tracking system, unadjusted by realization rates, free ridership, or spillover.	Tracking system gross
2	Gross Savings	Verified gross savings	Verification	Gross program savings after applying adjustments based on evaluation findings for only those items subject to verification review for the Verification Savings analysis	Ex post gross, Evaluation adjusted gross
3	Gross Savings	Verified gross realization rate	Verification	Verified gross / tracking system gross	Realization rate
4	Gross Savings	Research Findings gross savings	Research	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
5	Gross Savings	Research Findings gross realization rate	Research	Research findings gross / ex-ante gross	Realization rate
6	Gross Savings	Evaluation-Adjusted gross savings	Non-Deemed	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
7	Gross Savings	Gross realization rate	Non-Deemed	Evaluation-Adjusted gross / ex-ante gross	Realization rate
1	Net Savings	Net-to-Gross Ratio (NTGR)	Verification and Research	1 – Free Ridership + Spillover	NTG, Attribution
2	Net Savings	Verified net savings	Verification	Verified gross savings times NTGR	Ex post net
3	Net Savings	Research Findings net savings	Research	Research findings gross savings times NTGR	Ex post net
4	Net Savings	Evaluation Net Savings	Non-Deemed	Evaluation-Adjusted gross savings times NTGR	Ex post net
5	Net Savings	Ex-ante net savings	Verification and Research	Savings as recorded by the program tracking system, after adjusting for realization rates, free ridership, or spillover and any other factors the program may choose to use.	Program-reported net savings

‡ “Energy” and “Demand” may be inserted in the phrase to differentiate between energy (kWh, Therms) and demand (kW) savings.

† **Verification** = Verified Savings; **Research** = Impact Evaluation Research Findings; **Non-Deemed** = impact findings for programs without deemed parameters. We anticipate that any one report will either have the first two terms or the third term, but never all three.

§ Terms in this column are not mutually exclusive and thus can cause confusion. As a result, they should not be used in the reports (unless they appear in the “Terms to be Used in Reports” column).

Individual Values and Subscript Nomenclature

The calculations that compose the larger categories defined above are typically composed of individual parameter values and savings calculation results. Definitions for use in those components, particularly within tables, are as follows:

Deemed Value – a value that has been assumed to be representative of the average condition of an input parameter and documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a deemed measure shall use the superscript “D” (e.g., delta watts^D, HOU-Residential^D).

Non-Deemed Value – a value that has not been assumed to be representative of the average condition of an input parameter and has not been documented in the Illinois TRM or ComEd’s approved deemed values. Values that are based upon a non-deemed, researched measure or value shall use the superscript “E” for “evaluated” (e.g., delta watts^E, HOU-Residential^E).

Default Value – when an input to a prescriptive saving algorithm may take on a range of values, an average value may be provided as well. This value is considered the default input to the algorithm, and should be used when the other alternatives listed for the measure are not applicable. This is designated with the superscript “DV” as in X^{DV} (meaning “Default Value”).

Adjusted Value – when a deemed value is available and the utility uses some other value and the evaluation subsequently adjusts this value. This is designated with the superscript “AV” as in X^{AV}

Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 2012³³.

Evaluation: Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, accomplishments, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan. Impact evaluation in the energy efficiency arena is an investigation process to determine energy or demand impacts achieved through the program activities, encompassing, but not limited to: *savings verification, measure level research, and program level research*. Additionally, evaluation may occur outside of the bounds of this TRM structure to assess the design and implementation of the program.

Synonym: **Evaluation, Measurement and Verification (EM&V)**

³³ IL-TRM_Policy_Document_10-31-12_Final.docx

Measure Level Research: An evaluation process that takes a deeper look into measure level savings achieved through program activities driven by the goal of providing Illinois-specific research to facilitate updating measure specific TRM input values or algorithms. The focus of this process will primarily be driven by measures with high savings within Program Administrator portfolios, measures with high uncertainty in TRM input values or algorithms (typically informed by previous savings verification activities or program level research), or measures where the TRM is lacking Illinois-specific, current or relevant data.

Program Level Research: An evaluation process that takes an alternate look into achieved program level savings across multiple measures. This type of research may or may not be specific enough to inform future TRM updates because it is done at the program level rather than measure level. An example of such research would be a program billing analysis.

Savings Verification: An evaluation process that independently verifies program savings achieved through prescriptive measures. This process verifies that the TRM was applied correctly and consistently by the program being investigated, that the measure level inputs to the algorithm were correct, and that the quantity of measures claimed through the program are correct and in place and operating. The results of savings verification may be expressed as a program savings realization rate (verified ex post savings / ex ante savings). Savings verification may also result in recommendations for further evaluation research and/or field (metering) studies to increase the accuracy of the TRM savings estimate going forward.

Measure Type: Measures are categorized into two subcategories: custom and prescriptive.

Custom: Custom measures are not covered by the TRM and a Program Administrator's savings estimates are subject to retrospective evaluation risk (retroactive adjustments to savings based on evaluation findings). Custom measures refer to undefined measures that are site specific and not offered through energy efficiency programs in a prescriptive way with standardized rebates. Custom measures are often processed through a Program Administrator's business custom energy efficiency program. Because any efficiency technology can apply, savings calculations are generally dependent on site-specific conditions.

Prescriptive: The TRM is intended to define all prescriptive measures. Prescriptive measures refer to measures offered through a standard offering within programs. The TRM establishes energy savings algorithm and inputs that are defined within the TRM and may not be changed by the Program Administrator, except as indicated within the TRM. Two main subcategories of prescriptive measures included in the TRM:

Fully Deemed: Measures whose savings are expressed on a per unit basis in the TRM and are not subject to change or choice by the Program Administrator.

Partially Deemed: Measures whose energy savings algorithms are deemed in the TRM, with input values that may be selected to some degree by the Program Administrator, typically based on a customer-specific input.

In addition, a third category is allowed as a deviation from the prescriptive TRM in certain circumstances, as indicated in Section 3.2:

Customized basis: Measures where a prescriptive algorithm exists in the TRM but a Program Administrator chooses to use a customized basis in lieu of the partially or fully deemed inputs. These measures reflect more customized, site-specific calculations (e.g., through a simulation model) to estimate savings, consistent with Section 3.2.

5.2 Detailed Impact Results

This section includes Navigant’s research report for non-deemed measures and program-level savings. For GPY1/EPY4, natural gas direct install measure savings were deemed. Subsection 5.2.1 includes Navigant’s methodology and references for non-deemed electric measures. The following subsection, Subsection 5.2.2 includes detailed Net-to-Gross calculations.

5.2.1 Research Report of Non-Deemed Measures and Program-Level Savings

Navigant’s evaluation research was designed to review impacts for non-deemed electric measures using Illinois TRM algorithms and assumptions and from evaluation research conducted for this assignment, including survey self-report data from participants. Research findings for non-deemed measures are included in this sub-section.

Evaluation Research Gross Savings Algorithms

Navigant calculated research findings using Illinois TRM algorithms and assumptions for non-deemed measures presented in this section.

Evaluation Research Gross Savings Algorithm –Water Efficient Faucet Aerators

Navigant recommends using the algorithm³⁴ presented in Figure 5-1 to calculate gross savings for water efficient faucet aerators.

Figure 5-1. TRM Gross Savings Algorithm – Water Efficient Faucet Aerators

$$\begin{aligned} & \Delta kWh \\ & = \%ElectricDHW * ((GPM_base * L_base - GPM_low * L_low) \\ & * Household * 365.25 * DF / FPH) * EPG_electric * ISR \\ & = 125.1 kWh (kitchen) \qquad = 100.1 kWh (bathroom) \end{aligned}$$

Where:

- %ElectricDHW = Water heating supplied by electric resistance heating = 100%
- GPM_base = Average flow rate, in gallons per minute, of the baseline faucet “as-used”= 1.2
- GPM_low = Average flow rate, in gallons per minute, of the low-flow³⁵ faucet aerator “as-used”= 0.94
- L_base = Average baseline length faucet use per capita for all faucets in minutes
- = 9.85 min/person/day
- L_low = Average retrofit length faucet use per capita for all faucets in minutes
- = 9.85 min/person/day
- Household = Average number of people per household = 2.1³⁶
- 365.25 = Days in a year, on average
- DF = Drain Factor (Kitchen = 75%) (Bath = 90%)
- FPH = Faucets Per Household = (Kitchen = 1) (Bath = 1.5)

³⁴ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.4

³⁵ Navigant recommends replacing the term “low-flow faucet aerator” with “water efficient faucet aerator”

³⁶ Navigant recommends updating this reference to “Navigant, ComEd PY3 Multifamily Evaluation Report Final, May 16, 2012”

- EPG_electric = Energy per gallon of water used by faucet supplied by electric water heater = 0.0894 kWh/gal
- ISR = In service rate of faucet aerators = 0.95

Navigant recommends using the algorithm³⁷ presented in Figure 5-2 to calculate gross demand reduction for water efficient faucet aerators.

Figure 5-2. TRM Summer Coincident Peak Demand Savings - Water Efficient Faucet Aerators

$$\Delta kW = \Delta kWh/Hours * CF$$

= 0.017 kW (kitchen) = 0.014 kW (bathroom)

Where:

- ΔkWh = calculated value
- Hours = Annual electric DHW recovery hours for faucet use = ((GPM_base * L_base) * Household * 365.25 * DF) * 0.545/ GPH = 162
- GPH = Gallons per hour recovery of electric water heater calculated for 65.9F temp rise (120-54.1), 98% recovery efficiency, and typical 4.5kW electric resistance storage tank = 27.51
- CF = Coincidence Factor for electric load reduction = 0.022

Navigant recommends using the algorithm³⁸ presented in Figure 5-3 to calculate gallons saved for water efficient faucet aerators.

Figure 5-3. TRM Gallons Saved – Water Efficient Faucet Aerators

$$\Delta gallons = ((GPM_base * L_base - GPM_low * L_low) * Household * SPCD * 365.25 / SPH) * ISR$$

= 1,399.6 gallons saved (kitchen) = 1,119.7 gallons saved (bathroom)

Where:

- Inputs described above

Evaluation Research Gross Savings Algorithm –Water Efficient Showerheads

Navigant recommends using the algorithm³⁹ presented in Figure 5-4 to calculate gross savings for water efficient showerheads.

Figure 5-4. TRM Gross Savings Algorithm – Water Efficient Showerheads

$$\Delta kWh = \%ElectricDHW * ((GPM_base * L_base - GPM_low * L_low) * Household * SPCD * 365.25 / SPH) * EPG_electric * ISR$$

= 528.4 kWh

Where:

- %ElectricDHW = Water heating supplied by electric resistance heating = 100%

³⁷ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.4

³⁸ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.4

³⁹ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.5

- GPM_base = Average flow rate, in gallons per minute, of the baseline showerhead = 2.67
- GPM_low = Average flow rate, in gallons per minute, of the low-flow⁴⁰ showerhead, as used = 1.5
- L_base = Shower length in minutes with baseline showerhead = 8.2
- L_low = Shower length in minutes with low-flow showerhead = 8.2
- Household = Average number of people per household = 2.1
- SPCD = Showers Per Capita Per Day = 0.75
- 365.25 = Days per year, on average
- SPH = Showerheads Per Household = 1.3
- EPG_electric = Energy per gallon of water used by faucet supplied by electric water heater = 0.127 kWh/gal
- ISR = In service rate of showerhead = 0.98

Navigant recommends using the algorithm⁴¹ presented in Figure 5-5 to calculate gross demand reduction for water efficient showerheads.

Figure 5-5. TRM Summer Coincident Peak Demand Savings - Water Efficient Showerheads

$$\Delta kW = \Delta kWh/Hours * CF$$

$$= 0.041 kW$$

Where:

- ΔkWh = calculated value
- Hours = Annual electric DHW recovery hours for showerhead use = $((GPM_base * L_base) * Household * SPCD * 365.25) * 0.773 / GPH = 354$
- GPH = Gallons per hour recovery of electric water heater calculated for 65.9°F temp rise (120-54.1), 98% recovery efficiency, and typical 4.5kW electric resistance storage tank = 27.51
- CF = Coincidence Factor for electric load reduction = 0.0278

Navigant recommends using the algorithm⁴² presented in Figure 5-6 to calculate gallons saved for water efficient showerheads.

Figure 5-6. TRM Gallons Saved – Water Efficient Showerheads

$$\Delta gallons = ((GPM_base * L_base - GPM_low * L_low) * Household * SPCD * 365.25 / SPH) * ISR$$

$$= 4,160.6 \text{ gallons}$$

Where:

- Inputs described above

⁴⁰ Navigant recommends replacing the term “low-flow showerhead” with “water efficient showerhead.”

⁴¹ State of Illinois Energy Efficiency Technical Reference Manual, 7.4.5

⁴² State of Illinois Energy Efficiency Technical Reference Manual, 7.4.5

Research Report Program-Level Electric Savings Table 5-2 and Table 5-3 below summarizes evaluation research measure values for ComEd EPY4 electric measures. Navigant applied TRM methodology to calculate unit savings values based on algorithms and inputs presented above. Navigant applied in-service rates found in the TRM. Navigant applied measure-level NTG ratios based on evaluation survey self-report data to calculate research findings net savings. The evaluation research findings NTGR relative precision at a 90% confidence interval (two-tailed) was $\pm 3.9\%$.

Table 5-2. Evaluation Research Findings – ComEd EPY4 Electric Measures (Energy)

Measure	Unit	Research Findings Unit Savings (kWh)	Verified Units Installed	Research Findings Gross Savings (kWh)	Research Findings NTG Ratio	Research Findings Net Savings (kWh)
9W CFL	lamp	29.1	59,740	1,738,434	0.98	1,703,665
14W CFL	lamp	43.2	164,459	7,104,629	0.98	6,962,536
19W CFL	lamp	52.5	25,876	1,358,490	0.98	1,331,320
23W CFL	lamp	72.2	1,566	113,065	0.98	110,804
<i>sub-total CFL measures</i>	<i>n/a</i>	<i>n/a</i>	<i>251,641</i>	<i>10,314,618</i>	<i>0.98</i>	<i>10,108,326</i>
Showerhead	measure	528.4	2,444	1,291,410	0.92	1,188,097
Kitchen Aerator	measure	125.1	2,535	317,129	1.00	317,129
Bathroom Aerator	measure	100.1	2,615	261,762	0.94	246,056
<i>sub-total water measures</i>	<i>n/a</i>	<i>n/a</i>	<i>7,594</i>	<i>1,870,300</i>	<i>0.94</i>	<i>1,751,282</i>
Total	<i>n/a</i>	n/a	259,235	12,184,918	0.97	11,859,608

Source: Navigant analysis of evaluation survey self-report data, Illinois TRM
ComEd NTGR relative precision at a 90% confidence interval (two-tailed) was $\pm 3.9\%$

Table 5-3. Evaluation Research Findings – ComEd EPY4 Electric Measures (Demand)

Measure	Unit	Research Findings Unit Savings (kW)	Verified Units Installed	Research Findings Gross Savings (kW)	Research Findings NTG Ratio	Research Findings Net Savings (kW)
9W CFL	lamp	.0031	59,740	182	0.98	179
14W CFL	lamp	.0045	164,459	745	0.98	730
19W CFL	lamp	.0055	25,876	143	0.98	140
23W CFL	lamp	.0076	1,566	12	0.98	12
<i>sub-total CFL measures</i>	<i>n/a</i>	<i>n/a</i>	<i>251,641</i>	<i>1,082</i>	<i>0.98</i>	<i>1,061</i>
Showerhead	measure	0.041	2,444	100	0.92	92
Kitchen Aerator	measure	0.017	2,535	43	1.00	43
Bathroom Aerator	measure	0.014	2,615	37	0.94	35
<i>sub-total water measures</i>	<i>n/a</i>	<i>n/a</i>	<i>7,594</i>	<i>180</i>	<i>0.94</i>	<i>169</i>
Total	<i>n/a</i>	n/a	259,235	1,262	0.97	1,230

Source: Navigant analysis of evaluation survey self-report data, Illinois TRM
 ComEd NTGR relative precision at a 90% confidence interval (two-tailed) was $\pm 3.9\%$

5.2.2 Detailed NTG Calculations

Basic Rigor Free-Ridership Assessment

Free ridership cannot be measured directly due to the lack of empirical data regarding the counterfactual situation (i.e., what would have occurred in the hypothetical, “no program” alternate reality). Thus, free ridership is assessed as a probability score for each measure. The evaluation relies on self-reported data collected during participant telephone surveys to assign free ridership probability scores to each measure.

Free ridership was assessed using a customer self-report approach following a framework that was developed for evaluating net savings of California’s 2006-2008 non-residential energy efficiency programs. This method calculates free-ridership using data collected during participant telephone interviews concerning three items:

- A **Timing and Selection** score that reflects the influence of the most important of various program and program-related elements in the customer’s decision to select the specific program measure at this time.
- A **Program Influence** score that captures the perceived importance of the program (whether rebate, recommendation, or other program intervention) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score

- is cut in half if the participant learned about the program after having already decided to implement the measures.
- A **No-Program** score that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available. This score accounts for deferred free ridership by incorporating the likelihood that the customer would have installed program-qualifying measures at a later date if the program had not been available.

Each of these scores represents the highest response or the average of several responses given to one or more questions about the decision to install a program measure. The rationale for using the maximum value is to capture the most important element in the participant’s decision making.

More specifically, for each measure, the following questions are posed to each decision-maker:

- FR1. At the time that the participant first heard about this program, had they already been thinking about purchasing the measure?
- FR4. Did the participant have specific plans to install the measure before learning about the program?⁴³
- FR5/6. Did the program influence the participant to install the measures sooner than they otherwise would have, and if so, how much sooner?
- FR9. How likely was the participant to install the measure if they had not installed it through the program? (0-10 scale probability)
- FR10. How important was the program in the decision to install the measure? (0-10 scale)
- FR11. Would the participant have installed the same measure within a year of when they did if the program didn’t exist? (0-10 scale probability)

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

1. If the customer had not considered the measure prior to participating in the program then the probability of free ridership is estimated to be zero (based on FR1 above).
2. Similarly, if the customer did not have specific plans to install the program measure prior to participation, and the self-reported probability of installing the measure was less than or equal to 3 (on a 0-10 scale) then the probability of free ridership is estimated to be zero (based on FR4 and FR9).
3. If the customer had plans to install the measures in the absence of the program, but indicated that the program accelerated installation by at least two years, then the probability of free ridership is estimated to be zero (based on FR6).

If none of the above 3 criteria holds, then the responses to questions FR9, FR10, and FR11 are used to calculate the probability of free ridership. The programs are primarily direct install programs, where the customer demonstrates very little initiative to install the measures, as the actual purchase and install activities were performed by program staff. For this reason, participant self-reported intentions to install

⁴³ Questions FR2 and FR3 do not factor directly into the free ridership scoring, but are used to improve the accuracy of the response to question FR4 by asking the respondent to recall specific steps they may have taken toward implementing the measure prior to learning about the program.

these measures [FR9 and FR11] even without the program are discounted relative to the self-reported importance of the program to the installation [FR10], at a rate of 2 to 1. The corresponding formula for calculating free ridership is shown in Figure 5-7 below:

Figure 5-7. Self-Report Free Ridership Algorithm

$$\text{Free ridership} = [(FR9 + FR11)/2 * (1/3)] + (FR10) * (2/3)$$

A measure count weight is applied in calculating the overall result for free ridership.⁴⁴ Free ridership estimates were developed separately for each measure type installed.

The approach described above is largely consistent with the approach applied in the EPY3 Evaluation. There was one new adjustment made to this approach for EPY4, which was the addition of rule #3 above, in which free ridership was estimated to be zero if the participant indicated that the program accelerated their installation of the measure by more than two years.

Participant Spillover

Navigant included questions to identify spillover candidates, paraphrased below:

1. Since your participation in the MFHES program, did you implement any ADDITIONAL energy efficiency measures at this facility or at your other facilities within your utility’s service territory that did NOT receive incentives through any utility or government program?
2. On a scale of 0-10, where 0 means “no influence” and 10 means “greatly influenced,” how much did your experience with the MFHES program influence your decision to install high efficiency equipment on your own?
3. Why do you give the MFHES program this influence rating?

If the response to question 2 was given a score of 7 or higher, we judged the respondent to be a spillover candidate. Navigant asked additional questions of participant spillover candidates:

4. What was the first measure that you implemented?
 - a. Why did you purchase this equipment without the incentive available through the MFHES program?
5. What was the second measure that you implemented?
 - a. Why did you purchase this equipment without the incentive available through the MFHES program?

Navigant conducted brief follow-up telephone interviews with respondents who indicated that they may have purchased and installed qualifying energy saving equipment without an incentive. The telephone interview guide is included below.

⁴⁴ Each measure-level participant free ridership score is assigned a weight in accordance with the number of CFLs, showerheads, kitchen faucet aerators, or bathroom aerators installed in the home.

**Multi-Family Home Energy Savings Program
Participant Spillover Callback Interview Guide**

INTRODUCTION

Hello, this is (name) from Navigant Consulting calling on behalf of (ComEd and Nicor Gas)/(ComEd and Peoples Gas or North Shore Gas) Program. This is not a sales call. May I please speak with <PROGRAM CONTACT>?

I am following-up on a recent telephone interview by the Blackstone Group where you described your experience participating in the Multi-Family Home Energy Savings Program, where your tenants at one or more of your properties received water efficient showerheads, faucet aerators and CFLs at no cost to you.

During that interview, you indicated that the energy efficient <SPILLOVER MEASURE DESCRIPTION> you installed that did NOT receive a rebate through a utility program. You indicated in the survey that you would be willing to have a brief follow up call about this energy efficiency project. I just have a few quick questions about the equipment you installed that did not receive a rebate. Your answers will provide very important information that will help (ComEd and Nicor Gas)/(ComEd and Peoples Gas or North Shore Gas) with their programs. This survey will take only about 5 minutes. Is now a good time? [If no, schedule call-back]

Are you the person most knowledgeable about this project? [IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.

