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Energy Efficiency / Demand Response Plan: Plan Year 3 (6/1/2010-5/31/2011)

Evaluation Report: Multifamily All-Electric Efficiency Upgrade Program

Presented to:

Commonwealth Edison Company

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Section E. Executive Summary

E.1 Evaluation Objectives & Program Overview

The goal of this report is to summarize the evaluation team's findings, conclusions and recommendations of Commonwealth Edison Company's Program Year Three (ComEd PY3) Multifamily All-Electric Efficiency Upgrade Program.[1] The primary objectives of this assignment were to quantify the All-Electric Efficiency Upgrade Program's gross and net impacts. These results will be used to review program-reported savings and recommend adjustments to gross impact parameters to improve their accuracy for future planning. While the process evaluation portion of the All-Electric Efficiency Upgrade Program evaluation was narrowed due to anticipated changes to program delivery going forward, the evaluation team included relevant program delivery and coordination findings in this report where appropriate.

The All-Electric Efficiency Upgrade Program is designed to secure energy savings through direct installation of low-cost efficiency measures, such as compact fluorescent lamps (CFLs), water efficient showerheads and faucet aerators at eligible multifamily residences. A secondary objective of this program is to identify energy saving opportunities in the common areas of multifamily buildings (such as upgrades to or replacement of lighting equipment) through a brief visual inspection to channel customers to other ComEd Smart Ideas programs.

In PY3, ComEd participated in jointly delivered pilot programs with Nicor Gas and Peoples Gas. These pilot programs were implemented due to expected changes to the All-Electric Efficiency Upgrade Program's implementation in future years. ComEd provided key technical support and information sharing to enable the jointly implemented pilot programs to "hit the ground running." The jointly implemented pilot programs were similarly designed to achieve energy savings through direct installation of low-cost efficiency measures at eligible multifamily properties with space-heating and/or water-heating serviced by Nicor Gas or Peoples Gas. A secondary objective of the pilot programs was to identify energy saving opportunities in common areas of multifamily buildings (such as upgrades to or replacement of lighting equipment and HVAC equipment) through a brief visual inspection to channel customers to other ComEd and/or gas company programs. Honeywell Utility Solutions (HUS) was the implementation contractor for the ComEd and jointly implemented pilot programs. Impact results from the pilot programs are included in this evaluation report.

The addition of the jointly implemented natural gas pilot programs greatly expanded the number of eligible multifamily properties that could receive direct install measures, enabling the programs to exceed the programs' goals by installing measures in over 42,000 residential

[1] The Commonwealth Edison Company Program Year Three (ComEd PY3) began June 1, 2010 and ended May 31, 2011.

units. Table E-1 includes the participation results from the ComEd PY3 All-Electric Efficiency Upgrade Program and the jointly implemented pilot programs.

Table E-1. PY3 ComEd All-Electric & Pilot Programs
Participation Results (Residential Units)

Segment	Participation Goal	Units Completed	Completion Percentage
All-Electric	5,500	5,500	100.0%
Peoples Gas Joint Pilot	6,500	7,103	109.3%
Nicor Gas Joint Pilot	30,000	29,628	98.8%
Total Program	**42,000**	**42,231**	**100.6%**

Sources: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls. Participation results are for residential units that received CFLs and do not include units that received natural gas measures only.

E.2 Evaluation Methodology

The impact evaluation tasks included a review of the gross impact parameters used to calculate deemed measure savings and a review of the program reported activities, including installed measures and estimated gross savings. The evaluation team used tracking spreadsheets provided by ComEd program staff and the implementation contractor to verify measure counts for these programs.

Based on the findings from the PY3 metering study conducted by the ComEd Residential Lighting program evaluation team, the evaluation team updated some of the input parameters used to calculate the ex-post gross energy and demand savings estimates for the PY3 program. Details about these updated gross input parameters are included in Section Four.

The evaluation team used in-depth interviews with the Multifamily program teams (including ComEd and Honeywell program staff for the All-Electric program, and Nicor Gas and WECC program staff for the ComEd-Nicor jointly implemented pilot program) to inform this assignment. The evaluation team interviewed six (6) building owner/property management representatives and fielded telephone surveys with over one hundred and forty (140) end-use customers (e.g., apartment tenants) to help inform the evaluation's findings. ComEd All-Electric Efficiency Upgrade program evaluation activities were coordinated with the jointly implemented program evaluation activities whenever feasible.

E.3 Key Findings

This section presents impact and process findings from the ComEd PY3 All-Electric Efficiency Upgrade Program and the jointly implemented pilot programs.

Impact Findings--Energy Savings Estimates

For purposes of meeting statutory goal requirements, the table below presents deemed kWh savings from residential CFL installations instead of currently evaluator determined kWh savings from residential CFL installations. For PY3, the Multifamily All-Electric Program achieved net savings of 4,216 MWh and total savings from jointly implemented pilot programs with gas companies was 6,455 MWh. **Error! Reference source not found.** below presents the Multifamily program's impacts including deemed values for CFL savings (*ex-ante* gross) and the evaluated impacts (*ex-post* gross) and corresponding realization rates (RR) and net-to-gross (NTG) ratios for the Multifamily All-Electric Program and the jointly implemented pilot programs with gas companies.

Table E-2. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs Gross and Net Energy Savings Estimates – Deemed CFL Values

Multi-Family Programs - Deemed CFL Values	Ex-Ante Gross MWh	RR	Ex-Post Gross MWh	NTG	Ex-Post Net MWh
All-Electric	3,722	126%	4,678	90%	4,216
Joint Programs	7,969	100%	7,969	81%	6,455
Total Multi-Family	11,691	108%	12,647	84%	10,671

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls; PY3 ComEd Residential ENERGY STAR Lighting Program

Tables E-3 through E-5 present ex-ante (program reported) and ex-post (evaluator-adjusted) gross and net energy savings estimates. The evaluation team made no adjustments to measure counts in the program tracking spreadsheets. Measures saving natural gas installed through the jointly implemented pilot programs are not included in these totals.

Table E-3. PY3 ComEd All-Electric Efficiency Upgrade Program Gross and Net Energy Savings Estimates - Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate	Ex-Post Net MWh	NTG Ratio
Water Efficiency	2,494	3,450	138%	3,221	0.93
CFLs	1,228	1,326	108%	1,074	0.81
Program Total	**3,722**	**4,776**	**128%**	**4,295**	**0.90**

Table E-4. PY3 ComEd Jointly Implemented Pilot Programs
Gross and Net Energy Savings Estimates – Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate	Ex-Post Net MWh	NTG Ratio
Peoples Gas Pilot	1,574	1,700	108%	1,377	0.81
Nicor Gas Pilot	6,395	6,905	108%	5,593	0.81
Pilots Total	**7,969**	**8,605**	**108%**	**6,970**	**0.81**

Table E-5. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs
Gross and Net Energy Savings Estimates – Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate	Ex-Post Net MWh	NTG Ratio
All Programs Total	**11,691**	**13,380**	**114%**	**11,265**	**0.84**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls.

Evaluator Recommended Adjustments to Gross Energy Savings Estimates

Ex-Post adjustments to gross energy savings estimates from CFL measure installations resulted in a 108 percent realization rate due to the increased hours of use (HOU) estimate (from 2.34 HOU for PY2 to 2.57 HOU for PY3) based on the indoor installation estimate in the ComEd PY3 Residential Lighting Meter Study. Ex-Post adjustments to gross savings estimates from water efficiency measure installations resulted in a 138 percent realization rate due to new measure equipment installations in PY3 including 1.5 gpm showerheads and 1.0 gpm bath faucet aerators. However, when the program updates its tracking system to reflect energy savings from the new water measures, the realization rate for the program should be adjusted accordingly.

Occupancy rates were adjusted based on the PY3 All-Electric Efficiency Upgrade Participant Telephone Survey, in which the average household occupancy of respondents was 2.1 persons per residential living unit. The PY3 revised occupancy estimate is up from the PY2 occupancy estimate of 1.66 persons per residential unit, but still lower than the planning estimate of 2.35 persons per residential living unit. The blended realization rate for the ComEd PY3 All-Electric Efficiency Upgrade Program, including both CFL and water efficiency measure installations, was 128 percent.

Impact Findings--Peak Demand Reduction Estimates

Tables E-6 through E-8 present ex-ante (program reported) and ex-post (evaluator-adjusted) gross and net peak demand savings estimates.

Table E-6. PY3 ComEd All-Electric Efficiency Upgrade Program Gross and Net Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate	Ex-Post Net kW	NTG Ratio
Water Efficiency	197	194	98%	182	0.93
CFLs	117	134	115%	109	0.81
Program Total	**314**	**328**	**105%**	**291**	**0.89**

Table E-7. PY3 ComEd Jointly Implemented Pilot Programs Gross and Net Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate	Ex-Post Net kW	NTG Ratio
Peoples Gas Pilot	149	172	115%	139	0.81
Nicor Gas Pilot	607	699	115%	566	0.81
Pilots Total	**756**	**851**	**115%**	**705**	**0.81**

Table E-8. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs Gross and Net Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate	Ex-Post Net kW	NTG Ratio
All Programs Total	**1070**	**1200**	**112%**	**996**	**.83**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls.

Evaluator Recommended Adjustments to Gross Peak Demand Savings Estimates

Ex-Post adjustments to gross peak demand estimates from CFL measure installations resulted in a 115 percent realization rate due to the increased Peak Coincidence Factor (0.081 to 0.095) based on the ComEd PY3 Residential Lighting Meter Study.

Net Savings Estimates

Results from the PY3 participant surveys and in-depth interviews with multifamily building owners/property managers resulted in measure-specific net-to-gross (NTG) ratios for the All-Electric Efficiency Upgrade program's water efficiency measures of 0.93 and CFL measures of 0.81. These NTG ratios are similar to evaluation findings from previous years. The evaluation team found that NTG ratios for CFLs were the same for measures installed in All-Electric units and units in the jointly implemented natural gas pilot programs.

Overall, the program's NTG ratio was lower than previous years when including the All-Electric Efficiency Upgrade Program and the jointly implemented pilot programs. The PY3

program featured relatively fewer water efficiency measures (which carry a higher NTG ratio) than CFL measures, due to the additional CFL units installed as part of the jointly implemented natural gas pilot programs. The evaluation team's net-to-gross methodology is included in Section 5.1.

All-Electric Efficiency Upgrade Program Accomplishments (PY1-PY3)

The ComEd All-Electric Efficiency Upgrade program installed measures at more participating units and improved its NTG ratio each year over the last three years. The program achieved higher percentages of its ex-ante gross savings in PY3. PY3 values reflect deemed kWh savings for CFL measures. PY3 values do not include savings from jointly implemented pilot programs with gas companies.

Table E-9. ComEd Multifamily Program Accomplishments (PY1—PY3)

Performance Indicator	PY1	PY2	PY3
Participating Units	4,119	4,219	5,500
Ex-Ante Gross Savings (MWh)	2,568	2,698	3,722
Ex-Post Gross Savings (MWh)	2,315	2,090	4,678
Realization Rate	90%	77%	126%
Net Savings (MWh)	1,852	1,840	4,216
NTG Ratio	0.80	0.88	0.90
Net Demand Reduction (MW)	0.2	0.2	0.3

Sources: Navigant PY3 analysis, Navigant PY2 Evaluation Report, Summit Blue Consulting PY1 Evaluation Report

Process Evaluation Findings

This section includes the evaluation team's key process evaluation findings and ongoing efforts of the program team to continually improve the program as the implementation strategy transitions for future years.[2]

Program Planning and Administration

The Multifamily pilot programs benefitted from frequent communication and involvement between ComEd program staff and Honeywell, the program implementation contractor. Both ComEd and Honeywell have been implementing ComEd's Multifamily program for the last

[2] Note: Many topics raised during the data collection and in-depth interview phase are currently being addressed by the ComEd program team and gas company program teams.

three years. Therefore, pilot programs were able to benefit from lessons learned by the ComEd program and achieve significant energy savings for participating utilities without the typical delays associated with program planning and administration of a new pilot program. This collaboration is to be commended.

Customer Satisfaction: Building Owners/Property Managers

The evaluation team found that four of the six multifamily building owners/property managers were either "satisfied" or "very satisfied" with the Multifamily programs. Two interviewees were dissatisfied with the program, mostly due to dissatisfaction with the performance of installed measures including showerheads and bathroom faucet aerators. Building Owners/Property Managers also expressed dissatisfaction with the amount of time required of their internal maintenance staff to accompany the Multifamily program's field technicians during measure installation. The evaluation team received generally positive remarks about the Multifamily program team from the interviews.

Customer Satisfaction: End-Use Customers (e.g., Apartment Tenants, Condo Owners)

The PY3 ComEd All-Electric program tracking spreadsheets indicate that the program distributed 18,333 surveys during the program year. Customers returned 2,156 surveys to the program, a total of approximately twelve (12) percent. The weighted average score of all respondents, on scale of one to five, with five being most satisfied, was 4.83.

PY3 evaluation telephone survey data from one hundred and forty (140) end-use customers mirrored the program-reported levels of customer satisfaction. Survey respondents were generally "satisfied" or "very satisfied" with the Multifamily program, specifically with receiving water and energy saving measures at no cost. Respondents reported that field technicians were friendly and the program's report was helpful. Despite the positive view of the program and its measures, few respondents reported that they completed the customer satisfaction survey. Those respondents who reported that they were "not satisfied" with the Multifamily program were dissatisfied primarily with the performance of direct install measures, most frequently cited were showerheads and bathroom faucet aerators. Kitchen faucet aerators were less frequently reported as a source of dissatisfaction by respondents.

E.4 Cost Effectiveness

ComEd uses DSMore™ software for the calculation of the Illinois TRC test[3]. **Error! Reference source not found.** summarizes the unique inputs used in the DSMore model to assess the TRC ratio for the Multi-Family All Electric Efficiency program in PY3. Most of the unique inputs

[3] Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

come directly from the evaluation results presented previously in this report. Measure life estimates and program costs come directly from ComEd. All other inputs to the model, such as avoided costs, come from ComEd and are the same for this program and all programs in the ComEd portfolio.

Table E-10. Inputs to DSMore Model for Multi-Family All Electric Efficiency Program

Item	Value Used
Measure Life	9
Utility Administration and Implementation Costs	$502,566
Utility Incentive Costs	$0
Net Participant Costs	$0
Measure Life	9

Based on these inputs, the Illinois societal TRC for this program is 2.75 and the program passes the Illinois TRC test.

E.5 Recommendations

The evaluation team recommends that the ComEd program staff consider the following recommendations for the program:

Impact Recommendations

- Update the tracking system to reflect energy savings from new water efficiency measures, including 1.5 gpm showerheads and 1.0 gpm bath faucet aerators.
- Revise ex-ante gross impact assumptions to the following: 2.1 people/unit, 2.57 hours of use for CFLs, 0.095 peak coincidence factor.
- Gross impact parameters for CFLs, including delta watts, hours of use, installation rate, peak coincidence factor and interactive effects are sufficiently established to enable ComEd to deem these parameters for future years' planning assumptions.
- Realization rates for CFLs are the same in electric and natural gas heated units.
- Net-to-gross ratios for CFLs are the same in electric and natural gas heated units.
- Navigant reviewed and provided comments on the document ("*Multi-Family Nicor ComEd Data Needs 062011 (FINAL).xls*") provided by ComEd. This document provides sufficient guidance for gas companies to collect necessary information for reporting CFL savings to ComEd.
- Field data should be checked periodically for quality and accuracy and communication put in place to minimize the likelihood that obtaining this information doesn't provide an undue burden for customers or implementers.
- Consider expanding program measures to common areas, such as water efficiency measures in public bathrooms and lighting measures in hallways, to attract more participants.

Process Recommendations

- Implementation contractors, program staff, and evaluators should work together to ensure that systems are in place for efficiently merging data and reporting on participation and savings from different program databases used by implementation contractors.
- As the program upgrades its data-tracking capabilities, implement handheld electronic devices or laptop computers to minimize manual data entry.
- Add additional screening questions to identify properties that receive housing subsidies directly or tenants who receive subsidies to reduce the risk that projects will be hit with a high free ridership rate.
- Coordinate with state and federal programs that service the multifamily markets to avoid overlapping incentives and duplication of efforts.
- When working with a large property management firm, program representatives should target on-site staff with information to help get their buy-in to the project.
- Develop additional marketing material, such as case studies, that participants could share with colleagues.
- Develop procedures to follow up with participants to measure program satisfaction, provide technical information on the measures, and solicit referrals.

Section 1. Introduction to the Program

This section includes a brief description of ComEd's PY3 All-Electric Efficiency Upgrade program and jointly implemented pilot programs with Nicor Gas and Peoples Gas, including the program's implementation strategy and participation results, measures and researchable questions for this assignment.

1.1 Program Description

The ComEd All-Electric Efficiency Upgrade Program has a primary objective to secure energy savings through direct installation of low-cost efficiency measures, such as CFLs, water efficient showerheads and faucet aerators at eligible all-electric multifamily residences. A secondary objective of this program is to identify energy saving opportunities in the common areas of multifamily buildings (such as recommending upgrades to or replacement of lighting or HVAC equipment) through a brief visual inspection of common areas to channel customers to other ComEd programs.

In PY3, the ComEd All-Electric Efficiency Upgrade program added two pilot programs that were jointly delivered with Nicor Gas and Peoples Gas. These pilot programs were implemented due to expected changes to the All-Electric Efficiency Upgrade Program's implementation in future years. ComEd provided key technical support and information to enable the jointly implemented pilot programs to "hit the ground running." The jointly implemented pilot programs were similarly designed to achieve energy savings through direct installation of low-cost efficiency measures at eligible multifamily properties with space-heating and/or water-heating serviced by Nicor Gas or Peoples Gas. A secondary objective of the pilot programs was to identify energy saving opportunities in common areas of multifamily buildings (such as upgrades to or replacement of lighting equipment and HVAC equipment) through a brief visual inspection to channel customers to other ComEd and/or gas company programs. Honeywell Utility Solutions (HUS) was the implementation contractor for the ComEd and jointly implemented pilot programs. Impact results from the pilot programs are included in this evaluation report.

