FILED
June 30, 2016
INDIANA UTILITY
REGULATORY COMMISSION

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

IN THE MATTER OF THE VERIFIED PETITION OF INDIANA MICHIGAN POWER COMPANY FOR APPROVAL OF ALTERNATIVE REGULATORY PLAN FOR DEMAND SIDE MANAGEMENT (DSM) AND ENERGY EFFICIENCY (EE) PROGRAMS FOR 2015 AND ASSOCIATED ACCOUNTING AND RATEMAKING MECHANISMS, INCLUDING TIMELY RECOVERY THROUGH I&M'S DSM/EE PROGRAM COST RIDER OF ASSOCIATED COSTS, INCLUDING ALL PROGRAM COSTS, NET LOST REVENUE, SHAREHOLDER INCENTIVES AND CARRYING CHARGES, DEPRECIATION AND OPERATIONS AND MAINTENANCE EXPENSE ON CAPITAL EXPENDITURES.	)	**CAUSE NO. 44486**

SUBMISSION OF INDEPENDENT EVALUATION, VERIFICATION AND MEASUREMENT REPORTS-RESIDENTIAL

Indiana Michigan Power Company (I&M) respectfully submits its 2015 evaluation, verification and measurement (EM&V) reports for residential programs in accordance with the Commission's December 3, 2014 Order in this Cause.

Respectively submitted,

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Evaluation of Residential Incentive Program Portfolio

January 2015 through December 2015

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EM&V Report: June 2016

Table of Contents

Executive Summary ES-1
1. Introduction 1-1
2. General Methodologies 2-1
3. Residential Appliance Recycling Program 3-1
4. Residential Home Energy Reporting Program 4-1
5. Residential Online Energy Check-Up Program 5-1
6. Residential Peak Reduction Program 6-1
7. School Energy Education Program 7-1
8. Residential Home Weatherization Program 8-1
9. Residential Income Qualified Weatherization Program 9-1
10. New Construction Program 10-1
11. Residential Energy Efficient Products 11-1
12. Cost Effectiveness Testing 12-1
Appendix A: Appliance Recycling Program Participant Survey Instrument A-1
Appendix B: Home Energy Reporting Program Participant Survey Instrument B-1
Appendix C: Online Energy Check-Up Program Participant Survey Instrument C-1
Appendix D: Peak Reduction Program Participant Survey Instrument D-1
Appendix E: School Energy Education Program Participant Survey Instruments E-1
Appendix F: Home Weatherization Program Participant Survey Instrument F-1
Appendix G: Income Qualified Weatherization Program Participant Survey Instrument G-1
Appendix H: New Construction Program Builder Survey Instrument H-1
Appendix I: Energy Efficient Products Program Participant Survey Instruments I-1

List of Tables

Table ES-1 Annual kWh Savings Impact Summary ES-3
Table ES-2 Peak Demand Savings Impact Summary.....ES-4
Table ES-3 Cost Effectiveness Testing by Program.....ES-5
Table 2-1 Telephone Surveys by Program..... 2-3
Table 2-2 On-site Visits by Program 2-4
Table 3-1 Data Sources for Gross Impact Parameters – Appliance Recycling Program..... 3-1
Table 3-2 Gross Impact Summary 3-9
Table 3-3 Gross Impact kWh..... 3-9
Table 3-4 Gross Impact kW..... 3-9
Table 3-5 Net Impact Summary..... 3-9
Table 3-6 Verification Rates by Appliance Type 3-10
Table 3-7 Recycled Appliances Verified to be in Working Condition..... 3-10
Table 3-8 Cadmus DOE based UEC Regression Details..... 3-11
Table 3-9 PY6 Refrigerator Characteristics..... 3-11
Table 3-10 Unit Energy Savings Adjusted for Partial Use 3-13
Table 3-11: Prior Consideration of Disposal 3-15
Table 3-12: Refrigerator Discard/Keep Distribution 3-16
Table 3-13: Freezer Discard/Keep Distribution..... 3-16
Table 3-14: Induced Replacement Rate by Measure 3-16
Table 3-15 Net Impact Summary..... 3-18
Table 3-16 How Orders were Placed During the Program Year 3-20
Table 3-17 Customer Reported Participation with Reduced Rebate Amount 3-24
Table 3-18 Participant Satisfaction with Selected Elements of Program Experience 3-27
Table 3-19 Satisfaction with Communications with I&M staff..... 3-27
Table 3-20 Savings on Electric Bills 3-28
Table 3-3-21 Satisfaction with Savings 3-29
Table 4-1 Data Sources for Gross Impact Parameters – Home Energy Reporting Program..... 4-2
Table 4-2 Gross Impact Summary, Home Energy Reporting Program 4-4
Table 4-3 Gross Impact kWh, Participant Group 4-4
Table 4-4 Gross Impact kW, Participant Group 4-4
Table 4-5 Gross Impact kWh and kW, Persistence Group 4-4

Table 4-6 Reported Program Participants by Wave, as of December 2015 4-5
Table 4-7 Description of Variables Used in the Regression Model 4-6
Table 4-8 Output from the Net Savings Regression Model..... 4-7
Table 4-9 Realization Rate by Wave 4-7
Table 4-10 Output from the Net Savings Regression Model-Persistence Group 4-8
Table 4-11 Calculation of Net Per-Participant and Program Level kWh and kW Savings..... 4-9
Table 4-12 Calculation of Per-Participant and Program Level kWh and kW Savings-Persistence Group 4-9
Table 4-13 Energy Saving Recommendations Implemented..... 4-13
Table 4-14 Online Portal Access Rates 4-14
Table 4-15 Reason for Using the Online Portal..... 4-15
Table 4-16 Customer Feedback for Online Portal 4-15
Table 4-17 Satisfaction with Challenge Emails..... 4-16
Table 4-18 Participant Awareness and Participating in Other Programs 4-17
Table 4-19 Customer Satisfaction..... 4-17
Table 4-20 Comparison of 2014 and 2015 Satisfaction Ratings 4-18
Table 5-1 Sources for Gross Impact Parameters – Online Energy Check-Up Program Data 5-2
Table 5-2 Installation Rates per Measure by Kit 5-12
Table 5-3 Comparison of Average Monthly kWh by Analysis Group..... 5-14
Table 5-4 Description of Variables Used in the Regression Model 5-15
Table 5-5 Output from the Net Savings Regression Model..... 5-16
Table 5-6 Ex Post Gross kWh and kW Savings by Kit Measure..... 5-17
Table 5-7 Ex Post Gross Program Level kWh and kW Savings..... 5-17
Table 5-8 Ex Post Net Program Level kWh and kW Savings 5-18
Table 5-9 Ex Post Gross Gross Impact Summary 5-18
Table 5-10 Gross Impact kWh..... 5-18
Table 5-11 Gross Impact kW..... 5-18
Table 5-12 Net Impact Summary..... 5-18
Table 5-13 Summary of Returned Kits..... 5-20
Table 5-14 Summary of Damaged Items 5-21
Table 5-15 Participant Water Heater Type 5-21
Table 5-16 Customer Purchase of Measures since Receiving Energy Efficiency Kit..... 5-23
Table 5-17 Perceived Usefulness of Energy Audit Recommendations 5-24

Table 5-18 Importance of Factors in Participation Decision 5-25
Table 5-19 Reasons for Not Receiving Financial Incentives for Prior Equipment Purchased .. 5-26
Table 5-20 Additional Customer Purchasing of Energy Efficient Measures 5-26
Table 5-21 Program Influence on Customer Purchasing Behavior 5-27
Table 5-22 Cross-Program Awareness 5-29
Table 5-23 Customer Satisfaction with Selected Program Elements 5-30
Table 5-24 RAP Delivery Time 5-33
Table 6-1 Data Sources for Gross Impact Parameters – Peak Reduction Program 6-1
Table 6-2 Gross Impact Summary 6-3
Table 6-3 Gross Impact kWh 6-3
Table 6-4 Gross Impact kW 6-3
Table 6-5 Summary of Savings 6-3
Table 6-6 Total Program Participants 6-4
Table 6-7 Summarization of Savings 6-7
Table 6-8 Hourly kW Reduction per Unit 6-7
Table 6-9 Program Level Hourly kWh Reduction 6-7
Table 6-10 Adjustment Factors by Event Date 6-8
Table 6-11 Historic Peak Reduction Program Participant and Dropout Counts 6-11
Table 6-12 Participant Awareness of Reduction Events 6-17
Table 6-13 Participant Satisfaction with Contractor Visit Elements 6-18
Table 6-14 Participant Satisfaction with Selected Program Elements 6-18
Table 6-15 Participant Likelihood to Recommend Program 6-20
Table 6-16 Participants Continuing Participation Next Year 6-20
Table 7-1 Data Sources for Gross Impact Parameters – SEE Program 7-1
Table 7-2 Indiana TRM Page References by Measure 7-2
Table 7-3 Installation Rates per Measure 7-11
Table 7-4 Realization Rates per Measure 7-12
Table 7-5 Ex Post Gross kWh and kW Savings by Kit Measure 7-12
Table 7-6 Ex Post Gross Impact Summary 7-13
Table 7-7 Gross Impact kWh 7-13
Table 7-8 Gross Impact kW 7-13
Table 7-9 Schools Kits Net-to-Gross Ratios by Measure 7-14

Table 7-10 Schools Kits Ex Post Net Savings by Measure 7-14
Table 7-11 Net Impact Summary 7-15
Table 7-12 Average Number of Bedrooms, Bathrooms, and Residents 7-16
Table 7-13 Heating System and Water Heating Types 7-16
Table 7-14 Incidence of Broken Items 7-17
Table 7-15 Installation of Kit Items 7-17
Table 7-16 Number of Product Types Installed 7-17
Table 7-17 Reasons for not Installing Faucet Aerators 7-18
Table 7-18 Reasons for not Installing Furnace Filter Tone Alarm 7-19
Table 7-19 Kit Items Considered Most Useful 7-20
Table 7-20 Suggested Additional Products 7-21
Table 7-21 Familiarity of Ways to Save Energy as a Result of the Program 7-21
Table 7-22 Actions Taken to Save Energy Resulting from the Program 7-22
Table 7-23 Cross-Program Awareness 7-22
Table 7-24 Distribution of Kits 7-24
Table 7-25 Distribution of Kits 7-24
Table 7-26 Additional Educational Materials Received 7-25
Table 7-27 Types of Positive Feedback Received from Students 7-26
Table 7-28 Suggestions for Improving the Program 7-27
Table 7-29 School Energy Education Program – PY6 Student Kit Contents 7-29
Table 8-1 Data Sources for Gross Impact Parameters – Home Weatherization Program 8-1
Table 8-2 Verification Rates by Measure Type 8-11
Table 8-3 Home Verified to have Weatherization Measures Completed and are Program Eligible Participants 8-11
Table 8-4 Gross Impact Summary 8-12
Table 8-5 Gross Impact kWh 8-12
Table 8-6 Gross Impact kW 8-12
Table 8-7 Measure Savings Summary 8-12
Table 8-8 NTGR By Measure 8-13
Table 8-9 Net Impact Summary 8-13
Table 8-10 How Customers Learned of the Program 8-17
Table 8-11 Program Influence on Purchasing Decisions 8-19
Table 8-12 Customer Familiarity with Other Programs 8-19

Table 8-13 Customer Satisfaction with Selected Program Elements 8-20
Table 9-1 Data Sources for Gross Impact Parameters – Home Weatherization Program 9-1
Table 9-2 Verification Rates by Measure Type 9-10
Table 9-3 Home Verified to have Weatherization Measures Completed and are Program Eligible Participants 9-11
Table 9-4 Gross Impact Summary 9-12
Table 9-5 Gross Impact kWh 9-12
Table 9-6 Gross Impact kW 9-12
Table 9-7 Measure Savings Summary 9-12
Table 9-8 Net Impact Summary 9-13
Table 10-1 Data Sources for Gross Impact Parameters – New Construction Program 10-1
Table 10-2 New Construction Database Savings by Home Type 10-2
Table 10-3 Gross Impact Summary 10-7
Table 10-4 Gross Impact kWh 10-7
Table 10-5 Gross Impact kW 10-7
Table 10-6 Net Impact Summary 10-8
Table 10-7 Sources of Program Awareness 10-9
Table 10-8 Summary of PY6 Outreach 10-13
Table 10-9 Comparison of PY6 and PY7 Deemed kWh savings and incentives 10-15
Table 11-1 Data Sources for Gross Impact Parameters – Energy Efficient Products Program. 11-1
Table 11-2 Energy Efficient Products Verified 11-14
Table 11-3 Gross Impact Summary 11-15
Table 11-4 Gross Impact kWh 11-15
Table 11-5 Gross Impact kW 11-15
Table 11-6 Measure Savings Summary 11-15
Table 11-7 Gross Impact Summary, Lighting 11-16
Table 11-8 Gross Impact kWh by Bulb Type 11-16
Table 11-9 Gross Impact kW Summary, Lighting 11-16
Table 11-10 Gross Impact kW by Bulb Type 11-16
Table 11-11 NTGR By Measure 11-17
Table 11-12 EEPP Appliances NTGR Results 11-18
Table 11-13 EEPP Lighting Net Savings Results 11-18
Table 11-14 Summary of Appliance Component Program Activity 11-22

Table 11-15 Initial Source of Program Awareness 11-23
Table 11-16 Method of Obtaining Rebate Application, Appliance Rebate Participants 11-24
Table 11-17 Cross-Program Awareness 11-25
Table 11-18 Satisfaction with Selected Program Elements 11-26
Table 11-19 Participant Residence Age 11-27
Table 11-20 Participant Residence Square Footage 11-27
Table 11-21 Cross-Program Awareness 11-29
Table 11-22 Satisfaction with Selected Program Elements 11-30
Table 11-23 Participant Residence Age 11-31
Table 11-24 Participant Residence Square Footage 11-31
Table 12-1 Questions Addressed by the Various Cost Tests 12-2
Table 12-2 Summary of Benefits and Costs Included in Each Cost-Effectiveness Test 12-3
Table 12-3 Discount Rate by Test Type 12-4
Table 12-4 Appliance Recycling Program Cost Effectiveness Test Results 12-4
Table 12-5 Home Energy Reporting Program Cost Effectiveness Test Results 12-5
Table 12-6 Online Energy Check-Up Program Cost Effectiveness Results 12-5
Table 12-7 Peak Reduction Program Cost Effectiveness Results 12-5
Table 12-8 Schools Energy Education Program Cost Effectiveness Results 12-5
Table 12-9 Home Weatherization Program Cost Effectiveness Results 12-6
Table 12-10 Income Qualified Weatherization Program Cost Effectiveness Results 12-6
Table 12-11 New Construction Program Cost Effectiveness Results 12-6
Table 12-12 Energy Efficient Products Program – Appliances Cost Effectiveness Results 12-6
Table 12-13 Energy Efficient Products Program – Lighting Cost Effectiveness Results 12-7
Table 12-14 Cost Effectiveness Test Scores by Program 12-7

List of Figures

Figure 3-1: Induced Replacement Example 3-7
Figure 3-2: Net Savings Calculation Summary Diagram 3-8
Figure 3-3 Average Daily Load Profiles 3-14
Figure 3-4 NTGR Calculation - Refrigerators 3-17
Figure 3-5 NTGR Calculation – Freezers 3-17
Figure 3-6 Number of Completed Orders by Month the Order was Placed 3-21
Figure 3-7 How Customers Initially Learned about the Program 3-22
Figure 3-8 Main Reasons for Program Participation 3-23
Figure 3-9 Cross-Program Awareness and Participation 3-30
Figure 4-1 Participant Perceptions of Usefulness of Electronic and Hardcopy Report Formats ... 4-12
Figure 4-2 Usefulness of Reports for Reducing Energy Consumption 4-13
Figure 4-3 Number of People Living in Household 4-19
Figure 4-4 PY6 Home Energy Report Layout 4-20
Figure 4-5 Participant Energy Challenge – Sample Email 4-21
Figure 5-1 Pre- & Post-Period Matched Comparison (avg. monthly kWh) 5-13
Figure 5-2 Number of Kits Distributed by Month 5-20
Figure 5-3 How Customers Learned about the Program 5-22
Figure 5-4 Reported Reasons for Participating in the Online Energy Checkup Program 5-25
Figure 5-5 Pre- and Post-familiarity with Energy Efficiency 5-28
Figure 5-6 Online Energy Check Up Kit Quick Start Guide 5-34
Figure 6-1 Treatment, Control, and Adjusted Control Loads During 9/2/2015 Event 6-5
Figure 6-2 Screen Shot of 7/29/2015 Load Control Event Information 6-6
Figure 6-3 Load Control Event Information for 7/29/2015 DR Date 6-8
Figure 6-4 Load Control Event Information for 8/17/2015 DR date 6-9
Figure 6-5 Load Control Event Information for 9/1/2015 DR date 6-9
Figure 6-6 Load Control Event Information for 9/2/2015 DR date 6-10
Figure 6-7 Load Control Event Information for 9/3/2015 DR date 6-10
Figure 6-8 Sources of Participant Program Awareness 6-14
Figure 6-9 Reported Reasons for Participation in Peak Reduction Program 6-15
Figure 6-10 Initial Participation Concerns 6-16

Figure 6-11 Change in Satisfaction with I&M as Utility Provider 6-19
Figure 7-1 Satisfaction with Kit Items 7-20
Figure 7-2 Receipt and Use of Lesson Plans 7-25
Figure 7-3 Program Satisfaction 7-26
Figure 7-4 School Energy Education Program Quick Start Guide 7-30
Figure 8-1 Reported Reasons for Installation of Home Weatherization Program Measures 8-17
Figure 8-2 Actions Taken Since Participating in the Program 8-18
Figure 8-3 Participant Home Age 8-21
Figure 8-4 Participant Home Size 8-22
Figure 8-5 Number of People Living in Home 8-23
Figure 8-6 Verification Form for Home Weatherization and Income Qualified Weatherization Programs 8-29
Figure 9-1 Verification Form for Home Weatherization and Income Qualified Weatherization Programs 9-18
Figure 10-1 Program Elements Effect on Energy Efficiency 10-10
Figure 10-2: Satisfaction with Select Program Elements 10-11
Figure 11-1: Free Ridership Scoring for Appliance Rebate Survey Respondents 11-10
Figure 11-2: Free Ridership Scoring for Intercept Survey Respondents 11-13
Figure 11-3: Type of Heating System 11-32
Figure 11-4: Type of Water Heater 11-32
Figure 11-5 Example of Energy Efficient Products Contractor Newsletter 11-35
Figure 11-6 Marketing Mailers Sent to Customers 11-36

Executive Summary

This report provides the results of the impact and process evaluation of the residential portfolio of programs offered by Indiana Michigan Power (I&M). This report presents results for activity during the period January 1, 2015 through December 31, 2015.

Activity over this period took place in program year six (PY6) in which the I&M Residential Portfolio achieved program activity in each of the programs offered:

- Residential Appliance Recycling (ARP);
- Residential Home Energy Reporting (HERP);
- Residential Online Energy Check-Up (OECUP);
- Residential Peak Reduction (PRP);
- School Energy Education (SEE);
- Residential Home Weatherization (HWP);
- Residential Income Qualified Weatherization (IQW);
- Residential New Construction (NCP); and
- Residential Energy Efficient Products (EEPP).

For the 2015 evaluated programs, ADM's evaluation efforts consisted of estimating gross and net energy impacts resulting from program implementation, evaluating the cost-effectiveness of each program, and providing process related feedback and recommendations.

Evaluation Objectives

The objectives of this evaluation include:

- Development of program-specific evaluation plans;
- Design samples allowing for estimation of energy and demand impacts at the 90% confidence level with +/- 10% relative precision;
- Conduct on-site verification inspections and telephone surveying as needed;
- Estimate gross annual energy savings and peak demand reductions by program;
- Estimate net energy and peak demand impacts through evaluation of program free-ridership and spillover savings;
- Evaluate the cost-effectiveness of each program using the Total Resource Cost test, Utility Cost Test, Societal Cost Test, Participant Cost Test, Ratepayer Impact Test; and
- Evaluate program processes and provide feedback and recommendations for amendments and/or improvements.

Summary of Findings

Gross energy and peak demand impacts were estimated through engineering and billing analysis, statistical and simulation modeling, desk reviews of deemed savings estimates, participant surveying, and telephone verification activities depending on the particular program and measure types. Estimates of program free-ridership derived via participant surveying were used to develop net-to-gross ratios (NTGR's) for the Appliance Recycling, School Energy Education, New Construction, Efficient Products (lighting and appliances), and Home Weatherization programs.

Additionally, estimates of spillover savings derived via participant surveying were incorporated into the net-to-gross ratio for the School Energy Education, Efficient Products, and Home Weatherization programs.

Programs whose analyses incorporated a control group did not receive a separate net savings estimate of free-ridership or spillover effects. This is because these analyses incorporate all program effects relative to the control group, and any free-ridership or spillover is captured as part of gross savings. This applies to the Online Energy Check-Up Program, Peak Reduction Program, and Home Energy Reporting Program.

Finally, a net-to-gross ratio of 1 was applied to the Income Qualified Weatherization Program, as it is assumed that participants would not be financially able to complete these energy efficient improvements in the absence of program support. Similarly, it is assumed that there are no significant spillover savings effects for this program.

The NTGR's for all programs where net savings were calculated were multiplied by the estimated gross impacts to provide net impact estimates. Table ES-1 and Table ES-2 below present the verified ex post gross and net impacts by program.

Table ES-1 Annual kWh Savings Impact Summary [1]

Program	*PY6 Annual kWh Program Goals*	*Ex Ante Gross kWh Savings*	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Ex Post Net kWh Savings*
Appliance Recycling	3,068,260	3,185,144	3,185,144	3,113,940	3,348,633	1,797,633
Home Energy Reporting	33,000,000	26,810,824	26,810,824	26,810,824	31,253,948	31,253,948
Online Energy Check-Up	3,865,320	5,135,088	5,135,088	3,414,869	4,041,648	3,122,069
Peak Reduction	112,014	31,496	31,496	31,496	16,670	16,670
School Energy Education	4,962,843	4,962,961	4,962,961	3,578,191	4,571,388	3,173,323
Home Weatherization	1,276,803	197,978	197,978	197,978	165,210	136,592
Income Qualified Weatherization	1,029,804	36,443	36,443	36,443	25,411	25,411
New Construction	731,022	719,602	719,602	719,602	740,648	570,299
Energy Efficient Products - Appliances	1,294,877	654,713	654,713	654,713	591,598	354,391
Energy Efficient Products - Lighting	18,452,000	11,077,430	11,077,430	11,077,430	10,808,089	5,697,051

[1] Totals in the report tables may not correspond exactly to the summation of individual values due to rounding.

Table ES-2 Peak Demand Savings Impact Summary

Program	*Ex Ante Gross kW Savings*	*Gross Audited kW Savings*	*Gross Verified kW Savings*	*Ex Post Gross Peak kW Reduction*	*Ex Post Net Peak kW Reduction*
Appliance Recycling	376.77	376.77	368.41	399.61	215.41
Home Energy Reporting	3,635.98	3,635.98	3,635.98	3,434.25	3,434.25
Online Energy Check-Up	563.58	563.58	371.96	315.10	242.62
Peak Reduction	5,632	5,632	5,632	3,777	3,777
School Energy Education	705.30	705.30	508.51	811.03	606.89
Home Weatherization	19.00	19.00	19.00	15.95	13.37
Income Qualified Weatherization	2.00	2.00	2.00	2.06	2.06
New Construction	534.15	534.15	534.15	212.90	163.93
Energy Efficient Products - Appliances	89.00	89.00	89.00	105.63	58.93
Energy Efficient Products - Lighting	1,319.00	1,319.00	1,319.00	1,284.08	676.85

ADM estimated the cost-effectiveness of the PY6 programs and overall portfolio using the Utility Cost Test (UTC), Total Resource Cost Test (TRC), Ratepayer Impact Measure Test (RIM), Societal Cost Test (SCT), and the Participant Cost Test (PCT). The results are provided in Table ES-3 below.

Table ES-3 Cost Effectiveness Testing by Program

Program	*UCT*	*TRC*	*RIM*	*SCT*	*PCT*
Appliance Recycling	1.8	2.33	0.54	2.51	-
Home Energy Savings	1.8	1.8	0.47	1.8	-
Online Energy Check-Up	2.39	2.41	0.54	2.59	-
Peak Reduction	0.75	1.57	0.75	1.57	-
School Energy Education	2.38	2.56	0.62	2.76	-
Home Weatherization	0.46	0.47	0.29	0.57	3.33
Income Qualified Weatherization	0.1	0.11	0.09	0.12	-
New Construction	2.47	1.96	0.81	2.48	2.05
Energy Efficient Products - Appliances	1.05	0.89	0.49	1.02	1.77
Energy Efficient Products - Lighting	3.3	1.39	0.62	1.52	1.94

The process evaluation examined program operations and results for each program throughout the program operating year. This portion of the evaluation is designed to identify potential program improvements that may prospectively increase program efficiencies or effectiveness in terms of customer participation and satisfaction levels. Conclusions and recommendations have been developed based on impact analyses, interview and survey findings, and overall assessment of program processes. The process evaluation findings, as well as conclusions and recommendations, are detailed in the individual program chapters and may provide strategic advantage during future program cycles.

1. Introduction

This report presents the results of the impact and process evaluations of the Residential Appliance Recycling, Residential Home Energy Reporting, Residential Online Energy Check-Up, Residential Peak Reduction, School Energy Education, Residential Home Weatherization, Residential Income Qualified Weatherization, Residential New Construction, and Residential Efficient Products programs that Indiana Michigan (I&M) Power offered its residential customers during the period of January 2015 through December 2015. Descriptions of each program are detailed in the subsections below.

1.1 Residential Appliance Recycling

The Residential Appliance Recycling program (ARP) is designed to help customers reduce their energy consumption by removing old, working refrigerators, and freezers from their homes for recycling. There is a limit of two refrigerators or freezers per household per calendar year. I&M generates energy savings because the old appliances, which are generally inefficient, are permanently removed from the system. The environment also benefits from the recycling process through safe disposal of environmentally harmful material.

The goal of the program is to reduce the number of old, inefficient refrigerators and freezers that customers have moved to their garages or other locations such as basements and patios. Many areas in which spare units are placed are not space conditioned and most refrigerators used in that environment operate under a heavy thermal load during the summer.

During PY6 I&M contracted with JACO, Inc. (JACO) to implement the program. The program is designed as a turnkey, stand-alone energy efficiency initiative. The program targets existing multi- and single-family households, renters and homeowners who have old, inefficient refrigerators or freezers. To be eligible for the program, appliances to be recycled must be in working condition, plugged in and cooling at the time of pick-up. The customer receives pick-up and removal service in addition to a $40 rebate per recycled refrigerator or freezer.

JACO ceased program operations in November 2015 and is no longer under contract as the implementation contractor for this program. ADM verified that 2,601 refrigerators and 574 freezers had been recycled during 2015.

1.2 Residential Home Energy Reporting

The I&M Residential Home Energy Reporting program (HERP) is offered to randomly selected utility customers. The goal of the program is to send bimonthly reports to the customer via mail and email describing their current energy usage, their energy usage compared to similar homes in the area, and recommendations on ways to save energy. The customer also has the ability to access a web based tool to find out additional information on ways to save energy within their home.

Customers who are signed up to receive reports via email also receive Energy Challenge emails that encourage them to implement specific changes in their home.

The implementation contractor for this program is Tendril, Inc. The previous implementation contractor, Opower, was in place at the beginning of PY6 and distributed two batches of reports prior to June. Following this, Tendril assumed implementation of the program.

According to program documentation, the program had approximately 151,593 participants among all waves as of Dec 31, 2015.

1.3 Residential Online Energy Check-Up

The Residential Online Energy Check-Up program (OECUP) identifies energy saving opportunities through a web-based self-service assessment tool where customers answer basic questions about their homes and how they use energy in it. Upon completion of the questions online, the OECUP generates a printable report that includes:

- Useful details about customer home's energy consumption;
- Customized energy-saving recommendations;
- Potential savings from making the suggested improvement; and
- Environmental impact of implementing suggested improvements.

In addition, the customer is mailed a kit of energy efficient measures dependent on their water heating type:

Energy Efficient Kit for Gas Participants:

- 13 w CFL (1);
- 18 w CFL (2);
- 23 w CFL (1);
- 9 w LED (1);
- LED nightlight (2); and
- Refrigerator/Freezer thermometer (1).

Energy Efficient Kit for Electric Participants:

- 13 w CFL (1);
- 18 w CFL (2);
- 23 w (CFL) (1);
- Low Flow showerheads (2);
- Bathroom aerators (2);

- Kitchen aerator (1); and
- Refrigerator/Freezer thermometer (1).

The program implementation contractor is Resource Action Programs.

Participants received 9,588 kits (4,232 electric and 5,356 gas) during 2015.

1.4 Residential Peak Reduction

The Residential Peak Reduction program (RPRP) provides households in I&M's service territory the unique opportunity to save money and promote energy reliability. By participating in the program, participants help reduce stress on the electric grid when energy demand is at the highest. In return they receive:

- An $8.00 monthly bill credit for each central cooling unit controlled during the billing months of May through September for every year they participate;
- A program device installed near the outside central air conditioner. There is no cost for the device and installation; and
- A program welcome packet containing a quick reference guide to answer any additional questions and refrigerator magnet.

To qualify participants of the program must:

- Be an I&M residential customer living in Indiana;
- Have a home whose central air conditioning system is in good working condition. (Window and wall air conditioning units do not qualify for the program); and
- Own their home or have property owner's permission to participate.

The program is run through a third-party implementer, Honeywell, Inc.

The program had a total of 8,014 participants in 2015, although the majority of these customers were also enrolled in previous years of the program; the program added 113 new customers in 2015. This total number includes all program drop outs as well as "virtual unenrolls" for participants who moved during the year.

1.5 School Energy Education

The Schools Energy Education Program is an educational offering targeting 5th grade elementary school students, their teachers, and parents/guardians of teachers in the I&M service territory. The program provides school teachers with energy education tools as well as energy conservation kits to distribute among their students. The energy conservation kits include a variety of low-cost energy efficiency measures, as follows:

- 2-23w CFLs;

- 3-13w CFLs;
- 1 LED Night Light;
- 1 9w LED;
- 1 Kitchen Aerator;
- 1 Low Flow Shower head; and
- 1 Filter Tone.

Additionally, the energy conservation kits include informational literature detailing energy saving tips and measure installation instructions. The kits also include supplies that students can use to test their home energy use and make minor improvements to the home's energy management, including a flow rate test bag, light switch reminder stickers, a digital thermometer for hot water and freezer temperature, and plumbers' tape.

The program is designed to not only result in the installation of the low-cost energy conservation kit measures, but also to improve student and parent/guardian awareness of energy saving behaviors and equipment, as well as to incorporate energy education into the elementary school curriculum.

The program is administrated by Resource Action Programs. In 2015, the Schools Energy Education Program distributed kits in two batches, one during the spring and one during the fall, resulting in a total of 11,755 kits being distributed.

1.6 Home Weatherization

The I&M Residential Home Weatherization program (HWP) is offered to customers who would benefit from higher level standard home weatherization measures such as ceiling insulation, home infiltration, and duct sealing.

The first step to participate in the Home Weatherization program is for customers to sign up and receive a home energy assessment. During the assessment, the auditor identifies energy efficiency improvements and recommends measures to the participants.

To receive the weatherization incentives, the customer must decide which weatherization measures recommended in the assessment they want implemented. By having an authorized contractor install recommended home weatherization improvements, I&M customers with electrically heated homes can earn incentives up to 50% of the cost of the work up to $3,000. Measures must also be cost effective in order to qualify for incentives.

The program was implemented by Honeywell during the majority of PY6 but I&M assumed the role of program implementer towards the end of the year.

The program implemented a total of 1,314 measures during 2015.

1.7 Income Qualified Weatherization

The I&M Income Qualified Weatherization (IQW) Program is very similar to the Home Weatherization Program, but is offered to customers who have lower household income (below 200% of the federal poverty guideline) and would benefit from higher level standard home weatherization measures such as ceiling insulation, home infiltration, and duct sealing.

The first step to participate in the IQW Program is for customers to sign up and receive a home energy assessment. During the assessment, the auditor identifies energy efficiency improvements and installs measures in the customer home. There is no copay required of the customer for this program.

The program was implemented by Honeywell during the majority of PY6 but I&M assumed the role of program implementer towards the end of the year.

The program implemented a total of 258 measures during 2015.

1.8 New Construction

The I&M Residential New Construction program (NCP) is offered to home builders that construct their homes to be better than the minimum building code standards (IECC 2009). Participating homes fall into one of three tiers of energy efficiency based on HERS index score; I&M Silver, I&M Gold, and I&M Platinum. Participants receive incentives ranging from $360 to $1,000 of the cost to upgrade and certify each home, depending on the home's primary heating fuel type (gas or electric).

In addition to paying cash incentives, this program also represents a market transformation program, aimed at reducing multiple barriers to this higher level of construction standards. CLEAResult, the program implementer, promote the program using the following strategies:

- Direct marketing (a mail campaign, direct marking to trade allies, and direct contact with home builders);
- Marketing on the I&M website; and
- Home builder advisory group meetings.

Program participation is contingent upon an internal eligibility review and verification process. This process provides a first layer of assurance to I&M and the participating builders that the homes will meet program specifications and be more efficient than required by code (IECC 2009). Eligibility requirements are as follows:

- New homes must be located in I&M's Indiana service territory;
- All fields must be completed on the rebate claim form to receive a rebate;
- A HERS Certificate must be attached to the rebate claim form for Silver and Gold tiers;

- A HERS Certificate and a Tax Credit Report must be included with the rebate form for the Platinum tier; and
- The rebate form and documentation must be postmarked within 90 days of the HERS Certificate issuance and on or before December 31, 2015.

The program had a total of 445 participating homes during PY6.

1.9 Efficient Products - Appliances

The appliances component of the I&M Residential Efficient Products Program (EPP) provides financial incentives to residential customers that purchase ENERGY STAR® qualified products. The incentives are designed to encourage the purchase and installation of energy-efficient appliances, as well as lighting and HVAC products that will help reduce electricity consumption and reduce summer peak load demands. The ENERGY STAR® qualified products incentivized in PY6 include:

- Ceiling Fans;
- Variable Speed Pool Pumps;
- Electronically Commutated Motors (ECMs);
- Heat Pumps (including ductless heat pumps);
- Dehumidifiers;
- Programmable Thermostats;
- Central Air Conditioning (CAC) systems; and
- Heat Pump Water Heaters.

The program was implemented by a third party implementation contractor, Honeywell, Inc. in PY6.

The program rebated a total of 1,378 appliances during PY6.

1.10 Efficient Products - Lighting

The Energy Efficient Products - Lighting Program offers energy efficient in-store lighting discounts to customers in the I&M service territory. The lighting discounts serve as a subprogram to the Energy Efficient Products Program which offers appliance rebates.

The program offers instant discounts on both ENERGY STAR® CFLs and LEDs. The program partners with retailers in the I&M service territory to offer instant discounts on a variety of bulb types; the discounts are promoted in-store through both promotional events and I&M program marketing materials. This program provides benefits to both retailers and customers in that:

- Retailers can achieve a higher sales volume without a reduction in profit margin, as the lost revenue from the price reduction is absorbed by I&M;
- Customer saves money on purchase prices of the CFLs and LEDs; and
- Customers can save money on their electric bills as well as in replacement costs, as typical lifetime for an incandescent bulb is roughly 1,000 hours, compared to an average lifetime of 8,000 hours for CFLs and 20,000 hours for LEDs sold through this program.

2015 marks the first year that lighting discounts were brought into the umbrella of the Energy Efficient Products Program rather than being a standalone program. The program is implemented by the third-party contractor Honeywell.

A total of 308,100 CFLs and 69,435 LEDs were sold through the program during PY6.

1.11 Types of Savings Reported

This section describes the methodology for, and definitions of, the different types of energy savings reported for the residential programs during PY6.

- Ex Ante savings are the savings that were reported by the program implementer at the conclusion of the program year, prior to evaluation.
- Audited savings are determined by comparing the measures reported and confirmed through the program database in the I&M service territory.
- Verified savings are determined by applying an installation rate to the audited savings. The installation rate is defined as the ratio of units that were installed (verified) to the number of units reported (claimed).
- Ex Post gross savings reflect all adjustments made to the ex ante measure savings that were claimed by the program.
- Net savings reflects the portion of savings that are attributed to the effects of the program. The savings attributable to the program are the savings “net” of the total gross savings associated with the project.

1.12 Organization of Report

This report on the impact and process evaluation of the Residential program portfolio for the period January 2015 through December 2015 (PY6) is organized as follows:

- Chapter 2 presents and discusses the general methods used for sampling and data collection to obtain the results for estimating gross and net savings and the process evaluation for all of the residential programs evaluated.
- Chapter 3 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the Appliance Recycling Program.
- Chapter 4 presents and discusses the methods used and results obtained from estimating gross savings and the process evaluation for the Home Energy Reporting Program.

- Chapter 5 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the Online Energy Check-Up Program.
- Chapter 6 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the Peak Reduction Program.
- Chapter 7 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the School Energy Education Program.
- Chapter 8 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the Home Weatherization Program.
- Chapter 9 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the Income Qualified Weatherization Program.
- Chapter 10 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the New Construction Program.
- Chapter 11 presents and discusses the methods used and results obtained from estimating gross and net savings and the process evaluation for the Efficient Products Program.
- Chapter 12 presents and discusses the methods used and results obtained from estimating cost effectiveness for all programs.
- Appendix A provides a copy of the questionnaire used for the survey of participating customers for the Appliance Recycling Program.
- Appendix B provides a copy of the questionnaire used for the survey of participating customers for the Home Energy Reporting Program.
- Appendix C provides a copy of the questionnaire used for the survey of participating customers for the Online Energy Check-Up Program.
- Appendix D provides a copy of the questionnaire used for the survey of participating customers for the Peak Reduction Program.
- Appendix E provides a copy of the questionnaires used for the surveys of parents/guardians and instructors for the School Energy Education Program.
- Appendix F provides a copy of the questionnaire used for the survey of participating customers for the Home Weatherization Program.
- Appendix G provides a copy of the questionnaire used for the survey of participating customers for the Income Qualified Weatherization Program.
- Appendix H provides a copy of the questionnaire used for the survey of participating builders in the New Construction Program.
- Appendix I provides a copy of the questionnaires used for the survey of participating customers in the lighting and appliances components of the Efficient Products Program.

2. General Methodologies

This chapter details general impact evaluation methodologies by program type as well as data collection methods applied. This chapter will present full descriptions of:

- Gross Savings Estimation;
- Sampling Methodologies; and
- Data Collection Procedures.

2.1 Overview of Methodology

ADM's methodologies in the evaluation of the 2015 I&M Residential Portfolio are intended to provide:

- Gross and Net energy and peak demand impact results, by program, at the 90% confidence and +/-10% precision level;
- Program feedback and recommendations via process evaluation; and
- Cost effectiveness testing at the program level.

In doing so, ADM's evaluation will provide the Indiana Utility Regulatory Commission (IURC) with verified savings results, recommendations for program improvement, and will support cost-effective use of ratepayer funds.

2.2 Sampling

Sampling is necessary to evaluate savings for each program in the I&M Residential Portfolio insomuch as verification of a census of program participants is typically cost-prohibitive. As per I&M requirements, samples are drawn to meet 90% confidence at the +/- 10% precision level. Programs were evaluated on one of two bases during PY6:

- Census of Participants; and
- Simple Random Sample.

2.2.1 Census of Participants

A census of participant data is used for select programs where such review is feasible. No I&M residential programs incorporated a census approach in their entirety, but analysis of the Home Weatherization Program and Income Qualified Weatherization Program used a census approach to verifying ex ante savings estimates. Additionally, the Online Energy Check-up Program had a census approach to a subset of the analysis. The Online Energy Check-Up program was evaluated by reviewing the deemed savings calculations for a census of line items in the provided tracking

data, ensuring that energy and demand savings for each kit measure and participant were calculated appropriately.

2.2.2 Simple Random Sampling

For programs with relatively homogenous measures, ADM conducts a simple random sample of participants. The sample size for verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants. Coefficient of Variation (CV) is defined as:

$$CV(x) = \frac{Standard\ Deviation\ (x)}{Mean(x)}$$

Where x is the average kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of .5 in residential program evaluations. The resulting sample size is estimated at:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where,

1.645 = Z score for 90% confidence interval in a normal distribution

CV = Coefficient of variation

RP = Required precision: 10% in this evaluation

With 10% required precision (RP), this calls for a sample of 68 for programs with a sufficiently large population. For programs with a limited population, a finite population adjustment is applied to the sampling calculation.

2.3 Data Collection

This subsection provides descriptions of ADM's data collection procedures, including:

- Telephone Surveying; and
- On-Site Verification.

2.3.1 Telephone Surveying

ADM conducted a large volume of telephone surveys during the evaluation of the residential programs within the 2015 I&M Residential Portfolio. These surveys were designed to collect a variety of data needed for the evaluation effort, including:

- Verification of measures installed in participant homes;

- Parameters used in gross savings calculations;
- Data on decision-making to be used in determining program free-ridership and spillover savings; and
- Feedback from participants from their experiences with the program.

Table 2-1 below presents the total surveys conducted by program.

Table 2-1 Telephone Surveys by Program

Program	*Surveys Completed*
Appliance Recycling	191
Home Energy Reporting	281
Online-Energy Check-up	369
Peak Reduction	117
School Energy Education (Parent/Guardian)	35
School Energy Education (Instructor)	62
Home Weatherization	29
Income Qualified Weatherization	4
New Construction	10
Energy Efficient Products – Lighting (Intercept)	148
Energy Efficient Products – Lighting (Follow-up)	35
Energy Efficient Products - Appliances	118
Total Surveys:	1,399

With the exception of the lighting intercept surveys which were conducted by staff members from the Evaluation Team, surveys with program participants were conducted by VuPoint Research, an experienced survey firm. ADM performed quality control checking on the survey programming.

2.3.2 On-site Visits

ADM conducted site visits for the Home Weatherization, Income Qualified Weatherization, and New Construction programs during PY6. These visits served to verify that reported measures were installed, and installed correctly in the quantities reported in program tracking data. For the New Construction program, the on-site visits consisted of a drive-by of the residence to verify that the home was located at the address specified in program tracking data.

Table 2-2 below presents the total on-site visits conducted by program.

Table 2-2 On-site Visits by Program

Program	*Visits Completed*
New Construction	10
Home Weatherization	26
Income Qualified Weatherization	8
Total On-Site Visits:	44

3. Residential Appliance Recycling Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential Appliance Recycling Program during the period January 2015 through December 2015.

3.1 Program Specific M&V Methodologies

The M&V approach for the Appliance Recycling program (ARP) is aimed at measuring the following:

- Numbers of refrigerators and freezers collected and recycled;
- Average annual kWh savings per collected appliance;
- Average kW reduction per collected appliance;
- Providing estimates of net-to-gross savings and free-ridership; and
- Estimating cost effectiveness of the ARP in 2015.

Table 3-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 3-1 Data Sources for Gross Impact Parameters – Appliance Recycling Program

Parameter	*Source*
Number of Units Recycled	Program Tracking Data, Participant Surveying
Unit Energy Consumption	Regression model specified within Uniform Methods Project
Appliance and Household Characteristics	Participant Surveying, Uniform Methods Project guidelines
Net –to-Gross-Ratio	Participant Surveying

3.1.1 Verification of Units Recycled

A first aspect of conducting measurements of program activity is to verify the number of refrigerators and freezers collected and recycled. ADM takes several steps in verifying the number of refrigerators and freezers collected and recycled which consists of the following:

- Validating program tracking data provided by JACO by checking for duplicate or erroneous entries;

- Verifying that refrigerators and freezers are recycled according to the agreed-upon process between JACO and I&M; and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys are to verify that customers listed in the program tracking database did indeed participate and that the number of appliances claimed to be recycled was accurate. Additionally, survey respondents are asked a series of questions to verify the working condition of their recycled appliances; it is a program requirement that collected units be in working condition at the time of pick-up.

3.1.2 Calculating Gross Annual kWh Savings per Appliance

Ex ante savings for the ARP were assumed to be 1,004 kWh per refrigerator and 808 kWh per freezer recycled based on results for the PY5 evaluation. For the impact evaluation effort, these savings estimates were assessed by developing separate gross unit energy consumption (UEC) estimates for refrigerators and freezers recycled through the program using existing statistical models relating various appliance and household characteristics to estimated energy usage.

The Cadmus Group refined the use of linear regression methodology for estimating energy savings resulting from refrigerator recycling. This research consisted of a metering study of 472 refrigerators across five utilities to determine energy savings associated with refrigerators recycled through appliance recycling programs. [2]

Cadmus used the data from this monitoring sample to develop a regression model that relates the UEC of refrigerators - metered in situ operating conditions – to various characteristics of the appliance. The model is specified in the Uniform Methods Project (UMP), which is an effort by the U.S. Department of Energy to increase the consistency and transparency of how energy savings are determined. The protocols presented in the UMP provide a straightforward method for evaluating gross and net energy savings for common residential and commercial measures offered in ratepayer-funded initiatives in the United States.[3]

ADM used the UMP regression model developed by Cadmus to estimate the UEC for refrigerators recycled through the companies' program. The Cadmus regression model was developed using in situ monitoring data from 472 refrigerators. Specifically, the average characteristics of refrigerators recycled through the program were multiplied by the associated coefficients from the Cadmus model and summed to produce an estimated average in situ UEC for refrigerators recycled through the program.

[2] Source: Cadmus et al. (2013). *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* April 2013.

[3] Office of Energy Efficiency & Renewable Energy, energy.gov/eere/about-us/initiatives-and-projects/uniform-methods-project-determining-energy-efficiency-progr-0, accessed: 12 January 2015.

It is important to note that the Cadmus model only considers refrigerators. Accordingly, ADM used a refrigerator-to-freezer ratio factor to determine the average UEC for freezers. This refrigerator-to-freezer factor methodology is similar to that used by the NMR Group, Inc. in their recent evaluation of the Massachusetts Appliance Turn-in program.[4] Using relevant secondary sources, ADM concluded that freezers on average use 15% less energy annually than refrigerators. This implies a refrigerator-to-freezer factor of 0.85. The analysis supporting this refrigerator-to-freezer factor is detailed in the previously mentioned Massachusetts Appliance Turn-In program Evaluation performed by NMR Group, Inc.[5]

Finally, a partial use factor was developed for refrigerators and freezers to adjust UEC estimates to reflect the gross savings of appliances that were recycled through the program. The partial use factor is designed to account for the fact that not all refrigerators and freezers are plugged in year round. Secondary appliances are more likely to be unplugged for a portion of the year than primary appliances, and since there was a large presence of secondary appliances in the program, the partial use factor is an important consideration when developing gross savings estimates.

Based on the proceeding discussion, the procedures used by ADM to estimate gross energy savings (kWh) for the refrigerators and freezers recycled through the program can be summarized by the following steps:

(1) The Cadmus UMP-based model was used to predict the average annual in situ UEC for participating refrigerators in 2015 based on the average refrigerator characteristics established from JACO records and the participant survey.

(2) The average freezer annual UEC was obtained by multiplying the estimated average refrigerator UEC by the refrigerator-to-freezer factor of 0.85.

(3) Partial use factors were applied to the UEC estimates to account for the fact that some appliances are not used continuously throughout the entire year.

(4) The estimated average UECs for refrigerators and freezers were extrapolated to the population of program participating units to obtain a program level estimate of gross kWh savings resulting from refrigerator and freezer recycling.

3.1.3 Calculating Gross Peak kW Reduction

Gross peak demand savings were calculated based on the critical peak demand definition provided by I&M. Specifically, I&M established an on-peak period of 7:00 a.m. - 9:00 p.m. during weekdays (a 14 hour period each weekday). Measure specific normalized 8,760 hour load shapes were used to identify the average demand during this on-peak period. These load shapes assign a portion of estimated gross kWh savings to each hour of the year. After identifying the total kWh

[4] Ibid.

[5] Ibid.

saving's that fall into the defined on-peak hours, dividing by the total number of hours in the peak period results in the average gross peak demand reduction. There are a total of 3,654 hours per year that meet the criteria of I&M'S on-peak period definition. Appliance load shapes developed as part of the End-Use Load and Consumer Assessment program (ELCAP)[6] were used to estimate the percentage of kWh savings occurring during those 783 on-peak hours.

3.1.4 Calculating Net kWh and Peak kW impacts

This section will explain the net savings methodology in the context of the UMP protocol estimation of gross savings. The three effects discussed in this section are free-ridership, secondary market impacts, and induced replacement. Net savings are calculated relative to UMP gross savings using the formula below.

$$Net\ Savings = Gross\ Savings - Freeridership - Secondary\ Market\ Impacts - Induced\ Replacement$$

Where:

Gross Savings = The evaluated in situ UEC for the average recycled unit, adjusted for part use (UMP definition of gross savings);

Free-ridership = Program savings from units that would have been destroyed even in the absence of the program;

Secondary Market Impacts = Program Savings that would have occurred in the absence of the program based on the estimated/assumed counterfactual actions of appliance acquirers.

Induced Replacement = Average additional energy savings consumed by replacement units purchased due to the program.

The following sections detail more thoroughly the free-ridership, secondary market effects, and induced replacement components of net savings. After each effect is discussed individually, a summary diagram is provided in Figure 3-2 to illustrate the complete net savings adjustment.

Free-ridership occurs when an appliance recycled through the program would have been taken off the grid even in the absence of the program. The first step of the free-ridership analysis was to ask participants if they had considered discarding the program appliance before learning about the program. If the participant indicated no previous consideration of unit disposal, they are categorized as non-free-riders and removed from the subsequent free-ridership analysis.

[6] Pratt RG, CC Conner, EE Richman, KG Ritland, WF Sandusky, and ME Taylor. 1989. Description of Electric Energy Use in Single-Family Residences in the Pacific Northwest. (End-Use Load and Consumer Assessment program [ELCAP]). DOE/BP-13795-21, prepared for Bonneville Power Administration by Pacific Northwest Laboratory, Richland, Washington.

Conceptually, this reflects the assumption that without prior consideration of disposal, the program induced the resulting decommissioning of the appliance.

Next, the remaining participants (i.e., those who had previously considered discarding the program appliance) were asked a series of questions to determine the distribution of program appliances that would have been kept within participant households versus those that would have been discarded. If one considers the counterfactual scenario where there is no program intervention, there are essentially three outcomes for participating appliances:

- The appliance would have been kept in use by the participant household.[7]
- The appliance would have been discarded in such a way that it was transferred to another customer for continued use.
- The appliance would have been discarded in such a way that it would be taken out of service.

Of the three outcomes, one is indicative of free-ridership:

- Discarded and taken out of service (destroyed)
    - This outcome is indicative of free-ridership because the units would have been removed from the grid even without program intervention.
    - The participant surveys were used to estimate the percentage of program appliances that fall into each category. Participants were asked a series of questions about what they would have done with the appliance in the absence of the program. The distribution of likely discard outcomes was then calculated as a weighted average of the participant responses.

Secondary market impacts refer to the effect the program has on would-be acquirers of program participating units. In the event that a program unit would have been transferred to another customer (sold, gifted, donated), the question then becomes what other appliance acquisition decisions are made by the would-be acquirer of the program unit now that it is decommissioned and unavailable. The would-be acquirer could:

- Not purchase/acquire another unit.
- Purchase/acquire a different non-program used appliance.
- Purchase a new appliance instead.

Absent the program, if we consider the options of would-be acquirers at the market level, there are a range of possibilities as described below:

- **None of the would-be acquirers would find another unit:** This reflects a scenario where program participation results in a one-for-one reduction in the total number of appliances on

[7] Note that units kept by participant households but *not* used are accounted for in the estimation of part-use factors and therefore discounted from gross savings.

the grid. In this case, the total UEC of avoided transfers would represent energy savings achieved.

- **All of the would-be acquirers would find another unit:** This reflects a scenario where program participation has no effect on the total number of appliances operating on the grid. Without the program units available, all acquirers simply purchase non-program units (whether new or used).
- **Some of the would-be acquirers would find another unit, while others would not:** This possibility reflects the most likely possibility, where some would-be acquirers who were in the market for an appliance acquire a unit. Other would-be acquirers, who perhaps would have only taken the unit opportunistically (for example, taking a neighbors discarded unit to use as a secondary garage unit), do not acquire a new unit because of program intervention.

Ultimately, the true market level outcome in the absence of the program is difficult to assess. As a result, this evaluation takes a midpoint approach, as recommended by the UMP protocols. That is, 50% of would-be acquirers of program avoided transfers are assumed to find an alternate unit. The next question of interest is whether the alternative units acquired would be used (similar to those recycled by the program) or new. Again, this market distribution is difficult to estimate with any certainty. This evaluation takes the UMP recommendation and assumes that 50% of the alternative units would be used and 50% would be new, standard efficiency units.

Induced replacement refers to a scenario in which the ARP causes a program participant to purchase a replacement appliance. That is, the participant would not have replaced the refrigerator or freezer in the absence of the program. The purchase of a new appliance in conjunction with participating in the program does not necessarily indicate induced replacement. Older refrigerators and freezers are constantly being replaced with newer units, independent of any program effects.

However, if the program actually caused the decision to replace an older unit with a new unit (thus effectively putting another appliance on the grid) then the net program savings should account for this fact. This is the one scenario in which the energy usage of a replacement unit should be subtracted from energy savings produced by decommissioning the old unit.

The ARP offers an incentive and free pickup. This incentive is a small portion of the cost of purchasing a new appliance, and thus the likelihood of induced replacement can be reasonably assumed to be low. Indeed, past evaluations that have considered induced replacement effects have found that induced replacement is much less common than naturally occurring replacements unrelated to the program.