SPILLOVER ESTIMATION QUESTIONS

I would like to gather some basic information about the FIRST <SPILLOVER MEASURE DESCRIPTION> that did not receive a rebate.

- Please describe the equipment that you installed (Confirm measure type, efficiency)
- Can you tell me the size or quantity? (number of fixtures, tons of AC, etc.)
- Can you tell me the type of equipment that was previously installed (e.g. the equipment that was replaced by the new equipment)?

(If necessary) You also mentioned a SECOND measure that did not receive a rebate: <SECOND SPILLOVER MEASURE DESCRIPTION>. I have the same questions for you

- Please describe the equipment that you installed (Confirm measure type, efficiency)
- Can you tell me the size or quantity? (number of fixtures, tons of AC, etc.)
- Can you tell me the type of equipment that was previously installed (e.g. the equipment that was replaced by the new equipment)?

Those are all of the questions that I have. Thank you very much for your time.

END OF CALL

Evaluation Research Net-to-Gross Ratios

Navigant calculated measure-level research findings Net-to-Gross ratios using participating decision-maker survey self-report data. Navigant calculated separate free-ridership values for direct install measures separately for ComEd/Peoples Gas and North Shore Gas measures and ComEd/Nicor Gas measures. Navigant investigated reported spillover from survey data but found no quantifiable results. Subsequently, Navigant calculated a weighted average across both programs for ComEd measures. Table 5-4 below compares evaluation research Net-to-Gross ratios by measure.

Table 5-4. Research Findings Net to Gross Ratios

Measure	Peoples Gas/North Shore Gas	Nicor Gas	ComEd (Weighted Average)
CFL measures (all)	0.98	0.97	0.98
1.5 gpm Showerhead	0.89	0.95	0.92
1.5 gpm Kitchen Aerator	0.94	0.95	1.00
1.0 gpm Bathroom Aerator	0.94	0.95	0.94
Programmable Thermostat	n/a	1.00	1.00
Water Heater Setback	n/a	1.00	1.00
Pipe Wrap Insulation	1.00	n/a	1.00
Relative Precision (at 90% CI two-tailed)	90/ ± 2.5%	90/ ± 2.1%	90/ ± 3.9%

Sources: Navigant research of decision-maker self-report data

5.3 TRM Recommendations

Navigant included the following TRM recommendations for consideration:

State of Illinois Energy Efficiency Technical Reference Manual, 7.4.4 Low Flow Faucet Aerators

The State of Illinois Energy Efficiency Technical Reference Manual, 7.4.4 (pp. 410-416), refers to the direct install measure as “low flow faucet aerator” (in the heading) or energy efficient faucet aerator (in the text).

- Navigant recommends using a consistent term for this measure, replacing the term “low flow faucet aerator” with “water efficient faucet aerator” or “efficient faucet aerator” and updating the heading and text accordingly.
- Definition of Baseline Equipment (page 410)
 Navigant recommends revising the definition of baseline equipment to read “The baseline condition is assumed to be a standard bathroom faucet aerator rated at 2.2 GPM or greater, or a standard kitchen faucet aerator rated at 2.5 GPM or greater.”
- Footnote 700 (page 410)
 Navigant recommends revising this comment to note that, due to variations in the calendar, there are *frequently, but not always*, 65 days in the summer peak period. For example, during 2013, there are 64 days during the summer peak period. The calculation $(0.18 \times 65 / 365)$ should be revised to $(0.18 \times 65 / 365.25)$, to reflect average number of days in the calendar year. The TRM may want to include a notation that a summer peak period measurement may need to be adjusted as an average of several year or by actual calendar year, as warranted.
- This comment is repeated:
 Footnote 720, pages 414/415;
 Footnote 726, pages 417/418; and
 Footnote 745, page 421.
- Algorithm (page 411-412)
 Navigant recommends replacing the named parameters “GPM_low” and “L_low” with “GPM_eff” and “L_eff,” respectively.
- Footnote 710 (page 412)
 Navigant recommends updating this reference to “Navigant, ComEd PY3 Multi-Family Home Energy Savings Program Evaluation Report Final, May 16, 2012.”
- In-Service Rates (page 414)
 Navigant recommends distinguishing ISRs between multi-family and single family direct install activities.
- Footnote 723 (page 415)
 Navigant recommends updating this comment to “Water heating in multi-family buildings is often provided by a central boiler, with typical efficiency factors ranging from 0.59 to 0.75. This analysis uses an average efficiency factor of 0.67 as a default value for multi-family buildings.”
- This comment is repeated:
 Footnote 748, page 422

State of Illinois Energy Efficiency Technical Reference Manual, 7.4.5 Low Flow Showerheads

The State of Illinois Energy Efficiency Technical Reference Manual, 7.4.5 (pp. 417-423), refers to the direct install measure as “low flow showerhead” (in the heading), “low-flow showerhead” in the text definitions (see, e.g. page 419) and “energy efficient showerhead” (page 417).

- Navigant recommends using a consistent term for this measure, replacing the term “low flow showerhead” with “water efficient showerhead” or “efficient showerhead” and updating the heading and text accordingly.
- Algorithm (page 418-419)
 Navigant recommends replacing the named parameters “GPM_low” and “L_low” with “GPM_eff” and “L_eff,” respectively.
- Footnote 728 (page 418)
 Navigant recommends revising the comment to read “...Program targets showerheads rated at 2.5 GPM or greater.”
- Footnote 735 (page 419)
 Navigant recommends updating this reference to “Navigant, ComEd PY3 Multi-Family Home Energy Savings Program Evaluation Report Final, May 16, 2012.”
- In-Service Rates (page 420-421)
 Navigant recommends distinguishing ISRs between multi-family and single family direct install activities.

Evaluation Research In-Service Rates Compared to TRM In-Service Rates

Navigant calculated measure in-service rates from participating tenant survey self-report data. Tenant data is similar to reported in-service rates found in the Illinois TRM (7.4.4 for aerators and 7.4.5 for showerheads). Table 5-5 below compares TRM and GPY1/EPY4 evaluation research in-service rates by each water efficiency measure.

Table 5-5. Illinois TRM and Research Findings In-Service Rates

Measure Type	TRM In-Service Rate	Source	Research Findings In-Service Rate	Method
1.5 gpm Kitchen Aerator	0.95	TRM 7.4.4	0.91	Navigant analysis of tenant participant survey self-report data
1.0 gpm Bathroom Aerator	0.95		0.95	
1.5 gpm Showerhead	0.98	TRM 7.4.5	0.93	

Source: Navigant research of participating tenant self-report data, Illinois TRM

5.4 Sampling Details

5.4.1 Participating Tenant Survey Data

Navigant surveyed 81 randomly selected tenant households from the EPY4/GPY1 ComEd, Peoples Gas and North Shore Gas program and 80 randomly selected tenant households from the EPY4/GPY1 ComEd and Nicor Gas program. The combined total participant survey reached 161 participating tenant households. Tenant survey responses are included in this section.

Evaluation Research Findings: Tenant Occupancy

Navigant asked participants how many people live their household year-round to measure occupancy. Based on respondent self-report data, the average occupancy was 1.7 persons per household. Table 5-6 below shows tenant responses to Navigant’s survey question.

Table 5-6. Participating Tenant Survey Responses (Occupancy)

Q: How many people live in your household year round?	Peoples Gas/North Shore Gas (n=81)	Nicor Gas (n=80)	Total (n=161)
One Person	43	36	79
Two People	25	30	55
Three People	8	9	17
Four People	2	3	5
Five People	1	0	1
Don’t Know	2	2	4
Average	1.6	1.7	1.7

Source: Navigant tenant participant survey self-report data

Evaluation Research Findings: Rent v. Own

Navigant asked participants whether they own or rent their home. Ninety-four percent of respondents reported that they rent their home. Table 5-7 below shows tenant responses to Navigant’s survey question.

Table 5-7. Survey Self-Report Demographics (Rent v. Own)

Q: Do you own or rent your home?	Peoples Gas/North Shore Gas (n=81)	Nicor Gas (n=80)	Total (n=161)
Rent	98%	90%	94%
Own	2%	9%	6%
Don't Know	0%	≤1%	≤1%

Source: Navigant tenant participant survey self-report data

Navigant asked participants whether they were residing at their home when the products were installed by the program. One-hundred percent of respondents reported that they were the residents of their home during the time that the products were installed. Table 5-8 below shows tenant responses to Navigant's survey question.

Table 5-8. Survey Self-Report Demographics (Residence)

Q: Were you residing at your home when the products were installed?	Peoples Gas/North Shore Gas (n=81)	Nicor Gas (n=80)	Total (n=161)
Yes	100%	100%	100%
No	0%	0%	0%

Source: Navigant tenant participant survey self-report data

Navigant asked participants whether they were present when the products were installed by the program. Overall, 76 percent of respondents reported that they were present when the products were installed. Table 5-9 below shows tenant responses to Navigant's survey question.

Table 5-9. Survey Self-Report Demographics (Presence)

Q: Were you present when the products were installed?	Peoples Gas/North Shore Gas (n=81)	Nicor Gas (n=80)	Total (n=161)
Yes	64%	88%	76%
No	36%	11%	24%
Don't Know	0%	≤1%	≤1%

Source: Navigant tenant participant survey self-report data

Evaluation Research Findings: Tenant Survey Disposition

In the ComEd/Peoples Gas and North Shore Gas survey, 58 percent of respondents reported that their home was serviced by natural gas. Of those participants who responded that their home was serviced by natural gas, 43 percent reported that their home was serviced by Peoples Gas and 15 percent by North Shore Gas. In this survey, 28% of respondents reported that their homes were not serviced by natural gas and 14% reported that they didn't know or weren't sure about the question.

In the ComEd/Nicor Gas survey, 59 percent reported that their home was serviced by natural gas, all of whom have Nicor Gas as their service provider. In this survey, 35% of respondents reported that their homes were not serviced by natural gas and 6% reported that they didn't know or weren't sure about the question.

The remaining respondents indicated that they either didn't know whether their home was serviced by natural gas or gas company. Table 5-10 below shows tenant responses to Navigant's survey question.

Table 5-10. Survey Self-Report Responses by Utility

Q: Is your home serviced by Natural Gas?	Peoples Gas/North Shore Gas (n=81)	Nicor Gas (n=80)	Total (n=161)
Nicor Gas	n/a	59%	29%
Peoples Gas	43%	n/a	22%
North Shore Gas	15%	n/a	7%
Yes (sub-total)	58%	59%	58%
No	28%	35%	32%
Don't Know/Not Sure	14%	6%	10%

Source: Navigant tenant participant survey self-report data

5.4.2 Research Findings: Direct Install Measure In-Service Rates

Navigant surveyed 81 randomly selected tenant households from the EPY4/GPY1 ComEd, Peoples Gas and North Shore Gas program and 80 randomly selected tenant households from the EPY4/GPY1 ComEd and Nicor Gas program. The combined total participant survey reached 161 participating tenant households. This section includes Navigant's evaluation research findings for direct measure in-service rates. Direct install measures are installed by program field teams as part of the MFHES program's direct install activities and therefore, installed measure counts reported by the program and verified by the evaluators are included in gross energy impacts. Measure in-service rates account for the removal of direct install measures by occupants for various reasons, including measure malfunction, customer dissatisfaction with measure performance, or other reasons. Navigant calculated research findings in-service rates from participating tenant survey self-report data.

Water Efficient Faucet Aerators (Bathroom)

Navigant asked participants whether water efficient bathroom faucet aerators installed by the program were still installed in the original location(s). Of those participants who responded to the question, 95 percent indicated that their bathroom aerators were still installed in the original location(s). The respondent that did not have the bathroom aerator still installed stated that the aerator was faulty during installation so the technician did not install it at all and the original equipment remained installed. Table 5-11 below shows tenant responses to Navigant’s survey question.

Table 5-11. Water Efficient Faucet Aerators (Bathroom) Self-Report In-Service Rate

Q: Are the bathroom aerators still installed in the original location?	Peoples Gas/North Shore Gas (n=20)	Nicor Gas (n=72)	Total (n=92)
Yes	19	68	87
No	1	4	5
In-Service Rate	95%	94%	95%

Source: Navigant tenant participant survey self-report data

Water Efficient Faucet Aerators (Kitchen)

Navigant asked participants whether water efficient kitchen faucet aerators installed by the program were still installed in the original location(s). Of those participants who responded to the question, 96 percent indicated that kitchen aerators were still installed in the original location(s). The respondent that removed their kitchen aerator indicated that they removed it and threw it away because they found it to work improperly. Table 5-12 below shows tenant responses to Navigant’s survey question.

Table 5-12. Water Efficient Faucet Aerators (Kitchen) Self-Report In-Service Rate

Q: Are the kitchen aerators still installed in the original location?	Peoples Gas/North Shore Gas (n=24)	Nicor Gas (n=63)	Total (n=87)
Yes	23	56	79
No	1	7	8
In-Service Rate	96%	89%	91%

Source: Navigant tenant participant survey self-report data

Water Efficient Showerheads

Navigant asked participants whether water efficient showerheads installed by the program were still installed in the original location(s). Of those participants who responded to the question, 96 percent indicated that their showerheads were still installed in the original location(s). The respondent that removed their showerhead reported they put it in storage because they did not find the flow rate to be satisfactory. They reported that they replaced the water efficient showerhead with a less efficient model. Table 5-13 below shows tenant responses to Navigant’s survey question.

Table 5-13. Water Efficient Showerheads Self-Report In-Service Rate

Q: Are the showerheads still installed in the original location?	Peoples Gas/North Shore Gas (n=24)	Nicor Gas (n=65)	Total (n=89)
Yes	23	60	83
No	1	5	6
In-Service Rate	96%	92%	93%

Source: Navigant tenant participant survey self-report data

Programmable Thermostats

Navigant asked participants whether the settings are the same as when the programmable thermostats were originally installed. Of those participants who responded to the question, 50 percent indicated that the settings are the same as when the programmable thermostats were originally installed. Table 5-14 below shows tenant responses to Navigant’s survey question.

Table 5-14. Programmable Thermostats Self-Report In-Service Rate

Q: Are the settings the same as when the programmable thermostat was originally installed?	Peoples Gas/North Shore Gas (n=0)	Nicor Gas (n=7)	Total (n=7)
Yes	n/a	43%	43%
No	n/a	57%	57%
In-Service Rate	n/a	43%	43%

Source: Navigant tenant participant survey self-report data

Water Heater Temperature Setback

Navigant asked participants whether the settings for water heater temperature setback installed by the program were still in place. One respondent reported that they received a water heater temperature setback and that the settings installed by the program were still in place. Navigant was unable to calculate a research findings in-service rate for this measure from self-report data. For purposes of the research report, Navigant used previous evaluation research to estimate that 100 percent of water heater temperature setback installed by the program were still in place.

Hot Water Pipe Wrap Insulation

Navigant asked participants whether hot water pipe wrap insulation installed by the program was still installed in the original location(s). No respondents reported that they received hot water pipe wrap insulation. Navigant was unable to calculate a research findings in-service rate for this measure from self-report data. For purposes of the research report, Navigant used previous evaluation research to estimate that 100 percent of hot water pipe wrap insulation installed by the program was still installed in the original location(s).

CFL Measures

Navigant asked participants whether CFL measures installed by the program were still installed in the original location(s). Of those participants who responded to the question, 92 percent indicated that their CFL measures were still installed in the original location(s). The remaining respondents removed their CFL measures. Table 5-15 below shows tenant responses to Navigant’s survey question.

Table 5-15. CFL Measures Self-Report In-Service Rate

Q: Are CFL measures still installed in the original location?	Peoples Gas/North Shore Gas (n=70)	Nicor Gas (n=65)	Total (n=135)
Yes	64	60	124
No	6	5	11
In-Service Rate	91%	92%	92%

Source: Navigant tenant participant survey self-report data

Location of CFL Measure Installations

Navigant asked participants where CFL measures were installed by the program. Respondents indicated that bathrooms and kitchens were the most frequent places where CFLs were installed. The living room, bedroom and hallway were places reported frequently by respondents. Other places reported were the dining room and closet. Remaining places, such as office, spare room, outside, attic, garage, basement, family room, laundry or “other” received responses from three percent of respondents. Table 5-16 below shows tenant responses to Navigant’s survey question.

Table 5-16. CFL Measures Self-Report Locations

Q: Where was/were CFL measures installed?	Peoples Gas/North Shore Gas (n=64)	Nicor Gas (n=65)	Total (n=129)
Bathroom	73%	59%	66%
Kitchen	41%	59%	50%
Living Room	27%	20%	23%
Bedroom	22%	26%	24%
Hallway	22%	29%	26%
Dining Room	11%	22%	16%
Closet	6%	8%	7%
All others	≤2%	5%	3%

Source: Navigant tenant participant survey self-report data

5.5 Electric Impact Results Itemized by Utility Service Territory

This section includes verified electric impacts for the ComEd EPY4 Multi-Family Home Energy Savings Program, including CFL measures and electric water efficiency measures, itemized by electric measures installed in Peoples Gas and North Shore Gas service territories and in Nicor Gas service territory. Savings values in this section were calculated using gross measure values and verified measure counts.

5.5.1 ComEd EPY4 Electric Impact Results – Peoples Gas and North Shore Gas Service Territories

The ComEd, Peoples Gas and North Shore Gas program reported ex-ante gross energy savings of 4,616,791 kWh (4,617 MWh) and ex-ante gross demand reduction of 447 kW (0.4 MW). Navigant applied gross measure unit savings estimates and deemed realization rates to verified measure counts to calculate verified gross energy savings of 4,331,878 kWh (4,332 MWh) and verified gross demand reduction of 425 kW (0.4 MW). Navigant applied deemed NTG ratios to calculate verified net energy savings of 3,536,610 kWh (3,537 MWh) and verified net demand reduction of 345.27 kW (0.3 MW). Results are shown in Table 5-17 and Table 5-18 below.

Table 5-17. ComEd EPY4 Ex-Ante⁴⁵ & Verified Electric Savings (Peoples Gas & North Shore Gas Service Territories)

Measure	Ex-Ante Gross Savings (kWh)	Gross Realization Rate	Verified Gross Savings (kWh)	NTG Ratio	Verified Net Savings (kWh)
9W CFL	1,159,781	96.0%	1,113,389	0.81	901,845
14W CFL	2,700,907	96.0%	2,592,871	0.81	2,100,225
19W CFL	345,030	96.0%	331,229	0.81	268,295
23W CFL	65,413	96.0%	62,797	0.81	50,865
<i>sub-total CFL measures</i>	<i>4,271,131</i>	<i>96.0%</i>	<i>4,100,286</i>	<i>0.81</i>	<i>3,321,230</i>
Showerhead	214,413	67.0%	143,656	0.93	133,600
Kitchen Aerator	44,577	67.0%	29,867	0.93	27,776
Bathroom Aerator	86,670	67.0%	58,069	0.93	54,004
<i>sub-total water measures</i>	<i>345,660</i>	<i>67.0%</i>	<i>231,592</i>	<i>0.93</i>	<i>215,380</i>
Total	4,616,791	93.8%	4,331,878	0.81	3,536,610

Source: Navigant analysis of program tracking data; ComEd EPY4 deemed savings estimates

⁴⁵ In EPY4, gross realization rates and NTGR were deemed.

Table 5-18. ComEd EPY4 Ex-Ante⁴⁶ & Verified Demand Savings (Peoples Gas & North Shore Gas Service Territories)

Measure	Ex-Ante Gross Savings (kW)	Gross Realization Rate	Verified Gross Savings (kW)	NTG Ratio	Verified Net Savings (kW)
9W CFL	116	96.0%	111	0.81	90
14W CFL	275	96.0%	264	0.81	214
19W CFL	35	96.0%	33	0.81	27
23W CFL	7	96.0%	6	0.81	5
<i>sub-total CFL measures</i>	433	96.0%	414	0.81	336
Showerhead	5	67.0%	4	0.93	3
Kitchen Aerator	5	67.0%	4	0.93	4
Bathroom Aerator	4	67.0%	3	0.93	3
<i>sub-total water measures</i>	14	67.0%	11	0.93	9
Total	447	95.1%	425	0.81	345

Source: Navigant analysis of program tracking data; ComEd EPY4 deemed savings estimates

Navigant verified a total of 109,854 CFLs installed by the ComEd, Peoples Gas and North Shore Gas program during EPY4/GPY1 as shown in Table 5-19.

Table 5-19. ComEd EPY4 CFL Gross Impact Parameter Estimates (Peoples Gas & North Shore Gas Service Territories)

Measure	Unit	Unit Savings (kWh)	Unit Savings (kW)	Verified Measures Installed
9W CFL	lamp	29.1	.0029	39,855
14W CFL	lamp	43.2	.0044	62,521
19W CFL	lamp	52.5	.0053	6,572
23W CFL	lamp	72.2	.0073	906
Total	n/a	n/a	n/a	109,854

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

Navigant verified a total of 1,148 electric water efficiency measures (e.g. water efficiency measures installed in residential dwelling units with electric water heating) in 413 residential dwelling units as shown in Table 5-20. Electric water savings measures are shown by residence.

⁴⁶ In EPY4, gross realization rates and NTGR were deemed.

Table 5-20. ComEd EPY4 Water Efficiency Measures Gross Impact Parameter Estimates (Peoples Gas & North Shore Gas Service Territories)

Measure	Unit n = 413	Unit Savings (kWh)	Unit Savings (kW)	Verified Measures Installed
1.5 gpm Showerhead	residence	592.3	.0150	457
1.5 gpm Kitchen Aerator	residence	117.0	.0120	382
1.0 gpm Bathroom Aerator	residence	214.0	.0120	534
Total	n/a	n/a	n/a	1,148

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

5.5.2 ComEd EPY4 Electric Impact Results – Nicor Gas Service Territory

The ComEd EPY4/Nicor Gas GPY1 Multi-Family Home Energy Savings Program reported ex-ante gross energy savings of 8,001,614 kWh (8,002 MWh) and gross demand savings of 697 kW (0.7 MW). Navigant applied gross measure savings estimates and deemed realization rates to verified measure counts to calculate verified gross savings of 7,113,693 kWh (7,114 MWh) and 645 kW (0.6 MW). Navigant used deemed NTG ratios to calculate verified net savings of 5,919,523 kWh (5,920 MWh) and 529 kW (0.5 MW). Electric water savings measures are shown by residence. Unit savings, measure counts and gross savings estimates are included in Table 5-21 and Table 5-22 below.