The addition of the jointly implemented pilot programs greatly expanded the number of eligible multifamily properties that could receive direct install measures. ComEd, working collaboratively with Nicor Gas and Peoples Gas, was able to exceed the program's participation goals by installing CFLs in over 42,000 residential units during Program Year Three.

Table 1-1 includes the participation results from the ComEd PY3 All-Electric Efficiency Upgrade Program and the jointly implemented pilot programs.

Table 1-1. PY3 ComEd All-Electric & Pilot Programs Participation Results (Residential Units)

Segment	Participation Goal	Units Completed	Completion Percentage
All-Electric	5,500	5,500	100.0%
Peoples Gas Joint Pilot	6,500	7,103	109.3%
Nicor Gas Joint Pilot	30,000	29,628	98.8%
Total Program	**42,000**	**42,231**	**100.6%**

Sources: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls. Participation results are for residential units that received CFLs and do not include units that received natural gas measures only.

1.2 Implementation Strategy

The Multifamily programs use an implementation contractor to target property owners and building managers of eligible multifamily buildings with energy savings devices, a brief audit of common areas and energy educational materials at no cost to the participants.

Implementation Contractors

The Multifamily programs were able to hit the ground running with the help of dedicated program staff, implementation contractors and technical support from ComEd. Originally, the jointly implemented Nicor Gas pilot program contracted with two separate implementation contractors. However, after two months, the Multifamily program determined that one of the implementation contractors was not able to meet its obligations under the contract and was dropped from the program.

Marketing and Outreach

The Multifamily programs target building owners/property managers of multifamily buildings. Multifamily buildings with individual heating systems and individual meters and buildings with central heat and central meters are both eligible to participate. The programs reach target markets through a variety of methods, including general marketing and outreach to relevant apartment associations and professional organizations. General outreach is intended to increase market awareness of the program and add to the program's credibility. The programs also use a targeted marketing strategy to recruit property management companies in an effort to secure agreements to recruit multiple properties through a single point of contact before targeting owners and managers of individual properties. The programs may use direct mail solicitation,

customer calls, site visits and presentations at local property owners' associations to recruit participants.

1.3 Measures and Incentives

The All-Electric program installed up to six (6) compact fluorescent lamps (CFLs) in each living unit and water efficiency measures including 1.0 gpm bathroom faucet aerators, 1.5 gpm kitchen faucet aerators and 1.5 gpm water efficient showerheads. ComEd participated in jointly implemented pilot programs with Nicor Gas and Peoples Gas, in which the implementation contractor installed electric measures (e.g. CFLs) in residential units with space heating or water heating serviced by natural gas. Impact results from natural gas measures are not included in this report. The same water efficiency measures were used throughout the programs. There were no incentives offered to multifamily building owners or property managers during the direct installation process; however, building owners or property managers were offered referrals to the ComEd Smart Ideas program (or natural gas utility program if located in a jointly implemented pilot program) to replace common area measures such as lighting, boiler controls or tune-ups and steam trap replacement, as appropriate.[4] Table 1-2 lists the direct install measures offered by the Multifamily programs during Program Year Three.

Table 1-2 ComEd PY3 Multifamily Program Direct Install Measures

Measure	Electric	Natural Gas (pilot programs)
1.5 GPM Showerheads	X	X
1.5 GPM Kitchen Faucet Aerators	X	X
1.0 GPM Bathroom Faucet Aerators	X	X
9W CFL Replacing 40W Incandescent	X	
13W CFL Replacing 40W Incandescent	X	
14W CFL Replacing 60W Incandescent	X	
15W CFL Replacing 60W Incandescent	X	
19W CFL Replacing 75W Incandescent	X	
20W CFL Replacing 75W Incandescent	X	

Source: ComEd, Honeywell Operations Manual.
Note: 13W, 15W and 20W CFLs were phased out of the All-Electric program during the PY3 period.

[4] Multifamily program customer service representatives distribute information about potential incentives for common area lighting upgrades, boiler controls, boiler tune-ups and replacement of steam traps to eligible building owners or property managers.

1.4 Evaluation Questions

The evaluation sought to answer the following key researchable questions.

Impact Questions:

1. What are the gross impacts from this program?
2. What are the net impacts from this program?
3. Did the program meet its energy saving goals?
4. What data will ComEd require in order to verify kWh savings in future years, when the jointly implemented programs are primarily run by the gas companies?

Process Questions:
(for pilot programs only)

1. Has the program effectively recruited building owners and managers, trade associations or other relevant professional organizations to promote the program to customers? Is the program effectively leveraging its industry and trades network to promote the program to its target markets?

2. Has the program effectively channeled customers to install common area measures?

3. How has the current economic environment affected program participation? What strategies could be used to increase program participation?

Program Characteristics and Barriers

1. Does the application/enrollment process present any barriers to program participation?

2. Are end-use customers and building owners/property managers satisfied with the aspects of program implementation in which they have been involved?

Administration and Delivery

1. What challenges have occurred in initial pilot program implementation and how were they handled?

2. Has the program implementation contractor's field delivery been consistent with program design throughout the pilot programs and the All-Electric program?

Section 2. Evaluation Methods

This section briefly summarizes the evaluation team's analytic methods and data collection activities for the PY3 assignment. Further information is included in the Appendix and in previous years' evaluation reports.

2.1 Impact Evaluation

The evaluation team reviewed program reported ("ex-ante") gross savings estimates for each program measure by reviewing gross impact parameters that affect assumptions used to calculate measure-level savings estimates. Specifically, the evaluation team reviewed the occupancy estimates for participating residential units and used findings from the PY3 Residential Lighting Metering Study to make recommended updates to measure-level energy and demand savings estimates. The technical review of ex-ante savings and assumptions was designed to provide additional input for the ComEd multifamily program team to consider for future years when the jointly implemented programs will be primarily run by the gas companies, thereby minimizing risk to the portfolio due to relative uncertainties in the program's ex-ante savings estimates.

The evaluation team reviewed the Multifamily program Operations Manual,[5] program tracking database and a sample of the implementation contractor's weekly program delivery reports for accuracy and completeness.

To review the program's PY3 gross and net savings estimates, the evaluation team utilized telephone interviews with a sample of six (6) participating building owners and managers and telephone surveys with one hundred and forty (140) participating end-use customers. The interviews and surveys included questions to address occupancy rates, baseline conditions, operating habits and measure persistence. The evaluation team found results in the data to support revised ex-post gross savings estimates. The evaluation team's survey instruments employed a battery of questions to inform free ridership levels and estimate participant spillover.

2.2 Process Evaluation

The purpose of the process evaluation for this assignment was limited to reviewing the jointly implemented natural gas pilot programs. Since the pilot programs were new for PY3, the evaluation team interviewed the program staff and implementation contractor to gain

[5] Honeywell Utility Solutions, *Operations Manual, Residential Multi-family Direct Install Program* (updated February, 2011)

perspective about the implementation and delivery of these programs, to identify levels of customer satisfaction, potential barriers to program participation and opportunities for improvement.

Data Collection Methods and Sampling Plan

Table 2-1 provides a summary of the principal data sources contributing to the evaluation of the Multifamily programs.

Table 2-1. Principal Data Sources

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	Installed Units	Tracking Spreadsheets	-	All	July-August 2011
Project File Review	Installed Units	ComEd-Nicor Pilot Program Week of 4/30/11	-	-	July-August 2011
In-Depth Interviews	ComEd Program Staff	ComEd Program Staff	ComEd Multifamily program staff	1	May 2011
	Nicor Gas Program Staff & Implementer	Nicor Gas Program Staff	Nicor Gas program staff & WECC staff	3	July 2011
	Program Implementer	Honeywell staff	Honeywell staff	1	July 2011
Telephone Interviews	Owner/Managers	Participating Customers	Participating Building Owner/Manager	6	August 2011
Telephone Survey	Participating Customers	All-Electric and ComEd-Nicor pilot	Participating Customers	140	July-August 2011

Source: Navigant

Verification of Claimed Savings

The evaluation team reviewed the program tracking databases for the All-Electric and jointly implemented pilot programs for the PY3 program period. The project documentation was thoroughly reviewed and compared to corresponding entries in the program tracking database for accuracy and completeness. The evaluation team noted that the ComEd All-Electric program tracking database included default savings values for PY2 measures, instead of PY3 measure values.

In-Depth Interviews with Program Staff

The evaluation team conducted telephone interviews separately with the key people involved in the program's day-to-day operations, including representatives from ComEd, Nicor Gas, the ComEd-Nicor pilot program administrator (Wisconsin Energy Conservation Corporation—WECC) and implementation contractor (Honeywell Utility Solutions—Honeywell). The interviews included prepared question topics such as program administration, program outreach and marketing, program delivery and customer satisfaction, along with the opportunity for a "free-flowing" conversation between the evaluation team and participants in order to pursue relevant issues raised during the discussion. The in-depth interview guide used for program staff is included in the Appendix.

Telephone Interviews with Multifamily Building Owners/Property Managers

In August 2011, the evaluation team interviewed six (6) randomly chosen building owners/property managers that participated in the ComEd-Nicor Multifamily pilot program. Senior evaluation team members conducted interviews using an interview guide, but allowing for the free-flow of information between the parties. Telephone interviews with multifamily building owners/property managers included prepared question topics such as program administration, program outreach and marketing, program delivery and customer satisfaction, along with the opportunity for a "free-flowing" conversation between the evaluation team and participants in order to pursue relevant issues raised during the discussion. The in-depth interview guide used for building owners/property managers is included in the Appendix.

End-Use Customer Telephone Surveys

The evaluation team fielded two separate telephone surveys of seventy (70) participating end-use customers (e.g., apartment tenants or condo-owners) who participated in the Multifamily programs for a total of one hundred and forty (140) completed surveys. One population was chosen from the All-Electric program and one population was chosen from the ComEd-Nicor jointly implemented pilot program. The telephone surveys were conducted in July and August 2011. The telephone customer survey instrument is included in the Appendix. The evaluation team used these surveys in part to help verify program reported customer satisfaction responses from the tracking spreadsheets.

Section 3. Evaluation Findings

This section presents the evaluation team's findings for the ComEd PY3 All-Electric Efficiency Upgrade Program (All-Electric), the ComEd-Peoples Gas Jointly Implemented Pilot Program (Peoples Gas Pilot) and the ComEd-Nicor Gas Jointly Implemented Pilot Program (Nicor Gas Pilot).

3.1 Impact Findings

This section includes the Multifamily programs' impact results, including participation results and gross and net energy and demand savings estimates with program- and measure-level detail.

3.1.1. Program Participation

In PY3, the All-Electric program implementation contractors met program participation goals by installing 15,233 water efficiency measures and 29,103 CFLs in 5,500 units.

Table 3-1. Multifamily Participation Goals and Completions

Segment	Participation Goal	Units Completed	Completion Percentage
All-Electric	5,500	5,500	100.0%
Peoples Gas Joint Pilot	6,500	7,103	109.3%
Nicor Gas Joint Pilot	30,000	29,628	98.8%
Total Program	**42,000**	**42,231**	**100.6%**

Sources: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls. Participation results are for residential units that received CFLs and do not include units that received natural gas measures only.

When adding the results of the jointly implemented pilot programs with the gas companies, the program implementation contractors exceeded program participation goals by installing approximately 219,647 CFLs in 42,231 residential units. Individual program CFL measure counts are included later in this section. Participation totals do not include residential units that received natural gas measures only through one of the jointly implemented pilot programs. The jointly implemented pilot programs were more successful due to lessons learned by ComEd program staff and the implementation contractor. This experience enabled the pilot programs to achieve significant energy savings for the ComEd PY3 portfolio without typical delays associated with program planning and administration of new pilot programs.

3.1.2 Gross Program Impact Findings for Evaluated Parameters

The All-Electric Efficiency Upgrade program reported ex-ante gross impact savings of 1,228 MWh for CFL installations and 2,494 MWh for water efficiency measure installations for a total of 3,722 MWh. The All-Electric program reported peak demand reduction of 117 kW from CFL installations and 197 kW from water efficiency measure installations for a total of 314 kW.

In PY3, the program reported energy savings from the installation of CFLs through the jointly implemented pilot programs with the gas companies. The ComEd-Nicor joint pilot program reported energy savings of 6,395 MWh and peak demand reduction of 607 kW. The ComEd-Peoples Gas pilot program reported energy savings of 1,574 MWh and peak demand reduction of 149 kW.

When combined, the All-Electric program and the jointly implemented pilot programs reported energy savings of 11,691 MWh and peak demand reduction of 1,070 kW.

The evaluation team found that the All-Electric program's ex-ante gross energy savings under-estimated actual energy savings with a gross realization rate of 128 percent. While CFLs achieved a realization rate of 108 percent, water efficiency measures had a gross realization rate of 138 percent. However, this realization rate will be affected once the program's tracking system is updated to reflect estimated energy savings from new water efficiency measures introduced during PY3. The primary cause for adjustments to gross energy savings estimates for water efficiency measures was the introduction of new water efficiency measures, such as a 1.5 gpm showerhead and 1.0 bath faucet aerator, that were not reflected in the program's tracking system.

For CFLs, the hours of use estimate was updated from 2.34 (based on the PY2 evaluation results) to 2.57 based on the ComEd PY3 Residential Lighting Meter Study. Working in the opposite direction was an adjustment to gross savings estimates from water efficiency measure installations due to occupancy rate adjustments based on the PY3 All-Electric Efficiency Upgrade Participant Telephone Survey, in which the average household occupancy of respondents was 2.1 persons per residential living unit, up from PY2's occupancy estimate of 1.66 persons per residential living unit, but still lower than the planning estimate of 2.35 persons per residential living unit. The evaluation team determined that the occupancy rate result obtained from the participant survey presented a more accurate picture of multifamily residential unit occupancy specific to ComEd service territory than the census-based planning estimate.

Table 3-2. PY3 ComEd All-Electric Efficiency Upgrade Program Gross Energy Savings Estimates -- Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate
Water Efficiency	2,494	3,450	138%
CFLs	1,228	1,326	108%
All-Electric Program Total	**3,722**	**4,776**	**128%**

Source: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls

Table 3-3. PY3 ComEd Jointly Implemented Pilot Programs Gross Energy Savings Estimates -- Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate
Peoples Gas Pilot	1,574	1,700	108%
Nicor Gas Pilot	6,395	6,905	108%
Pilots Total	**7,969**	**8,605**	**108%**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls; WES Weekly Report 073110.xlsx; Integrys Honeywell Weekly Report 053111.xls.

Table 3-4. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs Gross Energy Savings Estimates -- Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate
All Programs Total	**11,691**	**13,380**	**114%**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 05311 WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls.

The evaluation team found that the program under-estimated gross peak demand reduction from CFL installations by approximately 15 percent. Ex-Post adjustments to gross peak demand reduction estimates from CFL measure installations were due to the increased Peak Coincidence Factor (0.081 to 0.095) based on the ComEd PY3 Residential Lighting Meter Study.

Table 3-5. PY3 ComEd All-Electric Efficiency Upgrade Program Gross Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate
Water Efficiency	197	194	98%
CFLs	117	134	115%
Program Total	**314**	**328**	**105%**

Source: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls

Table 3-6. PY3 ComEd Jointly Implemented Pilot Programs Gross Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate
Peoples Gas Pilot	149	172	115%
Nicor Gas Pilot	607	699	115%
Pilots Total	**756**	**851**	**115%**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls; WES Weekly Report 073110.xlsx; Integrys Honeywell Weekly Report 053111.xls.

Table 3-7. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs Gross Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate
All Programs Total	**1,070**	**1,200**	**112%**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls.

Because many of the savings estimates are sensitive to occupancy estimates for participating residential units, in PY3, the evaluation team doubled the number of telephone surveys with participating end-use customers (e.g., apartment tenants) to one hundred and forty (140) completions, including a sample populations of seventy (70) completions each from the All-Electric program and the ComEd-Nicor pilot program. The telephone surveys were fielded in July and August 2011. Recommended updates to gross impact parameters are summarized in the following table.

Table 3-8. PY3 Evaluator Recommended Updates to Key Gross Impact Parameters

Gross Impact Parameter	PY2 Evaluator Recommended	PY3 Evaluator Recommended	Source
Average Occupancy of Residential Unit	1.66	2.10	PY3 ComEd Multifamily participant survey
Hours of Use (CFLs)	2.34	2.57	PY3 ComEd Residential Lighting Metering Study
Peak Coincidence Factor	0.081	0.095	

Source: Navigant analysis.

3.1.3 Net-to-Gross Ratios

The evaluation team used a customer self-report method to estimate net-to-gross (NTG) ratios for this assignment. After reviewing the PY3 interviews and survey results, the evaluation team

found a NTG ratio for CFL measures of 0.81 and a NTG ratio for water efficiency measures of 0.93. The NTG ratio for the All-Electric program, including both CFL installations and water efficiency measures installations, was 0.90.

Taking into account CFL measure installations from the jointly implemented pilot programs, the overall program NTG was 0.84. The NTG ratio reduction resulted from CFL measures, that carry a lower NTG ratio than water efficiency measures, comprising a larger percentage of total program measures installed.

The evaluation team calculated net-to-gross ratios (NTG) for each measure using the following algorithm:

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

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

The evaluation team found that some participating owners/managers were already considering installing water efficiency measures at their properties. Their primary motivation was expected increases in water utility rates that would increase costs to property owners. In addition, some properties that service low-income residents are subject to federal requirements for energy efficiency planning. While the program has screening questions included in its Operations Manual, some installations occurred in properties that would likely be eligible for direct install measures (or required to install measures through energy efficiency guidelines) through one or more state or federal programs.