To account for induced replacement, the participant survey asked respondents a series of questions. First, if the respondent indicated the unit recycled was a primary refrigerator and that they would have discarded the unit even without the program, they were eliminated from consideration for induced replacement (because it is extremely unlikely a participant would choose to go without a refrigerator). All remaining respondents were asked the following questions:

- *"Did you replace the old [refrigerator, freezer] with a new unit?"* – Respondents who did not purchase a replacement appliance are removed from consideration.
- *"Would you have purchased a replacement [refrigerator, freezer] even if [I&M]'s recycling program had not been offered?"* – This is the primary question for determining whether the program induced replacement. However, because the question may cause confusion, those you indicate "yes" are then asked the following confirmation question:
- *"Let me be sure I understand. Are you saying that you chose to purchase a new appliance because of [I&M]'s appliance recycling program, or are you saying you would have purchased a new appliance regardless of the program?"* – If a respondent again indicates the program caused the replacement, then the recycled appliance in question is considered to exhibit induced replacement.

For the small proportion of program participants that were induced to replace an appliance, it is assumed that they purchased a standard efficiency new unit. Energy consumption for a standard unit was determined by 2011 sales weighted energy consumption data for refrigerators (425 kWh) and freezers (430 kWh).[8] Figure 3-1 below provides an example of how the induced replacement factor is calculated. In the example, induced replacement causes a 17 kWh per-unit decrease in net savings.

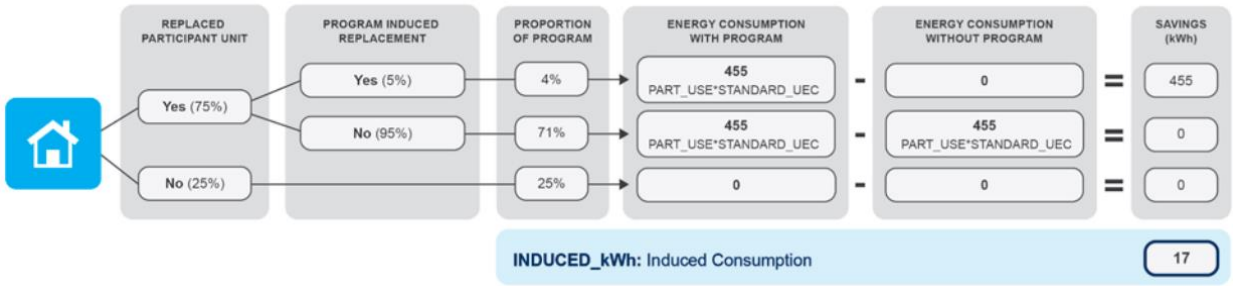


Figure 3-1: Induced Replacement Example[9]

Figure 3-2 summarizes the complete net-to-gross calculation used in this evaluation. Note that this diagram depicts net savings as calculated under the UMP gross savings definition.

[8] AHAM Energy Efficiency and Consumption Trends 2012

[9] Figure is taken directly from UMP protocol. Note that the values in the figure are just an example, and do not reflect the findings from this evaluation.

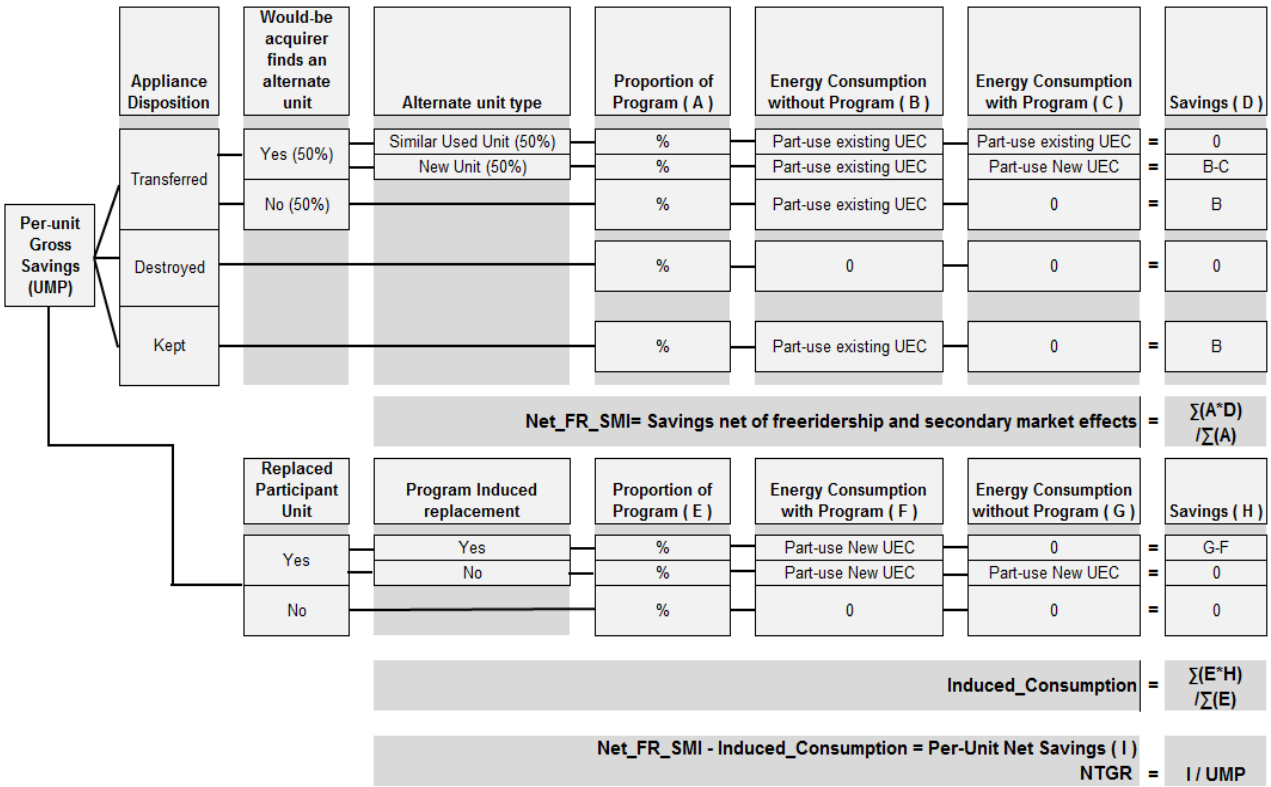


Figure 3-2: Net Savings Calculation Summary Diagram

3.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of program tracking data and participant survey data. The estimated gross impacts resulting from the PY6 ARP are summarized in Table 3-2. Table 3-3 and Table 3-4 show the audited and verified savings.

Table 3-2 Gross Impact Summary

Appliance Type	*PY6 Program Goals (kWh)*	*Verified Appliances Recycled*	*Per-Unit Annual Savings (kWh)*	*Annual Savings (kWh)*	*Peak Demand Savings (kW)*
Refrigerators		2,640	1,077	2,843,644	334.53
Freezers	3,068,260	574	880	504,989	65.08
Total		3,214	-	3,348,633	399.61

Table 3-3 Gross Impact kWh

Appliance Type	*Ex Ante Gross kWh Savings*	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
Refrigerators	2,702,768	2,702,768	2,650,117	2,843,644	105%
Freezers	482,376	482,376	463,823	504,989	105%
Total	3,185,144	3,185,144	3,113,940	3,348,633	105%

Table 3-4 Gross Impact kW

Appliance Type	*Ex Ante Peak kW Reduction*	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*	*Realization Rate*
Refrigerators	323.04	323.04	316.75	334.53	104%
Freezers	53.73	53.73	51.66	65.08	121%
Total	376.77	376.77	368.41	399.61	106%

In addition to gross savings, ADM estimated associated net-to-gross ratios (NTGRs) for both refrigerators and freezers based on results from the participant survey and applying the methodology described in Section 3.1.4. Applying the estimated NTGR of 51% for refrigerators and the estimated NTGR of 69% for freezers to the gross savings reported in Table 3-2 results in the net savings detailed in Table 3-5 below. The net realization rate is 54%.

Table 3-5 Net Impact Summary

Appliance Type	*PY6 Program Goals (kWh)*	*Ex Ante Net kWh Savings*	*Net-to-Gross Ratio*	*Per Unit Net Annual Savings (kWh)*	*Net Annual Savings (kWh)*	*Net Peak Demand Savings (kW)*
Refrigerators			51%	548	1,447,395	170.27
Freezers	2,209,147	2,293,304	69%	610	350,237	45.13
Total			54%	-	1,797,633	215.41

The calculations leading to these results are detailed in the sub-sections to follow.

3.2.1 Verification of Units Recycled

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided by JACO for accuracy. No duplicate entries were discovered. To verify that the number of units claimed in the program tracking database was accurate, ADM administered a telephone survey with a sample of program participants.

All 204 respondents who completed the participant survey verified that they had in fact participated in the program during 2015. However, in order for participating appliances to accrue energy savings by being taken out of service, the units must be in working condition at the time of pick-up. Six survey respondents who recycled refrigerators and one survey respondents who recycled a freezer reported that their units were not in working condition at the time they were collected for recycle. Based on these results, the verification rates shown in Table 3-6 for each appliance were determined:

Table 3-6 Verification Rates by Appliance Type

Utility	*Appliance Type*	
	Refrigerator	*Freezer*
Indiana Michigan Power	98.05%	96.15%

Based on these verification rates, Table 3-7 reports the numbers of refrigerators and freezers recycled through the program during PY6 that were verified as being in working condition when recycled and therefore program-eligible.

Table 3-7 Recycled Appliances Verified to be in Working Condition

Unit Type	*Quantity Reported as Recycled*	*Verification Rate*	*Quantity of Recycled Units Verified as program Eligible*
Refrigerator	2,692	98.05%	2,640
Freezer	597	96.15%	574

3.2.2 Gross Annual kWh Savings per Appliance

Gross annual kWh savings were calculated as described in Section 3.1.2 of this report. The details and results of these calculations are reported in this section.

For refrigerators, UEC estimates were derived using the DOE monitoring procedure based regression model developed by Cadmus in the evaluation of the California Statewide Appliance Recycling program. The model specification and estimated coefficients of the Cadmus model are shown in Table 3-8.

Table 3-8 Cadmus DOE based UEC Regression Details[10]

(Dependent Variable – UMP Estimated In Situ)

Independent Variables	*Coefficient*
Intercept	0.582
Appliance Age (years)	0.027
Dummy: Manufactured Pre-1990	1.055
Appliance Size (square feet)	0.067
Dummy: Single-Door Configuration	-1.977
Dummy: Side-by-Side Configuration	1.071
Dummy: Primary Usage Type	0.6054
Interaction: Uncooled Space x CDDs	0.02
Interaction: Uncooled Space x HDDs	-0.045

The program tracking database included information regarding configuration, size, and age for 2,516 out of the 2,692 refrigerators collected during PY6. Of these 2,516 refrigerators, 22.0% were side-by-side models; the average size was 18.61 cubic feet and the average age was 22.9 years old. Table 3-9 shows all of the relevant refrigerator characteristics.

Table 3-9 PY6 Refrigerator Characteristics

Appliance Characteristics	*Refrigerators*
Population Size	2,692
Appliance Age (years)	22.87
Manufacture Pre-1990	30.64%
Average Size (Cubic Feet)	18.61
Single-Door Configuration	3.50%
Side-by Side Configuration	22.02%
Primary Usage	61.49%
Interaction: Uncooled x CDD	0.75
Interaction: Uncooled x HDD	5.45

The refrigerator characteristics shown above were used in conjunction with the model coefficients in Table 3-8 to calculate annual energy consumption estimates for program participating

[10] Source: Cadmus et al. (2010). *Residential Retrofit High Impact Measure Evaluation Report.* February 8th, 2010.

refrigerators. The refrigerator-to-freezer factor of 0.85 was applied to develop annual energy consumption estimates for freezers. These calculations are shown below:

- Refrigerator UEC (kWh)

$$\big(.582 + .027 * 22.87(Age) + 1.055 * .306\ (Pre - 1990) + .067 * 18.61\ (Size) - 1.977 * .035\ (Single\ Door) + 1.071 * .220\ (Side\ by\ Side) + .6054 * .615\ (Usage) + .02 * 0.75\ (CDD\ Interaction) - .045 * 5.45\ (HDD\ Interaction)\big) * 365.25 = 1{,}113\ kWh$$

- Freezer UEC (kWh)

$$1{,}113 * 0.85\ (refrigerator - to - freezer\ factor) = 946kWh$$

The UMP-based Refrigerator UEC model presented above is the best option to use when in situ metering is not available, or when a recently developed model from a comparable program cannot be identified.[11] Since the UEC estimate takes into account in situ operating conditions for refrigerators, the estimates of 1,113 kWh for refrigerators and 946 kWh for freezers can be considered in situ estimates.

A final adjustment was made to account for not all refrigerators and freezers being plugged in year round. This partial use adjustment assigns different "use factors" based on three categories into which recycled appliances fall:

- Some units that were recycled were not being used at all before being sent for recycling. The use factor for such units therefore would be zero. That is, these units were not being used and therefore had no baseline energy usage.
- Other units were being used, but for only part of the year. For these units, the use factor is calculated by dividing the number of months in the past year that the unit had been in use by the number of months in the year. Based on data collected through the survey of participants, the average number of months in use for a freezer that was being partly used was two months, implying a use factor of 0.167 (i.e., 2/12). For refrigerators, survey responses indicated that no refrigerators were being partly used throughout the year.
- Units which are constantly in use have a use factor of one (1). The overall use factor and the corresponding overall Unit Energy Savings (UES) are calculated as a weighted average across the three categories, where the weights are determined by the percentages of units falling into the three categories. Table 3-10 shows the calculation of the overall UES for refrigerators and freezers when partial use is taken into account.

[11] Source: Cadmus et al. (2013). *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures.* April 2013.

Table 3-10 Unit Energy Savings Adjusted for Partial Use

Operating Status of Unit	*Percentage of Recycled Units in Category*	*Use Factor*	*Calculation of UES to Adjust for Part Use*
Refrigerators			
Not running	3.25%	0	0
Running part time	0.00%	0	0
Running all time	96.75%	1	1,113
Weighted Average UES for Refrigerators			1,077
Freezers			
Not running	3.85%	0	0
Running part time	3.85%	0.17	158
Running all time	92.31%	1	946
Weighted Average UES for Freezers			880

Based on the findings detailed in this section, the ex post gross per-unit annual kWh savings for refrigerators recycled through the program is estimated to be 1,077 kWh; the ex post gross per-unit annual kWh savings for freezers recycled through the program is estimated to be 880 kWh.

3.2.3 Gross Peak kW Reductions per Appliance

Appliance load shapes for refrigerators and freezers were used to estimate the average kW reduction occurring during the I&M defined on-peak period. These load shapes were normalized versions of load shapes originally developed as part of the End-Use Load and Consumer Assessment program (ELCAP).[12] The average daily load profile for each appliance type recycled through the program is shown in Figure 3-3.

[12] Ibid.

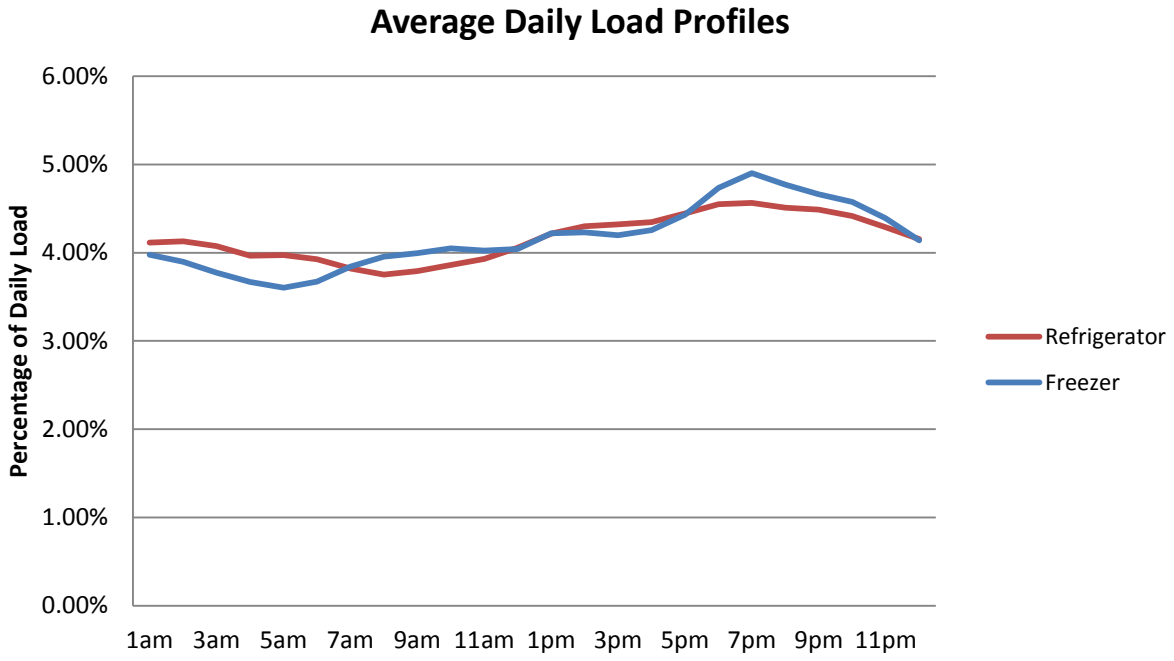


Figure 3-3 Average Daily Load Profiles

Using these normalized ELCAP load shapes, ADM determined that approximately 9.2% of the annual gross kWh savings attributable to a recycled refrigerator occurs during the on-peak period. This is equivalent to 100.1 kWh; dividing by the number of on-peak hours (783) results in an average on-peak demand reduction of 0.13 kW per recycled refrigerator.

Similarly, it was determined that approximately 9.4% of a freezer's energy consumption occurs during on-peak hours (89.6 kWh). Average on-peak demand reduction is thus 0.11 kW per recycled freezer.

3.2.4 Net Energy (kWh) and Peak Demand (kW) Impacts

The Evaluation Team used the formula shown below to estimate net savings for recycled refrigerators and freezers. Note that this definition considers gross savings under the UMP definition. Each component of the net savings calculation is described in Section 3.1.4 of this report. Spillover effects were not considered as part of the net savings analysis for this evaluation.

$$Net\ Savings = Gross\ Savings - Freeridership - Secondary\ Market\ Impacts - Induced\ Replacement$$

Where:

Gross Savings = The evaluated in situ UEC for the average recycled unit, adjusted for part use (UMP definition of gross savings);

Free-ridership = Program savings from units that would have been destroyed even in the absence of the program;

Secondary Market Impacts = Program Savings that would have occurred in the absence of the program based on the estimated/assumed counterfactual actions of appliance acquirers.

Induced Replacement = Average additional energy savings consumed by replacement units purchased due to the program.

Net savings are essentially calculated using a decision tree. The decision tree is populated with estimated percentages of appliance disposition in the absence of the program based on responses to the participant survey. In other words, participants' actions concerning discarded equipment are used to estimate savings values under all possible scenarios. The weighted average of savings under these scenarios is then used to calculate the net savings attributable to the program.

Participant survey respondents were first asked if they had considered discarding the program appliance before learning about the program. Respondent answers to this question are shown in Table 3-11.

Table 3-11: Prior Consideration of Disposal

	Measure	*Response*	*Percent of Respondents (n=123 (ref), 24 (frz))*
24. Had you already considered disposing of the *[refrigerator, freezer]* before you heard about *[I&M]'s* appliance recycling program?	Refrigerator	Yes No Don't know	59.35% 34.15% 6.50%
	Freezer	Yes No Don't know	41.67% 54.17% 4.17%

Respondents who indicated they had not considered disposal before learning about the program were considered non-free-riders. That is, for these respondents it was assumed they would have kept the appliance in use absent the program, since they hadn't considered disposal before learning about the program. Respondents who indicated they had considered disposal or "didn't know" if they had considered disposal were asked additional questions to determine whether the appliances they recycled were indicative of free-ridership.

Table 3-12 shows appliance disposition based on participant survey responses. Table 3-13 shows the same calculation for freezers.

Table 3-12: Refrigerator Discard/Keep Distribution

Discard/Keep	*Proportion of Participant Sample (n = 123)*	*Discard Scenario*	*Proportion of Discards (n=76)*	*Overall Proportion*
Discard	61.8%	Transfer	36%	22.0%
		Destroy	64%	39.8%
Keep	38.2%			38.2%

Table 3-13: Freezer Discard/Keep Distribution

Discard/Keep	*Proportion of Participant Sample (n = 24)*	*Discard Scenario*	*Proportion of Discards (n=11)*	*Overall Proportion*
Discard	41.7%	Transfer	50%	20.8%
		Destroy	50%	20.8%
Keep	58.3%			58.3%

Secondary market impacts account for program effects on would-be acquirers of program units (since they are no longer available to acquire program units). Only units that would have been transferred absent the program are considered in the secondary market impact analysis. As detailed in Section 3.1.4, a midpoint approach is taken in this evaluation, based on the recommendation of the UMP protocols. That is, 50% of would-be acquirers of program avoided transfers are assumed to find an alternate unit. Of those who are assumed to find an alternative unit, 50% are assumed to find a similar used unit, while 50% are assumed to purchase a new unit.

Induced replacement refers to a scenario in which the ARP causes a program participant to purchase a replacement appliance. That is, the participant would not have replaced the refrigerator or freezer in the absence of the program. Participant survey respondents were asked a series of questions to determine whether replacement was induced. The final induced replacement estimates are shown in Table 3-14.

Table 3-14: Induced Replacement Rate by Measure

Measure	*Induced Replacement Rate*
Refrigerator (n=115)	5.22%
Freezer (n=13)	7.69%

The Evaluation Team determined net savings as UMP gross savings less free-ridership, secondary market impacts, and induced replacement. Figure 3-4 depicts the complete net-to-gross ratio calculation for refrigerators. Figure 3-5 shows the same calculation for freezers.

	Appliance Disposition	Would-be acquirer finds an alternate unit	Alternate unit type	Proportion of Program (A)	Energy Consumption without Program (B)	Energy Consumption with Program (C)		Savings (D)
Per-unit Gross Savings (UMP)	Transferred (22.6%)	Yes (50%)	Similar Used Unit (50%)	5.49%	1,056 kWh Part-use existing UEC	1,056 kWh Part-use existing UEC	=	0 kWh
			New Unit (50%)	5.49%	1,056 kWh Part-use existing UEC	425 kWh Part-use New UEC	=	631 kWh
		No (50%)		10.98%	1,056 kWh Part-use existing UEC	0	=	1,056 kWh
	Destroyed (39.8%)			39.84%	0	0	=	0 kWh
	Kept (38.2%)			38.21%	1,056 kWh Part-use existing UEC	0	=	1,056 kWh
			Net_FR_SMI= Savings net of freeridership and secondary market effects				=	554 kWh
		Replaced Participant Unit	Program Induced replacement	Proportion of Program (E)	Energy Consumption with Program (F)	Energy Consumption without Program (G)		Savings (H)
		Yes (75%)	Yes (5%)	3.90%	425 kWh Part-use New UEC	0	=	425 kWh
			No (95%)	70.78%	425 kWh Part-use New UEC	425 kWh Part-use New UEC	=	0
		No (25%)		25.32%	0	0	=	0
			Induced_Consumption				=	17 kWh
			Net_FR_SMI - Induced_Consumption = Per-Unit Net Savings (I) = 477 kWh					
			NTGR				=	0.51

Figure 3-4 NTGR Calculation - Refrigerators

	Appliance Disposition	Would-be acquirer finds an alternate unit	Alternate unit type	Proportion of Program (A)	Energy Consumption without Program (B)	Energy Consumption with Program (C)		Savings (D)
Per-unit Gross Savings (UMP)	Transferred (20.8%)	Yes (50%)	Similar Used Unit (50%)	5.0%	846 kWh Part-use existing UEC	846 kWh Part-use existing UEC	=	0 kWh
			New Unit (50%)	5.0%	846 kWh Part-use existing UEC	430 kWh Part-use New UEC	=	416 kWh
		No (50%)		10.0%	846 kWh Part-use existing UEC	0	=	846 kWh
	Destroyed (20.8%)			21.0%	0	0	=	0 kWh
	Kept (58.3%)			58.0%	846 kWh Part-use existing UEC	0	=	846 kWh
			Net_FR_SMI= Savings net of freeridership and secondary market effects				=	603 kWh
		Replaced Participant Unit	Program Induced replacement	Proportion of Program (E)	Energy Consumption with Program (F)	Energy Consumption without Program (G)		Savings (H)
		Yes (50%)	Yes (8%)	3.85%	430 kWh Part-use New UEC	0	=	430 kWh
			No (92%)	46.15%	430 kWh Part-use New UEC	430 kWh Part-use New UEC	=	0
		No (50%)		50.00%	0	0	=	0
			Induced_Consumption				=	17 kWh
			Net_FR_SMI - Induced_Consumption = Per-Unit Net Savings (I) = 540 kWh					
			NTGR				=	0.69

Figure 3-5 NTGR Calculation – Freezers

Based on the used survey responses for the 123 refrigerators and 24 freezers (eligible participants in calculating NTGR), ADM estimated NTGRs of 0.51 for refrigerators and 0.69 for freezers. These values were multiplied by gross per-unit kWh. These values were applied in discounting annual kWh and peak demand savings for the 2015 ARP. Net savings values are shown in Table 3-15.

Table 3-15 Net Impact Summary

Appliance Type	*PY6 Program Goals (kWh)*	*Ex Ante kWh Savings*	*Net-to-Gross Ratio*	*Per Unit Net Annual Savings (kWh)*	*Net Annual Savings (kWh)*	*Net Peak Demand Savings (kW)*
Refrigerators	2,209,147	3,185,144	51%	548.35	1,447,395	170.27
Freezers			69%	610.13	350,237	45.13
Total			54%	-	1,797,633	215.41

3.3 Process Evaluation

This chapter presents the results of the process evaluation of I&M's Appliance Recycling program during program year six (PY6). This evaluation is based upon analysis of program structure and interviews and surveys of participating I&M customers, I&M program staff, and program tracking data. The process evaluation allows for a year-to-year comparison of program performance, structure and design. As 2015 marked the final year of appliance recycling operations for JACO, the process evaluation specifically addresses issues related to JACO's departure from the program and possible plans for future program operations under a new implementation contractor.

3.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity include:

- How effective is the program marketing? How do participants learn about the program and what are their reasons for participating?
- How did issues related to JACO ending its appliance recycling operations affect the program?
- How satisfied are participants with the program? What was their level of satisfaction with the scheduling process, the pickup of the appliance, and the time it took receive the incentive?
- What are the possible plans for implementing the program under a new contractor in future years?

During the evaluation, data and information from numerous sources are analyzed to achieve the stated research objectives. Insight into the customer experience with the Appliance Recycling program is developed from a telephone survey of program participants. Additionally, the internal organization and operational efficiency of program delivery is examined through an interview conducted with I&M program staff.

3.3.2 Summary of Primary Data Collection

- **Review of program documentation and relevant literature:** ADM reviewed relevant program documents, reports, and other materials to gain an understanding of program operation and structure. Documents reviewed included the program website, an evaluation of the program from the prior year, and program tracking data.
- **Participant surveys:** Participant surveys were the primary data source for understanding the customer perspective on the program and evaluating participant satisfaction. The participant surveys provided customer feedback and insight regarding customer experiences with the Appliance Recycling program. Respondents reported on their satisfaction with the program, characteristics of the appliance they recycled, characteristics of the replacement unit (if applicable), and the ease of signing up and having the unit recycled.
- **Interview with I&M staff:** An interview with I&M staff provided insight into program changes for PY6 and program performance relative to the prior year. I&M staff members also provided information regarding the temporary closure of the program in November of PY6, and possible plans for resuming the program under a new implementation contractor.

3.3.3 Overview of the Program Process

I&M's Appliance Recycling program is designed to reduce energy consumption by removing appliances from customer's homes and recycling them in an environmentally responsible way. In particular, the goal of the program is to remove older appliances from use and reduce the number of secondary appliances in customers' homes. Other than the program ending operations in November of PY6 due to JACO ceasing all appliance recycling activity, the program structure during PY6 was identical to that of prior program years.

I&M provides customers both convenience and financial incentives to encourage them to recycle refrigerators and freezers. The convenience the program offers is a service whereby the program will pick up the customer's appliances from their residence at no charge. Financial incentives are provided in the form of a $40 per unit rebate for disposing of a working appliance through the program. Furthermore, the program stresses the larger economic benefit from the energy savings resulting from disposing of an older model refrigerator or freezer.

To participate in the Appliance Recycling program, potential participants must have an I&M account. Units are eligible for recycling if they are between 10 and 30 cubic feet in size and are in working condition at the time of pickup. Customers are allowed to recycle a maximum of two units per year and receive $40 per unit in incentives.

Customers can participate in the program either by signing up directly using a toll-free number, online, or through a kiosk at Sears when they purchase a new appliance. Customers are informed of the eligibility requirements when they sign up and are told that the unit will not be collected if it is found ineligible at the time of pickup. Customers are reminded 48 hours prior to pickup of their appointment.

3.3.4 Appliance Recycling Program Activity

This section summarizes the program activity and is based on an analysis of the program tracking data provided to ADM by I&M. Details regarding the orders placed, units picked up, and characteristics of the units are presented below.

3.3.4.1 Orders Placed

During PY6, 2,103 orders for refrigerator and freezer pick-up were completed, resulting in a total of 3,289 units being picked up and recycled. The majority of these orders were placed by telephone (72%) as shown in Table 3-16. This is consistent with PY5 program enrollment activity. Additionally, eight percent of participants enrolled in the program through a retail store.

Table 3-16 How Orders were Placed During the Program Year

How Order was Placed	*Percent of Orders*	*Number of Orders (N=2,103)*
Telephone Orders	72%	1,505
Online Orders	21%	436
Retail Orders	8%	162

Figure 3-6 shows the number of completed orders placed in each month of PY6 in total and by mode of placement. The trend for the number of orders completed appears to be stable and following expected seasonal fluctuations where the majority of units were recycling during the summer months. As was the case in PY5, program activity was highest during the spring and fall period. However, unlike in PY5, no units were recycled during PY6 in March or April. Additionally, orders stopped when JACO operations ceased in November.

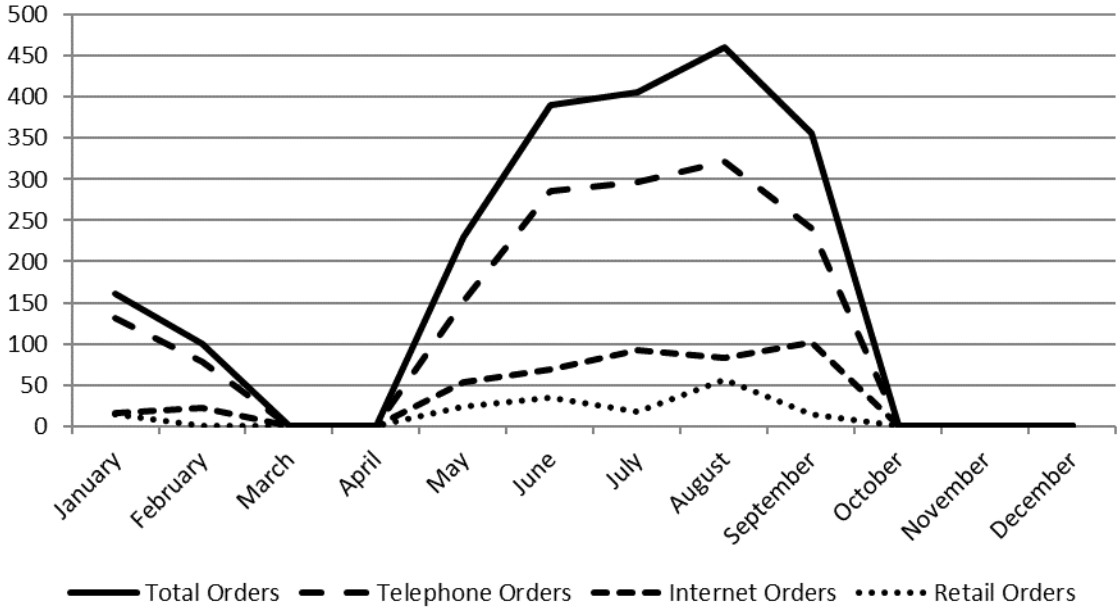


Figure 3-6 Number of Completed Orders by Month the Order was Placed

3.3.5 Participant Survey Findings

A telephone survey was conducted of a sample of program participants who had recycled at least one unit through the I&M Appliance Recycling program in PY6. The purpose of the participant survey was to evaluate customer perceptions of the program and gauge overall program satisfaction, drawing comparisons between PY5 and PY6 responses when appropriate. In total, 191 customers who participated in the 2015 program responded to the survey. Specific topics covered in the survey included:

- **Decision making process:** Respondents were asked to explain how they learned about the program, to indicate which factors led them to participate in the program, and state what actions they would have taken if the program had not been available.
- **Customer satisfaction:** Respondents were asked to rate their satisfaction of selected program elements including the program application process, the pickup process, and the program incentive. Respondents were also asked about their satisfaction with any interactions with I&M program staff.
- **Problem resolution:** Respondents were asked whether they experienced problems with any elements of the program. Those participants who identified issues were asked to describe the issues and asked if and how their problem had been resolved.

3.3.5.1 Customer Awareness of the Program

Participants were asked how they first learned about the Appliance Recycling program. As shown in Figure 3-7, a quarter of respondents reported that they heard about the program through a bill insert from I&M. Other common responses included word-of-mouth (i.e., friends and relatives)

and TV advertisements. These results demonstrate that bill inserts remain the main source of awareness among program participants. Word-of-mouth also continues to serve as an effective form of program promotion, suggesting that past participants are satisfied with the services offered by the program. These results are very similar to those obtained during PY5, and demonstrate the marketing methods used to promote the program are successfully reaching potential customers.

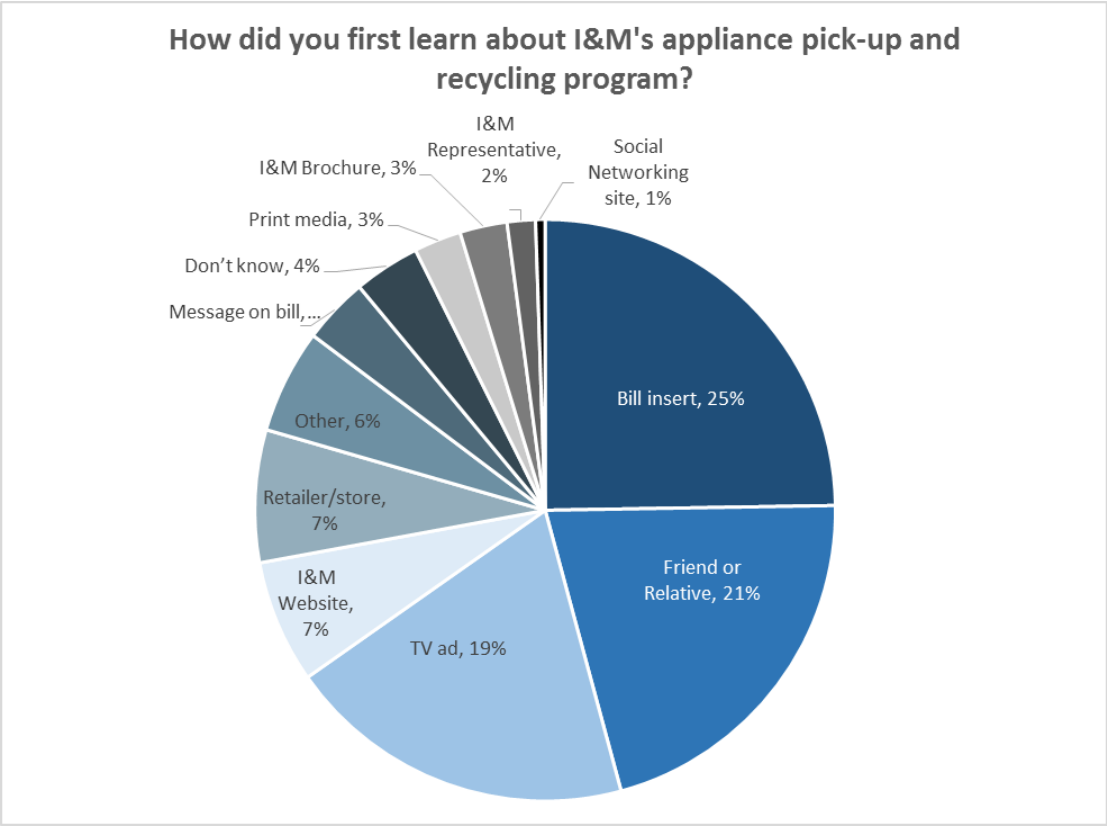


Figure 3-7 How Customers Initially Learned about the Program

3.3.5.2 Customer Decision Making Characteristics

In order to understand customer values and potential motivations for participating in the program, survey respondents were asked to identify the main reason they decided to dispose of their appliance through I&M's Appliance Recycling program. As shown in Figure 3-8, participants most commonly reported that they chose the I&M program because of the available financial incentive. The second most common response was the convenience provided by the program pick-up service. These responses are very similar to the PY4 and PY5 program evaluations.

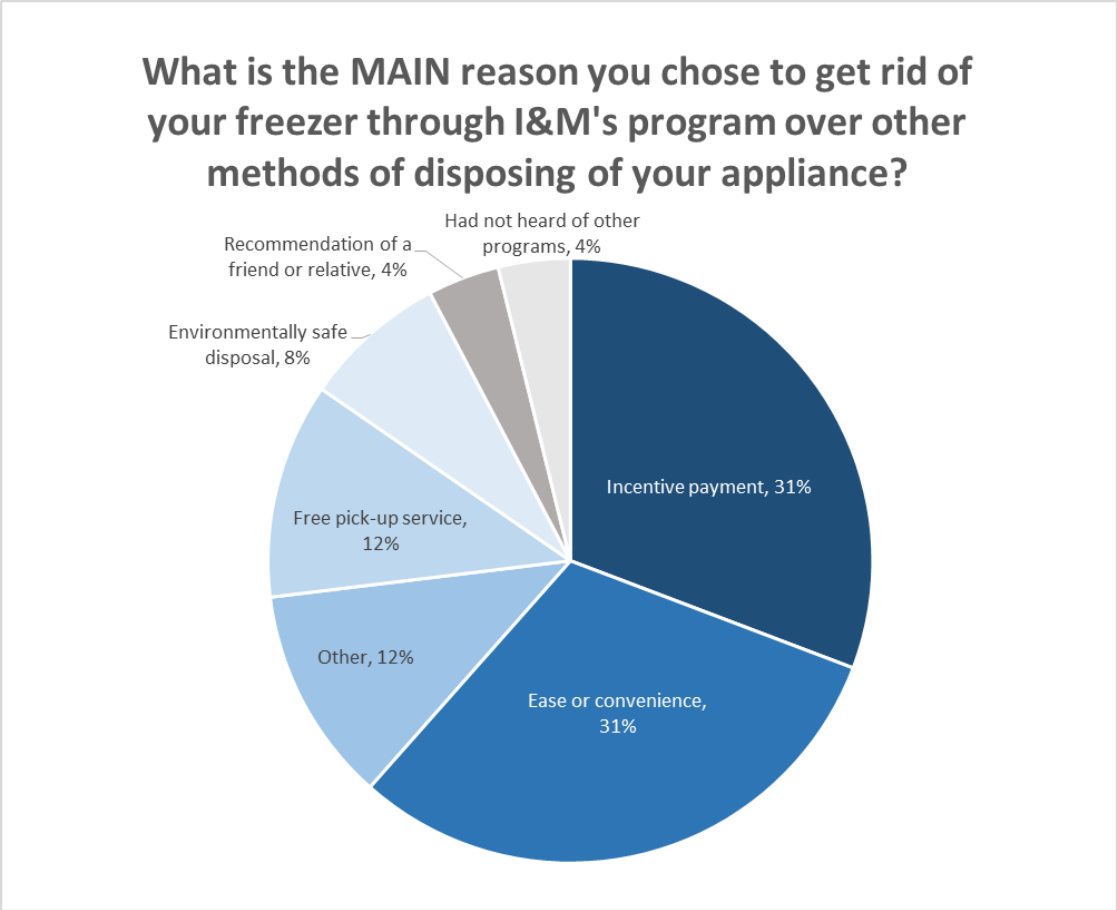


Figure 3-8 Main Reasons for Program Participation

In order to assess the appropriateness of the program incentive, respondents were then asked whether they would have participated in the program with reduced rebate amounts. As shown in Table 3-17, 64% of respondents indicated that they would have participated in the program with a reduced rebate amount, half of respondents stated that they would have participated if there had been no rebate check. These results are in agreement with those obtained during the PY5 evaluation, and do not indicate any changes in customer priorities or motivations. However, as noted in previous evaluations, a decreased rebate amount would likely significantly reduce the program participation rate; a sufficient incentive is necessary to capture the portion of the customer base that would not participate in the program for the convenience alone. Table 3-17 suggests that without an incentive, program participation could decrease by approximately 50%.

Table 3-17 Customer Reported Participation with Reduced Rebate Amount

	Response	*Percentage of Respondents Saying Yes (N = 190)*
Would you have participated in the program if…	The rebate check had been less?	64%
	There had been no rebate check altogether?	52%

3.3.5.3 Program Sign-up Process

Participants were asked about their experiences during the process of applying online or by telephone for an appliance pick-up. As previously mentioned in the program description, the majority of participants signed up for the program via telephone; about 74% of respondents reported that they had used this method.

Of the 25 respondents who stated that they had signed up for the program online, 92% indicated that it was easy to find the sign-up screen on the I&M website. All but one of these respondents reported that the website answered all of their questions about the Appliance Recycling program. Additionally, all but two participants stated they had received a confirmation when their sign-up process was completed. The responses to these questions indicate that although the I&M Appliance Recycling web portal is not being accessed by most customers, it is functioning effectively for the customers that use it. These customers are experiencing few if any issues when using the online sign-up method. These responses are very similar to those obtained during the PY5 evaluation.

Only three of the 110 respondents who had signed up for the program over the telephone reported that the program representative they spoke to was not polite and courteous. Similarly, only one respondent indicated that the representative was not able to answer all questions related to the Appliance Recycling program, and all but two respondents stated that they were able to schedule a convenient appliance pick-up date and time. Although 18 respondents stated that they had needed to call more than one time when attempting to sign up for the program, overall respondents seemed satisfied with the process of signing up for the program over the phone.

Overall, participants did not identify any issues with these processes, and indicated that they were pleased with the ease and convenience associated with enrolling in the Appliance Recycling program.

3.3.5.4 Retail Experience

The program was promoted through Sears retail stores during 2015. Survey respondents who indicated that they had purchased a replacement for the unit that was recycled through the program were asked whether they had purchased this unit from a Sears store; a quarter of respondents (33

customers) indicated that they had purchased the replacement unit at Sears. These respondents were asked whether they had also signed up for the program at the Sears store, and 24% reported that they had.

Of the eight respondents who indicated that they signed up for the program through Sears, only three indicated that Sears' offer of appliance pick-up and recycling motivated them to purchase the replacement appliance. Seven of these respondents stated that the sales associate had brought the program to their attention. The remaining respondent stated that they had asked about the program, having previously known about it.

When asked whether Sears had removed the old appliance when they delivered the new unit, or whether I&M had picked up the unit at a later date, half of respondents stated that Sears had removed the appliance.

Finally, when asked about their satisfaction with the quality and quantity of information provided about the recycling program by Sears staff in the retail store, two respondents reported dissatisfaction but neither explained why they were dissatisfied.

These results suggest that although the majority of customers have not interacted with the retail component of the Appliance Recycling Program, there do not appear to be any major operational issues for the customers who learn about the program through this channel.

3.3.5.5 Customer Satisfaction

Participants were asked to rate their satisfaction with several elements of the program. These elements included:

- Scheduling of appliance pick-up appointments;
- Appliance pick-up process;
- Time it took to receive the rebate after participating;
- The rebate amount;
- The overall process of participating in the program; and
- Interactions with program staff.

Respondents rated their satisfaction with these program elements on a scale of very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, and very dissatisfied. Table 3-18 displays the reported satisfaction ratings for each selected program element. Overall, satisfaction ratings were very high and consistent with the ratings provided by participants during the PY5 evaluation.

- **Customer satisfaction with pickup appointment scheduling:** Ninety-four percent of respondents indicated that they were at least somewhat satisfied with the scheduling of their pick-up appointment. Five percent of respondents indicated that they were dissatisfied with

this aspect of the program. When asked to explain why they were dissatisfied, three respondents stated that there were issues with the pick-up timing, two stated that the person picking up the equipment had damaged property during the process, and one each stated that it took too long to pick up the equipment and there were general scheduling issues.

- **Customer satisfaction with actual appliance pick-up:** When asked how satisfied they were with the actual appliance pick-up process, 94% of respondents reported that they were at least somewhat satisfied and only two percent expressed dissatisfaction. Additionally, half (56%) of respondents stated that they had interactions with the person who collected their appliance. All respondents stated that the person who collected the old appliance was courteous and professional, except for one respondent that did not know.
- **Customer satisfaction with time to receive program rebate:** Ninety-three percent of respondents reported being at least somewhat satisfied with the time it took to receive the rebate. Two percent of respondents stated that they were dissatisfied with this aspect of their program experience; none of these respondents provided further information about why they were dissatisfied. It should be noted that program documentation states that the expected time to receive a rebate is four to six weeks.
- **Customer satisfaction with rebate amount:** 94% of respondents reported satisfaction with the rebate amounts. Only one percent reported dissatisfaction.
- **Customer satisfaction with overall program:** 97% of respondents stated that they were satisfied or very satisfied with the overall program. One percent stated that they were dissatisfied with the program.

Table 3-18 Participant Satisfaction with Selected Elements of Program Experience

Element of program Experience	*Very satisfied*	*Somewhat satisfied*	*Neither satisfied nor dissatisfied*	*Somewhat dissatisfied*	*Very dissatisfied*	*Don't know/Refused*	*N*
Rebate amount	72%	22%	5%	1%	-	2%	190
Time until rebate was received	60%	33%	4%	1%	1%	2%	130
Scheduling of the appliance pick-up	73%	21%	1%	4%	1%	1%	186
Actual appliance pick-up	82%	12%	1%	1%	1%	1%	182
Overall program experience	80%	17%	1%	1%	-	2%	186

In addition to satisfaction levels for specific program elements, respondents were also asked about their experiences interacting with I&M program staff. A quarter (26%) of respondents stated that they contacted program staff during the course of participating in the program. As shown in Table 3-19, 69% of these respondents reported that they were very satisfied with these communications, and six percent of respondents indicated dissatisfaction with program staff. Three respondents elaborated on their dissatisfaction, one respondent stated that they had trouble finding the information, one stated the wait was very long, and the third explained that the time it took to get the rebate was too long and the check was sent to the wrong address.

In general, the responses suggest that participants are highly satisfied with their experiences with the program and the interactions they had with program staff.

Table 3-19 Satisfaction with Communications with I&M staff

	Response	*Percentage of Respondents (N = 49)*
How satisfied are you with your communications with I&M and program staff?	Very satisfied	69%
	Somewhat satisfied	22%
	Neither satisfied nor dissatisfied	2%
	Somewhat dissatisfied	4%
	Very dissatisfied	2%

Respondents were asked to explain their overall satisfaction with the I&M Appliance Recycling program. Nearly all of the open-ended comments were positive, suggesting participants valued their experiences with the program. Specific comments included:

"It was convenient and everyone was professional"

"[The program] made it very easy, they were very efficient and I got a refund"

"…it went very smoothly and all I had to do was call and [the refrigerator] was gone in a few weeks and I wouldn't have had anyone to help me move it"

"Overall was just great; presented clearly, what was stated was what happened and in a timely manner."

Respondents were also given the opportunity to provide suggestions for improving the I&M Appliance Recycling Program. The most common responses given by respondents were to increase the program incentives, increase flexibility in pick-up schedules, and to increase program marketing efforts.

3.3.5.6 Customer Savings on Electric Bills

In order to gauge whether participants noticed any long-term benefits of removing an old appliance from their home, respondents were asked whether they had noticed savings on their electric bills since the pick-up was performed. During PY5, only 24% of respondents stated that they had noticed savings on their monthly bills as a result of participating in the Appliance Recycling Program. As shown in Table 3-20, the results for PY6 show a slight increase, although recognition of savings still remains low. As noted in prior evaluation reports, there are several reasons why participants may not see immediate electric savings, including seasonal usage patterns and the use of new appliances in the home.

Table 3-20 Savings on Electric Bills

	Response	*Percentage of Respondents (N = 186)*
Have you noticed any savings on your electric bill since removing your old appliance(s)?	Yes	27%
	No	39%
	Not sure	23%
	Don't Know/Refused	11%

Participants that did notice savings on their electric bill were asked to rate their satisfaction with the savings. As displayed in Table 3-3-21, almost all respondents reported satisfaction with the savings they noticed on their electric bill.

Table 3-3-21 Satisfaction with Savings

	Response	*Percent of Respondents (n=50)*
How satisfied are you with any savings you noticed on your electric bill since removing your old appliance(s)?	Very dissatisfied	0%
	Dissatisfied	0%
	Neither satisfied nor dissatisfied	2%
	Satisfied	32%
	Very satisfied	66%
	Don't know	0%
	Refused	0%

3.3.5.7 Cross-Program Awareness

To gauge Appliance Recycling Program participant engagement in other programs offered by I&M, survey respondents were asked whether they were aware of any other rebates, incentives, or energy efficiency services offered by the utility. Sixteen percent of respondents indicated that they were aware of at least one other program, an eleven percentage point increase from PY5. These respondents were asked to identify which other programs they were aware of. As some customers may be aware of incentives or discounts for particular equipment or measures, but may not know the name of the associated program, respondents were prompted with a description of each program rather than with the name of the program. As shown in Figure 3-9, of the respondents that indicated they were aware of other I&M programs, more than half were aware of each program. A much smaller percentage of respondents had participated in the programs.

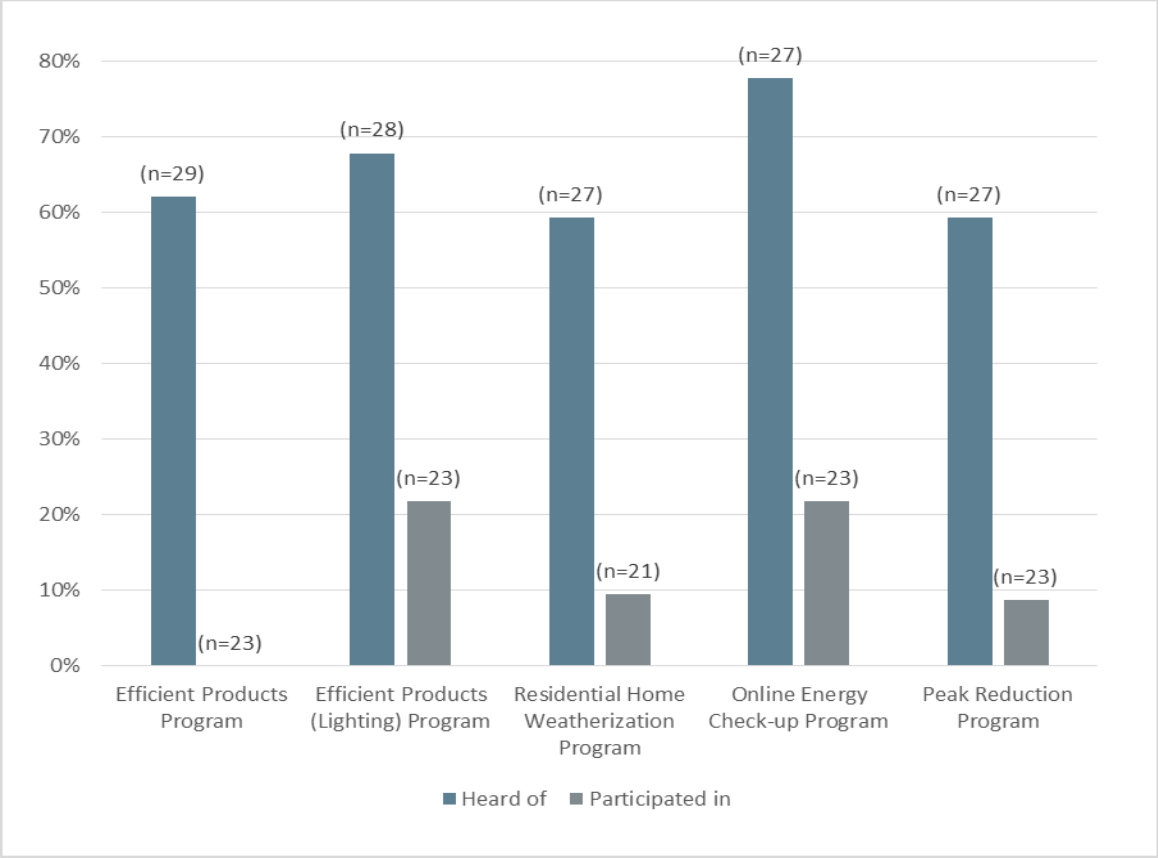


Figure 3-9 Cross-Program Awareness and Participation

The results indicate that although there has been some increase in cross-program over, there is still significant potential for increased cross-program promotion of the I&M residential energy efficiency programs within the Appliance Recycling Program.

3.3.6 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from PY6:

- **Participants continued to report high levels of overall satisfaction:** As with the prior program years, results from the participant survey indicate that customers are satisfied with the I&M Appliance Recycling Program, both with specific program elements and the overall program experience. Participants reported very few operational or design issues, and aside from anecdotal instances of dissatisfaction, it appears that program delivery has fully met customer needs.
- **No major issues with retail component:** The participant survey results indicate that the retail component of program promotion and enrollment is functioning as designed. Customers reported retail staff members are actively informing customers of the program, and that signing up for the program was a straightforward process. However, two of the eight survey

respondents that recycled units through Sears reported dissatisfaction with the information provided by the retailer. Neither of these respondents elaborated on why they were dissatisfied.