Table 5-21. ComEd EPY4 Ex-Ante⁴⁷ & Verified Electric Savings (Nicor Gas Service Territory)

Measure	Ex-Ante Gross Savings (kWh)	Gross Realization Rate	Verified Gross Savings (kWh)	NTG Ratio	Verified Net Savings (kWh)
9W CFL	578,654	96.0%	555,507	0.81	449,961
14W CFL	4,403,722	96.0%	4,227,573	0.81	3,424,334
19W CFL	1,013,460	96.0%	972,922	0.81	788,066
23W CFL	47,652	96.0%	45,746	0.81	37,054
<i>sub-total CFL measures</i>	<i>6,043,487</i>	<i>96.0%</i>	<i>5,801,748</i>	<i>0.81</i>	<i>4,699,415</i>
Showerhead	1,233,169	67.0%	826,223	0.93	768,387
Kitchen Aerator	252,018	67.0%	168,852	0.93	157,032
Bathroom Aerator	472,940	67.0%	316,870	0.93	294,689
<i>sub-total water measures</i>	<i>1,958,127</i>	<i>67.0%</i>	<i>1,311,945</i>	<i>0.93</i>	<i>1,220,108</i>
Total	8,001,614	88.9%	7,113,693	0.83	5,919,523

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

Table 5-22. ComEd EPY4 Ex-Ante⁴⁸ & Verified Demand Savings (Nicor Gas Service Territory)

Measure	Ex-Ante Gross Savings (kW)	Gross Realization Rate	Evaluation Verified Savings (kW)	NTG Ratio	Verified Net Savings (kW)
9W CFL	58	96.0%	55	0.81	45
14W CFL	449	96.0%	431	0.81	349
19W CFL	102	96.0%	98	0.81	80
23W CFL	5	96.0%	5	0.81	4
<i>sub-total CFL measures</i>	<i>613</i>	<i>96.0%</i>	<i>589</i>	<i>0.81</i>	<i>477</i>
Showerhead	31	67.0%	21	0.93	19
Kitchen Aerator	26	67.0%	17	0.93	16
Bathroom Aerator	27	67.0%	18	0.93	17
<i>sub-total water measures</i>	<i>84</i>	<i>67.0%</i>	<i>56</i>	<i>0.93</i>	<i>52</i>
Total	697	92.5%	645	0.81	529

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

⁴⁷ In EPY4, gross realization rates and NTGR were deemed.

⁴⁸ In EPY4, gross realization rates and NTGR were deemed.

Navigant verified a total of 141,787 CFLs installed by the ComEd/Nicor Gas program during EPY4/GPY1 as shown in Table 5-23 below.

Table 5-23. ComEd EPY4 CFLs Gross Impact Parameter Estimates (Nicor Gas Service Territory)

Measure	Unit	Unit Savings (kWh)	Unit Savings (kW)	Verified Measures Installed
9W CFL	lamp	29.1	.0029	19,885
14W CFL	lamp	43.2	.0044	101,938
19W CFL	lamp	52.5	.0053	19,304
23W CFL	lamp	72.2	.0073	660
Total	n/a	n/a	n/a	141,787

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

Navigant verified a total of 1,148 electric water efficiency measures (e.g. water efficiency measures installed in residential dwelling units with electric water heating) in 2,297 residential dwelling units as shown in Table 5-24 below. Electric water savings measures are shown by residence.

Table 5-24. ComEd EPY4 Water Efficiency Measure Gross Impact Parameter Estimates (Nicor Gas Service Territory)

Measure	Unit n = 2,297	Unit Savings (kWh)	Unit Savings (kW)	Verified Measures Installed
Showerhead	residence	592.3	.0150	2,082
Kitchen Aerator	residence	117.0	.0120	2,154
Bathroom Aerator	residence	214.0	.0120	2,210
Total	n/a	n/a	n/a	6,446

Source: Navigant analysis of ComEd program tracking data (September 25, 2012 data extract)

5.6 *Verification, Due Diligence and Tracking System Review Memo (final)*

TO: Pat Michalkiewicz, Peoples Gas & North Shore Gas

CC: Jennifer Hinman, David Brightwell, ICC staff
Kevin Grabner, Randy Gunn, Rob Neumann, Navigant

FR: Charles Ampong and Josh Arnold, Navigant

DA: May 21, 2012 (revised November 2, 2012)

RR: Peoples Gas & North Shore Gas PY1 Multi-Family Home Energy Savings Program —
Verification and Due Diligence and Program Tracking System Review

Introduction

This document provides the results from Navigant’s verification and due diligence review of the program tracking, quality assurance and savings verification procedures used in the Peoples Gas & North Shore Gas Multi-Family Home Energy Savings Program (Multi-Family program) during the program’s first year (PY1). The main components of this task included reviewing program documentation and procedures, interviewing the program manager and comparing the Multi-Family program’s activities to national best practices.

Overview of Findings

The program is generally operating well and achieving significant success, especially in Peoples Gas service territory. The program’s Operations Manual⁴⁹ provides a detailed quality control and quality assurance framework that clearly outline the program guidelines for eligibility, site assessment, installation of water devices and CFLs, safety training, customer satisfaction survey and complaint resolution. Our review found the Multi-Family program’s tracking system accurately records measure installations for individual dwelling units but we could not match total tracked quantities from installed water devices for all dwelling units in a given property with values shown in hard copy documents. The program should consider adding additional fields to the tracking system, as outlined in our Recommendations section.

Introduction to the Program

The Multi-Family program began program operations in June 2011. The Multi-Family program targets apartment and condominium complexes, with recruitment efforts focused on property management companies, condo associations and building owner associations. The goal is to secure agreements to treat multiple properties through a single point of contact and expand program awareness throughout associations serving multifamily housing.

Purpose of the Verification and Due Diligence Review

The primary purpose of the verification and due diligence task was to determine:

⁴⁹ Peoples, North Shore Gas and ComEd Multi-Family Home Energy Savings Program Operations Manual, Version 2, Updated 03-01-2012, Franklin Energy Services, LLC.

- Whether appropriate eligibility criteria have been properly adhered to and applications are backed with supporting documentation;
- Whether savings were calculated correctly and project information entered in an accurate and timely manner in the program tracking system; and
- If any QA/QC activities are biased (i.e., incorrect sampling that may inadvertently skew results, purposeful sampling that is not defensible, etc.).
- Whether the program tracking database contains all the information needed for program evaluation purposes.

Data Collection

Navigant collected data for this verification and due diligence task through interviews with program implementation staff and reviewing program documentation covering the period from January through April 2012.

Navigant’s findings are based on reviewing data collected through the following activities and materials reviewed from the Multi-Family program:

- Interview with the program implementation contractor
- Operations Manual
- Program application and incentive worksheets
- File review of projects selected by Navigant
- Program tracking system review
- Review of marketing and outreach efforts
- Comparing program materials to national best practices

Interview with Program Implementation Contractor

Navigant conducted a telephone interview with the Multi-Family program implementation contractor to review the program’s accomplishments and challenges to date. The telephone interview included prepared question topics such as program administration, program outreach and marketing, program delivery mechanisms, customer satisfaction, and implementation challenges. At the conclusion of the interview, Navigant provided extra time to discuss any questions or raise additional topics not covered in the telephone interview.

Program Documentation Review

Navigant requested program documentation to review for this task. The program implementer provided program documentation to conduct the verification and due diligence review. This documentation included the program’s Operations Manual, Integrys 2011 Compliance Filing⁵⁰, an extract from the program’s tracking database, customer applications, incentive processing worksheets and marketing materials.

The program’s Operations Manual provides a detailed quality control and quality assurance framework that clearly outlines the program guidelines for participant and measure eligibility, application review, site assessment, common area energy assessment, procedure for CFL installation, post-installation water

⁵⁰ North Shore Gas/Peoples Gas Compliance Filing Energy Efficiency Program Plan, June 1, 2011 – May 31, 2014, June 2011, Docket 10-0564 Attachment A.pdf

flow rate testing, safety training, customer satisfaction survey, and complaint tracking and resolution. The application and agreement forms capture requisite information necessary to determine eligibility, and include property manager and customer survey checklists, a property enrollment form, and service agreement and authorization forms.

Navigant reviewed the program’s quarterly program delivery report submitted to Peoples Gas and North Shore Gas in February 2012. The Quarterly Delivery Report included highlights of potential and realized energy savings and cost information related to the program’s performance to date.

Project File Engineering Desk Review

The evaluation team requested project documentation files for three (3) multifamily projects, specifying the following dwelling unit project IDs: North Shore Gas project 21016, and Peoples Gas projects 26717 and 24865. Information was provided to Navigant from the program implementation contractor. Navigant reviewed information included in the project files and compared entries in the project files to corresponding entries in the program tracking database for accuracy and completeness.

All three documentation sets requested included complete property enrollment and service agreement forms, customer authorization forms for releasing gas usage information, resident reports (completed by the installer for each dwelling unit) and property summary reports (completed by the installer for presentation to the property manager). While not required of all properties, only one of the three requested files contained a completed common area survey report, and none of the requested files contained water flow rate testing sheets or customer/property manager survey responses. Navigant did not find QA/QC reports for post-installation inspection for these files. Navigant reviewed the program tracking database to verify that these fields were empty for the requested projects.

Upon follow-up with the program manager, Navigant was provided with water-flow testing reports conducted for other properties.

Program Tracking Database Review

Navigant performed a review of the program tracking database. The program implementation contractor provided a process guide for the Bensight Data Management system.⁵¹ The guide provided by the program implementation contractor details the process for creating an account, setting up a project file and recording project information. In addition, the guide includes a process for conducting final data entry quality control checks to help ensure project information is accurately recorded and tracked in the system. Navigant obtained an extract from the program tracking system (Access database format extracted from 2/14/2012) to review information included in the tracking system and compare corresponding entries in project files. The program extract from 2/14/2012 indicated that the program had completed 11,046 units with realized energy savings (10,951 dwelling units in Peoples Gas service territory and 95 dwelling units in North Shore Gas service territory).

Marketing and Outreach Review

Navigant reviewed marketing and outreach materials supplied by the implementation contractor. The marketing and outreach documents included a program marketing plan⁵², property referral forms, mail-in forms and leave-behind handouts, and outreach and orientation meeting documents. Navigant found

⁵¹ EE and EA Process in Bensight.pdf (Bensight Guide)

⁵² North Shore Gas & Peoples Gas Multi-Family Program, Tactical Marketing Plan PY1

that the program's marketing and outreach materials were generally consistent with the program's marketing plan and goals.

Review of Program Operating Procedures

Navigant examined the program Operations Manual. We outline each step in the section below.

- Pre-Installation
- Installation
- Post-Installation
- Safety and Training
- Customer Service, Invoicing and Reporting

Pre-Installation

The program implementation contractor establishes contact with eligible potential program participants through their field technicians (called Energy Advisors) and may receive referrals from other Peoples Gas and North Shore Gas programs or trade allies. Some multifamily properties that receive federal subsidies are ineligible for the Peoples Gas and North Shore Gas Multi-Family Direct Install Program and are referred to the Department of Commerce and Economic Opportunity (DCEO) for weatherization.

Upon expression of interest in the program by the decision-maker, the Energy Advisor sets up an initial meeting during which the field technician may perform a presentation of eligible devices for the property. The Energy Advisor then conducts a physical survey of the premise and several apartment units to determine whether there is an opportunity to save energy by installing CFLs, aerators, and showerheads. Data collected on the property and apartment units is recorded on the Property Enrollment Form. For eligible properties, the Energy Advisor may complete a walk-through of the building's common areas to identify potential opportunities for energy savings for the property's space heating systems, water heating systems, or common area lighting.

The Property Enrollment Form allows the Energy Advisor to record count and baseline gallons per minute (GPM) of faucet aerators and showerheads in sampled apartment units, and record a count of potential CFL installations per apartment. The three projects selected for due diligence review recorded data for one or two apartment units of the apartment complex. There is no indication on the Property Enrollment Form whether the recorded GPM value is based on flow testing or ratings stamped on the devices, but on the forms we reviewed, the GPM recorded for baseline aerators and showerheads appeared to be rated flows from the devices because it matched standards. The baseline GPM recorded for showerheads on the three reviewed forms was 2.5 GPM, matching the default savings assumption. The baseline GPM recorded for aerators on two of the three reviewed forms was 2.2 GPM, matching the default savings assumption, while the third form recorded 2.0 GPM for aerators.

The Operations Manual does not address water flow-testing when discussing the site survey, nor does it address the minimum baseline GPM value required for eligibility of the direct installation of water saving devices. The Operations Manual provides a lumen-equivalent baseline incandescent for CFLs.

After the walk-through assessment to verify that the property is eligible to enroll in the Multi-Family program, the Energy Advisor may make a presentation or proposal for performing direct-installation of energy savings measures. If the decision-maker for the property decides to enroll their building(s) in the program, the Energy Advisor requests that an authorized representative sign a Service Agreement form,

the Property Enrollment form, and a Utility Data Release form. The building management representative is provided with copies of tenant notification letters and posters for the use of providing required notice of pending entry to tenant units. The Energy Advisor schedules the direct installation activity with the property manager or site representative.

Installation

Upon arriving at a property scheduled to receive direct installation services, Energy Advisors meet with an authorized representative to confirm if proper notice of entry has been given to tenants. Upon confirmation of due notice, the Energy Advisors conduct the direct installation activity. During this activity, Energy Advisors are accompanied by an authorized building representative to interface with tenants or to gain entry to vacant or unoccupied dwelling units, as needed. In the event that Energy Advisors encounter a dwelling unit in which the tenant is present, the Energy Advisors are instructed to explain the reason for the direct installation activity and may demonstrate the installation of the showerhead or faucet aerators and give a brief review of the energy saving devices installed. Energy Advisors install direct install measures (e.g. water efficiency devices and CFLs) in each unit, depending on eligibility, and are instructed to test the water flow rate in at least one dwelling unit per building. Each unit can have up to six CFLs installed. CFLs installed should be matched to a similar lumen output as the pre-installation lighting following the guidelines provided in the Operations Manual.

If a tenant is present during the direct installation activity, Energy Advisors present program handout(s) and a Resident Report to the tenant. The tenant is also provided with a customer satisfaction survey that can be completed at the time of the direct installation. In the event that a tenant is not present during the direct installation activity, Energy Advisors leave program handouts at the dwelling unit, including a pre-paid mail-in customer survey. Energy Advisors provide an authorized building management representative with a property-wide energy assessment report, program handouts and a building manager satisfaction survey after completing the direct installation activity. Information about the direct installation activity is transferred to program staff and entered into the program tracking database.

Post-Installation

Post installation activities include QA/QC checks with participating customers and building management representatives to gauge customer satisfaction and verify measure installation. An Energy Advisor monitors and reviews the direct installation activity and is instructed to conduct random samples for at least 2.5% of participating dwelling units or at least one dwelling unit per building (whichever is greater). Energy Advisor post-installation reporting may also include observations about successes and challenges occurring during the direct installation activity.

Safety, Customer Service, Invoicing and Reporting

The program implementer reports to Peoples Gas and North Shore Gas on a monthly or quarterly basis including financial, invoicing, installations, and marketing activities. The program implementer provides weekly reporting to ComEd on schedules and building units that received CFL installations. In the event that a customer is dissatisfied with the program staff or measures, the program implementer uses a complaint resolution process⁵³ to address the cause of the customer's dissatisfaction. All customer service complaints and responses are documented and made available to Peoples Gas, North Shore Gas and

⁵³ Complaints are defined in the Operating Manual as issues communicated by customers that impact timely and accurate installation, the conduct and safety of the direct installation technicians, product performance, and damage to customers' property during the field visit.

ComEd program staff in a tracking log. The program implementer provides safety training for all staff involved in the program, particularly driving and personal safety training for Energy Advisors participating in direct installation activities.

Verification and Due Diligence Findings

Navigant reached the following findings for this task based on reviewing program documentation and interviewing program staff. Our findings are followed by a comparison of the Multi-Family program's activities to the *Best Practices Self-Benchmarking Tool*⁵⁴ from the *National Energy Efficiency Best Practices Study*.

- Navigant reviewed the program tracking database extract from 2/14/2012 and found that Peoples Gas installations have been completed for 10,951 participating units (representing 72% of the program's target of 15,300 units). North Shore Gas has had relatively lower participation from only 95 units (4% of the program's target of 2,700 units).
- Navigant reviewed the Multi-Family Program's Property Enrollment Form and determined that the form is sufficient for a customer to submit necessary information to enroll in the program, although we recommend that additional detail be considered. The form has inputs for information needed to meet program eligibility, including rate classification, utility type, onsite contact, domestic water heating system, number of buildings and units, and a checklist of potential direct install energy-saving measures. The application form includes instructions for use and other terms and conditions for enrollment. The form allows recording of baseline GPM for showerheads and aerators, but does not specify whether recorded values are from device ratings or water-flow testing, and it does not state minimum GPM values to be eligible.
- Generally, the program tracking database (2/14/2012 extract) captures relevant data required to track the program's actions for reporting and evaluation activities such as work orders, installation completion dates and comments, tracking of default/deemed savings and overall project savings estimates.
- Navigant's review of the program tracking database found no entries for post-installation inspection activity. Navigant was unable to verify whether post-installation inspection activities occurred due to the absence of this information in the program tracking database.
- The program tracking database indicates the dwelling units where customer satisfaction surveys and properties where common area surveys were completed by Energy Advisors. Navigant did not find the results of these surveys in the program tracking database.
- Navigant found no information about pre- and post-installation water-flow testing in dwelling units in the program tracking database.
- Navigant found limited documentation about referrals by the Multi-Family program to other Peoples Gas, North Shore Gas or ComEd programs for recommended common area energy efficiency upgrades.
- Navigant's review of the project files including properties/buildings with dwelling unit IDs NSG-21016 and PG-26717 and PG-24865 confirmed that the quantity of measures installed written on the installer Resident Reports for individual dwelling units were consistent with the entries in the tracking system. However, Navigant could not reconcile total quantities on the property summary reports provided to the property owners with the entries in the tracking system. For example, the summary report for the Property that included project #24865 shows

⁵⁴ Best Practices Self-Benchmarking Tool developed for the Energy Efficiency Best Practices Project: <http://www.eebestpractices.com/benchmarking.asp>

1,210 water devices were installed compared with 1,504 water devices found in the tracking system. The summary report for the Property that includes project #21016 shows 266 water devices were installed compared with 344 water devices found in the tracking system. The discrepancies may be due to error in recording installed units by the implementer, or may be due to the lack of an observed unique property ID (covering all dwelling units at the property site) that made it difficult to identify dwelling units or buildings of the specified properties that matched to the property summary reports.

- The Multi-Family program marketing strategy has been effective to date, particularly due to collaboration with Apartment Owners Associations in the Chicago area.

Quality Control and Verification Best Practices

To conduct the best practices benchmarking assessment, the evaluation team compared the program implementer's practices (shown as a bullet list) with the *Best Practices Self-Benchmarking Tool* from the *National Energy Efficiency Best Practices Study* (numbered items in *italic font*).

Program Design and Structure

1. *Have a sound program plan and clearly articulated program theory that describe the program logic, niche, resources and ultimate goal*
 - The program Operations Manual, EE Plan Compliance Filling, and Marketing Plan include a program theory that address the target market and ultimate goals. Program interventions and key metrics are consistent with the underlying program theory.
2. *Assure quality of product through independent testing procedures.*
 - The program sources equipment (e.g. showerheads, CFLs and faucet aerators) that meet or exceed product quality standards through various standards and certifications for such equipment.
3. *Use measure product specifications in program requirements and guidelines.*
 - The program uses products specified by the program implementer in consultation with the utility sponsors.
4. *Develop inspection and verification procedures during the program design phase.*
 - Procedures for inspection and verification are detailed in the Operations Manual.

Data Reporting and Tracking

5. *Base reporting and tracking system design on how information will be used and data needs unique to multi-family programs.*
 - The program tracking database allows real-time reporting of routine functions like monthly portfolio and program reports, energy savings, and financial tracking. The implementation contractor documents and retains the knowledge obtained from the multi-family building sector for the utility clients, and lessons learned from PY1 will be helpful for further program refinement in future years.
6. *Set reasonable and accurate expectations for energy savings and measure performance.*
 - The program implementer meets with potential participants before installations to discuss their expectations for energy and bill savings.
7. *Assure that tracking systems are intuitive, straightforward, integrated and comprehensive.*

- The data tracking system is well designed. The system tracks program key performance indicators, fully integrates marketing, customer, audit and impact data, as well as the status of pipeline projects.
8. *Define and identify key information needed to track and report early in the program development process*
 - Program data requirements were defined early in the program development process and are tracked in the program tracking database.
 9. *Design the program tracking system to support the requirements of evaluators as well as program staff.*
 - The tracking system allows real-time reporting of routine functions like monthly portfolio and program reports, energy savings and financial tracking.
 10. *Develop accurate algorithms and assumptions on which to base savings estimates.*
 - Savings algorithms use empirical data from recent evaluations and are based on deemed savings approaches. Navigant has recommended adjustment to per unit savings for showerheads and aerators.