The evaluation team did not find any significant differences between the survey data from the All-Electric population and the ComEd-Nicor Pilot population to support differences in deemed savings estimates or net-to-gross ratios between a residential unit served by electric space and/or water heating and a residential unit served by natural gas space and/or water heating.

Additional information about the evaluation team's net-to-gross methodology is included in Section 5.2.

3.1.4 Net Program Impact Findings

For purposes of meeting statutory goal requirements, the table below presents deemed kWh savings from residential CFL installations instead of currently evaluator determined kWh savings from residential CFL installations. For PY3, the Multifamily All-Electric Program achieved net savings of 4,216 MWh and total savings from jointly implemented pilot programs with gas companies was 6,455 MWh. **Error! Reference source not found.** below presents the Multifamily program's impacts including deemed values for CFL savings (*ex-ante* gross) and the evaluated impacts (*ex-post* gross) and corresponding realization rates (RR) and net-to-gross (NTG) ratios for the Multifamily All-Electric Program and the jointly implemented pilot programs with gas companies.

Table 3-9. PY3 ComEd All-Electric Efficiency Upgrade Program Gross and Net Energy Savings Estimates – Deemed CFL Values

Multi-Family Programs - Deemed CFL Values	Ex-Ante Gross MWh	RR	Ex-Post Gross MWh	NTG	Ex-Post Net MWh
All-Electric	3,722	126%	4,678	90%	4,216
Joint Programs	7,969	100%	7,969	81%	6,455
Total Multi-Family	11,691	108%	12,647	84%	10,671

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls; PY3 ComEd Residential ENERGY STAR Lighting Program

The evaluation team found the following impact results for the All-Electric and jointly implemented pilot programs. Tables 3-10 through 3-12 include gross and net energy savings estimates.

Table 3-10. PY3 ComEd All-Electric Efficiency Upgrade Program Gross and Net Energy Savings Estimates – Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate	Ex-Post Net MWh	NTG Ratio
Water Efficiency	2,494	3,450	138%	3,221	0.93
CFLs	1,228	1,326	108%	1,074	0.81
Program Total	**3,722**	**4,776**	**128%**	**4,295**	**0.90**

Source: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls

Table 3-11. PY3 ComEd Jointly Implemented Pilot Programs Gross and Net Energy Savings Estimates – Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate	Ex-Post Net MWh	NTG Ratio
Peoples Gas Pilot	1,574	1,700	108%	1,377	0.81
Nicor Gas Pilot	6,395	6,905	108%	5,593	0.81
Pilots Total	**7,969**	**8,605**	**108%**	**6,970**	**0.81**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; Integrys Honeywell Weekly Report 053111.xls.

Table 3-12. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs Gross and Net Energy Savings Estimates – Evaluated Parameters

Segment	Ex-Ante Gross MWh	Ex-Post Gross MWh	Realization Rate	Ex-Post Net MWh	NTG Ratio
All Programs Total	**11,691**	**13,380**	**114%**	**11,265**	**0.84**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls.

Tables 3-13 through 3-15 include gross and net peak demand reduction estimates.

Table 3-13. PY3 ComEd All-Electric Efficiency Upgrade Program Gross and Net Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate	Ex-Post Net kW	NTG Ratio
Water Efficiency	197	194	98%	182	0.93
CFLs	117	134	115%	109	0.81
Program Total	**314**	**328**	**105%**	**291**	**0.89**

Source: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls

Table 3-14. PY3 ComEd Jointly Implemented Pilot Programs Gross and Net Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate	Ex-Post Net kW	NTG Ratio
Peoples Gas Pilot	149	172	115%	139	0.81
Nicor Gas Pilot	607	699	115%	566	0.81
Pilots Total	**756**	**851**	**115%**	**705**	**0.81**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; Integrys Honeywell Weekly Report 053111.xls.

Table 3-15. PY3 ComEd All-Electric Efficiency Upgrade & Pilot Programs Gross and Net Peak Demand Reduction Estimates

Segment	Ex-Ante Gross kW	Ex-Post Gross kW	Realization Rate	Ex-Post Net kW	NTG Ratio
All Programs Total	**1,070**	**1,200**	**112%**	**996**	**0.83**

Sources: Navigant analysis of ComEd tracking spreadsheets; ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls.

3.2 *Process Evaluation Findings*

The process component of this assignment focused on program administration, processes and implementation for the jointly implemented natural gas pilot programs. The primary data sources for the process evaluation were in-depth interviews with ComEd program staff, Nicor Gas energy efficiency staff, the ComEd-Nicor Gas pilot program administrator and implementation contractor. The evaluation team conducted in-depth interviews with six (6) multifamily building owners/property managers and surveys with one hundred and forty (140) end-use customers who participated in the ComEd-Nicor Gas jointly implemented pilot program and the ComEd All-Electric program. This section includes the evaluation team's key process evaluation findings and ongoing efforts of the program team to continually improve the program.[6]

3.2.1. Program Planning and Administration

The Multifamily pilot programs benefitted from frequent communication and involvement between the ComEd program staff and Honeywell, the program implementation contractor and the staff of the gas companies and their administrator. The pilot programs were able to benefit from lessons learned by the ComEd program staff and implementation contractor and achieve significant energy savings for the ComEd portfolio without the typical delays associated with a new pilot program. This collaboration is to be commended.

3.2.2. Program Implementation

The evaluation team noted that the Multifamily programs overcame some implementation challenges in the ComEd-Nicor Gas joint pilot program, which was the program with the largest participation and energy savings goals for the program year. The ComEd-Nicor Gas jointly implemented pilot program, administered by the Wisconsin Energy Conservation Corporation (WECC), had originally hired two implementation contractors. However, after two months, the Multifamily program determined that one of the implementation contractors was

[6] Note: Many topics raised during the data collection and in-depth interview phase are currently being addressed by the ComEd program team and those from the gas companies.

not able to meet its obligations under the program and was dropped from the program. Despite this obstacle, the evaluation team noted that the remaining program implementer (Honeywell) had scheduled enough multifamily units to meet the ComEd-Nicor Gas joint pilot program participation goal by May 31, 2011. However, due to last minute scheduling conflicts and cancellations, the program was not able to complete its scheduled installations on May 31, 2011. Instead, the program completed its target participation goals the next day on June 1, 2011. The program staff and remaining implementation contractor demonstrated great flexibility for their ability to adapt staffing and resource levels to install measures at necessary units to meet and exceed the program's participation goals.

3.2.3. Customer Satisfaction: Building Owners/Property Managers

The evaluation team found that four of the six multifamily building owners/property managers were either "satisfied" or "very satisfied" with the Multifamily programs. Two interviewees were dissatisfied with the program, mostly due to dissatisfaction with the performance of installed measures including showerheads and bathroom faucet aerators. Building Owners/Property Managers also expressed dissatisfaction with the amount of time required of their internal maintenance staff to accompany the Multifamily program's field technicians during measure installation. The evaluation team received generally positive remarks about the Multifamily program team from the interviews.

Interviewees reported that, once they had a satisfactory experience with the program, they were likely to recommend the program to their colleagues and/or expand the program to other properties that they own or manage. This finding would benefit from further investigation in future implementation and evaluation.

3.2.4. Customer Satisfaction: End-Use Customers (Apartment Tenants, Condo Owners)

The PY3 ComEd All-Electric program tracking spreadsheets indicate that the program distributed 18,333 surveys during the program year. Customers returned 2,156 surveys to the program, a total of about twelve (12) percent. The weighted average score of all respondents, on scale of one to five, with five being most satisfied, was 4.83. The Nicor Gas pilot program includes a line item for each of the implementation contractors originally retained for the program.

Survey results tracked by the program mirror those survey data obtained by the evaluation team. Based on telephone survey responses with one hundred and forty (140) end-use customers, respondents were generally "satisfied" or "very satisfied" with the Multifamily program, specifically with receiving water and energy saving measures at no cost. Respondents reported that field technicians were friendly and the program's report was helpful. Those respondents who reported that they were "not satisfied" with the Multifamily program were dissatisfied primarily with the performance of direct install measures, most frequently cited

were showerheads and bathroom faucet aerators. Kitchen faucet aerators were less frequently reported as a source of dissatisfaction by respondents.

Table 3-16. PY3 Customer Satisfaction Survey Results

Program Segment	Surveys Distributed	Surveys Returned	Percentage Returned	Average Rating (1-5)
ComEd All-Electric	5,500*	293	5.3%	4.88
Peoples Gas Pilot	3,039	550	18.1%	4.89
Nicor Gas Pilot (IC1)	9,393	1,289	13.7%	4.80
Nicor Gas Pilot (IC2)	401	24	5.9%	4.50
Total	**18,333**	**2,156**	**11.9%**	**4.83**

*Sources: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls ; WES Weekly Report 073110.xlsx; ComEd MF Wkly Rprt 053111.xls; Integrys Honeywell Weekly Report 053111.xls. Participation results are for residential units that received CFLs and do not include units that received natural gas measures only.*ComEd All-Electric surveys distributed are estimated at 5,500 by the evaluation team based on program participation.*

3.2.5. Barriers to Participation: Building Owners/Property Managers

The Multifamily programs target a hard-to-reach customer segment and multifamily building owners, property managers and maintenance staff are typically responsible for regular maintenance for a large numbers of dwelling units, in addition to responding to tenant requests that often take priority due to safety issues. The evaluation team found that lack of knowledge about the programs was one of the biggest barriers to participation from eligible multifamily building owners/property managers. Property managers, especially those that are part of a large property management firm, cited the issue of "split incentives" (e.g. owners/managers are hesitant to allocate staff time or investments for items where benefits accrue to the tenants, as may be the case when tenants pay for water, electricity and/or natural gas at a property) and requested more direct benefits from the program to property managers, such as common area lighting upgrades or public area bathroom fixtures.

As with many DSM programs, the current economic environment presents a significant hurdle for many potential customers to participate in the Multifamily programs, even with direct install energy savings measures offered with no cash outlay to participants. An additional potential barrier to participation was the concern about allocating maintenance staff time to accommodate the Multifamily programs' field technicians while performing direct installation of measures. It may be the case that decision-makers are under-estimating or are under-informed about the amount of staff time required to work with the field technicians during direct installation. In addition, current prices for natural gas make payback periods less attractive for businesses to use scarce resources to invest in energy savings measures that do

require cash outlays, such as boiler controls or steam trap replacements, which may affect future participation in the jointly implemented programs.

However, through interviews with the program staff, the program administrator and program implementation contractor, the evaluation team verified that there were no inherent barriers to participation for prospective customers due to program design or delivery. There was no indication that the program participation requirements create an undue burden for customers to participate in the program. This topic is one to potentially explore in more detail for future program implementation and evaluation.

3.3 Cost Effectiveness Review

This section addresses the cost effectiveness of the Multi-Family All Electric Efficiency program. Cost effectiveness is assessed through the use of the Illinois Total Resource Cost (TRC) test. The Illinois TRC test is defined in the Illinois Power Agency Act SB1592 as follows:

> *'Total resource cost test' or 'TRC test' means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases.*[7]

ComEd uses DSMore™ software for the calculation of the Illinois TRC test.[8] The DSMore model accepts information on program parameters such as number of participants, gross savings, free ridership, program costs and CO_2 reductions. It then calculates a TRC that fits the requirements of the Illinois Legislation.

[7] Illinois Power Agency Act SB1592, pages 7-8.
[8] Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

One important feature of the DSMore model is that it performs a probabilistic estimation of future avoided energy costs. It looks at the historical relationship between weather, electric use and prices in the PJM Northern Illinois region and forecasts a range of potential future electric energy prices. The range of future prices is correlated to the range of weather conditions that could occur, and the range of weather is based on weather patterns seen over the historical record. This method captures the impact that extreme weather has on electricity prices. Extreme weather generally results in electricity price spikes and creates a skewed price distribution. High prices are going to be much higher than the average price while low prices are going to be only moderately lower than the average. DSMore is able to quantify the weighted benefits of avoiding energy use across years which have this skewed price distribution.

Results

Table 3-17 summarizes the unique inputs used in the DSMore model to assess the TRC ratio for the Multi-Family All Electric Efficiency program in PY3. Most of the unique inputs come directly from the evaluation results presented previously in this report. Measure life estimates and program costs come directly from ComEd. All other inputs to the model, such as avoided costs, come from ComEd and are the same for this program and all programs in the ComEd portfolio.

Table 3-17. Inputs to DSMore Model for Multi-Family All Electric Efficiency Program

Item	Value Used
Measure Life	9
Utility Administration and Implementation Costs	$502,566
Utility Incentive Costs	$0
Net Participant Costs	$0

Based on these inputs, the Illinois societal TRC for this program is 2.75 and the program passes the TRC test.

Section 4. Recommendations and Conclusion

This section includes the evaluation team's recommendations and conclusion for the ComEd PY3 All-Electric Efficiency Upgrade Program, including the joint natural gas pilot programs.

4.1 Impact Recommendations

This section includes the evaluation team's impact evaluation recommendations.

4.1.1 Tracking Systems Coordination

The All-Electric program and each of the pilot programs had separate tracking systems during the PY3 program period, despite having the same program implementer for all three programs. Going forward, the evaluation team has been informed that the programs are expected to have separate program implementers and separate tracking systems. The existence of separate implementation contractors and separate tracking systems creates a need for early discussion about merging data for reporting purposes and frequent communication between the program implementers and utility partners throughout the program year.

Recommendation Summary: Implementation contractors, program staff, and evaluators should work together to ensure that systems are in place for efficiently merging data and reporting on participation and savings. Update tracking system to reflect estimated energy savings from new water efficiency measures.

4.1.2 Proposed Revisions to Gross Savings Estimates

The evaluation team recommends adjustments to input assumptions on occupancy rates, hours of use and peak coincidence factor shown in the following table.

Table 4-1. Evaluator Recommended Revisions to Gross Input Parameters

Gross Impact Parameter	PY2 Evaluator Recommended	PY3 Evaluator Recommended	Source
Average Occupancy of Residential Unit	1.66	2.10	PY3 ComEd Multifamily participant survey
Hours of Use (CFLs)	2.34	2.57	PY3 ComEd Residential Lighting Metering Study
Peak Coincidence Factor	0.081	0.095	

Source: Navigant evaluation team analysis.

Recommendation Summary: Revise ex ante gross impact assumptions: 2.1 people/unit, 2.57 CFL hours of use, 0.095 peak coincidence factor.

4.1.3 Net Energy Savings Estimates: Free-Ridership and Spillover

The evaluation team found evidence of potential free ridership and spillover in the program. For example, the evaluation team found that some participating owners/managers were already considering installing water efficient measures at their properties primarily because of expected increases in water utility rates. In addition, some properties that service low-income residents are subject to federal requirements for energy efficiency planning. The program team may want to consider adding additional screening questions for multifamily properties to identify whether potential participants may be required to install energy efficiency measures or have access to energy efficiency measures through other programs, such as DCEO's low income programs.

The evaluation team recommends that the program further investigate the myriad low-income programs available to multifamily property owners, managers and residents and further coordinate its services with state and federal programs to avoid duplication of efforts and potentially collaborate to refer eligible properties between programs. If such coordination were sufficiently tracked, the results may have an impact on program net savings through adjustments to free-ridership and/or spillover.

Recommendation Summary:

- Consider adding additional screening questions for multifamily properties to identify whether potential participants may be required to install energy efficiency measures or have access to energy efficiency measures through other programs, such as DCEO's low income programs.
- Further investigate collaboration with state and federal programs to minimize free rider risk through periodic communication and information sharing.

4.1.4. Information Requirements for Future Years

Navigant reviewed and provided comments on the document ("*Multi-Family Nicor ComEd Data Needs 062011 (FINAL).xls*") provided by ComEd. This document provides sufficient guidance for gas companies to collect necessary information for reporting CFL savings to ComEd.

We recommend that this document be used as a guide for gas companies to provide necessary information to ComEd to verify kWh savings in future years, when the multifamily programs will be primarily run by gas companies. ComEd, in conjunction with the gas companies, should help share information for their respective evaluation teams in order to help verify kWh savings in future years. The information gathering form should be updated as needed.

Recommendation Summary

- Use the ("*Multi-Family Nicor ComEd Data Needs 062011 (FINAL).xls*") document developed by ComEd and revised by Navigant to verify kWh savings in future years.
- Review and update information sharing requirements and processes as needed.

4.1.5. Electric and Natural Gas Units Realization Rates and NTGR

The evaluation team found that realization rates and net-to-gross ratios for CFL measures were the same whether the CFLs were installed in units heated by electricity or heated by natural gas.

Recommendation Summary

- Use the same realization rates and net-to-gross ratios for CFL measures in electric or natural gas units.

4.2 Process Recommendations

This section includes the evaluation team's process evaluation recommendations. The process recommendations in this report were also included in the evaluation report to Nicor Gas as part of the evaluation of their program. The evaluation team felt that these recommendations were relevant for the ComEd program staff as well.

4.2.1 Outreach and Marketing to Multifamily Property Managers

The evaluation team interviewed representatives from large properties and from small properties. Based on the interview results, it appears that representatives from small properties found more benefits and found the program easier to work with and were generally more satisfied than representatives from large properties. These findings may indicate a tendency for large, professional property management companies to make decisions at the top and hand them down to the onsite property managers, who feel that they did not have a say in the decision and who have to field tenant complaints that result from these decisions. If that is the case, it may indicate a potential opportunity for the Multifamily program to do additional outreach and education to onsite property managers and maintenance staff at affected properties managed by large professional property management companies These are the people ultimately responsible for maintenance and upkeep of the direct install measures, addressing tenant complaints or concerns about the measures, and potentially making recommendations or decisions about boiler tune-ups or steam trap replacements. The Multifamily program may want to target these on-site representatives.