3.3.7 Program Operations Perspective

Interviews were conducted with program staff to gain insight into any program changes that were implemented during PY6, to identify any remaining opportunities for program improvements, and to discuss any challenges or issues that had emerged since the prior program year. The most significant program event was sudden closure and cessation of JACO operations in November. ADM did not complete any interviews with JACO staff prior to this date. Consequently, for the PY6 evaluation, one interview was conducted with I&M program management staff. This section highlights key points from the interviews and identifies any notable differences between PY5 and PY6.

- **Program Design Remained Consistent:** Program staff reported that the incentive structure and program participation guidelines remained unchanged in PY6.
- **Expansion of the Program and Energy Savings Goal Achieved**: Program staff indicated the Appliance Recycling program expanded twice in PY6 due to increased participation. In September the program increased the goal for the number of units recycled to 2,761, and in October the goal was again increased to 3,350 total units recycled. Staff indicated that the program ultimately recycled 3,289 prior to JACO's filing for receivership. Consequently, JACO's closure had minimal impact on the program's achievement of PY6 goals.
- **New Implementation Contractor for PY7**: Utility staff indicated that they are in final negations with ARCA to implement the Appliance Recycling program in PY7. Rebates are to remain the same ($40) and I&M will continue to process the incentive payments. Currently there are no changes planned for the key aspects of the program design or implementation strategy.
- **I&M Manage Program Marketing Strategy and Implementation in PY7**: Staff indicated that I&M staff will manage the key marketing functions for the Appliance Recycling Program in PY7. Although the marketing strategy is not fully developed, staff indicated the bill inserts and direct mail will likely be the primary forms of customer outreach. Last year the implementation contractor outsourced the program marketing to a third-party that marketed the program through TV and radio ads.

3.3.8 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from PY6:

- **Successful program performance and delivery:** The Appliance Recycling exceeded its unit recycling goal during PY6, despite goal increases during the program year and the ending of JACO operations in November.
- **Participants continued to report high levels of overall satisfaction:** As with the prior program years, results from the participant survey indicate that customers are pleased with the

I&M Appliance Recycling Program, both in relation to specific program elements and in their overall program experience. Participants reported very few operational or design issues, and aside from anecdotal instances of dissatisfaction, it appears that program delivery has fully met customer needs.

- **Decrease in Refrigerator Net-to-Gross Ratio:** The net-to-gross ratio increased from 66% in PY5 to 69% in PY6 for freezers, but decreased from 73% to 51% for refrigerators. This may be partially related to an increase in the portion of refrigerators that were primary units: during PY5 approximately 49% of refrigerators were primary units, and during PY6 approximately 62% of refrigerators were primary units. Customers who are replacing their primary refrigerator are very likely to replace it with another unit, meaning that the recycling of the refrigerator may have been a consequence of a prior plan to replace the old unit, rather than a consequence of the program. Additionally, the net-to-gross assessment methodology was updated during PY6 to comply with the Uniform Methods Project (UMP), which takes a more detailed approach to free-ridership. The UMP method does not necessarily result in lower net-to-gross ratios in general, but for PY6 the UMP found higher free-ridership than would have been found with the PY5 methodology.
- **No issues with retail component:** The participant survey results indicate that the retail component of program promotion and enrollment has functioned as designed thus far. Customers reported that retail staff members are actively informing customers of the program, and that signing up for the program was a fairly straightforward process. However, two of the eight survey respondents that recycled units through Sears reported dissatisfaction with the information provided by the retailer. Neither of these respondents elaborated on why they were dissatisfied.
- **Most recycled units were secondary units:** Program tracking data indicate that most of the units replaced during PY6 were secondary units. The large share of program activity comprised of secondary unit recycling is consistent with findings from PY5. However, unlike PY5, during which tracking data indicated most units were replaced, most of the secondary units recycled during PY6 were not replaced.
- **New implementation contractor for PY7:** Staff plans to continue to offer an appliance recycling contractor with a new firm, ARCA, providing implementation services in JACO's stead. I&M will be responsible for program marketing.

4. Residential Home Energy Reporting Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential Home Energy Reporting Program during the period January 2015 through December 2015.

4.1 Program Specific M&V Methodologies

The M&V approach for the Home Energy Reporting Program (HERP) is aimed at determining the following:

- Numbers of homes that received reports in the mail;
- Number of homes that opted out of the program;
- Number of homes that accessed the web based tool to receive more information regarding their homes energy usage and receive more recommendations;
- Average annual kWh savings per home;
- Average kW reduction per home;
- Savings for the persistence group participants (these participants stopped receiving reports in October 2013, and the evaluation seeks to quantify any continues energy savings for this group in PY6); and
- Estimating cost effectiveness of the HERP in 2015.

As the HER Program experienced a change in implementation contractors during PY6, moving from Opower to Tendril, Inc. mid-year, the evaluation incorporates both Opower report batches and Tendril report batches in order to quantify the above items for the full program year. Table 4-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 4-1 Data Sources for Gross Impact Parameters – Home Energy Reporting Program

Parameter	*Source*
Number of Participants	Program Tracking Data for Tendril and Opower reports
Number of Opt Outs/ Account closures	Program Tracking Data for Tendril and Opower reports
Recommended Measures Completed	Survey data/ I&M Residential Billing Database
Monthly kWh Consumption	I&M Residential Billing Database
Daily Weather Data (HDD and CDD)	Direct Pull From KFWA (Fort Wayne Airport) Weather Station

4.1.1 Verification of Participation in Program

A first aspect of conducting measurements of program activity is to verify if participants of the program did participate in the program. Second aspect is to verify the extent to which the recommendations and informational messaging provided within the home energy reports resulted in reduced energy consumption among the participant population. ADM takes several steps in verifying participation and if recommendation measures were completed, which consists of the following:

- Validating program tracking data provided for both Opower and Tendril report batches by checking for duplicate or erroneous entries;
- Verifying that participants were part of the program according to the agreed-upon process between the implementation contractor and I&M; and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys are to verify that customers listed in the program tracking database did indeed participate. Participants are also asked about what recommendations, if any, were implemented within the household. As Tendril, Inc. replaced Opower as the program's implementation contractor and will be continuing in this role moving forward, the participant survey was administered only to customers who received reports from Tendril during PY6.

4.1.2 Calculating Gross Annual kWh/kW Savings

The scope of the HERP reports includes informational messaging about energy use as well as recommendations for energy efficiency improvements that customers can implement in their homes. In order to determine the kWh and kW savings attributable to the information provided in the home energy reports, ADM conducted a regression analysis using a census of program participant data and a control group. The billing data for participants includes one year of pre-data for each customer. Data screening procedures include:

- Removing duplicate records;
- Retaining bills with billing duration between 7 to 37;
- Truncating billing usage distribution to the range of 250 to 7,000; and
- Removing negative and zero consumption values.

During 2015, ADM received billing data from I&M representing all residential customers from the period of January 2014 through December 2015, as well as data identifying the set of treatment and control group customers by wave. The model specification was run on these data sets to calculate savings for Waves 4 and 5.

In order to calculate savings for Waves 1 through 3, customer billing data from the period of January 2011 through December 2013 were also needed. ADM retained a cleaned copy of billing data for Wave 3 customers from the 2014 program evaluation and was able to use these data to calculate savings for Wave 3 customers, but did not retain a full set of billing data for Wave 1 and 2 customers. To ensure that the full set of billing data for Wave 1 and 2 customers was included in the analysis, ADM submitted an additional data request and received the 2011-2013 billing data in two forms: one data set from I&M containing billing data for all residential customers for the period of January 2011 through December 2013, and one data set from Tendril containing pre- and post-billing data and treatment/control specifications for all customers in the participant waves.

ADM checked the validity of the Tendril dataset by sampling approximately 100 customer records and comparing the data for these customers with the billing data provided by I&M, and found that there were no discrepancies between the two data sets. After verifying the validity of the Tendril data set, ADM conducted the above data cleaning procedures on the Tendril data for Waves 1 and 2 and then ran the model specification on the resulting data set for those waves.

4.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) impacts

As the analysis for this program incorporates a control group, the savings resulting from the model are net savings and the net-to-gross ratio is 1, or 100%.

4.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of participant billing data. This section presents the results of the impact evaluation activities.

The estimated gross impacts resulting from the PY6 Home Energy Reporting program are summarized in Table 4-2, which is inclusive of both the program participant population and the

persistence group.[13] Table 4-3 and Table 4-4 show the audited and verified savings for the program participant population separately. Table 4-5 displays the savings for the persistence group separately.

Table 4-2 Gross Impact Summary, Home Energy Reporting Program

Program	*PY6 Program Goals (kWh)*	*Peak Demand Reduction (kW)*		*Annual Energy Savings (kWh)*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Home Energy Reporting	33,000,000	3,635.98	3,567.80	26,810,824	31,253,948	117%

Table 4-3 Gross Impact kWh, Participant Group

Ex Ante kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
26,108,333	26,108,333	26,108,333	30,084,073	115%

Table 4-4 Gross Impact kW, Participant Group

Ex Ante Peak kW Reduction	*Gross Audited Peak kW Reduction*	*Gross Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
3,635.98	3,635.98	3,635.98	3,434.25

Table 4-5 Gross Impact kWh and kW, Persistence Group

Ex Ante kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*	*Ex Post Gross kW Savings*
702,491	702,491	702,491	1,169,874	167%	133.55

4.2.1 Verification of Participation in Program

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided for both Opower and Tendril customer groups for accuracy. No duplicate entries were discovered.

To verify that the number of homes in the program tracking database claiming to have received reports in the mail was accurate, ADM administered a telephone survey with 300 program participants. Nearly all respondents who completed the participant survey verified that they had received reports in the mail through the program during 2015. ADM applied a verification rate of 100% to the program.

[13] These participants were taken out of the program in October 2013 with the intent of calculating their energy use during successive program years to determine whether they continued implementing behaviors and energy saving improvements recommended in their home energy reports.

Table 4-6 lists total participation for each wave of the program as of December 2015, according to I&M scorecards and Tendril and Opower monthly reports.

Table 4-6 Reported Program Participants by Wave, as of December 2015

Wave 1 (July 2012)	*Wave 2 (October 2013)*	*Wave 3 (December 2013)*	*Wave 4 (January 2015)*	*Wave 5 (June 2015)*	*Total*
35,337	24,286	18,687	16,079	57,204	151,593

4.2.2 Gross Annual kWh Savings and Peak kW Reduction

ADM conducted a regression analysis to determine the savings attributable to the HERP. To serve as a baseline, the analysis incorporated billing data for a control group of customers who were assigned randomly prior to program implementation, consistent with a random controlled trial (RCT) approach.

The mixed effects panel regression model[14] was then specified as follows:

$$\mathrm{kWh}_{i,t} = \beta_1 \mathrm{HDD65}_{i,t} + \beta_2 \mathrm{CDD75}_{i,t} + \beta_3 \mathrm{Post}_{i,t} + \beta_4 \left(\mathrm{Post}_{i,t} * \mathrm{Treatment}_i\right) + \alpha_i \mathrm{Customer}_i + \varepsilon_{i,t}$$

Where the subscript i denotes individual customers and $t = 1, \ldots, T(i)$ serves as a time index, where $T(i)$ is the number of bills available for i. The model is defined as "mixed effects" because the model decomposes its parameters into fixed-effects (i.e. HDD65, CDD75, Post, Treat, and its various interactions) and random effects (i.e. the individual customer's base usage). Put simply, a fixed effect is assumed to be constant and independent of the sample, while random effects are assumed to be sources of variation (other than natural measurement error) that are uncorrelated with the fixed effects. The approach is similar to others that treat the individual customer as a fixed-effect, but is more computationally efficient as the number of individuals in the sample becomes very large.

While the results of this model are expected to be consistent with a pooled regression (which ignores the individual customer effect), controlling for the individual effect achieves some improvement in the model's fit to the data. The variables included in the both regression models are specified in Table 4-7 below.

[14] Implemented in R using the lme4 package (citation). The syntax used for model specification is lmer(avg.kw ~ 1 + treat*post + post * (cdd + hdd) + (1 | ACCOUNT_NUMBER), data=dataset)

Table 4-7 Description of Variables Used in the Regression Model[15]

Variable	*Description*
Customer random intercept	Unique identifier for each customer to control for any customer specific differences.
Heating Degree Days (HDD)	Average Heating Degree Days per day within each billing period. This was calculated by summing up the number of heating degree hours per day, and then averaging over the number of days in the billing period. The set point of 65 was used for the model.
Cooling Degree Days (CDD)	Average Cooling Degree Days per day within each billing period. This was calculated by summing up the number of cooling degree hours per day, and then averaging over the number of days in the billing period. The set point of 75 was used for the model.
Post	Indicator if an observation is post audit (=1 if post, =0 otherwise).
kWh	The average daily kWh usage for account i during billing period t.

The HDD and CDD have been calculated on a daily basis so they can be applied to each customer's billing period, however long that may be. It is rare that a customer's billing dates are on the first of each month, so this ensures that no estimation of usage must occur to match weather data with the billing data.

A free-rider in the HER program would be a customer who would have reduced energy usage regardless of the program's influence. The experimental design for this study excludes customers who are known to be enrolled in other energy-efficiency programs, and controls for attributes that may correlate with energy conservation via the randomization. A free-rider then would have been equally likely to have been in the treatment or control groups, and hence Net-to-Gross is 1. There are no assumed free-riders.

The results of the regression analysis are listed in Table 4-8, with realization rates by waves displayed in Table 4-9.

[15] ADM also included a "flag.treatment" variable in the analysis to account for overall differences in energy usage between the control and treatment groups, but found that this variable was not significant for any of the five waves or for the persistence group of customers. Therefore, the flag.treatment variable was removed from the model specification.

Table 4-8 Output from the Net Savings Regression Model

Regression Model Output					
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Daily kWh Savings (β_6)	1.05	0.49	0.36	0.13	0.05
Number of Customers (Combined Treatment and Control)	67,549	54,435	40,707	35,500	92,762
R-Squared	0.45	0.40	0.38	0.23	0.67
Monthly kWh Mean during Post Period	1,730	1,256	935	2,920	656

Table 4-9 Realization Rate by Wave

Wave	*Ex Ante Gross kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
1	15,069,651.49	17666725.39	117%
2	5,693,358.66	6658527.465	117%
3	2,934,616.55	3,459,755	118%
4	1,162,168.21	1,122,280	97%
5	1,248,538.18	1,176,785	94%

The results of the persistence group regression analysis are displayed below in Table 4-10.

Table 4-10 Output from the Net Savings Regression Model-Persistence Group

Regression Model Output	
	Persistence Group
Daily kWh Savings (β_6)	0.70
Number of Customers (Combined Treatment and Control)	22,409
R-Squared	0.44
Monthly kWh Mean during Post Period	1,711

4.2.3 Calculating Net Annual kWh/kW Savings

The coefficient estimate on β_6 from the regression model output in Table 4-8 is used to determine the annual Net kWh and kW savings for the HER program. The calculation steps are detailed in Table 4-11 for the participant waves and Table 4-12 for the persistence group and are as follows:

(1) Scale the daily savings from the regression model up to the annual level, by multiplying by a factor of 365.

(2) kW savings were calculated by applying a flat load shape (i.e. 1/8760) to the kWh savings.

(3) Multiply by the number of program participants (or persistence group customers) to arrive at a program level kWh savings number.

It should be noted that the participant counts displayed for each group in the tables below do not match the participant counts reported by Tendril. As the calculation of both sets of participant counts and the savings analyses were conducted using actual program and customer usage data, this discrepancy may be due to a difference in the approaches used by ADM and Tendril to define and count customer participants. After initial data preparation using the approach described in Section 4.1.2, ADM calculated participant counts using the following R code:[16]

$$
\begin{aligned}
&billing.data\ \%>\% \\
&select(Account_id, deployment_wave, flag.treatment)\ \%>\% \\
&unique\ \%>\% \\
&group_by(deployment_wave, flag.treatment)\ \%>\% \\
&summarize(wave.size = n())
\end{aligned}
$$

[16] The code includes functions incorporated in the dplyr package (https://cran.r-project.org/web/packages/dplyr/dplyr.pdf).

The above code provides the number of unique account IDs for the treatment and control groups within each deployment wave. The resulting counts are higher than any monthly participant count reported by Tendril for any group, which may be primarily due to Tendril's monthly counts excluding customers whose usage data are not available for that period. Although ADM's data cleaning procedures are similar to those used by Tendril, the ex post savings analysis assesses the population of each wave at an annual level, which would include customers whose usage data were not available during certain months.

Table 4-11 Calculation of Net Per-Participant and Program Level kWh and kW Savings

Wave	*Daily kWh Savings*	*Per Participant PY6 kWh Savings*	*Per Participant PY6 kW Savings*	*Number of Participants*	*Program Level PY6 kWh Savings*	*Program Level PY6 kW Savings*
1	1.05	384.49	0.04	45,949	17,666,725	2017
2	0.49	177.32	0.02	37,550	6,658,527	760
3	0.36	131.26	0.01	26,337	3,459,755	395
4	0.13	47.76	0.01	23,500	1,122,280	128
5	0.05	17.70	0.002	66,488	1,176,785	134
Totals	-	-	-	199,824	30,084,073	3,434.25

Table 4-12 Calculation of Per-Participant and Program Level kWh and kW Savings-Persistence Group

Wave	*Daily kWh Savings*	*Per Participant PY6 kWh Savings*	*Per Participant PY6 kW Savings*	*Number of Participants*	*Program Level PY6 kWh Savings*	*Program Level PY6 kW Savings*
Persistence Group	0.70	257.23	0.0294	4,548	1,169,874	133.55

4.3 Process Evaluation

This chapter presents the results of the process evaluation for I&M's Home Energy Reporting program during PY6. The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework. The purpose of the process evaluation is to assess the design of the program in order to determine how effectively it is achieving its intended outcomes. This evaluation is based upon analysis of program structure and interviews and surveys of participating I&M customers, I&M energy efficiency staff, Tendril staff, and program documentation.

4.3.1 Evaluation Objectives

The purpose of the process evaluation is to examine program operations and results throughout the operating year, and to identify potential improvements that may prospectively increase program efficiency or effectiveness in terms of customer participation and satisfaction levels. As the program experienced an implementation contractor change during PY6, the process evaluation addresses differences in program operations and reports as compared to PY5. Additionally, comparison of participant survey responses for PY6 and PY5 may provide insight into whether the implementation change has affected customer satisfaction levels.

Key research questions to be addressed by this evaluation of PY6 activity include:

- How useful are the program reports to participating customers? What types of information are most useful to participants?
- What is the preferred method of receiving home energy reports (e.g. email, conventional mailings) within the participant group?
- How satisfied are participants with the program? What was their level of satisfaction with information provided in the reports and savings on monthly bills from recommendations implemented?
- What changes have taken place as a result of the change in implementation contractor from Opower to Tendril?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the Home Energy Reporting program is developed from a telephone survey of program participants. The internal organization and operational efficiency of program delivery is examined through analysis of interviews conducted with I&M program staff and Tendril staff.

4.3.2 Summary of Primary Data Collection

- **Review of program documentation:** ADM reviewed a sample Tendril home energy report, program descriptions, and program tracking data.
- **Participant surveys:** Surveys served as the foundation for understanding the customer perspective. The participant surveys provided customer feedback and insight regarding customer experiences with the Home Energy Reporting program. Respondents reported on their satisfaction with the program and the usefulness of the report.
- **Interview with program staff members:** Interviews with I&M staff and Tendril staff provided insight into program changes since PY5 and the effects of the implementation contractor change.

4.3.3 Participant Survey Findings

The following section presents key findings from surveys conducted with customers who participated in I&M's 2015 Home Energy Reporting program and received reports distributed by Tendril. None of the survey respondents had previously received reports delivered by Opower.

ADM conducted telephone surveys with program participants as part of the PY6 evaluation of the Home Energy Reporting Program. This survey was designed to gather information regarding the participant perspective on program operations and delivery, as well as to characterize specific energy efficiency measures and behaviors resulting from customer participation in the recommendation process. Data collected via participant and opt-out surveying are used in evaluating:

- Awareness of the program;
- Implementation of energy efficient measures and behaviors;
- Decision making behaviors after taking part in the program; and
- Satisfaction with the program.

In total, 281 participants who had received at least one Tendril report during PY6 responded to the survey.

4.3.4 Customer Feedback on Hardcopy and Electronic Reports

Beginning in September, reports were delivered by email to approximately one-half of participants for which email addresses were available. The 22% of survey respondents who had received at least one report were asked their delivery mode preference. Sixty percent stated that they preferred receiving the reports electronically, 29% preferred receiving them through the mail, and 9% had no preference.

As shown in Figure 4-1, approximately three-quarters of respondents indicated a preferred format for the usefulness of the reports for providing energy use information and energy saving actions. However, respondents preferred electronic and hard copy versions in roughly equal shares.

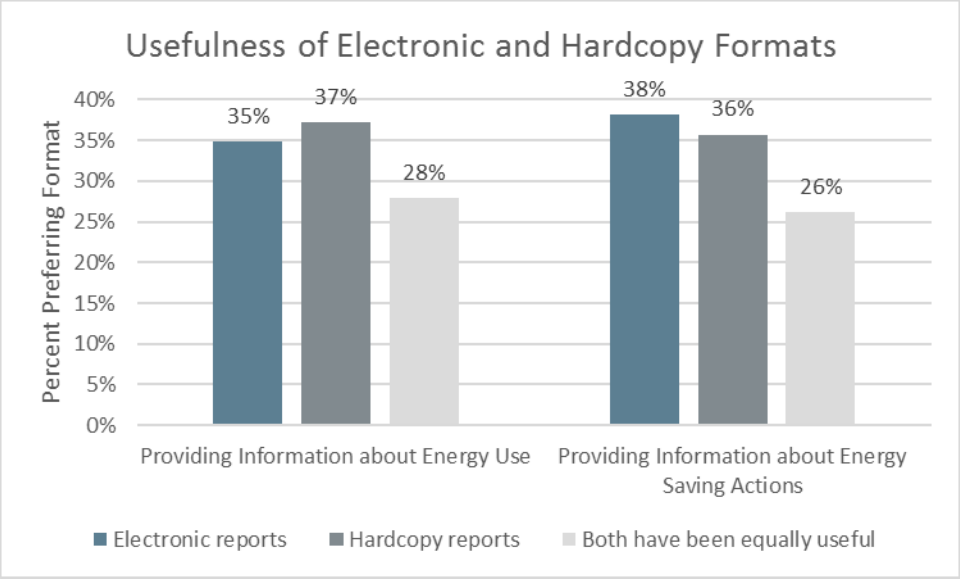


Figure 4-1 Participant Perceptions of Usefulness of Electronic and Hardcopy Report Formats

When asked about the recommendations that were provided in the reports, 53% of respondents stated that they followed one or more of the energy saving recommendations provided in the reports, while 41% reported that they had not implemented any recommendations from the reports.

As shown in Table 4-13, respondents were also asked which of the energy savings recommendations from the reports were implemented. The most common actions taken involved replacing light bulbs with LEDs/CFLs, purchasing energy efficiency appliances, and turning off lights when not in use.

Table 4-13 Energy Saving Recommendations Implemented

Implemented Recommendations	*Percent of Respondents* (N = 147)*
Using LED light bulbs	26%
Replacing incandescent light bulbs with CFLs	21%
Purchasing energy efficient appliances	17%
Turning off lights when not in use	16%
Adding door sweeps, window sealing, or other building envelope items	13%
Cleaning or replacing furnace filters	10%
Reducing heating system usage	10%
Unplugging appliances when not in use	7%
Reducing air conditioner usage	5%
Adjusting water heater temperature	3%
Washing clothes with cold water	3%
Adding water heater pipe wrap or water heater jackets	1%
Other	10%
Don't know	3%
Prefer not to answer	20%

*Respondents can select multiples responses, therefore the total may be greater than 100%.

In order to characterize the potential energy savings impacts of the program, participant survey respondents were asked how useful the reports were for helping them understand what they could do to reduce their household's energy consumption. As shown below, the majority of respondents reported that they found the reports sent "very useful" to "slightly useful".

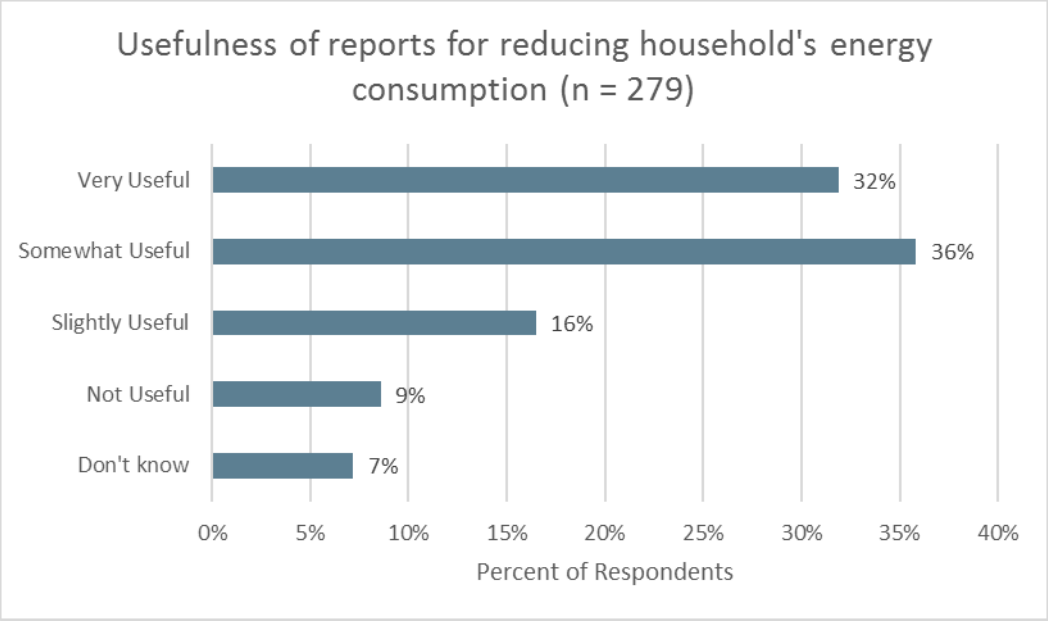


Figure 4-2 Usefulness of Reports for Reducing Energy Consumption

Those who reported that the report was "not useful" stated several reasons for their response. Examples of commentary provided by survey respondents included:

> "*Because we can't afford to do anything.*"
>
> *"We are doing what is recommend and it is not helping […] the bills keep going up."*
>
> *"Because I don't know what I could do to change anything."*

4.3.5 Customer Feedback on Usefulness of Online Portal

Respondents were next asked whether they had used the program's online portal, which shows more detailed information about their home's electricity usage. Only 4% of respondents stated that they had used the online portal overall. However, as shown in Table 4-14, the rate at which participants accessed the online portal was significantly greater for those who received the electronic reports from those who did not receive an electronic report. This finding suggests that the electronic format may be more likely to increase rates of access of the portal which may contribute to greater reductions in energy use.

Table 4-14 Online Portal Access Rates

Accessed Online Portal	*All Respondents (N = 279)*	*Have Received Electronic Report (N = 56)*	*Have Not Received Electronic Format (N = 190)*
Yes	4%	18%	1%
No	91%	77%	96%
Don't know	4%	5%	4%
Prefer not to answer	0%	0%	0%

** The difference in portal access between those that did and did not receive a hard copy report is statistically significant (p < .01).*

The most common reasons among the full respondent group for not using the online portal included lack of awareness (26%), lack of time (22%), and no computer or internet connection (13%).

Table 4-15 Reason for Using the Online Portal

Why haven't you logged into the online portal?	*Percent of Respondents (N = 209)*
Was not aware of the portal	26%
Did not have the time to use the portal	22%
No computer or internet	13%
Not interested in saving energy right now	8%
Did not think the portal would provide useful information	6%
Did not know how to access the portal	2%
Did not know how to use the portal	1%
Other	9%
Don't know	11%
Prefer not to answer	1%

Respondents who did use the online portal were asked several questions regarding their experience with it. Twelve respondents total stated that they had accessed the online portal, but only eight of these participants responded to these additional questions. As shown in Table 4-16, the majority of these respondents thought the website was easy to understand, easy to use, and provided useful information. Respondents were most likely to disagree with the statement that the portal helped them reduce their energy use, although 63% did agree with this statement.

Table 4-16 Customer Feedback for Online Portal

Program Element	*Completely Disagree*	*Disagree*	*Neutral*	*Agree*	*Completely Agree*	*N*
The communication informing me about the online portal was easy to understand	0%	0%	13%	25%	63%	8
The set up process for the online portal was easy	0%	0%	13%	38%	50%	8
The website was visually appealing	0%	0%	0%	50%	50%	8
The website was easy to navigate	0%	0%	0%	50%	50%	8
The information was easy to understand	0%	0%	25%	38%	38%	8
The information helped me reduce my household's energy use	0%	13%	25%	25%	38%	8

4.3.6 Customer Feedback for Energy Challenge Emails

In October the program began sending Energy Challenge Emails to participants. These emails ask participants to take an action to save energy (e.g., close your curtains at night). Of the 58 respondents who reported having received home energy reports electronically, 36% recalled receiving Energy Challenge Emails from I&M during 2015. Of these respondents, 19% reported taking at least one challenge, while 43% read the emails but never took a challenge, and 10% did

not read the emails.[17] As Table 4-17 shows, the majority of respondents were satisfied (25%), or very satisfied (38%) with the Challenge Emails.

Table 4-17 Satisfaction with Challenge Emails

How satisfied are you with the Challenge Emails?	*Percent of Respondents (N = 16)*
Very dissatisfied	0%
Dissatisfied	0%
Neutral	31%
Satisfied	25%
Very Satisfied	38%
Don't know	0%
Prefer not to answer	6%

4.3.7 Cross-Program Awareness

Respondents were asked if they had heard of other energy efficiency programs, or had applied for or participated in such programs. As some customers may be aware of incentives or discounts for particular equipment or measures, but may not know the name of the associated program, respondents were prompted with a description of each program rather than with the name of the program. Sixteen percent of respondents said they had, while 77% said they had not, and 6% did not know. As Table 4-18 shows, a majority of respondents (69%) had heard of the program offering rebates for energy efficient products, while the other programs were lesser known. In addition, very few respondents had applied for or received assistance from any of the programs, with the program offering rebates for energy efficient products being the most common program for interaction (18%).

[17] The remaining 28% of these respondents did not elaborate on their involvement with the Energy Challenge Emails.

Table 4-18 Participant Awareness and Participating in Other Programs

Program	*Aware of*				*Participated in*			
	Yes	*No*	*Don't know*	*N*	*Yes*	*No*	*Don't know*	*N*
Energy Efficient Products (Appliance and Thermostat Rebates)	69%	29%	3%	35	18%	73%	9%	33
Energy Efficient Products (Lighting Discounts)	29%	63%	9%	35	3%	84%	13%	32
Residential Home Weatherization Program	54%	37%	9%	35	6%	85%	9%	33
Online Energy Check Up Program	51%	46%	3%	35	6%	85%	9%	33
Peak Reduction Program	37%	49%	14%	35	9%	76%	15%	33

In addition, seventy-one percent of respondents who know about these other programs learned about them from the home energy report, while 23% learned about them from other sources.

4.3.8 Customer Satisfaction

As Table 4-19 shows, customers are generally satisfied with the program, although a fair number (at least 20%) reported that they were neither particularly satisfied nor dissatisfied with each program element. The relatively high level of indifference may be a function of their lack of involvement in making the decision to participate in the program. Those respondents who reported dissatisfaction were generally unhappy with the complexity of the reports, the number of reports sent, and that their electricity bill did not decrease after implementing energy efficiency measures.

Table 4-19 Customer Satisfaction

Program Element	*Very Dissatisfied*	*Dissatisfied*	*Neutral*	*Satisfied*	*Very Satisfied*	*Don't know*	*N*
Any savings on your monthly utility bill since receiving the reports	3%	7%	32%	26%	17%	15%	281
Information provided through the reports	2%	4%	25%	33%	28%	8%	281
Frequency of receiving the reports	3%	6%	20%	31%	32%	7%	281
Overall program experience	2%	5%	25%	36%	25%	7%	281

Satisfaction ratings were compared for 2014 and 2015 program participants and are summarized in Table 4-20. Recipients who were surveyed during PY5 received reports developed by Opower, the participants who were surveyed during PY6 recipients received reports developed by Tendril. Ratings were very similar between the two years and there were no significant differences in the level of satisfaction.

Table 4-20 Comparison of 2014 and 2015 Satisfaction Ratings

Aspect of Program	*Average Satisfaction Rating*
Savings on your monthly bill resulting from your energy efficiency efforts	
2015 (N = 240) 2014(N = 258)	3.5 3.5
t(494) = .12, p = .91	
Information provided through the reports	
2015 (N = 259) 2014(N = 270)	3.9 3.9
t(518) = -.61, p = .54	
Overall program experience	
2015 (N = 262) 2014(N = 273)	3.8 3.9
t(531) = -.88, p = .38	

4.3.9 Customer Demographics

The customer survey resulted in several key demographic findings that may be relevant to future program design and operations.

When asked about the type of water heating system in their home, 52% of respondents reported that they have natural gas water heating, while 41% reported having electric water heating. Figure 4-3 displays responses related to how many people live in participants' households. Respondents most commonly had one to two people living in their home (69%).

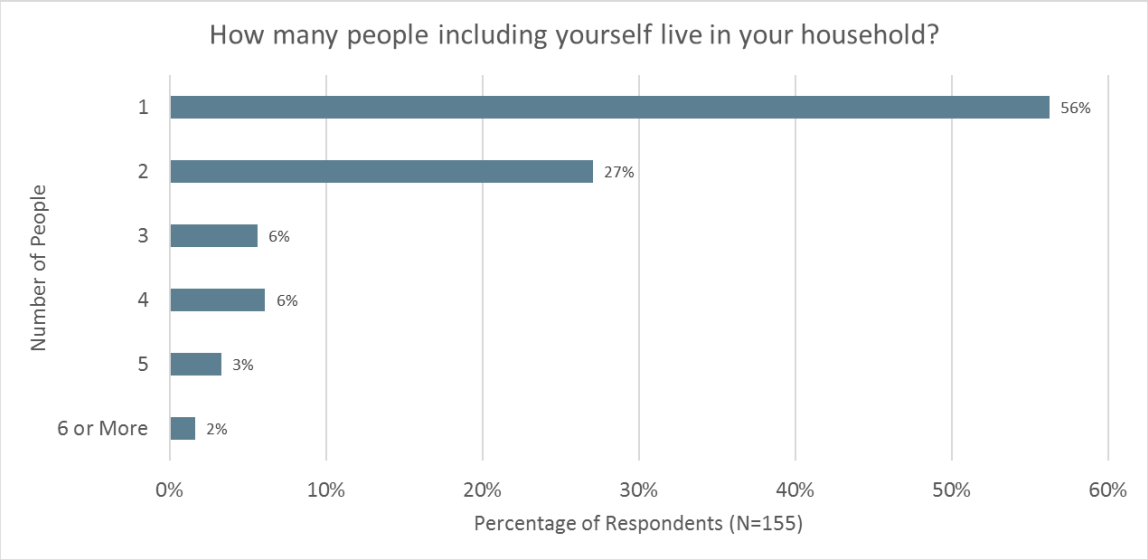


Figure 4-3 Number of People Living in Household

Finally, respondents were asked to indicate the number of bedrooms and bathrooms in their home. The average number of bedrooms was 3.1, while the average number of bathrooms was 1.8.

4.3.10 Program Operations Perspective

This section summarizes the core findings from interviews conducted with I&M program staff and Tendril staff for the purposes of developing market environment and internal program management perspectives.

Interviews were conducted with program staff to gain insight into program operations for PY6 and changes in program implementation resulting from the transition from Opower to Tendril. This section summarizes (1) the roles and responsibilities of the staff responsible for managing program operations, (2) the program design and implementation, (3) successes and challenges from PY6, and (4) planned changes for PY7. In closing, key findings will highlight the most salient themes from the program areas and research activities described above.

4.3.10.1 Roles and Responsibilities

Staff was asked to discuss their roles and responsibilities with regards to the Home Energy Reporting Program. The I&M Program Manager also manages two other Residential Programs, the Energy Efficient Products Program and Energy Efficient Lighting Program. Her daily responsibilities are to provide implementation oversight to those programs and the HER Program. For the Home Energy Reporting Program, she manages the relationship between I&M and Tendril, the implementation contractor. There are other administrative support staff that assist with marketing and accounting. The program team at Tendril provides most of the program administration and implementation services.

The Tendril program team is led by a primary Account Manager who is responsible for the day-to-day operations of the Home Energy Reporting Program. When Tendril launched in PY6, the account manager was responsible for the ensuring the success of the initial launch. She provides weekly program updates to I&M that detail the progress towards the energy savings goals. The Account Manager is also responsible for the projections and budget maintenance. Staff indicated there are approximately 5 to 10 other support staff whose roles are in engineering, M&V, administration, accounting, and operations.

4.3.10.2 Program Design and Implementation

Staff was asked to provide feedback regarding the transition from Opower to Tendril. Staff said that Tendril took over implementation a month sooner than expected and the transition went very well. Tendril utilized data provided in the same format as it had been for Opower but amended the report messaging. The reports present the same information but have a new look and feel. Figure 4-4 below displays the new Tendril report layout. Tendril omitted the rating factor that rated customers' energy usage as great, good, or more than average but kept comparisons of the recipient's home to average and efficient homes.

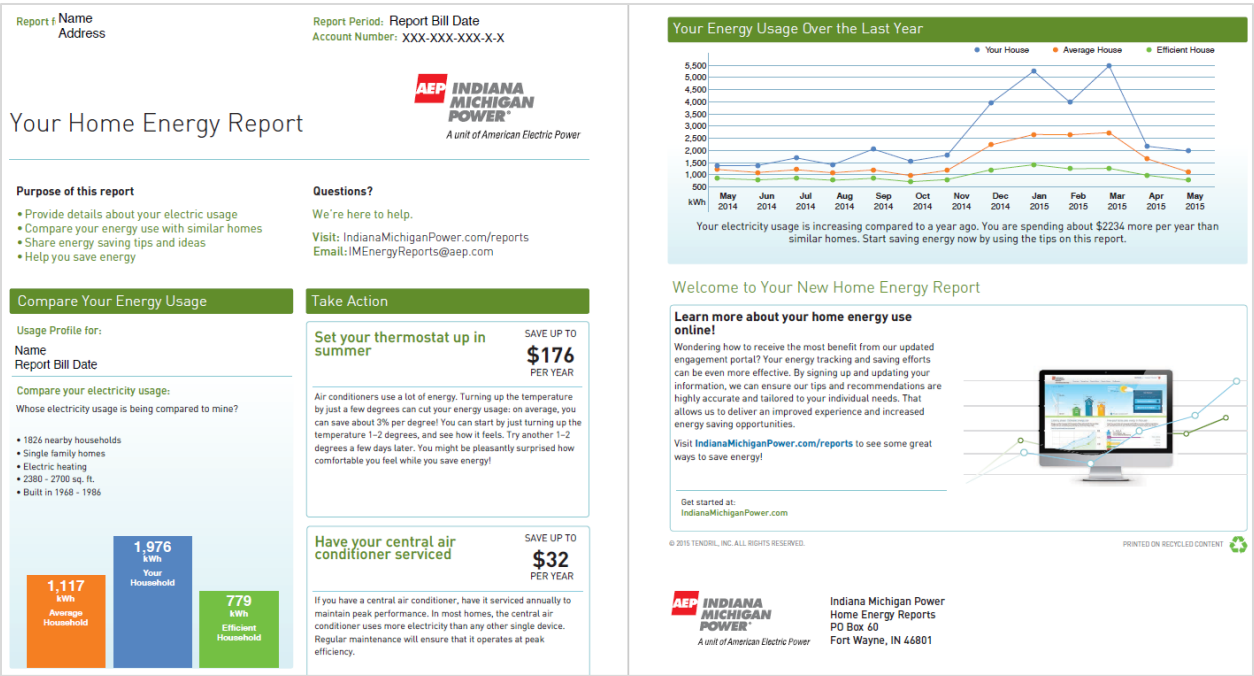


Figure 4-4 PY6 Home Energy Report Layout

Staff was asked if there were efforts to expand the program in PY6 or if the recipient list changed at all. Staff indicated that at the beginning of PY6, approximately 100,000 customers received Opower reports, to which another 45,000 customers were added in June. Therefore, 100,000 participants were legacy participants and 45,000 were new participants.

Tendril's filtering parameters also resulted in some participants being dropped from the reporting recipient list. For example, if the customer account did not have enough usage history they were dropped from the treatment group. Opower would apply these filters to each wave of reports that went out, while Tendril applied the filtering parameters just once.

In addition to the filter parameters, implementation staff indicated that email communication was added when Tendril took over. Email addresses were available for approximately half of the recipients. Starting in September, the 3rd report, electronic version of the reports were sent via email those recipients with email addresses available.

In October, monthly challenge emails started as well. The challenge is meant to encourage behavior changes to further reduce energy usage. Figure 4-5 displays a challenge that encouraged participants to close their curtains at night.

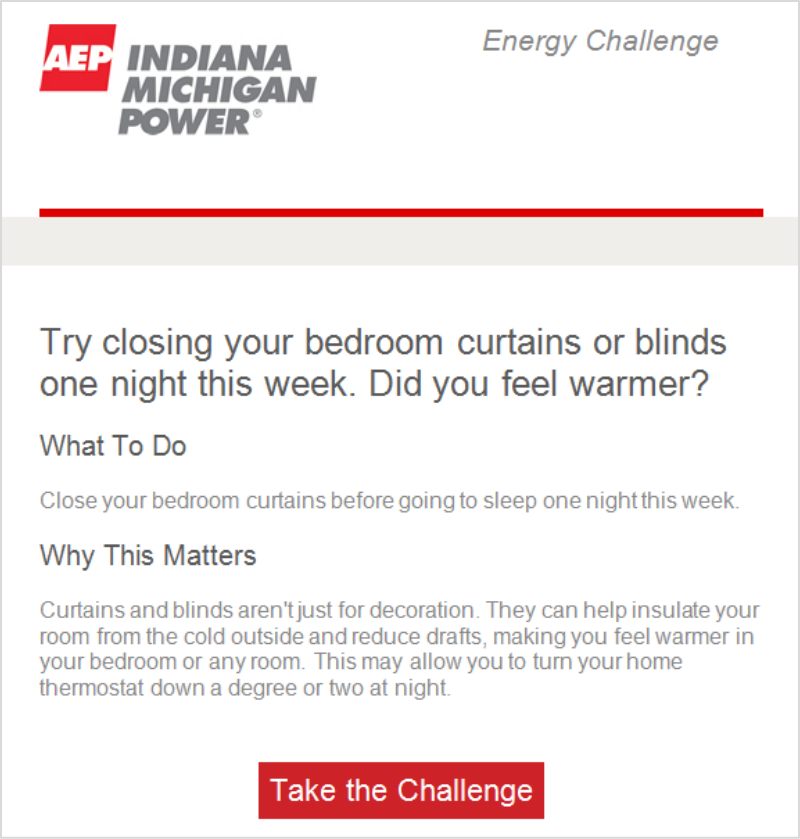


Figure 4-5 Participant Energy Challenge – Sample Email

Tendril is also in the process of further developing a customer facing portal that participants can visit to view more detailed information on their energy usage. The objective is to increase the ways in which customers have access to information and to encourage participants to learn about how their home uses energy. Tendril tracks the portal traffic; staff indicated they are continually looking for ways to increase the number of participants visiting the portal.

Staff was asked to provide feedback on how energy savings calculations are developed and if staff have considered last year's EM&V recommendation to adjust ex ante savings estimations based on evaluation results. Tendril program staff said that they have an M&V team specifically focused on savings calculations. The M&V team reviews the usage bills for a control group and the participating, treatment group. Once the PY6 EM&V results are received they will revisit that recommendation to see if it still applies.

4.3.10.3 Successes and Challenges

Staff was asked what they feel were the greatest successes and challenges during PY6. Utility staff was very positive about the transition to the new implementation contractor. They indicated the turnaround time to launch the program was quick and that the new look and feel of the reports was an improvement. Implementation staff indicated that the opt-out rate was low and they were very happy about the increased electronic communication that was occurring.

Staff indicated that encouraging behavior changes that drive savings will always be a challenge in these types of programs. Program staff continually looks for new and interesting ways to engage participants and keep them interested in energy conservation. Therefore, maintaining savings with the existing group of participants requires continual improvement and creativity. Currently the email open rates in the I&M territory are slightly lower than some of the other jurisdictions Tendril works in. Getting people interested and more comfortable with the electronic format will be challenging.

4.3.10.4 PY7 Changes

Looking forward to 2016 staff was asked to discuss any planned changes to the Home Energy Reporting Program. Implementation staff indicated usage alerts will go into effect in PY7. Usage alerts are sent electronically to participant to let them know their energy usage has increased beyond a pre-defined threshold. Increased email communication was also noted as a planned change for the upcoming program year.

I&M's Michigan customers are also being added to the treatment group in PY7. Prior to PY7, all participants were Indiana customers. The reports and participation processes will be identical for both states. Another change planned for PY7 is the removal of customers who are not producing energy savings as a result of receiving the reports. The evaluation team and program team discussed the benefits associated with removing these "under performers." In pervious program years, customers were only removed from the treatment group when they moved residences, asked to be removed, or in 2013 when staff created a separate persistence group.

4.3.11 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from the PY6 process evaluation:

- **Transition to Tendril was Successful:** Staff reported that the transition from Opower to Tendril went smoothly and was completed ahead of schedule. Tendril implemented several changes to the program including a new reporting format that presented similar information as the Opower reports but in a different format. Additionally, email delivery of reports was initiated during the program year and in October, participants began receiving Energy Saving Challenge Emails.

- **Preference for Electronic Mail Reports over Postal Mail Reports:** Sixty percent of participants that received at least one email report preferred to receive the report by email as opposed to 29% who preferred to receive it by mail. However, participants provided mixed assessments of the usefulness of receiving the energy use information and recommendations by mail or email. Mail and email receipt was preferred by roughly equal numbers of participants.

- **Online Portal Access Rates Higher for Participants Receiving Electronic Reports:** A larger share of customers that received email reports reported accessing the portal than those who did not receive any reports by email. The higher rate of access is likely due to the ease of accessing the portal through an electronic email.

- **Few Respondents Dissatisfied with Program:** Very few participants reported dissatisfaction with the program. For most aspects of the program a majority of participants reported satisfaction and a significant share were neither satisfied nor dissatisfied. However, less than one-half of respondents were satisfied with the energy savings seen on their bill and 10% of respondents reported dissatisfaction with their energy savings. The recommendations that 53% of participants have begun implementing may not have had a significantly large impact for participants to notice changes in energy bills in the context of seasonal and other sources of variation.

  Participant satisfaction ratings were consistent with ratings provided by participants that received Opower reports in 2014.

5. Residential Online Energy Check-Up Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential Online Energy Check-Up Program during the period January 2015 through December 2015.

5.1 Program Specific M&V Methodologies

The M&V approach for the Online Energy Check-Up program (OECUP) is aimed at determining the following:

- Numbers of kits distributed;
- Percent of kit components installed;
- Average annual kWh savings and kW reduction per kit measure;
- % of participants who completed recommended measures;
- Average annual kWh savings and kW reduction for recommended measures;
- % of homes with electric water heating;
- Providing estimates of net-to-gross savings and free-ridership; and
- Estimating cost effectiveness of the OECUP in 2015.

Table 5-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 5-1 Sources for Gross Impact Parameters – Online Energy Check-Up Program Data

Parameter	*Source*
Number of Participants	Program Tracking Data
Installation Rates of Kit Measures	Survey data
Recommended Measures Completed	Survey data/ Billing Analysis
% of Homes with Electric Water Heating	Program Tracking Data/Survey Data
Hours of Use	Data from the Indiana TRM[18]

5.1.1 Verification of Kit Measures Installed

A first aspect of conducting measurements of program activity is to verify the number of kit measures received and installed. ADM takes several steps in verification effort, which is consisted of the following:

- Validating program tracking data provided by program staff by checking for duplicate or erroneous entries;
- Verifying that gas and electric kits were sent to the appropriate participants and according to the agreed-upon process by I&M; and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys was to verify that customers listed in the program tracking database did indeed participate and the total number of measures in the kit were received. Additionally, survey respondents were asked a series of questions to verify that the kit measures were installed and if they are still in use.

5.1.2 Calculating Gross Annual kWh/kW Savings per Kit Measure

The Online Energy Check-Up program identifies energy saving opportunities through a web-based self-service assessment tool where customers answer basic questions about their homes and how they use energy within it. Upon completion of the questions online, the OECUP generates a printable report that includes:

- Useful details about customer home's energy consumption;
- Customized energy-saving recommendations;
- Potential savings from making the suggested improvement; and
- Environmental impact of implementing suggested improvements.

[18] http://www.in.gov/iurc/files/42693_1order_081512.pdf

In addition, the customer is mailed a kit of energy efficient measures dependent on their water heating type.

5.1.2.1 Analysis of Kit Measures Savings

ADM reviewed the 2012 Indiana TRM to calculate kit measures distributed through the OECUP in 2015. ADM's deemed review is broken down between the following seven measure categories:

- 13W/18W/23W CFLs;
- 9W LEDs;
- LED night lights;
- Low Flow Showerhead;
- Refrigerator/Freezer Thermometer;
- Bath aerator; and
- Kitchen faucet aerator.

A. Deemed Savings Review - CFLs

The program distributes both Gas and Electric kits containing a mix of CFLs. The available sets include:

- Electric: (1) 13W, (2) 18W, and (1) 23W CFLs;
- Gas: (1) 13W, (2) 18W, and (1) 23W CFLs

Annual savings for an individual CFL are calculated as:

Annual kWh Savings (CFLs) = (CFL Watts × Hours of use per day × Hrs per Yr/1000) × WHF_e × % Installed × #Kits

Where,

CFL Watts = Wattage of CFLs provided in the kit

Delta Watts Multiplier = Lookup value from Indiana TRM for 13W, 18W, and 23W light bulbs to represent reduction in wattage from a baseline incandescent bulb

Hours per Year = A function of room-type and whether the resident lives in single or multi-family housing

WHF_e = Waste Heat Factor for Energy to account for cooling savings from efficient lighting

Peak kW Reductions (CFLs) = {(CFL Watts × Delta Watts Multiplier × × CF)/ 1000} × WHF_d × % Installed × #Kits

Where;

CFL Watts = Wattage of CFLs provided in the kit

Delta Watts Multiplier = Lookup value from Indiana TRM for 13W, 18W, and 23W light bulbs to represent reduction in wattage from a baseline incandescent bulb

$\mathbf{WHF_d}$ = Waste Heat Factor for Demand to account for cooling savings from lighting

CF = Peak Coincidence Factor for measure

B. Deemed Savings Review – LED Bulb

Both gas and electric kits contain one 9W LED bulb. Annual savings for LED bulbs are calculated as:

Annual kWh Savings (LEDs) = $((Watt_{base} - Watt_{LED})/1000) \times ISR \times HOURS \times (1+WHF_e \mathbf{WHF_d})$

Where,

$Watt_{base}$ = Wattage of baseline bulb, based on TRM lookup table

$Watt_{LED}$ = Wattage of LED

Hours per Year = 1,040 (2.85 hours per day)

WHF_e = Waste Heat Factor for Energy to account for cooling savings from efficient lighting

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reductions (LEDs) = $((Watt_{base} - Watt_{LED})/1000) \times ISR \times CF \times (1+\mathbf{WHF_d})$

Where;

$Watt_{base}$ = Wattage of baseline bulb, based on TRM lookup table

$Watt_{LED}$ = Wattage of LED

$\mathbf{WHF_d}$ = Waste Heat Factor for Demand to account for cooling savings from lighting

CF = Peak Coincidence Factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

B. Deemed Savings Review – Low Flow Showerheads

The program's Electric kit contains two low flow showerheads. Annual savings for low flow showerheads are calculated as:

Annual kWh Savings (Low Flow Showerheads) = (2.80-GPMlow) × min/day × #people × shower/per × 8.3 × (Tshower-Tmains) × days in year/DHW Recovery Efficiency/3412 × % Installed × # Electric Kits × 2

Where,

2.80 = The baseline is a standard showerhead using 2.80 GPM

GPMlow = GPM of the showerhead provided in the kit

people = Average number of people per household

Shower/per = Average showers/ per day

Days in year = Days shower used per year

Min/day = Average minutes per shower

8.3 = Constant to convert gallons to lbs

Tshower = Assumed temperature of water used for shower (105)

Tmains = Assumed temperature of water entering house

2 = Two low flow showerheads are included in the kit

Peak kW Reductions (Low Flow Showerheads) =
(2.80-GPMlow) × 60 × 8.3 × (Tshower-Tmains)/ DHW Recovery Efficiency/3412 × CF × 2

Where,

2.80= The baseline is a standard showerhead using 2.80 GPM

GPMlow = GPM of the showerhead provided in the kit

8.3 = Constant to convert gallons to lbs

Tshower = Assumed temperature of water used for shower (105)

Tmains = Assumed temperature of water entering house

CF = Peak coincidence factor for measure

2 = Two low flow showerheads are included in the kit

C. Deemed Savings Review – LED night lights

The program's Gas kit contains two LED nightlights. Annual savings for an individual LED nightlight are calculated as:

Annual kWh Savings (LEDs) = (Incandescent Watts – LED Watts)/1000 × Hours/yr × % Installed × # Gas Kits × 2

Where,

Incandescent Watts = Wattage of an equivalent baseline LED

LED Watts = Wattage of LED provided in the kit

Hours/yr = A function of room-type and whether the resident lives in single or multi-family housing

2 = Two LED night lights are included in the kit

D. Deemed Savings Review – Refrigerator/Freezer Thermometer

The program's Online Energy Check-Up Gas and Electric kits contains one refrigerator/freezer thermometer. The thermometer is to be placed in the participant's refrigerator and freezer to check the temperature. The reference manual suggests an energy efficient temperature that the refrigerator/freezer should be set to which allows for energy savings. In the 2012 evaluation, the program implementer assigned 0 kWh savings for the measure.