Inspection Procedures

11. *Conduct quality assurance and verification inspections to improve the overall understanding of how multi-family buildings function.*
 - An Energy Advisor monitors and reviews the direct installation activity and is instructed to conduct random samples for at least 2.5% of participating dwelling units or at least one dwelling unit per building (whichever is greater). Post-installation QA/QC reporting may also include customer satisfaction surveys and observations about successes and challenges occurring during the direct installation activity.
12. *Conduct an independent audit or pre- and post-installation inspections.*
 - Pre-inspections are conducted to confirm the property's eligibility for the direct install measures. The pre-inspection records GPM for showerheads and aerators, but does not specify the minimum qualifying GPM value and whether the GPM provided is based on flow testing or device ratings.
 - Post-installation inspection and verification is conducted by the program implementer in PY1. Program staff have indicated that the program may hire an independent third-party to conduct post-installation inspections in future program years.
13. *Conduct inspections in a timely manner.*
 - Navigant was not able to find sufficient evidence of post-installation inspections in the program tracking database. Program staff should make efforts to update the program tracking system with post-installation inspection activity more frequently.

Evaluation

14. *Assess customer satisfaction with the product through evaluation.*
 - Navigant conducts an independent evaluation of this program's processes and impacts.
15. *Present actionable findings to program staff both in real time and at the end of study*
 - Navigant's reports will include actionable findings. Any actionable items are communicated to program staff as soon as possible through informal communications or memoranda.

Recommendations

Navigant has the following recommendations for consideration by Peoples Gas and North Shore Gas and the program implementation contractor. These recommendations are based on our review of the program’s documentation and interviews with program staff.

- Navigant recommends that the program track whether a building has a central or individual domestic hot water system and track savings separately from each.
- Navigant recommends including additional information in the program tracking system, including water flow testing results, results of common area surveys and referrals to the Peoples Gas, North Shore Gas or ComEd programs, responses from customer or property manager surveys, and post-installation inspection activity.
- For each property (apartment complex) defined by a property summary report, Navigant recommends including a unique numeric property identification field that is associated with each dwelling unit of the property. Navigant confirmed that sampled resident reports (reports from individual dwelling units) were consistent with corresponding entries in the tracking system. However, Navigant could not resolve some inconsistencies between the tracking system and the summary property reports from the sampled files. A unique numeric property-level identification for each dwelling unit may provide additional opportunities for internal quality assurance in data entry and post-installation verification.
- To the extent feasible, the program should attempt to minimize hand-written data entry. For example, hand held tablets facilitate on-site data collection and document survey findings. Handwriting on some resident reports was difficult to read, leading to the possibility of data entry errors.
- Navigant recommends that the program staff update their quarterly reports to include additional program performance metrics, including information on participation, quantity of installed measures, marketing and outreach activities and challenges.
- Some resident reports indicated that Energy Advisors were unable to install energy efficiency measures due to “PC” or “poor condition”. Navigant recommends that the program develop a definition for this term and include it in the program Operations Manual.
- The implementer should consider modifications to the Operations Manual and Property Enrollment Form regarding the baseline GPM of showerheads and aerators. The Operations Manual should identify the minimum rating for baseline GPM required to be eligible for the direct installation of showerheads and aerators, and the Property Enrollment Form should indicate that recorded values are “rated” GPMs. The Operations Manual should describe procedures and frequency for conducting water-flow testing during the pre-installation site survey, if water flow testing will occur in PY2.
- Navigant recommends that the program periodically review Resident Reports for accuracy and appropriateness, and consider standardized statements for recurring issues. For example, we found one Resident Report in Peoples Gas Project ID26717 with a tenant-specific statement on apartment conditions as reason for ending the install. If tenant unit conditions are found to be unsuitable for reasons other than equipment compatibility, a standardized statement such as “Installation terminated by installer discretion for reasons other than equipment compatibility” (or a shorthand code for this longer statement) will be easier to track and report.
- The program implementer should ensure that all scanned hard copies of project documents are saved and transferred onto the program tracking system for easy access and review.

5.7 Franklin Energy Services Memorandum in Response to VDDTSR (Multi-Family excerpt)

Date: July 18, 2012

To: Pat Michalkiewicz, Manager, Energy Efficiency and Major Accounts, Peoples gas and North Shore Gas

Cc: Ed Carroll, Jamie Peters, Tim Kaddatz, Ken Dentice – Franklin Energy
Susan Nathan, AEG

From: Jay Boettcher, Regional Director
Paul Isaac, Regional Director

Re: Navigant’s verification and due diligence review of program tracking, quality assurance and savings verification procedures in PY1 of the Peoples Gas and North Shore Gas Residential Portfolio

The following memo provides analysis, feedback, and strategies for improvement in response to two program evaluation memos provided to the program by our evaluator, Navigant. Responses for evaluations of the Multi-Family Home Energy Saving Program and the Residential Prescriptive Program are within.

Multi-Family Home Energy Saving (HES) Program

Overall, the evaluation team found that the program is operating well and achieving success. A few issues were raised in the memo and are addressed below.

1. Recommendation: Multi-Family program’s tracking system accurately records measure installations for individual dwelling units but we could not match total tracked quantities from installed water devices for all dwelling units in a given property with values shown in hard copy documents. The program should consider adding additional fields to the tracking system.
Response: The program sends project summary reports to the building manager/owner. This report includes total quantities of each device installed. This report is attached, in .pdf format, to the common area account in the tracking system. As for actually extracting the data and summarizing it from the tracking system, it can be done for properties that are master metered. We enter hierarchy for properties that have individual accounts. The tenant account is linked to the common area account. It can be reported on in the tracking system, but most likely does not exist in the flat file format that Navigant uses.

2. Recommendation: Only one of the three requested files contained a completed common area survey report, and none of the requested files contained water flow rate testing sheets or customer/property manager survey responses. Navigant did not find QA/QC reports for post-installation inspection for these files.

Response: Paper Common Area Survey Reports are now uploaded into Salesforce at the individual project level of the Common Area account for the building. The paper sheet is filed in the paper file for the building.

- a. Water flow rate tests in PY1 were collected and filed chronologically at the Field Supervisor’s desk. These sheets need to be retroactively uploaded at the project (apartment) level, and then filed in the paper file. In PY2, water flow rate tests will be captured via the mobile electronic data capture system on the site at the time the tests are performed.
 - b. During PY1, paper QA/QC reports were scanned and uploaded into Salesforce at the individual project (apartment) level, then kept in a separate folder at the Field Supervisor’s desk. The paper QA/QC reports need to be filed away in the paper building file. Beginning in PY2 the Field Supervisor is uploading the QA/QC and filing the paper copy in the paper file for the building.

- 3. Recommendation:** Navigant’s review of the program tracking database found no entries for post-installation inspection activity.
Response: Inspection takes place immediately after the work is performed, i.e., Field Supervisor watches installation as part of QA/QC and follows up with DI Techs on the spot when improvement is required.

- 4. Recommendation:** The Operations Manual does not address water flow-testing when discussing the site survey, nor does it address the minimum baseline GPM value required for eligibility of the direct installation of water saving devices. The Operations Manual should describe procedures and frequency for conducting water-flow testing during the pre-installation site survey, if water flow testing will occur in PY2.
Response: Subsection 7.4 (pages 9 and 10) and Subsection 10.3.3 (page 24) of the Multi-Family Operations Manual will be amended to include specificity regarding faucet aerators and shower heads need to either be labeled/stamped as having flow rates in excess of 1.5 G.P.M. or bag flow test resulting in a flow rate in excess of 1.5 G.P.M. in order to qualify for replacement under the program. A short description of the bag flow test can be added to this subsection.

- 5. Recommendation:** The (Multi-Family Program’s Property Enrollment) form allows recording of baseline GPM for showerheads and aerators, but does not specify whether recorded values are from device ratings or water-flow testing, and it does not state minimum GPM values to be eligible.
Response: This form has very recently been reviewed and sent to PG/NSG for PY2 approval. Operations Manual changes to reflect minimum GPM rate requirement for program eligibility can be made. When flow rate tests are performed, the tests will be captured in the mobile digital data capture system at the project (apartment) level. If no flow rate test is present at the project level, the default origin of the recorded value is assumed to be the flow rate label or stamp on the aerator or shower head.

- 6. Recommendation:** The program tracking database indicates the dwelling units where customer satisfaction surveys and properties where common area surveys were completed by Energy Advisors. Navigant did not find the results of these surveys in the program tracking database. Where do we keep the returned surveys? They should remain anonymous.

Response: Franklin uploads Common Area Surveys, Central Plant Reviews at the project level of the common area account. When apartment numbers are provided, Customer Satisfaction Surveys are now uploaded at the project (apartment) level. Franklin recently went back through PY1 Customer Satisfaction Surveys and uploaded them.

7. **Recommendation:** Navigant found limited documentation about referrals by the Multi-Family program to other Peoples Gas, North Shore Gas or ComEd programs for recommended common area energy efficiency upgrades.

Response: Franklin IM staff is looking at best ways to marry/track referrals in Salesforce between staff members/programs. Multi-Family advisors will have goals for referrals to both SBES and C&I for PY2.

8. **Recommendation:** Navigant recommends that the program track whether a building has a central or individual domestic hot water system and track savings separately from each.

Response: Franklin tracks at the account and project (apartment) levels whether units have central or individual domestic water heating systems, and whether they are gas or electric. Franklin does not presently report energy savings separately for central versus individual water heaters. However, those data could be provided relatively easily upon request.

9. **Recommendation:** Navigant recommends including additional information in the program tracking system, including water flow testing results, results of common area surveys and referrals to the Peoples Gas, North Shore Gas or ComEd programs, responses from customer or property manager surveys, and post-installation inspection activity.

Response: Franklin has created fields in the mobile electronic data capturing system for water flow test results and QA/QC inspections. Results of individual common area surveys and central plant reviews are not presently captured electronically (except for scanned/uploaded paper copies thereof). However, the vision for doing so via the mobile electronic data collection system has been established and is a goal.

10. **Recommendation:** For each property (apartment complex) defined by a property summary report, Navigant recommends including a unique numeric property identification field that is associated with each dwelling unit of the property. Navigant confirmed that sampled resident reports (reports from individual dwelling units) were consistent with corresponding entries in the tracking system. However, Navigant could not resolve some inconsistencies between the tracking system and the summary property reports from the sampled files. A unique numeric property-level identification for each dwelling unit may provide additional opportunities for internal quality assurance in data entry and post-installation verification.

Response: A unique apartment unit identifier is an idea considered at great length by Franklin. The gas companies are sensitive to customer account data confidentiality and do not want a system developed whereby a breach to, and resultant breach of their customer data could occur by someone looking up electric account information suddenly having full access to gas account information via the unique apartment identifier. Franklin is on the cusp of gathering and

reporting all these data electronically, thus greatly improving accuracy and consistency in summary reports.

- 11. Recommendation:** To the extent feasible, the program should attempt to minimize hand-written data entry. For example, hand held tablets facilitate on-site data collection and document survey findings. Handwriting on some resident reports was difficult to read, leading to the possibility of data entry errors.

Response: Franklin is deploying a mobile electronic data capturing system during July and August 2012 utilizing a proprietary application via iPad to eliminate data entry via paper forms.

- 12. Recommendation:** Navigant recommends that the program staff update their quarterly reports to include additional program performance metrics, including information on participation, quantity of installed measures, marketing and outreach activities and challenges.

Response: Quarterly reports have been updated to include information on participation, quantity of installed measures, marketing and outreach activities and challenges.

- 13. Recommendation:** Some resident reports indicated that Energy Advisors were unable to install energy efficiency measures due to “PC” or “poor condition”. Navigant recommends that the program develop a definition for this term and include it in the program Operations Manual.

Response: The MF Operations Manual will be updated to include a brief description of typical poor conditions which would prompt decisions to forego installation of energy efficient devices.

- 14. Recommendation:** Navigant recommends that the program periodically review Resident Reports for accuracy and appropriateness, and consider standardized statements for recurring issues. For example, we found one Resident Report in Peoples Gas Project ID26717 with a tenant-specific statement on apartment conditions as reason for ending the install. If tenant unit conditions are found to be unsuitable for reasons other than equipment compatibility, a standardized statement such as “Installation terminated by installer discretion for reasons other than equipment compatibility” (or a shorthand code for this longer statement) will be easier to track and report.

Response: Tenant-specific reasons for non-installation of energy efficiency devices can be addressed in the amplified delineation of possible definitions for “Poor Condition” in the MF Operations Manual.

- 15. Recommendation:** The program implementer should ensure that all scanned hard copies of project documents are saved and transferred onto the program tracking system for easy access and review.

Response: Franklin is now scanning and uploading documents at the project (apartment) level of the common area account or the individual apartment customer account, whichever is appropriate for the document.

5.8 Data Collection Instruments

5.8.1 Program Manager & Implementation Contractor Interview Guide

MULTI-FAMILY HOME ENERGY SAVINGS PROGRAM

GPY1/EPY4 Program Manager and Implementation Contractor Interview Guide July 20, 2012 FINAL

Purpose of this Survey Instrument (not to be read to Participants)

[Note to Reviewer] The Interview Guide is a tool to guide process evaluation interviews with utility staff and implementation contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual played in the program's design and operation, i.e., where they have significant experiences for meaningful responses. Interview date/times will be arranged in advance.

The table below outlines the sections, topics and questions of the tenant survey instrument to cross-reference them with the goals and objectives of the Multi-Family Home Energy Savings Program evaluation.

Survey Instrument: Topics and Corresponding Questions

Interview/Research Objectives	Corresponding Questions
Roles & Responsibilities	RR1 – RR7
Program Goals	G1 – G3
Marketing & Promotion	MP1 – MP2
Program Participation & Customer Satisfaction	CS1 – CS6
Data Tracking & Program Channeling	D1 – D2
Quality Assurance & Quality Control	QA1 – QA2
Information Request & Wrap Up	WU1 – WU3

Contact Information

Name of Interviewee: _____ Date: _____
 Title: _____ Company: _____
 Role in Program: _____

Introduction

Hello, may I please speak with [NAME]?

My name is ___ and I'm calling from Navigant Consulting, we are part of the team hired to conduct an evaluation of the Multi-Family Home Energy Savings Program. We're conducting interviews with program managers and key staff in order to improve our understanding of the program. At this time we are interested in asking you some questions about the Multi-Family program. The questions will take about an hour. Is this still a good time to talk?
 [IF NOT, SCHEDULE A CALL BACK.]

Ok, great. Let's begin.

Roles and Responsibilities

1. Can you briefly summarize your role in the Multi-Family Program: What are your main responsibilities? For how long have you carried these out, including the planning phase? Has your role changed over time?
2. Please explain key actors and roles in program delivery.
3. From your perspective, do key actors have an adequate understanding of their role in enabling the Multi-Family program to meet its goals?
4. What is the Multi-Family's strongest attribute? What attribute(s) (if any) do you think could be improved?
5. What are the formal and informal communication channels between program staff, program administrator and/or implementation contractor? In your opinion, is information shared in a timely manner?
6. What are the Multi-Family program's reporting requirements? Are the reporting requirements for this program appropriate from an administrative perspective? Do you have any suggestions about ways to improve or streamline the program's reporting requirements?
7. Are utility resources (e.g. program staff, account managers) available to provide customer referrals or introductions to any key customers associated with multifamily buildings or building management firms?

Program Goals and Objectives

1. According to the most recent monthly report, you are [ahead/behind] on current year goals. Why do you think this is? Do you think next year's goals are realistic? Why or why not?
2. Outside of the quantitative goals (e.g., \$, \$/kWh, savings and participation rates), in your own words, what are the key goals and objectives of this program?
3. During the last year, how successfully did the program integrate new measures, such as programmable thermostats? Have you implemented or are you planning to implement any specific training, inspection or M&V activities for new measures? If so, please describe.

Marketing and Promotion

1. What are the most common ways that properties are recruited into the Multi-Family program? From your perspective, are the program's current marketing efforts meeting your expectations? Is there any specific effort that is working particularly well? Any specific effort that could be improved?
2. Do you anticipate making any upcoming changes to program marketing efforts? If so, please describe these changes.

Program Participation and Customer Satisfaction

1. Please briefly describe the Multi-Family program's participation process from the customer perspective:
 - a. Who drives participation: customer, field implementers, others?
 - b. What is a typical timeline for participation (from first contact to direct installation)? Is there a target timeframe? Are direct installations being scheduled within that timeframe? What, if anything, is slowing down the timeframe?
 - c. Is there a process in place for communicating the status of their application to customers?
 - d. Typically, how many contacts (e.g. property managers or building owners) do you have to contact to get participation?
 - e. How are participation rates tracked by the program?
2. Have you received any feedback from property managers/decision-makers on any aspects of the program? If so, please share it with us.
3. How have participants received common area recommendations? Do you find that property managers/decision makers are responsive to these recommendations? How does the program track these recommendations after they're provided to the participant?
4. Have you received any feedback from residents on any aspects of the program? Does program staff leave surveys for residents? About what percentage of surveys is returned? How are survey results tracked? How does the program respond to survey results? Are there any examples of specific action implemented by the program as a result of customer surveys?
5. What process is in place to field and address customer complaints or questions?
6. What impact, if any, do current economic conditions have on program participation?

Data Tracking and Program Channeling

1. Can you briefly describe the process for tracking data for the program(s)? Who captures the data and how? What data is collected? Is it manually done? Who enters into database? What QA is in place? Who does QC on data collected? Data entered? Barriers? Improvements? Any planned changes to data collection? If so, what?

From your perspective, does the Multi-Family program encourage program participants (property managers or residents) to participate in other programs sponsored by the utility? What about behavioral changes? What processes are in place, if any, to identify larger improvements that are potential energy savers? What processes are in place to share referrals to other programs (e.g. common areas, rebates for large improvements)?

Quality Assurance and Quality Control

1. Can you briefly describe your quality assurance and quality control procedures? What processes are in place to ensure property eligibility? Direct installation project completion?
2. Approximately what percentage of projects is post-inspected? By whom? How are the post-installation projects chosen? Do they use standardized data collection forms? How can we arrange to obtain these documents?

Information Request and Wrap Up



1. We'd like to make sure that we have the most up to date program information, including the tracking system, marketing, operational documents. Would it be ok with you if we follow-up via email or phone if we have additional questions? Likewise, feel free to reach out to us if you have additional information or questions for us.
2. Are there any additional people with key roles that we should talk to?
3. Are there any other topics that you wish to discuss?

Thank you very much for sharing your time and insights with us.
We appreciate your contribution to our evaluation research.

5.8.2 Participating Tenant Telephone Survey Instrument

MULTI-FAMILY HOME ENERGY SAVINGS PROGRAM GPY1/EPY4 PARTICIPATING TENANT SURVEY August 21, 2012 FINAL

Purpose of this Survey Instrument (not to be read to Participants)

The table below outlines the sections, topics and questions of the tenant survey instrument to cross-reference them with the goals and objectives of the Multi-Family Home Energy Savings Program evaluation.

Survey Instrument: Topics and Corresponding Questions

Section	Topics	Questions
Screening tenants	Is the tenant served by Nicor Gas, North Shore Gas, Peoples Gas and/or Commonwealth Edison Company? Does the tenant have knowledge of the direct install of measures?	S0-S5
CFL Verification	Count, status, and location of the CFLs. Is/are the measure(s) still in place? Would the tenant have installed the same lights without the program? Tenant satisfaction?	CMV1-CMV23
Bathroom Faucet Aerator Verification	Count, status, and location of the bathroom faucet aerators. Is/are the measure(s) still in place? Tenant satisfaction?	BAMV1-BAMV17
Kitchen Faucet Aerator Verification	Count, status, and location of the kitchen faucet aerators. Is/are the measure(s) still in place? Tenant satisfaction?	KAMV1-KAMV16
Water Efficient Showerhead Verification	Count status, and location of the showerhead(s). Is/are the measure(s) still in place? Tenant satisfaction?	SMV1-SMV17
Programmable Thermostat Verification (Nicor Gas & ComEd Only)	Thermostat verification and setting verification. Is/are the measure(s) still in place? Tenant use and satisfaction?	PMV1-PMV8a
Tank Turndown Verification	Status of turndown. Is/are the measure(s) still in place? Tenant satisfaction?	HMV1-HMV5a
Hot Water Pipe Wrap Verification (Peoples Gas and North Shore Gas Only)	Is/are the measure(s) still in place? Tenant satisfaction?	WMV1-WMV3a
Customer Satisfaction	How satisfied is the tenant with the direct install measures, the field technicians and the program?	SAT1-SAT5
Tenant Demographics	Occupancy, Primary Language, Ownership	D1-D3

INTRODUCTION AND SCREENER

Hello, this is [INTERVIEWER'S NAME] calling on behalf of your local natural gas and electric utilities. This is not a sales call. We are contacting customers who have participated in the Multi-Family Home Energy Savings Program, when a field technician came to your home and installed new energy efficient equipment.

Are you the person who is most familiar with the upgrades?

(IF NOT: May I please speak with the person who is most familiar with the upgrades?)

IF CUSTOMER NOT AVAILABLE: THANK AND TERMINATE)

CONTINUE WITH RIGHT PERSON: We are conducting an independent study to evaluate the Multi-Family Home Energy Savings Program and would like to include your opinions. Your answers will be included with answers from other program participants and used to help evaluate the effectiveness of the program and to design future programs. We would be grateful for your participation in our research.

[If Customer asks for additional information about the study] Your local natural gas and electric utilities sponsor the Multi-Family Home Energy Savings Program. Our firm has been hired to prepare an independent evaluation of their energy efficiency programs. The Illinois Commerce Commission (ICC) requires certain utilities to submit such a report each year. The information that we gather will help the ICC determine if existing programs should continue while assisting in the design of future programs.

[If needed: This program provided free installation of compact fluorescent light bulbs, faucet aerators, showerheads, programmable thermostats, hot water tank turndown, and pipe wrap.]

(IF NEEDED: It will take about 15-20 minutes.)

Throughout this survey I will refer to your apartment as your “home.”

SCREENING QUESTIONS

S0. Is your home serviced by natural gas?