Since property management firms pay for energy use in common areas, they are interested in getting energy savings measures for those areas. In addition, one property manager recommended the program offer direct install measures or other incentives for larger, mixed-

use buildings that include retail or other commercial components. The program should consider expanding measures for common areas to attract more participants.

While the Multifamily program already screens properties for eligibility, the program should add additional screening questions to identify properties that receive housing subsidies directly or tenants who receive subsidies. This will reduce the risk that projects will be hit with a high free ridership rate. The program should also closely coordinate with state and federal programs that service the multifamily markets to avoid overlapping incentives or duplication of efforts.

The evaluation team recommends additional outreach to multifamily property managers, trade associations and professional organizations (e.g. ASHRAE, IFMA, BOMA and USGBC Illinois) to promote program resources to these organizations. Examples could include presentations at trade association events, articles in newsletters or other publications or co-branded events when feasible.

When interviewing building owners and property managers, those respondents that reported satisfaction with the Multifamily program also indicated that they would refer the program to their colleagues and/or expand the program to other properties under their control. The evaluation team recommends that the program team consider creating additional marketing materials to capitalize on this sentiment. Specifically, the program team may want to consider developing one or more case studies featuring property managers discussing their experience and the benefits of the program. In addition, the program may want to consider attempting to identify participating building owners or property managers who may be willing to give short testimonials to include in program literature or who may be willing to speak about the program at trade association meetings or other outreach events.

Recommendation Summary:

- When working with a large property management firm, target on-site staff with information to help get their buy-in to the project.
- The program should consider expanding measures for common areas to attract more participants.
- The program should add additional screening questions to identify properties that receive housing subsidies directly or tenants who receive subsidies. This will reduce the risk that projects will be hit with a high free ridership rate.
- The program should also closely coordinate with state and federal programs that service the multifamily markets to avoid overlapping incentives and duplication of efforts.
- Expand marketing and outreach to multifamily trade associations and property management firms.

- Develop additional marketing material that participants could share with colleagues.

4.2.2. Follow Up Information with Participating Properties

The evaluation team recommends that the program team consider including a system to follow up with program contacts about their experience with the program. These customer follow up contacts could include topics ranging from customer satisfaction (including maintenance staff, residents, managers and owners) to common maintenance questions that appear to arise (such as how to rinse sediment from showerheads and faucet aerators). The program may consider including a Frequently Asked Questions brochure or website to circumvent customer dissatisfaction with the performance of direct install measures. During the follow up conversation, the program could ask for referrals.

Recommendation Summary:

- Develop procedures to follow up with participants to measure program satisfaction, provide technical information on the measures, and solicit referrals.

4.2.3 Minimize Manual Data Entry As Feasible

The program should minimize the number of times that hand-written information needs to be manually entered into a database or tracking system, such as a spreadsheet. While the program has an adequate QA/QC procedure in place, minimizing manual entry reduces the likelihood of human error leading to errors in program tracking. As the program upgrades its data-tracking system, consider implementing handheld smart devices or laptop computers to streamline data entry and reporting.

Recommendation Summary:

- As the program upgrades its data-tracking capabilities, consider implementing handheld electronic devices or laptop computers to minimize manual data entry.

4.3 Conclusion

The Multifamily programs overcame early implementation challenges to exceed their participation goal during the program year due to close collaboration among ComEd program staff, the implementation contractor (Honeywell) and the gas companies. Multifamily owners reported that when they were satisfied with the program they would recommend it to their colleagues or expand the program to other properties under their management. Multifamily owners who were dissatisfied said their dissatisfaction was primarily due the performance of installed bathroom faucet aerators and showerheads.

While the implementation strategy for the program is effectively designed, the maintenance staff time required to accompany the program's field technicians during direct installation

presents a barrier to participation. In addition, some property management firms are hesitant to commit resources to a program where most of the benefit accrues to the tenants. To counter these barriers, the Multifamily program should consider increasing program benefits to facility owners and increase marketing and outreach to key market actors, such as trade associations and professional property management organizations, asking for referrals and featuring marketing material about satisfied customers to further promote the program to their colleagues.

Section 5. Appendices

5.1 *Multifamily Program Impacts—by Program Segment & Measure*

Ex-ante gross savings estimates, by measure, are included in the tables below:

Table 5-1- ComEd PY3 All-Electric Efficiency Upgrade Program

Unit	Measure Count	DW	kWh/unit	Ex-Ante Gross kWh	kW/unit	Ex-Ante Gross kW
CFLs						
9W replacing 40W lamp	718	31	26.5	19,027	0.0025	1.8
13W replacing 40W lamp	290	27	23.1	6,699	0.0022	0.6
14W replacing 60W lamp	15,156	46	39.3	595,630	0.0037	56.5
15W replacing 60W lamp	1,038	45	38.4	39,859	0.0036	3.8
19W replacing 75W lamp	9,618	56	47.8	459,740	0.0045	43.6
20W replacing 75W lamp	2,283	55	47.0	107,301	0.0045	10.2
lighting sub-total	29,103			1,228,321		116.5
Water Efficiency Measures						
1.0 gpm bath aerator	5,332		88	469,216	0.012	64.0
1.5 gpm kitchen aerator	5,093		117	595,881	0.012	61.1
1.0 gpm showerhead	4,808		297	1,427,976	0.015	72.1
water measures sub-total	15,233			2,493,073		197.2
Program Total	**44,336**			**3,721,394**		**313.7**

Source: ComEd MF Wkly Rprt 053111.xls

Table 5-2. ComEd-Peoples Gas Jointly Implemented Pilot Program

unit	Measure Count	DW	kWh/unit	Ex-Ante Gross kWh	kW/unit	Ex-Ante Gross kW
9W replacing 40W lamp	213	31	26.5	5,640	0.0025	0.5
14W replacing 60W lamp	27,150	46	39.3	1,066,685	0.0037	101.2
19W replacing 75W lamp	10,492	56	47.8	501,828	0.0045	47.6
Program Total	**37,855**			**1,574,153**		**149.3**

Source: ComEd, Integrys Honeywell Weekly Report 053111.xls (energy savings from natural gas measures are not reported)

Table 5-3. ComEd-Nicor Gas Jointly Implemented Pilot Program

Unit	Measure Count	DW	kWh/unit	Ex-Ante Gross kWh	kW/unit	Ex-Ante Gross kW
9W replacing 40W lamp	8,329	31	26.5	220,528	0.0025	20.9
14W replacing 60W lamp	85,474	46	39.3	3,358,154	0.0037	318.5
19W replacing 75W lamp	58,886	56	47.8	2,816,494	0.0045	267.1
Program Total	**152,689**			**6,395,175**		**606.5**

Source: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls, WES Weekly Report 073110.xlsx (energy savings from natural gas measures are not reported)

Gross & Net Energy Savings

Gross and net energy savings estimates, by program segment and measure, are included in the tables below.

Table 5-4. PY3 ComEd All-Electric Efficiency Upgrade Program
Gross and Net Energy Savings Estimates -- Evaluated Parameters

Measure	Ex-Ante Gross kWh	Ex-Post Gross kWh	kWh RR	Ex-Post Net kWh	NTG Ratio
CFLs					
9W replacing 40W lamp	19,011	20,525	108%	16,625	0.81
13W replacing 40W lamp	6,688	7,220	108%	5,848	0.81
14W replacing 60W lamp	595,458	642,894	108%	520,744	0.81
15W replacing 60W lamp	39,895	43,073	108%	34,889	0.81
19W replacing 75W lamp	460,025	496,672	108%	402,305	0.81
20W replacing 75W lamp	107,245	115,789	108%	93,789	0.81
CFLs sub-total	1,228,321	1,326,174	108%	1,074,201	0.81
Water Efficiency Measures					
1.0 gpm lav aerator	469,216	741,148	158%	696,679	0.94
1.5 gpm kitchen aerator	595,881	544,951	91%	512,254	0.94
1.0 gpm showerhead	1,427,976	2,163,600	152%	2,012,148	0.93
water measures sub-total	2,493,073	3,449,699	138%	3,221,081	0.93
All Measures (Water Efficiency + CFLs)					
Program Total	**3,721,394**	**4,775,873**	**128%**	**4,295,282**	**0.90**

Source: ComEd MF Wkly Rprt 053111.xls

Table 5-5. ComEd-Peoples Gas Jointly Implemented Pilot Program
Gross and Net Energy Savings Estimates -- Evaluated Parameters

Measure	Ex-Ante Gross kWh	Ex-Post Gross kWh	kWh RR	Ex-Post Net kWh	NTG Ratio
9W replacing 40W lamp	5,640	6,089	108%	4,932	0.81
14W replacing 60W lamp	1,066,685	1,151,661	108%	932,846	0.81
19W replacing 75W lamp	501,828	541,806	108%	438,863	0.81
Program Total	**1,574,153**	**1,699,556**	**108%**	**1,376,640**	**0.81**

Source: ComEd, Integrys Honeywell Weekly Report 053111.xls (energy savings from natural gas measures are not reported)

Table 5-6. ComEd-Nicor Gas Jointly Implemented Pilot Program
Gross and Net Energy Savings Estimates -- Evaluated Parameters

Measure	Ex-Ante Gross kWh	Ex-Post Gross kWh	kWh RR	Ex-Post Net kWh	NTG Ratio
9W replacing 40W lamp	220,528	238,096	108%	192,858	0.81
14W replacing 60W lamp	3,358,154	3,625,676	108%	2,936,798	0.81
19W replacing 75W lamp	2,816,494	3,040,866	108%	2,463,101	0.81
Program Total	**6,395,175**	**6,904,638**	**108%**	**5,592,757**	**0.81**

Source: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls; WES Weekly Report 073110.xlsx (energy savings from natural gas measures are not reported)

Gross and Net Demand Reduction Estimates

The following tables include the estimated PY3 gross and net demand savings estimates by program segment and measure.

Table 5-7. PY3 ComEd All-Electric Efficiency Upgrade (Water Efficiency and CFLs) Gross and Net Demand Reduction Estimates

Measure	Ex-Ante Gross kW	Ex-Post Gross kW	kW RR	Ex-Post Net kW	NTG Ratio
CFLs					
9W replacing 40W lamp	1.8	2.1	115%	1.7	0.81
13W replacing 40W lamp	0.6	0.7	115%	0.6	0.81
14W replacing 60W lamp	56.5	65.1	115%	52.7	0.81
15W replacing 60W lamp	3.8	4.4	115%	3.5	0.81
19W replacing 75W lamp	43.6	50.3	115%	40.7	0.81
20W replacing 75W lamp	10.2	11.7	115%	9.5	0.81
CFLs sub-total	116.5	134.3	115%	108.8	0.81
Water Efficiency Measures					
1.0 gpm lav aerator	64.0	62.9	98%	59.1	0.94
1.5 gpm kitchen aerator	61.1	60.1	98%	56.5	0.94
1.0 gpm showerhead	72.1	70.9	98%	65.9	0.93
water measures sub-total	197.2	193.9	98%	181.5	0.93
All Measures (Water Efficiency + CFLs)					
Program Total	**313.7**	**328.2**	**105%**	**290.3**	**0.90**

Source: Navigant analysis of ComEd tracking spreadsheets; ComEd MF Wkly Rprt 053111.xls

Table 5-8. ComEd-Peoples Gas Jointly Implemented Pilot Program Gross and Net Demand Reduction Estimates

Measure	Ex-Ante Gross kW	Ex-Post Gross kW	kW RR	Ex-Post Net kW	NTG Ratio
9W replacing 40W lamp	0.5	0.6	115%	0.5	0.81
14W replacing 60W lamp	101.2	116.6	115%	94.5	0.81
19W replacing 75W lamp	47.6	54.9	115%	44.4	0.81
Program Total	**149.3**	**172.1**	**115%**	**139.4**	**0.81**

Source: ComEd, Integrys Honeywell Weekly Report 053111.xls (energy savings from natural gas measures are not reported)

Table 5-9. ComEd-Nicor Gas Jointly Implemented Pilot Program Gross and Net Demand Reduction Estimates

Measure	Ex-Ante Gross kW	Ex-Post Gross kW	kW RR	Ex-Post Net kW	NTG Ratio
9W replacing 40W lamp	20.9	24.1	115%	19.5	0.81
14W replacing 60W lamp	318.5	367.2	115%	297.4	0.81
19W replacing 75W lamp	267.1	308.0	115%	249.4	0.81
Program Total	**606.5**	**699.3**	**115%**	**566.4**	**0.81**

Source: ComEd, Nicor ComEd Honeywell Weekly Report 053111.xls; WES Weekly Report 073110.xlsx (energy savings from natural gas measures are not reported)

5.2 *Evaluation Net-to-Gross Methodology*

The evaluation team implemented a customer self-report method to estimate net-to-gross (NTG) ratios for this evaluation using data gathered during participant telephone surveys and in-depth interviews. The primary objective of the net savings analysis is to determine each program's net effect on customers' electricity usage. This requires estimating what would have happened in the absence of program activities and incentives. After gross program impacts are adjusted, net program impacts are derived by estimating a NTG ratio. The NTG ratio quantifies the percentage of the gross program impacts that are attributable 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).

The final net-to-gross ratios (NTG) for each measure are calculated as:

Where,

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

And,

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

Free Ridership

Free ridership cannot be measured directly due to absent empirical data regarding the counter-factual situation. 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. More specifically, for each measure, the following questions are posed to each measure recipient:

FR1. Had the participant heard about the program before or after they thought about installing the program measure?

FR2. Did the participant have specific plans to install the measure before learning about the program?

FR3. How likely was the participant to install the measure if they had not installed it through the program? (0-10 scale probability)

FR4. How critical was the program in the decision to install the measure? (0-10 scale)

FR5. 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)

Free Ridership Scoring

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

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).

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 FR2 and FR3).

If neither of the above criteria holds, then responses to questions FR3, FR4 and FR5 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 these measures [FR3 and FR5] even without the program are discounted relative to the self-reported importance of the program to the installation [FR4], at a rate of 2 to 1. The corresponding formula for calculating free ridership is shown below:

3. [(FR3+FR5)/2 *(1/3) + (FR4)*(2/3)]

Note that in the above formula, if FR3 or FR5 are invalid (missing or "don't know") then the first component [(FR3+FR5)/2] relies on the non-missing factor. That is, if FR3 is invalid the formula is: [FR5*(1/3)+(FR4)*2/3]. If FR3 and FR5 are missing then the score is based on FR4 alone.

A bulb count weight is applied in calculating the overall result for CFL free ridership[9], while other measure free ridership scores are aggregated using an equal weight, in accordance with the assignment of ex-ante impact.

The approach described above is consistent with the approach applied in the PY2 Evaluation. There was one new adjustment made to this approach for CFL free ridership measurement only. For CFL free ridership scoring, adjustments are made in a few special cases. In particular, free ridership scores are set to zero for customers who report a CFL spillover adoption, or have a low pre-retrofit CFL saturation rate.

» Customers that reported the program strongly influenced them to install additional CFLs following their participation (i.e. report spillover adoptions) are assumed not to be free riders. This is to reflect the most improbable event that these customers are highly influenced by the program to purchase more CFLs, yet would have purchased CFLs without the program in any case.

» Customers who reported that prior to participating in the program less than 10% of their sockets were already retrofit with CFLs are also assumed not to be free riders. In light of the direct install delivery approach, this adjustment reflects the empirical evidence of the customer's low propensity to install CFLs independently.

Spillover

The objective of the spillover assessment is to estimate the impact arising from efficient measures installed as a result of the program that were not incented by the program. The evaluation relies on self-reported data collected during the telephone survey and interviews to identify these measures and assess the role of the program in the decision to install. For each measure installed through the program, the following questions are posed to each measure recipient:

[9] Each participant free ridership score is assigned a weight in accordance with the number of bulbs installed in the home.

SP1. Have you installed any additional measures since receiving the ones through the program?

SP2. How many additional measures did you install?

SP3. How influential was the program in encouraging you to install these additional measures? (0-10 scale)

Spillover Scoring

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

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

1. [If SP1=1 and SP3 is greater than or equal to 8, then adoption is spillover]

Table 5-10. PY3 Multifamily Evaluation Free Ridership and Spillover Results by Measure

Measure	Free Ridership	Spillover	NTG
Compact Fluorescent Bulbs	20%	1%	81%
1.0 gpm lav aerator	6%	0%	94%
1.5 gpm kitchen aerator	6%	0%	94%
1.5 gpm showerhead	7%	0%	93%
Program total	11%	1%	90%

Source: Navigant analysis of PY3 participant survey

5.3 Energy and Demand Impact Methodology (PY1--PY3)

The purpose of this section is to document the evaluation team's methodology used for the ComEd All-Electric Efficiency Upgrade (Multifamily) Program evaluation reports. We explain how we calculated ex-post gross savings values by including evaluator recommended (ex-post gross) savings estimates, gross impact parameters and outputs for each program measure. This section does not present any new information; rather, it is intended to provide the reader with a convenient reference to compare evaluator recommended measure values from Program Year One to Program Year Three. Table5-11 lists program accomplishments from PY1 to PY3. PY3 values reflect deemed kWh savings for CFL measures. PY3 values do not include savings from jointly implemented pilot programs with gas companies.

Table 5-11. ComEd Multifamily Program Accomplishments (PY1—PY3)

Performance Indicator	PY1	PY2	PY3
Participating Units	4,119	4,219	5,500
Ex-Ante Gross Savings (MWh)	2,568	2,698	3,722
Ex-Post Gross Savings (MWh)	2,315	2,090	4,678
Realization Rate	90%	77%	126%
Net Savings (MWh)	1,852	1,840	4,216
NTG Ratio	0.80	0.88	0.90
Net Demand Reduction (kW)	160	151	290

Sources: Navigant PY3 analysis, PY3 ComEd Residential ENERGY STAR Lighting Program Navigant PY2 Evaluation Report, Summit Blue Consulting PY1 Evaluation Report

Compact Fluorescent Lamps

This section describes key assumptions for CFL measure savings estimates over time from PY1 to PY3. The evaluation team used the following ex-post gross savings results to estimate energy savings from CFL measures. The Multifamily program phased out 13W, 15W and 20W CFLs in PY2. The program introduced 9W, 14W, and 19W CFLs in PY3.