E. Deemed Savings Review – Faucet Aerators

The program's electric kit contains two faucet aerators. Annual savings for faucet aerators are calculated as:

Annual kWh Savings (Faucet Aerator) = (2.4-GPMlow) × min/day × DR × 8.3 × (Tft-Tmains) × 365/ DHW Recovery Efficiency/ 3412 × # Electric Kits × 2 × % Installed

Where,

2.4 = Gallons per minute of baseline faucet

GPMlow = Gallons per minute of low flow faucet

min/day = Average minutes per day used by each faucet in home

days/y = Days faucet used per year

DR = Percentage of water flowing down drain (if water is collected in a sink, a faucet aerator will not result in any saved water)

8.3 = Constant to convert gallons to lbs

Tft = Assumed temperature of water used by faucet

Tmains = Assumed temperature of water entering house

2 = Two faucet aerators are included in the kit

Peak kW Reduction (Faucet Aerator) = (2.4-GPMlow) × 60 × DR × 8.3 × (Tft-Tmains) / DHW Recovery Efficiency/ 3412 CF # Electric Kits 2 % Installed

Where,

2.4 = Gallons per minute of baseline faucet

GPMlow = Gallons per minute of low flow faucet

DR = Percentage of water flowing down drain (if water is collected in

8.3 = Constant to convert gallons to lbs

Tft = Assumed temperature of water used by faucet

Tmains = Assumed temperature of water entering house

CF = Peak Coincidence Factor for measure

2 = Two faucet aerators are included in the kit

F. Deemed Savings Review – Kitchen Aerator

The program's electric kit contains one kitchen aerator. Annual savings for a kitchen aerator are calculated as:

Annual kWh Savings (Kitchen Aerator) = (2.4-GPMlow) × min/day × DR × 8.3 × (Tft-Tmains) × 365/ DHW Recovery Efficiency/ 3412 × # Electric Kits × % Installed

Where,

2.4 = Gallons per minute of baseline faucet

GPMlow = Gallons Per minute of low flow faucet

min/day = Average minutes per day used by each faucet in home

days/y = Days faucet used per year

DR = Percentage of water flowing down drain (if water is collected in a sink, a faucet aerator will not result in any saved water)

8.3 = Constant to convert gallons to lbs

Tft = Assumed temperature of water used by faucet

Tmains = Assumed temperature of water entering house

Peak kW Reduction (Faucet Aerator) = (2.4-GPMlow) × 60 × DR × 8.3 × (Tft-Tmains) / DHW Recovery Efficiency/ 3412 × CF × # Electric Kits × % Installed

Where,

2.4 = Gallons per minute of baseline faucet

GPMlow = Gallons per minute of low flow faucet

DR = Percentage of water flowing down drain (if water is collected in

8.3 = Constant to convert gallons to lbs

Tft = Assumed temperature of water used by faucet

Tmains = Assumed temperature of water entering house

CF = Peak Coincidence Factor for measure

H. Structural/Appliance and Lifestyle Recommendations

The scope of the OECUP printable report includes recommendations for lifestyle, structural, and appliance changes. In order to determine the kWh and kW savings attributable to these recommendations, ADM conducted a regression analysis using a census of program participant data. The billing data includes two years of monthly observations for each customer. Data screening procedures include:

- Removal of customers without pre-audit monthly billing data.
- Removal of customers who completed the audit after 6/1/2015. This ensures that all customers in the regression have 6 months of post audit data. This is the minimum amount of data that can be used to analyze a program with monthly billing data and a savings level below 5% of monthly kWh.
- The dataset was also screened for duplicate entries (identical kWh and date for the same account).
- Screening of customers from the control group whose average daily usage in the baseline period is 1.5 times greater than, or 0.5 times less than, the minimum and maximum average daily usage of OECUP participants (this will provide for a more accurate propensity matching).

5.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) impacts

In determining ex post net savings for the OECUP, ADM provides estimates of free-ridership. Free-riders are program participants that would have implemented the same energy efficiency measures at nearly the same time absent the program. Rather than apply a binary scoring (0% vs. 100% free-ridership), ADM applied a free-ridership probability to program participants, based upon four factors:

- Financial ability to purchase energy efficiency measures absent program assistance;
- Prior planning to purchase energy efficiency measures that were provided through the program;
- Importance of program assistance in the decision-making process; and
- Demonstrated behavior in purchasing similar equipment absent Program assistance.

In this methodology, Part (1) is essentially a gateway value, in that if a participant does not have the financial ability to purchase energy efficient measures absent the program, the other components of free-ridership become moot. As such, if they could not have afforded the energy efficiency measures absent the rebate, free-ridership is scored at 0%. If they did have the financial capability, the Evaluation Team then examines the other three components, each contributing an equal scoring of 33% to free-ridership. It should be noted that having financial ability does not necessarily imply free-ridership; it just opens the possibility that other factors could contribute. A participant that was financially able to purchase the energy efficiency measures, for example, could still be scored at 0% free-ridership if it is demonstrated that:

- The program measures factored into their decision-making process;
- They did not have prior plans to install energy efficiency measures before learning of the program; and
- They did not demonstrate prior behavior of purchasing similar measures absent the program.

Each of these factors is described in the subsections to follow.

5.1.4 Financial Ability

For Part 1, customers were asked:

- Would you have been financially able to install these energy efficiency measures without the [Program]?

If the customer answered "No" to this, then they are assigned 0% free-ridership, as without the financial ability to purchase the measures, other factors in the decision making process are not relevant. Having financial ability does not inherently make one a free-rider, however, as they could still have been program-induced.

5.1.5 Prior Planning

Following this, customers are asked as to any plans they had to purchase any of the measures. This is addressed in the following questions:

- Before you heard of the program, did you have specific plans to purchase these measures that are part of the program?

If the respondent answers "No", then the respondent is considered to have not been planning to purchase any of the measures and is 0% free-rider for this component. If the respondent answers "Yes" and indicated that they learned of the program "After planning to purchase these items on my own but before actually purchasing them", then the respondent is considered to have been planning to purchase the same quantity of measures with or without the program and is thus a partial free-rider. If the respondent answers "Yes" and indicated that they learned of the program "After purchasing these energy efficient items on my own but before installing them", or "After purchasing and installing these energy efficient items on my own", then the respondent is

considered to have been planning to purchase the same quantity of measures and already did with or without the program and is thus a 100% free-rider for this component.

5.1.6 Importance of Program in Decision Making

Once customers learn of the program, it is possible that this knowledge will sway their decision making process to install these energy efficient measures in their homes. To address this, participants receive the following question to inform the Importance of Decision Making variable:

- How likely is it that you would have purchased all the energy efficiency measures if you had not participated in the [Program]?

In order to address possible over-reporting of energy efficiency purchases for OECUP participants, the survey included a 'Previous Experience' screen into the 'Importance of Program in Decision Making' variable. The survey presented an itemized list of kit contents and asks participants whether they had previously installed any of these items. Additionally, the survey asks whether these items were obtained through a utility program or discount, or whether the participant purchased them on their own. The 'Importance of Program in Decision Making ' variable for OECUP participants is then calculated as follows. Both of the following questions are used as a screen to accept the free-ridership score obtained from the above two questions.

- Before you received the energy efficiency kit, had you previously installed any of these energy efficient items in your home?
- Were any of those previously installed items provided to you through a utility energy efficiency program, such as an energy efficiency kit program or an in-store giveaway?

In order to be categorized as a free-rider under the 'Importance of Program in Decision Making' variable, a respondent must indicate that they would have definitely or probably purchased the energy efficiency measures in the absence of the program, AND that they had previously purchased any 2 or more of the measures on their own (i.e. without the assistance of a utility program or discount). Participants who indicate that they have never purchased any 2 of the energy efficiency items on their own are categorized as 0% free-riders under the 'Importance of Program in Decision Making' variable.

5.1.7 Likelihood of Installing Similar Equipment without Program

Finally, customers are asked whether they would have purchased the measures if the program were not available. This is addressed with the following questions:

- Did you install these energy efficient measures earlier than you otherwise would have without the program?
- When would you otherwise have installed the measures?

If the respondent indicates that they installed the measures earlier than they otherwise would have, and indicates that they would have installed the measures more than one year later in the absence

of the program, then they are considered to have been motivated by the energy efficiency kit and are thus 0% free-riders for this component. If respondents indicate that they would have installed the measures in “less than 6 months” or “6-12 months”, these respondents are considered partial free-riders. If the respondent indicates that in the absence of the program they would have installed the measures at the same time that they did, then they are a free-rider for this component because the program did not affect timing of purchase and installation of measures.

The scores for the above indicator variables are each considered and each participant is assigned with a final net-to-gross ratio based on the preponderance of evidence identified. The above variables are scored with equal weight, resulting in the final net-to-gross score. The exception to this is that free-ridership scores of 0% for the ‘Importance of Program in Decision Making’ and ‘Prior Planning’ variables serve as mitigating factors for free-ridership, and participants who are scored with mitigating factors for both of these components are considered 0% free riders regardless of their aggregate net-to-gross score.

5.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of program tracking data and regression analysis. This section presents the results of the gross and net savings calculation activities.

5.2.1.1 Number of Kits Mailed

The total number and type of kits mailed and installed at participant homes in the 2015 program year is determined by (1) reviewing the program tracking system and related documentation from I&M and (2) administering a telephone survey with program participants. Specifically, the tracking system is checked to assure that: (1) duplicate shipments to the same account number do not exist (2) the ex-ante kWh savings are reasonable and (3) that appropriate kits types are sent to customers. The energy efficiency kits are mailed to Indiana addresses on record for those ratepayers who complete the online energy audit questionnaire. ADM found no duplicates of shipments.

ADM administered a telephone survey to 369 program participants who received one of the two types of energy savings kits distributed through the program. All 369 survey respondents verified that they had participated in the program during 2015. Based on these results, the verification rate for kits sent is 100%. This results in a total kit quantity of 9,588 kits (5,356 gas kits and 4,232 electric kits).

5.2.1.2 Installation Rate

Savings claims were further verified through the telephone survey effort by focusing on the installation rates of measures provided in the energy efficiency kit. Though the program consists of direct install by the participant, the telephone survey recognizes that some of the items may have been uninstalled or perhaps never installed by participating home owners. The installation

rates determined through the telephone survey were applied to each kit measure to determine verified savings. Table 5-2 displays installation rates by measure and kit type.

Energy savings for the program are determined by applying the resulting installation rates to the quantity of measures reported within program tracking data, and then multiplying the resulting measure quantities by their individual savings values.

Table 5-2 Installation Rates per Measure by Kit

Measure	*Electric Kit Installation Rate*	*Gas Kit Installation Rate*	*Overall Installation Rate*
13 Watt CFL (1)	86%	85%	85%
18 Watt CFL (2)	81%	79%	80%
23 Watt CFL (1)	81%	76%	78%
Low Flow Bathroom Aerators (2)	50%	-	50%
Low Flow Kitchen Aerator (1)	56%	-	56%
Low Flow Showerhead (2)	43%	-	43%
LED Nightlights (2)	-	77%	77%
9 Watt LED (1)	76%	76%	76%

H. Structural/Appliance and Lifestyle Recommendations

ADM conducted a regression analysis to determine the savings attributable to the non-kit components of the OECUP. ADM received program participant's monthly billing data from January 2014 through February 2016. These program participants were first screened by the procedures below.

(1) Removal of Customers without pre-audit monthly billing data.

(2) Removal of customers who completed the audit after 6/1/2015. This ensures that all customers in the regression have 6 months of post audit data. This is the minimum amount of data that can be used to analyze a program with monthly billing data and a savings level below 5% of monthly kWh.

(3) The dataset was also screened for duplicate entries (identical kWh and date for the same account).

(4) Screening of customers from the control group whose average daily usage in the baseline period is 1.5 times greater than, or 0.5 times less than, the minimum and maximum average daily usage of OECUP participants (this will provide for a more accurate propensity matching).

This resulted in a final analysis group of 2,058 program participants.

Propensity Matching for Control Group Selection:

ADM received a download of all I&M residential customers billing data (January 2014 through February 2016). Included in the billing data were codes relating to the household type—gas, electric, etc. The raw billing data was subsetted according to their water heating type (=15 if gas and =16 if electric) before matching program participants to a suitable control (non-program participant). Because of the heterogeneous nature of customer usage, ADM implements propensity score matching as a method for bias reduction. Figure 5-2 shows the average monthly kWh comparison between program participants and their matched controls. Additionally, notice the similar pre-treatment trends between the electric and gas water heating types. This trending further bolsters the bias-reduction accomplished through propensity score matching as a condition for obtaining an unbiased difference-in-difference estimate is for the treatment and control groups to exhibit similar pre-treatment trends.

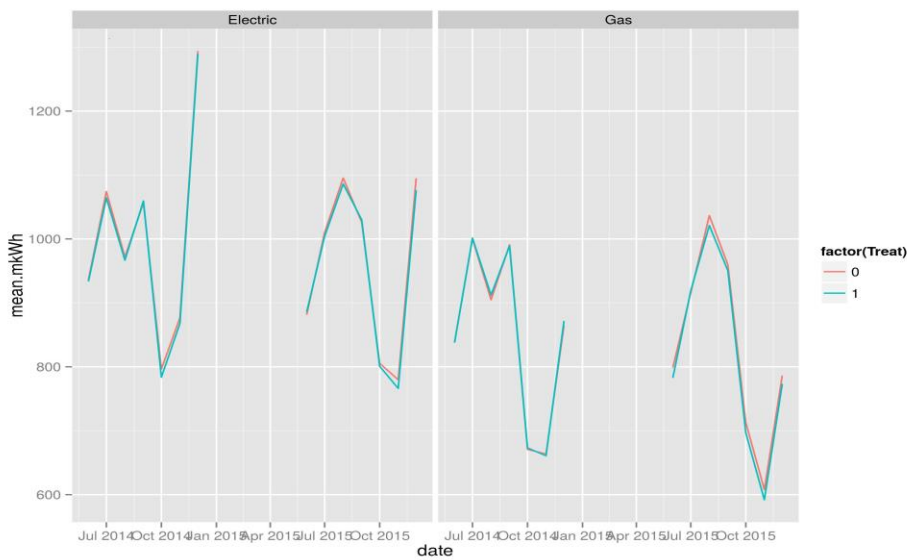


Figure 5-1 Pre- & Post-Period Matched Comparison (avg. monthly kWh)

Propensity matching is a method of selecting a suitable control group when a randomized experiment was not conducted. Each participant is matched 1-1 with a member of the control sample with a similar usage levels. More specifically, matching occurs through a combination of propensity scoring and nearest neighbor matching. Each participant and potential matched-control were given a "propensity score" (i.e. its estimated conditional mean from a logistic regression model), defined as the (log) odds of being in the participant group based on participant and control

group average daily kWh for each month in the pre-period (June 1st, 2014 – December 31st, 2014). Matching of participants with a suitable control is accomplished by finding the program participant's "nearest neighbor" via the propensity score. The propensity scoring and nearest neighbor matching was accomplished in the R environment using the statistical package "MatchIt"[19][20].

Table 5-3 Comparison of Average Monthly kWh by Analysis Group

Analysis Group	*Pre-Propensity Match Average Monthly kWh*	*Post-Propensity Match Average Monthly kWh*
Electric	995	995
Electric Control	995	1,001
Gas	849	849
Gas Control	859	848

Net savings are then calculated using a linear mixed effects model. With a properly matched control group, the mixed effects regression model will provide a bias-reduced estimate of the energy savings attributable to the program. Additionally, variables for temperature were introduced to the mixed effects model to control for fluctuations in energy usage attributed to changes in the weather.

The mixed effects panel regression[21] model was then specified as follows:

$$kWh_{i.t} = \alpha_i\, Customer_i + \beta_1 HDD65_t + \beta_2 CDD75_t + \beta_3 Post_{i,t} + \beta_4 Treat_i \cdot CDD75_t + \beta_5 Treat_i \cdot HDD65_t + \beta_6 Treat_i + \beta_7 Treat_i \cdot Post_{i,t} + C + \varepsilon_{i,t}$$

Where the subscript i denotes individual customers and $t = 1, \ldots, T(i)$ serves as a time index, where $T(i)$ is the number of bills available for i. The regression model is considered a "mixed effects" model because the model parameters are decomposed into both fixed-effects (i.e. HDD65, CDD75, Treat, and Post parameters) and random effects (i.e. the individual customer's base usage). Put simply, fixed effects assume the observed explanatory variables are non-random quantities whereas random effects are assumed to be sources of variation (other than natural measurement error) that are uncorrelated with the fixed effects. The approach is similar to others that treat the individual customer as a fixed-effect, but is more computationally efficient as the number of individuals in the sample becomes very large. The variables included in both regression models are specified in Table 5-4 below.

[19] Ho D, King G, Imai K, Stuart E. 2011. "MatchIt: Nonparametric Preprocessing for Parametric Causal Inference." *Journal of Statistical Software.* 42(8): 1-28.

[20] R Syntax (requires package matchit): matchit(treat ~ sum_i (avg daily kWh)_i , method = "nearest", distance = "logit") where i is ordinal for the pre-period months

[21] R syntax (requires package nlme): lme(daily.kwh ~ post * treat + treat *(cdd + hdd)+ (1| acct_number), data=dataset)

Table 5-4 Description of Variables Used in the Regression Model

Variable	*Description*
Individual customer random intercept (α_i)	Unique identifier for each customer to control for any customer specific differences.
Heating Degree Days (HDD)	Average Heating Degree Days per day within each billing period. This was calculated by summing up the number of heating degree hours per day, and then averaging over the number of days in the billing period. The setpoint of 65 was used for the model. HDD is interacted with the treatment group variable to control for systematic differences in weather sensitivity among the treatment and control groups.
Cooling Degree Days (CDD)	Average Cooling Degree Days per day within each billing period. This was calculated by summing up the number of cooling degree hours per day, and then averaging over the number of days in the billing period. The setpoint of 75 was used for the model. CDD is interacted with the treatment group variable to control for systematic differences in weather sensitivity among the treatment and control groups.
Treat	Indicator for program participation (e.g. =1 if participant, =0 if matched control)
Post	Indicator if a participant's observation is post audit (=1 if post, =0 otherwise). For control group participants, all bills after 6/1/13 were labeled as post.
kWh	The average daily kWh, which is the read usage divided by the number of days since the last reading.

The results of the regression analysis are listed in Table 5-5.

Table 5-5 Output from the Net Savings Regression Model

Regression Model Output		
	Gas Kits	Electric Kits
Daily post savings (kWh) for treatment group (β_7). (Standard errors are in parentheses.)	0.46 (0.163)	0.11 (0.264)
Number of Customers (Combined Treatment and Control)	2,346	1,770
R-Squared (Fixed Effects)	0.065	0.032
R-Squared (Mixed Effects)	0.814	0.750
Average post-audit daily usage (kWh)	27.17	31.29

The daily post savings value from the regression model output in Table 5-5 applied to the program level through the following steps:

(1) Extrapolate the estimate of daily savings to annual savings by multiplying by 365.

(2) Subtract the kWh savings from the kit measures as they would be doubled counted by the regression analysis otherwise.

(3) kW savings were calculated by applying a flat load shape (i.e. 1/8760) to the kWh savings from the non-kit components.

(4) Multiply by the number of participants in each group to arrive at program level kWh/kW savings numbers.

The above analysis was designed to assess the extent to which the program influenced participants to engage in energy saving behaviors beyond the installation of the energy efficiency measures included in the program kits. However, the savings resulting from the regression analysis totaled less than the TRM-calculated savings attributable to the energy efficiency kit measures. Therefore, no behavioral savings can be attributed to the OECUP for PY6.

5.2.1.3 Gross and Net kWh Savings and Peak kW Reduction

Although annual per-participant behavioral savings of approximately 100 kWh were found during the PY5 evaluation, the PY6 analysis suggests that the OECUP did not result in a measurable change in participant energy usage behavior beyond the installation of kit items. The final ex post gross and net savings are inclusive of kit measure savings only. Table 5-6 displays a breakdown of kit savings by measure and kit type. Measure savings by kit type vary slightly due to installation rate adjustments.

Table 5-6 Ex Post Gross kWh and kW Savings by Kit Measure

Measure Type	*Ex Post Gross kWh Savings Per Kit - Electric*	*Ex Post Gross kW Savings Per Kit - Electric*	*Ex Post Gross kWh Savings Per Kit - Gas*	*Ex Post Gross kW Savings Per Kit - Gas*
13w CFL	22.44	0.003	22.29	0.003
18w CFL	57.41	0.007	55.40	0.007
23w CFL	37.51	0.004	35.40	0.004
Energy efficient shower heads	569.07	0.029	-	-
Bathroom aerators	22.71	0.005	-	-
Kitchen aerator	19.07	0.003	-	-
9w LED	25.21	0.003	25.21	0.003
LED nightlights	-	-	21.00	-
Total	753	0.054	159	0.016

Table 5-7 converts the participant level gross kWh and kW savings to the program level. This is accomplished via multiplication between the participant level savings specific to the electric and gas customers, and the number of participants for each group. Table 5-8 details the same calculations using net savings.

Table 5-7 Ex Post Gross Program Level kWh and kW Savings

Water Heat Type	*Annual Per-Participant Gross kWh Savings*	*Annual Per-Participant Gross kW Savings*	*Number of Participants*	*Total Ex Post Gross kWh Savings*	*Total Ex Post Gross kW Savings*
Electric	753	0.054	4,232	3,188,465	227.10
Gas	159	0.016	5,356	853,183	88.00
Total	912	0.070	9,588	4,041,648	315.10

The net-to-gross methodology described in Section 5.1.3 resulted in a program-level net-to-gross ratio of 0.77, or 77%. Table 5-8 below presents the net savings by kit type for the full program population.

Table 5-8 Ex Post Net Program Level kWh and kW Savings

Kit Type	*Ex Post Gross kWh Savings*	*Ex Post Gross kW Savings*	*Net-to-Gross Ratio*	*Ex Post Net kWh Savings*	*Ex Post Net kW Savings*
Electric	3,188,465	227.10	77%	2,455,118	174.86
Gas	853,183	88.00	77%	656,951	67.76
Total	4,041,648	315.10	77%	3,112,069	242.62

The ex post gross impacts resulting from the PY6 Online Energy Check-Up program are summarized in Table 5-9. Table 5-10 and Table 5-11 show the audited and verified savings.

Table 5-9 Ex Post Gross Gross Impact Summary

Program	*PY6 Program kWh Goals*	*Gross Peak kW Reduction*		*Gross kWh Energy Savings*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Online Energy Check-Up	3,865,320	563.58	315.10	5,135,088	4,041,648	78%

Table 5-10 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
5,135,088	5,135,088	3,414,869	4,041,648	78%

Table 5-11 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
563.58	563.58	371.96	315.10

Applying the estimated NTGR of 77% to the gross savings reported in Table 5-9 results in the net savings detailed in Table 5-12 below.

Table 5-12 Net Impact Summary

Gross kWh Savings	*Gross Peak kW Reduction*	*Net-to-Gross Ratio*	*Net Peak kW Reduction*	*Net kWh Energy Savings*
4,041,648	315.10	77%	242.62	3,122,069

5.3 Process Evaluation

This chapter presents the results of the process evaluation for I&M's Online Energy Check-Up program during PY6. The process evaluation for PY6 seeks to identify any program changes that have been implemented since the prior program year, to assess whether the program is meeting its

current objectives, to determine whether there are any remaining opportunities for program improvement, and to identify any prospective changes to the program that are planned for future year. As the program experienced an implementation contractor change from Apogee to Resource Action Programs in PY6, the process evaluation also addresses any changes in program operation resulting from this transition.

5.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity include:

- How effective is the program marketing? How do participants learn about the program and what are their reasons for participating?
- What effects, if any, has the implementation contractor transition had on program operations or performance?
- What recommendations participants received and how useful were they?
- How satisfied are participants with the program? What was their level of satisfaction with completing the audit, the measure kit, and the recommendations?
- Are there any current plans for changes to program structure or design, and what opportunities may exist for future modifications to these factors?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the Online Energy Check-Up program is developed from a telephone survey of program participants. The internal organization and operational perspective on the program is examined through analysis of interviews conducted with I&M program staff and Resource Action Programs staff.

5.3.2 Summary of Primary Data Collection

- **Participant surveys:** Participant surveys were the primary data source for providing insight into the customer perspective on the program. The participant surveys provided customer feedback and insight regarding customer experiences with the Online Energy Check-Up program. Respondents reported on their satisfaction with the program, the usefulness of the recommendations, and whether they installed the measures provided in the kit.
- **Interviews with program staff members:** Interviews with I&M staff and Resource Action Programs staff provided insight into program operation during PY6 and changes in implementation resulting from the transition to Resource Action Programs.

5.3.3 Program Participation and Residential Characteristics

This section summarizes PY6 program activity and is based on an analysis of the program tracking data provided to ADM by I&M. Additional details regarding participation rates are described below.

5.3.3.1 Program Activity

The evaluators reviewed the program tracking data for PY6 in order to determine overall performance, identify participation seasonality, and gauge participation from specific customer types. Figure 5-2 shows the number of energy savings kits mailed by when the audit was completed, with separate lines for electric and gas kit recipients. The largest number of customers participated in April of 2015. This contrasts with PY5, where the most active month was February.

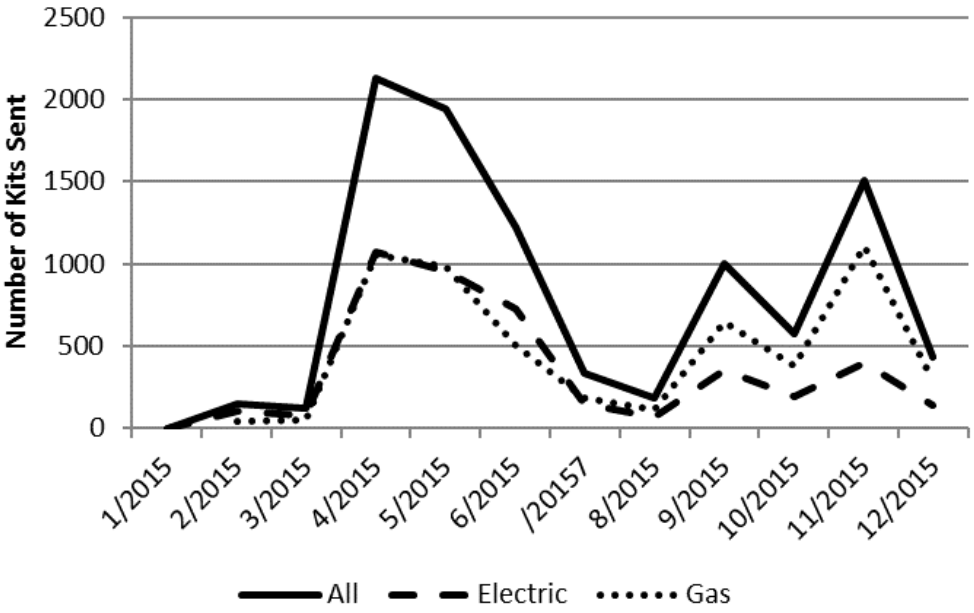


Figure 5-2 Number of Kits Distributed by Month

5.3.3.2 Returned Kits and Damaged Items

The evaluators reviewed the program tracking data for rates of returned or damaged kits. Table 5-13 displays the statistics for returned kits and Table 5-14 displays the damaged item statistics. As shown, the rates of returned kits or damaged items are negligible.

Table 5-13 Summary of Returned Kits

Metric	*Count*
Incidence of Returned Kits	0.3%
Count of Returns to Add Water Measures	2
Count of Undeliverable Kits	29

Table 5-14 Summary of Damaged Items

Metric	*Incidence*
Incidence of Damaged Return Items	0.2%
Count of Light Bulb Replacements	17
Count of Night Light Replacements	1
Count of Thermometer Replacements	4

5.3.3.3 Water Heater Type

The most common type of water heater among kit recipients was a standard natural gas water heater, although standard electric water heaters were nearly as prevalent.

Table 5-15 Participant Water Heater Type

Water Heater Type	*Percent of Participants*
Natural Gas	46%
Electric	40%
None	7%
Electric - High Efficiency	4%
Propane	1%
Other	1%
Natural Gas - Tankless	<1%
Heat Pump	<1%

5.3.4 Participant Survey Findings

The following section presents key findings from surveys conducted with customers who participated in the PY6 Online Energy Check-Up program through I&M. This survey was designed to gather information regarding the participant perspective on program operations and delivery, as well as to characterize specific energy efficiency measures and behaviors resulting from customer participation in the online audit process. Data collected via participant surveying is used in evaluating:

- Customer awareness of the program;
- Customer implementation of energy efficient equipment and energy saving behaviors;
- Customer decision making; and
- Customer satisfaction with the program.

In order to preserve consistency with prior evaluations, the participant survey format and content were primarily unchanged from the instruments used for previous years. However, minor modifications were made to the survey instrument in order to either improve the level of detail obtained through the survey or to minimize response biases or other potential inaccuracies. This

section discusses key findings from the participant survey effort, drawing comparisons between PY5 results and PY4 results where appropriate.

In total, 369 participants responded to the telephone survey.

5.3.4.1 Customer Awareness of Program

Survey participants were asked how they learned about the Online Energy Check-Up program. As shown in Figure 5-3, the most common source respondents reported that they had learned of the program was through a bill insert, with 44% of respondents learning of the program this way. Other common responses included word of mouth (12%), the I&M website (11%), and an I&M brochure (10%). Direct mail has remained the primary marketing channel for the program, although as the program becomes more established other sources such as word of mouth are becoming increasingly important to customer awareness of the program.

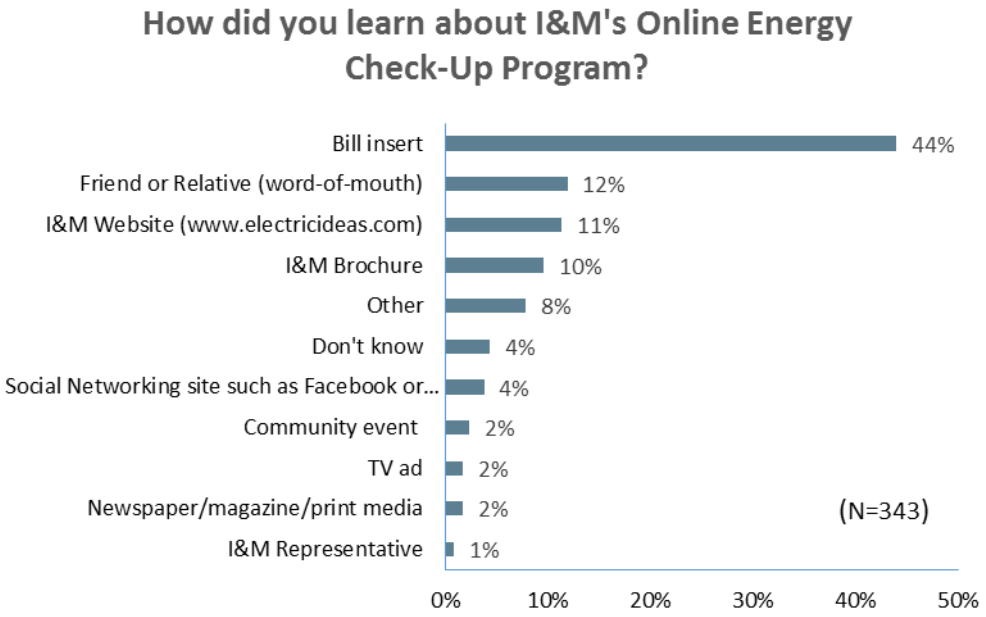


Figure 5-3 How Customers Learned about the Program

5.3.4.2 Customer Installation of Measures

As the Online Energy Check-Up program provides energy efficiency information and equipment to customers, it has the opportunity to motivate participants to independently implement energy saving improvements or make energy efficient purchases after participating in the program. In order to identify these potential energy saving impacts, the survey included questions to determine whether participants had purchased and installed additional energy efficiency measures or initiated energy saving behaviors in their home. Eighty-three percent of respondents indicated that they had

received at least one energy saving recommendation through the Online Energy Check-up Program.

These participants were asked about the specific recommendations they had received as part of their completion of the online audit tool, and whether they had then implemented these recommendations. As shown in Table 5-16, participants reported receiving a variety of recommendations through the online audit, the most commonly cited being lighting replacements, thermostat modifications, modifying water heater temperature, and weatherization improvements. The responses shown in the table likely underestimate the number of recommendations provided to respondents, as the survey required participants to recall these recommendations from memory.

When asked whether they had implemented the recommendations they received, a majority of respondents reported that they had implemented at least one recommendation. As shown in Table 5-16, respondents most commonly reported that they had replaced interior lighting, modified thermostat settings, modified water heater temperature, and weatherized their home.

In PY4 and PY5, survey respondents who had implemented at least one recommendation also most commonly reported that they had replaced lighting, weatherized their home, or modified thermostat settings. While participants appear to be implementing the same types of measures across program years after completing the online audit, instances of respondents implementing recommendations that they received during the online audit has increased significantly compared to the PY5 and PY4 survey efforts.[22]

Table 5-16 Customer Purchase of Measures since Receiving Energy Efficiency Kit

Measure/behavioral recommendation category	*Percentage of respondents*			
	Received recommendation	*N*	*Implemented recommendation*	*N*
Modifying thermostat or heater settings	81%	287	63%	267
Weatherizing your home	72%	284	42%	265
Replacing lighting in your home	88%	282	82%	263
Modifying water heater temperature	75%	280	44%	260
Window replacement	62%	285	24%	257
Replacing refrigerators or freezers	71%	285	32%	261
Water heater replacement	62%	285	25%	254
Other	10%	133	11%	118

When asked to rate the usefulness of the recommendations provided within the online audit, 86% of respondents reported that the recommendations were at least somewhat useful (Table 5-17). Only three percent of respondents stated that these recommendations were not at all useful.

[22] During PY5, lighting replacement was the most commonly cited action taken by respondents, and was cited by 52% of respondents.

Table 5-17 Perceived Usefulness of Energy Audit Recommendations

	Response	*Percentage of Respondents (N = 345)*
How useful did you find the recommendations that were provided by the online energy check-up?	Very useful	57%
	Somewhat useful	29%
	Slightly useful	8%
	Not at all useful	3%
	Don't know	4%

Additional commentary regarding how the energy audit recommendations could have been more useful to participants included:

> *"A more comprehensive study of the home, go more in depth."*
>
> *"More information that would have been of help."*
>
> *"Things that are more practical, [because] it's not practical for everybody to buy new appliances."*

5.3.4.3 Factors Affecting Customer Decision Making

As with prior program years, survey respondents were asked a series of questions related to their decision making behaviors involving energy efficiency. As displayed in Figure 5-4, 52% of respondents indicated that they chose to participate in the program in order to save money on their energy bills. This motivation was also the most common response during PY5. Another 29% of respondents indicated that they participated because the measures in the energy efficiency kit were provided at no additional cost. Additionally, seven percent of the respondents cited environmental concerns as the reason for participating. These results do not indicate any shifts in customer preferences or priorities since the prior program year.

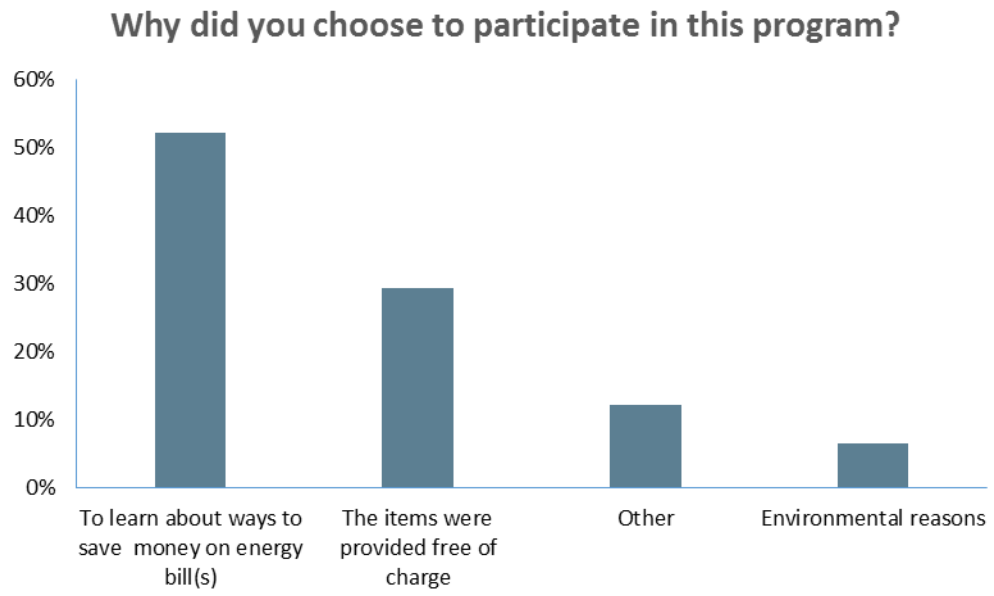


Figure 5-4 Reported Reasons for Participating in the Online Energy Checkup Program

In order to determine whether PY6 participants were more interested in receiving the conservation kit or learning about how to save energy, the survey included a follow-up question asking respondents about the importance of each of these factors in their decision to participate. Table 5-18 shows that responses were high for both receiving the kit and receiving information regarding energy conservation in their homes, however learning to save energy by completing the audit was rated somewhat more important to respondents.

Table 5-18 Importance of Factors in Participation Decision

Response	*Reason for Interest in Program*	
	The opportunity to receive the energy saving kit (N = 343)	*Learning to save energy by completing the audit (N = 343)*
Very important	50%	66%
Somewhat important	32%	24%
Slightly important	14%	4%
Not at all important	3%	4%
Don't know	1%	1%

To gauge participants' past involvement with energy efficiency rebates and other incentives, respondents were then asked whether they had applied for financial incentives for the energy efficient equipment they had purchased prior to participating in the Online Energy Check-Up program. Of the 279 respondents that purchased and used energy efficiency measures in their home prior to participation in the program, 87% (241) stated that they had not applied for or received financial incentives for these previous energy efficiency purchases. As shown in Table 5-19, over

half these respondents indicated that they had not been aware of existing financial incentives for these prior purchases.

Table 5-19 Reasons for Not Receiving Financial Incentives for Prior Equipment Purchased

	Response	*Percentage of respondents (N = 240)*
Why didn't you receive a financial incentive for those items?	Did not know about the financial incentives	51%
	No incentives were offered for the measures	28%
	Did not know whether measures qualified for incentives	10%
	The financial incentive was insufficient	1%
	Other / Don't know	10%

As a follow-up to asking about participants' energy efficiency behaviors prior to completing the online audit, respondents were asked whether they had independently made any energy efficient purchases after participating in the Online Energy Check-Up program. According to Table 5-20, 19% of respondents reported that the program has led them to purchase any energy efficient equipment for which they have not received a rebate or incentive.

Table 5-20 Additional Customer Purchasing of Energy Efficient Measures

	Response	*Percent of Respondents (N = 337)*
Because of your experience with the Online Energy Check-Up Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial incentive or rebate?	Yes, have already bought non-incentivized energy efficient items because of my experience with the program	19%
	Yes, likely to buy energy efficient items because of my experience with the program	66%
	No	12%
	Don't know	3%

Although measures purchased after participating in a program may qualify for energy savings spillover, it is necessary to assess the extent to which the program influenced the purchase of these measures. As a follow-up question, the 19% of respondents who reported implementing additional measures were asked about the importance of the Online Energy Check-Up Program in their decision to purchase these additional measures. Table 5-21 shows that the majority of these respondents indicated that the program was at least somewhat important in their decision to purchase the additional items.

Table 5-21 Program Influence on Customer Purchasing Behavior

	Response	*Percent of Respondents (N = 50)*
How important was your experience with the Online Energy Check-Up Program in your decision to purchase and install these additional items?	Very important	40%
	Somewhat important	28%
	Only slightly important	16%
	Not at all important	12%
	Don't know	4%

However, upon answering follow-up questions, some of these respondents clarified that they had not yet installed the measures specified. In this instances, the measures are not eligible for spillover savings.

5.3.4.4 Customer Use of Audit Tool

When asked how many times they have logged in to the online audit tool, 54% of respondents reported that they had only accessed the tool one time. Only five percent of respondents indicated that they had accessed the tool three or more times.

Few respondents had difficulty navigating the audit tool. Specifically, 83% of respondents stated that it had been either somewhat or very easy to navigate. Only 2% stated that it had been somewhat or very difficult.

Similarly, most customers did not have difficulty providing the information needed for the audit. When asked about the ease with which they were able to provide the information requested by the audit tool, such as residence and equipment characteristics, 84% of respondents indicated that this had been very easy or somewhat easy to do. Only three percent of respondents reported that this process had been somewhat difficult. Respondents who stated that this process was difficult explained that it had either been burdensome or time consuming to look around their house for the information.

Respondents were also asked about their familiarity with energy efficiency both before and after they participated in the program. As shown in Figure 5-5, three-quarters of respondents indicated that they are now very familiar with ways to save energy in their home, and no respondents stated that they are currently not at all familiar with ways to save energy in their home. When scored using a scale where 3 means very familiar and 0 means not at all familiar, the average familiarity rating after completing the online audit was significantly higher than the average before familiarity rating (2.7 vs. 2.4, $t(342) = -9.39$, $p < .01$).

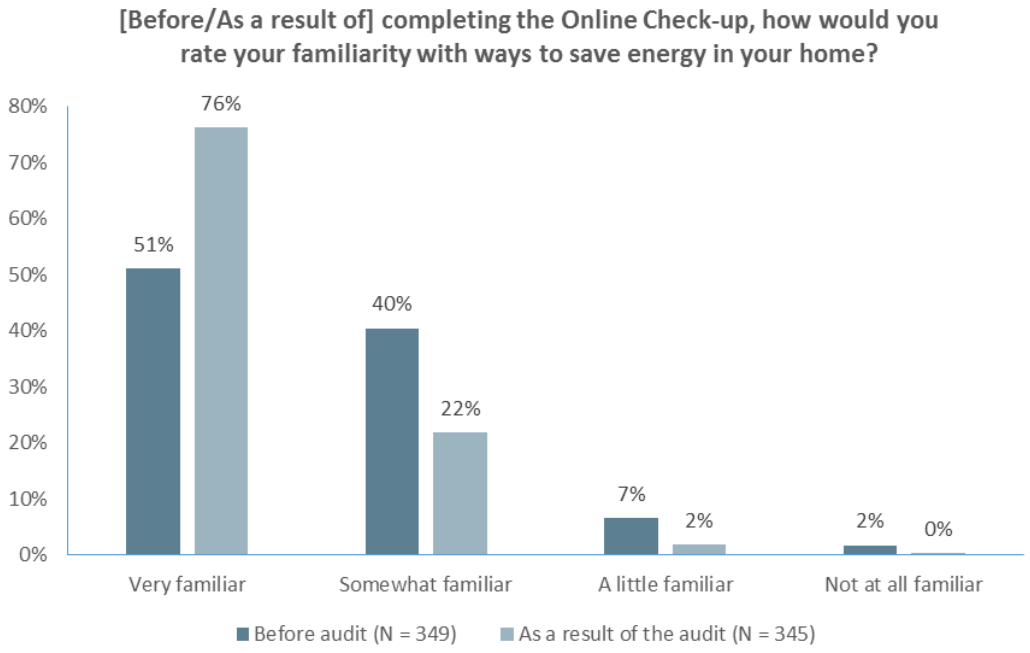


Figure 5-5 Pre- and Post-familiarity with Energy Efficiency

5.3.4.5 Cross-Program Awareness

In order to gauge Online Energy Check-up Program participant engagement in other programs offered by I&M, survey respondents were asked whether they were aware of any other rebates, incentives, or energy efficiency services offered by the utility. Only 39 respondents (12%) indicated that they were aware of at least one other program; these respondents were then asked which programs they had in mind. As some customers may be aware of incentives or discounts for particular equipment or measures, but may not know the name of the associated program,

respondents were prompted with a description of each program rather than with the name of the program. The results are summarized by program in the following table.

Table 5-22 Cross-Program Awareness

Program Name	*Program Description*	*Yes, have heard of*	*N*	*Yes, have participated in*	*N*
Home Weatherization Program	A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation	50%	32	17%	23
Efficient Products (Appliances)	A program that offers discounts on light bulbs purchased at participating retailers?	30%	33	22%	23
Peak Reduction Program	A program that discounts your electric bill for using your air conditioner less during peak demand periods	45%	33	16%	25
Appliance Recycling	A program that provides a rebate for recycling your old refrigerator or freezer?	86%	36	24%	29
Efficient Products (Lighting)	A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats?	42%	33	17%	23

Additionally, when asked if they had heard about these programs through the Online Energy Check-up audit, nearly fifty percent (47%) stated that they had. These results indicate that there is significant potential for increased cross-program promotion of the I&M residential energy efficiency programs within the Online Energy Check-up Program.

5.3.4.6 Customer Satisfaction

As with the prior program year, survey respondents were asked about their levels of satisfaction with selected elements of the Online Energy Check-Up program experience. Results are provided on a scale of 1 to 5, with 1 representing very dissatisfied and 5 representing very satisfied. As displayed in Table 5-23, satisfaction ratings were high across all program elements.

Aside from their overall program experience, respondents provided the highest satisfaction ratings for the performance of the measures installed, the contents of the conservation kit, and the effort required for completing the program application. Satisfaction ratings were somewhat lower for the savings on participants' monthly utility bills. As stated in the prior evaluation report, dissatisfaction with monthly bill savings is typical for residential programs, as participants may

not notice immediate savings or closely monitor their bills. Overall, satisfaction ratings for individual program elements in PY6 were higher than those obtained during the PY5 evaluation.

Table 5-23 Customer Satisfaction with Selected Program Elements

Element of program Experience	*Satisfaction Rating*						*N*
	Very satisfied	*Somewhat satisfied*	*Neutral*	*Somewhat dissatisfied*	*Very dissatisfied*	*Don't know*	
Performance of the measures installed	73%	19%	6%	2%	1%	0%	(335)
Savings on your monthly bill	27%	19%	41%	4%	2%	7%	(335)
The effort required for completing the online energy check-up	58%	21%	16%	1%	1%	3%	(334)
Contents of the Online Energy Check-up Kit	71%	18%	7%	1%	1%	2%	(335)
Recommendations provided in the Online Energy Check-up	56%	27%	11%	1%	1%	3%	(335)
Overall program experience	63%	27%	7%	1%	1%	2%	(332)

Respondents also provided a variety of open-ended commentary regarding their overall experiences with the Online Energy Check-Up program. These comments included some suggestions for improving the program, as well as requests for more information about other program offerings. Additionally, some respondents explained that they were not able to use certain measures because they did not have enough information to properly install them. Specific examples of commentary provided by survey respondents included:

> *"Letting the folks know about other programs offered such as rebates and incentives"*
>
> *"Provide more energy efficient services for renters."*
>
> *"Maybe provide kits for the elderly or financially disadvantaged, who do not have computer access or difficult time accessing the website."*
>
> *"Sounds like [there are] more programs available that I didn't know about or are available, I would like to know about all the programs that are available"*

The majority of open-ended commentary was positive in nature, with many respondents providing praise for the services and items offered through the program. Such commentary included:

"Thank you for the kit."

"I really like the program"

"Grateful for programs and would love for them to continue doing programs like this."

"I very much appreciate it and I recommend it to friends in hopes that they will complete and participate in the audit."

"Appreciate them trying to help us save money."

"Thank you for the kit, I was pleasantly surprised by the contents of the kit. It was much more than I expected."

Overall, the satisfaction results suggest that the Online Energy Check-Up Program has continued to serve participants as intended, and that there are no major issues with program delivery. The instances of dissatisfaction were infrequent, and nearly all respondents reported being satisfied with their overall program experience. While some respondents identified potential program improvements, such as providing additional information about specific measures or providing more relevant recommendations, the survey results suggest that the program is fully meeting the needs of a high majority of participants.

5.3.5 Program Operations Perspective

Interviews were conducted with program staff to gain insight into PY6 program performance and operations and to identify any notable program changes from the prior year. Specifically, the interviews focused on program management activities, the overall effectiveness of the program process, and the identification of areas for future program improvement.

For the PY6 evaluation, ADM conducted an interview with I&M program management staff and an interview with Resource Action Programs staff. This section highlights key points from the interviews and identifies any notable differences between program years. These interviews discussed the process of providing efficiency kits to customers.

5.3.5.1. Program Staff Roles and Responsibilities

Interviews were held with the two primary program staff responsible for program oversight and delivery. The I&M program team is led by the Energy Efficiency Consumer and Programs Coordinator who is responsible for program implementation and budgetary oversight. I&M is responsible for managing all marketing and outreach activities. The I&M corporate marketing team designs the outreach materials, while printing and distribution is done through the Ft. Wayne office.

The kit delivery for the Online Energy Check Up Program is implemented by Resource Action Program (RAP), an energy efficiency programs solutions provider headquartered in Sparks

Nevada. RAP implements measure-based market, education and outreach programs all over the United States.[23] The Program Manger takes the lead on day-to-day program implementation and is supported design, IT, marketing, and production teams. Staff indicated that I&M supplies RAP with the qualified participants and RAP fulfills the kit orders.

Similar to the previous implementation contractor, RAP also maintains the program tracking system. As orders are received from I&M, RAP will review the participant list to make sure there are no duplicates and transfer the orders details to the distribution center for processing. The program implementation team provides weekly reports stating which kits, gas or electric, were sent to which participants. The implementation team is also responsible for tracking issues related to returned and damaged kits.

5.3.5.2. Goals and Program Design

The PY6 expected savings for the Online Energy Check Up program equaled 5,135,088 kWh, which exceeded its energy savings goal of 3,865,320 kWh. Staff indicated that I&M upper management set the PY6 kWh goal prior to the program start. RAP estimated it would take 7,762 kits to reach the goal, although RAP was under contract to send 11,423 (7,800 electric kits and 3,623 gas kits.) According to program staff the year closed out with a total of 9,588 kits mailed.

The program launched on time in February. There were some customers expecting kits from audits completed in December of 2014 and these were delivered in mid-February.

Implementation staff indicated that projecting program participation is challenging because participation is dependent on customers completing the online audit. During the year, staff monitored audit activity in order to continually adjust their projections of the number of kits needed to manage kit inventories. The management of kit inventories was critical to balancing the need to deliver kits on time with the need to manage the costs associated with maintaining kit inventories.

RAP staff indicated that they believe that their management of product inventory was one of the program year's successes. Staff reported that they succeeded in managing rapid changes in the number of kits requested.

Delivery time is an implementation performance metric that is tracked in the database and reported to I&M on a monthly basis. The goal is to deliver kits within 10 days of receipt of the enrollment data from I&M. I&M staff aggregates the enrollment data at the end of each week and sends it to RAP on Monday, the date the data is received is recorded in the tracking system at the "RAP Enrollment Received Date." Table 5-24 below provides a summary of the delivery times provided in the program tracking data. Ninety-eight percent of kits were delivered in 5 days or less and only one percent of kit deliveries exceeded the 10-day period.

[23] http://www.resourceaction.com/about-us/

Table 5-24 RAP Delivery Time

Delivery Time (Number of Days)	*Percent*
1	3%
2	28%
3	18%
4	30%
5	20%
6	1%
46	1%

Program staff was asked to comment on program changes that occurred in PY6 when RAP took over implementation services. The most notable change was the kit design. The redesign included providing additional packaging to better secure the contents and avoid breakage. In the event that some of the kit contents are damaged upon receipt, the customer can call RAP to request replacements. RAP will replace the broken items and apologize for the damage. Implementation staff indicated they try and send the replacements within one week of receiving the customer call. As discussed in Section 5.3.3.2, the incidence of returned kits was minimal during PY6.

The new kits include promotional tear sheets and quick response (QR) codes that direct customers to online cross-program promotional information.

The new kit design also includes an information booklet called a *Quick Start Guide*. The quick start guide is designed to provide installation instructions for each measure included in the kit. It also has energy savings tips that relate to various aspects of home energy use. The same instructions are also printed in Spanish. Figure 5-6 below provides a screen shot of the quick start guide.

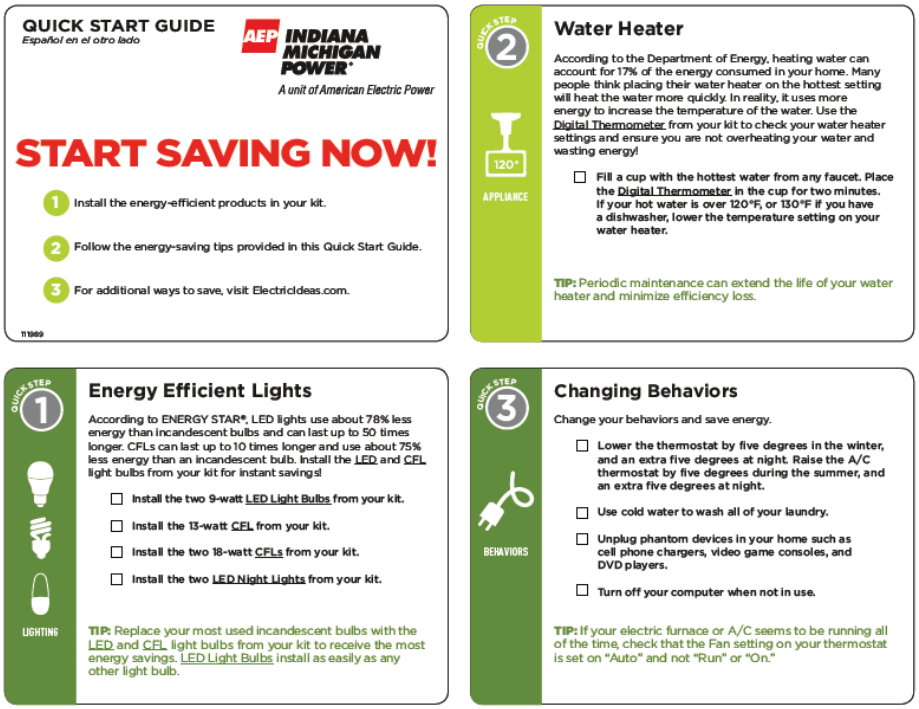


Figure 5-6 Online Energy Check Up Kit Quick Start Guide

5.3.5.3. Communication

Overall, the communication between I&M and RAP is sufficient for supporting the administration of the kit deliveries for the Online Energy Check Up Program. Utility staff indicated they have a standing weekly meeting with RAP to discuss the program activity, progress towards goals, and any ongoing issues. I&M also receives a weekly report that details the number of kits that were shipped, the savings associated with the shipment, the date of shipment, and delivery time. Utility staff indicated they also receive a monthly invoice that has the same information aggregated for monthly activity. I&M staff noted that RAP was not only easy to communicate with, but also flexible and responsive to changes in program activity. RAP staff provided similar feedback regarding the ease of sharing information with I&M and their responsiveness to inquiries.