- 1. YES **[SKIP TO S1]**
- 2. NO **[SKIP TO S3]**
- 8. DON'T KNOW
- 9. REFUSED

S1. Our records indicate that **[INCLUDE UTILITY FROM CUSTOMER RECORD]** provides natural gas service to your home, is this correct? **(RECORD UTILITY ANSWER AND FOLLOW SKIP LOGIC ACCORDINGLY)**

- NICOR GAS **[DURING SURVEY, SKIP SECTION WMV]**
- NORTH SHORE GAS **[DURING SURVEY, SKIP SECTION PMV]**
- PEOPLES GAS **[DURING SURVEY, SKIP SECTION PMV]**
- ANOTHER UTILITY: **[SPECIFY _____, THANK & TERMINATE]**
- DON'T KNOW
- REFUSED

[IF UTIL AND ANSWER IN S1 DO NOT MATCH, PLEASE RECATEGORIZE THE RESPONDENT IN THE QUOTAS AS ANSWER TO S1. IF S1=1, THEN TAG AS QUOTA=NICOR. IF S1=2 OR 3, THEN TAG AS QUOTA=INTEGRYS. IF S1=4, THEN TERMINATE. IF S1=8 OR 9, CONTINUE WITH Q'RE AND USE UTIL AS QUOTA]

S2. **[OMITTED]**

To start, we have several questions regarding the equipment installed in your home. The answers to these questions are very important so that we can determine how much energy is being saved.

S3. Our records indicate that during the visit to your home, a field technician installed the following equipment. Please confirm that this is correct. Did you receive....**(READ ANSWERS FROM INSTALLATION LIST ON CUSTOMER RECORD) [1=YES, 2=NO, 7=NA, 8=DON'T KNOW, 9=REFUSED]**

- a. **[If CFL=1]** Compact Fluorescent Light Bulbs
- b. **[If AERA=1]** Faucet Aerators

- c. **[IF SHOW=1]** A Water Efficient Showerhead
- d. **[IF THER=1]** A Programmable Thermostat
- e. **[IF HOTWA=1]** Hot Water Tank Turndown
- f. **[IF PIPE=1]** Pipe Wrap

[IF ANY S3a-f = 1 CONTINUE TO S4, ELSE THANK AND TERMINATE]

S4. Were you residing at your current home when the energy efficient products were installed?

- 1. YES
- 2. NO **[THANK AND TERMINATE]**
- 8. DON'T KNOW **[THANK AND TERMINATE]**
- 9. REFUSED **[THANK AND TERMINATE]**

S5. Our records indicate that you were present when the energy efficient products were installed at your home, is this correct?

- 1. YES
- 2. NO
- 8. DON'T KNOW
- 9. REFUSED

Now I would like to ask you about the upgrades you received through the program.

CFL VERIFICATION

CMV1. Our records indicate that **[INSERT CFL_QTY FROM CUSTOMER RECORD]** CFL(s) were installed by the Multi-Family Home Energy Savings Program during a field technician's visit to your home. Is this correct?

- 1. YES, QUANTITY IS CORRECT **[SKIP TO CMV3]**
- 2. NO, QUANTITY IS INCORRECT **[CONTINUE TO CMV2]**
- 3. NO, I REMOVED THEM **[CONTINUE TO CMV2]**
- 8. DON'T KNOW **[SKIP TO BAMV1]**
- 9. REFUSED **[SKIP TO BAMV1]**

CMV2. How many CFLs were installed during the visit? **[NUMERIC OPEN END (UP TO 99), DK, REF] [USE AS CFL_QTY FOR REMAINDER OF SURVEY UNLESS DK OR REF, IF DK OR REF THEN SKIP TO BAMV1]**

CMV3a. Where (was/were) the CFL(s) installed? **[MULTIPUNCH]**

- 1. BEDROOM
- 2. BATHROOM
- 3. FAMILY ROOM / DEN
- 4. GARAGE
- 5. HALLWAY, STAIRCASE, FOYER OR ENTRY
- 6. KITCHEN
- 7. LIVING ROOM
- 8. LAUNDRY ROOM
- 9. ATTIC
- 10. BASEMENT
- 11. DINING ROOM
- 12. OFFICE
- 13. OUTSIDE

- 14. SPARE ROOM
- 15. CLOSET
- 00. OTHER, SPECIFY
- 98. DON'T KNOW **[SKIP TO CMV4]**
- 99. REFUSED **[SKIP TO CMV4]**

CMV3. Do you generally use the CFL(s) installed [in each of those locations] at least two hours every day?
[MULTIPUNCH]

[INTERVIEWER: IF THE RESPONDENT SAYS YES, ALL ARE USED AT LEAST TWO HOURS EVERYDAY, MARK THEM ALL INDIVIDUALLY. IF ONLY CERTAIN CFLS ARE USED, ONLY SELECT THE ROOMS THAT ARE USED AT LEAST TWO HOURS EVERYDAY]

- [INSERT ANSWERS CHOSEN IN CMV4]**
- 97. NO/USE ALL LESS THAN TWO HOURS DAILY
- 98. DON'T KNOW
- 99. REFUSED

CMV4. What type of light bulbs did the CFLs replace? **(SELECT ALL THAT APPLY)**

- 01. Halogen
- 02. Incandescent
- 03. CFL
- 04. ADDED NEW LAMP/FIXTURE
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

CMV5. Is (are) all the CFL(s) still installed in the original location?

- 1. YES **[SKIP TO CMV16]**
- 2. NO
- 8. DON'T KNOW
- 9. REFUSED

CMV6. Which of the following best describes what happened with the CFL(s) that are no longer in their original location? **(READ LIST) [MULTIPUNCH]**

- 1. It is installed at some other location in your home
- 2. It was thrown away
- 3. It is in storage
- 4. It was sold or given away
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

[IF CFL_QTY=1, SKIP TO CMV13]

CMV7. Now, I would like to understand what happened to the all **[INSERT CFL_QTY]** CFLs. Just to let you know, we will need to account for all **[CFL_QTY]** CFL(s). If you're not exactly sure where they all ended, please use your best guess so that your answers add up to **[CFL_QTY]**.

First, how many CFLs are currently installed in their original location? **[NUMERIC OPEN END UP TO CFL_QTY, DK, REF]**

CMV8. **[ASK IF CMV6=1]** How many are installed at some other location in your home? **[NUMERIC OPEN END UP TO CFL_QTY, DK, REF]**

CMV9. **[ASK IF CMV6=2]** How many program bulbs have been thrown away? **[NUMERIC OPEN END UP TO CFL_QTY, DK, REF]**

CMV10. **[ASK IF CMV6=3]** How many are in storage? **[NUMERIC OPEN END UP TO CFL_QTY, DK, REF]**

CMV11. **[ASK IF CMV6=4]** How many were sold or given away? **[NUMERIC OPEN END UP TO CFL_QTY, DK, REF]**

[SHOW “CFL_QTY CHECK” IF SUM OF CMV7 THROUGH CMV11 IS GREATER THAN CFL_QTY. IF THE SUM OF CMV7 THROUGH CMV11 EQUALS CFL_QTY, SKIP TO LOGIC BEFORE CMV13. IF THE SUM OF CMV7 THROUGH CMV11 IS LESS THAN CFL_QTY, ASK CMV12. IF DK/REF IS MARKED FOR ANY OF CMV7 THROUGH CMV11, SKIP TO LOGIC BEFORE CMV13]

“I must have made a mistake, those quantities add up to more than were installed through the program. Let me read through the last few questions again” **AND SKIP BACK TO CMV8.**

[ASK IF SUM OF CMV7 THROUGH CMV11 IS LESS THAN CFL_QTY]

CMV12. What was done with the remaining **[CFL_QTY MINUS SUM OF CMV7 THROUGH CMV11]** of CFLs? **[OPEN END, DK, REF]**

IF CMV6 = 4, ASK CMV13. ELSE SKIP TO CMV14

CMV13. [Wording if CFL_QTY=1 OR CMV11=1] Is (are) the CFL(s) you sold or gave away located in ComEd service territory?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

IF CMV6= 1, 2 or 3; ASK CMV14. ELSE SKIP TO CMV15

CMV14. Why [were the CFLs/was the CFL] moved from [their/its] original location? **(MULTIPLE RESPONSE UP TO 7 RESPONSES)**

01. EQUIPMENT FAILED
02. DIDN'T WORK PROPERLY
03. WRONG SIZE – TOO SMALL OR TOO LARGE
04. DIDN'T LIKE THE COLOR OF THE LIGHT OUTPUT
05. DIDN'T LIKE THE APPEARANCE OF THE LIGHT BULB
06. PERSONAL PREFERENCE--WANTED TO USE BULBS IN ANOTHER FIXTURE
00. OTHER, SPECIFY
98. DON'T KNOW
99. REFUSED

CMV15. What did you replace the CFL(s) with? **(MULTIPLE RESPONSE)**

01. With a new CFL
02. With an incandescent bulb
03. DID NOT REPLACE
00. OTHER, SPECIFY
98. DON'T KNOW
99. REFUSED

CMV16. Have you installed any more CFLs since you received the ones through the program?

1. YES **[CONTINUE TO CMV17]**
2. NO **[SKIP TO CMV20]**

- 8. DON'T KNOW [SKIP TO CMV20]
- 9. REFUSED [SKIP TO CMV20]

IF CMV16 = 1, ASK CMV17. ELSE SKIP to CMV20

CMV17. How many additional CFLs have you installed? [NUMERIC OPEN END UP TO 999, DK, REF]

CMV18-19a. [OMITTED]

CMV20. Before participating in the program, approximately how many of the screw-in light bulb fixtures in your home were already equipped with CFL bulbs?

- 0. NONE
[NUMERIC OPEN END UP TO 95]
- 8. DON'T KNOW
- 9. REFUSED

CMV21. [OMITTED]

CMV22. On a scale of 1 to 5, how would you rate your satisfaction with the installed CFLs? (1=very dissatisfied; 5=very satisfied) [1-5, DK, REF]

IF CMV22 = 1 or 2, ASK CMV22a. ELSE SKIP to BAMV1

CMV22a. Why did you rate it that way? (OPEN END, RECORD VERBATIM, DK/REF) [IF DK OR REF, THEN SKIP TO BAMV1]

CMV23. [OMITTED]

BAMV. BATHROOM FAUCET AERATOR MEASURE VERIFICATION

[ASK BAMV MODULE IF AERA1=1 OR 3, ELSE SKIP TO LOGIC BEFORE KAMV MODULE]

BAMV1. Our records indicate that [INSERT BAER_QTY FROM CUSTOMER RECORD] bathroom faucet aerator(s) were installed by the Multi-Family Home Energy Savings Program during a technician's visit to your home. Is this correct?

- 1. YES, QUANTITY IS CORRECT [SKIP TO BAMV2A]
- 2. NO, QUANTITY IS INCORRECT [CONTINUE TO BAMV2]
- 8. DON'T KNOW [SKIP TO KAMV1]
- 9. REFUSED [SKIP TO KAMV1]

BAMV2. How many faucet aerators were installed in your bathroom(s)? (PROMPT FOR BEST GUESS.) [NUMERIC OPEN END UP TO 999, DK, REF] [IF DK OR REF, SKIP TO KAMV1][USE AS [BAER_QTY] FOR REMAINDER OF SURVEY]

BAMV3. Is (are) the bathroom faucet aerator(s) still installed in the original location?

- 1. YES [SKIP TO BAMV15]
- 2. NO [CONTINUE TO BAMV3A]
- 8. DON'T KNOW [CONTINUE TO BAMV3A]
- 9. REFUSED [CONTINUE TO BAMV3A]

BAMV3a. Which of the following best describes what happened with the bathroom faucet aerator? (READ LIST) [MULTIPUNCH]

- 01. It is installed at some other location in your home
- 02. It was thrown away
- 03. It is in storage
- 04. It was given away
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

BAMV3b-3g. **[OMITTED]**

BAMV4. **[OMITTED]**

IF BAMV3a = 01, 02 or 03; ASK BAMV5. ELSE SKIP TO BAMV6

BAMV5. Why [was/were] the bathroom faucet aerator(s) moved from [their/its] original locations? **(MULTIPLE RESPONSE UP TO 5 RESPONSES)**

- 01. EQUIPMENT FAILED
- 02. DIDN'T WORK PROPERLY
- 03. DIDN'T LIKE THE FLOW OF WATER WITH THE EFFICIENT AERATOR
- 04. DIDN'T LIKE THE APPEARANCE OF THE AERATOR
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

BAMV6. What did you replace the bathroom faucet aerator(s) with? **(MULTIPLE RESPONSE)**

- 01. With a new high efficiency aerator
- 02. With a less efficient aerator
- 03. Re-installed old equipment
- 04. DID NOT REPLACE
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

BAMV7-14. **[OMITTED]**

BAMV15. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how would you rate your satisfaction with your new bathroom faucet aerator(s)? **(1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]**

IF BAMV15 = 1 or 2, ASK BAMV15a. ELSE SKIP to BAMV17

BAMV15a. Why did you rate it that way? [OPEN END, RECORD VERBATIM] **[IF DK OR REF, THEN SKIP TO BAMV17]**

BAMV16. **[OMITTED]**

BAMV17. How many total bathroom faucets do you have in your home? **[NUMERIC OPEN END up to 99, DK, REF]**

KAMV. KITCHEN FAUCET AERATOR MEASURE VERIFICATION

KAMV1. Our records indicate that **[INSERT KAER_QTY FROM CUSTOMER RECORD]** faucet aerator(s) were installed by the Multi-Family Home Energy Savings Program during a technician's visit to your home. Is this correct?

- 1. YES, QUANTITY IS CORRECT **[SKIP TO KAMV3]**
- 2. NO, QUANTITY IS INCORRECT **[CONTINUE TO KAMV2]**
- 8. DON'T KNOW **[SKIP TO SMV1]**

9. REFUSED [SKIP TO SMV1]

KAMV2. How many faucet aerators were installed in your kitchen faucets? **[PROMPT FOR BEST GUESS.]**
[NUMERIC OPEN END UP TO 999, DK, REF] [IF DK OR REF, SKIP TO SMV1][USE AS [KAER_QTY] FOR REMAINDER OF SURVEY]

KAMV3. Is (are) the kitchen faucet aerator(s) still installed in the original location?

1. YES [SKIP TO KAMV15]
2. NO [CONTINUE TO KAMV3A]
8. DON'T KNOW [CONTINUE TO KAMV3A]
9. REFUSED [CONTINUE TO KAMV3A]

KAMV3a. Which of the following best describes what happened with the kitchen faucet aerator(s)? **(READ LIST)**
[MULTIPUNCH]

01. It is installed at some other location in your home
02. It was thrown away
03. It is in storage
04. It was given away
00. OTHER, SPECIFY
98. DON'T KNOW
99. REFUSED

KAMV3b-4. **[OMITTED]**

IF KAMV3a = 01, 02 or 03; ASK KAMV5. ELSE SKIP TO KAMV6

KAMV5. Why [was/were] the kitchen faucet aerator(s) removed? **(MULTIPLE RESPONSE UP TO 5 RESPONSES)**
[WORDING CHANGE BASED ON KAER_QTY]

01. EQUIPMENT FAILED
02. DIDN'T WORK PROPERLY
03. DIDN'T LIKE THE FLOW OF WATER WITH THE EFFICIENT AERATOR
04. DIDN'T LIKE THE APPEARANCE OF THE AERATOR
00. OTHER, SPECIFY
98. DON'T KNOW
99. REFUSED

KAMV6. What did you replace the kitchen faucet aerator(s) with? **(MULTIPLE RESPONSE)**

01. With a new high efficiency aerator
02. With a less efficient aerator
03. Re-installed old equipment
04. DID NOT REPLACE
00. OTHER, SPECIFY
98. DON'T KNOW
99. REFUSED

KAMV7-14. **[OMITTED]**

KAMV15. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how would you rate your satisfaction with your new kitchen faucet aerators? **(1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]**

IF KAMV15 = 1 or 2, ASK KAMV15a. ELSE SKIP to KAMV16

KAMV15a. Why did you rate it that way? **[OPEN END, RECORD VERBATIM] [IF DK OR REF, THEN SKIP TO KAMV16]**

KAMV16. How many total kitchen faucets are there in your kitchen?

[NUMERIC OPEN END UP TO 97, DK, REF]

SMV. SHOWERHEAD MEASURE VERIFICATION

SMV1. Our records indicate that **[INSERT S_QTY FROM CUSTOMER RECORD]** water efficient showerhead(s) were installed by the Multi-Family Home Energy Savings Program during a technician’s visit to your home. Is this correct? **(NOTE TO INTERVIEWER: THIS INCLUDES BOTH WATER EFFICIENT SHOWERHEADS AND HANDHELD SHOWERHEADS)**

- 1. YES, QUANTITY IS CORRECT **[SKIP TO SMV3]**
- 2. NO, QUANTITY IS INCORRECT **[CONTINUE TO SMV2]**
- 8. DON’T KNOW **[SKIP TO PMV1]**
- 9. REFUSED **[SKIP TO PMV1]**

SMV2. How many showerheads were installed? **(PROBE FOR BEST ESTIMATE) [NUMERIC OPEN END UP TO 999, DK, REF] [IF DK OR REF, THEN SKIP TO PMV1] [USE AS S_QTY FOR REMAINDER OF SURVEY]**

SMV3. Is (are) the showerhead(s) still installed in the original location?

- 1. YES **[SKIP TO SMV16]**
- 2. NO **[CONTINUE TO SMV3A]**
- 8. DON’T KNOW **[CONTINUE TO SMV3A]**
- 9. REFUSED **[CONTINUE TO SMV3A]**

SMV3a. Which of the following best describes what happened with the showerhead? **(READ LIST) [MULTIPUNCH]**

- 1. It is installed at some other location in your home
- 2. It was thrown away
- 3. It is in storage
- 4. It was given away
- 00. OTHER, SPECIFY
- 98. DON’T KNOW
- 99. REFUSED

SMV4a-6. **[OMITTED]**

IF SMV3a = 1, 2 or 3; ASK SMV7. ELSE SKIP TO SMV8

SMV7. Why were the showerhead(s) moved from their original location? **(MULTIPLE RESPONSE UP TO 7 RESPONSES)**

- 01. EQUIPMENT FAILED
- 02. DIDN’T WORK PROPERLY
- 03. DIDN’T LIKE THE FLOW OF WATER WITH THE EFFICIENT SHOWERHEAD
- 04. DIDN’T LIKE THE APPEARANCE OF THE SHOWERHEAD
- 00. OTHER, SPECIFY
- 98. DON’T KNOW
- 99. REFUSED

SMV8. What did you replace the showerhead(s) you removed with? **(MULTIPLE RESPONSE)**

- 01. With a new high efficiency showerhead
- 02. With a less efficient showerhead

- 03. Re-installed old equipment
- 04. DID NOT REPLACE
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

SMV9-15. **[OMITTED]**

SMV16. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how would you rate your satisfaction with your new water efficient showerhead(s)? **(1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]**

IF SMV16 = 1 OR 2, ASK SMV16A. ELSE SKIP TO SMV17

SMV16a. Why did you rate it that way? **[OPEN END, RECORD VERBATIM] [IF DK OR REF, THEN SKIP TO SMV17]**

SMV17. In total, how many showers are in your home? **[NUMERIC OPEN END UP TO 999, DK, REF]**

PMV. PROGRAMMABLE THERMOSTAT VERIFICATION

IF S1 = 1, ASK PMV1-PMV6A. ELSE SKIP TO HMV1

PMV1. Our records indicate that **[INSERT PRT_QTY FROM CUSTOMER RECORD]** programmable thermostats(s) were installed by the Multi-Family Home Energy Savings Program during a technician's visit to your home. Is this correct?

- 1. YES, QUANTITY IS CORRECT **[SKIP TO PMV3]**
- 2. NO, QUANTITY IS INCORRECT **[CONTINUE TO PMV2]**
- 3. NO, I DID NOT INSTALL **[CONTINUE TO PMV2]**
- 8. DON'T KNOW **[CONTINUE TO PMV2]**
- 9. REFUSED **[CONTINUE TO PMV2]**

PMV2. How many programmable thermostats were installed? **(PROBE FOR BEST ESTIMATE) [NUMERIC OPEN END UP TO 999, DK, REF] [IF DK OR REF, THEN SKIP HMV1] [USE AS S_QTY FOR REMAINDER OF SURVEY]**

IF S5 = 1, ASK PMV3. ELSE SKIP TO PMV3A

PMV3. Did the field technician demonstrate how to operate the programmable thermostat while you were home?

- 1. YES **[CONTINUE TO PMV4]**
- 2. NO **[CONTINUE TO PMV3A]**
- 8. DON'T KNOW **[CONTINUE TO PMV4]**
- 9. REFUSED **[CONTINUE TO PMV4]**

PMV3a. Did the field technician leave a pamphlet that indicates how to operate the programmable thermostat?

- 1. YES **[CONTINUE TO PMV4]**
- 2. NO **[CONTINUE TO PMV4]**
- 8. DON'T KNOW **[CONTINUE TO PMV4]**
- 9. REFUSED **[CONTINUE TO PMV4]**

PMV4. Are the settings on the programmable thermostat the same now as when it was originally installed by the Multi-Family program?

- 1. YES **[SKIP TO PMV6]**
- 2. NO **[CONTINUE TO PMV4A]**
- 8. DON'T KNOW **[SKIP TO PMV6]**
- 9. REFUSED **[SKIP TO PMV6]**

IF PMV4 = 2, ASK PMV4a-PMV4b. ELSE SKIP TO PMV6

PMV4a. About how long after the programmable thermostat was installed did you change the settings?

1. Immediately
2. A few days
3. A week or two
4. A month or more
8. DON'T KNOW
9. REFUSED

PMV4b. What settings did you change on your programmable thermostat? **[MULTIPUNCH]**

1. Increased the temperature
2. Decreased the temperature
3. Changed the timing of the program
4. Switched to manual control (turned off programmed schedule)
8. DON'T KNOW
9. REFUSED

PMV5. **[OMITTED]**

PMV6. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how would you rate your satisfaction with your new programmable thermostat(s)? **(1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]**

IF PMV6 = 1 or 2, ASK PMV6a. ELSE SKIP TO HMV1

PMV6a. Why did you rate it that way? **[MULTIPUNCH]**

1. PERSONAL COMFORT
2. THERMOSTAT NOT WORKING LIKE CUSTOMER EXPECTED
3. DIFFICULT TO READ SETTINGS
4. DIFFICULT TO OPERATE
5. OPEN END, RECORD VERBATIM
6. DK **[EXCLUSIVE]**
7. REF **[EXCLUSIVE]**

[IF DK OR REF, THEN SKIP TO HMV1]

PMV7-7a. **[OMITTED]**

PMV8-8a. **[OMITTED]**

HMV. HOT WATER TANK TURNDOWN VERIFICATION

HMV1. **[OMITTED]**

HMV2. Our records indicate that during the Multi-Family Home Energy Savings Program technician's visit to your home, they adjusted the temperature settings on your hot water heater. Is this correct?