Table 5-12. CFL Measure Ex-Post Gross Energy Savings Estimates

Measure	Unit	Delta Watts	PY1 Values	PY2 Values	PY3 Values
9W replacing 40W	lamp	31	n/a	n/a	28.6 kWh
13W replacing 40W	lamp	27	n/a	23.1 kWh	n/a
14W replacing 60W	lamp	46	n/a	n/a	42.4 kWh
15W replacing 60W	lamp	45	n/a	38.4 kWh	n/a
19W replacing 75W	lamp	56	n/a	n/a	51.6 kWh
20W replacing 75W	lamp	55	52.3 kWh	47.0 kWh	n/a

Source: ComEd Planning Estimates, Navigant analysis

Recent findings from the PY3 ComEd ENERGY STAR® Residential Lighting Program Evaluation caused updates to the estimated hours of use for CFL measures (from 2.34 HOU to 2.57 HOU) and for energy interactive effects, estimated to be a 2.4 percent benefit.

Table 5-13. CFL Measure Ex-Post Gross Demand Savings Estimates

Measure	Unit	Delta Watts	PY1 Values	PY2 Values	PY3 Values
9W replacing 40W	lamp	31	n/a	n/a	.0025 kW
13W replacing 40W	lamp	27	n/a	.0021 kW	n/a
14W replacing 60W	lamp	46	n/a	n/a	.0037 kW
15W replacing 60W	lamp	45	n/a	.0035 kW	n/a
19W replacing 75W	lamp	56	n/a	n/a	.0045 kW
20W replacing 75W	lamp	55	.0040 kW	.0042 kW	n/a

Source: ComEd Planning Estimates, Navigant analysis

Based on findings from the PY3 ComEd ENERGY STAR® Residential Lighting Program Evaluation, we recommended updates to the average peak coincidence factor for indoor CFL installations from 0.081 to 0.095.

Table 5-14. PY1-PY3 Ex-Post Gross Impact Parameter Inputs for CFL Measures

Input	PY1 Values	PY2 Values	PY3 Values
Daily Hours of Use (HOU)	2.34 hours	2.34 hours	2.57 hours, PY3 Res Lighting Evaluation
Operating Days per Year	365	365	365
Installation Rate	Propose to use 1.0 and let evaluation realization rate account for lamp removal	0.96, PY2 Multifamily Participant Telephone Surveys	0.96, PY3 Multifamily Participant Telephone Surveys
Demand and Energy Interactive Effects	Not Addressed	Recommend ComEd use 1.0 for both factors in PY2.	2.4%, PY3 Res Lighting evaluation
Coincidence Factor	0.081	Recommend ComEd use 0.081 for PY2, the same value used in PY1.	0.095, PY3 Res Lighting evaluation

Source: ComEd Planning Estimates, Navigant analysis

Table 5-15. Sources of Ex-Post Gross Input Parameters for CFL Measures

Gross Savings Input Parameters	Source
CFL Units	PY1/PY2/PY3 Program Tracking Data
Delta Watts	Deemed Estimates (Val Jensen Testimony) / Energy Star Standard Equivalency Tables / Lumen-based Incandescent Equivalents
Hours of Use	ComEd Metering Study
Peak Load Coincidence Factor	ComEd Metering Study
Installation Rate	PY3 Multifamily Participant Telephone Surveys
Interactive Effects	PY3 Residential Lighting, eQuest Modeling

Source: ComEd Planning Estimates, Navigant analysis

Faucet Aerators

The evaluation team has worked with ComEd over the years to recommend several adjustments to faucet aerator gross input parameters since the original planning estimate. The evaluation team recommended an engineering algorithm in PY2 that was adopted by ComEd as a planning estimate for PY3. In PY3, the Multifamily program introduced new bathroom aerator measures with a flow rate of 1.0 gpm that replaced the 1.5 gpm bathroom aerators installed in previous years. The introduction of the new 1.0 gpm bathroom faucet aerator measure resulted in changes to the evaluator recommended adjustments to energy savings estimates for these measures. Demand savings were unchanged.

- **Baseline and Retrofit Flow Rates.** In PY2, the evaluation team used rated flow rates based on national standards and replacement specifications. Studies that measured faucet flows also corroborated these values. However, these measurements are often taken with faucets at full flow, and metering studies using flow trace analysis show that actual faucet flow rates are typically much lower than rated or even measured flows. The evaluation team recommends PY3 inputs to reflect the percent reduction in flow rate affected by metering studies.

- **Occupancy Rates.** The evaluation team conducted a survey of 140 participants in the PY3 Multifamily program (including 70 in the All-Electric and 70 in the jointly implemented pilot program with Nicor Gas). The average occupancy rate was 2.1 persons/residence.

- **Cold Water Temperature.** The evaluation team recommends refining this value from an estimated intake temperature of 55°F to 54.1°F to reflect Chicago water mains temperatures estimated by the Building America Benchmarking analysis.

The following two tables include PY1-PY3 ex-post gross savings estimates for kitchen and bathroom faucet aerators.

Table 5-16. Faucet Aerator Ex-Post Gross Energy Savings Estimates

Measure	Unit	PY1 Values	PY2 Values	PY3 Values
1.5 gpm kitchen aerator	household	52.0 kWh	117.0 kWh	107.0 kWh
1.5 gpm bath aerator	household	52.0 kWh	88.0 kWh	n/a
1.0 gpm bath aerator	household	n/a	n/a	139.0 kWh

Source: ComEd Planning Estimates, Navigant analysis

Table 5-17. Faucet Aerator Ex-Post Gross Demand Savings Estimates

Measure	Unit	PY1 Values	PY2 Values	PY3 Values
1.5 gpm kitchen aerator	household	0.012 kW	0.012 kW	0.012 kW
1.5 gpm bath aerator	household	0.012 kW	0.012 kW	n/a
1.0 gpm bath aerator	household	n/a	n/a	0.012 kW

Source: ComEd Planning Estimates, Navigant analysis

The following table includes gross impact parameters used to estimate energy savings for kitchen faucet aerators from PY1-PY3.

Table 5-18. PY1-PY3 Ex-Post Gross Impact Parameter Inputs for Kitchen Faucet Measures

Input	PY1 Values	PY2 Values	PY3 Values
Occupancy estimate (persons/unit)	2.00	2.35	2.10
Total faucet usage/person/day	14 gallons	14 gallons	14 gallons
Kitchen Baseline Flow (as-rated)	2.2 gpm	2.2 gpm	2.2 gpm
Kitchen Baseline Flow (as-used)	-	1.3 gpm	1.3 gpm
Kitchen Retrofit Flow (as-rated)	1.5 gpm	1.5 gpm	1.5 gpm
Kitchen Retrofit Flow (as-used)	-	1.0 gpm	1.0 gpm
% Flow Rate reduction, kitchen	-	32%	32%
% Kitchen use	-	65%	65%
% Down the drain use, kitchen	-	50%	50%
% of Kitchen use affected	-	100%	100%
Incoming cold water temp.	55°F	55°F	54.1°F
Faucet Temperature	90°F	90°F	90°F
Electric Water Heater Efficiency	88%	91%	91%
Energy and Demand Savings Estimates			
Estimated kWh savings/unit	52.0 kWh	117.0 kWh	107.0 kWh
Estimated kW savings/unit	0.012 kW	0.012 kW	0.012 kW

Source: ComEd Planning Estimates, Navigant analysis
**Note: PY1 Defaults based on a 3% measure savings, using DEER baseline of 1,896 kWh.*

The following table details the gallon savings for kitchen aerators. All values are in units of annual gallons per household. Total pre-retrofit gallons are calculated based on occupancy and per person faucet use (bathroom and kitchen combined). Kitchen pre-retrofit gallons and gallons down the drain are calculated based on estimates of the overall percentage of kitchen faucet use (65%) and the percent of kitchen faucet use that flows down the drain and does not represent batch use (50%), respectively. The flow reduction rate, which is the most changed since PY2, is used to calculate total kitchen gallon savings from pre-retrofit down-the-drain usage.

Table 5-19. Kitchen Faucet Water Savings (Annual Gallons/Residence)

Output	PY1 Values	PY2 Values	PY3 Values
Total Unit Base Case	10,220	12,009	10,731
Kitchen Base Case (total*0.65)	6,643	7,806	6,975
Kitchen Base Case Gallons Down-the-Drain (Kitchen Base Case*0.5)	3,322	3,903	3,953
Flow Rate Reduction (percentage)	32%	32%	32%
Kitchen Gallons Saved (base case – retrofit)	1,063	1,243	1,265

Source: ComEd planning estimates, Navigant analysis

The following table includes gross impact parameters used to estimate energy savings for bathroom faucet aerators from PY1-PY3.

Table 5-20. PY1-PY3 Ex-Post Gross Impact Parameter Inputs for Bathroom Faucet Measures

Input	PY1 Values	PY2 Values	PY3 Values
Occupancy estimate	2.00	2.35	2.10
Faucet usage/person/day	14 gallons	14 gallons	14 gallons
Bath Faucet Baseline Flow(as-rated)	2.2 gpm	2.2 gpm	2.2 gpm
Bath Faucet Baseline Flow (as-used)	-	1.3 gpm	1.3 gpm
Bath Faucet Retrofit Flow (as-rated)	1.5 gpm	1.5 gpm	1.0 gpm
Bath Faucet Retrofit Flow (as-used)	-	1.0 gpm	1.0 gpm
% Flow Rate reduction, Bath Faucet	-	32%	32%
% Bath Faucet use	-	35%	35%
% Down the drain use, Bath Faucet	-	70%	39%
% of Bath Faucet use affected	-	100%	100%
Incoming cold water temperature	55°F	55°F	54.1°F
Faucet Temperature	90°F	90°F	90°F
Electric Water Heater Efficiency	88%	91%	91%
Energy and Demand Savings Estimates			
Energy savings/ unit (1.5 gpm aerator)	52 kWh	88 kWh	n/a
Energy savings/unit (1.0 gpm aerator)	n/a	n/a	139 kWh
Demand savings/unit	0.012 kW	0.012 kW	0.012 kW

Source: ComEd Planning Estimates, Navigant analysis,

**Note: PY1 Defaults based on a 3% measure savings, using DEER baseline of 1,896 kWh*

The following table details the gallon savings for bathroom aerators. All values are in units of annual gallons per household. Total pre-retrofit gallons are calculated based on occupancy and per person faucet use (bathroom and kitchen combined). Bathroom pre-retrofit gallons and gallons down the drain are calculated based on estimates of the overall percentage of bathroom faucet use (35%) and the percent of kitchen faucet use that flows down the drain and does not represent batch use (70%), respectively. The flow reduction rate, which is the most changed since PY2, is used to calculate total kitchen gallon savings from pre-retrofit down-the-drain usage.

Table 5-21. Bathroom Faucet Water Savings (Annual Gallons/Residence)

Output	PY1 Values	PY2 Values	PY3 Values
Total Pre-retrofit Gallons	10,220	12,009	10,731
Bath Pre-retrofit Gallons	3,577	4,203	3,756
Bath Pre-retrofit Gallons Down-the-Drain	2,504	2,942	2,942
Bath Flow Rate Reduction	32%	32%	39%
Bath Gallons Saved (1.5 gpm aerator)	801	936	n/a
Bath Gallons Saved (1.0 gpm aerator)	n/a	n/a	841

Source: ComEd Planning Estimates, Navigant analysis

The following table includes the sources of information that the evaluation team used to estimate the gross impact parameter inputs to estimate savings for kitchen and bath faucet aerators.

Table 5-22. Sources for Ex-Post Gross Savings Input Parameters (Aerators)

Input	Source
As-used baseline and retrofit flow rates	Mayer, P. W., et al. *Residential End Uses of Water,* AWWA Research Foundation, 1999. Mayer, P.W., et al. *Residential Indoor Water Conservation Study: Evaluation of High Efficiency Indoor Plumbing Fixtures in Single-Family Homes in East Bay Municipal Utility District Service Area,* EBMUD, Aquacraft & US EPA, 2003. Mayer, P.W., et al. *Seattle Home Water Conservation Study: The Impacts of High Efficiency Plumbing Fixture Retrofits in Single-Family Homes,* Aquacraft & US EPA, 2000. Mayer, P.W., et al. *Tampa Water Department Residential Water Conservation Study,* Aquacraft & US EPA, 2004.
Household members	U.S. Census Bureau, http://www2.census.gov/geo/maps/dc10_thematic/2010_Profile/2010_Profile_Map_Illinois.pdf
Total Daily Faucet use per capita per day	Mayer, P. W., et al. *Residential End Uses of Water,* AWWA Research Foundation, 1999.
Flow Rate Reduction	Calculated from baseline and retrofit flows
Down the drain use, kitchen and bath	Cook, G. and Barkett, B. *Resource Savings Values in Selected Residential DSM Prescriptive Program,* Summit Blue Canada Inc., 2008.
% Kitchen use and % Bath use	Cook, G. and Barkett, B. *Resource Savings Values in Selected Residential DSM Prescriptive Program,* Summit Blue Canada Inc., 2008.
% of Kitchen use affected	Assume all kitchen faucets replaced, per ComEd tracking spreadsheets
% of bath use affected	Assume all bathroom faucets replaced, per ComEd tracking spreadsheets
Faucet Temperature	Cook, G. and Barkett, B. *Resource Savings Values in Selected Residential DSM Prescriptive Program,* Summit Blue Canada Inc., 2008.
Cold water temperature	US DOE Building America Program. *Building America Analysis Spreadsheet*. http://www1.eere.energy.gov/buildings/building_america/analysis_spreadsheets.html
Electric water heater efficiency	ComEd 2008-2010 energy efficiency plan

Low Flow Showerheads

The following two tables show energy and demand savings for low flow showerheads.

Table 5-23. Showerhead Ex-Post Gross Energy Savings Estimates

Measure	Unit	PY1 Values	PY2 Values	PY3 Values
2.0 gpm showerhead	household	355.0 kWh	297.0 kWh	n/a
1.5 gpm showerhead	household	n/a	n/a	450.0 kWh

Source: ComEd planning estimates, Navigant analysis

Table 5-24. Showerhead Ex-Post Gross Demand Savings Estimates

Measure	Unit	PY1 Values	PY2 Values	PY3 Values
2.0 gpm showerhead	household	.0015 kW	.0015 kW	n/a
1.5 gpm showerhead	household	n/a	n/a	.0015 kW

Source: ComEd planning estimates, Navigant analysis

Occupancy Estimates

Multifamily participant surveys yielded different occupancy rates (1.66 persons/unit in PY2 v. 2.1 persons/unit in PY3) than the U.S. Census information (estimated at 2.38 persons/occupied rental unit in Illinois).[10] In PY2, the evaluation team used the planning estimate of 2.35 persons to calculate estimated energy impacts from water efficiency measures. In PY3, the evaluation team recommends using participant surveys to estimate occupancy in multifamily units.

Incoming Water Temperature

The evaluation team reviewed information about average incoming water temperatures in the Chicago area and recommended a small adjustment to the average incoming water temperature (55°F in PY2 v. 54.1°F in PY3) based on this research. This adjustment resulted in an estimated additional savings of five kWh/unit to each showerhead unit.

Throttling Factors

The evaluation team conducted additional research regarding throttling factors for showerheads at various flow rates, due to the introduction of the 1.5 gpm showerhead measure in PY3. The evaluation team's research confirmed the adjustment known as a "throttling factor" would be applicable to the base case showerhead, assumed to be rated at 2.5 gpm at 80 psi. The base case showerhead is assigned a throttling factor of 0.9, meaning that the actual flow rate of a showerhead rated at 2.5 gpm is normally closer to 2.25 gpm in most households (2.5 gpm * 0.9 =

[10] U.S. Census Bureau, http://www2.census.gov/geo/maps/dc10_thematic/2010_Profile/2010_Profile_Map_Illinois.pdf

2.25 gpm). The evaluation team's research indicates that, as flow rates from showerheads are reduced below 2.0 gpm, the throttling factor is reduced and is assumed to be negligible. Therefore, the retrofit 1.5 gpm showerheads are assigned a throttling factor of 1.0, leaving the actual flow rate of the replacement showerhead at 1.5 gpm. As a result, the evaluation team recommends using a value of 0.75 gpm as the difference between the actual flow rate of a base case showerhead and a replacement showerhead (2.25 gpm – 1.5 gpm = 0.75 gpm.) When the new inputs for throttling factor and incoming water temperature are applied to the measure algorithm, each replacement 1.5 gpm showerhead unit saves 450.0 kWh.

The evaluation team recommends leaving the demand savings estimates for showerheads unchanged from the previous year. Both a 1.5 gpm replacement showerhead and a 2.0 gpm replacement showerhead continue to have a value of 0.015 kW/unit.

Low Flow Showerhead Gross Impact Parameter Inputs

The following table includes gross impact parameters used to estimate energy savings for low flow showerheads from PY1-PY3. The original planning estimates for low flow showerhead savings included gross impact parameter inputs from the California 2005 DEER database. These factors were researched and adjusted for use in a more detailed engineering algorithm for PY2. The algorithm from PY2 remains unchanged. As shown in Table 5-25, the key evaluation adjustments made to gross impact parameter inputs in PY3 are for unit occupancy estimates, average temperature of incoming cold water and the application of research for the 1.5 gpm showerhead measure used in the PY3 All-Electric program.