5.3.5.1. PY7 Changes

Staff indicated there are no plans to change the contents of the kits for PY7, although here may be additional tweaks to the packing. Direct mail will continue to be the primary marketing channel as well.

5.3.6 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from the current program year:

- **Participation was equally motivated by interest in kit items and interest in learning how to save energy through the online audit.** Most participants indicated that they were somewhat

or very interested in receiving the kit items and learning how to save energy. Program outreach and messaging should continue to focus on conveying both the benefits of learning how to save energy and the free energy saving items provided in the kits.

- **Respondents indicated that they were more knowledgeable about how to save energy after completing the audit than before.** A significant difference in knowledge of how to save energy before and after completing the audit was found among surveyed participants. This finding suggests that the audit is effective in helping customers understand how to save energy.

- **Low incidence of returned broken items and undeliverable kits.** Analysis of program tracking data indicates that very few (0.5%) of the mailed kits were returned because items were broken or because the kits were undeliverable.

- **Staff effectively managed timely distribution of kits.** Nearly all kits were delivered within 10 days of receiving kit request data from I&M and 98% were delivered in five days or less. The implementation contractor providing the kits noted that managing inventories to meet the 10-day delivery target and manage program costs was one of the key program successes.

- **Continued program participants satisfied with the program.** Ninety percent of survey respondents reported that they were satisfied with the program overall and 89% were satisfied with the kit contents.

- **In-service rates comparable to prior year.** Overall, participants reported similar in-service rates as found in prior year evaluations.

The evaluation team currently has the following recommendations for program improvement consideration.

- **Provide information on rebate programs in the energy saving kits.** Providing this information in the kits provides an additional low cost channel for distributing information about I&M program incentives.

6. Residential Peak Reduction Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential Peak Reduction Program during the period January 2015 through December 2015.

6.1 Program Specific M&V Methodologies

The M&V approach for the Peak Reduction program (PRP) is aimed at determining the following:

- Numbers of homes that participated in the program;
- Number of homes that opted out of the program;
- Average annual kWh savings per home;
- Average kW reduction per home; and
- Estimating cost effectiveness of the PRP in 2015.

Table 6-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 6-1 Data Sources for Gross Impact Parameters – Peak Reduction Program

Parameter	*Source*
Number of Participants	Program Tracking Data/ Participant Surveying
Number of Opt Outs/ Account closures	Program Tracking Data
Hourly kWh Consumption	I&M Residential Billing Database
Hourly kW Consumption	I&M Residential Billing Database
Date of Events	I&M program Tracking Data
Number of Participants Part of Each Event	I&M/Honeywell Event Program Counts
Daily Weather Data (HDD and CDD)	Direct Pull From KFWA (Fort Wayne Airport) Weather Station

6.1.1 Verification of Participation in Program

A first aspect of conducting measurements of program activity is to verify if participants of the program did participate in the program. ADM takes several steps in verifying participation, which consists of the following:

- Validating program tracking data provided by Honeywell by checking for duplicate or erroneous entries;

- Verifying that participants were part of the program according to the agreed-upon process between Honeywell and I&M; and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys are to verify that customers listed in the program tracking database did indeed participate. Participants are also asked about their opinions on events administered and if participating in the program was an inconvenience in any way to their lifestyle.

6.1.2 Calculating Gross Annual kWh/kW Savings

The residential component of the PRP was evaluated through use of a control group. Honeywell developed a sample for metering, weighted to be sufficiently representative of the Indiana Michigan Power regions. The sample is metered for the length of the control season (June 1 – September 30). Determining the total peak demand reduction provided by the PSP is done through the following steps:

(1) Comparison of kW values of curtailment and control groups over the range of the events;

(2) Calculating the highest kW reduction over a 15-minute rolling average of 5-minute intervals; and

(3) Multiplying the resulting kW by total number of enrolled customers in the program for each event.

The PRP incorporated two cycling strategies for the treatment group during PY6, where 70% of participants were assigned to a 50% True Cycle group and the remaining 30% of participants were assigned to a 70% True Cycle group. While ADM's analysis was initially designed to compare the effects of the two cycling strategies for PY6, the limited sample size of homes with smart meter data (only 38 homes in the sample for the 70% cycling strategy) did not allow for a statistically significant comparison to be conducted. As a result, both of the treatment groups were combined as one treatment and were control matched.

6.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) impacts

The program assumed no free-ridership; therefore net savings are equal to gross savings. (NTG=1)

6.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of participant billing data and participant survey data. The estimated gross impacts resulting from the PY6 Peak Reduction program are summarized in Table 6-2. Table 6-3 and Table 6-4 show the audited and verified savings.

Table 6-2 Gross Impact Summary

Program	*PY6 Program Goals (kWh)*	*Peak Demand Savings (kW)*		*Annual Energy Savings (kWh)*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Peak Reduction	112,014	5,632	3,777	31,496	16,670	53%

Table 6-3 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
31,496	31,496	31,496	16,670	53%

Table 6-4 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
5,632	5,632	5,632	3,777

Table 6-5 Summary of Savings

	29-Jul	17-Aug	1-Sep	2-Sep	3-Sep
kWh participant-day without snapback	0.66	0.69	0.51	0.91	0.94
kWh participant-day with snapback	0.20	-0.13	0.37	0.80	0.84
kW at second hour of event	0.25	0.19	0.22	0.39	0.41
MAX kW (anytime during event)	0.25	0.28	0.31	0.47	0.41
Average kW over event	0.16	0.17	0.17	0.30	0.31

The program assumed no free-ridership; therefore, net savings are equal to gross savings. (NTGR=1)

6.2.1 Verification of Participation in Program

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided by Honeywell for accuracy. No duplicate entries were discovered. Table 6-6 lists total participation for the 2015 program year.

Table 6-6 Total Program Participants

Variable	*# of Participants*
2012 participants	2,158
2012 dropouts	1
2013 participants	4,551
2013 dropouts	194
2014 participants	2,316
2014 dropouts	390
2015 participants	113
2015 dropouts	539[24]
Total 2015 participants	8,014[25]

To verify that the number of homes in the program tracking database claiming to have participated in the program was accurate, ADM administered a telephone survey with 426 program participants. All respondents who completed the participant survey verified that they participated in the program during 2015. ADM applied a verification rate of 100% to the program.

6.2.2 Gross Annual kWh Savings and Peak kW Reduction

The impacts of the PY6 Peak Reduction program were determined through analysis of metered run-time data from a random sample of 124 program participants located in South Bend, Indiana. Although the Peak Reduction program is also operated in the Fort Wayne and Muncie areas, smart meter data was only available for South Bend, and the results derived from South Bend are extrapolated to the other two metro areas. In 2015, six Peak Reduction events were called (times are in eastern standard time). The dates are listed below.

- 7/29/2015 14:00-18:00

[24] This includes devices that were inactive prior to the beginning of the peak season. Only six of these devices were assigned a cycling group and potentially participated in events during PY6.

[25] Not all PY6 participants participated in events, as some participants signed up after the last event of the season was called.

- 8/17/2015 14:00-18:00
- 9/1/2015 14:00-18:00
- 9/2/2015 15:00-18:00
- 9/3/2014 15:00-19:00

The per-home impact of these events is calculated by comparing the aggregate load of the 124 South Bend homes (the treatment group) with the aggregate load of a control group of homes (also from South Bend) during the events. The events' impact is the difference between the two loads (up to an adjustment of the control group load to match the treatment group during the pre-event period). As discussed above, the 70% True Cycle treatment group and 50% True Cycle treatment group were combined in order to provide statistically significant results.

Figure 6-1 below illustrates this idea with a graph overlaying the treatment, control, and adjusted control group loads during the 9/2 event.

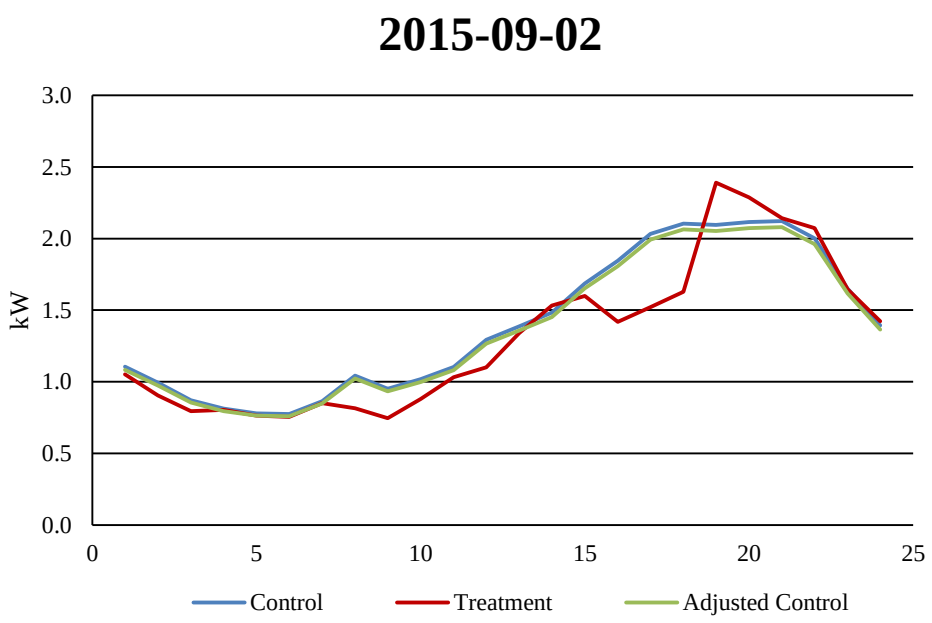


Figure 6-1 Treatment, Control, and Adjusted Control Loads During 9/2/2015 Event

Demand Reduction:

The demand reduction per participant for each event hour is taken ***as the difference between the treatment group aggregate load and the adjusted control group aggregate load.*** The program level demand reduction results by scaling the per-participant kW by the total number of participants, as recorded in the PDF report "2015 Load Control Summary Report.pdf" (Screenshot below). Because our unit of measurement is individual homes, we use the "Accounts Controlled" count rather than the "Hardware Controlled" count (which counts individual control switches).

Indiana Michigan Power Load Control

Monday, September 21, 2015
5:52:02 PM

Event Date	Load Group	Control Start	Control Stop	Cycle Percent	Accounts Controlled	Hardware Controlled	Total Controlled Hours	Hardware Opted Out	Total Opt Out Hours
7/29/2015									
	L2015_M&V Test 2 Central Time Zone	2:00 PM	6:00 PM	50	2	2	8.00	0	0.00
	L2015_M&V Test 2 Eastern Time Zone	2:00 PM	6:00 PM	50	47	48	191.99	0	0.00
	L2015_Standard A Central Time Zone	2:00 PM	6:00 PM	50	52	54	215.99	0	0.00
	L2015_Standard A Eastern Time Zone	2:00 PM	6:00 PM	50	5477	5588	22348.95	0	0.00
	Total for Cycle Strategy: 50				5578	5692	22764.92	0	0.00
	L2015_M&V Test 1 Central Time Zone	2:00 PM	6:00 PM	70	5	5	20.00	0	0.00
	L2015_M&V Test 1 Eastern Time Zone	2:00 PM	6:00 PM	70	121	125	499.97	0	0.00
	L2015_Standard B Central Time Zone	2:00 PM	6:00 PM	70	28	28	111.99	0	0.00
	L2015_Standard B Eastern Time Zone	2:00 PM	6:00 PM	70	2377	2397	9585.43	0	0.00
	Total for Cycle Strategy: 70				2531	2555	10217.39	0	0.00
	Total Participation				**8109**	**8247**	**32982.31**	**0**	**0.00**

Figure 6-2 Screen Shot of 7/29/2015 Load Control Event Information

Total Energy Savings:

The total energy savings is taken as the sum of the total kW reductions for each event hour, adjusted by the (sometimes, but not always) negative kW values that account for increased usage immediately following a curtailment event. Referring to Figure 1, one may note increased energy usage immediately after the event ends. The increased energy usage is attributable to greater than typical AC energy usage needed to restore the home's typical indoor temperature. This phenomenon is called "snapback". ***The snapback contributions are calculated for three post-event hours.***

Table 6-7 Summarization of Savings

Parameter	*Value*	*Source*
Total Event Hours	17	Event Records
Average # of Participants	8,044	Event Records (weighted by savings)
Estimated Energy Savings kWh (not counting snapback)	29,844	Sum of hourly kW impacts excluding 3 hours snapback period
Estimated Energy Savings kW (not counting snapback)	1,756	Average of hourly kW impacts
Snapback	13,174	Sum of hourly kW impacts during 3 hour snapback period
Estimated Energy Savings (including snapback)	16,670	Difference between kWh savings without snapback and snapback

Table 6-8 and Table 6-9 show the hourly kW reduction per unit and program level hourly kW reductions.

Table 6-8 Hourly kW Reduction per Unit

Hourly kW Reduction Per Home					
Hour Beginning\Date	**29-Jul**	**17-Aug**	**1-Sep**	**2-Sep**	**3-Sep**
14	-0.015	-0.031			
15	0.252	0.192	-0.023	0.054	0.113
16	0.203	0.254	0.224	0.389	0.412
17	0.218	0.275	0.309	0.470	0.413
18	0.214	0.007	0.276	0.436	0.401
19	-0.378	-0.534	-0.315	-0.336	-0.298
20	-0.296	-0.293	-0.105	-0.214	-0.201

Table 6-9 Program Level Hourly kWh Reduction

Treatment Level Hourly kW Reduction					
Enrolled Customers	**8109**	**8037**	**8013**	**8033**	**8026**
Hour Beginning\Date	**29-Jul**	**17-Aug**	**1-Sep**	**2-Sep**	**3-Sep**
14	-118.7	-248.3			
15	2,044.7	1,540.3	-186.8	436.7	908.5
16	1,642.1	2,044.9	1,797.8	3,127.2	3,304.1
17	1,766.2	2,210.2	2,479.8	3,776.9	3,318.7
18	1,731.4	54.1	2,214.2	3,499.5	3,216.6
19	-3,062.3	-4,289.4	-2,520.7	-2,699.9	-2,391.9
20	-2,396.5	-2,353.3	-842.6	-1,721.2	-1,612.2
Total Energy Savings (kWh)	1607.0	-1041.4	2941.7	6419.2	6743.9

Time Series Graphs:

The adjusted control group is simply the control group time series multiplied by a factor, usually slightly less than 1.0 because the control group had overall higher usage than the treatment group. The purpose of this factor is to mitigate any remaining bias that was not factored out during the control group matching process. All customers in the treatment group had HVAC units, but this was not the case in the control group. To account for HVAC usage in the control group, mean kW usage was calculated by premise number (customer) for the entire DR season for the control group. Only the top 90% of average kW usage by premise number (customer) were retained for use in control matching. This method optimized control matching while likely removing any users without HVAC units from the control group.

This factor was itself chosen as the value that minimized the squared residual between the treatment group and adjusted control group time series during the three hours prior to the event. This minimization problem was solved using the Excel solver module.

The adjustment factors used are:

Table 6-10 Adjustment Factors by Event Date

Date	**7/29**	**8/17**	**9/1**	**9/2**	**9/3**
Adjustment Factor	0.95	0.97	0.90	0.98	0.98

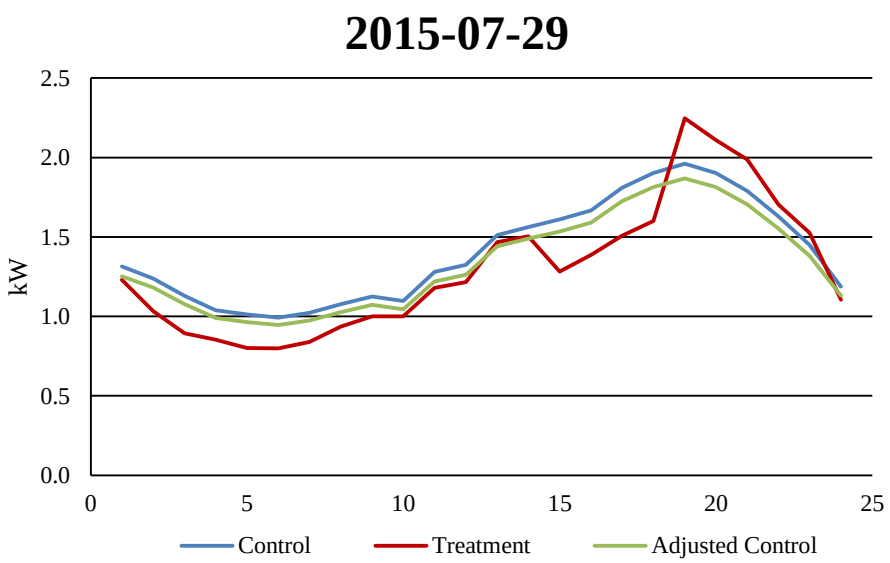


Figure 6-3 Load Control Event Information for 7/29/2015 DR Date

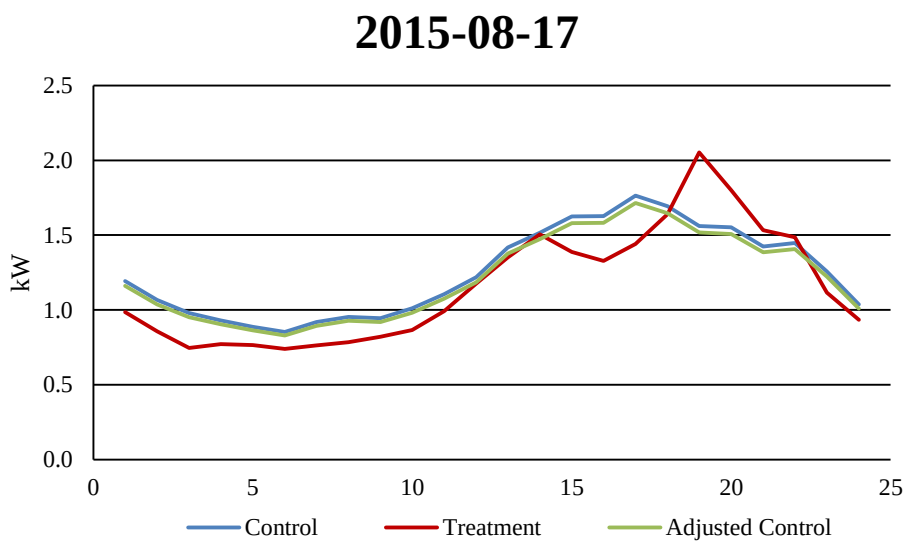


Figure 6-4 Load Control Event Information for 8/17/2015 DR date

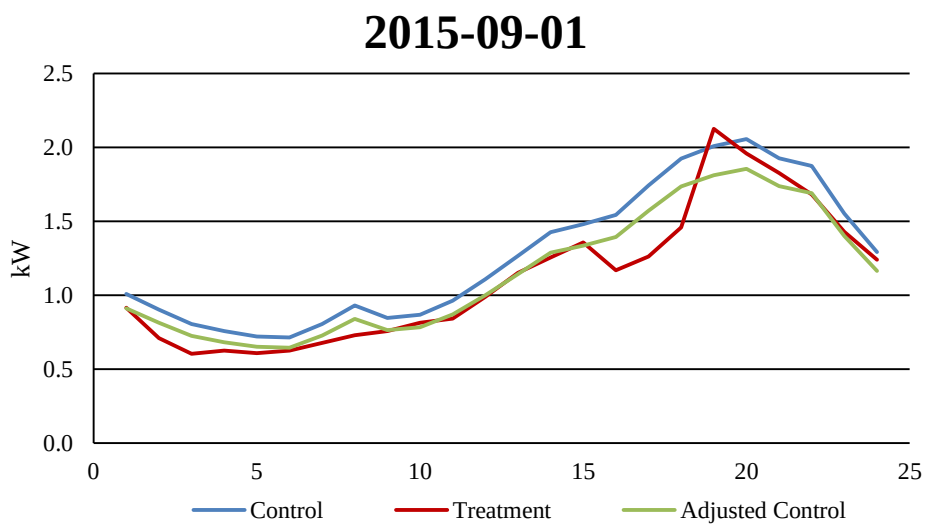


Figure 6-5 Load Control Event Information for 9/1/2015 DR date

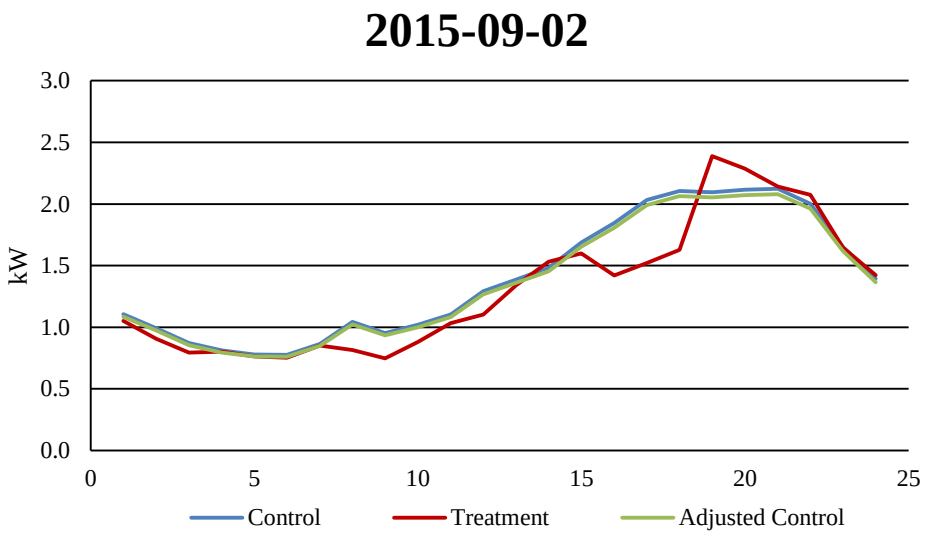


Figure 6-6 Load Control Event Information for 9/2/2015 DR date

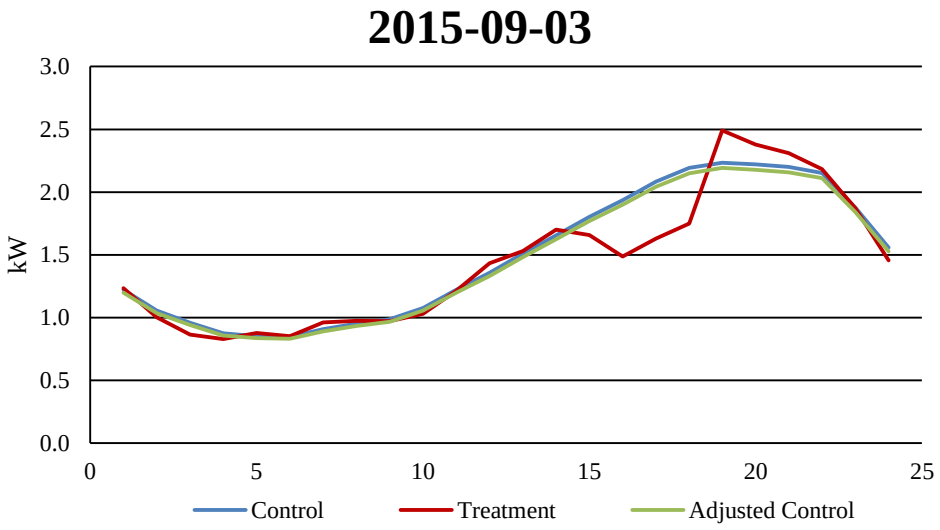


Figure 6-7 Load Control Event Information for 9/3/2015 DR date

6.2.3 Calculating Net Annual kWh/kW Savings

The program assumed no free-ridership, therefore net savings are equal to gross savings. (NTG=1)

6.2.4 Participant Attrition

Participant attrition should be considered when implementing a more aggressive AC-curtailment strategy. Participants will drop out of a program if it makes them too uncomfortable or proves to

be a large inconvenience. Table 6-11 shows historic participant and dropout counts for the Residential Peak Reduction Program.

Table 6-11 Historic Peak Reduction Program Participant and Dropout Counts

Variable	*# of Participants*
2012 participants	2,158
2012 dropouts	1
2013 participants	4,551
2013 dropouts	194
2014 participants	2,316
2014 dropouts	390
2015 participants	113
2015 dropouts	539[26]

Although the above data show a higher number of dropouts during PY6, this value includes devices that were already inactive prior to the beginning of the peak season. The majority of these switches were never assigned a cycling strategy and their corresponding households did not participate in any events during PY6. Only six customers who were assigned a cycling strategy during PY6 dropped out of the program, and only one of these customers was assigned to the 70% cycling group. These results suggest that the 70% cycling strategy has not resulted in additional program attrition, and that adding more customers to the 70% cycling group would not likely pose a threat to attrition moving forward. However, if there is a significant increase in summer temperatures, these attrition rates may increase in the future.

6.3 Process Evaluation

This chapter presents the results of the process evaluation of I&M's Peak Reduction program during program year six (PY6). The PY6 process evaluation focuses on any program changes that were implemented since PY5, and assesses any trends in program performance or participation.

This evaluation is based upon analysis of program structure and tracking data, and interviews and surveys of current program participants, I&M program staff, and program implementation contractor staff.

[26] This includes devices that were inactive prior to the beginning of the peak season. Only six of these devices were assigned a cycling group and potentially participated in events during PY6.

6.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity include:

- How do participants learn about the program? What barriers to participation exist?
- Why did customers participate in the program?
- What communication between I&M, Honeywell, Inc., and customers exists? Do customers find that level of communication sufficient? Are events communicated appropriately to maximize program participation?
- How effectively has the program performed now that events are being called? How have customers responded to event activity?
- How satisfied are participants with the program overall? What was their level of satisfaction with different elements of the program; from the enrollment process to the receipt of the monthly bill credit?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the Peak Reduction program is developed from a telephone survey of program participants. The internal organization and operational efficiency of program delivery is examined through analysis of interviews conducted with I&M program staff and interviews with Honeywell staff. Further insight into the program's internal structure is obtained through a review of program documentation such as marketing literature and participant tracking data.

6.3.2 Summary of Primary Data Collection

- **Review of program documentation and relevant literature:** ADM reviewed relevant program planning documents and program tracking data in order to assess the current state of program documentation and to note any significant changes in data content or structure.
- **Participant surveys:** Participant surveys were the primary data source for the process evaluation, and served as the foundation for understanding the customer perspective. The participant surveys provided customer feedback and insight regarding customer experiences with the Peak Reduction program. Participants also relayed their experiences responding to peak reduction events, Respondents also reported on their satisfaction with the program, contractor professionalism when installing the switch and the different elements of the program from enrollment to scheduled visit to monthly bill credit receipt.
- **Interviews with program staff members:** Interviews with I&M staff members and Honeywell, Inc. staff, provided insight into various aspects of the program and its organization. Honeywell, Inc. staff provided insight into key program metrics and addressed various areas of program performance and delivery. I&M staff members also provided information regarding future plans for the program and its interaction with other I&M programs.

6.3.3 Participant Survey Findings

The following section presents key findings from surveys conducted with customers who participated in PY6 of the I&M Residential Peak Reduction program (Peak Reduction Program). This section also highlights any notable comparisons between PY5 and PY6 program participants.

ADM conducted a telephone survey of program participants as part of the evaluation effort for the PY6 Peak Reduction Program. As with the prior year, this survey was designed to gather information regarding the participant perspective on their experiences in the program, as well as to characterize customer preferences and decision making with regard to energy efficiency. Specifically, data collected via participant surveying are used in evaluating:

- Customer awareness of the program;
- Customer decision making behaviors;
- Customer experiences during demand reduction events; and
- Customer satisfaction with the program.

In total, 117 customer participants who enrolled in the program and participated in peak events during PY6 responded to the survey.

6.3.3.1 Participant Awareness of Program

As shown in Figure 6-8, the majority of respondents reported that they had learned of the program from utility bill inserts and direct mail. This is consistent with the program's marketing efforts, and with the participant survey findings from PY3, PY4, and PY5.

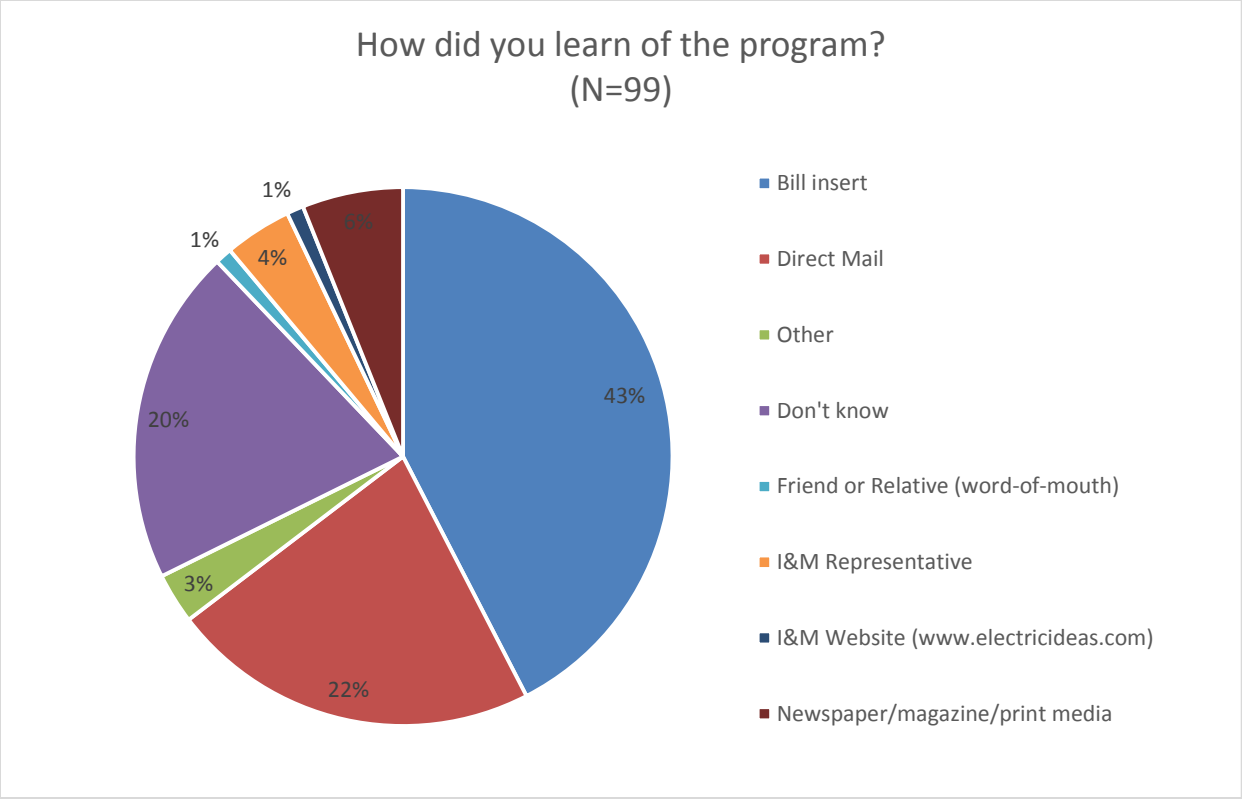


Figure 6-8 Sources of Participant Program Awareness

6.3.3.2 Factors Affecting Participation

Survey respondents were asked a series of questions related to their decision to participate in the program. When asked why they decided to participate in the program, respondents most commonly indicated that they chose to participate in the program in order to receive the monthly bill credit (Figure 6-9). This is consistent with survey results in PY5.

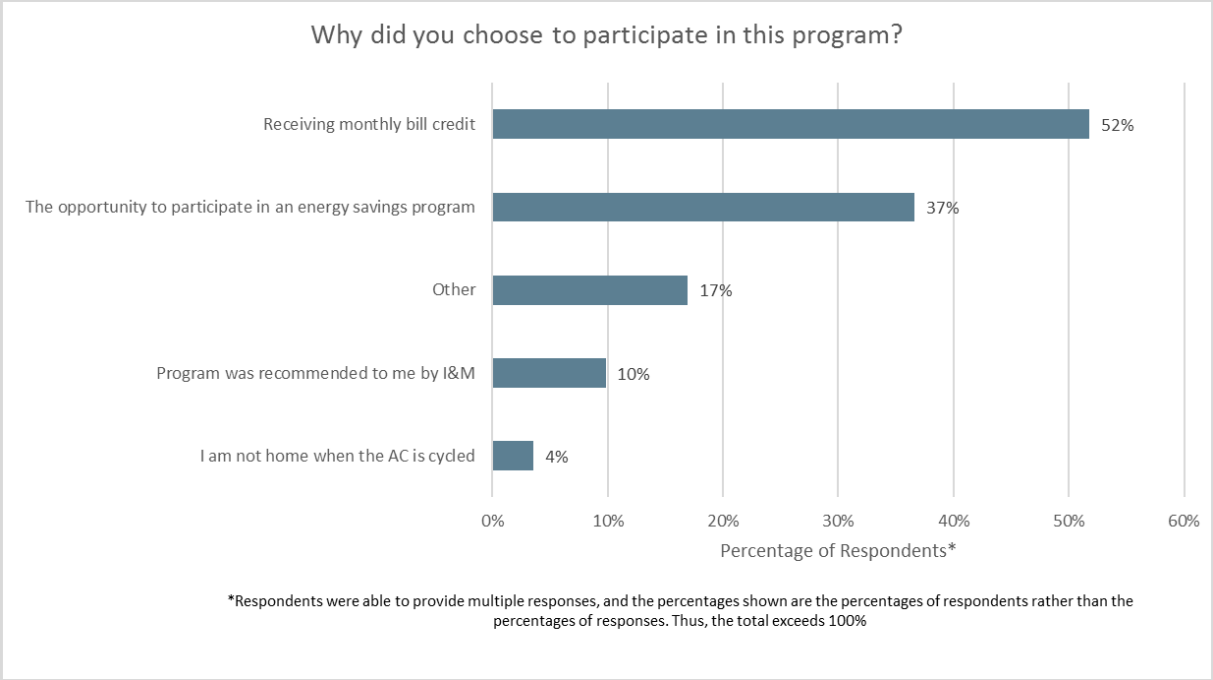


Figure 6-9 Reported Reasons for Participation in Peak Reduction Program

As the Peak Reduction Program affects participants by adjusting their cooling systems, some participants in prior years have expressed that they were concerned about how the program would affect their home's temperature or whether the program would result in energy savings. When asked whether they had any initial concerns about participating in the program, only 16% of respondents indicated that they had concerns about the program before deciding to participate. These respondents most frequently indicated (noted by 44%) that they were concerned about being uncomfortable during the energy reduction events, as shown in the following table.

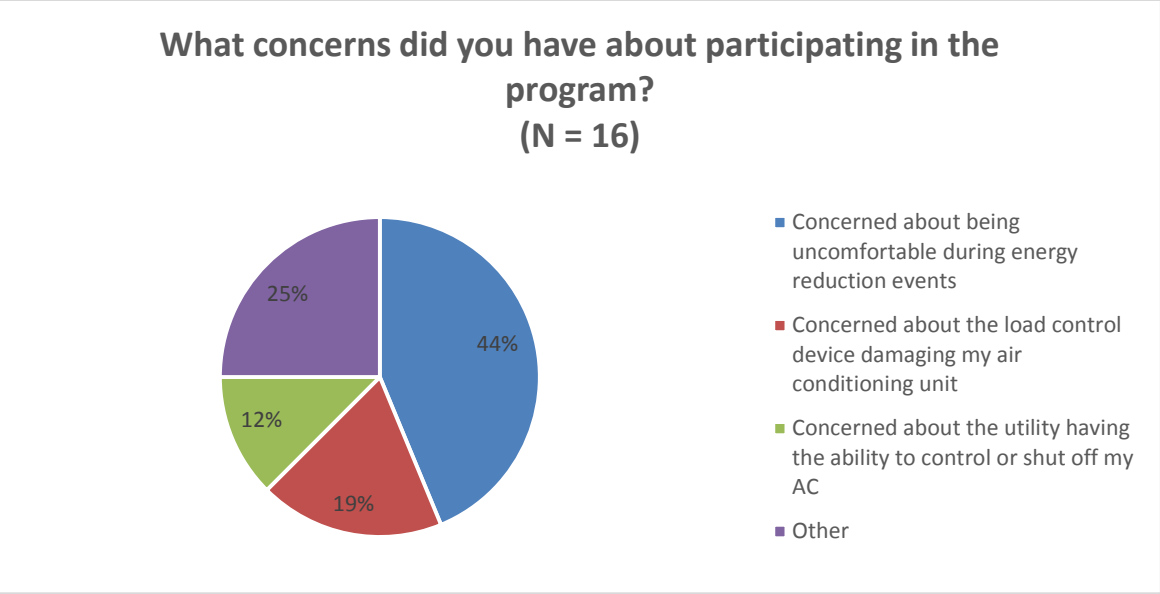


Figure 6-10 Initial Participation Concerns

These results are fairly similar to those obtained during the PY4 and PY5 evaluation, and it is likely that these concerns are shared by customers who ultimately decide not to participate in the program. However, as with prior years, these concerns represent a minority of respondents.

6.3.3.3 Participant Experiences during Reduction Events

When asked whether they had been home during any of the demand reduction events, 29% of respondents indicated that they were home for at least one event. These respondents were then asked how they could tell that a reduction event was occurring, and the responses are shown in Table 6-12. The most common response was that respondents either did not know how to tell when an event was occurring or could not tell than an event was occurring. This was followed by respondents stating that the home temperature increased, and that the air conditioner appeared to run less. Overall, these results suggest that the demand reduction events were fairly innocuous, and that the majority of respondents were not aware of the events when they occurred.

Table 6-12 Participant Awareness of Reduction Events

	Response	*Percent of Respondents (N = 26)*
How could you tell that an energy reduction event was occurring?	The house was warmer than usual	19%
	I didn't hear the air conditioner run as often	19%
	I looked at the thermostat and saw that the temperature had increased	4%
	I&M notified me of the specific event in advance	0%
	Didn't notice	58%

Six of the participants who reported being aware of at least one peak reduction event responded to a question about the extent to which the home temperature increased during the event. Two respondents indicated a small increase of 1 to 3 degrees and two more reported a more substantial temperature rise of 3 to 6 degrees. Two respondents were not sure how much the home temperature rose

Overall, these results indicate that the majority of participants were not aware of individual peak reduction events or the effect that these events were having on their home. As event awareness is not a priority for the program, these results suggest that the program is operating successfully without significantly affecting customers' experiences.

6.3.3.4 Participant Behavior during Cycling Season

When asked whether they had an initial expectation of the number of events that would take place, a large majority of respondents (84%) stated that they did not know how many events to expect. The one respondent who indicated that they expected a certain number of events reported that the number of events that occurred during PY6 was fewer than what they had expected. However, since only one survey participant responded to this question, these results may be of limited value.

Only one percent of respondents indicated that they opted out of one or more events during the PY6 event season, which is comparable to the percent of participants who opted out of one or more events in PY5. When asked why they opted out, the respondent indicated that they were unhappy with the time periods when the energy reduction events took place.

6.3.3.5 Participant Satisfaction

Survey respondents were first asked about their levels of satisfaction with selected elements of the Peak Reduction Program experience in regards to the contractor who visited their home to install the switch on the participant's air conditioner. Results were provided on a scale of *1* to *5*, with *1* representing *very dissatisfied* and *5* representing *very satisfied*. As displayed in Table 6-13, respondents reported being highly satisfied with each listed element of the installation experience. This was also the case for these program satisfaction elements during the PY4 and PY5 program evaluation.

Table 6-13 Participant Satisfaction with Contractor Visit Elements

Element of Contractor Experience	*Satisfaction Rating*						*N*
	Very satisfied	*Satisfied*	*Neutral*	*Dissatisfied*	*Very dissatisfied*	*Don't know*	
Professionalism of the contractor who installed the cycling switch	40%	14%	11%	0%	4%	32%	113
How quickly the contractor installed the cycling switch	40%	11%	7%	0%	3%	40%	113
Quality of work conducted by the contractor	42%	15%	9%	0%	2%	33%	113

Survey respondents were then asked about their levels of satisfaction with other selected elements of the Peak Reduction Program experience. Results were also provided on a scale of *1* to *5*, with *1* representing *very dissatisfied* and *5* representing *very satisfied*. As displayed in Table 6-14, respondents were highly satisfied with nearly all listed program elements. Respondents reported being most satisfied with the initial enrollment process, along with the information provided about program requirements.

Table 6-14 Participant Satisfaction with Selected Program Elements

Element of program Experience	*Satisfaction Rating*						*N*
	Very satisfied	*Satisfied*	*Neutral*	*Dissatisfied*	*Very dissatisfied*	*Don't know*	
The initial enrollment process for the program	58%	18%	8%	4%	1%	11%	108
Scheduling process for equipment installation	48%	20%	8%	1%	3%	19%	108
Information provided that explained the program requirements	55%	20%	11%	3%	1%	10%	108
The monthly bill credit	51%	16%	8%	1%	3%	21%	108
Interaction with call center staff	25%	25%	50%	-	-	-	4

Respondents who indicated being dissatisfied with one or more elements of the program were asked to explain the reason for their dissatisfaction. Examples of comments from these respondents include:

"The program didn't save me money."

"It was supposed to start in May but I didn't get it until July."

"After I called the people were very uninformed and the employees were not trained well."

"It's been over a year and I haven't seen any info about it."

When asked how their experiences with the program had affected their satisfaction with I&M as their utility provider, only three percent of all respondents indicated that the program had negatively affected their satisfaction with I&M; this was slightly higher than the proportion of respondents who reported decreased satisfaction in PY5, though the occurrence of dissatisfaction is still quite low. The majority of respondents (50%) indicated that the program had no effect on their satisfaction with I&M as a utility provider.

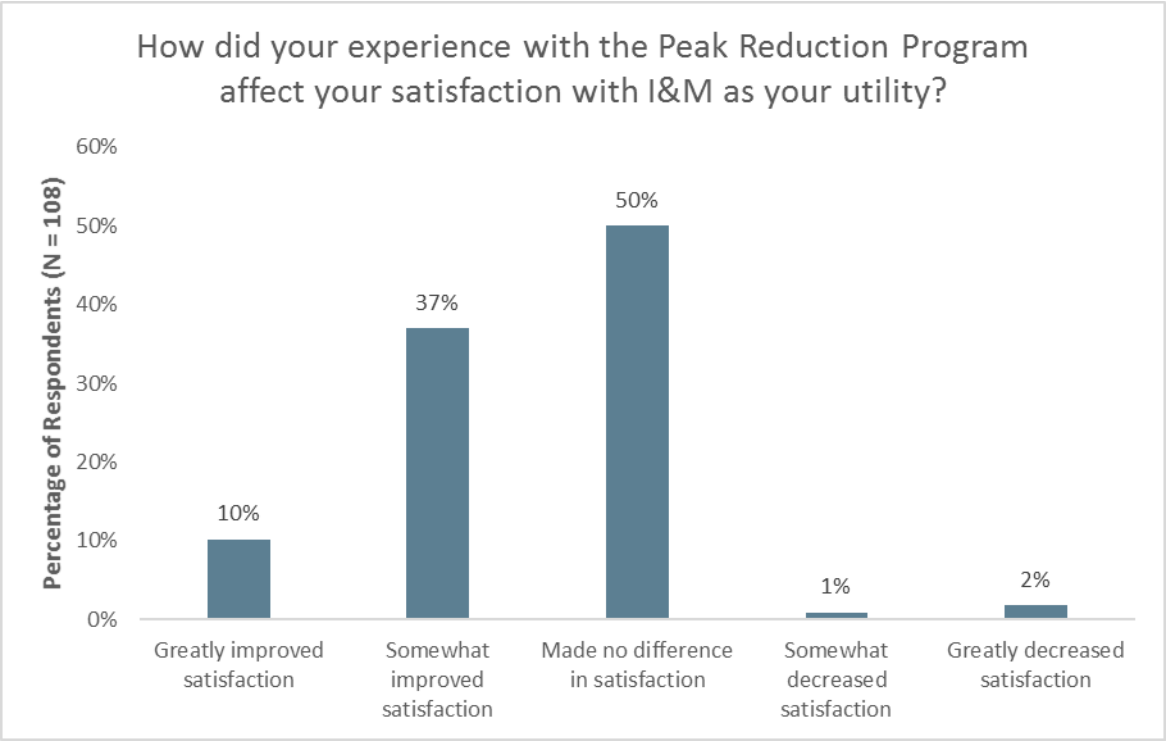


Figure 6-11 Change in Satisfaction with I&M as Utility Provider

When asked whether the program has increased their familiarity with ways to save energy in their home, fifty percent of respondents indicated that the program has done this. Additionally, 19% of respondents reported that the Peak Reduction Program has changed how they use energy in their home. When asked to explain how the program has changed the way they use energy, respondents provided a variety of behavioral changes ranging from turning off lights and appliances when they are not in use, switching out inefficient lightbulbs, and adjusting thermostat temperatures.

Respondents were asked whether they had recommended the program to friends, family members, or colleagues, and more than one-third (31%) of respondents reported that they had done this. The remaining respondents were asked how likely they would be to recommend the program, based on their experience thus far. As shown in Table 6-15, 56% of respondents indicated that they are *very likely* or *somewhat likely* to recommend the program to friends, family, or colleagues. Thirteen percent of respondents stated that they are *very unlikely* to recommend the program, although the reasons for this were not clear.

Table 6-15 Participant Likelihood to Recommend Program

	Response	*Percent of Respondents (N = 55)*
Based on your experience with the Peak Reduction Program, how likely are you to recommend it to your friends, family members, or colleagues?	Very likely	24%
	Somewhat likely	33%
	Somewhat unlikely	7%
	Very unlikely	13%
	Don't know	24%
	Refused	0%

These satisfaction results suggest that the program has fully met the needs and expectations of a majority of participants, and that there are no major issues with program delivery. Across PY3, PY4, and PY5, instances of dissatisfaction have been very infrequent.

In order to gauge the potential for attrition from the program, respondents were asked if they were planning on continuing their participation in the program in 2016. As shown in Table 6-16, 81% of respondents replied "yes" to participating in the program during 2016. These results are lower than those obtained during the previous program year, but still suggest that only a small percentage of respondents are considering dropping out of the program.

Table 6-16 Participants Continuing Participation Next Year

	Response	*Percentage of respondents (N = 108)*
Do you plan to continue participation in the program next year?	Yes	81%
	No	3%
	Don't Know	16%

6.3.3.6 Program Website Visits

Twenty-four percent of respondents reported they have visited the I&M website (www.electricideas.com). As this website provides thorough information regarding I&M's portfolio of residential program offerings, it is an important component of customer program awareness. In fact, 43% of those that accessed the website did so to learn about I&M efficiency programs and another 5% reported accessing it to enroll in a program. General curiosity was another often cited reason for accessing it (mentioned by 33% of respondents).

6.3.4 Program Operations Perspective

This section summarizes the core findings from an interview conducted with Honeywell program staff for the purposes of tracking program implementation and performance changes across program years, and identifying any remaining opportunities for program improvement.

As program structure and operational processes have remained fairly consistent across program years, the PY6 staff interviews focused on incremental differences between program years. This section highlights key findings from these interviews. Key program features and trends addressed by respondents include:

- Staff roles and responsibilities;
- Program operations and design changes;
- Communication processes; and
- Barriers to participation.

6.3.4.1. Staff Roles and Responsibilities

In PY6 the program was focused on maintaining the current level of activity rather than growth of the program. Consequently, all staffing levels remained the same in PY6.

The Peak Reduction Program is led by the Program Manager who is responsible for coordinating all the activity in the field, training technicians, responding to custom requests, managing client communication, and running reports. Additionally, the program employs one full-time field engineer who is responsible for installing and removing devices when necessary. The implementation contractor is also supported by a customer support call center and administrative staff.

6.3.4.2. PY6 Changes

A few changes to program operations were made during the year. Staff indicated that the marketing effort was decreased, namely the bill messaging used in PY5 to promote the program was not continued in PY6. Additionally, customer service support was handled through Honeywell's customer service call center. In PY5, this function had been outsourced to another firm but the firm performed poorly on metrics such as answer time and the abandon rate. Staff indicated that performance has improved since Honeywell began handling this function.

In an effort to address customer comfort levels the program implemented new cycling strategy in early PY6. Instead of curtailing the AC run-time by a consistent 70% for all participants, I&M decided to try multiple cycling levels for a subset of participants. The cycling levels were 30%, 50%, and 70%. Results of the cycling trials were presented in the 2014 evaluation report.

6.3.4.3. Communication

Staff discussed communication processes between I&M and Honeywell. Staff noted that the amount of communication varies during the year and is greater during the peak season than during the remainder of the year. Specifically, weekly calls are held from May through September to discuss program activity. The calls are facilitated by a weekly summary report that covers the number of device removals, installations, and active devices deployed. During these calls, staff also reviews the customer call log to verify that customer issues are handled in a timely manner.

Staff also discuss the move-in move-out list, which summarizes how many customers have left their residences and if devices are still on their HVAC units. If a tenant moves out, program staff will call the new tenant and explain the program to determine if they want to participate.

Outside of the peak season, calls are held on a bi-weekly basis and reports are delivered bi-monthly.

6.3.4.4. Barriers to Participation

Staff discussed what they perceived as potential barriers to participation. Staff noted that the incentive amount may not be sufficient to entice some customers. Additionally, staff suggested that providing smart thermostats that customers interact with may be more enticing than use of a device installed on the HVAC unit.

Staff also suggested that providing tiered incentives based on the amount of reductions customers commit to may be effective at generating higher per participant peak demand reductions.

Lastly, staff discussed customer issues that may potentially negatively impact retention. Staff indicated that most of the customer complaints tend to stem from misconceptions about how the device works. They think their AC is broken or HVAC contractors tell customers the device is causing issues. These concerns may occur because customers are not notified of events before or after then occur.

6.3.5 Conclusions and Recommendations

This section presents the overall conclusions, and any associated recommendations, from the PY6 process evaluation of the I&M Peak Reduction program. These findings are based on the full scope of evaluation activities, including document review, participant surveys, and program staff interviews.

Key conclusions and recommendations from the PY6 evaluation are as follows:

- **Continued participant satisfaction:** As with the prior program year, the PY6 participant survey results suggest that a high majority of respondents are very satisfied with each element of their program experience. It should be noted that the no participants reported dissatisfaction with the call center which may reflect improvements in Honeywell's improved handling of this function as compared to the outside firm that provided call center support during PY5.
- **No increase in attrition rate:** Only six customers who were assigned a cycling strategy during PY6 dropped out of the program, and only one of these customers was assigned to the 70% cycling group. These results suggest that the 70% cycling strategy has not resulted in additional program attrition, and that adding more customers to the 70% cycling group would not likely pose a threat to attrition moving forward. However, if there is a significant increase in summer temperatures, these attrition rates may increase in the future.
- **Minimal customer event awareness:** As was the case in PY5, the participant survey results suggest that the customers who have not dropped out of the program are minimally affected

by the demand reduction events, and that a majority of these customers were not aware of events occurring. Although the implementation contractor suggested the possibility of notifying participants of upcoming events, it appears that lack of event awareness may be an important aspect of retaining customer participation.

ADM provides the following recommendations based on a research activity consisting of runtime data analysis to assess the difference in demand response performance of individual AC-curtailment strategies.

- **Call more training days in order to leverage the AC-curtailments strategies' ability to adjust to participant's AC usage.** Program performance will improve as the "placeholder" 60-minute runtime slots are purged from the thermostat memories. Training on moderately hot days is preferable. In general, it is safer to err on the side of training too frequently.
- **For future program filings, consider shifting to an incentive scheme that allots bill credit per event rather than per month.** This allows funds to rollover month to month and year to year which would allow for greater cost effectiveness in years with mild weather.

7. School Energy Education Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the School Energy Education Program during the period January 2015 through December 2015.

7.1 Program Specific M&V Methodologies

The M&V approach for the School Energy Education Program (SEE) is aimed at determining the following:

- Numbers of kits distributed;
- Percent of kit components installed;
- Average annual kWh savings and kW reduction per kit measure;
- % of homes with electric water heating;
- Providing estimates of net-to-gross savings and free-ridership; and
- Estimating cost effectiveness of the SEE Program in 2015.

Table 7-1 below summarizes the inputs needed to accomplish these objectives and the source of each input.