1. YES, CORRECT
2. NO, INCORRECT **[SKIP TO WMV1]**
8. DON'T KNOW **[SKIP TO WMV1]**
9. REFUSED **[SKIP TO WMV1]**

HMV3. Is your water heater still set to the settings by the Multi-Family program?

1. YES **[SKIP TO HMV4]**
2. NO **[CONTINUE TO HMV3A]**

8. DON'T KNOW [SKIP TO H MV4]
9. REFUSED [SKIP TO H MV4]

IF H MV3 = 2, ASK H MV3a-b. ELSE SKIP TO H MV4

H MV3a. About how long after the water heater temperature was adjusted by the Multi-Family program did you change the settings?

1. Immediately
2. A few days
3. A week or two
4. A month or more
8. DON'T KNOW
9. REFUSED

H MV3b. What settings did you change on your water heater?

1. Increased the temperature
2. Decreased the temperature
8. DON'T KNOW
9. REFUSED

H MV4. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how would you rate your satisfaction with the new temperature settings on your water heater? (1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]

IF H MV4 = 1 or 2, ASK H MV4a. ELSE SKIP TO W MV1

H MV4a. Why did you rate it that way?

[OPEN END, RECORD VERBATIM] [IF DK OR REF, THEN SKIP TO W MV1]

H MV5. [OMITTED]

H MV5a. [OMITTED]

W MV. PIPE WRAP VERIFICATION

IF S1 = 2 or 3, ASK W MV1-W MV3a. ELSE SKIP TO N A1

W MV1. Our records indicate that during the Multi-Family Home Energy Savings Program technician's visit to your home, your hot water pipes were wrapped for better insulation. Is this correct?

1. YES, CORRECT [CONTINUE TO W MV2]
2. NO, INCORRECT [SKIP TO SAT1]
8. DON'T KNOW [SKIP TO SAT1]
9. REFUSED [SKIP TO SAT1]

W MV2. Is the pipe wrap still present on your hot water pipes?

1. YES [SKIP TO W MV3]
2. NO [CONTINUE TO W MV2A]
8. DON'T KNOW [SKIP TO W MV3]
9. REFUSED [SKIP TO W MV3]

IF W MV2 = 2, ASK W MV2a. ELSE SKIP TO W MV3

W MV2a. What happened to the pipe wrap?

1. It was removed
2. It was thrown away
3. It is in storage
4. It was given away

- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

WMV3. On a scale of 1 to 5, with 1 being very dissatisfied and 5 being very satisfied, how would you rate your satisfaction with your new hot water pipe wrap? **(1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]**

IF WMV3 = 1 or 2, ASK WMV3a. ELSE SKIP TO SAT1

WMV3a. Why did you rate it that way? **[OPEN END, RECORD VERBATIM] [IF DK OR REF, THEN SKIP TO SAT1]**

SAT. CUSTOMER EXPERIENCE AND SATISFACTION

SAT1. I now have a few questions regarding your overall experience with the Multi-Family Program visit to your home. On a scale of 1 to 5, with 1 being very dissatisfied and 5 being very satisfied, how would you rate... **(1 THROUGH 5, 11=DK) [ASK ON SEPARATE SCREENS] [ROTATE SCREENS]**

- a. ... your overall satisfaction with the report you received at the end of the visit
- b. ... your overall satisfaction with the visit
- c. ... your overall satisfaction with the technician that visited your home
- d. ... your overall satisfaction with the Multi-Family Home Energy Savings Program

ASK SAT2a FOR ALL SAT1a-d RATED 1 OR 2 DIRECTLY AFTER IT WAS RATED

SAT2a. Why did you rate it that way?

- 00. OPEN END**
- 98. DON'T KNOW
- 99. REFUSED

SAT3a. Did you experience any problems with the technicians that visited your home or the equipment installed?

- 1. YES, EXPERIENCED A PROBLEM WITH THE PROGRAM STAFF **[CONTINUE TO SAT3B]**
- 2. YES, EXPERIENCED A PROBLEM WITH THE INSTALLED EQUIPMENT **[CONTINUE TO SAT3B]**
- 3. YES, EXPERIENCED A PROBLEM WITH THE STAFF AND EQUIPMENT **[CONTINUE TO SAT3B]**
- 4. DID NOT EXPERIENCE ANY PROBLEMS **[SKIP TO SAT5]**
- 8. DON'T KNOW **[SKIP TO SAT5]**
- 9. REFUSED **[SKIP TO SAT5]**

SAT3b. Did you report the problem?

- 1. YES **[CONTINUE TO SAT3C]**
- 2. NO **[SKIP TO SAT5]**
- 8. DON'T KNOW **[SKIP TO SAT5]**
- 9. REFUSED **[SKIP TO SAT5]**

SAT3c. To whom did you report the problem? **[MULTIPUNCH]**

- 1. MY BUILDING MANAGER OR BUILDING OWNER
- 2. CALLED PHONE NUMBER ON PROGRAM INFORMATION
- 3. ON-SITE TECHNICIAN FROM THE PROGRAM
- 00. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

SAT3d. Was the issue resolved to your satisfaction?

- 1. YES
- 2. NO

- 8. DON'T KNOW
- 9. REFUSED

SAT4. [OMITTED]
SAT4a-c. [OMITTED]

IF S5 = 1, ASK SAT5-SAT5a. ELSE SKIP TO D1

SAT5. Did you complete and mail the customer survey that the technician left with you?

- 1. YES [SKIP TO D1]
- 2. NO [CONTINUE TO SAT5A]
- 8. DON'T KNOW [SKIP TO D1]
- 9. REFUSED [SKIP TO D1]

IF SAT5 = 2, ASK SAT5a. ELSE SKIP TO D1

SAT5a. Why not? [MULTIPUNCH]

- 1. TAKES TOO MUCH TIME
- 2. CAN'T FIND IT
- 00. OTHER (SPECIFY)
- 98. DON'T KNOW
- 99. REFUSED

D. DEMOGRAPHICS/HOME CHARACTERISTICS

I have just a few questions left for background purposes.

D1. How many people live in your household year-round?

(NOTE TO INTERVIEWER: IF NEEDED, PLEASE CLARIFY THAT THEY SHOULD ONLY BE ANSWERING FOR THEIR OWN HOME/APARTMENT, NOT THE APARTMENT BUILDING OR COMPLEX)

[NUMERIC OPEN END]

- 98. DON'T KNOW
- 99. REFUSED

D2. What is the primary language spoken in your home?

00. OPEN END

- 98. DON'T KNOW
- 99. REFUSED

D3. Do you own or rent your home?

- 1. Own
- 2. Rent/Lease
- 8. DON'T KNOW
- 9. REFUSED

Those are all the questions I have. On behalf of the Multi-Family Home Energy Savings Program, thank you very much for your time.

5.8.3 Participating Decision-Maker Telephone Survey Instrument

**MULTI-FAMILY HOME ENERGY SAVINGS PROGRAM
GPY1/EPY4 PARTICIPATING DECISION MAKER SURVEY INSTRUMENT
October 12, 2012 FINAL**

Purpose of this Survey Guide (not to be read to Participants)

The purpose of this survey guide is to collect information from participating customers in the Multi-Family Home Energy Savings Program. Questions in this survey guide are designed to provide interviewers with prepared questions to ask participating multi-family property managers or other decision-makers about their experience with the program. The table below outlines the sections, topics and questions of the interview guide to cross-reference them with the goals and objectives of the Multi-Family Home Energy Savings Program.

Survey Guide: Topics and Corresponding Questions

Section	Topics	Questions
Screening Questions	Is the property serviced by any of the following energy utilities: Nicor Gas, North Shore Gas, Peoples Gas and/or Commonwealth Edison Company?	S0-S2
Sources of Program Awareness	How did the property manager learn about the program? What were the primary motivations for participating?	SR2-SR4
CFL Verification	Verification of CFL installation. How significant was participating in the Multi-Family Program on the decision-maker's choice to install the CFLs?	CMV1-CMV11
Programmable Thermostat Verification (Nicor Gas only)	Verification of Programmable Thermostat Installation. How significant was participating in the Multi-Family Program on the decision-maker's choice to install the programmable thermostats?	PMV1-PMV11
Water Efficiency Measures Verification	Verification of Faucet Aerator Installation. How significant was participating in the Multi-Family Program on the decision-maker's choice to install the aerators?	WMV1-WMV11
Hot Water Tank Turndown Service Verification	Verification of Hot Water Tank Turndown Implementation. How significant was participating in the Multi-Family Program on the decision-maker's choice to implement the hot water tank turndown?	HMV1-HMV9
Participant Spillover & Other Properties	Did the property manager implement energy efficiency measures in common areas that did not receive a rebate? Does the property manager recall receiving suggestions about energy efficiency improvements to common areas? Did the property manager/management company adopt new measures or practices at other properties under management (that did not receive a rebate) after participating in the Multi-Family program? How significant was participating in the Multi-Family Program on the decision-maker's choice to implement these measures or practices?	CA1-CA11
Customer Satisfaction	How satisfied was the customer with the common area and direct installation portions of the multifamily program? Did the customer make referrals to the program? What are potential barriers to additional participation? Does customer wish to share any additional information about the program?	CS9-CS14
Firmographics	Is subject property master metered or individually metered? Do residents own or rent?	F1-F2

INTRODUCTION AND SCREEN

[NOTE TO INTERVIEWER: Cross-reference names from program tracking database to ensure you indicate the property utilities.]

INT1. Hello, this is **[INTERVIEWER'S NAME]** calling from the Blackstone Group on behalf of your local natural gas and electric utilities. ***This is not a sales call.*** We are contacting people who have participated in the Multi-Family Home Energy Savings Program when a field technician came to your property and installed new energy efficient equipment in your tenants' homes.

[IF NEEDED: This program provided free installation of compact fluorescent light bulbs, faucet aerators, low flow showerheads, programmable thermostats, hot water tank turndown, and pipe wrap and recommendations for energy efficiency improvements to your common areas.]

INT2. The purpose of this call is to ask you about your satisfaction with the Multi-Family Home Energy Savings Program as it pertains to your property [PNAME] at [LOCAT]. We are conducting an independent study to evaluate the Multi-Family Home Energy Savings Program and would like to include your opinions. Your answers will be included with answers from other program participants and used to help evaluate the effectiveness of the program and to design future programs. *We would be grateful for your participation in our research.*

Are you the person who is most familiar with your participation in this program?

1. YES [GO TO INT5]
2. NO [GO TO INT3]
3. REQUESTS MORE INFORMATION [GO TO INT4]
4. DON'T KNOW [GO TO INT3]
5. REFUSED [GO TO INT3]

INT3. Is there someone who may be more knowledgeable about the upgrades that I could speak with?

1. YES AND AVAILABLE [GO BACK TO INT1]
2. YES AND BUSY [SCHEDULE CALLBACK]
3. YES AND BUSY [SCHEDULE GENERAL CALLBACK]
4. NO [TERMINATE – REFUSAL]
5. DON'T KNOW/REFUSED [TERMINATE]

INT4. Your local gas and electric utilities sponsor the Multi-Family Home Energy Savings Program. The Illinois Commerce Commission (ICC) requires certain utilities to submit such a report each year. These utilities hired our firm to prepare an independent evaluation of their energy efficiency programs. The information that we gather will help the ICC determine if existing programs should continue while assisting in the design of future programs.

1. SATISFIED WITH INFORMATION – CONTINUE [GO TO INT5]
2. WANTS TO VERIFY STUDY [SCHEDULE CALLBACK]
3. WANTS TO VERIFY STUDY [GENERAL CALLBACK]
4. REFUSED [TERMINATE]

INT5. In this survey, I will refer to the property that participated in the program as “property.”

(IF NEEDED: It will take about 30 minutes.)

SCREENING QUESTIONS

S0. Is your property serviced by natural gas?

Yes [SKIP TO S1]

No [SKIP TO S2]

(DON'T KNOW)

(REFUSED)

S1. The program records indicate that [UTIL] provides natural gas service to your property, is this correct?

(RECORD UTILITY ANSWER AND FOLLOW SKIP LOGIC ACCORDINGLY)

1. NICOR GAS [DURING SURVEY, SKIP SECTION WMV]
2. NORTH SHORE GAS [DURING SURVEY, SKIP SECTION PMV]
3. PEOPLES GAS [DURING SURVEY, SKIP SECTION PMV]
4. ANOTHER UTILITY: [SPECIFY _____]
5. DON'T KNOW
6. REFUSED

[IF UTIL AND ANSWER IN S1 DO NOT MATCH, PLEASE RECATEGORIZE THE RESPONDENT IN THE QUOTAS AS ANSWER TO S1. IF S1=1, THEN TAG AS QUOTA=NICOR. IF S1=2 OR 3, THEN TAG AS QUOTA=INTEGRYS. IF S1=4, THEN TERMINATE. IF S1=8 OR 9, CONTINUE WITH Q'RE AND USE UTIL AS QUOTA]

S2. The program records show that during the visit to your property, a field technician installed the following equipment. Please confirm that this is correct. Did you receive....**(READ ANSWERS FROM INSTALLATION LIST ON CUSTOMER RECORD) [1=YES, 2=NO, 7=NA, 8=DON'T KNOW, 9=REFUSED]**

- g. [IF CFL=1] Compact fluorescent light (CFL) bulbs
- h. [IF KAERA=1] Kitchen faucet aerators
- i. [IF BAERA=1] Bathroom faucet aerators
- j. [IF SHOW=1] Low flow showerheads
- k. [IF POTHER=1] Programmable thermostats
- l. [IF HWTT=1] Hot water tank turndown
- m. [IF PWRAP=1] Pipe wrap for your water heater pipes
- n. [IF CAREC= 1] Recommendations to improve common area energy efficiency (e.g. upgrades to common area lighting or central heating system)

SOURCES OF PROGRAM AWARENESS/REASONS FOR PARTICIPATING

[OMITTED]

SR1. How did you become aware of the Multi-Family Home Energy Savings program? (READ LIST)

[RANDOMIZE, MULTIPUNCH]

1. Field technician visit
2. Mass media (newspaper, internet, TV/Radio)
3. Phone call to property
4. Part of larger corporate decision
5. Trade organization and events
0. (OTHER, SPECIFY)
98. (DON'T KNOW)
99. (REFUSED)

SR2. What was your primary reason for participating in the program? (READ LIST) **[RANDOMIZE, MULTIPUNCH]**

1. Free energy efficiency products for dwelling units

- 2. Common area energy efficiency recommendations
- 3. Requests from tenants
- 4. Marketing
- 5. Corporate decision
- 0. (OTHER, SPECIFY)
- 98. (DON'T KNOW)
- 99. (REFUSED)

SR3. About how many months after you first became aware of the program was it that you decided to participate in the program?

- 1. Within six months
- 2. More than six months, but less than a year later
- 3. More than a year, but less than two years later
- 4. More than two years later
- 88. (Don't know)
- 99. (Refused)

SR4. [OMITTED]

CFLS [ASK IF CFL=1]

CMV1. At the time that you first heard about this program, had you already been thinking about purchasing CFLs for this property?

- 1. (YES) [\[CONTINUE TO CMV2\]](#)
- 2. (NO) [\[SKIP TO NEXT SECTION\]](#)
- 8. (DON'T KNOW) [\[CONTINUE TO CMV2\]](#)
- 9. (REFUSED) [\[CONTINUE TO CMV2\]](#)

CMV2. Had you already began researching or collecting information about CFLs to aid in your purchase decision?

- 1. (YES) [\[CONTINUE TO CMV3\]](#)
- 2. (NO) [\[SKIP TO CMV4\]](#)
- 8. (DON'T KNOW) [\[SKIP TO CMV4\]](#)
- 9. (REFUSED) [\[SKIP TO CMV4\]](#)

CMV3. Had you already selected which CFLs you were planning to purchase?

- 1. (YES)
- 2. (NO)
- 8. (DON'T KNOW)
- 9. (REFUSED)

CMV4. Just to be sure I understand, did you have specific plans to purchase and install CFLs before learning about the program?

- 1. YES [\[CONTINUE TO CMV5\]](#)
- 2. NO [\[SKIP TO CMV9\]](#)
- 8. (DON'T KNOW) [\[SKIP TO CMV9\]](#)
- 9. (REFUSED) [\[SKIP TO CMV9\]](#)

CMV5. Did the program influence you to purchase and install the CFLs **earlier** than you otherwise would have?

1. YES [CONTINUE TO CMV6]
2. NO [SKIP TO CMV7]
8. (DON'T KNOW) [SKIP TO CMV7]
9. (REFUSED) [SKIP TO CMV7]

CMV6. How much later would you have installed the <MEASURE>, if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

CMV7. Without the program, would you have installed the same number of CFLs, fewer CFLs, or more CFLs?

1. The same number [SKIP TO CMV9]
2. Would have installed **fewer** CFLs [CONTINUE TO CMV8]
3. Would have installed **more** CFLs [CONTINUE TO CMV8]
8. (DON'T KNOW) [SKIP TO CMV9]
9. (REFUSED) [SKIP TO CMV9]

CMV8. About how many CFLs would you have installed without the program?

[NUMERIC OPEN END, DK, REF]

CMV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same number of CFLs on your property if you had not received them through the program? [0-10, DK, REF]

[IF CMV9 < 3 AND CMV4 = 2, 8, OR 9, SKIP TO LOGIC BEFORE PMV1] [SHOW CMV10 AND CMV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read several statements about the CFLs you received. On a scale of 0 to 10, where 0 is Strongly Disagree and 10 is Strongly Agree, how much do you agree with each statement:

CMV10. There may have been several reasons for my installation of CFLs, but the program was a critical factor in my decision to have the CFLs installed. [0-10, DK, REF]

CMV11. I would have purchased and installed the same CFLs within a year of when I did even if I had not received them from the program. [0-10, DK, REF]

[ASK CMVC1 IF QUALIFY BASED ON SIX TERMS BELOW. ELSE SKIP TO LOGIC BEFORE PMV1]

Consistency Check & Resolution

NOTE TO PROGRAMMING: [CMVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.)] THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER CMVCC1 ARE:

- CMV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)
- CMV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)
- CMV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)

{IF CMV9= 0,1, OR 2 AND CMV10= 0,1, OR 2 AND CMV11= 8,9, OR 10, ASK CMVC1. THEN INCONSISTENCY1= “you would likely not have installed the CFLs without the program but that differs from when you said the program was not a critical factor and you would install the CFLs within a year without the program”}

{IF CMV9= 8,9,10 AND CMV10= 8,9,10 AND CMV11= 0,1,2, ASK CMVC1. INCONSISTENCY1= ‘you would likely have installed the CFLs without the program but that differs from your response that the program was a critical factor and you would not have installed the CFLs within the year without the program’}

{IF CMV9= 0,1,2 AND CMV10= 0,1,2 AND CMV11= 0,1,2, ASK CMVC1. INCONSISTENCY1=‘the program was not a critical factor in your decision to install the CFLs but that differs from your response that you would not have installed the CFLs within the year without the program’}

{IF CMV9= 8,9,10 AND CMV10= 8,9,10 AND CMV11= 8,9,10, ASK CMVC1. INCONSISTENCY1=‘the program was a critical factor in your decision install the CFLs but that differs from your response that you would have installed the CFLs within the year without the program’}

{IF CMV9= 8,9,10 AND CMV10= 0,1,2 AND CMV11= 0,1,2, ASK CMVC1. INCONSISTENCY1= ‘you would not have installed the CFLs within the year without the program but that differs from your response that the program was not a critical factor and you were likely to install the CFLs without the program’}

{IF CMV9= 0,1,2 AND CMV10= 8,9,10 AND CMV11=8,9,10, ASK CMVC1. INCONSISTENCY1=‘you would have installed the CFLs within the year without the program but that differs from your response that you were not likely to install the CFLs and the program was a critical factor’}

CMVC1. Let me make sure I understand you. Earlier, you said **[INCONSISTENCY1]**. Please tell me in your own words what influence, if any, the program had on your decision to install the CFLs at the time you did? **[OPEN END, DK, REF]**

PROGRAMMABLE THERMOSTATS [ASK IS P THER=1 AND UTIL=1]

[NOTE TO PROGRAMMING: PROGRAMMABLE THERMOSTATS QUESTIONS ARE TO BE ASKED OF COMED & NICOR GAS CUSTOMERS ONLY.]

PMV1. At the time that you first heard about this program, had you already been thinking about purchasing programmable thermostats for this property?

1. (YES) **[CONTINUE TO PMV2]**
2. (NO) **[SKIP TO NEXT SECTION]**
8. (DON'T KNOW) **[SKIP TO PMV2]**
9. (REFUSED) **[SKIP TO PMV2]**

PMV2. Had you already began researching or collecting information about programmable thermostats to aid in your purchase decision?

1. (YES) **[CONTINUE TO PMV3]**
2. (NO) **[SKIP TO PMV4]**
8. (DON'T KNOW) **[SKIP TO PMV4]**
9. (REFUSED) **[SKIP TO PMV4]**

PMV3. Had you already selected which programmable thermostats you were planning to purchase?

1. (YES)
2. (NO)
8. (DON'T KNOW)
9. (REFUSED)

PMV4. Just to be sure I understand, did you have any specific plans to purchase and install the same programmable thermostats at your property before learning about the program?