Table 5-25. PY1-PY3 Ex-Post Gross Impact Parameter Inputs for Showerhead Measures

Input	PY1 Values	PY2 Values	PY3 Values
Occupancy Rate	2.0	2.35	2.1
Showers per capita per day	1.0	0.70	0.70
Shower length (minutes)	8.0	8.2	8.2
Proportion of showering activity affected by replacement	100%	100%	100%
Baseline Rated Flow (80 psi)	2.5 GPM	2.5 GPM	2.5 GPM
Retrofit Rated Flow (80 psi)	2.0 GPM	2.0 GPM	1.5 GPM
Throttling factor	-	0.90	1.0 for flows <2.0 GPM 0.90 for flows >2.0 GPM
Shower Water Use Reduction	0.5 gpm	0.5 gpm	0.75 gpm
Cold water temperature	55° F	55° F	54.1° F
Shower Temperature	100° F	105° F	105° F
Water heater efficiency	0.90	0.91	0.91
Estimated kWh savings/unit (2.0 gpm showerhead)	355.0 kWh	297.0 kWh	n/a
Estimated kWh savings/unit (1.5 gpm showerhead)	n/a	n/a	450.0 kWh
Estimated kW savings/unit	0.015 kW	0.015 kW	0.015 kW

Source: ComEd planning estimates, Navigant analysis

The following table details the estimated water savings for low flow showerheads. Total pre-retrofit gallons are calculated based on occupancy estimates.

Table 5-26. Showerhead Water Savings (Annual Gallons/Residence)

Output	PY1 Values	PY2 Values	PY3 Values
Base Case Gallons	10,220	12,309	12,162
Gallons Saved (2.0 gpm showerhead)	2,920	2,216	n/a
Gallons Saved (1.5 gpm showerhead)	n/a	n/a	3,300

Source: ComEd planning estimates, Navigant analysis

The following table summarizes the sources of information that the evaluation team used to estimate the gross impact parameter inputs to estimate savings for low flow showerheads.

Table 5-27. Sources for Gross Savings Input Parameters (Showerheads)

Input	Source
Household Members	U.S. Census Bureau, http://www2.census.gov/geo/maps/dc10_thematic/2010_Profile/2010_Profile_Map_Illinois.pdf
Showers per capita per day	Biermayer, Peter J. *Potential Water and Energy Savings from Showerheads*, Lawrence Berkeley National Laboratory, 2006. Mayer, P. W., et al. *Residential End Uses of Water,* AWWA Research Foundation, 1999.
Shower Length	Biermayer, Peter J. *Potential Water and Energy Savings from Showerheads*, Lawrence Berkeley National Laboratory, 2006. Mayer, P. W., et al. *Residential End Uses of Water,* AWWA Research Foundation, 1999.
Proportion Affected	Cook, G. and Barkett, B. *Resource Savings Values in Selected Residential DSM Prescriptive Program,* Summit Blue Canada Inc., 2008.
Baseline as-used flow	Biermayer, Peter J. *Potential Water and Energy Savings from Showerheads*, Lawrence Berkeley National Laboratory, 2006. Federal standard flow rate of 2.5 gpm in effect since 1994 is baseline rated flow.
Retrofit as-used flow	Biermayer, Peter J. *Potential Water and Energy Savings from Showerheads*, Lawrence Berkeley National Laboratory, 2006.
Shower Temperature	Biermayer, Peter J. *Potential Water and Energy Savings from Showerheads*, Lawrence Berkeley National Laboratory, 2006. Cook, G. and Barkett, B. *Resource Savings Values in Selected Residential DSM Prescriptive Program,* Summit Blue Canada Inc., 2008.
Cold water temperature	US DOE Building America Program. *Building America Analysis Spreadsheet*. http://www1.eere.energy.gov/buildings/building_america/analysis_spreadsheets.html

5.4 In-Depth Interview Guide for Program Staff, Administrator and Implementation Contractor

The evaluation team used the Interview Guide below for in-depth interviews with program staff.

Multifamily Program Staff Interview Guide May 2, 2011

Marketing and Participation

- How did customers become aware of the program? What marketing strategies could be used to boost program awareness?

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

- Has the program effectively recruited trade ally partners to promote the program to customers? Is the program effectively leveraging its trade ally network and/or other industry associations to promote the program to customers?

- Has the program effectively channeled customers to other programs sponsored by the Companies to implement common area efficiency measures as identified in common area audits? What are the main barriers to and motivation for adopting recommended common area measures?

Program Characteristics and Barriers

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

- Does the application/enrollment process present any barriers to program participation?

- Are customers and program partners satisfied with the aspects of program implementation in which they have been involved?

Administration and Delivery

- Are program administrative and delivery processes effective for delivering efficient scheduling and installation of measures?
    - Program tracking and information management systems
    - Internal and external program communications
    - Program delivery organization and staffing
    - Skill levels needed to implement the program

- Are customers satisfied with participation in the program and customer service experiences? Are customer surveys completed and reviewed by the program?

- What are the verification procedures for the program? Have they been implemented in a manner consistent with design? Do they present a barrier to participation or perceived undue burden on customers?

- Is the program effectively coordinating with ComEd for electric measures and reporting? What adjustments, if any, are needed to improve the framework for cost allocation based on savings/benefits to each utility's customers?

5.5 In-Depth Interview Guide for Property Owners/Managers

The evaluation team used the Interview Guide below for in-depth interviews with property owners/managers.

ComEd-Nicor Gas Joint Pilot Program
Multifamily Building Owner/Manager
In-Depth Interview Guide

Purpose
This interview guide includes questions for participating multifamily building owners/property managers.

Interview Objectives

Objective	Discussion Items
Marketing and Outreach Efforts	Identify and document efforts. Compare market uptake with those in other programs.
Program delivery experience	Describe the Multifamily program from the stakeholder perspective, including participation, scheduling, demonstration, and installation. Note any program delivery issues.
Customer Satisfaction	Inquire about satisfaction with customer service, measures, complaint resolution, as applicable.
External/Internal Market Variations	Discuss external market drivers: gas rates, market demographics, the economy. How do external variations affect program uptake, if at all?

Introduction

Hello, I am calling on behalf of ComEd and Nicor Gas regarding your property's participation in the Multifamily Direct Install program. This is not a sales call. I would like to ask you some prepared questions about your experience with the program. I expect our conversation to last between 10 min to 15 min. We will be using your comments, as well as those of other

interviewees, to help inform our report. Your name will be listed as an interviewee in an appendix to the report that we will submit to ComEd and Nicor Gas along with others. Your name will not be linked to your responses. Is this acceptable to you?

Confirm contact information

Date: _ Interviewer: _____

Interviewee Name:

Property Name:

Property Address:

Phone:

Email:

Number of Units

Number of buildings

Marketing and Outreach Efforts

1. How did you first learn about the Multifamily Direct Install program?
2. Why did you decide to enroll your facility in the program?
3. What was the internal decision making process for enrolling your facility in the program?

Program Delivery Experience

Participation

4. Overall, was participation easy for you? Why or why not?
5. What program changes would increase customers' ease of participation?
6. Do you have any ideas on ways that the utilities could improve the Multifamily Direct Install program to increase participation?
7. Do you have any other comments on the program's participation?

Scheduling

8. How efficient was scheduling the demonstration and installation process?
9. Were their barriers to scheduling the demonstration and/or installation? If so, what?
10. How could they have been addressed more efficiently?

Demonstration

11. Did a field technician demonstrate the program to you or a member of your firm (this demonstration may have included showing examples of installing CFLs, faucet aerators and showerheads in one or more units….etc.)
12. Did the field technician adequately explain your roles and responsibilities by participating in the multifamily program?

    - Did they explain that they needed to enter all the units and they would need a maintenance person or other agent to enter the apartments with them?
    - Did they post the poster information for the renters? Did they distribute the door hangers?
    - What marketing materials did you receive from the program implementer? (Leave behind pamphlet for decision maker/posters they can put up around the property to notify the residents/report that they get at the end of the installation specific to their property that identifies what was installed.)
    - Were marketing materials informative?

13. Did the field technician adequately answer your questions?
14. Did the field technician provide requested follow up information in a timely manner?
15. How soon did you schedule the installation after the initial demonstration?
16. Did the installation occur on the date on which it was scheduled? If not, why not?
17. Did the field technician ask you for referrals of other properties that might benefit from the multifamily program?
18. Did the field technician refer you to other Nicor Gas and/or ComEd energy efficiency programs that your property might benefit from participating?

Measure Satisfaction

19. How satisfied are you, as a building owner/manager, with the measures that were installed at your property?
20. Have you received any feedback from residents at your property about their level of satisfaction with measures installed at your property? If so, what?
21. Are there measures that should be dropped from the program? Why?
22. Are there measures that should be added to the program? Why?

Customer Satisfaction

23. Were there any complaints made by you or your residents during the installation at your property? If so, what?
24. Was the complaint communicated to the field technician or program contractor (Honeywell)?

- Were you satisfied with the resolution of the complaint?
- Is there anything that the program could have done differently to satisfy your complaint or avoid it from occurring in the first place?

25. Were you satisfied with the program implementer?

    What type of interactions have you had with them?

    Is there any feedback you would like to give to the program administrators? Are there any issues that you'd like to discuss?

26. Overall, how satisfied are you with the Multifamily Program?
    (On a scale of 1 to 4, where 1 is very satisfied and 4 is very unsatisfied)

    1 VERY SATISFIED
    2 SOMEWHAT SATISFIED
    3 SOMEWHAT UNSATISFIED
    4 VERY UNSATISFIED
    8 DON'T KNOW
    9 REFUSED

External/Internal Market Variations

27. Are there any other factors (outside of the Multifamily program) that are influencing your interest/participation in the program? (for example, vacancy rates, economy, etc.)

28. Would you recommend the program to colleagues within your firm or other building owners or managers?

Net To Gross (NTG)
Free Ridership

1. Without the program, do you think you would have installed any of the energy efficiency measures
   a. CFLs,
   b. faucet aerators,
   c. showerheads
2. If so, would you have installed them within 6 months, longer than 6 months, longer than 1 year?
   a. CFLs,
   b. faucet aerators,
   d. showerheads

Spillover

1. Since participating in the program, have you taken any other energy efficiency actions at this property? (prompt as needed)

2. Since participating in the program, have you taken any other energy efficiency actions at other property (ies)? (prompt as needed)

Wrap up (only ask if not covered yet)

29. Is there anything about the program that was done particularly well?

30. Is there anything about the program that could be improved?

31. Do you have anything else that you would like to share about the Multifamily program?

Thank you for participating in our energy efficiency research!

5.6 Participant Telephone Survey Instrument

The evaluation team used the survey instrument to contact program participants (e.g. apartment residents).

COMED-NICOR
JOINTLY IMPLEMENTED MULTIFAMILY PILOT PROGRAM
PARTICIPANTING TENANT SURVEY
July 25, 2011 FINAL

INTRODUCTION AND SCREENER

Hello, this is [INTERVIEWER'S NAME] calling on behalf of COMED and NICOR GAS. This is not a sales call. We are contacting customers who have participated in the Multifamily Direct-Install Program also known as the "Multi-Family program." [If needed: This program provided free installation of compact fluorescent light bulbs, faucet aerators and showerheads.]

Are you the person who was most familiar with the upgrades? (If not may I please speak with the person who was most familiar with the upgrades?)

CONTINUE WITH RIGHT PERSON: Nicor and ComEd sponsor the Multi-Family Program and has hired our firm to prepare an independent evaluation of their energy efficiency programs. The Illinois Commerce Commission (ICC) requires Nicor and ComEd 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.

We are conducting an independent study to evaluate the Multi-Family 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. We would be grateful for your participation in our research.

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

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

SCREENING QUESTIONS

S0. Is ComEd your electric company or do you receive electric service from another utility?

1. ComEd
2. Another Utility [THANK & TERMINATE]
8. (Don't know)
9. (Refused)

To start, we have several questions regarding the upgrades that were installed in your home.

S1. Our records show that during the visit to your home, a program representative installed the following upgrades. Please confirm if this is correct. Did you receive…. [1=YES, 2=NO, 8=DON'T KNOW, 9=REFUSED]

a. [If CFL=1] Compact Fluorescent Light Bulbs
b. [If AERATOR=1] Faucet Aerators
c. [IF SHOWERHEAD =1] A low flow showerhead

[CONTINUE IF ANY S1a-d = 1, ELSE THANK AND TERMINATE]

S2. Were you present when the energy efficiency products were installed at your home?

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.

[ROTATE ORDER OF SECTIONS C, FA, AND SH]

CFL VERIFICATION [ASK IF CFL=1, ELSE SKIP TO AMV1]

[ASK SECTION IF S1a =1]

CMV1. Our records show that [insert CFL_QTY] CFL(s) were installed by the Multi-Family Program during a technician's visit to your home. Is this correct?

1. (Yes, quantity is correct)
2. (No, quantity is incorrect)
3. (No, I did not install) [SKIP TO NEXT SECTION]
8. (Don't know) [SKIP TO NEXT SECTION]
9. (Refused) [SKIP TO NEXT SECTION]

[ASK IF CMV1=2]

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 NEXT SECTION**]

CMV3. Our records indicate that the CFLs were installed in locations that operate 2 or more hours per day. Is this correct?

1. Yes
2. No
8. (Don't know)
9. (Refused)

CMV3a. [ASK IF CMV3=2] Where are the CFLs installed?
[OPEN END, DK, REF]

CMV4. What type of light bulbs did the CFLs replace? (Select all that apply)

01. Halogen
02. Incandescent
03. CFL
00. (Other, specify)
98. (Don't know)
99. (Refused)

CMV6. [Wording if CFL_QTY=1] Is the CFL still installed in the original location?
[Wording if CFL_QTY>1] Are all of CFLs still installed in their original locations?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF CMV6 =2 AND CFL_QTY=1]
CMV7. Which of the following best describes what happened with the CFL? (READ LIST AND RECORD ONE RESPONSE)

01. It is installed at some other location in your home
02. It was thrown away
03. It is in storage
04. It was sold or given away
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF CMV6 =2 AND CFL_QTY>1]
CMV8. Now, I would like to understand what happened to the [insert CFL_QTY] CFLs. First, how many CFLs are currently installed in their original location? [NUMERIC OPEN END up to CFL_QTY, DK, REF]

[CHECK IF CMV8=VERIFIED QUANTITY, THEN SKIP TO CMV19]

[ASK IF CMV6 =2 AND CFL_QTY>1]
CMV9. How many are installed at some other location in your home? [NUMERIC OPEN END up to CFL_QTY, DK, REF]

[IF CMV9+8 = VERIFIED QUANTITY, THEN SKIP TO CMV16]

[ASK IF CMV6 =2 AND CFL_QTY>1]
CMV11. How many program bulbs have been thrown away? [NUMERIC OPEN END up to CFL_QTY, DK, REF]

[IF CMV11+9+8 = VERIFIED QUANTITY, THEN SKIP TO CMV16]

[ASK IF CMV6 =2 AND CFL_QTY>1]
CMV12. How many are in storage? [NUMERIC OPEN END up to CFL_QTY, DK, REF]

[IF CMV12+11+9+8 = VERIFIED QUANTITY, THEN SKIP TO CMV16]

[ASK IF CMV6 =2 AND CFL_QTY>1]
CMV13. How many were sold or given away? [NUMERIC OPEN END up to CFL_QTY, DK, REF]

[IF CMV8 *OR* CMV9 CMV*OR* CMV11 *OR* CMV12 *OR* CMV13 = 98 or 99 THEN SKIP TO CMV15]

[*CFL_QTY check*
IF CMV8+ CMV9 CMV+CMV11+ CMV12+ CMV13= CFL_QTY
then proceed to CMV15.
ELSE IF CMV8+ CMV9 CMV+CMV11+ CMV12+ CMV13> CFL_QTY
then read "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
ELSE IF CMV8+ CMV9 CMV+CMV11+ CMV12+ CMV13< CFL_QTY
then proceed to CMV14]

CMV14. What were done with the remaining [CFL_QTY –(CMV8+ CMV9+ CMVCMV11+ CMV12+ CMV13)] CFLs?
[OPEN END, DK, REF]

[ASK IF CMV13>0 (BUT NOT DK/REF) OR CMV7=4]
CMV15. [Wording if CFL_QTY=1 OR CMV13=1] Is the CFL you sold or gave away located in ComEd's service territory?
[Wording if CMV13>1] Are all of the CFLs sold or given away located in ComEd's service territory?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF CMV6=2]
CMV16. Why [were the CFLs/was the CFL] moved from [their/its] original location? (MULTIPLE RESPONSE UP TO 6 RESPONSES)

01. (Equipment failed)
02. (Didn't work properly)
03. (Wrong size – too small or too large)
04. (Didn't like the color)
05. (Didn't like the appearance/unattractive)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF CMV6=2]
CMV17. What did you replace the CFL(s) with? (MULTIPLE RESPONSE)

01. (With a new CFL)
02. (With an incandescent bulb)
04. (Did not replace)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF CMV7=3 OR CMV12>0 (BUT NOT DK/REF)]

CMV18. When do you think you will install the CFL(s) you put in storage? Would you say …(READ ANSWER LIST)

1. Within the next 3 months
2. 3 to 6 months from now
3. 6 to 12 months from now
4. More than a year from now
5. Never
8. (Don't know)
9. (Refused)

CMV19. Have you installed any more CFLs since you received the ones through the program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF CMV19=1, ELSE SKIP TO CMV22]
CMV20. How many additional CFLs have you installed? [NUMERIC OPEN END up to 999, DK, REF]

CMV21. How influential was the Multi-Family program in encouraging you to install the additional CFL(s)? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential. [0-10, DK, REF]

CMV22. Have you recommended CFLs to anyone else?