Table 7-1 Data Sources for Gross Impact Parameters – SEE Program

Parameter	*Source*
Number of Kits Distributed	Program Tracking Data/ Parent-Guardian and Instructor Surveying
Type of Measures Installed	Program Tracking Data/Parent-Guardian Surveying
% of Homes with Electric Water Heating	Parent-Guardian Surveying
Net-to-gross Ratio	Parent-Guardian Surveying
Gross Annual kWh Savings and kW Reductions	Indiana Technical Reference Manual (TRM)

7.1.1 Verification of Participation in Program

A first aspect of conducting measurements of program activity is to verify the number of kit measures received and installed. ADM takes several steps in verification effort, which is consisted of the following:

- Validating program tracking data provided by Resource Action Programs by checking for duplicate or erroneous entries;
- Verifying that the conservation kits were distributed to instructors and subsequently distributed to students as per the agreed upon process between Resource Action Programs and I&M; and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys was to verify that customers listed in the program tracking database did indeed participate and the total number of measures in the kit were received. Additionally, survey respondents were asked a series of questions to verify that the kit measures were installed and if they are still in use.

7.1.2 Calculating Gross Annual kWh and Peak kW Reduction

ADM reviewed the 2012 Indiana TRM to calculate kit measures distributed through the SEE Program in 2015. ADM's deemed review is broken down between the following measure categories:

- 13W/23W CFLs;
- LED Night Lights;
- 9W LEDs;
- Energy Efficient Showerheads;
- Kitchen Faucet Aerators; and
- Filter Tone Alarms.

Table 7-2 displays the page numbers in the Indiana TRM that were referenced to determine savings for the above measures. As there is no section in the Indiana TRM for filter tone alarms, the savings algorithm for this measure was previously developed for use in the 2014 Statewide Core program portfolio using a variety of sources including prior evaluation reports and engineering studies performed for this measure in other regions.

Table 7-2 Indiana TRM Page References by Measure

Program Measure Name	*Page Reference in Indiana TRM*
13W CFL	9-15
23W CFL	9-15
9W LED	23-27
LED Night Light	28-29
Faucet Aerator	112-115
Low Flow Showerhead	116-119
Filter Tone	N/A

A. Deemed Savings Review - CFLs

The kits distributed to students contain the following CFLs:

- (3) 13W CFLs; and
- (2) 23W CFLs.

Annual savings for an individual CFL are calculated as:

Annual kWh Savings (CFLs) = (CFL Watts × Delta Watts Multiplier × Hrs per Yr/1000) × WHF_e WHF_d × ISR

Where,

CFL Watts = Wattage of CFLs provided in the kit

Delta Watts Multiplier = Lookup table value from Indiana TRM for 13W and 23W light bulbs to represent the wattage reduction from an incandescent bulb

Hours per Year = 1,040 (2.85 hours per day)

WHF_e = WHF_d = Waste Heat Factor for Energy to account for cooling savings from efficient lighting

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reductions (CFLs) = {(CFL Watts × Hours of use per day × CF)/ 1000} × WHF_d × ISR

Where;

CFL Watts = Wattage of CFLs provided in the kit

Hours of use per day = Delta Watts Multiplier from Indiana TRM for 13W and 23W light bulbs

WHF_d = Waste Heat Factor for Demand to account for cooling savings from lighting

CF = Peak Coincidence Factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

B. Deemed Savings Review – LED Bulb

The kits contain one 9W LED bulb. Annual savings for LED bulbs are calculated as:

Annual kWh Savings (LEDs) = (($Watt_{base}$ – $Watt_{LED}$)/1000) × ISR × HOURS × (1+WHF_e WHF_d)

Where,

$Watt_{base}$ = Wattage of baseline bulb, based on TRM lookup table

$Watt_{LED}$ = Wattage of LED

Hours per Year = 1,040 (2.85 hours per day)

WHF_e = Waste Heat Factor for Energy to account for cooling savings from efficient lighting

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reductions (LEDs) = $((Watt_{base} - Watt_{LED})/1000) \times ISR \times CF \times (1+\mathbf{WHF_d})$

Where;

$Watt_{base}$ = Wattage of baseline bulb, based on TRM lookup table

$Watt_{LED}$ = Wattage of LED

$\mathbf{WHF_d}$ = Waste Heat Factor for Demand to account for cooling savings from lighting

CF = Peak Coincidence Factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

C. Deemed Savings Review – Low Flow Showerheads

The kits contain one low flow showerhead. Annual savings for low flow showerheads are calculated as:

Annual kWh Savings (Low Flow Showerheads) = (2.80-GPMlow) × min/day × #people × shower/per × 8.3 × (Tshower-Tmains) × days in year/DHW Recovery Efficiency/3412 × ISR

Where,

2.80 = The baseline is a standard showerhead using 2.80 GPM

GPMlow = GPM of the showerhead provided in the kit

people = Average number of people per household

Shower/per = Average showers/ per day

Days in year = Days shower used per year

Min/day = Average minutes per shower

8.3 = Constant to convert gallons to lbs

Tshower = Assumed temperature of water used for shower (105)

Tmains = Assumed temperature of water entering house

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reductions (Low Flow Showerheads) =
(2.80-GPMlow) × 60 × 8.3 × (Tshower-Tmains)/ DHW Recovery Efficiency/3412 × CF × ISR

Where,

2.80= The baseline is a standard showerhead using 2.80 GPM

GPMlow = GPM of the showerhead provided in the kit

8.3 = Constant to convert gallons to lbs

Tshower = Assumed temperature of water used for shower (105)

Tmains = Assumed temperature of water entering house

CF = Peak coincidence factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

D. Deemed Savings Review – LED Night Lights

The kits contain one LED nightlight. The Indiana TRM contains a deemed value of 13.6 kWh for this measure, based on the following calculation:

Annual kWh Savings (LEDs) = (Incandescent Watts – LED Watts)/1000 × Hours/yr × ISR

Where,

Incandescent Watts = Wattage of an equivalent baseline LED (assumed 5 watts)

LED Watts = Wattage of LED provided in the kit (assumed 0.33 watts)

Hours/yr = 2,920

ISR = In Service Rate or percentage of distributed units that are installed

E. Deemed Savings Review – Faucet Aerators

The kits contain one kitchen faucet aerator. Annual savings for faucet aerators are calculated as:

Annual kWh Savings (Faucet Aerator) = (2.4-GPMlow) × min/day × DR × 8.3 × (Tft-Tmains) × 365/ DHW Recovery Efficiency/ 3412 × ISR

Where,

2.4 = Gallons per minute of baseline faucet

GPMlow = Gallons per minute of low flow faucet

min/day = Average minutes per day used by each faucet in home

days/y = Days faucet used per year

DR = Percentage of water flowing down drain (if water is collected in a sink, a faucet aerator will not result in any saved water)

8.3 = Constant to convert gallons to lbs

Tft = Assumed temperature of water used by faucet

Tmains = Assumed temperature of water entering house

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reduction (Faucet Aerator) = (2.4-GPMlow) × 60 × DR × 8.3 × (Tft-Tmains) / DHW Recovery Efficiency/ 3412 × CF × ISR

Where,

2.4 = Gallons per minute of baseline faucet

GPMlow = Gallons per minute of low flow faucet

DR = Percentage of water flowing down drain (if water is collected in

8.3 = Constant to convert gallons to lbs

Tft = Assumed temperature of water used by faucet

Tmains = Assumed temperature of water entering house

CF = Peak Coincidence Factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

F. Deemed Savings Review – Filter Tone Alarm

There is no section in the Indiana TRM dedicated to filter tone alarms. I&M provided ADM with a savings algorithm for the filter tone measure based on the previous 2014 evaluation of this program. The evaluators reviewed this algorithm and the associated measure input sources for reasonableness prior to incorporating this algorithm into the 2015 savings calculations.

The algorithms for filter tone alarm savings provided to ADM are as follows:

Annual kWh Savings (Central Air Conditioner) = FLH_{cool} × $BtuH_{CAC}$ × (1/SEER)/1000 * EF_{elec}

Annual kWh Savings (Heat Pump) = (FLH_{cool} × $BtuH_{CAC}$ * (1/SEER)/1000 + FLH_{heat} × $BtuH_{HP}$ * (1/HSPF)/1000) × EF_{elec}

Peak kW Reduction (Central Air Conditioner) = $BtuH_{CAC}$ × (1/EER)/1000 × EF_{elec} × CF

Peak kW Reduction (Heat Pump) = $BtuH_{HP}$ × (1/EER)/1000 × EF_{elec} × CF

Where,

EF_{elec} = Efficiency savings for gas furnace

SEER = Seasonal energy efficiency ratio

EER = Energy efficiency ratio

$BtuH_{CAC}$ = Size of central AC units

HSPF = Heating season performance factor

$BtuH_{HP}$ = Size of heat pump

CF = Summer peak coincidence factor for heat pump/central AC

FLH_{cool} = Full load cooling hours

FLH_{heat} = Full load heating hours

ADM reviewed the input assumptions used by the Statewide Core evaluation for this measure and found the majority of assumptions to be reasonable. However, ADM found that the EF_{elec} value of 0.035 was only applicable to units with poorly maintained filters, and the original study that developed this value applied a 1:1 ratio of properly maintained to poorly maintained appliances.[27] This results in an average EFelec of 0.0175 for a whole population, rather than the 0.035 value assumed for the Statewide Core evaluation. ADM applied this adjusted EF_{elec} to the savings algorithm for this measure, resulting in 18.65 kWh, and 0.036 kW per filter tone alarm.

7.1.3 Calculating Net kWh and Peak kW Reduction Impacts

Evaluation of net savings from the Schools Energy Education Program requires determination of free-ridership and spillover savings through surveying of parents or guardians of students who received energy conservation kits through the program.

7.1.3.1 Free-ridership Assessment

The free-ridership assessment consists of evaluating three components of participant behavior and decision making: prior planning, importance of program in decision making, and the likelihood of installing similar equipment without the energy conservation kit. The three components were addressed with questions detailed in the subsections to follow.

7.1.3.1.1. Prior Planning

Parents/guardians are asked whether they had pre-existing plans to purchase any of the kit measures. This is addressed in the following question:

- FR1: Before you heard of the program, did you have specific plans to purchase <KIT MEASURE>?

[27] Quantec: Engineering Review and Savings Estimates for the “Filtertone” Filter Restriction Alarm

- [FOR CFLS AND LEDS] FR2: How many of <KIT MEASURE> were you planning to purchase before you learned of the program?

If the respondent answers "No" to FR1, then the respondent is considered to have not been planning to purchase the measure and is not assigned a level of free-ridership for that measure under the planning component. If the respondent answers "Yes" and indicates that they were planning to purchase an equal or greater quantity of the measure prior to learning about the program, then the respondent is considered to have been planning to purchase the same quantity of measures with or without the conservation kit and is thus a partial free-rider.

7.1.3.1.2. Importance of Program in Decision Making

Once customers learn of the energy efficiency kit, it is possible that this knowledge will sway their decision making process to install these energy efficient measures in their homes. To address this, the survey included the following question:

- FR3: If you had not received the energy conservation kit, how likely would you have been to purchase <KIT MEASURE> on your own?

For FR3, if the respondent indicates that they "Definitely would not have purchased" the kit measures on their own, then they are considered to have been motivated by the energy efficiency kit and are not a free-rider on this component.

If the respondent indicates that they "Definitely would have purchased" or "Probably would have purchased", or "Probably would not have purchased" the measures provided in the kit sent by the I&M, then they are considered to have been less influenced by the energy efficiency kit and are assigned free-ridership values of 1.00, 0.66, or 0.33 for this variable, respectively.

7.1.3.1.3. Likelihood of Installing Similar Equipment without Program

Customers who indicate a likelihood of installing a kit measure without the program are then asked when they would have made the purchase and installation:

- FR4: When do you think you would have purchased any of the following items if you had never received them through the energy conservation kit?

Respondents who indicate that they would have made the purchase in the next 6 months are considered full free-riders in this component, and respondents who indicate that they would have made the purchase in 6-12 months are considered to be 50% free-riders for this component. Respondents who indicate that the purchase would not have occurred until more than a year later are considered not to be free-riders in this component.

7.1.3.1.4. Prior Experience

The survey also incorporates a 'Previous Experience' screen into the free-ridership assessment. The survey presents an itemized list of kit contents and asks participants whether they had previously installed any of these items:

- FR5: Before you received the kit, did you have the following items from the kit installed in your home?

This component of the net-to-gross analysis acts as a "mitigating factor", where participants who indicate that they do not have prior experience with a measure are considered less likely to have purchased that measure on their own without the program. If a respondent reports that they did not previously have a measure installed, their overall free-ridership level is reduced by 50%.

Aside from the mitigating Prior Experience factor, the indicator variables just described are averaged with equal weights to determine free-ridership for a given respondent.

7.1.3.2 Spillover Savings Assessment

In order to calculate spillover savings that are attributable to the Schools Energy Education Program, the parent/guardian survey included questions related to any additional energy efficiency purchases that have been made due to the customers' experience with the program. The survey prompts respondents with the following questions in order to identify additional purchases made:

- SO1: Because of your experience with the School Energy Education Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial rebate?
- SO2: Please indicate whether you have purchased any of the following items on your own since receiving the energy conservation kit, and indicate how many you have purchased.

Participants indicating one or more energy efficiency purchases are then be asked two questions in order to determine whether the energy savings resulting from that measure may be attributed to the program:

- SO3: On a scale of 0 to 10, where 0 represents "not at all important" and 10 represents "extremely important", how important was your experience with the School Energy Education Program in your decision to purchase the items you just mentioned?
- SO4: On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely" how likely would you have been to make the additional purchases you just mentioned even if you had not received a conservation kit through the program?

Participants responding to question SO3 with a rating of 7 or higher, and responding to question SO4 with a rating of 3 or lower, are considered to have been motivated by the program to make these additional purchases, and the energy savings from these items are attributed to the program. Savings for spillover measures similar to those included in the kits are calculated and then extrapolated to the population of respondents.

Once free-ridership and spillover rates are determined, ADM then estimates the Net-to-Gross Ratio (NTGR), calculated as:

NTGR = 1 – % Free-Ridership + Spillover Savings

7.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions for the SEE Program through applying algorithms in the Indiana TRM and through detailed analysis of program tracking data and participant survey data. This section presents the results of the gross and net savings calculation activities.

7.2.1.1 Number of Kits Distributed

The total number of kits distributed to instructors and students during PY6 is determined by (1) reviewing the program tracking system and related documentation from I&M and (2) administering a telephone survey with both instructors and the parents/guardians of students who received a kit.

ADM administered a telephone survey to 62 instructors and 35 parents/guardians for the PY6 evaluation. The instructor survey served to verify that the instructor had received the quantity of kits reported within program tracking data, and to verify that all of these kits were then distributed to students. The parent/guardian survey served to verify that the student had received the kit and also informed the installation rate assessment for individual measures.

Based on the instructor survey, ADM found a kit distribution rate of 99.9%. Out of the 1,647 kits verified received by instructors, 1,645 were then distributed to students. One instructor stated that they had not distributed 21 of the kits they received, but later clarified that these kits were used by another teacher.

All 35 parent/guardians verified that their student had received the energy efficiency kit. Therefore, no further adjustments were made to the kit distribution rate.

Applying the verified distribution rate of 99.9% to the program population of kits resulted in a total program population of 11,744 kits (compared to the 11,755 kits reported within program tracking data).

7.2.1.2 Installation Rate

Ex ante savings were further verified through the telephone survey effort by focusing on the installation rates of measures provided in the energy efficiency kit. Though the program consists of direct install by the participant, the telephone survey recognizes that some of the items may have been uninstalled or perhaps never installed by participating home owners. The installation rates determined through the telephone survey were applied to each kit measure to determine verified savings. Table 5-2 displays installation rates by measure.

Energy savings for the program are determined by applying the resulting installation rates to the quantity of measures reported within program tracking data, and then multiplying the resulting measure quantities by their individual savings values.

Table 7-3 Installation Rates per Measure

Measure	*Installation Rate*
23 Watt CFL (2)	80%
13 Watt CFL (3)	87%
LED Nightlight (1)	94%
Low Flow Showerhead (2)	74%
Low Flow Kitchen Aerator (1)	59%
Filter Tone Alarm (1)	60%
9 Watt LED (1)	64%

7.2.1.3 Gross and Net kWh Savings and Peak kW Reduction

Ex post gross savings were calculated using the algorithms specified in Section 7.1.2. As ex post savings were calculated based on the results of the PY3 Statewide Energizing Indiana evaluation, and ex post savings were primarily calculated using the Indiana TRM, realization rates ranged widely, from 6% to 255%.

The lowest realization rate was for kitchen aerators, which was due to an installation rate of 59% and a calculated electric-to-gas water heating ratio of 39% (based on participant survey results). However, even without the application of water heating type or installation rate the ex ante savings of 127 kWh for this measure greatly exceeded the Indiana TRM savings of 13.4 kWh. In contrast, savings of 260 kWh for low flow shower heads (not including installation rate or water heating type) were calculated using the Indiana TRM, whereas the ex ante savings for this measure were 76 kWh. Overall, ADM recommends that the program calculate ex ante savings using the Indiana TRM for future program years.

Measure-level realization rates are displayed in the following table, and are inclusive of installation rate and water heating type adjustments.

Table 7-4 Realization Rates per Measure

Measure	*Realization Rate*
23 Watt CFL (2)	135%
13 Watt CFL (2)	68%
LED Nightlight (1)	183%
Low Flow Showerhead (2)	255%
Low Flow Kitchen Aerator (1)	6%
Filter Tone Alarm (1)	67%
9 Watt LED (1)	52%

Table 7-5 displays a breakdown of ex post gross kWh and kW kit savings by measure for a full kit.

Table 7-5 Ex Post Gross kWh and kW Savings by Kit Measure

Measure Type	*Ex Post Gross kWh Savings Per Kit*	*Ex Post Gross kW Savings Per Kit*
23 Watt CFL (2)	75	0.01
13 Watt CFL (2)	68	0.01
LED Nightlight (1)	13	0.00
Low Flow Showerhead (2)	194	0.03
Low Flow Kitchen Aerator (1)	8	0.00
Filter Tone Alarm (1)	11	0.02
9 Watt LED (1)	21	0.00
Total	389	0.07

Table 7-6 converts the participant level ex post gross kWh and kW savings to the program level. This is accomplished by multiplying the measure level savings displayed in Table 7-5 by the total number of kits verified as distributed through the program (11,744). Table 7-7 and Table 7-8 display audited and verified savings.

Table 7-6 Ex Post Gross Impact Summary

Program	*PY6 Program kWh Goals*	*Gross Peak kW Reduction*		*Gross kWh Energy Savings*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Schools Energy Education	4,962,843	705.30	811.03	4,962,961	4,571,388	92%

Table 7-7 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*
4,962,961	4,962,961	3,578,191	4,571,388

Table 7-8 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
705.30	705.30	508.51	811.03

The net-to-gross methodology described in Section 5.1.3 resulted in net-to-gross ratios for each individual measure. Table 7-9 displays the net-to-gross ratios by measure, as well as the overall program-level net-to-gross ratio. The overall net-to-gross ratio is 69%, with filter tone alarms having the highest net-to-gross ratio and CFLs having the lowest net-to-gross ratio. The net-to-gross ratios for CFLs and LED night lights include a very small amount of spillover (less than one percentage point for CFLs and three percentage points for LED night lights), as one participant indicated that they had purchased additional CFLs and LED night lights as a result of their participation in the program.

Table 7-9 Schools Kits Net-to-Gross Ratios by Measure

Measure	*Net-to-Gross Ratio*
23 Watt CFL	58%
13 Watt CFL	58%
LED Nightlight	79%
Low Flow Showerhead	75%
Low Flow Kitchen Aerator	81%
Filter Tone Alarm	87%
9 Watt LED	71%
Overall	69%

Table 7-10 below presents the ex post net savings by kit measure for the full program population of 11,744 kits.

Table 7-10 Schools Kits Ex Post Net Savings by Measure

Measure	*Ex Post Net kWh*	*Ex Post Net kW*
23 Watt CFL	510,597	60.66
13 Watt CFL	465,898	55.35
LED Nightlight	118,971	-
Low Flow Showerhead	1,712,985	222.32
Low Flow Kitchen Aerator	75,148	27.39
Filter Tone Alarm	114,127	220.30
9 Watt LED	175,594	20.86
Overall	3,173,323	606.89

The program-level ex post net savings are displayed in Table 7-11. The net savings total includes 16,717 kWh and 1.23 kW of spillover resulting from extrapolation of survey data indicating that the program had resulted in the purchase of additional CFLs and LED night lights.

Table 7-11 Net Impact Summary

Gross kWh Savings	*Gross Peak kW Reduction*	*Net-to-Gross Ratio*	*Net kWh Energy Savings*	*Net Peak kW Reduction*
4,571,388	811.03	69%	3,173,323	606.89

7.3 Process Evaluation

This chapter presents the results of the process evaluation of I&M's SEE Program during program year six (PY6). The PY6 process evaluation of the SEE Program is based upon analysis of program structure and tracking data, and interviews and surveys of current program participants and I&M program staff as well as Resource Action Programs staff.

7.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity include:

- How useful were items in the Schools Energy Education kit? Did the kit contain information relevant to the customer?
- Has the customer or their child engaged in any additional energy conscious behaviors since receiving the energy conservation kit?
- What are the recipient satisfaction levels with the program and its components? Are there specific demographics which display markedly higher or lower satisfaction levels?
- What changes, if any, would the customer like to see in the program or in the kit?
- Customer demographics. What type of heating and water heating does the customer have? How many occupants are there in the home? How old is the home?

7.3.2 Summary of Primary Data Collection

- **Program documentation review:** The Evaluators reviewed program documents including program descriptions and surveys administered by Resource Action Programs to parents and guardians of students who received kits.
- **Parent/guardian surveys:** The Evaluators conducted surveys with a sample of parents and guardians whose students received kits through the program. Respondents provided insight into their installation of the kit measures, satisfaction with the items, and perspective on their child's experiences with the program. Responses from the parent/guardian survey were also used to inform the net savings analysis, which is further discussed in the impact evaluation chapter of this report.
- **Instructor surveys:** The Evaluators conducted surveys with a sample of instructors who requested kits for their classrooms during PY6. The instructor survey served to assess whether all kits received by instructors were distributed to students, and to examine instructor involvement with the educational materials offered through the program.

- **Interviews with program staff:** An interview with I&M program management staff provided insight into program launch, and whether there were any issues with program administration or performance. Similarly, an interview with implementation staff at Resource Action Programs provided insight into program objectives and potential future program opportunities.

7.3.3 Parent/Guardian Survey Findings

The following section presents key findings from surveys conducted with parents and guardians whose children received kits through the SEE Program during PY6.

ADM completed a survey of parents and guardians who received energy efficiency kits through the SEE Program. In addition to collecting information to estimate gross and net savings, the survey also contained questions pertaining to participants' experience with the program. Specifically, respondents provided information on the condition of the kits, reasons for not installing kit items, satisfaction with the contents, energy saving actions influenced by the program, and awareness of rebate programs offered by I&M.

In total, 35 parents or guardians completed the survey. On average, these respondents reported that their homes have 3.5 bedrooms, 1.9 bathrooms, and 4.1 persons living in them. A minority of homes had electric heating (14%) while a larger share reported that their water was heated by electricity (38%).

Table 7-12 Average Number of Bedrooms, Bathrooms, and Residents

Metric	*Average*
Number of bedrooms (N = 35)	3.5
Number of bathrooms (N = 34)	1.9
Number of residents (N = 34)	4.1

Table 7-13 Heating System and Water Heating Types

Fuel Type	*Heating System Type (N = 35)*	*Water Heating Type (N = 34)*
Natural Gas	80%	59%
Electric	14%	38%
Combination of Types	3%	N/A
Don't know	3%	3%

7.3.3.1 Condition of Kits Contents Upon Arrival

As shown in Table 7-14, very few (6%) of the kit recipients reported that one or more items in the kit was broken or not working. One of the respondents reported that a light bulb was broken and another that an LED nightlight was broken. Neither of these respondents contacted program staff about the broken item.

Table 7-14 Incidence of Broken Items

Were any of the kit items broken or not working?	*Percent of Respondents (N = 35)*
Yes	6%
No	91%
Don't know	3%

7.3.3.2 Installation of Kit Items

The share of respondents that reported that they installed some or all of the kit items is shown in Table 7-15. Customers were most likely to report installing the nightlight (94%) included in the kit, followed by the CFLs (88%). Install rates for faucet aerators (59%), furnace filter tone alarm (58%), and the LED light bulb (50%) were lower.

Table 7-15 Installation of Kit Items

Product Type	*Installed Some or All*
Nightlight (N =35)	94%
CFL Light Bulbs (N =32)	88%
Showerhead (N =35)	74%
Faucet Aerator (N =34)	59%
Furnace Filter Tone Alarm (N =31)	58%
LED Light Bulb (N =28)	50%

Table 7-16 displays the number of measure types installed by participants. As shown, all participants installed at least one item and a majority installed four or more of the six items. Overall, this table shows that uninstalled items are the result of participants choosing not to install one or more items rather than a few participants not installing any items.

Table 7-16 Number of Product Types Installed

Number of Product Types	*Percent of Respondents (N = 35)*
0	0%
1	3%
2	11%
3	23%
4	26%
5	23%
6	14%

Additional information regarding the installation of the kit items is described in the sections below.

7.3.3.2.1 LED Night Light

Fifty-two percent of respondents reported that they installed the nightlight in a location where a standard nightlight was previously installed. Twenty-nine percent of those that replaced a

nightlight indicated that they threw away the old night light, while 12% reported moving it to a new location, and 59% stored it for later use.

The two participants that reported not installing the nightlight indicated that either it was being stored or that the nightlight was broken.

7.3.3.2.2 CFL Installation

Four customers provided reasons for not installing any of the CFLs. Three indicated that they were waiting for their current bulbs to burn out and one indicated that they did not like the color of the CFLs light.

On average, similar shares of the 23 watt CFLs (64%) and 13 watt CFLs (61%) were installed, suggesting no clear preference for one type of bulb over another by kit recipients.

All respondents that did not install all of the CFLs (n = 14) said that the uninstalled bulbs were being saved for future use.

7.3.3.2.3 Showerhead

Nine customers provided reasons for not installing any of the showerheads. The most commonly mentioned reason for not installing them, noted by 44% of the nine respondents that did not install the item, was that they do not like energy efficient showerheads. Additionally, another one-third of respondents indicated that they already had energy efficient showerheads installed. Other reasons provided, each mentioned by one respondent, were that the respondent was waiting for the current shower head to need replacement and had not had the time to install the showerhead.

7.3.3.2.4 Faucet Aerators

Table 7-17 summarizes the reasons for not installing the faucet aerators. The most commonly provided reason for not installing the aerators was that it did not fit the faucet and a gender adapter was not provided (43%). Other commonly mentioned reasons were that the customer already had them installed (29%) or did not have time to install them (21%).

Table 7-17 Reasons for not Installing Faucet Aerators

Reasons for not Installing Faucet Aerators	*Percent of Respondents (N = 14)*
Doesn't fit my faucet (no gender adapter)	43%
Already have them	29%
Have not had time	21%
Did not understand how to install	7%
Well water pressure is too low	7%
Getting assistance from someone else	7%

7.3.3.2.5 Furnace Filter Tone Alarm

Table 7-18 summarizes the reasons given for not installing the furnace filter tone alarm. As shown, a variety of reasons were given but lack of knowledge or time to install it were the most common reasons provided.

Table 7-18 Reasons for not Installing Furnace Filter Tone Alarm

Reasons for not Installing Furnace Filter Tone Alarm	*Percent of Respondents (N = 12)*
I didn't know how to install the filter tone	17%
I haven't had time to install the filter tone	17%
I didn't like the idea of a filter alarm	8%
We already have a filter tone device installed	8%
Doesn't work	8%
Getting assistance from someone else	8%
Other	8%
Don't know	17%

7.3.3.2.6 LED light bulb

All eight participants that provided a reason for not installing the LED bulb indicated that they did not have a location for it. Additionally, all indicated that they were storing it for future use.

7.3.3.3 Satisfaction with Kits Measures and Suggestions for Additional Items

Table 7-19 summarizes responses regarding which items in the kits were the most useful to recipients. Overall, the responses indicate that there was considerable variation in which products were deemed most useful by recipients, with no single item clearly preferred by a majority of recipients. Only one item, the furnace filter tone alarm, was not considered to be the most useful by all participants.

These findings suggest that different items appealed to different recipients and that the mix of items is probably well designed to provide a benefit to most recipients, even if any given item is relatively less useful to a particular participant.

Table 7-19 Kit Items Considered Most Useful

Kit Products Considered Most Useful	*Percent of Respondents (N = 35)*
CFL bulbs	34%
13W CFL	37%
23W CFL	57%
Prefer different wattage	7%
Energy efficient showerhead	23%
LED bulb	17%
Faucet aerators	14%
LED night light	9%
The stickers sent	3%
Filter tone	0%

Respondents who reported installing the kit items were asked to rate their level of satisfaction with the items. As shown in Figure 7-1, either all or most recipients were satisfied with each of the items. Recipients were most likely to report being satisfied with the CFLs, LED light bulbs, and nightlights. The only two measures for which any participant noted dissatisfaction were the showerhead and faucet aerators. One respondent reported dissatisfaction with each of these measures.

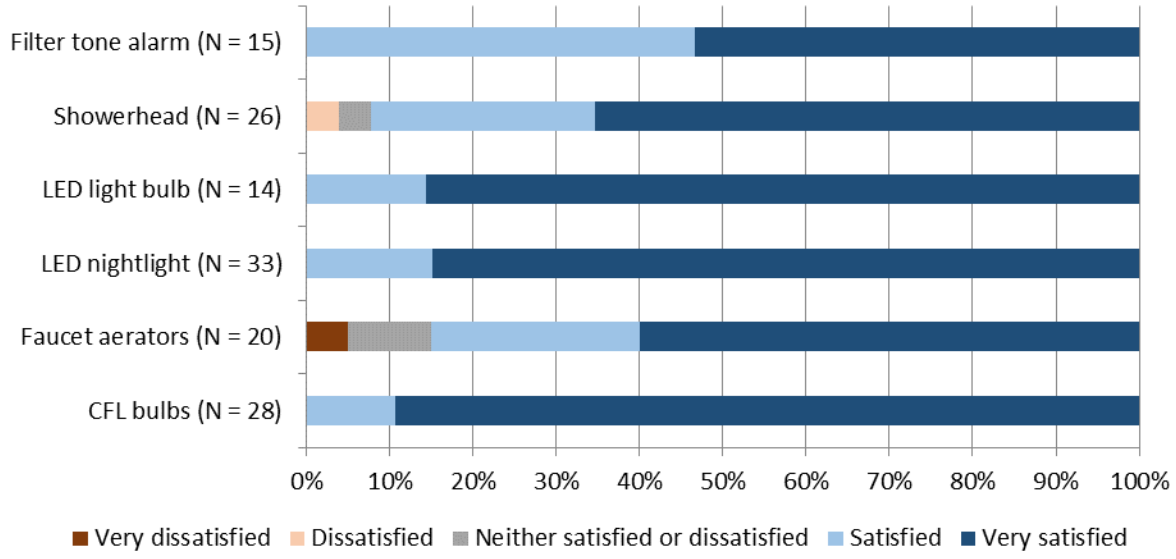


Figure 7-1 Satisfaction with Kit Items

Survey respondents were asked if there were additional products that they think should be included in the kits. As shown, in Table 7-20 nearly one-half of respondents did not have any suggestions for additional products and the most frequently made suggestions were to include more of the products already provided.

Table 7-20 Suggested Additional Products

Additional Products	*Percent of Respondents (N = 34)*
More faucet aerators	12%
Additional night light	9%
More light bulbs	6%
More LED bulbs	6%
More of each	3%
Door / window sealing	3%
Improved instructions	3%
Thermostat	3%
Higher wattage CFLs	3%
None	44%
Don't know	9%
Other	3%

7.3.3.4 Program Impact on Energy Saving Knowledge and Behavior

Ninety-four percent of survey respondents indicated that they are very familiar or somewhat familiar with ways to save energy as a result of the program, a finding that may suggest that the program is increasing knowledge of energy conservation.

Table 7-21 Familiarity of Ways to Save Energy as a Result of the Program

Response	*Percent of Respondents (N = 35)*
Very familiar	63%
Somewhat familiar	31%
A little familiar	3%
Not at all familiar	3%
Don't know	0%

Moreover, 60% of respondents reported that they had changed some aspect of the way they used energy in their homes. These respondents were asked to report what actions they had taken. Their responses are summarized in Table 7-22.

The most commonly reported action, by a wide margin, was turning off lights when not in use. Seventy-six percent of respondents that took one or more actions reported making this behavior change. Less frequently reported actions included unplugging appliances when not in use (24%), adjusting thermostat settings (14%), using cold water for washing (10%), and taking shorter baths or showers (10%).

Table 7-22 Actions Taken to Save Energy Resulting from the Program

Action Taken	*Percent of Respondents (N = 21)*
Turn off lights when not in use	76%
Unplug appliances when not in use	24%
Adjust thermostat settings/Decrease use of heating and cooling equipment	14%
Use cold water for washing	10%
Take shorter baths or showers	10%
Use our windows to help manage the temperature in the home	5%
Turn off TVs when leave room	5%
Use lower light bulbs that are not as bright	5%
Turn off water more quickly	5%
Don't know	5%

7.3.3.5 Cross-Program Awareness

In order to gauge kit recipient awareness of and participation in other programs offered by I&M, survey respondents were asked whether they were aware of any other rebates, incentives, or energy efficiency services offered by the utility. Only eleven percent (n = 4) of respondents indicated that they were aware of at least one other program; these respondents were then asked which programs they were aware of and which they had participated in. Because some customers may be aware of incentives or discounts for particular equipment or measures, but may not know the name of the associated program, respondents were prompted with a description of each program rather than with the name of the program.

Awareness of and participation in other efficiency programs is presented in Table 7-23. All four respondents were aware of the Refrigerator Recycling Program and one-half were aware of the Home Weatherization Program. Only one respondent had participated in any program. This respondent participated in the Home Weatherization Program.

Table 7-23 Cross-Program Awareness

Program	*Heard of Program (N =4)*	*Participated in Program (N =4)*
Peak Reduction Program	0%	0%
Refrigerator Recycling Program	100%	0%
Energy Efficient Products (Lighting Discounts)	0%	0%
Residential Home Weatherization Program	50%	25%
Energy Efficient Products (Appliance and Thermostat Rebates)	25%	0%
Online Energy Check-up Program	0%	0%

Three of the four respondents indicated that they learned of the programs through a bill insert and one respondent indicated learning of the programs through an email.

These results indicate that there is significant potential to promote awareness of other I&M efficiency programs through the Schools Kits Program.

7.3.3.6 Parent / Guardian Conclusions and Recommendations

- **Kit is Well Designed:** Overall, the survey responses suggest that the kits contents are appropriate. With the exception of the furnace tone alarm, each item type was endorsed by some participants as the most useful item in the kits. Additionally, nearly all respondents were satisfied with each of the items provided. For the most part, the reasons for not installing items centered on not currently having a need for the item (e.g., no location to install the light bulb) rather than dislike of the items. The one exception was for showerheads, for which 44% of respondents indicated that they did not like them. Faucet aerators was the only item for which a sizable share of respondents indicated that they had not installed the item because it did not fit their equipment. Staff should consider including a gender adapter with the kit for each faucet aerator to increase install rates.

- **Few Broken Items Reported:** Only 6% of respondents reported that a kit item was broken when it was received. A nightlight and CFLS were the items reported as broken.

- **Parents/Guardians Report Behavioral Impacts:** Sixty percent of respondents reported that they had changed their energy use behavior because of the program. Turning off lights when not in a room was the most commonly reported behavior change. This finding suggests the kits are increasing participant focus on saving energy beyond installing the kit items.

- **Awareness of Other Programs is Low:** The program may be able to capitalize on the increased concern with saving energy reported by respondents by providing information about the energy efficiency rebates and discounts provided by I&M. Relatively few of the survey respondents reported being aware of other efficiency programs offered. Staff may want to consider including a one-page hand out informing customers of the efficiency programs that provides links to additional information available online.

7.3.4 Instructor Survey Findings

The following section presents key findings from surveys conducted with instructors who requested and received kits from the SEE Program to distribute within their classrooms during PY6.

A survey of instructors that participated in the SEE Program by requesting conservation kits for their students was completed. Respondents were asked questions regarding their interactions with and perceived benefits of the program, including:

- Assessing initial student reception of program;
- Instructor motivations for participating in the program;

- Perceived benefits to the classroom, students, and parents/guardians of students;
- Verification of kit distribution to students;
- Suggestions for future program offerings or improvements in program delivery; and
- Overall satisfaction with the Schools Energy Education Program.

In total, 62 instructors completed the survey.

7.3.4.1 Distribution of Kits

Instructors were asked a series of questions about the receipt and distribution of the kits. All of the instructors indicated that the kits were received in a timely manner.

Ninety-five percent of instructors indicated that they distributed all of the kits. The three instructors reported that on average, nine kits were not distributed. However, the number of kits not distributed varied substantially. One respondent reported that 21 kits were not distributed, although this instructor clarified that the 21 kits were used by another instructor. The remaining two respondents reported that fewer than five kits were not distributed.

Table 7-24 Distribution of Kits

Were all of the kits distributed to students?	*Percent of Respondents (N =55)*	*Average Number of Kits Not Distributed (N = 3)*
Yes	95%	N/A
No	5%	9

Instructors provided varying explanations of what was done with the kits that were not distributed, as summarized in Table 7-25. The instructor that reported 21 kits were not distributed indicated that they were used by another teacher.

Table 7-25 Distribution of Kits

What was done with the kits not distributed?	*Percent of Respondents (N =3)*
Used by another teacher	33%
Kept for use as replacements parts	33%
Kept as extras	33%

7.3.4.2 Receipt and Use of Instructional Materials

Figure 7-2 summarizes responses to questions regarding the receipt and use of lesson plans. As shown, all respondents indicated that they received the lesson plans, 85% reported using them, and 13% that reported not using them. The reasons given for not using them were that other teaching priorities took precedence, that there was insufficient time to incorporate them into the curriculum, and that the lesson plans were not relevant to the course.

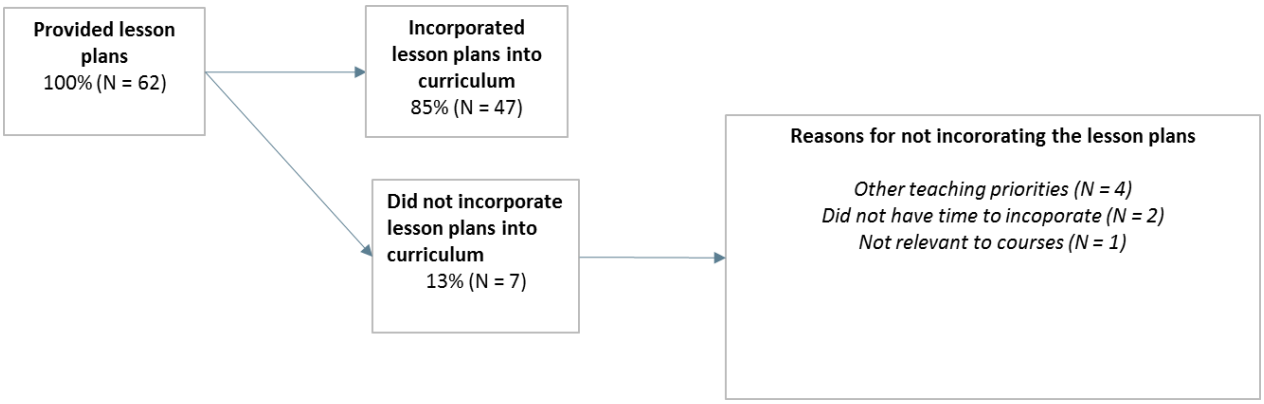


Figure 7-2 Receipt and Use of Lesson Plans

Sixty-five percent of respondents indicated that they received other education materials in addition to the teacher book. The materials received are summarized below in Table 7-26.

Table 7-26 Additional Educational Materials Received

Additional Materials Received	*Percent of Respondents (N =36)*
Workbooks	53%
Posters	39%
Online resources	11%
Student Activity Ideas	8%
Handouts	3%
Student Questionnaire	3%
Student/Parent packets	3%
Teacher kit	3%
Don't recall	8%

7.3.4.3 Feedback from Students

Seventy-four percent of instructors reported that they had received feedback from students on the use of the items provided in the energy saving kit. Nearly all of the instructors that received feedback reported that the feedback was positive (93%), however, 7% reported that they had received both positive and negative feedback.

As shown in Table 7-27, the positive feedback received was most commonly about liking the products (38%) and working with parents on installing the kit items (33%). Instructors also indicated that students liked the hands-on experience (23%) and that they were excited to save energy and money (20%).

Table 7-27 Types of Positive Feedback Received from Students

Positive Feedback Received	*Percent of Respondents (N=40)*
Liked /excited about the products	38%
Installing / working with parents	33%
Liked the hands-on experience	23%
Excited to save energy / money	20%
Excited to learn something	3%
Other	10%

Three respondents indicated that they had heard some negative feedback from students. The types of feedback noted were parental concern about the mercury content in the bulbs, that the low-flow devices did not fit the student's faucet, and that they did not have time to install the kits contents.

7.3.4.4 Program Satisfaction

Figure 7-3 summarizes instructor satisfaction with the program. As shown, nearly all were satisfied with the kit contents, the educational materials, or the program as a whole and none were dissatisfied with these aspects or the program as a whole.

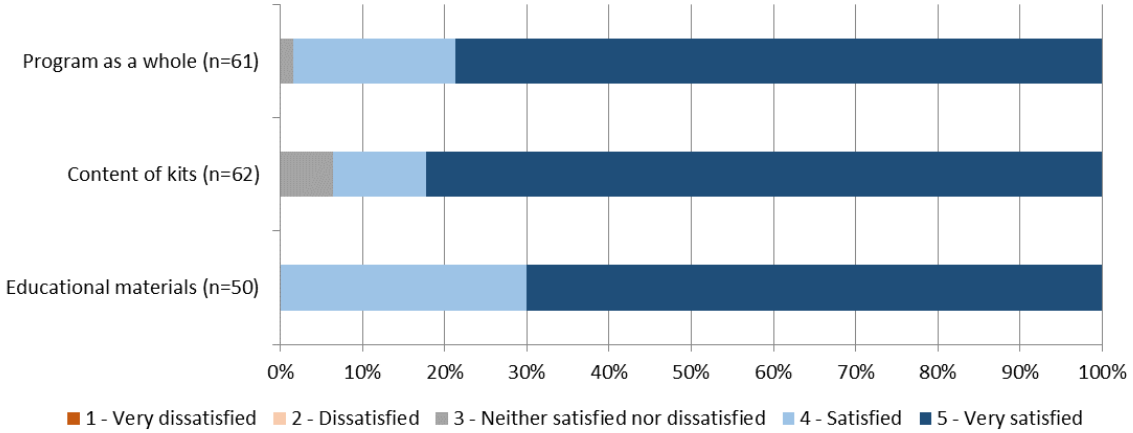


Figure 7-3 Program Satisfaction

Instructors were asked to provide suggestions they may have for improving the program. Twenty-two instructors provided a variety of suggestions as shown in Table 7-28.

Table 7-28 Suggestions for Improving the Program

Suggestion	*Percent of Respondents (N =22)*
Involve instructors earlier in year	14%
Provide a representative to explain the kit and program	14%
Expand to other grade levels	9%
Provide more LED bulbs	9%
Remove filter tone	9%
Change the kit each year because siblings will pass through the program	5%
Include space for students to write notes in booklets	5%
Make activities easier	5%
More online materials	5%
Remove the light bulbs	5%
The text could be made more interesting	5%
Other	18%

7.3.4.5 Instructor Survey Conclusions and Recommendations

- **Instructors Satisfied with the Program:** Instructors are largely satisfied with the program. All indicated that they were satisfied with the instructional materials and nearly all were satisfied with the program overall. Additionally, many more instructors indicated that they had heard positive feedback from students than negative feedback. Students were excited about the products and value that the program provides them an opportunity to interact with their parents through the installation of the kit items. Additionally, they are excited to save energy and money.

- **High use of Instructional Materials:** Eighty-five percent of instructors reported that they incorporated the lesson plans into their curriculum. Most of those that did not incorporate them stated that other teaching priorities took precedent or that they did not have time to incorporate them into the program. Staff may improve the use of the curriculum materials by providing them with more notice to enable instructors to incorporate them into their lesson plans.

- **Most Kits Distributed:** More than ninety-five percent of kits were distributed by instructors. Two of the three instructors did not distribute a relatively small number of kits (i.e., < 5), however, one instructor reported not distributing 21 kits. Although this was an isolated case reported by respondents, the large number of kits not distributed by this participant suggests that staff should consider revising ordering procedures or providing a means to have the undistributed kits returned.

7.3.5 Program Operations Perspective

This section summarizes the core findings from interviews conducted with I&M program management staff and Resource Action Programs staff for the purposes of identifying program strengths, challenges thus far, and future opportunities. The following subsections summarize (1) the roles and responsibilities of the staff responsible for managing program operations, (2) the program design and delivery framework, (3) communication between the utility and the implementation team, and (4) planned changes for PY7 and staff responses to participant survey feedback. In closing, key findings will highlight the most salient themes from the program areas and research activities described above.

7.3.5.1. Program Staff Roles and Responsibilities

Interviews were held with the two primary program staff responsible for program oversight and delivery. The I&M program team is led by the Program Coordinator who is responsible for program implementation oversight. The Program Coordinator also works with the implementation contractor to develop the list of schools that are approved to participate in the program. The School Energy Education Program is implemented by Resource Action Programs (RAP), an energy efficiency programs solutions provider headquartered in Sparks Nevada. RAP implements measure-based market, education and outreach programs all over the United States.[28]

The program implementation team is comprised of a Program Manager and Program Coordinator who manage the day-to-day operations and who are also supported by design, IT, marketing, and production teams. The Program Manager is responsible for coordinating the program launch by setting the kit measure mix, branding, and overseeing ex ante savings calculations. The Program Coordinator works to enroll participating schools and addresses questions and concerns from teachers. Both utility and implementation program staff indicated the current staffing resources are sufficient for effectively delivering the School Energy Education Program.

7.3.5.2. Program Design and Delivery

Staff was asked to provide feedback regarding the PY6 program design and delivery. Staff discussed the process for enrolling schools, defining the program goals and onboarding participating teachers. I&M began by providing RAP with a list of all zip codes in the Indiana service territory; RAP came up with a list of all public and private schools in those zip codes and provided it to I&M. I&M was able to screen that initial list based on their utility account numbers to ensure each school on the list was an I&M customer. The result was the target population, a list of schools that were eligible to participate in the program. As part of the implementation contract, RAP guarantees enrollment of at least 80% of the program eligible schools with 5th grade students in the target population. In PY6 there were 185 eligible schools in the Indiana service territory, of those 159 were enrolled, which represents an 86% enrollment rate. Program energy savings goals were initially based on an 80% enrollment rate and a pre-determined ex ante kWh savings per kit.

[28] http://www.resourceaction.com/about-us/

The RAP Program Coordinator solicits each school by contacting its administration to explain the program offerings and participation process. Pending administrator agreement, each 5th grade teacher receives a letter and a program data sheet in their mailbox. Program staff then contacts teaching staff to schedule delivery of the program curriculum determine the number of kits needed. Each enrolled teacher receives detailed lesson plans and tips for teaching the concepts at a 5th grade level. The curriculum is designed to be taught by teachers from all educational disciplines. The program can be implemented in as little as 5 days or up to 2 weeks. The teacher can directly contact to program staff or an education director if they have any questions or concerns about delivering the information to students.

Staff indicated the first mailers were sent to schools in early February and the 1st kits were shipped out on February 27th. The kits are handed out in class; each student takes a kit home and installs the measures with a parent or guardian. The goal is to get families talking about home energy use and ways to conserve energy. Table 7-29 below summarizes the contents of each take-home kit.

Table 7-29 School Energy Education Program – PY6 Student Kit Contents

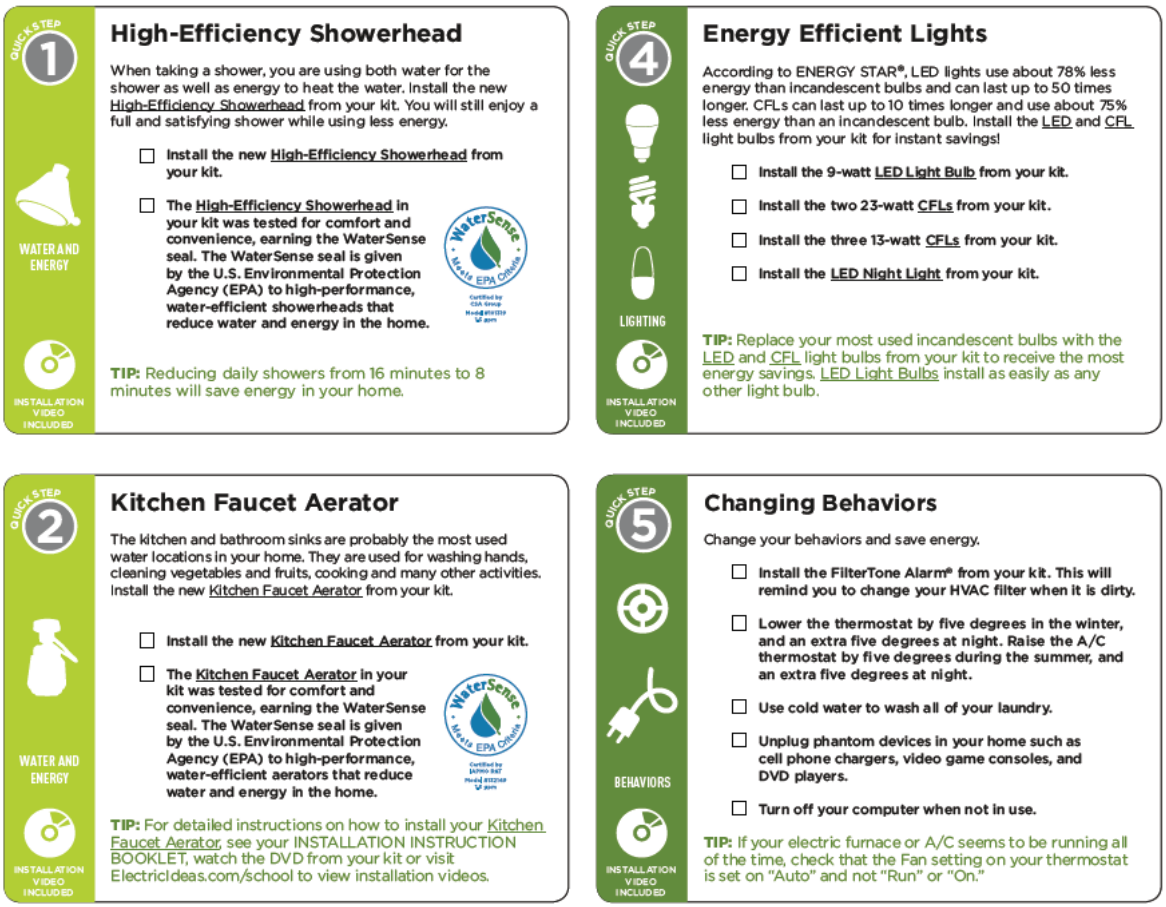
2015 School Kit Contents
(2) ENERGY STAR® Compact Fluorescent Bulbs: 23w = 100w equivalent
(3) ENERGY STAR® Compact Fluorescent Bulbs: 13w = 60w equivalent
(1) 9 Watt LED (800 Lumen, ENERGY STAR Rated, Omni-directional, Dimmable)
(1) LED Nightlight
(1) Showerhead 1.5 GPM – 3-way Adjustment
(1) Kitchen Faucet Aerator 1.5 GPM
(1) FilterTone® Alarm
(1) Flow Rate Test Bag
(1) Sticker and Magnet Pack
(1) Digital Thermometer (Water / Fridge / Freezer)
Wristband Postcard
Parent Comment Card
Custom Direct-Printed Five-Color School Energy Education Box
Parent/Guardian Quick Start Guide
Installation DVD

The parent comment card is designed to elicit feedback from parents. To encourage return of the comment card, teachers are provided a $50 stipend if 80% or more of the class returns the card.

The comment card has 4 questions:

- Was the program easy for you and your child to use?
- Will you continue to use the kit items after the completion of the program?
- Would you like to see this program continued in local schools?
- What comment would you like to express about the School Energy Education Program?

The parent quick start guide is designed to provide installation instructions for each measure included in the kit. It also has energy savings tips that relate to various aspects of home energy use. The same instructions are also printed in Spanish. Similar information is included in the installation DVD. The objective was to provide instructions through multiple information mediums and languages to accommodate diversity in learning styles and languages. Figure 7-4 provides a screen shot of the quick start guide.



QUICK STEP 1

High-Efficiency Showerhead

When taking a shower, you are using both water for the shower as well as energy to heat the water. Install the new High-Efficiency Showerhead from your kit. You will still enjoy a full and satisfying shower while using less energy.

- ☐ Install the new High-Efficiency Showerhead from your kit.
- ☐ The High-Efficiency Showerhead in your kit was tested for comfort and convenience, earning the WaterSense seal. The WaterSense seal is given by the U.S. Environmental Protection Agency (EPA) to high-performance, water-efficient showerheads that reduce water and energy in the home.

WATER AND ENERGY

INSTALLATION VIDEO INCLUDED

TIP: Reducing daily showers from 16 minutes to 8 minutes will save energy in your home.

QUICK STEP 4

Energy Efficient Lights

According to ENERGY STAR®, LED lights use about 78% less energy than incandescent bulbs and can last up to 50 times longer. CFLs can last up to 10 times longer and use about 75% less energy than an incandescent bulb. Install the LED and CFL light bulbs from your kit for instant savings!

- ☐ Install the 9-watt LED Light Bulb from your kit.
- ☐ Install the two 23-watt CFLs from your kit.
- ☐ Install the three 13-watt CFLs from your kit.
- ☐ Install the LED Night Light from your kit.

LIGHTING

INSTALLATION VIDEO INCLUDED

TIP: Replace your most used incandescent bulbs with the LED and CFL light bulbs from your kit to receive the most energy savings. LED Light Bulbs install as easily as any other light bulb.