1. YES [CONTINUE TO PMV5]
2. NO [SKIP TO PMV9]
8. (DON'T KNOW) [SKIP TO PMV9]
9. (REFUSED) [SKIP TO PMV9]

PMV5. Did the program influence you to purchase and install the programmable thermostats **earlier** than you otherwise would have?

1. YES [CONTINUE TO PMV6]
2. NO [SKIP TO PMV7]
8. (DON'T KNOW) [SKIP TO PMV7]
9. (REFUSED) [SKIP TO PMV7]

PMV6. How much later would you have installed the thermostats, if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

PMV7. Without the program, would you have installed the same number of programmable thermostats, fewer thermostats, or more thermostats?

1. The same number [SKIP TO CMV9]
2. Would have installed **fewer** thermostats [CONTINUE TO CMV8]
3. Would have installed **more** thermostats [CONTINUE TO CMV8]
8. (Don't know) [SKIP TO CMV9]
9. (Refused) [SKIP TO CMV9]

PMV8. How many thermostats would you have installed without the program?

[NUMERIC OPEN END, DK, REF]

PMV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same programmable thermostats on your property if you had not received (it/them) through the program? [0-10, DK, REF]

[IF PMV9 <=3 AND PMV4 = No/DK/REF, SKIP TO LOGIC BEFORE WMV1.] [SHOW PMV10 AND PMV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read two statements about the programmable thermostats you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with each statement.

PMV10. There may have been several reasons for my installation of programmable thermostats, but the program was a critical factor in my decision to have the programmable thermostats installed. [0-10, DK, REF]

PMV11. I would have purchased and installed the same programmable thermostats within a year of when I did even if I had not received (it/them) from the program. [0-10, DK, REF]

[ASK CMVC1 IF QUALIFY BASED ON SIX TERMS BELOW. ELSE SKIP TO LOGIC BEFORE WMV1]

Consistency Check & Resolution

[PMVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER PMVCC1 ARE:

- PMV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)
- PMV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)
- PMV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)

{IF PMV9= 0,1,2 AND PMV10= 0,1,2 AND PMV11= 8,9,10, ASK PMVC1. INCONSISTENCY2='you would likely not have installed the programmable thermostats without the program but that differs from when you said the program was not a critical factor and you would install the programmable thermostats within a year without the program'}

{IF PMV9= 8,9,10 AND PMV10= 8,9,10 AND PMV11= 0,1,2, ASK PMVC1. INCONSISTENCY2= 'you would likely have installed the programmable thermostats without the program but that differs from your response that the program was a critical factor and you would not have installed the programmable thermostats within the year without the program'}

{IF PMV9= 0,1,2 AND PMV10= 0,1,2 AND PMV11= 0,1,2, ASK PMVC1. INCONSISTENCY2='the program was not a critical factor in your decision to install the programmable thermostats but that differs from your response that you would not have installed the programmable thermostats within the year without the program'}

{IF PMV9= 8,9,10 AND PMV10= 8,9,10 AND PMV11= 8,9,10, ASK PMVC1. INCONSISTENCY2='the program was a critical factor in your decision install the programmable thermostats but that differs from your response that you would have installed the programmable thermostats within the year without the program'}

{IF PMV9= 8,9,10 AND PMV10= 0,1,2 AND PMV11= 0,1,2, ASK PMVC1. INCONSISTENCY2= 'you would not have installed the programmable thermostats within the year without the program but that differs from your response that the program was not a critical factor and you were likely to install the programmable thermostats without the program'}

{IF PMV9= 0,1,2 AND PMV10= 8,9,10 AND PMV11=8,9,10, ASK PMVC1. INCONSISTENCY2='you would have installed the programmable thermostats within the year without the program but that differs from your response that you were not likely to install the programmable thermostats and the program was a critical factor'}}

PMVC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY2]. Please tell me in your own words what influence, if any, the program had on your decision to install the programmable thermostats at the time you did? [OPEN END, DK, REF]

WATER EFFICIENCY MEASURES [ASK IF SHOW=1]

SHOWERHEADS:

WMV1. At the time that you first heard about this program, had you already been thinking about purchasing Water Efficient Showerheads for this property?

1. (YES) [CONTINUE TO WMV2]
2. (NO) [SKIP TO NEXT SECTION]
8. (DON'T KNOW) [SKIP TO WMV2]
9. (REFUSED) [SKIP TO WMV2]

WMV2. Had you already began researching or collecting information about Water Efficient Showerheads to aid in your purchase decision?

1. (YES) [CONTINUE TO WMV3]
2. (NO) [SKIP TO WMV4]
8. (DON'T KNOW) [SKIP TO WMV4]
9. (REFUSED) [SKIP TO WMV4]

WMV3. Had you already selected which Water Efficient Showerheads you were planning to purchase?

1. (YES)
2. (NO)
8. (DON'T KNOW)
9. (REFUSED)

WMV4. Just to be sure I understand, did you have any specific plans to purchase and install Water Efficient Showerheads before learning about the program?

1. YES [CONTINUE TO WMV5]
2. NO [SKIP TO WMV9]
8. (DON'T KNOW) [SKIP TO WMV9]
9. (REFUSED) [SKIP TO WMV9]

WMV5. Did the program influence you to purchase and install the Water Efficient Showerheads **earlier** than you otherwise would have?

1. YES [CONTINUE TO WMV6]
2. NO [SKIP TO WMV7]
8. (DON'T KNOW) [SKIP TO WMV7]
9. (REFUSED) [SKIP TO WMV7]

WMV6. How much later would you have installed the Water Efficient Showerheads , if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

WMV7. Without the program, would you have installed the same number of Water Efficient Showerheads , fewer Water Efficient Showerheads , or more Water Efficient Showerheads ?

1. The same number [SKIP TO WMV9]
2. Would have installed **fewer** Water Efficient Showerheads [CONTINUE TO WMV8]
3. Would have installed **more** Water Efficient Showerheads [CONTINUE TO WMV8]
8. (Don't know) [SKIP TO WMV9]
9. (Refused) [SKIP TO WMV9]

WMV8. How many Water Efficient Showerheads would you have installed without the program?

[NUMERIC OPEN END, DK, REF]

WMV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same Water Efficient Showerheads on your property if you had not received them through the program?

[0-10, DK, REF]

[IF WMV9 =3 AND WMV4 = 2,8,9, SKIP TO WMV12] [SHOW WMV10 AND WMV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read several statements about the Water Efficient Showerheads you received. On a scale of 0 to 10, where 0 is Strongly Disagree and 10 is Strongly Agree, how much do you agree with each statement:

WMV10. There may have been several reasons for my installation of Water Efficient Showerheads , but the program was a critical factor in my decision to have the Water Efficient Showerheads installed. [0-10, DK, REF]

WMV11. I would have purchased and installed the same Water Efficient Showerheads within a year of when I did even if I had not received them from the program. [0-10, DK, REF]

Consistency Check & Resolution

NOTE TO PROGRAMMER: [WMVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WMVCC1 ARE:

- **WMV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **WMV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)**
- **WMV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)**

{IF WMV9= 0,1,2 AND WMV10= 0,1,2 AND WMV11= 8,9,10, ASK WMVC1. INCONSISTENCY3='you would likely not have installed the Water Efficient Showerheads without the program but that differs from when you said the program was not a critical factor and you would install the CFLs within a year without the program'}

{IF WMV9= 8,9,10 AND WMV10= 8,9,10 AND WMV11= 0,1,2, ASK WMVC1. INCONSISTENCY3= 'you would likely have installed the Water Efficient Showerheads without the program but that differs from your response that the program was a critical factor and you would not have installed the Water Efficient Showerheads within the year without the program'}

{IF WMV9= 0,1,2 AND WMV10= 0,1,2 AND WMV11= 0,1,2, ASK WMVC1. INCONSISTENCY3='the program was not a critical factor in your decision to install the Water Efficient Showerheads but that differs from your response that you would not have installed the Water Efficient Showerheads within the year without the program'}

{IF WMV9= 8,9,10 AND WMV10= 8,9,10 AND WMV11= 8,9,10, ASK WMVC1. INCONSISTENCY3='the program was a critical factor in your decision install the Water Efficient Showerheads but that differs from your response that you would have installed the Water Efficient Showerheads within the year without the program'}

{IF WMV9= 8,9,10 AND WMV10= 0,1,2 AND WMV11= 0,1,2, ASK WMVC1. INCONSISTENCY3= 'you would not have installed the Water Efficient Showerheads within the year without the program but that differs from your response that the program was not a critical factor and you were likely to install the Water Efficient Showerheads without the program'}

{IF WMV9= 0,1,2 AND WMV10= 8,9,10 AND WMV11=8,9,10, ASK WMVC1. INCONSISTENCY3='you would have installed the Water Efficient Showerheads within the year without the program but that differs from your response that you were not likely to install the Water Efficient Showerheads and the program was a critical factor'}

WMVC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY3]. Please tell me in your own words what influence, if any, the program had on your decision to install the Water Efficient Showerheads at the time you did? [OPEN END, DK, REF]

[Note to Interviewer: Repeat as necessary for all water efficiency measures. Hot Water Pipe Wrap for Peoples Gas and North Shore Gas customers only.]

[IF WEM=1, SKIP TO LOGIC BEFORE HMV1]

WMV12. The questions I just asked you focused on Water Efficient Showerheads, and our program records indicate that you also installed [SHOW IF KAERA=1 "Kitchen Aerators"] [SHOW IF KAERA=1 AND BAERA=1 "and"] [SHOW IF BAERA=1 "Bathroom Aerators"] [SHOW IF (KAERA=1 AND HWPW=1) OR IF (BAERA=1 AND HWPW=1) OR (KAERA=1 AND BAERA=1 AND HWPW=1) "and"] [SHOW IF HWPW=1 "Hot Water Pipe Wrap"]. Was the program as influential in your decision to install these other water efficiency measures as it was in your decision

to install water efficient showerheads or would you say the program influenced some measures more than others? (READ LIST) **[MULTIPUNCH]**

1. The program was similarly influential for all measures installed **[SKIP TO LOGIC BEFORE HMV1]**
2. **[SHOW IF KAERA=1]** Kitchen aerators involved a unique decision making process
3. **[SHOW IF BAERA=1]** Bathroom aerators involved a unique decision making process
4. **[SHOW IF PWRAP=1]** Hot water pipe wrap involved a unique decision making process
5. **[SHOW IF KAERA=1 AND BAERA=1]** Both kitchen and bathroom aerators were the same process, but different from water efficient showerheads and hot water pipe wrap

KITCHEN AERATORS [ASK IF (WMV12=2 OR 5) OR IF (KAERA=1 AND SHOW=0)]

WKV1. At the time that you first heard about this program, had you already been thinking about purchasing kitchen aerators for this property?

1. (YES) **[CONTINUE TO WKV2]**
2. (NO) **[SKIP TO NEXT SECTION]**
8. (DON'T KNOW) **[SKIP TO WKV2]**
9. (REFUSED) **[SKIP TO WKV2]**

WKV2. Had you already began researching or collecting information about kitchen aerators to aid in your purchase decision?

1. (YES) **[CONTINUE TO WKV3]**
2. (NO) **[SKIP TO WKV4]**
8. (DON'T KNOW) **[SKIP TO WKV4]**
9. (REFUSED) **[SKIP TO WKV4]**

WKV3. Had you already selected which kitchen aerators you were planning to purchase?

1. (YES)
2. (NO)
8. (DON'T KNOW)
9. (REFUSED)

WKV4. Just to be sure I understand, did you have any specific plans to purchase and install kitchen aerators before learning about the program?

1. YES **[CONTINUE TO WKV5]**
2. NO **[SKIP TO WKV9]**
8. (DON'T KNOW) **[SKIP TO WKV9]**
9. (REFUSED) **[SKIP TO WKV9]**

WKV5. Did the program influence you to purchase and install the kitchen aerators **earlier** than you otherwise would have?

1. YES **[CONTINUE TO WKV6]**
2. NO **[SKIP TO WKV7]**
8. (DON'T KNOW) **[SKIP TO WKV7]**
9. (REFUSED) **[SKIP TO WKV7]**

WKV6. How much later would you have installed the kitchen aerators , if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

WKV7. Without the program, would you have installed the same number of kitchen aerators , fewer kitchen aerators , or more kitchen aerators ?

1. The same number [SKIP TO WKV9]
2. Would have installed **fewer** kitchen aerators [CONTINUE TO WKV8]
3. Would have installed **more** kitchen aerators [CONTINUE TO WKV8]
8. (Don't know) [SKIP TO WKV9]
9. (Refused) [SKIP TO WKV9]

WKV8. How many kitchen aerators would you have installed without the program?
[NUMERIC OPEN END, DK, REF]

WKV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same kitchen aerators on your property if you had not received them through the program?
[0-10, DK, REF]

[IF WKV9 =3 AND WKV4 = 2,8 OR 9, SKIP TO LOGIC BEFORE WBV1] [SHOW WKV10 AND WKV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read several statements about the kitchen aerators you received. On a scale of 0 to 10, where 0 is Strongly Disagree and 10 is Strongly Agree, how much do you agree with each statement:

WKV10. There may have been several reasons for my installation of kitchen aerators , but the program was a critical factor in my decision to have the kitchen aerators installed. [0-10, DK, REF]

WKV11. I would have purchased and installed the same kitchen aerators within a year of when I did even if I had not received them from the program. [0-10, DK, REF]

Consistency Check & Resolution

NOTE TO PROGRAMMER: [WKVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WKVCC1 ARE:

- **WKV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **WKV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)**
- **WKV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)**

{IF WKV9= 0,1,2 AND WKV10= 0,1,2 AND WKV11= 8,9,10, ASK WKVC1. INCONSISTENCY4='you would likely not have installed the kitchen aerators without the program but that differs from when you said the program was not a critical factor and you would install the CFLs within a year without the program'}

{IF WKV9= 8,9,10 AND WKV10= 8,9,10 AND WKV11= 0,1,2, ASK WKVC1. INCONSISTENCY4= 'you would likely have installed the kitchen aerators without the program but that differs from your response that the program was a critical factor and you would not have installed the kitchen aerators within the year without the program'}

{IF WKV9= 0,1,2 AND WKV10= 0,1,2 AND WKV11= 0,1,2, ASK WKVC1. INCONSISTENCY4='the program was not a critical factor in your decision to install the kitchen aerators but that differs from your response that you would not have installed the kitchen aerators within the year without the program'}

{IF WKV9= 8,9,10 AND WKV10= 8,9,10 AND WKV11= 8,9,10, ASK WKVC1. INCONSISTENCY4='the program was a critical factor in your decision install the kitchen aerators but that differs from your response that you would have installed the kitchen aerators within the year without the program'}

{IF WKV9= 8,9,10 AND WKV10= 0,1,2 AND WKV11= 0,1,2, ASK WKVC1. INCONSISTENCY4= ‘you would not have installed the kitchen aerators within the year without the program but that differs from your response that the program was not a critical factor and you were likely to install the kitchen aerators without the program’}
 {IF WKV9= 0,1,2 AND WKV10= 8,9,10 AND WKV11=8,9,10, ASK WKVC1. INCONSISTENCY4=‘you would have installed the kitchen aerators within the year without the program but that differs from your response that you were not likely to install the kitchen aerators and the program was a critical factor’}}

WKVC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY4]. Please tell me in your own words what influence, if any, the program had on your decision to install the kitchen aerators at the time you did? [OPEN END, DK, REF]

[ASK IF KAERA=1 AND SHOW=0 AND BAERA=1]

WMV12. The questions I just asked you focused on kitchen aerators, and our program records indicate that you also installed bathroom aerators. Was the program as influential in your decision to install the bathroom aerators as it was in your decision to install kitchen aerators or would you say the program influenced the bathroom aerators differently? (READ LIST) **[MULTIPUNCH]**

1. The program was similarly influential for all measures installed **[SKIP TO LOGIC BEFORE BHV1]**
2. Bathroom aerators involved a unique decision making process **[ASK WBV1]**

BATHROOM AERATORS [ASK IF (WMV12=3) OR IF (BAERA=1 AND SHOW=0 AND WMV12<>1)]

WBV1. At the time that you first heard about this program, had you already been thinking about purchasing bathroom aerators for this property?

1. (YES) **[CONTINUE TO WBV2]**
2. (NO) **[SKIP TO NEXT SECTION]**
8. (DON'T KNOW) **[SKIP TO WBV2]**
9. (REFUSED) **[SKIP TO WBV2]**

WBV2. Had you already began researching or collecting information about bathroom aerators to aid in your purchase decision?

1. (YES) **[CONTINUE TO WBV3]**
2. (NO) **[SKIP TO WBV4]**
8. (DON'T KNOW) **[SKIP TO WBV4]**
9. (REFUSED) **[SKIP TO WBV4]**

WBV3. Had you already selected which bathroom aerators you were planning to purchase?

1. (YES)
2. (NO)
8. (DON'T KNOW)
9. (REFUSED)

WBV4. Just to be sure I understand, did you have any specific plans to purchase and install bathroom aerators before learning about the program?

1. YES **[CONTINUE TO WBV5]**
2. NO **[SKIP TO WBV9]**
8. (DON'T KNOW) **[SKIP TO WBV9]**
9. (REFUSED) **[SKIP TO WBV9]**

WBV5. Did the program influence you to purchase and install the bathroom aerators **earlier** than you otherwise would have?

1. YES [CONTINUE TO WBV6]
2. NO [SKIP TO WBV7]
8. (DON'T KNOW) [SKIP TO WBV7]
9. (REFUSED) [SKIP TO WBV7]

WBV6. How much later would you have installed the bathroom aerators , if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

WBV7. Without the program, would you have installed the same number of bathroom aerators , fewer bathroom aerators , or more bathroom aerators ?

1. The same number [SKIP TO WBV9]
2. Would have installed **fewer** bathroom aerators [CONTINUE TO WBV8]
3. Would have installed **more** bathroom aerators [CONTINUE TO WBV8]
8. (Don't know) [SKIP TO WBV9]
9. (Refused) [SKIP TO WBV9]

WBV8. How many bathroom aerators would you have installed without the program?
[NUMERIC OPEN END, DK, REF]

WBV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same bathroom aerators on your property if you had not received them through the program?

[0-10, DK, REF]

[IF WBV9 =3 AND WBV4 = 2,8 OR 9, SKIP TO LOGIC BEFORE WHV1] [SHOW WBV10 AND WBV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read several statements about the bathroom aerators you received. On a scale of 0 to 10, where 0 is Strongly Disagree and 10 is Strongly Agree, how much do you agree with each statement:

WBV10. There may have been several reasons for my installation of bathroom aerators , but the program was a critical factor in my decision to have the bathroom aerators installed. [0-10, DK, REF]

WBV11. I would have purchased and installed the same bathroom aerators within a year of when I did even if I had not received them from the program. [0-10, DK, REF]

Consistency Check & Resolution

NOTE TO PROGRAMMER: [WBVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WBVCC1 ARE:

- **WBV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **WBV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)**
- **WBV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)**

{IF WBV9= 0,1,2 AND WBV10= 0,1,2 AND WBV11= 8,9,10, ASK WBVC1. INCONSISTENCY4='you would likely not have installed the bathroom aerators without the program but that differs from when you said the program was not a critical factor and you would install the CFLs within a year without the program'}

{IF WBV9= 8,9,10 AND WBV10= 8,9,10 AND WBV11= 0,1,2, ASK WBVC1. INCONSISTENCY4= 'you would likely have installed the bathroom aerators without the program but that differs from your response that the program was a critical factor and you would not have installed the bathroom aerators within the year without the program'}

{IF WBV9= 0,1,2 AND WBV10= 0,1,2 AND WBV11= 0,1,2, ASK WBVC1. INCONSISTENCY4='the program was not a critical factor in your decision to install the bathroom aerators but that differs from your response that you would not have installed the bathroom aerators within the year without the program'}

{IF WBV9= 8,9,10 AND WBV10= 8,9,10 AND WBV11= 8,9,10, ASK WBVC1. INCONSISTENCY4='the program was a critical factor in your decision install the bathroom aerators but that differs from your response that you would have installed the bathroom aerators within the year without the program'}

{IF WBV9= 8,9,10 AND WBV10= 0,1,2 AND WBV11= 0,1,2, ASK WBVC1. INCONSISTENCY4= 'you would not have installed the bathroom aerators within the year without the program but that differs from your response that the program was not a critical factor and you were likely to install the bathroom aerators without the program'}

{IF WBV9= 0,1,2 AND WBV10= 8,9,10 AND WBV11=8,9,10, ASK WBVC1. INCONSISTENCY4='you would have installed the bathroom aerators within the year without the program but that differs from your response that you were not likely to install the bathroom aerators and the program was a critical factor'}

WBVC1. Let me make sure I understand you. Earlier, you said [insert appropriate inconsistency statement]. Please tell me in your own words what influence, if any, the program had on your decision to install the bathroom aerators at the time you did? [OPEN END, DK, REF]

HOT WATER PIPE WRAP [ASK IF (WMV12=4 OR 5) OR IF (HWPW=1 AND SHOW=0)]

WHV1. At the time that you first heard about this program, had you already been thinking about purchasing hot water pipe wrap for this property?

1. (YES) [CONTINUE TO WHV2]
2. (NO) [SKIP TO NEXT SECTION]
8. (DON'T KNOW) [SKIP TO WHV2]
9. (REFUSED) [SKIP TO WHV2]

WHV2. Had you already began researching or collecting information about hot water pipe wrap to aid in your purchase decision?

1. (YES) [CONTINUE TO WHV3]
2. (NO) [SKIP TO WHV4]
8. (DON'T KNOW) [SKIP TO WHV4]
9. (REFUSED) [SKIP TO WHV4]

WHV3. Had you already selected which hot water pipe wrap you were planning to purchase?

1. (YES)
2. (NO)
8. (DON'T KNOW)
9. (REFUSED)

WHV4. Just to be sure I understand, did you have any specific plans to purchase and install hot water pipe wrap before learning about the program?