1. Yes
2. No
8. (Don't know)
9. (Refused)

CMV23. At the time that you first heard about this program, had you…? (READ LIST UNTIL RESPONDENT SAYS NO)

01. Already been thinking about purchasing CFLs?
02. Already begun collecting information about CFLs?
03. Already selected the CFLs you were going to get?
04. Already decided to buy the CFLs
05. (Had not thought about purchasing CFLs before you first heard about the program)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[SKIP IF CMV23=05,98,99]
CMV24. Just to be sure I understand, did you have specific plans to install CFLs before learning about the program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

CMV25. 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 CFLs if you had not received (it/them) through the program? [0-10, DK, REF]

CMV32. If the program had not been available, would you have purchased and installed the CFLs?

1. Yes
2. No [SKIP TO CMV40]
8. (Don't know) [SKIP TO CMV40]
9. (Refused) [SKIP TO CMV40]

CMV33. If the program had not been available, would you still have purchased and installed the CFLs at the same time?

1. Yes [SKIP TO CMV36]
2. No
8. (Don't know) [SKIP TO CMV36]
9. (Refused) [SKIP TO CMV36]

CMV34. If the program had not been available, would you have purchased and installed the CFLs earlier or later?

1. Earlier
2. Later
8. (Don't know) [SKIP TO CMV36]
9. (Refused) [SKIP TO CMV36]

CMV35. If the program had not been available, how much [insert response to CMV34] would you have installed the CFLs?

[OPEN END, DK, REF]

CMV36. Without the program, would you have purchased and installed the same quantity as the program provided?

1. Yes [SKIP TO CMV38]
2. No
8. (Don't know) [SKIP TO CMV38]
9. (Refused) [SKIP TO CMV38]

CMV37. How many/much would you have installed without the program?
[OPEN END, DK, REF]

CMV38. If the program had not been available, would you have done anything else differently?

1. Yes
2. No [SKIP TO CMV40]
8. (Don't know) [SKIP TO CMV40]
9. (Refused) [SKIP TO CMV40]

CMV39. What would you have done differently?
[OPEN END, DK, REF]

CMV40. 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 CFLs if you had not received them through the program?
[0-10, DK, REF]

[IF (CMV24=2 or CMV23=5) AND (CMV40<=3) THEN SKIP TO NEXT SECTION]

I'm going to read two 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.

CMV26. 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]

CMV27. I would have bought CFLs within a year of when I did even if I had not received (it/them) from the program. [0-10, DK, REF]

Consistency Check & Resolution

[CFLCC1 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 CFLCC1 are:

- CMVCMV32 (would have purchased item without the program)
- CMVCMV40 (how likely is it that you would have bought the same item without program)
- CMV26 (program was a critical factor in my decision to install item)
- CMV27 (would have bought item within a year, without the program)

{IF CMV32 = 1 AND CMV40 = 0,1, 2 AND CMV26 = 8, 9,10 AND CMV27= 0,1, 2, ASK CFLCC1. INCONSISTENCY1='you would have purchased the CFLs without the program'}

{IF CMV32 = 2 AND CMV40 = 8, 9,10 AND CMV26 = 0,1, 2 AND CMV27 = 8, 9,10, ASK CFLCC1. INCONSISTENCY1= 'you would not have purchased the CFLs without the program'}

{IF CMV40 = 0,1,2 AND CMV32 = 1 AND CMV26 = 0,1, 2 AND CMV27 = 8, 9,10, ASK CFLCC1. INCONSISTENCY1='you would likely not have purchased the CFLs without the program'}

{IF CMV40 = 8, 9,10 AND CMV32 = 2 AND CMV26 = 8, 9,10 AND CMV27 = 0,1, 2, ASK CFLCC1. INCONSISTENCY1= 'you would likely have purchased the CFLs without the program'}

{IF CMV26 = 0,1, 2 AND CMV32 = 2 AND CMV40 = 0,1, 2 AND CMV27 = 0,1, 2, ASK CFLCC1. INCONSISTENCY1='the program was not a critical factor in your decision to purchase the high efficiency/energy efficient light bulbs without the program'}

{IF CMV26 = 8, 9,10 AND CMV32 = 1 AND CMV40 = 8, 9,10 AND CMV27 = 8, 9,10, ASK CFLCC1. INCONSISTENCY1='the program was a critical factor in your decision to purchase the high efficiency/energy efficient light bulbs without the program'}

{IF CMV27 = 8, 9,10 AND CMV32 = 2 AND CMV40 = 0,1, 2 AND CMV26 = 8, 9,10, ASK CFLCC1. INCONSISTENCY1= 'you would have bought the CFLs within [a year/2 years] even without the program'}

{IF CMV27 = 0,1, 2 AND CMV32 = 1 AND CMV40 = 8, 9,10 AND CMV26 = 0,1, 2, ASK CFLCC1. INCONSISTENCY1='you would not have bought the CFLs within [a year/2 years] even without the program'}

CMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMVCMV
CFLCC1. Let me make sure I understand you. Earlier, you said [insert inconsistency1], but that differs from some of your other responses. Please tell me in your own words what influence, if any, the program had on your decision install the CFLs at the time you did? [OPEN END, DK, REF]

FA. FAUCET AERATOR MEASURE VERIFICATION

[ASK SECTION IF S1b=1]

AMV1. Our records show that [insert AER_QTY] faucet aerator(s) were installed by the Multi-Family Program during a technician's visit to your home. Is this correct?

1. (Yes, quantity is correct)
2. (No, quantity is incorrect)
3. (No, I did not install) [SKIP TO NEXT SECTION]
8. (Don't know) [SKIP TO NEXT SECTION]
9. (Refused) [SKIP TO NEXT SECTION]

[ASK IF AMV1=2]
AMV2. How many faucet aerators were installed? [Prompt for best guess.] [NUMERIC OPEN END up to 999, DK, REF] **[IF DK OR REF, SKIP TO NEXT SECTION]**[USE AS AER_QTY FOR REMAINDER OF SURVEY]

AMV3. [Wording if AER_QTY=1] Is the faucet aerator still installed in the original location? [Wording if AER_QTY>1] Are all of faucet aerators still installed in their original locations?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF AMV3 =2 AND AER_QTY=1]
AMV3a. Which of the following best describes what happened with the faucet aerator? (READ LIST AND RECORD ONE RESPONSE)

01. It is installed at some other location in your home
02. It was thrown away

03. It is in storage
04. It was sold or given away
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF AMV3 =2 AND AER_QTY>1]
Now, I would like to understand what happened to the [insert AER_QTY] aerators. How many… [SHOW ON SAME SCREEN]
AMV3b. Are currently installed in their original location?

[CHECK IF AMV3b =VERIFIED QUANTITY, THEN SKIP TO AMV8]

AMV3c. Are installed at some other location in your home?

[IF AMV3b+c = VERIFIED QUANTITY, THEN SKIP TO AMV5]

AMV3d. Have been thrown away?

[IF AMV3b+c+d= VERIFIED QUANTITY, THEN SKIP TO AMV5]

AMV3e. Are in storage?

[IF AMV3b+c+d+e = VERIFIED QUANTITY, THEN SKIP TO AMV5]

AMV3f. Were sold or given away?
[NUMERIC OPEN END up to AER_QTY, DK, REF]

[IF AMV3b *or* AMV3c *or* AMV3d *or* AMV3e *or* AMV3f=98 OR 99 THEN SKIP TO AMV4]

[*MEAS_QTY check*
If AMV3b+AMV3c+AMV3d+AMV3e+AMV3f = AER_QTY
then proceed to AMV4.
Else if AMV3b+AMV3c+AMV3d+AMV3e+AMV3f > AER_QTY
then read "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 AMV3b
Else if AMV3b+AMV3c+AMV3d+AMV3e+AMV3f < AER_QTY
then proceed to AMV3g]

AMV3g. What were done with the remaining [AER_QTY – (AMV3b+AMV3c+AMV3d+AMV3e+AMV3f)] aerators? [OPEN END, DK, REF]

[ASK IF AMV3f>0 (BUT NOT DK/REF) OR AMV3a=4]
AMV4. [Wording if AER_QTY=1 OR AMV3f=1] Is the aerator you sold or gave away located in ComEd's service territory?
[Wording if AMV3f>1] Are all of the aerators you sold or gave away located in ComEd's service territory?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF AMV3=2]
AMV5. Why [was/were] the aerator(s) moved from [their/its] original locations? (MULTIPLE RESPONSE UP TO 7 RESPONSES) [WORDING CHANGE BASED ON AER_QTY]

01. (Equipment failed)
02. (Didn't work properly)
03. (Wrong size – too small or too large)
04. (Low water flow)
05. (Didn't like the color)
06. (Didn't like the appearance/unattractive)
00. (Other, specify)
98. (Don't know)
99. (Refused)

ASK IF AMV3=2]
AMV6. What did you replace the 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)

[ASK IF AMV3a=3 or AMV3e>0 (BUT NOT DK/REF)]

AMV7. When do you think you will install the aerator(s) that are in storage? Would you say …(READ ANSWER LIST)

1. Within the next 3 months
2. 3 to 6 months from now
3. 6 to 12 months from now
4. More than a year from now
5. Never
8. (Don't know)
9. (Refused)

AMV8. Have you installed any more faucet aerators since you received the ones through the program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF AMV8=1, ELSE SKIP TO AMV11]
AMV9. How many additional aerators have you installed? [NUMERIC OPEN END up to 999, DK, REF]

AMV10. How influential was the Multi-Family program in encouraging you to install the additional aerator(s)? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential. [0-10, DK, REF]

AMV11. Since receiving aerators through the program, have you recommended aerators to anyone else?

1. Yes
2. No
8. (Don't know)
9. (Refused)

AMV12. At the time that you first heard about this program, had you…? (READ LIST UNTIL RESPONDENT SAYS NO)

01. Already been thinking about purchasing aerators?
02. Already begun collecting information about aerators?
03. Already selected the aerators you were going to get?
04. Already decided to buy the aerators?

05. (Had not thought about purchasing aerators before you first heard about the program)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[SKIP IF AMV12=05,98,99]
AMV13. Just to be sure I understand, did you have specific plans to install aerators before learning about the program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

AMV32. If the program had not been available, would you have purchased and installed the aerators?

1. Yes
2. No [SKIP TO AMV40]
8. (Don't know) [SKIP TO AMV40]
9. (Refused) [SKIP TO AMV40]

AMV33. If the program had not been available, would you still have purchased and installed the aerators at the same time?

1. Yes [SKIP TO AMV36]
2. No
8. (Don't know) [SKIP TO AMV36]
9. (Refused) [SKIP TO AMV36]

AMV34. If the program had not been available, would you have purchased and installed the aerators earlier or later?

1. Earlier
2. Later
8. (Don't know) [SKIP TO AMV36]
9. (Refused) [SKIP TO AMV36]

AMV35. If the program had not been available, how much [insert response to AMV34] would you have installed the aerators?

[OPEN END, DK, REF]

AMV36. Without the program, would you have purchased and installed the same quantity as the program provided?

1. Yes [SKIP TO AMV38]
2. No
8. (Don't know) [SKIP TO AMV38]
9. (Refused) [SKIP TO AMV38]

AMV37. How many/much would you have installed without the program?
[OPEN END, DK, REF]

AMV38. If the program had not been available, would you have done anything else differently?

1. Yes
2. No [SKIP TO AMV40]
8. (Don't know) [SKIP TO AMV40]
9. (Refused) [SKIP TO AMV40]

AMV39. What would you have done differently?
[OPEN END, DK, REF]

AMV40. 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 aerator(s) if you had not received (it/them) through the program? [0-10, DK, REF]

[IF (AMV13=2 or AMV12=5) AND (AMV40<=3) THEN SKIP TO NEXT SECTION]

I'm going to read two statements about the 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.

AMV26. There may have been several reasons for my installation of aerators, but the program was a critical factor in my decision to have the aerators installed. [0-10, DK, REF]

AMV27. I would have bought aerators within a year of when I did even if I had not received (it/them) from the program. [0-10, DK, REF]

Consistency Check & Resolution

[AERCC1 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 AERCC1 are:

- AERMV32 (would have purchased item without the program)
- AERMV40 (how likely is it that you would have bought the same item)
- AERMV26 (program was a critical factor in my decision to install item)
- AERMV27 (would have bought item within a year, without the program)

{IF AERMV32 = 1 AND AERMV40 = 0,1, 2 AND AERMV26 = 8, 9,10 AND AERMV27_*n* = 0,1, 2, ASK AERCC1. INCONSISTENCY1='you would have purchased the aerator without the program'}

{IF AERMV32 = 2 AND AERMV40 = 8, 9,10 AND AERMV26 = 0,1, 2 AND AERMV27 = 8, 9,10, ASK AERCC1. INCONSISTENCY1= 'you would not have purchased the aerator without the program'}

{IF AERMV40 = 0,1,2 AND AERMV32 = 1 AND AERMV26 = 0,1, 2 AND AERMV27 = 8, 9,10, ASK AERCC1. INCONSISTENCY1='you would likely not have purchased the aerators without the program'}

{IF AERMV40 = 8, 9,10 AND AERMV32 = 2 AND AERMV26 = 8, 9,10 AND AERMV27 = 0,1, 2, ASK AERCC1. INCONSISTENCY1= 'you would likely have purchased the aerators without the program'}

{IF AERMV26 = 0,1, 2 AND AERMV32 = 2 AND AERMV40 = 0,1, 2 AND AERMV27 = 0,1, 2, ASK AERCC1. INCONSISTENCY1='the program was not a critical factor in your decision to purchase the high efficiency/energy efficient aerator without the program'}

{IF AERMV26 = 8, 9,10 AND AERMV32 = 1 AND AERMV40 = 8, 9,10 AND AERMV27 = 8, 9,10, ASK AERCC1. INCONSISTENCY1='the program was a critical factor in your decision to purchase the high efficiency/energy efficient aerator without the program'}

{IF AERMV27 = 8, 9,10 AND AERMV32 = 2 AND AERMV40 = 0,1, 2 AND AERMV26 = 8, 9,10, ASK AERCC1. INCONSISTENCY1= 'you would have bought the aerator within [a year/2 years] even without the program'}

{IF AERMV27 = 0,1, 2 AND AERMV32 = 1 AND AERMV40 = 8, 9,10 AND AERMV26 = 0,1, 2, ASK AERCC1. INCONSISTENCY1='you would not have bought the aerator within [a year/2 years] even without the program'}

AERCC1. Let me make sure I understand you. Earlier, you said [insert inconsistency1], but that differs from some of your other responses. Please tell me in your own words what influence, if any, the program had on your decision install the aerator(s) at the time you did? [OPEN END, DK, REF]

SH. SHOWERHEAD MEASURE VERIFICATION

[ASK SECTION IF S1c=1]

SMV1. Our records show that [insert S_QTY] low flow showerheads were installed by the Multi-Family Program during a technician's visit to your home. Is this correct? [Note to interviewer: This includes both low flow showerheads and low flow handheld showerheads]

1. Yes, quantity is correct
2. No, quantity is incorrect
3. (No, I did not install) [SKIP TO NEXT SECTION]
8. (Don't know) [SKIP TO NEXT SECTION]
9. (Refused) [SKIP TO NEXT SECTION]

[ASK IF SMV1=2]
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 NEXT SECTION] [USE AS S_QTY FOR REMAINDER OF SURVEY]

SMV3. [Wording if S_QTY=1] Is the showerhead still installed in the original location? [Wording if S_QTY>1] Are all of these showerheads still installed in their original locations?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF SMV3=2 AND S_QTY=1]
SMV3a. Which of the following best describes what happened with the showerhead? (READ LIST AND RECORD ONE RESPONSE)

01. It is installed at some other location in your home
02. It was thrown away
03. It is in storage
04. It was sold or given away

00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF SMV3=2 AND SHOW_QTY>1]
Now, I would like to understand what happened to the [insert S_QTY] showerheads. How many… [SHOW ALL ON SAME SCREEN]
SMV4a. Are currently installed in their original location?

[CHECK IF SMV4A =VERIFIED QUANTITY, THEN SKIP TO SMV10]

SMV4b. Are installed at some other location in your house?

[IF SMVa+b = VERIFIED QUANTITY, THEN SKIP TO SMV7]

SMV4c. Have been thrown away?

[IF SMVa+b+c = VERIFIED QUANTITY, THEN SKIP TO SMV7]

SMV4d. Are in storage?

[IF SMVa+b+c+d = VERIFIED QUANTITY, THEN SKIP TO SMV7]

SMV4e. Were sold or given away?
[NUMERIC OPEN END up to S_QTY, DK, REF]

[IF SMV4a *OR* SMV4b *OR* SMV4c *OR* SMV4d *OR* SMV4e=98 OR 99 SKIP TO SMV6]

IF SMV4a+ SMV4b+ SMV4c+ SMV4d+ SMV4e= SHOW_QTY
then proceed to SMV6.
ELSE IF SMV4a+ SMV4b+ SMV4c+ SMV4d+ SMV4e > SHOW_QTY
then read "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 SMV4a
ELSE IF SMV4a+ SMV4b+ SMV4c+ SMV4d+ SMV4e < SHOW_QTY
then proceed to SMV5]

SMV5. What were done with the remaining [S_QTY –(SMV4a+ SMV4b+ SMV4c+ SMV4d+ SMV4e)] showerheads? [OPEN END, DK, REF]

[ASK IF SMV4e>0 (BUT NOT DK/REF) OR SMV3a=4]
SMV6. [Wording if S_QTY=1 OR SMV4e=1] Is the showerhead you sold or gave away located in ComEd's service territory?
[Wording if SMV4e>1] Are all of the showerheads you sold or gave away located in ComEd's service territory?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF SMV3 = 2]
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. (Wrong size – too small or too large)
04. (Low water flow)
05. (Didn't like the color)
06. (Didn't like the appearance/unattractive)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF SMV3=2]
SMV8. What did you replace the showerhead(s) you removed with? (MULTIPLE RESPONSE)

01. With a new high efficient shower head
02. With a less efficient showerhead
03. Re-installed old equipment
04. Did not replace
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF SMV3a=3 OR SMV4d>0 (BUT NOT DK/REF)]
SMV9. When do you think you will install the showerhead(s) you put in storage? Would you say …(READ ANSWER LIST)

1. Within the next 3 months
2. 3 to 6 months from now

3. 6 to 12 months from now
4. More than a year from now
5. Never
8. (Don't know)
9. (Refused)

SMV10. Have you installed any more low-flow showerheads since you received the ones through the program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF SMV10=1, ELSE SKIP TO SMV13]
SMV11. How many additional showerheads have you installed? [NUMERIC OPEN END up to 999, DK, REF]

SMV12. How influential was the program in encouraging you to install the additional showerheads? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential. [0-10, DK, REF]

SMV13. Since receiving showerheads through the program, have you recommended low flow showerheads to anyone else?