QUICK STEP 2

Kitchen Faucet Aerator

The kitchen and bathroom sinks are probably the most used water locations in your home. They are used for washing hands, cleaning vegetables and fruits, cooking and many other activities. Install the new Kitchen Faucet Aerator from your kit.

- ☐ Install the new Kitchen Faucet Aerator from your kit.
- ☐ The Kitchen Faucet Aerator in your kit was tested for comfort and convenience, earning the WaterSense seal. The WaterSense seal is given by the U.S. Environmental Protection Agency (EPA) to high-performance, water-efficient aerators that reduce water and energy in the home.

WATER AND ENERGY

INSTALLATION VIDEO INCLUDED

TIP: For detailed instructions on how to install your Kitchen Faucet Aerator, see your INSTALLATION INSTRUCTION BOOKLET, watch the DVD from your kit or visit ElectricIdeas.com/school to view installation videos.

QUICK STEP 5

Changing Behaviors

Change your behaviors and save energy.

- ☐ Install the FilterTone Alarm® from your kit. This will remind you to change your HVAC filter when it is dirty.
- ☐ Lower the thermostat by five degrees in the winter, and an extra five degrees at night. Raise the A/C thermostat by five degrees during the summer, and an extra five degrees at night.
- ☐ Use cold water to wash all of your laundry.
- ☐ Unplug phantom devices in your home such as cell phone chargers, video game consoles, and DVD players.
- ☐ Turn off your computer when not in use.

BEHAVIORS

INSTALLATION VIDEO INCLUDED

TIP: If your electric furnace or A/C seems to be running all of the time, check that the Fan setting on your thermostat is set on "Auto" and not "Run" or "On."

Figure 7-4 School Energy Education Program Quick Start Guide

7.3.5.3. Communication

Staff provided their perspective on the frequency and nature of communication between the utility and program implementation teams. Each week the program team hosts a call to discuss program activity and any issues that come up with regards to the School Energy Education Program. RAP also provides a monthly progress report to I&M that coincides with the monthly invoice. It includes the participating school addresses, the number of kits sent out, date the teacher requested the kits by, shipping date, tracking information, the freight company, and kWh savings for the associated kits.

Both I&M and RAP staff said the level of communication is sufficient for effectively supporting the delivery of the School Energy Education Program. Overall implementation staff are responsive and are able to quickly turnaround requested program information and data requests.

7.3.5.4. PY7 Changes and Response to Participant Feedback

Looking forward, staff was asked if there are any planned changes to the program design or delivery strategies. The only changes planned at this time are the removal of one 23W CFL that will be replaced by one 9W LED.

The evaluation team administered surveys to both parent kit recipients and participating teachers. Two suggestions were commonly made by survey recipients (1) consider expanding the program to more grades and (2) consider having program staff come into the classroom to administer the lesson plan and answer questions for the students. Staff stated that there are no plans to expand the program beyond the 5th grade. Staff indicated that tracking participation as students transfer schools and grades becomes challenging; the program is designed so that a student only participates once. Additionally, RAP's research has found that students at the 5th grade level are at the ideal age to participate because they are more receptive and engaged in the curriculum than students in other age groups.

Regarding the suggestion that program staff deliver the curriculum, staff noted that the providing that instruction would not be cost effective.

7.3.6 Conclusions and Recommendations

This section summarizes key conclusions, and any associated recommendations, resulting from the PY6 evaluation of the SEE Program. Key findings and recommendations for the PY6 Renewables and Demonstrations program evaluation include:

- **Kit is well designed.** Overall, the survey responses suggest that the kits contents are appropriate. With the exception of the furnace tone alarm, each item type was endorsed by some participants as the most useful item in the kits. Additionally, nearly all respondents were satisfied with each of the items provided. For the most part, the reasons for not installing items centered on not currently having a need for the item (e.g., no location to install the light bulb) rather than dislike of the items. The one exception was for showerheads, for which 44% of respondents indicated that they did not like them. Faucet aerators was the only item for which a sizable share of respondents indicated that they had not installed the item because it did not fit their equipment. Staff should consider including a gender adapter with the kit for each faucet aerator to increase install rates.

- **Parents/guardians report behavioral impacts.** Sixty percent of respondents reported that they had changed their energy use behavior because of the program. Turning off lights when not in a room was the most commonly reported behavior change. This finding suggests the kits are increasing participant focus on saving energy beyond installing the kit items.

- **Instructors satisfied with the program.** Instructors are largely satisfied with the program. All indicated that they were satisfied with the instructional materials and nearly all were satisfied with the program overall. Additionally, many more instructors indicated that they had heard positive feedback from students than negative feedback. Students were excited about the products and value that the program provides them an opportunity to interact with their parents through the installation of the kit items. Additionally, they are excited to save energy and money.

- **High use of instructional materials.** Eighty-five percent of instructors reported that they incorporated the lesson plans into their curriculum. Most of those that did not incorporate them stated that other teaching priorities took precedent or that they did not have time to incorporate them into the program. Staff may improve the use of the curriculum materials by providing them with more notice to enable instructors to incorporate them into their lesson plans.

- **Few changes suggested for kits.** Nearly one-half of survey respondents indicated that they do not have any suggestions for modifying the kit contents and the most common suggestions made were to increase the number of specific items currently included in the kit.

- **Electric water heating more prevalent than electric space heating.** Thirty-eight percent of respondents reported that they had electric water heating, while only 18% of respondents reported that they had electric space heating. These finding suggest that inclusion of low-flow devices is relatively effective for reducing electricity use.

- **Small change in kit content planned for PY7.** For PY7, one of the 23W CFLs will be replaced by a 9 W LED. Based on PY6 ex post savings, this change will result in a small (e.g., < 5%) decrease in gross and net per kit savings for PY7.

8. Residential Home Weatherization Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential Home Weatherization Program during the period January 2015 through December 2015.

8.1 Program Specific M&V Methodologies

The M&V approach for the Home Weatherization program (HWP) is aimed at determining the following:

- Numbers of weatherization measures installed;
- Average annual kWh savings per weatherization measure implemented;
- Average kW reduction per weatherization measure implemented;
- Providing estimates of net-to-gross savings and free-ridership; and
- Estimating cost effectiveness of the HW program in 2015.

Table 8-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 8-1 Data Sources for Gross Impact Parameters – Home Weatherization Program

Parameter	*Source*
Number of Participants	Program Tracking Data/ Data Collection
Participant Location	Program Tracking Data/ Data Collection
Participant HVAC Equipment Type	Program Tracking Data/ Data Collection
Pre-Post Insulation Values	Program Tracking Data/ Data Collection
HVAC efficiencies	Program Tracking Data/ Data Collection
Square Footage Insulated	Program Tracking Data/ Data Collection
Pre-Post Blower Door Test	Program Tracking Data/ Data Collection
Pre-Post Duct Leakage	Program Tracking Data/ Data Collection
Wattage of Efficient Lighting	Program Tracking Data/ Data Collection
Length/Circumference of Water Heater Pipe	Program Tracking Data/ Data Collection
Gallons per minute of low flow aerator/showerhead	Program Tracking Data/ Data Collection
Net-to-Gross Ratio	Participant Surveying

8.1.1 Verification of Weatherization Measures Installed

A first aspect of conducting measurements of program activity is to verify if participants of the program did participate in the program. ADM takes several steps in verifying the number of weatherization measures installed, which consists of the following:

- Validating program tracking data provided by Honeywell and I&M by checking for duplicate or erroneous entries;
- Verifying that participants were part of the program according to the agreed-upon process between Honeywell and I&M;
- Performing site visits to participant's homes to confirm that measures were installed in the quantity and specifications claimed, and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys are to verify that customers listed in the program tracking database did indeed participate and the number of measures installed was accurate.

8.1.2 Calculating Gross Annual Savings and Peak kW Reduction

Gross energy impacts and demand reductions for the Home Weatherization program were calculated (by measure) using the 2012 Indiana Technical Reference Manual. ADM reviewed the TRM and assessed the appropriateness of the engineering algorithms, and their level of rigor. In the course of this engineering review, ADM also reviewed the assumptions for each measure which was provided by Honeywell and I&M.

The following sections describe the specific algorithms and inputs used to calculate savings for each measure in the program.

8.1.2.1 Air Infiltration Reduction Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Air Sealing – Reduce Infiltration (Retrofit)* section was used to calculate energy savings for the reduction of home air infiltration. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \frac{CFM50_{Exist} - CFM50_{New}}{N\text{-}Factor} \times \Delta kWh/cfm \qquad (1)$$

Parameters used in Equation 1 are as follows:

$CFM50_{Exist}$	= Existing Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door before air sealing
$CFM50_{New}$	= New Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door after air sealing
N-Factor	= Conversion factor to convert 50-pascal air flows to natural airflow dependent on exposure level
ΔkWh/cfm	= kWh impacts per CFM of infiltration rate reduction

*Assumptions made:

- Post air sealing CFM50 measurements were not provided. ADM assumed the CFM50 post was a 20% reduction from the pre CFM50 reading based on tracking data indicating that the reduction was "> 20%."

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{\mathrm{CFM50_{Exist} - CFM50_{New}}}{\mathrm{N-Factor}} \times \frac{\Delta \mathrm{kW}}{\mathrm{cfm}} \times \mathrm{CF} \quad (2)$$

Parameters used in Equation 2 are as follows:

$CFM50_{Exist}$	= Existing Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door before air sealing
$CFM50_{Exist}$	= New Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door after air sealing
N-Factor	= Conversion factor to convert 50-pascal air flows to natural airflow dependent on exposure level.
ΔkWh/cfm	= kW impacts per CFM of infiltration rate reduction
CF	= Summer Peak Coincidence Factor for measure, 0.88

8.1.2.2 Attic Insulation Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Attic/Roof/Ceiling Insulation (Retrofit)* section was used to calculate energy savings for the installation of additional insulation in attics. The following equation was used to calculate the annual kWh savings:

$$\Delta \mathrm{kWh} = kSF \times \Delta kWh/kSF \quad (1)$$

Parameters used in Equation 1 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkWh/kSF	= Unit energy savings from lookup table

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = kSF \times \Delta kW/kSF \times CF \quad (2)$$

Parameters used in Equation 2 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkW/kSF	= Unit demand savings from lookup table
CF	= Summer Peak Coincidence Factor for measure, 0.88

8.1.2.3 Customer Education Savings Calculations

From the 2012 Energizing Indiana Programs EM&V Report, the Home Audit Recommendations section was used as reference to calculate energy savings for customer education. Evaluation staff asked participants during the telephone survey which recommendations from the education were implemented. Savings were attributed to the portion of sampled participants who indicated that they had engaged in these behaviors. These behavior engagement rates were then extrapolated to the participant population. Estimated savings attributed to each of the behaviors listed in the 2012 Energizing Indiana Programs EM&V Report are as follows:

- Turning off lights when not in use: 158 kWh, 0.01 kW
- Unplugging unused appliances: 21 kWh, 0.00 kW
- Installing water heater tank wrap: 79 kWh, 0.01 kW
- Washing clothes in cold water: 58 kWh, 0.00 kW
- Programming an existing thermostat: 26 kWh, 0.00 kW
- Installing a programmable thermostat: 131 kWh, 0.00 kW

8.1.2.4 Duct Sealing Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Duct Sealing and Insulation (Retrofit)* section was used to calculate energy savings for performing duct sealing. The following equation was used to calculate the annual kWh savings:

$$\Delta \text{kWh} = \Delta kWh_{cooling} + \Delta kWh_{heating} \quad (1)$$

$$\Delta kWh_{cooling} = \frac{\left(\frac{DE_{after} - DE_{before}}{DE_{after}}\right) \times FLH_{cool} \times BtuH}{SEER \times 1{,}000} \quad (2)$$

$$\Delta kWh_{heating} = \frac{\left(\frac{DE_{after} - DE_{before}}{DE_{after}}\right) \times FLH_{heat} \times BtuH}{\eta Heat \times 3{,}412} \quad (3)$$

Parameters used in Equation 1, 2, & 3 are as follows:

$\Delta kWh_{cooling}$	= Cooling energy savings due to duct sealing
$\Delta kWh_{heating}$	= Heating energy savings due to duct sealing
DE_{after}	= Distribution Efficiency after duct sealing
DE_{before}	= Distribution Efficiency before duct sealing
FLH_{cool}	= Full Load Cooling Hours dependent upon location

FLH_{heat} = Full Load Heating Hours dependent upon location

BtuH = Size of equipment in BtuH

SEER = Seasonal average efficiency in SEER of Air Conditioning equipment

ηHeat = Efficiency in COP of Heating equipment

*Assumptions made:

- Pre/Post duct leakage was not provided. ADM assumed all sites had a pre-leakage rate of 20% and a post leakage of 10% based on tracking data indicating leakage reduction was ">10% reduction." Future program years should include pre/post leakage rates.
- Duct location was assumed to be unknown. Other allowable inputs per the TRM are Unconditioned Attic and Unconditioned Basement. Implementer should note the location of the duct work for future program years.
- Duct System R-Value was assumed to be R-4.2 for all participants. Program tracking data indicated that duct system R-Value was R-3 for all participants and R-4.2 was the nearest value available in TRM tables.

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{\left(\frac{DE_{pk,after} - DE_{pk,before}}{DE_{pk,after}}\right) \times BtuH \times CF}{EER \times 1{,}000} \quad (4)$$

Parameters used in Equation 4 are as follows:

$DE_{pk,after}$ = Distribution Efficiency under peak summer conditions after duct sealing

$DE_{pk,before}$ = Distribution Efficiency under peak summer conditions before duct sealing

BtuH = Size of equipment in Btuh

EER = Peak efficiency in EER of Air Conditioning equipment

CF = Summer Peak Coincidence Factor for measure, 0.88

8.1.2.5 Low Flow Faucet Aerator Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Low Flow Faucet Aerator (Time of Sale or Early Replacement)* section was used to calculate energy savings for the installation of low flow faucet aerators. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \frac{ISR \times (GPM_{base} - GPM_{low}) \times min/day \times DR \times 8.3 \times (T_{ft} - T_{mains}) \times 365}{\eta DHW \times 3{,}412} \quad (1)$$

Parameters used in Equation 1 are as follows:

ISR = In Service Rate or fraction of units that get installed, 1.0

GPM_{base} = Gallons per Minute of baseline faucet, 2.4

GPM_{low} = Gallons per Minute of low flow faucet, 1.5 (kitchen), 1.0 (bathroom)

Min/day = Average minutes per day used by each faucet in home, 3 (kitchen), 2 (bathroom)

DR = Percentage of water flowing down drain, 63%

T_{ft} = Assumed temperature of water used by faucet, 80ºF

T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{ISR \times (GPM_{base} - GPM_{low}) \times 60 \times DR \times 8.3 \times (T_{ft} - T_{mains}) \times CF}{\eta DHW \times 3{,}412} \qquad (2)$$

Parameters used in Equation 2 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline faucet, 2.4
GPM_{low}	= Gallons per Minute of low flow faucet, 1.5 (kitchen), 1.0 (bathroom)
DR	= Percentage of water flowing down drain, 63%
T_{ft}	= Assumed temperature of water used by faucet, 80ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98
CF	= Summer Peak Coincidence Factor for measure, 0.00262

8.1.2.6 Low Flow Showerhead Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Low Flow Showerhead (Time of Sale or Early Replacement)* section was used to calculate energy savings for the installation of low flow shower heads. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \frac{ISR \times (GPM_{base} - GPM_{low}) \times \frac{min}{day} \times \#people \times shower/per \times 8.3 \times (T_{shower} - T_{mains}) \times 365}{\eta DHW \times 3{,}412} \qquad (1)$$

Parameters used in Equation 1 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline showerhead, 2.8
GPM_{low}	= Gallons per Minute of low flow showerhead,
Min/day	= Average minutes per shower, 8.36
#people	= Average number of people per household, 2.46
shower/per	= Average showers per day, 0.58
DR	= Percentage of water flowing down drain, 63%
T_{shower}	= Assumed temperature of water used for shower, 105ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{ISR \times (GPM_{base} - GPM_{low}) \times 60 \times 8.3 \times (T_{shower} - T_{mains}) \times CF}{\eta DHW \times 3{,}412} \qquad (2)$$

Parameters used in Equation 2 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline showerhead, 2.8
GPM_{low}	= Gallons per Minute of low flow showerhead, 1.75
shower/per	= Average showers per day, 0.58
DR	= Percentage of water flowing down drain, 63%
T_{shower}	= Assumed temperature of water used for shower, 105ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98
CF	= Summer Peak Coincidence Factor for measure, 0.00371

8.1.2.7 Side Wall Insulation Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Wall Insulation (Retrofit)* section was used to calculate energy savings for the installation of additional insulation in knee and side walls. The TRM supplies EFLH values and savings for insulation in a kWh/1000 ft2 manner based on weather zone. The following equation was used to calculate the annual kWh savings:

$$\Delta\text{kWh} = kSF \times \Delta kWh/kSF \quad (1)$$

Parameters used in Equation 1 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkWh/kSF	= Unit energy savings from lookup table

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = kSF \times \Delta kW/kSF \times CF \quad (2)$$

Parameters used in Equation 2 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkW/kSF	= Unit demand savings from lookup table
CF	= Summer Peak Coincidence Factor for measure, 0.88

8.1.2.8 LED Lighting Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Residential LED Lamps* section was used to calculate energy savings for the installation of LED lamps. The following equation was used to calculate the annual kWh savings:

$$\Delta\text{kWh} = \frac{(Watt_{base} - Watt_{LED})}{1{,}000} \times ISR \times Hours \times (1 + WHF_e) \quad (1)$$

Parameters used in Equation 1 are as follows:

$Watt_{base}$	= Baseline lamp Watts
$Watt_{LED}$	= LED lamp Watts
ISR	= In Service Rate or fraction of units that get installed, 1.0
Hours	= Average hours of use per year, 1,040
WHF_e	= Waste Heat Factor for Energy to account for HVAC interactions with efficient lighting, -0.059

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{(Watt_{base} - Watt_{LED})}{1{,}000} \times ISR \times CF \times (1 + WHF_d) \quad (2)$$

Parameters used in Equation 2 are as follows:

$Watt_{base}$	= Baseline lamp Watts
$Watt_{LED}$	= LED lamp Watts
ISR	= In Service Rate or fraction of units that get installed, 1.0
CF	= Summer Peak Coincidence Factor for measure, 0.1 1
WHFd	= Waste Heat Factor for Demand to account for HVAC interactions with efficient lighting, 0.057

8.1.2.9 Domestic Hot Water Pipe Insulation Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Domestic Hot Water Pipe Insulation (Retrofit)* section was used to calculate energy savings for the installation of insulation on the hot water pipes coming out of the hot water heater. The following equation was used to calculate the annual kWh savings:

$$\Delta \text{kWh} = \frac{\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) \times L \times C \times \Delta T \times 8{,}760}{\eta DHW \times 3{,}412} \quad (1)$$

Parameters used in Equation 1 are as follows:

R_{exist}	= Pipe heat loss coefficient of uninsulated pipe (Btu/hr-°F-ft), 1.0
R_{new}	= Pipe heat loss coefficient of insulated pipe (Btu/hr-°F-ft)
L	= Length of pipe from water heating source covered by pipe wrap (ft)
C	= Circumference of pipe (ft)
ΔT	= Average temperature difference between supplied water and outside air temperature, 65°F
ηDHW	= Recovery efficiency of electric hot water heater, 0.98

*Assumptions made:

- Pipe circumference was not provided for several participants. ADM assumed all pipes were ¾ inches thick as all homes that had this information recorded had water heater pipes this size.

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta \text{kW} = \frac{\Delta kWh}{8{,}760} \quad (2)$$

Parameters used in Equation 2 are as follows:

ΔkWh = Annual kWh savings due to the installation of the pipe wrap

8.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) impacts

The purpose of the Home Weatherization program is to help customers who would benefit from higher level standard home weatherization measures such as ceiling insulation, home infiltration, and duct sealing. However, some homes that were part of the program might have installed the same weatherization measures without the program. These homes would represent free-ridership. Thus the question to be addressed in the net savings analysis was what proportion of gross savings resulting from the implemented weatherization measures was directly attributable to the HWP. Rather than apply a binary scoring (0% vs. 100% free-ridership), ADM applied a free-ridership probability to program participants, based upon four factors below with the survey questions included that pertain to them:

- Financial Ability to purchase weatherization measures absent program assistance

  Question 11: Would you have been financially able to install these energy efficiency measures without the Home Weatherization program from I&M?

If the customer answered "No" to this, then they are assigned 0% free-ridership, as without the financial ability to purchase the measures in the kit, other factors in the decision making process are not relevant. Having financial ability does not inherently make one a free-rider, however, as they could still have been program-induced.

- Importance of program assistance in the decision-making process

  Question 9: For the (measures) that were installed in your home, would you still have installed this measure (or these measures) at your home if you had not participated in the I&M Home Weatherization program?

If the respondent answers in Question 9 "No", then the respondent is considered to have not been planning to purchase any of the measures and is 0% free-rider.

- Prior Planning to purchase weatherization measures

  Question 10: When did you learn of the Home Weatherization program?

Question 8: For the measures that was installed in your home, did you have plans to install this measure (or these measures) at your home before participating in the I&M Weatherization program?

If the respondent answers in Question 10 "Yes" and indicated that they learned of the rebate "After deciding to replace items in my home with these energy efficiency measures but before I had purchased these measures on my own", then the respondent is considered to have been planning to purchase the same quantity of measures with or without the rebate and is thus a partial free-rider. If the respondent answers in Question 10 "Yes" and indicated that they learned of the rebate "After I had purchased these energy efficiency measures on my own but before I had installed them", or "After I had already replaced some items in my home with these energy efficiency measures", then the respondent is considered to have been planning to purchase the same quantity of measures and already did with or without the rebate and is thus 100% free-rider. Question 8 is also taken into consideration depending on how it is answered.

- Demonstrates Behavior In Purchasing Similar Equipment absent program assistance

  Question 12: Did you install these energy efficient measures earlier than you otherwise would have without the program?

  Question 13: When would you otherwise have installed the measures?

If the respondent indicates in Question 12 "Yes", and for Question 13 chooses an option of "over 1 year", then they are considered to have been motivated by the energy efficiency program and are thus 0% free-rider. If respondents who indicated in Question 13 "less than 6 months" or "6-12 months", these respondents are considered partial free-riders. If the respondent indicated in Question 12 "No", then they are a free-rider because the program retrofit did not affect timing of purchase and installation of measures.

For residential programs, free-ridership is calculated as the average score determined for the sample of participants surveyed. Once free-ridership is determined, ADM then estimates the Net-to-Gross Ratio (NTGR), calculated as:

NTGR = 1 – % Free-Ridership

8.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of participant tracking data, using the 2012 Indiana TRM, and participant survey data. The program implemented 1,314 measures in 2015. This section presents the results of the gross and net savings calculation activities.

8.2.1 Verification of Participation in Program

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided by Honeywell and I&M for accuracy. One participant from the Residential Income Qualified Weatherization Program was found in program tracking data. ADM did find that the number of measures implemented in the 2015 program was 1,314. To verify that the number of homes in the program tracking database claiming to have weatherization measures installed through the program was accurate, ADM administered a telephone survey and conducted site visits with program participants.

All 29 respondents who completed the participant survey verified that they had participated in the program during 2015. All survey respondents also indicated that the measures installed were identical to what was claimed in the Honeywell and I&M tracking database. In addition, all of the 26 participant homes visited by ADM staff had the measures claimed by Honeywell and I&M installed. The specifications of the measures matched what was claimed by the implementers in program tracking data. Based on these results, the verification rates shown in Table 8-2 for each type of weatherization measure were determined.

Table 8-2 Verification Rates by Measure Type

Program	*Weatherization Measure*						
	Air Infiltration	*All types of Insulation*	*Customer Education*	*Duct Sealing*	*Faucet Aerator*	*LED Lamp*	*Showerhead*
Home Weatherization	100%	100%	100%	100%	100%	100%	100%

Based on these verification rates, Table 8-3 reports the numbers of homes that were weatherized through the program during PY6 that were verified as being program eligible participants.

Table 8-3 Home Verified to have Weatherization Measures Completed and are Program Eligible Participants

Program	*Quantity of Measures Weatherized*	*Verification Rate*	*Quantity of Measures Which Where Verified as Program Eligible*
Home Weatherization	1,314	100%	1,314

8.2.2 Gross Annual kWh Savings and Peak kW Reduction

The estimated gross impacts resulting from the PY6 Home Weatherization program are summarized in Table 8-4. Table 8-5, Table 8-6, and Table 8-7.

Table 8-4 Gross Impact Summary

Program	*PY6 Program Goals (kWh)*	*Peak Demand Savings (kW)*		*Annual Energy Savings, (kWh)*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Home Weatherization	1,276,803	19.00	15.95	197,978	165,210	83%

Table 8-5 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
197,978	197,978	197,978	165,210	83%

Table 8-6 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
19.00	19.00	19.00	15.95

Table 8-7 Measure Savings Summary

Measure Type	*Ex ante Annual Savings (kWh)*	*Ex post Gross Annual Savings (kWh)*	*Realization Rate*
Air Infiltration	25,535	25,378	99%
Attic Insulation	55,536	42,834	77%
Customer Education	30,254	11,410	38%
Duct Sealing	2,521	6,055	240%
Faucet Aerator	1,983	1,942	98%
LED Lamp	39,454	37,644	95%
Pipe Insulation	11,338	9,775	86%
Showerhead	15,898	27,389	172%
Sidewall Insulation	15,458	2,783	18%
Total	197,978	165,210	83%

8.2.3 Net Energy (kWh) and Peak Demand (kW) Impacts

To obtain net savings for the PY6 Home Weatherization program, ADM surveyed program participants to develop estimates of free-ridership. As detailed in Section 8.1.3, developing free-ridership estimates for the HWP is dependent upon survey questions addressing financial ability, prior planning, importance of rebate, and importance of program to purchase of measure.

Based upon this analysis, ADM estimates a net to gross rate of 70-100%, depending on measure type. The measure level net-to-gross ratios are calculated as 1- estimated free ridership. The free-ridership rate of each measure was applied in discounting annual kWh and kW savings for the measure rebate portion of the 2015 Residential Home Weatherization Program. Table 8-8 shows the NTGR found for each measure implemented through the program.

Table 8-8 NTGR By Measure

Measure Type	*Free Ridership Estimate*	*NTGR Estimate (1-FR)*
Air Infiltration	8%	92%
Attic Insulation	28%	72%
Customer Education	0%	100%
Duct Sealing	0%	100%
Faucet Aerator	18%	82%
LED Lamp	18%	82%
Pipe Insulation	18%	82%
Showerhead	18%	82%
Sidewall Insulation	28%	72%
Overall	17%	83%

Applying the estimated NTGRs to the ex post gross savings of that specific measure in Table 8-8 results in the net savings detailed in Table 8-9 below. The overall net realization rate is 83%.

Table 8-9 Net Impact Summary

Measure Type	*PY6 Program Goals (kWh)*	*NTGR*	*Ex post Annual Savings (kWh)*	*Ex post Demand Savings (kW)*	*Net Ex Post Annual Savings (kWh)*	*Net Ex Post Demand Savings (kW)*
Air Infiltration	1,276,803	92%	25,378	1.34	23,348	1.23
Attic Insulation		72%	42,834	3.82	30,841	2.75
Customer Education		100%	11,410	0.65	11,410	0.65
Duct Sealing		100%	6,055	2.48	6,055	2.48
Faucet Aerator		82%	1,942	0.37	1,593	0.30
LED Lamp		82%	37,644	4.47	30,868	3.67
Pipe Insulation		82%	9,775	1.12	8,015	0.91
Showerhead		82%	27,389	1.40	22,459	1.15
Sidewall Insulation		72%	2,783	0.30	2,004	0.22
Total		83%	165,210	15.95	136,592	13.37

8.3 Process Evaluation

This chapter presents the results of the process evaluation for I&M's Home Weatherization Program during PY6. The PY6 process evaluation focuses on identifying any notable trends in program operation and performance for the program year, and assess the extent to which the Home Weatherization Program has changed or improved since the prior year. This evaluation is based upon analysis of program structure and interviews and surveys of participating I&M customers, I&M energy efficiency staff, and program tracking data.

8.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity include:

- How effective is the program marketing? How do participants learn about the program?
- Have there been any changes within the participant group since PY5?
- Why did customers participate in the program?
- How satisfied are participants with the program? What was their level of satisfaction with performance of the measures, the effort required to complete the application, and the quality of the work completed?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the Home Weatherization program is developed from a telephone survey of program participants. The internal organization and operational efficiency of program delivery is examined through analysis of interviews conducted with I&M program staff, as well as the program implementer, Honeywell.[29]

8.3.2 Summary of Primary Data Collection

The data collection activities conducted for the PY6 process evaluation are similar to those that were conducted for the PY5 evaluation. This allows for comparisons between program years with regard to participant and program management and implementation perspectives.

- **Interview with I&M staff members:** Interviews with I&M staff members, including program managers, provided insight into any program design or operational changes since the prior program year. I&M staff members also provided information regarding future plans for the program.

- **Interview with Honeywell staff:** Honeywell program implementation staff was interviewed to provide information regarding program progress and observations regarding the participating customer group. The implementer was asked questions about any evolving program strategies, progress towards performance goals, and any operational issues that had occurred during the year.

- **Participant surveys:** Participant surveys served as the foundation for understanding the customer perspective. The participant surveys provided customer feedback and insight regarding customer experiences with the Residential Home Weatherization program. Respondents reported on how they learned about the program, their decision to participate, and satisfaction with the program.

[29] Honeywell stopped providing program implementation in the fourth quarter of 2015, at which point I&M fully implemented the program.

8.3.3 Documentation Review

ADM reviewed two key forms of program documentation: an Excel based audit tool and the home verification visit form.

8.3.3.1 Audit Tool

The Excel based audit tool contains worksheets for energy usage, inputting home characteristics, inputting measure quantities and calculating costs, summary information for the customer, and a sheet to develop the work order. Based on a review of the form ADM suggests the following modifications for staff to consider:

- Consider adding additional data validation elements. Some fields utilize drop down menus to insure data quality but other fields are open ended ranges without any restrictions on what information can be input. For example, any value may be entered in year built input cell. Consider adding elements to disallow certain entries (e.g., year built values that are earlier than possible) or create warnings if unusual (home sizes exceeding 10,000 square feet that may indicate an additional digit was entered). Data validation to summarize unpopulated input fields should also be considered. This validation element will help ensure that both the audit and the data entry are complete.

- Consider adding the savings-to-investment ratio. The savings-to-investment ratio (SIR) is a commonly used metric to prioritize whole-home program retrofits to help ensure program cost effectiveness. Although, the tool currently provides payback, which incorporates energy saving benefits and costs, SIR also incorporates measure lifetime (which can be based on the Indiana TRM values) and may enable the program to more effectively prioritize cost effective measures.

- Consider adding electricity cost savings to the summary report. Currently the report provides useful information such as customer and I&M costs, electricity savings, and payback period. However, for some customer's annual cost savings may be particularly useful for making decisions about measures to implement.

8.3.3.2 Verification Form

The verification form was used to verify that measures were implemented as required and in accord with project documentation and that the audit was performed in a manner consistent with program procedures. Specifically, the form has indicators for whether or not the work was performed as specified and includes space to record test results such as duct blasting and blower door test results. Insulation pre and post R-values are recorded. The square footage of insulated space is recorded for floor space insulation and quantity added for attic, knee-wall, and exterior wall insulation.

Additionally, the form includes space for the inspector to confirm whether or not the customer participated in the audit process, received and understood the report, was satisfied with the audit, and if the customer signoff sheet is included in the file.

Based on the review of the form, ADM recommends the following:

- Include square feet for attic and wall insulation as these are important savings parameters;
- Verify water heating type if water heating measures are included in the project;
- Verify space heating type; and
- Although I&M will be performing the audits and verifications in PY7, staff may want to consider adding space to verify direct install measures as part of the verification process.

8.3.4 Participant Survey Findings

ADM conducted telephone surveys with program participants as part of the PY6 evaluation of the Home Weatherization Program. The survey instrument was designed to gather information related to both the impact and process components of the program evaluation. Data collected via participant surveying are used in evaluating:

- Customer demographics and characteristics;
- Customer implementation of energy efficient measures and behaviors;
- Customer decision making behaviors; and
- Customer satisfaction with the program.

Additionally, the survey results collected during PY5 allow for comparisons between participant perspectives in PY5 and PY6. This section of the report summarizes the results from the participant survey effort in PY6, drawing comparisons with the PY5 survey results when appropriate.

In total, 29 customer participants who had received energy saving weatherization retrofits through the program during PY6 responded to the survey.

8.3.4.1 Customer Awareness of Program

As shown in Table 8-10, the majority of survey respondents (66%) learned of the program by receiving a letter in the mail about the program. Other sources of frequently noted sources of awareness included I&M's website (14%), and an I&M representative (10%).

Table 8-10 How Customers Learned of the Program

	Response	*Percent of Respondents* (N = 29)*
How did you learn of the Home Weatherization program sponsored by I&M? (Select all that apply)	Received a letter in the mail about the program	66%
	The I&M website	14%
	An I&M representative mentioned it	10%
	Approached directly by representative of the program	0%
	Friends or colleagues	0%
	An architect, engineer or energy consultant	0%
	An equipment vendor or building contractor	0%
	Past experience with the program	0%
	Other (please specify):	14%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

8.3.4.2 Motivation for Participating in the Program

As displayed in Figure 8-1, 55% of respondents indicated that they chose to participate in the weatherization money to save money on their energy bills. In comparison, most 2014 participants (84%) indicated their motivation was to save money on their energy bills. It is not clear that this change represents a substantive shift in motivations for participating, or if it represents sampling variation due to the smaller sample of 29 respondents. Another common response was the participant's desire to improve their home or increase their home's value (17%).

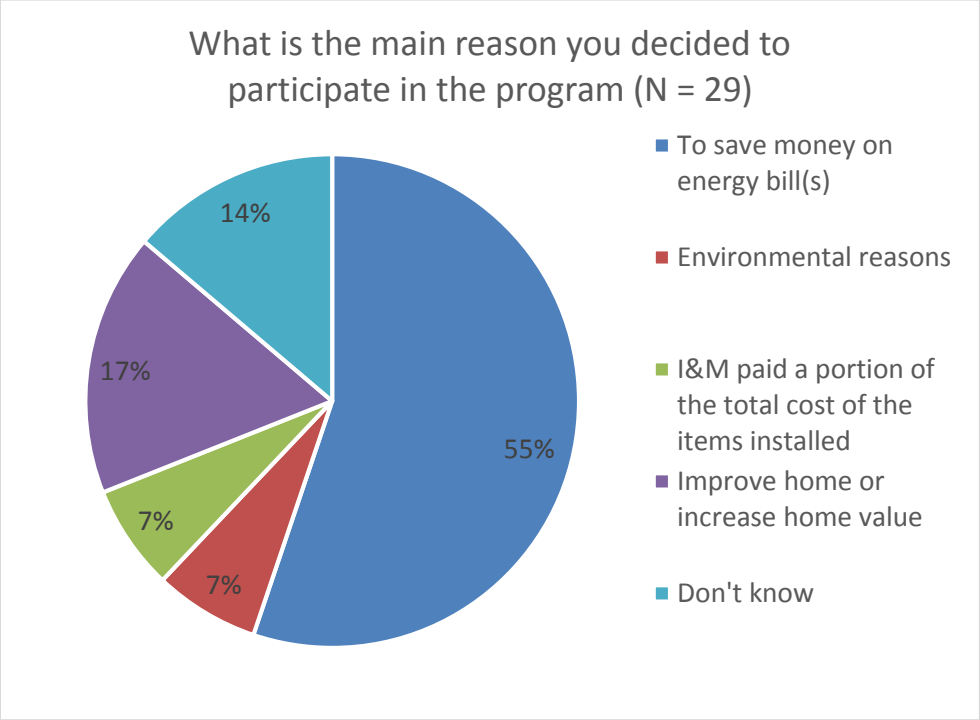


Figure 8-1 Reported Reasons for Installation of Home Weatherization Program Measures

8.3.4.3 Behaviors that Impact Energy Usage and Spillover

Survey respondents were asked to report on actions taken since participating in the program that limit energy usage. Approximately one-third of respondents reported that they did not engage in any behaviors that limit energy use. The most common action taken by respondents that limit energy use was turning off the lights when they leave a room (62%). Other common actions taken included, washing clothes in cold water (48%), unplugging unused appliances (34%), or installing a programmable thermostat or programming an existing one (24%).

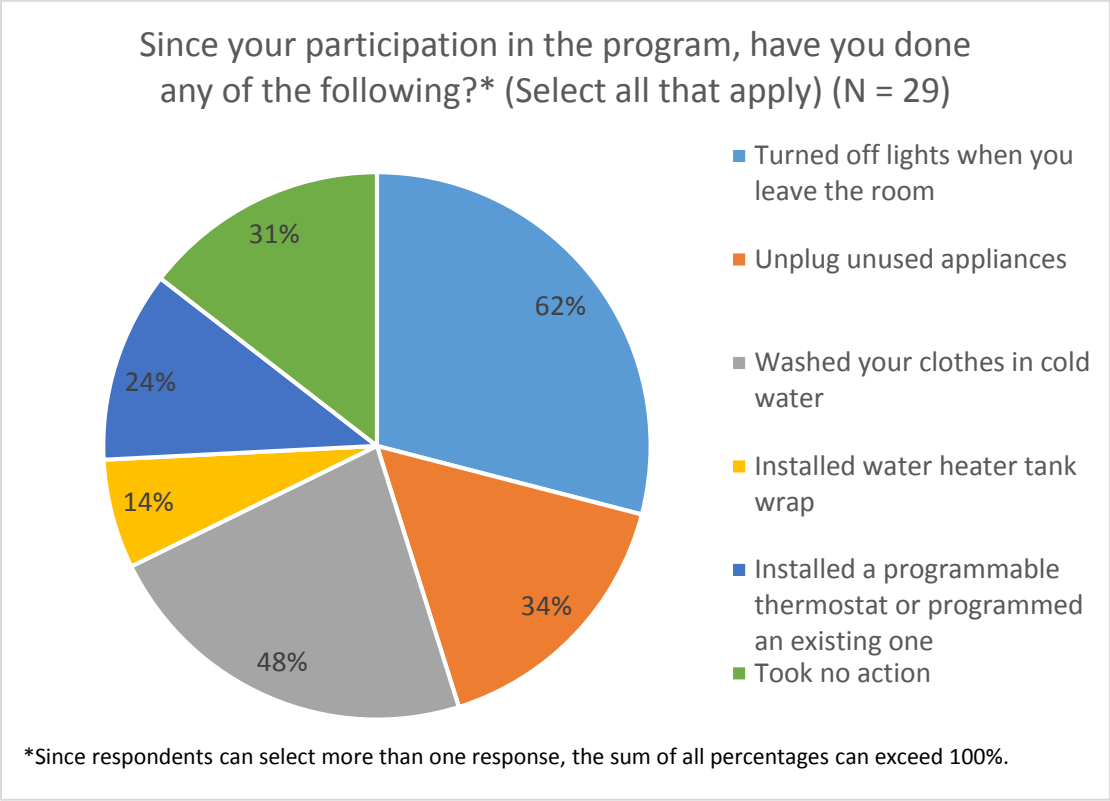


Figure 8-2 Actions Taken Since Participating in the Program

Respondents were also asked whether experience with the program had, or was likely to, influence their purchasing decisions for energy products that do not come with a financial incentive or rebate. Forty-five percent of respondents said they were likely to buy energy efficient items, while 14% said they had already bought such items, and 21% said the program would not change their behavior. These actions may represent potential program spillover to the extent that they resulted in reductions in energy use attributable to the program.

Table 8-11 Program Influence on Purchasing Decisions

	Response	*Percent of Respondents (N = 29)*
Because of your experience with the program, have you bought, or are likely to buy, additional energy efficient items on your own without a financial incentive or rebate?	Yes, have already bought non-incentivized energy efficient items because of my experience with the program	14%
	Yes, likely to buy energy efficient items because of my experience with the program	45%
	No	21%
	Don't know	21%

8.3.4.4 Cross-Program Awareness

Respondents were then asked if they had heard of any other rebates, incentives, or energy efficiency services offered by I&M, to which 19% of respondents said they had heard of them.

These respondents were also asked if they had heard of particular energy efficiency programs, or had applied for or participated in such programs. As Table 8-12 shows, many of the programs were familiar to customers.

Table 8-12 Customer Familiarity with Other Programs

Incentive Type	*Have heard of …*				*Have applied for or received…*			
	Yes	*No*	*Don't know*	*N*	*Yes*	*No*	*Don't know*	*N*
A program that offers rebates for purchasing energy efficiency air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.	75%	25%	0%	4	33%	67%	0%	3
A program that offers discounts on light bulbs purchased at participating retailers.	25%	75%	0%	4	33%	67%	0%	3
A program that offers a rebate for recycling your old refrigerator or freezer.	75%	25%	0%	4	67%	33%	0%	3
A program that provides an online energy checkup and suggestions for how you can save energy.	50%	25%	25%	4	67%	0%	33%	3
A program that discounts your electric bill for using your air conditioner less during peak demand periods.	50%	50%	0%	4	0%	67%	33%	3

Finally, respondents were asked if they had visited I&M's Electric Ideas website (electricideas.com), which provides information about other energy efficiency programs offered and tips on how to save energy. Thirty-eight percent of respondents said they had visited the website. Two of these respondents reported that they accessed the website to learn about I&M efficiency programs and one respondent accessed the site for tips on how to save energy. Other

reasons given, each mentioned by one respondent, were general curiosity, to speak with a program representative, and to save money.

8.3.4.5 Customer Satisfaction

Respondents were asked how satisfied they were with various program elements. Results were provided on a scale of 1 to 5, with 1 representing very dissatisfied and 5 representing very satisfied. As shown below, the majority of customers were satisfied with each of the program elements, although a much lower proportion were satisfied with the savings on their monthly bill (38%). Twenty-one percent were neutral about their monthly bill savings, while 31% did not know how they felt.

Table 8-13 Customer Satisfaction with Selected Program Elements

Program Element	*Very Dissatisfied*	*Somewhat Dissatisfied*	*Neutral*	*Somewhat Satisfied*	*Very Satisfied*	*Don't know*	*N*
Performance of the items or improvements installed	3%	3%	3%	28%	62%	0%	29
Savings on your monthly bill	3%	3%	24%	21%	17%	31%	29
The effort required for the program application process	3%	3%	7%	34%	41%	10%	29
Usefulness of the energy audit	0%	0%	10%	21%	66%	3%	29
Information provided by I&M	0%	0%	14%	24%	62%	0%	29
Quality of work conducted by the installer	0%	0%	3%	24%	72%	0%	29
Overall program experience	0%	0%	4%	29%	68%	0%	28

Although no respondents provided additional information regarding the specific reasons for any dissatisfaction, some respondents summarized their overall thoughts about the program at the end of the survey. Several examples of this type of commentary include:

> *"I think they could be more thorough when they examine."*
>
> *"I thought it was supposed to save money for my outdoor air conditioner but my bill keeps going ups."*
>
> *"I have to turn on the water on in my kitchen for 1 or 2 minutes before I get hot water to come out of my faucet."*

The majority of respondents provided commentary that was positive in nature, such as praising the program for the services it provides or restating the benefits they have received by participating. Examples of this type of commentary include:

> *"It was very thorough and included [an] air pressures test […]"*
>
> *"I do appreciate them. [I] think we have a very good electric company."*

"Great contractors."

8.3.4.6 Respondent Demographics

The customer survey resulted in several key demographic findings that may be relevant to future program design and operations.

Respondents were first asked to indicate the year that their home was built. Eighty-three percent of respondents had homes built before 1980, while 7% had a newer home, and 10% did not provide a response.

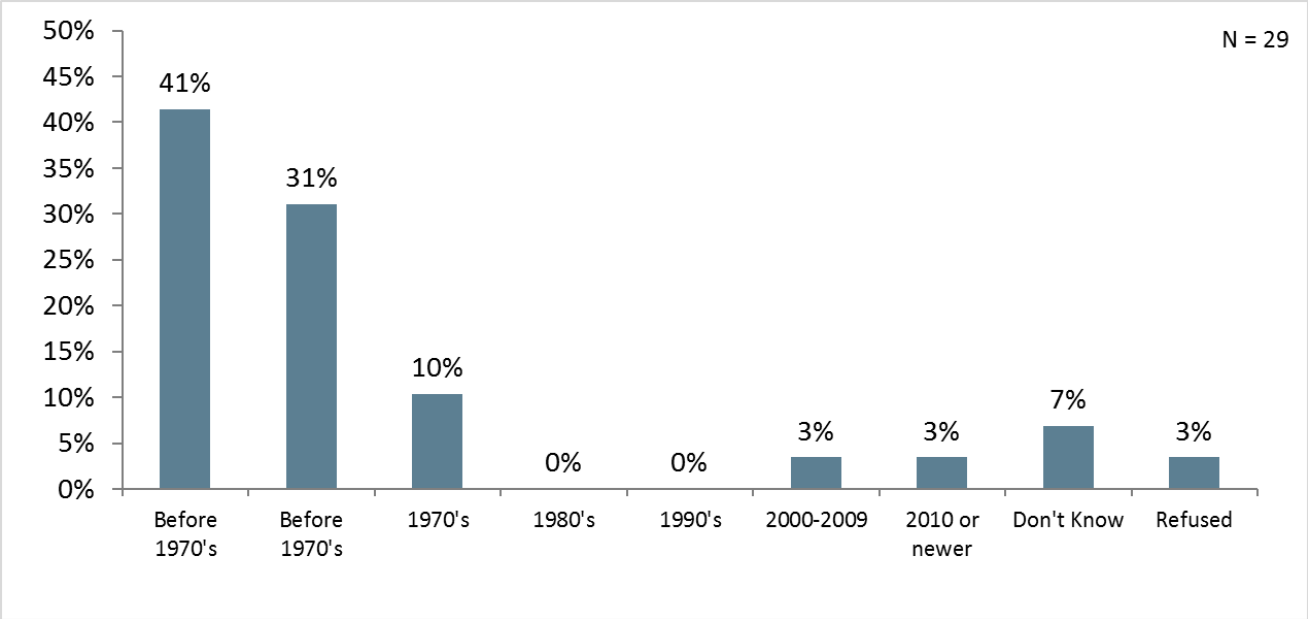


Figure 8-3 Participant Home Age

Respondents were also asked to indicate the square footage of their home. Respondents most commonly reported that their home is 2,000 square feet or less (62%), while 31% indicated a larger home, and 6% did not provide an answer.

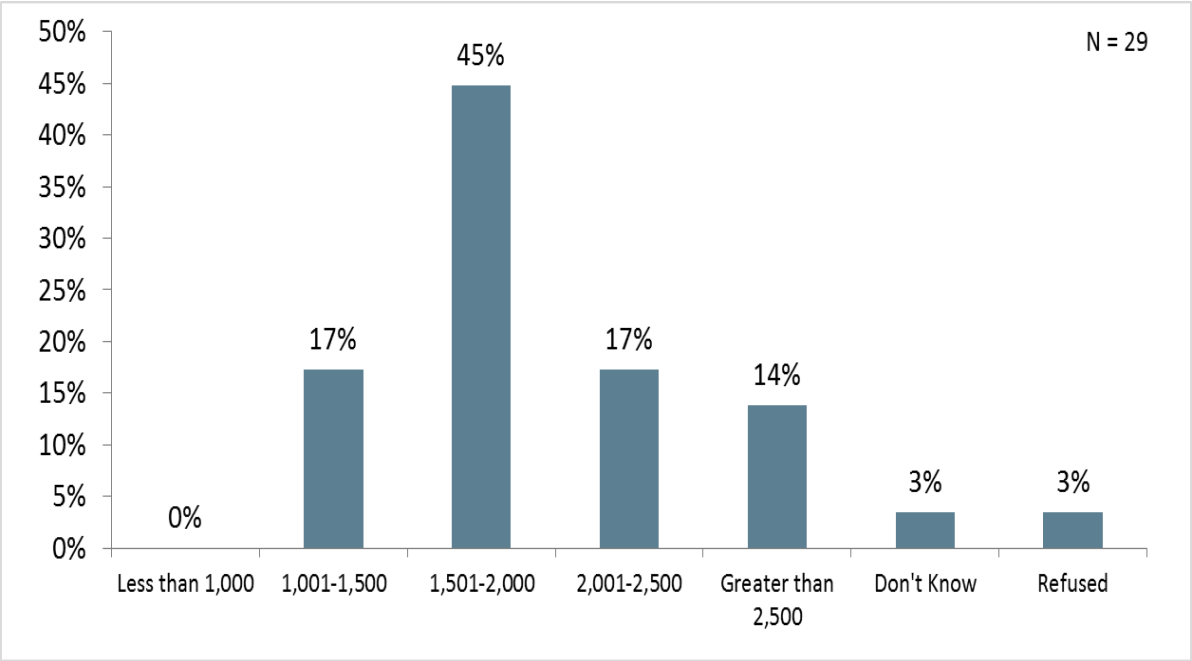


Figure 8-4 Participant Home Size

When asked about the type of heating system in their home, 79% of respondents reported that they have electric heating. Similarly, 86% of respondents reported that they have electric water heating.

Figure 8-5 displays responses related to how many people live in participants' households. Respondents most commonly had one to two people living in their home (81%).

Respondents were asked to indicate the number of bedrooms and bathrooms in their home. The average number of bedrooms was 3.3 and the average number of bathrooms was 2.2.

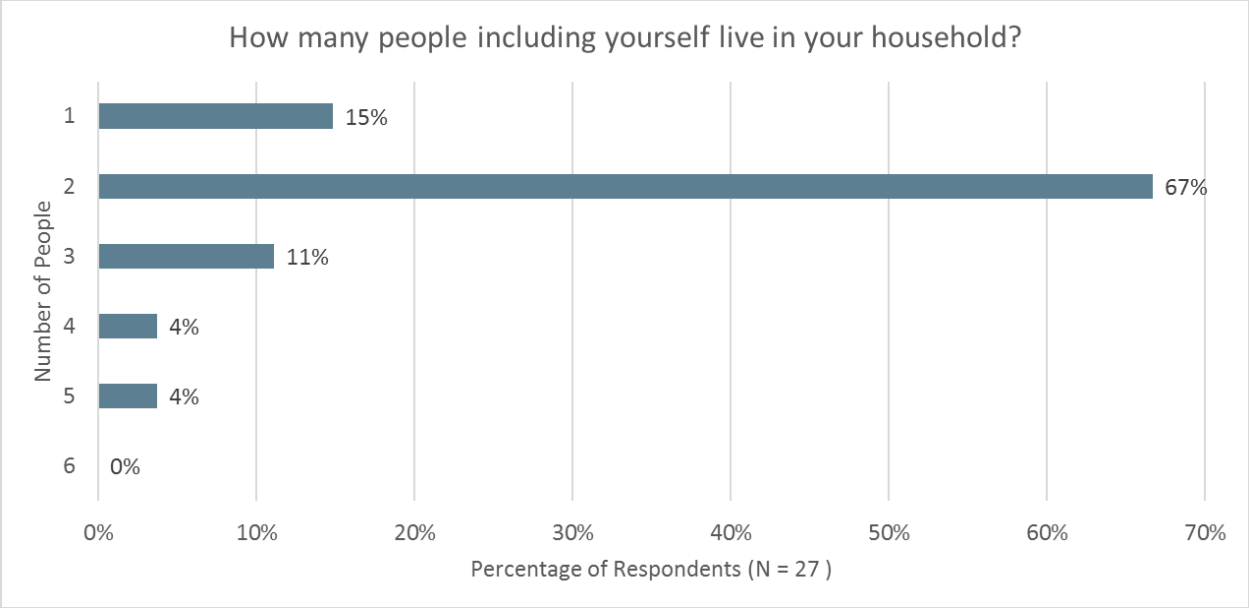


Figure 8-5 Number of People Living in Home

8.3.5 Contractor Interview Findings

Five program approved contractors were interviewed during October of 2015 as part of the evaluation of the Home Weatherization and Income Qualified Weatherization Programs. Topics addressed included the participation process, communications with program staff, program design, marketing, and program challenges. Contractors also provided suggestions on how program implementation and the list of eligible measures could better meet their needs in the future. Of the five respondents, four had completed multiple projects during 2015, while one had not completed any 2015 projects (as of October). Because the program operations and design of the Home Weatherization and Income Qualified Weatherization Programs are very similar, the findings presented herein pertain to both programs.

8.3.5.1 New Program Design and Implementation Contractor

Contractors were asked to reflect on how they became approved contractors, how the Income Qualified program component differs from the standard program path, and their experience with the Home Weatherization Program now that Honeywell is providing implementation services.

Four of the five contractors indicated that their involvement was initiated when they were contacted by Indiana-Michigan Power (I&M) and recruited to become approved contractors. The other contractor interviewed said that he approached I&M; this was the same contractor that he has not completed a job through the program.

All contractors indicated that the program year started slowly and that consequently, fewer projects were completed in PY6 than in PY5.

Contractors indicated that there were few differences between the Home Weatherization Program and the Income Qualified Weatherization Program. From their perspective the only difference is that when this job is finished they do not invoice the income qualified home owners. Contractors stated that there are no differences in the way the job is bid or how the work is performed.

All contractors interviewed indicated that program operating procedures changed in 2015 when Honeywell was contracted to perform implementation services. Prior to PY6 (2015), the statewide Energizing Indiana program prequalified homes and provided leads to contractors, who were then responsible for approaching the homeowner, conducting the audit, explaining the incentive opportunities, and completing any weatherization work. When the Energizing Indiana programs were dissolved, I&M took the opportunity to redesign how the Weatherization Programs were being delivered.