1. YES [CONTINUE TO WHV5]
2. NO [SKIP TO WHV9]
8. (DON'T KNOW) [SKIP TO WHV9]
9. (REFUSED) [SKIP TO WHV9]

WHV5. Did the program influence you to purchase and install the hot water pipe wrap **earlier** than you otherwise would have?

1. YES [CONTINUE TO WHV6]
2. NO [SKIP TO WHV7]
8. (DON'T KNOW) [SKIP TO WHV7]
9. (REFUSED) [SKIP TO WHV7]

WHV6. How much later would you have installed the hot water pipe wrap , if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

WHV7. Without the program, would you have installed the same amount of hot water pipe wrap, less hot water pipe wrap, or more hot water pipe wrap?

1. The same number [SKIP TO WHV9]
2. Would have installed **fewer** hot water pipe wrap [CONTINUE TO WHV8]
3. Would have installed **more** hot water pipe wrap [CONTINUE TO WHV8]
8. (Don't know) [SKIP TO WHV9]
9. (Refused) [SKIP TO WHV9]

WHV8. How much hot water pipe wrap would you have installed without the program?

[NUMERIC OPEN END, DK, REF]

WHV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same amount of hot water pipe wrap on your property if you had not received them through the program?

[0-10, DK, REF]

[IF WHV9 =3 AND WHV4 = 2,8 OR 9, SKIP TO LOGIC BEFORE WHV1] [SHOW WHV10 AND WHV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read several statements about the hot water pipe wrap you received. On a scale of 0 to 10, where 0 is Strongly Disagree and 10 is Strongly Agree, how much do you agree with each statement:

WHV10. There may have been several reasons for my installation of hot water pipe wrap, but the program was a critical factor in my decision to have the hot water pipe wrap installed. [0-10, DK, REF]

WHV11. I would have purchased and installed the same amount of hot water pipe wrap within a year of when I did even if I had not received them from the program. [0-10, DK, REF]

Consistency Check & Resolution

NOTE TO PROGRAMMER: [WHVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WHVCC1 ARE:

- WHV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)
- WHV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)
- WHV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)

{IF WHV9= 0,1,2 AND WHV10= 0,1,2 AND WHV11= 8,9,10, ASK WHVC1. INCONSISTENCY5='you would likely not have installed the hot water pipe wrap without the program but that differs from when you said the program was not a critical factor and you would install the CFLs within a year without the program'}

{IF WHV9= 8,9,10 AND WHV10= 8,9,10 AND WHV11= 0,1,2, ASK WHVC1. INCONSISTENCY5= 'you would likely have installed the hot water pipe wrap without the program but that differs from your response that the program was a critical factor and you would not have installed the hot water pipe wrap within the year without the program'}

{IF WHV9= 0,1,2 AND WHV10= 0,1,2 AND WHV11= 0,1,2, ASK WHVC1. INCONSISTENCY5='the program was not a critical factor in your decision to install the hot water pipe wrap but that differs from your response that you would not have installed the hot water pipe wrap within the year without the program'}

{IF WHV9= 8,9,10 AND WHV10= 8,9,10 AND WHV11= 8,9,10, ASK WHVC1. INCONSISTENCY5='the program was a critical factor in your decision install the hot water pipe wrap but that differs from your response that you would have installed the hot water pipe wrap within the year without the program'}

{IF WHV9= 8,9,10 AND WHV10= 0,1,2 AND WHV11= 0,1,2, ASK WHVC1. INCONSISTENCY5= 'you would not have installed the hot water pipe wrap within the year without the program but that differs from your response that the program was not a critical factor and you were likely to install the hot water pipe wrap without the program'}

{IF WHV9= 0,1,2 AND WHV10= 8,9,10 AND WHV11=8,9,10, ASK WHVC1. INCONSISTENCY5='you would have installed the hot water pipe wrap within the year without the program but that differs from your response that you were not likely to install the hot water pipe wrap and the program was a critical factor'}}

WHVC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY5]. Please tell me in your own words what influence, if any, the program had on your decision to install the hot water pipe wrap at the time you did? [OPEN END, DK, REF]

HOT WATER TANK TURNDOWN SERVICE [ASK IF HWTT=1]

HMV1. At the time that you first heard about this program, had you already been thinking about implementing hot water turndown service for this property?

1. (YES) [CONTINUE TO HMV2]
2. (NO) [SKIP TO NEXT SECTION]
8. (DON'T KNOW) [SKIP TO HMV2]
9. (REFUSED) [SKIP TO HMV2]

HMV2. Had you already began researching or collecting information about implementing hot water turndown service to aid in your decision?

1. (YES) [CONTINUE TO HMV3]
2. (NO) [SKIP TO HMV4]
8. (DON'T KNOW) [SKIP TO HMV4]
9. (REFUSED) [SKIP TO HMV4]

HMV3. Had you already selected a contractor or technician to perform the hot water turndown service you were planning to purchase?

1. (YES)
2. (NO)
8. (DON'T KNOW)
9. (REFUSED)

HMV4. Just to be sure I understand, did you have any specific plans to implement hot water turndown service before learning about the program?

1. YES [CONTINUE TO HMV5]
2. NO [SKIP TO HMV9]
8. (DON'T KNOW) [SKIP TO HMV9]
9. (REFUSED) [SKIP TO HMV9]

HMV5. Did the program influence you to implement hot water turndown service **earlier** than you otherwise would have?

1. YES [CONTINUE TO HMV6]
2. NO [SKIP TO HMV7]
8. (DON'T KNOW) [SKIP TO HMV7]
9. (REFUSED) [SKIP TO HMV7]

HMV6. How much later would you have implemented the hot water turndown service, if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. (Don't know)
99. (Refused)

HMV7. **OMITTED**

HMV8. **OMITTED**

HMV9. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have implemented the same hot water turndown service on your property if you had not received the service through the program? [0-10, DK, REF]

[IF HMV7 <=3 AND HMV4 = 2,8, OR 9, SKIP TO LOGIC BEFORE CA1] [SHOW WHV10 AND WHV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read several statements about the hot water turndown service you received. On a scale of 0 to 10, where 0 is Strongly Disagree and 10 is Strongly Agree, how much do you agree with each statement:

HMV10. There may have been several reasons for my implementing the hot water turndown service, but the program was a critical factor in my decision to have the hot water turndown service performed. **[0-10, DK, REF]**

HMV11. I would have implemented the same hot water turndown service within a year of when I did even if I had not received it from the program. **[0-10, DK, REF]**

Consistency Check & Resolution

NOTE TO PROGRAMMER: [HMVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ALL BUT ONE OF THE QUESTIONS ARE AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE ONE QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER HMVCC1 ARE:

- **HMV9 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **HMV10 (PROGRAM WAS A CRITICAL FACTOR IN MY DECISION TO INSTALL ITEM)**
- **HMV11 (WOULD HAVE INSTALLED ITEM WITHIN A YEAR, WITHOUT THE PROGRAM)**

{IF HMV9= 0,1,2 AND HMV10= 0,1,2 AND HMV11= 8,9,10, ASK HMVC1. INCONSISTENCY6='you would likely not have implemented the hot water turndown service without the program but that differs from when you said the program was not a critical factor and you would implement the hot water turndown service within a year without the program'}

{IF HMV9= 8,9,10 AND HMV10= 8,9,10 AND HMV11= 0,1,2, ASK HMVC1. INCONSISTENCY6= 'you would likely have implemented the hot water turndown service without the program but that differs from your response that the program was a critical factor and you would not have implemented the hot water turndown service within the year without the program'}

{IF HMV9= 0,1,2 AND HMV10= 0,1,2 AND HMV11= 0,1,2, ASK HMVC1. INCONSISTENCY6='the program was not a critical factor in your decision to implement the hot water turndown service but that differs from your response that you would not have implemented the hot water turndown service within the year without the program'}

{IF HMV9= 8,9,10 AND HMV10= 8,9,10 AND HMV11= 8,9,10, ASK HMVC1. INCONSISTENCY6='the program was a critical factor in your decision implement the hot water turndown service but that differs from your response that you would have implemented the hot water turndown service within the year without the program'}

{IF HMV9= 8,9,10 AND HMV10= 0,1,2 AND HMV11= 0,1,2, ASK HMVC1. INCONSISTENCY6= 'you would not have implemented the hot water turndown service within the year without the program but that differs from your response that the program was not a critical factor and you were likely to implement the hot water turndown service without the program'}

{IF HMV9= 0,1,2 AND HMV10= 8,9,10 AND HMV11=8,9,10, ASK HMVC1. INCONSISTENCY6='you would have implemented the hot water turndown service within the year without the program but that differs from your response that you were not likely to implement the hot water turndown service and the program was a critical factor'}}

HMVC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY6]. Please tell me in your own words what influence, if any, the program had on your decision to implement the hot water turndown service at the time you did? **[OPEN END, DK, REF]**

PARTICIPANT SPILLOVER

CA1. Since participating in the Multi-Family Home Energy Savings Program, have you taken action to reduce the energy consumption of any of the following systems at your property...? **[RANDOMIZE 1-3] [MULTIPLE RESPONSE]**

1. Lighting
2. Space Heating
3. Water Heating
4. Appliances
5. Faucet Aerators
6. Water Efficient Showerheads
7. Programmable Thermostats
8. Hot Water Heater Tank Turndown Service
9. Hot Water Pipe Insulation Wrap
10. OTHER, SPECIFY
11. NO **(SKIP TO NEXT SECTION)**
88. (DON'T KNOW) **(SKIP TO NEXT SECTION)**
99. (REFUSED) **(SKIP TO NEXT SECTION)**

CA1a. **[ASK IF CA1=1-10]** Did you receive a utility rebate for this action?

1. Yes **(SKIP TO NEXT SECTION)**
2. No (continue to CA1b)
3. Project not yet complete (continue to CA1b)
8. (DON'T KNOW) (continue to CA1b)
9. (REFUSED) (continue to CA1b)

CA1b. Please describe the energy efficiency upgrades at your property. What type of equipment did you install? (NOTE TO INTERVIEWER: ASK FOR MAKE, MODEL AND EFFICIENCY RATING. IF RESPONSE IS GENERAL, E.G., "LIGHTING EQUIPMENT", PROBE FOR SPECIFIC MEASURE. PROBE FROM LIST, IF NECESSARY.)

[MULTIPLE RESPONSE]

- 1 (Lighting: T8 lamps)
- 2 (Lighting: T5 lamps)
- 3 (Lighting: CFL fixtures)
- 4 (Lighting: LED lamps)
- 5 (Lighting: Controls / Occupancy sensors)
- 6 (Space Heating: Central Furnace or Boiler)
- 7 (Space Heating: Individual Furnace or Boiler)
- 8 (Space Heating: Variable Frequency Drives (VFD/VSD) on HVAC Motors)
- 9 (Water Heating: Central Boiler or Water Heater)
- 10 (Water Heating: Individual Water Heaters)
- 11 (Appliances: ENERGY STAR appliances in common area)
- 12 (Appliances: ENERGY STAR appliances in dwelling units)
- 13 (Faucet Aerators: Faucet Aerators in common area bathroom(s))
- 14 (Faucet Aerators: Faucet Aerators in common area kitchen(s))
- 15 (Water Efficient Showerheads: Water Efficient Showerheads in common area(s))
- 16 (Programmable Thermostats)
- 17 (Hot Water Heater Tank Turndown Service)
- 18 (Hot Water Pipe Insulation Wrap)
- 00 (Other, specify)
- 96 (Didn't implement any measures)
- 98 (Don't know)
- 99 (Refused)

CA1c. What was the quantity of the new equipment installed? [0-1000, DK, REF]

CA1d. **[ASK IF CA1=2-10]** What is the fuel source of the new equipment installed?

1. Electric
2. Natural Gas
3. Other (Specify)
4. Don't Know
5. Refused

CA1e. Thinking about the measure with the greatest potential for reducing energy consumption, why did you purchase this equipment without an incentive, if it was available? (If needed, read back measure: <CA1b RESPONSE>). [MULTIPLE RESPONSE, UP TO 3] [PROBE FROM LIST, IF NECESSARY]

- 1 (Takes too long to get approval)
- 2 (No time to participate, needed equipment immediately)
- 3 (The equipment did not qualify)
- 4 (The amount of the incentive wasn't large enough)
- 5 (Did not know the program was available)
- 6 (There was no program available)
- 7 (Had reached the maximum incentive amount)
- 00 (Other, specify)
- 98 (Don't know)
- 99 (Refused)

[ASK CA1f IF CA1e=3, ELSE SKIP TO CA1e]

CA1f. Why didn't the equipment qualify? [OPEN END]

CA1g. What type of equipment did you replace? (NOTE TO INTERVIEWER: Prompt if needed for the fuel source, make and model, or fuel source and approximate age of the old equipment at the location) [OPEN END, DK, REF]

CA2. Was the Multi-Family Home Energy Savings Program a significant influence in encouraging you to implement efficiency improvements in your property's [answer to CA1]? Please rate this on a 0-10 scale, where 0 means not at all significant and 10 means very significant. [0-10, DK, REF]

CA2a. **[ASK IF CA2≥5]** In your own words, how was the program influential in encouraging you to implement efficiency improvements in your property's [answer to CA1]? [OPEN END, DK, REF]

CA2b. Was this action recommended to you by a representative of the Multi-Family Home Energy Savings Program? (note to interviewer: could include written or verbal recommendation, formal or informal)

1. Yes
2. No
8. (DON'T KNOW)
9. (REFUSED)

OTHER PROPERTIES

CA3. Since participating in the Multi-Family Home Energy Savings Program, have you taken action to reduce the energy consumption of any of the following systems at other properties under management [RANDOMIZE 1-3] [MULTIPUNCH]

1. Lighting
2. Space Heating
3. Water Heating
4. Appliances
5. Faucet Aerators
6. Water Efficient Showerheads
7. Programmable Thermostats
8. Hot Water Heater Tank Turndown Service
9. Hot Water Pipe Insulation Wrap
10. OTHER, SPECIFY
11. NO (SKIP TO NEXT SECTION)
88. (DON'T KNOW) (SKIP TO NEXT SECTION)
99. (REFUSED) (SKIP TO NEXT SECTION)

CA3a. Did you receive a utility rebate for this action?

1. Yes (SKIP TO next section)
2. No (continue to CA3b)
3. Project not yet complete (continue to CA3b)
8. (DON'T KNOW) (continue to CA3b)
9. (REFUSED) (continue to CA3b)

CA3b. Please describe the projects where you purchased and installed energy efficiency upgrades at other property(ies) under your management within the state of Illinois. What type of equipment did you install? (NOTE TO INTERVIEWER: ASK FOR MAKE, MODEL AND EFFICIENCY RATING. IF RESPONSE IS GENERAL, E.G., "LIGHTING EQUIPMENT", PROBE FOR SPECIFIC MEASURE. PROBE FROM LIST, IF NECESSARY.) [MULTIPLE RESPONSE]

- 1 (Lighting: T8 lamps)
- 2 (Lighting: T5 lamps)
- 3 (Lighting: CFL fixtures)
- 4 (Lighting: LED lamps)
- 5 (Lighting: Controls / Occupancy sensors)
- 6 (Space Heating: Central Furnace or Boiler)
- 7 (Space Heating: Individual Furnace or Boiler)
- 8 (Space Heating: Variable Frequency Drives (VFD/VSD) on HVAC Motors)
- 9 (Water Heating: Central Boiler or Water Heater)
- 10 (Water Heating: Individual Water Heaters)
- 11 (Appliances: ENERGY STAR appliances in common area)
- 12 (Appliances: ENERGY STAR appliances in dwelling units)
- 13 (Faucet Aerators: Faucet Aerators in common area bathroom(s))
- 14 (Faucet Aerators: Faucet Aerators in common area kitchen(s))
- 15 (Water Efficient Showerheads: Water Efficient Showerheads in common area(s))
- 16 (Programmable Thermostats)
- 17 (Hot Water Heater Tank Turndown Service)
- 18 (Hot Water Pipe Insulation Wrap)
- 00 (Other, specify)
- 96 (Didn't implement any measures)
- 98 (Don't know)

99 (Refused)

CA3c. What was the quantity of the new equipment installed? [0-1000, DK, REF]

CA3d. **[ASK IF CA3=2-10]** What was the fuel source of the new equipment installed?

1. Electric
2. Natural Gas
3. Other (specify)
4. Don't Know
5. Refused

CA4. Thinking about the measure with the greatest potential for reducing energy consumption, why did you purchase this equipment without an incentive, if it was available? (If needed, read back measure: <CA3b RESPONSE>). [MULTIPLE RESPONSE, UP TO 3] [PROBE FROM LIST, IF NECESSARY]

- 1 (Takes too long to get approval)
- 2 (No time to participate, needed equipment immediately)
- 3 (The equipment did not qualify)
- 4 (The amount of the incentive wasn't large enough)
- 5 (Did not know the program was available)
- 6 (There was no program available)
- 7 (Had reached the maximum incentive amount)
- 00 (Other, specify)
- 98 (Don't know)
- 99 (Refused)

[ASK CA4a IF CA4=3, ELSE SKIP TO CA5]

CA4a. Why didn't the equipment qualify? [OPEN END]

CA5. What type of equipment did you replace? (NOTE TO INTERVIEWER: prompt if needed the fuel source, make and model of old equipment, or fuel source and approximate age of the old equipment at the location) [OPEN END, DK, REF]

CA6. Where was the project located? (Prompt for: Name of property and address incl. street number, street name, city, state and zip code if possible)
[OPEN END, DK, REF]

CA7 To your knowledge, what utility provides natural gas to this property?

- 1 Nicor Gas
- 2 North Shore Gas
- 3 Peoples Gas
- 4 Other
- 5 Don't Know
- 6 Refused

CA8 To your knowledge, what utility provides electricity to this property?

- 1 Commonwealth Edison (ComEd)
- 2 Other
- 3 Don't Know
- 4 Refused

CA9. Was the Multi-Family Home Energy Savings Program a significant influence in encouraging you to implement efficiency improvements in your property's [answer to CA3b]? Please rate this on a 0-10 scale, where 0 means not at all significant and 10 means very significant. [0-10, DK, REF]

CA9a. **[ASK IF CA9≥5]** In your own words, how was the program influential in encouraging you to implement efficiency improvements in your property's [answer to CA3b]? [OPEN END, DK, REF]

CA11. Thank you for sharing this information with us. We may have follow-up questions about the equipment you installed that didn't receive a rebate. Would you be willing to schedule a brief follow-up conversation with a member of our program team to get more details?

- 1 (Yes)
- 2 (No)
- 98 (Don't know)
- 99 (Refused)

OVERALL CUSTOMER SATISFACTION

CS1 – CS8a. [OMITTED]

CSINT. I'll now ask you to rate your experience with the on-site visit and the program in general on a scale from 0 to 10, where 10 is a high rating and 0 is a low rating. For example, if I ask about your level of satisfaction, 0 would mean "very dissatisfied" and 10 would mean "very satisfied." If you are unsure about the meaning of the scale for any of the questions, just let me know.

CS9. On a scale of 0 to 10, how would you rate your overall satisfaction with... (PROMPT IF NECESSARY: Remember 0 means "very dissatisfied" and 10 means "very satisfied") **[SHOW ON SEPARATE PAGES RANDOMIZED WITH QUESTION TEXT AND PROMPT ON EACH PAGE][SCALE 0-10, DK, REF] [RANDOMIZE]**

- e. ...the recommended opportunities for common area energy efficiency upgrades at your property
- f. ...the direct install measures
- g. ...the summary report about the direct install activities at your property
- h. ...the field team that installed the direct install measures at your property
- i. ...the Multi-Family Home Energy Savings Program

[IF CS9a-e<3, ASK CS10a-e DIRECTLY AFTER IT IS RATED LOW]

CS10a-e. Why did you rate it that way?

- 01. OPEN END
- 98. (DON'T KNOW)

CS11. On a scale from 0-10, with 10 being very influential, how influential has the Multi-Family Home Energy Savings Program been at helping your property...? **[GRID] [RANDOMIZE] [SCALE 0-10, DK, REF]**

- a. Retain tenants?
- b. Increase property appeal?
- c. Decrease property utility expenses?
- d. Decrease maintenance expenses?
- e. Decrease tenant utility bills?

C11f. Has the Multi-Family Home Energy Savings Program been helpful in any other way at your property?

- 0. YES **[OPEN END]**
- 1. NO
- 88. DON'T KNOW
- 99. REFUSED

CS12. Are there additional incentives or measures you would like to see included in the Multi-Family Home Energy Savings Program? (IF YES, ASK “Which?”)

1. COMMON AREA LIGHTING
2. COMMON AREA BATHROOM AERATORS OR SHOWERHEADS
3. PARKING LOT LIGHTING
4. HVAC UPGRADES
5. OTHER, SPECIFY
6. NO
88. (DON'T KNOW)
99. (REFUSED)

CS13. What barriers, if any, are there to referring other properties to the Multi-Family Home Energy Savings Program? [Select all that apply] **[RANDOMIZE 1-4]** **[MULTIPUNCH]**

1. I don't know any other property managers
2. I don't have time to refer the program to my colleagues
3. There is no incentive for me to refer the program to my colleagues
4. I'm not convinced that the program saves me money
5. OTHER (SPECIFY)
8. (DON'T KNOW)
7. (REFUSED)

CS14. Do you have any specific stories for potential program case studies that you wish to share with the program?

1. YES **[OPEN END]**
2. NO
8. (DON'T KNOW)
9. (REFUSED)

FIRMOGRAPHICS

I have just a few questions left for background purposes.

F1. Is the property that we discussed master-metered (e.g. have a central water heating system) or individually metered (e.g. each apartment has its own water heating system)?

1. MASTER-METERED
2. INDIVIDUALLY METERED
3. OTHER (SPECIFY)
4. (DON'T KNOW)
5. (REFUSED)

F2. Do residents at your property own or rent their homes?

1. OWN
2. RENT
3. OTHER (SPECIFY)
4. (DON'T KNOW)
5. (REFUSED)

OUTRO. Those are all the questions I have. On behalf of the Multi-Family Home Energy Savings Program, thank you very much for your time.