1. Yes
2. No
8. (Don't know)
9. (Refused)

SMV14. At the time that you first heard about this program, had you…?
(READ LIST UNTIL RESPONDENT SAYS NO)

01. Already been thinking about purchasing low flow showerheads?
02. Already begun collecting information about low flow showerheads?
03. Already selected the low flow showerhead you were going to get?
04. Already decided to buy the low flow showerhead
05. (Had not thought about purchasing low flow showerheads before you first heard about the program)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[SKIP IF SMV14=05,98,99]
SMV15. Just to be sure I understand, did you have specific plans to install low flow showerheads before learning about the program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

SMV32. If the program had not been available, would you have purchased and installed the showerheads?

1. Yes
2. No [SKIP TO SMV40]
8. (Don't know) [SKIP TO SMV40]
9. (Refused) [SKIP TO SMV40]

SMV33. If the program had not been available, would you still have purchased and installed the showerhead at the same time?

1. Yes [SKIP TO SMV36]
2. No
8. (Don't know) [SKIP TO SMV36]
9. (Refused) [SKIP TO SMV36]

SMV34. If the program had not been available, would you have purchased and installed the showerhead earlier or later?

1. Earlier
2. Later
8. (Don't know) [SKIP TO SMV36]
9. (Refused) [SKIP TO SMV36]

SMV35. If the program had not been available, how much [insert response to SMV34] would you have installed the showerhead?

[OPEN END, DK, REF]

SMV36. Without the program, would you have purchased and installed the same quantity as the program provided?

1. Yes [SKIP TO SMV38]
2. No
8. (Don't know) [SKIP TO SMV38]
9. (Refused) [SKIP TO SMV38]

SMV37. How many/much would you have installed without the program?
[OPEN END, DK, REF]

SMV38. If the program had not been available, would you have done anything else differently?

1. Yes
2. No [SKIP TO SMV40]
8. (Don't know) [SKIP TO SMV40]
9. (Refused) [SKIP TO SMV40]

SMV39. What would you have done differently?
[OPEN END, DK, REF]

SMV40. 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 showerheads if you had not received (it/them) through the program? [0-10, DK, REF]

[IF (SMV15=2 or SMV14=5) AND (SMV 40=<3) THEN SKIP TO NEXT SECTION]

I'm going to read two statements about the 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.

SMV26. There may have been several reasons for my installation of low flow showerheads, but the program was a critical factor in my decision to have the showerheads installed. [0-10, DK, REF]

SMV27. I would have bought low flow showerheads within a year of when I did even if I had not received (it/them) from the program. [0-10, DK, REF]

Consistency Check & Resolution

[SCC1 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 SCC1 are:

- SMV32 (would have purchased item without the program)

- SMV40 (how likely is it that you would have bought the same item)
- SMV26 (program was a critical factor in my decision to install item)
- SMV27 (would have bought item within a year, without the program)

{IF SMV32 = 1 AND SMV40 = 0,1, 2 AND SMV26 = 8, 9,10 AND SMV27_*n* = 0,1, 2, ASK SCC1. INCONSISTENCY1='you would have purchased the low flow showerhead without the program'}

{IF SMV32 = 2 AND SMV40 = 8, 9,10 AND SMV26 = 0,1, 2 AND SMV27 = 8, 9,10, ASK SCC1. INCONSISTENCY1= 'you would not have purchased the low flow showerhead without the program'}

{IF SMV40 = 0,1,2 AND SMV32 = 1 AND SMV26 = 0,1, 2 AND SMV27 = 8, 9,10, ASK SCC1. INCONSISTENCY1='you would likely not have purchased the low flow showerhead without the program'}

{IF SMV40 = 8, 9,10 AND SMV32 = 2 AND SMV26 = 8, 9,10 AND SMV27 = 0,1, 2, ASK SCC1. INCONSISTENCY1= 'you would likely have purchased the low flow showerhead without the program'}

{IF SMV26 = 0,1, 2 AND SMV32 = 2 AND SMV40 = 0,1, 2 AND SMV27 = 0,1, 2, ASK SCC1. INCONSISTENCY1='the program was not a critical factor in your decision to purchase the low flow showerhead without the program'}

{IF SMV26 = 8, 9,10 AND SMV32 = 1 AND SMV40 = 8, 9,10 AND SMV27 = 8, 9,10, ASK SCC1. INCONSISTENCY1='the program was a critical factor in your decision to purchase the low flow showerhead without the program'}

{IF SMV27 = 8, 9,10 AND SMV32 = 2 AND SMV40 = 0,1, 2 AND SMV26 = 8, 9,10, ASK SCC1. INCONSISTENCY1= 'you would have bought the low flow showerhead within [a year/2 years] even without the program'}

{IF SMV27 = 0,1, 2 AND SMV32 = 1 AND SMV40 = 8, 9,10 AND SMV26 = 0,1, 2, ASK SCC1. INCONSISTENCY1='you would not have bought the low flow showerhead within [a year/2 years] even without the program'}

SCC1. Let me make sure I understand you. Earlier, you said [insert inconsistency1], but that differs from some of your other responses. Please tell me in your own words what influence, if any, the program had on your decision install the showerhead(s) at the time you did? [OPEN END, DK, REF]

NEW ADOPTIONS

NA1. Since participating in the Multi-Family program have you made any other changes to the appliances, equipment or other characteristics of your home that would affect how much energy you are using, besides those we have already discussed?

1. Yes
2. No [SKIP TO EE1]
8. (Don't know) [SKIP TO EE1]
9. (Refused) [SKIP TO EE1]

NA2. What changes did you make?
[OPEN END, DK, REF]

NA3. Did you receive a rebate for this change through a Nicor or ComEd program?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[SKIP IF NA2=98,99]

NA5. How influential was the home survey in encouraging you to [insert response to NA2]? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential.
[0-10, DK, REF]

ENERGY EFFICIENT PRACTICES

EE1. OK. Now I'd like to talk about other types of regular actions people take around their home to use energy more efficiently. These are more behavioral in nature than the types of improvements we just discussed. Since the energy efficient products (e.g., CFLs, faucet aerators, low-flow showerheads) were installed in your home, have you taken any new energy conservation actions to reduce your overall energy use, such as routinely turning off lights or setting the thermostat higher when using the air conditioner?

1. Yes
2. No [SKIP TO OA4]
8. (Don't know) [SKIP TO OA4]

9. (Refused) [SKIP TO OA4]

EE2. What changes did you make?

00. (Open End)
98. (Don't know) [SKIP TO OA4]
99. (Refused) [SKIP TO OA4]

EE4. How influential was the visit from the program technician in encouraging you to make this change? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential.

[0-10, DK, REF]

OTHER PROGRAM AWARENESS

OA4. Since participating in this program, have you participated in any other Nicor or ComEd programs?

1. Yes
2. No [SKIP TO SAT1]
8. (Don't know) [SKIP TO SAT1]
9. (Refused) [SKIP TO SAT1]

OA5. Which Nicor or ComEd program have you participated in?

[OPEN END, DK, REF]

Customer experience and satisfaction

I'll now ask you to rate your experience with the visit 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.

SAT1. On a scale of 0 to 10, how would you rate… (0 through 10, 11=DK)

a. … your satisfaction with the installed items [CFLs, aerator, showerhead] (0=very dissatisfied; 10=very satisfied)
b. … your satisfaction with the report you received at the end of the visit (0=very dissatisfied; 10=very satisfied)
c. … your overall satisfaction with the visit (0=very dissatisfied; 10=very satisfied)
d. …your overall satisfaction with the technician that visited your home (0=very dissatisfied; 10=very satisfied)
e. …your overall satisfaction with the Multi-Family Program
f. … your overall satisfaction with Nicor (0=very dissatisfied; 10= very satisfied)
g. … your overall satisfaction with ComEd (0=very dissatisfied; 10= very satisfied)

[FOR EACH S1a-i<4 FOLLOW UP WITH S2a-i]
SAT2a-i. Why did you rate it that way?

00. OPEN END
98. (Don't know)

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

1. Yes, experienced a problem with the program staff
2. Yes, experienced a problem with the installed equipment
3. Yes, experienced a problem with the staff and equipment
4. Did not experience any problems
8. (Don't know)
9. (Refused)

[ASK IF SAT3a=1,2,3, ELSE SKIP TO SAT4]
SAT3b. Did you report the problem?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF SAT3b=1]
SAT3c. To whom did you report the problem?

01. (My building manager or building owner)
02. (Called phone number on program information)
03. (On-site technician from the program)
00. (Other, specify)
98. (Don't know)
99. (Refused)

[ASK IF SAT3b=1]
SAT3d. Was the issue resolved to your satisfaction?

1. Yes
2. No
8. (Don't know)
9. (Refused)

SAT4. Have you noticed any savings on your electricity or natural gas bill since the visit?

1. Yes
2. No
3. (Not applicable/don't pay the bill)
8. (Don't know)
9. (Refused)

[ASK IF S2=1]
SAT5. Did you complete and mail the customer survey that the technician left with you?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF SAT5=2]
SAT5a. Why not?

1. (Takes too much time)
2. (Can't find it)
00. (Other (specify))
98. (Don't know)
99. (Refused)

DEMOGRAPHICS/HOME CHARACTERISTICS

I have just a few questions left for background purposes. Some of these questions may seem very detailed because we are asking information about the usage of showerheads and faucet aerators in your home, but it would be really helpful for our research if you would answer them as accurately as possible.

D3. How many people live in your household year-round?

[NUMERIC OPEN END]
98. (Don't Know)
99. (Refused)

D1. Do you own or rent your home?
1. Own
2. Rent/Lease
8. (Don't Know)
9. (Refused)

[ASK IF D1 = 2, ELSE DOC1]
D2. Do you pay your own electric or natural gas bill or is it included in your rent?
1. Pay bill
2. Included in Rent
8. (Don't Know)
9. (Refused)

D4. Do you pay your own water bill or is it included in your rent?
1. Pay bill
2. Included in Rent
8. (Don't Know)
9. (Refused)

OC1. Including yourself, how many people currently live in your home in the following age ranges?
…Less than 18 years old [NUMERIC OPEN END up to 99, DK, REF]
OC2 …18-24 years old [NUMERIC OPEN END up to 99, DK, REF]
OC3 …25-34 years old [NUMERIC OPEN END up to 99, DK, REF]
OC4 …35-44 years old [NUMERIC OPEN END up to 99, DK, REF]
OC5 …45-54 years old [NUMERIC OPEN END up to 99, DK, REF]
OC6 …55-64 years old [NUMERIC OPEN END up to 99, DK, REF]
OC7 …65 or older [NUMERIC OPEN END up to 99, DK, REF]

HC3. How many full or half bathrooms do you have in your home? (PROBE: A full bathroom is one that has a sink with running water, and a toilet, and either a bathtub or shower. A half bathroom has either a toilet or a bathtub or a shower) [NUMERIC OPEN END up to 99, DK, REF]

HC6. [ASK IF SHOWERHEAD=1] In total, how many showers are present in your home? [NUMERIC OPEN END up to 97, DK, REF]

HC7. [ASK IF AERATOR=1] How many faucets are there in your *kitchen*?
[NUMERIC OPEN END up to 97, DK, REF]

HC8. [ASK IF AERATOR=1] Now thinking about your home's bathrooms, how many faucets are there, all together, in all of your home's *bathrooms*?
[NUMERIC OPEN END up to 97, DK, REF]

HC9. [ASK IF CFL=1] Before participating in the program, approximately how many of the screw-in light bulb fixtures in your home were already equipped with CFL bulbs?
00. (NUMERIC OPEN END up to 95)
98. (Don't know)
99. (Refused)

HC15. [ASK IF SHOWERHEAD=1] How long is the average shower taken in your home? (In minutes)
[NUMERIC OPEN END up to 97, DK, REF]

HC16. [SHOWERHEAD=1] All combined, how many showers do you and your family members take per week?
[NUMERIC OPEN END up to 97, DK, REF]

D6a. Was your total family income in 2010 before taxes UNDER OR OVER $50,000?
1. Under $50,000
2. Over $50,000
3. (Exactly $50,000)
8. (Don't know)
9. (Refused)

[ASK IF D6a=1, ELSE D6c]
D6b. Was it under $15,000, between $15,000 and $30,000 or between $30,000 and $50,000?
[INTERVIEWER NOTE: IF EXACTLY $30,000 ENTER AS '3. $30,000-$50,000']
1. Under $15,000
2. $15,000-$30,000
3. $30,000-$50,000
8. (Don't know)
9. (Refused)

[ASK IF D6a=2, ELSE D7]
D6c. Was it between $50,000 and $75,000 or between $75,000 and $100,000 or was it over $100,000?

[INTERVIEWER NOTE: IF EXACTLY $75,000 ENTER AS '2. $75,000-$100,000'. IF EXACTLY $100,000 ENTER AS '3. OVER $100,000']

1. $50,000-$75,000
2. $75,000-$100,000
3. Over $100,000
8. (Don't know)
9. (Refused)

D7. What is the highest level of education you have completed?

01. Less than high school
02. High school graduate or equivalent (e.g., GED)
03. Attended some college (includes junior/community college)
04. Bachelors degree
05. Advanced degree
00. (Other, Specify)
98. (Don't know)
99. (Refused)

Those are all the questions I have. On behalf of the Multifamily Program, thank you very much for your time.

5.7 PY3 ComEd Multifamily Deemed Savings Impact Estimates

PY3 Deemed Savings Impact Estimates

Gross and net energy savings estimates, including deemed savings for CFLs, are included in the tables below. There were no deemed savings for water efficiency measures.

Table: 5-28. PY3 ComEd CFL Measure Deemed Savings Values

Unit	DW	kWh/unit
9W replacing 40W lamp	31	26.5
13W replacing 40W lamp	27	23.1
14W replacing 60W lamp	46	39.3
15W replacing 60W lamp	45	38.4
19W replacing 75W lamp	56	47.8
20W replacing 75W lamp	55	47.0

Source: PY3 ComEd Residential ENERGY STAR Lighting Program

Table 5-29. PY3 ComEd All-Electric Efficiency Upgrade Program Gross and Net Energy Savings Estimates (CFL Deemed Savings)

Measure	Ex-Ante Gross kWh	Ex-Post Gross kWh	kWh RR	Net-to-Gross Ratio	Ex-Post Net kWh
CFLs (Deemed Savings)					
9W	19,011	19,011	100%	0.81	15,412
13W	6,688	6,688	100%	0.81	5,426
14W	595,458	595,458	100%	0.81	482,461
15W	39,895	39,895	100%	0.81	32,286
19W	460,025	460,025	100%	0.81	372,390
20W	107,245	107,245	100%	0.81	86,914
CFLs sub-total	1,228,321	1,228,321	100%	0.81	994,888
Water Efficiency Measures					
1.0 gpm lav aerator	469,216	741,148	158%	0.94	696,679
1.5 gpm kitchen aerator	595,881	544,951	91%	0.94	512,254
1.0 gpm showerhead	1,427,976	2,163,600	152%	0.93	2,012,148
water measures sub-total	2,493,073	3,449,699	138%	0.93	3,221,081
All Measures (Water Efficiency + Deemed CFL Savings)					
Program Total	**3,721,394**	**4,677,956**	**126%**	**0.90**	**4,215,970**

Source: PY3 ComEd Residential ENERGY STAR Lighting Program, ComEd MF Wkly Rprt 053111.xls

Table 5-30. ComEd-Peoples Gas Jointly Implemented Pilot Program Gross and Net Energy Savings Estimates (Deemed Savings)

Measure	Ex-Ante Gross kWh	Ex-Post Gross kWh	kWh RR	Net-to-Gross Ratio	Ex-Post Net kWh
9W replacing 40W lamp	5,640	5,640	100%	0.81	4,572
14W replacing 60W lamp	1,066,685	1,066,685	100%	0.81	864,266
19W replacing 75W lamp	501,828	501,828	100%	0.81	406,229
Program Total	**1,574,153**	**1,574,153**	**100%**	**0.81**	**1,275,067**

Source: PY3 ComEd Residential ENERGY STAR Lighting Program, ComEd Integrys Honeywell Weekly Report 053111.xls

Table 5-31. ComEd-Nicor Gas Jointly Implemented Pilot Program Gross and Net Energy Savings Estimates (Deemed Savings)

Measure	Ex-Ante Gross kWh	Ex-Post Gross kWh	kWh RR	Net-to-Gross Ratio	Ex-Post Net kWh
9W replacing 40W lamp	220,528	220,528	100%	0.81	178,782
14W replacing 60W lamp	3,358,154	3,358,154	100%	0.81	2,720,894
19W replacing 75W lamp	2,816,494	2,816,494	100%	0.81	2,279,948
Program Total	**6,395,175**	**6,395,175**	**100%**	**0.81**	**5,179,624**

Source: PY3 ComEd Residential ENERGY STAR Lighting Program, Nicor ComEd Honeywell Weekly Report 053111.xls; WES Weekly Report 073110.xlsx