Under the redesigned program, program staff, rather than contractors, are responsible for initiating contact with the homeowners, conducing an energy audit, drafting a work order, and coordinating project completion through an approved contractor. Contractors provided feedback on how their experiences this year compared to previous years. The most often change commented on was the change in how audits were scheduled and delivered. Contractors all said that the new audit process was more efficient and they like that customers are qualified and that scheduling with the homeowner is taken care of.

There was a consensus among contractors that Honeywell auditors were doing a good job, however they believe knowledge gaps exist. Two contractors mentioned BPI certifications, stating that they are the industry standard for entry level positions and a required credential for program auditors. However, some contractors feel that there have been missed opportunities for energy savings and expressed concern that a BPI certification may not provide the knowledge necessary to uncover all aspects of home energy waste and prioritize cost effective solutions that result in deeper energy savings.

One contractor said he felt as if the Honeywell staff were overwhelmed by the volume of work they had to manage, and that this was complicated by the development of a new process and additional paperwork. The contractor that there is a learning curve to these programs. This contractor has been performing weatherization work for more than years and said when programs change hands like this, there is always a period of time it takes to get the “kinks” worked out and new staff up to speed.

8.3.5.2 Communication with Program Staff and Contractor Payment

Most contractors appreciated the work Honeywell was doing and stated that staff are cooperative and responsive. All four of the active contractors indicated that they were in weekly communication with program staff. Contractors speak with both utility staff and Honeywell staff regarding work order details, scheduling, qualifying measures, and incentive payments.

All four participating contractors that were interviewed indicated that payments have been delayed more so this year than in previous years. One contractor said he cannot complete anymore work through the program until he gets paid and another contractor said they have jobs that were completed in May for which they have not received payment yet. The timing of incentive payments was the most common complaint from contractors.

One contractor indicated that there were two instances this year when he arrived at a home and was in disagreement about the measures specified in the work order. The contractor reached out to program staff to suggest prioritizing different measures and but did not hear back from staff. As a result, he did not start the weatherization work on the home. He said he could not begin the work order as designed by Honeywell, because in his opinion there were issues with the thermal boundary of the home that had to be addressed before the homeowner would see any improved from Honeywell's proposed measures. The contractor suggested that program staff consider adding a provision or process by which a contractor could easily amend a work order or suggest changes to staff if they disagree with the measures that were originally proposed.

8.3.5.3 Contractors' Suggestions for Program Improvement

Contractors were asked to comment on the list of eligible measures and to what degree they believe the homes are receiving the appropriate upgrades. Two contractors had specific suggestions for program staff to consider. Minimum R-values were noted as being too low. One respondent specifically stated that it takes an R-50 to stop heat loss and that a minimum of R-25 to R-28 would be more reasonable for attic insulation and a minimum of R-11 for sidewalls. Another contractor indicated that the type of insulation should be a top concern. For example, if a home has fiberglass batted insulation auditors need to consider adding blown cellulose.

Two contractors said there is not enough emphasis on duct sealing; they indicated that while duct sealing is part of the program it's often over looked by program auditors. Additionally, electronically commutated motors (ECMs) were noted by one contractor, while they are not technically part of the thermal envelop they directly impact the efficiency of the furnace and will further increase the efficiency gains that come from thermal envelope improvements.

All participating contractors interviewed agreed that they would like to know more about the home before they arrive on the job site. Specifically, pictures of the exterior walls, interior walls, attic, and crawl spaces. They said these additional details would help them further prepare for the job and better estimate the time and effort needed to complete it.

Two contractors indicated they liked when the Honeywell auditor met them at the job site. They could discuss the work being completed and ask more detailed questions about the program guidelines and how they apply to the nuances of the home.

8.3.5.4 Program Marketing

Consistent with the program design intent, contractors are not marketing the incentive programs directly to customers.

When contractors were asked to comment on the level of program awareness that exists in the market they indicated that very few homeowners are aware of incentive opportunities for weatherization measures. More importantly, most homeowners are generally unfamiliar with benefits of added insulation and air sealing. All contractors agreed that education is needed. One contractor indicated that mailers and emails are not enough and that homeowners often disregard those forms of communication. He specifically suggested workshops in targeted communities where program staff could present information about ways to save energy and take advantage of program incentives. Venues such as big box stores, libraries, schools, churches, and community centers were suggested as appropriate venues.

8.3.5.5 Key findings from Contractor Interviews

Summarized below are key findings that resulted from the contractor interviews:

- Program staff is doing most of the contractor recruiting. Four of the 5 contractors that we spoke with were contacted by Indiana Michigan to become approved contractors.
- The new audit component of the Weatherization Programs creates efficiencies from the contractors' perspectives. They no longer have to qualify home owners and conduct the audit themselves; Honeywell simply reaches out to schedule a job now.
- Interviewees consider program staff to be cooperative and responsive, however knowledge gaps exist between program auditors and approved contractors. Program auditors have the latest training and technology available while approved contractors tend to have more hands on work experience that comes from years in the field. Contractors feel that program auditors are doing a good job but would like to have a process by which they could provide input on the proposed measures once they've had a chance to visit the home.
- Incentive payments are lagging. Some contractors have been reportedly waiting over 6 months to receive payment.
- Contractors agree that most homeowners are generally unaware of the condition of the thermal envelop of their home and what they can do to improve it. Thus, the audit element of the program is key to customer understanding of the value of the program sponsored efficiency improvements.

8.3.6 Program Operations Perspective

This section summarizes the core findings of interviews conducted with I&M and Honeywell program staff for the purposes of developing internal program management perspectives and comparing these perspectives with those expressed during the prior program year.

Specific interview questions addressed changes that had been implemented during PY6, whether the program had met its performance goals, and what changes may be made for the coming program year. This section summarizes (1) the roles and responsibilities of the staff responsible for managing program operations, (2) the program design and implementation procedures, (3) quality assurance and quality control (QA/QC) procedures, (4) marketing and outreach, and (5) changes planned for PY7.

8.3.6.1 Staff roles and responsibilities

The Honeywell PY6 implementation team at included a Program Manager, Program Coordinator and financial administrative staff. The Honeywell Program Manager is responsible for the day-to-day operations of the Weatherization Programs which includes activities such as providing weekly updates to I&M regarding program activity, progress towards goals, and issues in field. The Program Coordinator is responsible for homeowner outreach and scheduling of audits, post installation field inspections. The Program Coordinator also performs home audits on an as needed basis.

The I&M program manager provides oversight of Honeywell's implementation of the program. I&M staff are responsible for the standard audits that fall under the Home Weatherization Program.

8.3.6.2 Program Design and Implementation

The PY6 delivery model was modified when Honeywell assumed responsibility to implement the program. In prior years, contractors were required to perform the audit, schedule the installation, and complete all program paperwork. The program's success in achieving its goals was in part, driven by contractors' ability to market and sell the program incentives. In PY6 the task of performing the home audit was shifted to program staff. Once an audit was performed staff would reach out to program qualified contractors to schedule the installation of recommended measures.

At the time of the audit the program auditor offers to install a list of direct install measures that include CFL light bulbs, low-flow shower heads and faucet aerators. The home owner is provided a report that details the weatherization measures that are recommended for their home. If a homeowner agrees to the pricing and can commit to having the work done, a contractor is then scheduled to install the measures.

The program guidelines state that the homeowner can choose the contractor. If the owner does not have a preference, the auditor will choose a contractor based on the geographic location. If there are multiple contractors in the area, they will rotate which contractors are selected. Ideally the auditor can schedule the contractor's visit immediately after the audit is completed. If the

homeowner cannot commit on the day of the audit, the auditors contact information is provided to the homeowner and Honeywell Program Coordinator conducts follow up phone calls with the home owner.

The price that contractors are allowed to charge to implement the efficiency measures is fixed by the program. The allowed amount was determined by surveying contractors for information on standard charges to implement the measures. The allowed price was set at the average of contractor estimates. Contractors must agree to the prices to complete work through the program.

Once the work in complete the homeowner pays the contractor for the portion of the work they are responsible for (50% of the cost for insulation and air sealing measures). The contractor submits the final paperwork and the rebate check is sent directly to the contractor.

Staff indicated that the objective of the program design was to standardize the audit process and streamline the scheduling of jobs. However, staff indicated there was some disconnect between the auditor recommendations and what the contractors thought needed to be done. In particular, one issue noted was that there have been multiple instances when the contractor disagreed with the specifics in the work order and that there is little flexibility for a contractor to modify the work order developed during the home audit, although it was noted that modifications occurred on multiple occasions.

Staff indicated that all field auditors are required to have industry knowledge along with industry standard credentials, such as Building Performance Institute certification. Staff also said that field auditors typically have experience using energy modeling software and HVAC experience.

8.3.6.3 QA/QC Procedures

A random sample of homes is selected for a verification site visit. Both Honeywell and I&M staff perform verification inspections. Which party performs the verification is dependent on which completed the audit: sites audited by Honeywell are inspected by I&M and sites audited by I&M are inspected by Honeywell.

Figure 8-6 below displays the verification form used by field staff. The inspector will review the project details in the program tracking system to insure accurate data entry; they also ask the home owner if they participated in the audit, if they understood the report, and if they were satisfied with the audit. The inspector will also document post-installation R-Values and perform a final blower door tests.

I&M Weatherization Inspection Report

Inspection Date _____ Inspector: _____
Customer Name: _____ Program: WX _____ IQW _____
Address: _____
Auditor: _____ Date of Audit: _____

Enter ✓ PASS	when **ALL ITEMS COMPLY** with standards and guidance.
Enter **X** FAIL	if **CORRECTIVE ACTION IS REQUIRED** to bring the failed item into compliance.
Enter **N/A**	if the item is not required for this inspection.

File and Customer review :	PASS	FAIL	N/A	Re-Inspection
All data accurately entered into software *				
Customer participated during audit				
Customer received and understands Report				
Customer satisfied with audit				
Customer signoff sheet from audit in file				
Job Close-Out Data:				
Duct Sealing				
Work performed as specified				
Pressure Pan Results (Pa)				
Pre: Post:				
Air Sealing				
BAS BTL CFM_{50} Goal				
Work performed as specified				
Goal Achieved				
Blower Door Results (@CFM_{50})				
Pre: Post:				

*ADDITIONAL COMMENTS/NOTES:

ON-SITE WORK INSPECTION	PASS	FAIL	N/A	Re-Inspection
Floor Subspace: Slab ☐ Crawl ☐ Basement ☐				
R-Value: Pre Post Quantity Sq. Ft				
Vapor-barrier installed properly				
Insulation:				
Attic Insulation Installed as specified				
R-Value: Pre Post Quantity Added				
(Circle) Blown Cellulose Blown Fiberglass Batt Fiberglass				
Slopes/Knee-wall Insulation Installed as specified				
R-Value: Pre Post Quantity Added				
(Circle) Blown Cellulose Blown Fiberglass Batt Fiberglass				
Exterior wall Insulation Installed as specified				
R-Value: Pre Post Quantity Added				
(Circle) Blown Cellulose Blown Fiberglass Batt Fiberglass				
Additional work: performed as specified				

ADDITIONAL COMMENTS/NOTES:

Figure 8-6 Verification Form for Home Weatherization and Income Qualified Weatherization Programs

8.3.6.4 Marketing and Outreach

Direct mail, bill inserts, and web marketing were the primary marketing channels used to promote awareness of the program. Direct mailers were sent out based on geographic regions, a few weeks apart. The goal was to have homeowners from those regions call and request audits at similar times in order to maximize the efficiency of the audits by reducing the need to travel to widely dispersed sites. Staff also indicated that the program is promoted through the Home Energy Reporting Program.

8.3.6.5 PY7 Changes

Honeywell will not implement the program in PY7. I&M will fully implement the program without the assistance of a third party contractor.

8.3.7 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from PY6:

- **Program savings goal not met:** The program did not achieve its PY6 savings goal. This was largely a function of not completing the targeted number of projects rather than projects not resulting in the expected savings. Multiple operational changes likely impacted the programs ability to meet its savings goal. Honeywell began implementing the program for the first time this year, but this ended towards the end of the year, at which point I&M took over all implementation tasks. Additionally, the program activity is largely dependent on the marketing

efforts of program staff rather than leveraging contractor interest in completing program work as a means to incentivize contractors promote the program as well.

- **Audits performed by program staff:** Unlike prior years, program staff completed the audits and scheduled implementation work with contractors. This process represents a departure from prior year operations for which contractors completed the audits and any scheduling of work to be performed. Staff indicated that the objective of the change was to streamline the participation process. Contractors reported that the new process is more streamlined from their perspective because they no longer have to qualify the homes and perform the audits.

  Honeywell completed the majority of program audits during the first two-quarters of the program year, with some additional audits being performed by I&M. However, I&M completed the audits during the last two quarters of the program year.

- **Contractors raised concerns about measure prioritization during the audits:** However, staff indicated that there were occurrences of contractors disagreeing with the specified work provided in the work order. Two contractors noted that in some instances, the auditors were not correctly prioritizing work to maximize program cost-effective savings. Additionally, it was noted that there is not an efficient process to modify the work order under these circumstances.

- **Customers are highly satisfied with the program:** Ninety-six percent of customers were satisfied with the program overall, and very few customers (i.e., 6% or fewer) stated any dissatisfaction with any single aspect of the program.

- **I&M's direct outreach methods are primary sources of program awareness:** The majority of participants reported learning of the program from a letter sent by I&M (66%), from the I&M website (14%), or from an I&M representative (10%).

- **Program will be implemented by I&M during PY7:** Audits, scheduling of measure implementation, and site verifications will be performed by I&M.

The evaluation team currently has the following recommendation for program improvement consideration.

- **Consider providing more detailed information to contractors in advance of scheduled work.** Contractors stated a preference for receiving more detailed audit results prior to performing the measure implementation work. This information might include photographs of the home characteristics that were audited, detailed testing results, and other collected information. Providing this information in advance might enable contractors to identify instances where they believe measures are incorrectly specified and to correct these issues prior to the site visit.

- **Consider holding meetings between contractors and auditors to discuss work order issues.** Discussions between participating contractors and auditors regarding work order issues may provide common understanding about how measures should be prioritized and allow the program to identify changes to the audit process that will allow for greater agreement between auditors and contractors on the work to be performed.

- **Consider hosting events inform communities about the benefits of weatherization measures and incentive opportunities.** Contractors suggested partnering with big-box retailers, libraries, churches, community centers and schools to deliver the message. Staff may want to consider if there is an opportunity to cross-promote the program through retailer events promoting program lighting discounts.
- **Consider adding a contractor referral program.** To boost program activity staff may want to consider establishing a system by which contractors can refer their customers to the program and then be assigned to perform the measure implementation work.
- **Consider modifying the verification form to include square footage of attic and wall insulation, space and water heating equipment type, and counts of direct install measures.**
- **Consider modifying audit tool to include data validation elements to reduce data entry errors and incomplete information.**
- **Monitor industry standards and emerging research regarding the effect of insulation improvements on air infiltration levels.** Commentary from I&M and participating contractor staff suggest that the installation of attic or wall insulation may result in air sealing improvements in addition to the typical energy savings attributed to increased insulation. Initial research during the evaluation period revealed varying perspectives on whether dense packed cellulose can be used to significantly reduce air infiltration,[30] but ADM did not identify any sources which quantified the magnitude of these effects. Moving forward, ADM recommends that the evaluation team monitor emerging research regarding the interaction between insulation and air infiltration as an ongoing research activity. If this research indicates that air infiltration energy savings resulting from insulation can be reliably quantified and are significant, these savings should be attributed to the program in the future.

[30] Reviewed documentation regarding these effects include literature from the Department of Energy National Renewable Energy Lab (http://www.nrel.gov/docs/fy00osti/26446.pdf), as well as a presentation from the North American Insulation Manufacturers Association (https://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/BETEC/1E.cottrell.pdf)

9. Residential Income Qualified Weatherization Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential Income Qualified Weatherization Program during the period January 2015 through December 2015.

9.1 Program Specific M&V Methodologies

The M&V approach for the Residential Income Qualified Weatherization Program (IQW) is aimed at determining the following:

- Numbers of weatherization measures installed;
- Average annual kWh savings per weatherization measure implemented;
- Average kW reduction per weatherization measure implemented;
- Estimating cost effectiveness of the HW program in 2015.

Table 9-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 9-1 Data Sources for Gross Impact Parameters – Home Weatherization Program

Parameter	*Source*
Number of Participants	Program Tracking Data/ Data Collection
Participant Location	Program Tracking Data/ Data Collection
Participant HVAC Equipment Type	Program Tracking Data/ Data Collection
Pre-Post Insulation Values	Program Tracking Data/ Data Collection
HVAC efficiencies	Program Tracking Data/ Data Collection
Square Footage Insulated	Program Tracking Data/ Data Collection
Pre-Post Blower Door Test	Program Tracking Data/ Data Collection
Pre-Post Duct Leakage	Program Tracking Data/ Data Collection
Wattage of Efficient Lighting	Program Tracking Data/ Data Collection
Length/Circumference of Water Heater Pipe	Program Tracking Data/ Data Collection
Gallons per minute of low flow aerator/showerhead	Program Tracking Data/ Data Collection
Net-to-Gross Ratio	Participant Surveying

9.1.1 Verification of Weatherization Measures Installed

A first aspect of conducting measurements of program activity is to verify if participants of the program did participate in the program. ADM takes several steps in verifying the number of weatherization measures installed, which consists of the following:

- Validating program tracking data provided by Honeywell and I&M by checking for duplicate or erroneous entries;
- Verifying that participants were part of the program according to the agreed-upon process between Honeywell and I&M
- Performing site visits to participant's homes to confirm that measures were installed in the quantity and specifications claimed, and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys are to verify that customers listed in the program tracking database did indeed participate and the number of measures installed was accurate.

9.1.2 Calculating Gross Annual Savings and Peak kW Reduction

Gross energy impacts and demand reductions for the Home Weatherization program were calculated (by measure) using the 2012 Indiana Technical Reference Manual. ADM reviewed the TRM and assessed the appropriateness of the engineering algorithms, and their level of rigor. In the course of this engineering review, ADM also reviewed the assumptions for each measure which was provided by Honeywell and I&M.

The following sections describe the specific algorithms and inputs used to calculate savings for each measure in the program.

9.1.2.1 Air Infiltration Reduction Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Air Sealing – Reduce Infiltration (Retrofit)* section was used to calculate energy savings for the reduction of home air infiltration. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \frac{CFM50_{Exist} - CFM50_{New}}{N-Factor} \times \Delta kWh/cfm \qquad (1)$$

Parameters used in Equation 1 are as follows:

$CFM50_{Exist}$	= Existing Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door before air sealing
$CFM50_{New}$	= New Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door after air sealing
N-Factor	= Conversion factor to convert 50-pascal air flows to natural airflow dependent on exposure level
ΔkWh/cfm	= kWh impacts per CFM of infiltration rate reduction

*Assumptions made:

- Post air sealing CFM50 measurements were not provided. ADM assumed the CFM50 post was a 20% reduction from the pre CFM50 reading based on tracking data indicating that the reduction was "> 20%."

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{\mathrm{CFM50_{Exist} - CFM50_{New}}}{\mathrm{N-Factor}} \times \frac{\Delta \mathrm{kW}}{\mathrm{cfm}} \times \mathrm{CF} \quad (2)$$

Parameters used in Equation 2 are as follows:

$CFM50_{Exist}$	= Existing Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door before air sealing
$CFM50_{Exist}$	= New Cubic Feet per Minute at 50 Pascal pressure differential as measure by the blower door after air sealing
N-Factor	= Conversion factor to convert 50-pascal air flows to natural airflow dependent on exposure level.
ΔkWh/cfm	= kW impacts per CFM of infiltration rate reduction
CF	= Summer Peak Coincidence Factor for measure, 0.88

9.1.2.2 Attic Insulation Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Attic/Roof/Ceiling Insulation (Retrofit)* section was used to calculate energy savings for the installation of additional insulation in attics. The following equation was used to calculate the annual kWh savings:

$$\Delta \mathrm{kWh} = kSF \times \Delta kWh/kSF \quad (1)$$

Parameters used in Equation 1 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkWh/kSF	= Unit energy savings from lookup table

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = kSF \times \Delta kW/kSF \times CF \quad (2)$$

Parameters used in Equation 2 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkW/kSF	= Unit demand savings from lookup table
CF	= Summer Peak Coincidence Factor for measure, 0.88

9.1.2.3 CFL Lighting Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Residential ENERGY STAR Compact Fluorescent Lamp (CFL) (Time of Sale)* section was used to calculate energy savings for the CFL lighting installed through the program. The following equation was used to calculate the annual kWh savings:

$$\Delta\text{kWh} = \frac{\Delta\text{Watts}}{1{,}000} \times ISR \times Hours \times (1 + WHF_e) \quad (1)$$

Parameters used in Equation 1 are as follows:

ΔWatt	= Compact Fluorescent Watts * Delta Watts Multiplier (provided by lookup table)
ISR	= In Service Rate or fraction of units that get installed, 1.0
Hours	= Average hours of use per year, 1,040
WHF_e	= Waste Heat Factor for Energy to account for HVAC interactions with efficient lighting, -0.059

Following this, ADM calculated the peak kW reduction using the following TRM defined equation

$$\Delta kW = \frac{\Delta\text{Watts}}{1{,}000} \times ISR \times CF \times (1 + WHF_d) \quad (2)$$

Parameters used in Equation 2 are as follows:

ΔWatt	= Compact Fluorescent Watts * Delta Watts Multiplier (provided by lookup table)
ISR	= In Service Rate or fraction of units that get installed, 1.0
CF	= Summer Peak Coincidence Factor for measure, .11
WHF_e	= Waste Heat Factor for Demand to account for HVAC interactions with efficient lighting, .057

9.1.2.4 Customer Education Savings Calculations

From the 2012 Energizing Indiana Programs EM&V Report, the Home Audit Recommendations section was used as reference to calculate energy savings for customer education. Evaluation staff asked participants during the telephone survey which recommendations from the education were implemented. Savings were attributed to the portion of sampled participants who indicated that they had engaged in these behaviors. These behavior engagement rates were then extrapolated to the participant population. Estimated savings attributed to each of the behaviors listed in the 2012 Energizing Indiana Programs EM&V Report are as follows:

- Turning off lights when not in use: 158 kWh, 0.01 kW
- Unplugging unused appliances: 21 kWh, 0.00 kW
- Installing water heater tank wrap: 79 kWh, 0.01 kW
- Washing clothes in cold water: 58 kWh, 0.00 kW
- Programming an existing thermostat: 26 kWh, 0.00 kW
- Installing a programmable thermostat: 131 kWh, 0.00 kW

9.1.2.5 Duct Sealing Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Duct Sealing and Insulation (Retrofit)* section was used to calculate energy savings for performing duct sealing. The following equation was used to calculate the annual kWh savings:

$$\Delta \text{kWh} = \Delta kWh_{cooling} + \Delta kWh_{heating} \quad (1)$$

$$\Delta kWh_{cooling} = \frac{\left(\frac{DE_{after} - DE_{before}}{DE_{after}}\right) \times FLH_{cool} \times BtuH}{SEER \times 1{,}000} \quad (2)$$

$$\Delta kWh_{heating} = \frac{\left(\frac{DE_{after} - DE_{before}}{DE_{after}}\right) \times FLH_{heat} \times BtuH}{\eta Heat \times 3{,}412} \quad (3)$$

Parameters used in Equation 1, 2, & 3 are as follows:

$\Delta kWh_{cooling}$	= Cooling energy savings due to duct sealing
$\Delta kWh_{heating}$	= Heating energy savings due to duct sealing
DE_{after}	= Distribution Efficiency after duct sealing
DE_{before}	= Distribution Efficiency before duct sealing
FLH_{cool}	= Full Load Cooling Hours dependent upon location
FLH_{heat}	= Full Load Heating Hours dependent upon location
BtuH	= Size of equipment in BtuH
SEER	= Seasonal average efficiency in SEER of Air Conditioning equipment
ηHeat	= Efficiency in COP of Heating equipment

*Assumptions made:

- Pre/Post duct leakage was not provided. ADM assumed all sites had a pre-leakage rate of 20% and a post leakage of 10% based on tracking data indicating leakage reduction was “>10% reduction.” Future program years should include pre/post leakage rates.
- Duct location was assumed to be unknown. Other allowable inputs per the TRM are Unconditioned Attic and Unconditioned Basement. Implementer should note the location of the duct work for future program years.
- Duct System R-Value was assumed to be R-4.2 for all participants. Program tracking data indicated that duct system R-Value was R-3 for all participants and R-4.2 was the nearest value available in TRM tables.

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{\left(\frac{DE_{pk,after} - DE_{pk,before}}{DE_{pk,after}}\right) \times BtuH \times CF}{EER \times 1{,}000} \quad (4)$$

Parameters used in Equation 4 are as follows:

$DE_{pk,after}$	= Distribution Efficiency under peak summer conditions after duct sealing
$DE_{pk,before}$	= Distribution Efficiency under peak summer conditions before duct sealing
BtuH	= Size of equipment in Btuh
EER	= Peak efficiency in EER of Air Conditioning equipment
CF	= Summer Peak Coincidence Factor for measure, 0.88

9.1.2.6 Low Flow Faucet Aerator Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Low Flow Faucet Aerator (Time of Sale or Early Replacement)* section was used to calculate energy savings for the installation of low flow faucet aerators. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \frac{ISR \times (GPM_{base} - GPM_{low}) \times min/day \times DR \times 8.3 \times (T_{ft} - T_{mains}) \times 365}{\eta DHW \times 3{,}412} \qquad (1)$$

Parameters used in Equation 1 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline faucet, 2.4
GPM_{low}	= Gallons per Minute of low flow faucet, 1.5 (kitchen), 1.0 (bathroom)
Min/day	= Average minutes per day used by each faucet in home, 3 (kitchen), 2 (bathroom)
DR	= Percentage of water flowing down drain, 63%
T_{ft}	= Assumed temperature of water used by faucet, 80ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{ISR \times (GPM_{base} - GPM_{low}) \times 60 \times DR \times 8.3 \times (T_{ft} - T_{mains}) \times CF}{\eta DHW \times 3{,}412} \qquad (2)$$

Parameters used in Equation 2 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline faucet, 2.4
GPM_{low}	= Gallons per Minute of low flow faucet, 1.5 (kitchen), 1.0 (bathroom)
DR	= Percentage of water flowing down drain, 63%
T_{ft}	= Assumed temperature of water used by faucet, 80ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98
CF	= Summer Peak Coincidence Factor for measure, 0.00262

9.1.2.7 Low Flow Showerhead Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Low Flow Showerhead (Time of Sale or Early Replacement)* section was used to calculate energy savings for the installation of low flow shower heads. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \frac{ISR \times (GPM_{base} - GPM_{low}) \times \frac{min}{day} \times \#people \times shower/per \times 8.3 \times (T_{shower} - T_{mains}) \times 365}{\eta DHW \times 3{,}412} \qquad (1)$$

Parameters used in Equation 1 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline showerhead, 2.8
GPM_{low}	= Gallons per Minute of low flow showerhead, 1.75
Min/day	= Average minutes per shower, 8.36
#people	= Average number of people per household, 2.46
shower/per	= Average showers per day, 0.58
DR	= Percentage of water flowing down drain, 63%
T_{shower}	= Assumed temperature of water used for shower, 105ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{ISR \times (GPM_{base} - GPM_{low}) \times 60 \times 8.3 \times (T_{shower} - T_{mains}) \times CF}{\eta DHW \times 3{,}412} \quad (2)$$

Parameters used in Equation 2 are as follows:

ISR	= In Service Rate or fraction of units that get installed, 1.0
GPM_{base}	= Gallons per Minute of baseline showerhead, 2.8
GPM_{low}	= Gallons per Minute of low flow showerhead, 1.75
shower/per	= Average showers per day, 0.58
DR	= Percentage of water flowing down drain, 63%
T_{shower}	= Assumed temperature of water used for shower, 105ºF
T_{mains}	= Assumed temperature of water entering house
ηDHW	= Recovery efficiency of electric hot water heater, 0.98
CF	= Summer Peak Coincidence Factor for measure, 0.00371

9.1.2.8 Knee and Side Wall Insulation Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Wall Insulation (Retrofit)* section was used to calculate energy savings for the installation of additional insulation in knee and side walls. The TRM supplies EFLH values and savings for insulation in a kWh/1000 ft2 manner based on weather zone. The following equation was used to calculate the annual kWh savings:

$$\Delta \text{kWh} = kSF \times \Delta kWh/kSF \quad (1)$$

Parameters used in Equation 1 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkWh/kSF	= Unit energy savings from lookup table

*No assumptions were made as all pertinent information was provided.

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = kSF \times \Delta kW/kSF \times CF \quad (2)$$

Parameters used in Equation 2 are as follows:

kSF	= Area of installed insulation (1,000 sq. ft.)
ΔkW/kSF	= Unit demand savings from lookup table
CF	= Summer Peak Coincidence Factor for measure, 0.88

9.1.2.9 LED Lighting Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Residential LED Lamps* section was used to calculate energy savings for the installation of LED lamps. The following equation was used to calculate the annual kWh savings:

$$\Delta\text{kWh} = \frac{(Watt_{base} - Watt_{LED})}{1{,}000} \times ISR \times Hours \times (1 + WHF_e) \quad (1)$$

Parameters used in Equation 1 are as follows:

$Watt_{base}$	= Baseline lamp Watts
$Watt_{LED}$	= LED lamp Watts
ISR	= In Service Rate or fraction of units that get installed, 1.0
Hours	= Average hours of use per year, 1,040
WHF_e	= Waste Heat Factor for Energy to account for HVAC interactions with efficient lighting, -0.059

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \frac{(Watt_{base} - Watt_{LED})}{1{,}000} \times ISR \times CF \times (1 + WHF_d) \quad (2)$$

Parameters used in Equation 2 are as follows:

$Watt_{base}$	= Baseline lamp Watts
$Watt_{LED}$	= LED lamp Watts
ISR	= In Service Rate or fraction of units that get installed, 1.0
CF	= Summer Peak Coincidence Factor for measure, 0.1 1
WHFd	= Waste Heat Factor for Demand to account for HVAC interactions with efficient lighting, 0.057

9.1.2.10 Domestic Hot Water Pipe Insulation Savings Calculations

From the 2012 Indiana Technical Reference Manual, the *Domestic Hot Water Pipe Insulation (Retrofit)* section was used to calculate energy savings for the installation of insulation on the hot water pipes coming out of the hot water heater. The following equation was used to calculate the annual kWh savings:

$$\Delta\text{kWh} = \frac{\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) \times L \times C \times \Delta T \times 8{,}760}{\eta DHW \times 3{,}412} \quad (1)$$

Parameters used in Equation 1 are as follows:

R_{exist}	= Pipe heat loss coefficient of uninsulated pipe (Btu/hr-ºF-ft), 1.0
R_{new}	= Pipe heat loss coefficient of insulated pipe (Btu/hr-ºF-ft)
L	= Length of pipe from water heating source covered by pipe wrap (ft)
C	= Circumference of pipe (ft)
ΔT	= Average temperature difference between supplied water and outside air temperature, 65ºF
ηDHW	= Recovery efficiency of electric hot water heater, 0.98

*Assumptions made:

- Pipe circumference was not provided for several participants. ADM assumed all pipes were ¾ inches thick as all homes that had this information recorded had water heater pipes this size.

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta\text{kW} = \frac{\Delta kWh}{8{,}760} \quad (2)$$

Parameters used in Equation 2 are as follows:

ΔkWh = Annual kWh savings due to the installation of the pipe wrap

9.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) impacts

The purpose of the Residential Income Qualified Weatherization Program is to assist income-qualified customers who would benefit from higher level standard home weatherization measures such as ceiling insulation, home infiltration, and duct sealing. Because the Program is offered to customers whose income is below 200% of the federal poverty level, and who would be unlikely to implement the measures without the Program, ADM applies a NTGR of 100% to the program.

9.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of participant tracking data, using the 2012 Indiana TRM, and participant survey data. This section presents the results of the savings calculation activities.

9.2.1 Verification of Participation in Program

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided by Honeywell and I&M for accuracy. One participant was found in the Home Weatherization Program tracking data. No duplicate entries were discovered. ADM did find that the number of measures implemented in the 2015 program was 258. To verify that the number of homes in the program tracking database claiming to have weatherization measures installed through the program was accurate, ADM administered a telephone survey and conducted site visits with program participants.

All 4 respondents who completed the participant survey verified that they had participated in the program during 2015. All survey respondents also indicated that the measures installed were identical to what was claimed in the Honeywell and I&M tracking database. In addition, all of the 8 participant homes visited by ADM staff had the measures claimed by Honeywell and I&M installed. The specifications of the measures matched what was claimed by the implementers in program tracking data. Based on these results, the verification rates shown in Table 9-2 for each type of weatherization measure were determined.

Table 9-2 Verification Rates by Measure Type

Program	*Weatherization Measure*						
	Air Infiltration	*All types of Insulation*	*Customer Education*	*Duct Sealing*	*Faucet Aerator*	*All Lighting*	*Showerhead*
Income Qualified Weatherization Program	100%	100%	100%	100%	100%	100%	100%

Based on these verification rates, Table 9-3 reports the numbers of homes that were weatherized through the program during PY6 that were verified as being program eligible participants.

Table 9-3 Home Verified to have Weatherization Measures Completed and are Program Eligible Participants

Program	*Quantity of Measures Weatherized*	*Verification Rate*	*Quantity of Measures Which Where Verified as Program Eligible*
Income Qualified Weatherization Program	258	100%	258

9.2.2 Gross Annual kWh Savings and Peak kW Reduction

Gross energy and demand impacts were calculated using the 2012 Indiana Technical Reference Manual and the 2012 Energizing Indiana Program EM&V Report. Where program tracking data provided no information on inputs used, ADM used the Indiana TRM default inputs.

The program implemented 258 measures in PY6. The estimated gross impacts resulting from the PY6 Home Weatherization program are summarized in Table 9-4, Table 9-5, Table 9-6, and Table 9-7.

Table 9-4 Gross Impact Summary

Program	*PY6 Program Goals (kWh)*	*Peak Demand Savings (kW)*		*Annual Energy Savings, (kWh)*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Income Qualified Weatherization	1,029,804	2.00	2.06	36,443	25,411	70%

Table 9-5 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
36,443	36,443	36,443	25,411	70%

Table 9-6 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
2.00	2.00	2.00	2.06

Table 9-7 Measure Savings Summary

Measure Type	*Ex ante Annual Savings (kWh)*	*Ex post Annual Savings (kWh)*	*Realization Rate*
Air Infiltration	6,845	7,354	107%
Attic Insulation	9,918	6,122	62%
CFL Lighting	4,206	4,514	107%
Customer Education	8,705	2,310	27%
Faucet Aerator	234	215	92%
Knee Wall Insulation	601	262	44%
LED Lamp	1,868	1,730	93%
Pipe Insulation	1,468	1,176	80%
Showerhead	1,026	1,323	129%
Sidewall Insulation	1,572	403	26%
Total	36,443	25,411	70%

9.2.3 Net Energy (kWh) and Peak Demand (kW) Impacts

The purpose of the Residential Income Qualified Weatherization Program is to assist income-qualified customers who would benefit from higher level standard home weatherization measures such as ceiling insulation, home infiltration, and duct sealing. Because the Program is offered to customers whose income is below 200% of the federal poverty level, and who would be unlikely to implement the measures without the Program, ADM applies a NTGR of 100% to the program. The final net-to-gross ratios and associated net savings for each measure of the program are shown in Table 9-8

Table 9-8 Net Impact Summary

Measure Type	*NTGR*	*Ex post Annual Savings (kWh)*	*Ex post Demand Savings (kW)*	*Net Ex Post Annual Savings (kWh)*	*Net Ex Post Demand Savings (kW)*
Air Infiltration	100%	7,354	0.39	7,354	0.39
Attic Insulation	100%	6,122	0.49	6,122	0.49
CFL Lighting	100%	4,514	0.54	4,514	0.54
Customer Education	100%	2,310	0.13	2,310	0.13
Faucet Aerator	100%	215	0.04	215	0.04
Knee Wall Insulation	100%	262	0.02	262	0.02
LED Lamp	100%	1,730	0.21	1,730	0.21
Pipe Insulation	100%	1,176	0.13	1,176	0.13
Showerhead	100%	1,323	0.07	1,323	0.07
Sidewall Insulation	100%	403	0.04	403	0.04
Total	100%	25,411	2.06	25,411	2.06

9.3 Process Evaluation

This chapter presents the results of the process evaluation for I&M's Income Qualified Weatherization Program during PY6. The PY6 process evaluation focuses on identifying any notable trends in program operation and performance for the program year, and assess the extent to which the I&M's Income Qualified Weatherization Program has changed or improved since the prior year. This evaluation is based upon analysis of program structure and interviews and surveys of participating I&M customers, I&M energy efficiency staff, and program tracking data.

9.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity include:

- How effective is the program marketing? How do participants learn about the program?
- Have there been any changes within the participant group since PY5?
- Why did customers participate in the program?
- How satisfied are participants with the program? What was their level of satisfaction with performance of the measures, the effort required to complete the application, and the quality of the work completed?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the Home Weatherization program is developed from a telephone survey of program participants. The internal organization and operational efficiency of program delivery is examined through analysis of interviews conducted with I&M program staff, as well as the program implementer, Honeywell.

9.3.2 Summary of Primary Data Collection

The data collection activities conducted for the PY6 process evaluation are similar to those that were conducted for the PY5 evaluation. This allows for comparisons between program years with regard to participant and program management and implementation perspectives.

- **Interview with I&M staff members:** Interviews with I&M staff members, including program managers, provided insight into any program design or operational changes since the prior program year. I&M staff members also provided information regarding future plans for the program.
- **Interview with Honeywell staff:** Honeywell program implementation staff was interviewed to provide information regarding program progress and observations regarding the participating customer group. The implementer was asked questions about any evolving program strategies, progress towards performance goals, and any operational issues that had occurred during the year.
- **Participant surveys:** Participant surveys served as the foundation for understanding the customer perspective. The participant surveys provided customer feedback and insight regarding customer experiences with the Residential Home Weatherization program. Respondents reported on how they learned about the program, their decision to participate, and satisfaction with the program.

9.3.3 Documentation Review

The documentation reviewed for the Home Weatherization Program is also used for the Low Income Weatherization Program. Findings are presented in the Home Weatherization Program Chapter.

9.3.4 Participant Survey Findings

ADM conducted telephone surveys with program participants as part of the evaluation effort for the Income Qualified Weatherization Program in PY6. These surveys were designed to gather information related to both the impact and process components of the program evaluation. Data collected via participant surveying are used in evaluating:

- Customer demographics and characteristics;
- Customer implementation of energy efficient measures and behaviors;
- Customer decision making behaviors; and
- Customer satisfaction with the program.

Due to the limited population of participants during PY6, ADM attempted to complete interviews with a census of customers. The evaluation team attempted to reach all participants with a telephone number listed in program tracking data, however, only four participants ultimately

completed the survey. This represents approximately 12% of the program population of 33 customers for PY6. Due to the small number of respondents, the survey results discussed below cannot be considered a statistically representative summary of the participant perspective. Instead, these results may be viewed as anecdotal feedback.

9.3.4.1 Customer Awareness of Program

All of the survey respondents learned of the program through I&M's marketing efforts: two received a letter in the mail, one learned of it directly from an I&M representative, and one learned of it from the I&M website.

9.3.4.2 Factors Affecting Customer Decision Making

Survey respondents were asked what was the main factor involved in their decision to participate in the program. One respondent participated for environmental reasons, while the other three participated because they needed the service (i.e. insulation) or wanted to increase their home's comfort.

9.3.4.3 Customer Behavioral Savings

Respondents were asked if they had taken certain actions since participating in the program, such as, turning off lights after leaving a room, or unplugging unused appliances. All four survey respondents said they turn off lights when leaving a room, though none of the respondents unplug unused appliances. In addition, three of the four respondents wash their clothes in cold water and installed a water heater tank wrap.

9.3.4.4 Cross-Program Awareness

Respondents were then asked if they had heard of any other rebates, incentives, or energy efficiency services offered by I&M, but none of the four respondents said they had heard of them.

Survey respondents were also asked if they had visited I&M's Electric Ideas website (electricideas.com), which provides information on ways to save energy. Two of the four respondents had visited the website, one to get tips on saving energy, and the other to "get the bulbs".

9.3.4.5 Customer Satisfaction

Respondents were asked to rate their level of satisfaction with the following:

- Performance of the items installed;
- Savings on your monthly bill;
- The effort required to participate;
- Usefulness of the energy audit;

- Information provided by I&M;
- Quality of work conducted by the contractor; and
- Overall program experience.

All of the survey respondents reported that they were satisfied or very satisfied with each aspect of the program and the program overall.

9.3.4.6 Respondent Demographics

The key demographic characteristics are summarized below:

- Three of the four respondents stated their homes were built before 1980, while the other did not know the date.
- Two of the four said the home size was between 1000 and 1,500 square feet, while the other two did not know their home's size.
- All four respondents reported that they have electric heating. Similarly, all respondents reported that they have electric water heating.
- The average number of people living the household was 2.3.
- Households had an average of 1.4 bathrooms and 3 bedrooms.

9.3.5 Contractor Interview Findings

The findings from the contractor interviews are reported in the Home Weatherization Program chapter. From a contactor standpoint the Low Income Weatherization Program and Home Weatherization Program have highly similar operations.

9.3.6 Program Operations Perspective

This section summarizes the core findings of interviews conducted with I&M and Honeywell program staff for the purposes of developing internal program management perspectives and comparing these perspectives with those expressed during the prior program year.

Specific interview questions addressed changes that had been implemented during PY6, whether the program had met its performance goals, and what changes may be made for the coming program year. This section summarizes (1) the roles and responsibilities of the staff responsible for managing program operations, (2) the program design and implementation procedures, (4) quality assurance and quality control (QA/QC) procedures, (5) marketing and outreach, and (6) changes planned for PY7.

Because, the Home Weatherization Program and the Income Qualified Weatherization program utilize the same staff, marketing strategies and very similar implementation procedures, much of the summary of program operations discussed below repeats the summary provided in the Home

Weatherization Program chapter. However, the ways in which the Income Qualified Weatherization program differs from the Home Weatherization Program are noted below.

9.3.6.1 Staff roles and responsibilities

The Honeywell PY6 implementation team at included a Program Manager, Program Coordinator, Field Auditor, and financial administrative staff. The Honeywell Program Manager is responsible for the day-to-day operations of the Weatherization Programs which includes activities such as providing weekly updates to I&M regarding program activity, progress towards goals, and issues in field. The Program Coordinator is responsible for homeowner outreach and scheduling of audits, post installation field inspections. The Field Auditor is responsible for completing all program audits, although the Program Coordinator also performs home audits on an as needed basis.

The I&M program manager provides oversight of Honeywell's implementation of the program.

9.3.6.2 Program Design and Implementation

The PY6 delivery model was modified when Honeywell assumed responsibility to implement the program. In prior years, contractors were required to perform the audit, schedule the installation, and complete all program paperwork. The program's success in achieving its goals was in part, driven by contractors' ability to market and sell the program incentives. In PY6 the task of performing the home audit was shifted to program staff. Once an audit was performed staff would reach out to program qualified contractors to schedule the installation of recommended measures.

At the time of the audit the program auditor offers to install a list of direct install measures that include CFL light bulbs, low-flow shower heads and faucet aerators. The home owner is provided a report that details the weatherization measures that are recommended for their home. A contractor is then scheduled to install the measures.

The program guidelines state that the homeowner can choose the contractor. If the owner does not have a preference, the auditor will choose a contractor based on the geographic location. If there are multiple contractors in the area, they will rotate which contractors are selected. Ideally the auditor can schedule the contractor's visit immediately after the audit is completed. If the homeowner cannot commit on the day of the audit, the auditors contact information is provided to the homeowner and Honeywell Program Coordinator conducts follow up phone calls with the home owner.

The price that contractors are allowed to charge to implement the efficiency measures is fixed by the program. The allowed amount was determined by surveying contractors for information on standard charges to implement the measures. The allowed price was set at the average of contractor estimates. Contractors must agree to the prices to complete work through the program.

Unlike the mass market weatherization program, a copay for weatherization services is not required of customers. The contractor submits the final paperwork and the rebate check is sent directly to the contractor.

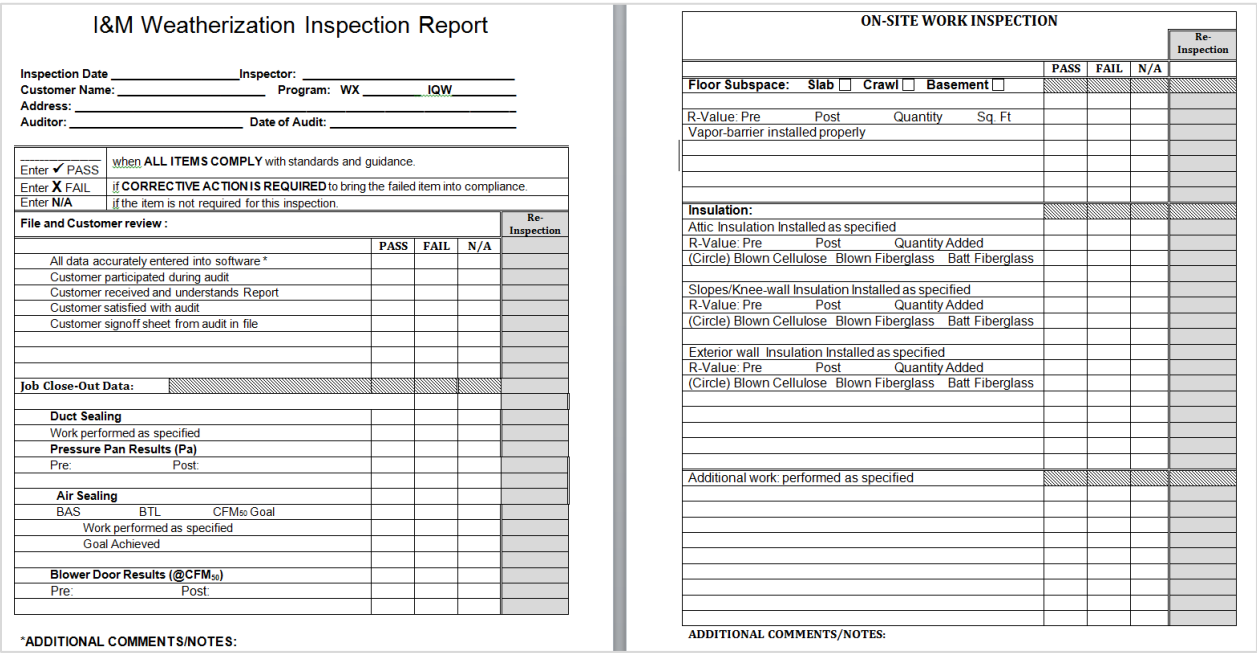
Staff indicated that the objective of the program design was to standardize the audit process and streamline the scheduling of jobs. However, staff indicated there was some disconnect between the auditor recommendations and what the contractors thought needed to be done. In particular, one issue noted was that there have been multiple instances when the contractor disagreed with the specifics in the work order and that there is little flexibility for a contractor to modify the work order developed during the home audit, although it was noted that modifications occurred on multiple occasions.

Staff indicated that all field auditors are required to have industry knowledge along with industry standard credentials, such as Building Performance Institute certification. Staff also said that field auditors typically have experience using energy modeling software and HVAC experience.

9.3.6.3 QA/QC Procedures

A random sample of homes is selected for a verification site visit. Honeywell staff performed verification inspections.

Figure 8-6 below displays the verification form used by field staff. The inspector will review the project details in the program tracking system to insure accurate data entry; they also ask the home owner if they participated in the audit, if they understood the report, and if they were satisfied with the audit. The inspector will also document post-installation R-Values and perform a final blower door tests.



I&M Weatherization Inspection Report

Inspection Date _____ Inspector: _____
Customer Name: _____ Program: WX _____ IQW_____
Address: _____
Auditor: _____ Date of Audit: _____

Enter ✓ PASS	when **ALL ITEMS COMPLY** with standards and guidance.
Enter **X** FAIL	if **CORRECTIVE ACTION IS REQUIRED** to bring the failed item into compliance.
Enter **N/A**	if the item is not required for this inspection.

File and Customer review :	PASS	FAIL	N/A	Re-Inspection
All data accurately entered into software *				
Customer participated during audit				
Customer received and understands Report				
Customer satisfied with audit				
Customer signoff sheet from audit in file				
Job Close-Out Data:				
Duct Sealing				
Work performed as specified				
Pressure Pan Results (Pa)				
Pre: Post:				
Air Sealing				
BAS BTL CFM_{50} Goal				
Work performed as specified				
Goal Achieved				
Blower Door Results (@CFM_{50})				
Pre: Post:				

*ADDITIONAL COMMENTS/NOTES:

ON-SITE WORK INSPECTION	PASS	FAIL	N/A	Re-Inspection
Floor Subspace: Slab ☐ Crawl ☐ Basement ☐				
R-Value: Pre Post Quantity Sq. Ft				
Vapor-barrier installed properly				
Insulation:				
Attic Insulation Installed as specified				
R-Value: Pre Post Quantity Added				
(Circle) Blown Cellulose Blown Fiberglass Batt Fiberglass				
Slopes/Knee-wall Insulation Installed as specified				
R-Value: Pre Post Quantity Added				
(Circle) Blown Cellulose Blown Fiberglass Batt Fiberglass				
Exterior wall Insulation Installed as specified				
R-Value: Pre Post Quantity Added				
(Circle) Blown Cellulose Blown Fiberglass Batt Fiberglass				
Additional work: performed as specified				

ADDITIONAL COMMENTS/NOTES:

Figure 9-1 Verification Form for Home Weatherization and Income Qualified Weatherization Programs

9.3.6.4 Marketing and Outreach

I&M staff worked with information provided by community action agencies to develop lists of low income home owners and renters that would meet the program's income qualifications. Community action agencies qualify customers for energy assistance based on their income.

Staff indicated that it was challenging to develop a comprehensive list of potential homeowners and renters that would qualify for the program. If a customer has trouble paying their utility bill, there are various community agencies they can go to for assistance. The agencies are responsible for qualifying the customer based on their income for energy assistance. Community agencies provide lists of customers that meet the energy assistance qualification to I&M annually. I&M uses this information to flag accounts in their database. However, a limitation of this approach is that maintenance of the list is dependent on the customer re-applying for energy assistance on an annual basis. Staff indicated there are often many customers who are overlooked because they do not reapply on time.

9.3.7 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from PY6:

- **Program savings goal not met.** The program did not achieve its PY6 savings goal. This was largely a function of not completing the targeted number of projects rather than projects not resulting in the expected savings. Multiple operational changes likely impacted the programs ability to meet its savings goal. Honeywell began implementing the program for the first time this year, but this ended towards the end of the year, at which point I&M took over all implementation tasks. Additionally, the program activity is largely dependent on the marketing efforts of program staff rather than leveraging contractor interest in completing program work as a means to incentivize contractors promote the program as well.
- **Audits now performed by program staff.** Unlike prior years, program staff completed the audits and scheduled implementation work with contractors. This process represents a departure from prior year operations for which contractors completed the audits and any scheduling of work to be performed. Staff indicated that the objective of the change was to streamline the participation process. Contractors reported that the new process is more streamlined from their perspective because they no longer have to qualify the homes and perform the audits.

  Honeywell completed the majority of program audits during the first two-quarters of the program year, with some additional audits being performed by I&M. However, I&M completed the audits during the last two quarters of the program year.
- **Contractors raised concerns about measure prioritization during the audits.** However, staff indicated that there were occurrences of contractors disagreeing with the specified work provided in the work order. Two contractors noted that in some instances, the auditors were not correctly prioritizing work to maximize program cost-effective savings. Additionally, it

was noted that there is not an efficient process to modify the work order under these circumstances.

- **Customers are highly satisfied with the program.** Ninety-six percent of customers were satisfied with the program overall, and very few customers (i.e., 6% or fewer) stated any dissatisfaction with any single aspect of the program.
- **I&M's direct outreach methods are primary sources of program awareness.** The majority of participants reported learning of the program from a letter sent by I&M (66%), from the I&M website (14%), or from an I&M representative (10%).
- **Program will be implemented by I&M during PY7.** Audits, scheduling of measure implementation, and site verifications will be performed by I&M.

The evaluation team currently has the following recommendation for program improvement consideration.

- **Consider providing more detailed information to contractors in advance of scheduled work.** Contractors stated a preference for receiving more detailed audit results prior to performing the measure implementation work. This information might include photographs of the home characteristics that were audited, detailed testing results, and other collected information. Providing this information in advance might enable contractors to identify instances where they believe measures are incorrectly specified and to correct these issues prior to the site visit.
- **Consider holding meetings between contractors and auditors to discuss work order issues.** Discussions between participating contractors and auditors regarding work order issues may provide common understanding about how measures should be prioritized and allow the program to identify changes to the audit process that will allow for greater agreement between auditors and contractors on the work to be performed.
- **Consider hosting events inform communities about the benefits of weatherization measures and incentive opportunities.** Contractors suggested partnering with big-box retailers, libraries, churches, community centers and schools to deliver the message. Staff may want to consider if there is an opportunity to cross-promote the program through retailer events promoting program lighting discounts.
- **Consider adding a contractor referral program.** To boost program activity staff may want to consider establishing a system by which contractors can refer their customers to the program and then be assigned to perform the measure implementation work.
- **Consider adding a customer referral program.** Staff may want to consider a referral program that provides customers with a small incentive (e.g., $20) for referring a friend or neighbor to the program that participates. In other jurisdictions where a similar referral program is offered, ADM has found friends and neighbors to be a key source of program awareness.

- **Consider modifying the verification form to include square footage of attic and wall insulation, space and water heating equipment type, and counts of direct install measures.**
- **Consider modifying audit tool to include data validation elements to reduce data entry errors and incomplete information.**
- **Monitor industry standards and emerging research regarding the effect of insulation improvements on air infiltration levels.** Commentary from I&M and participating contractor staff suggest that the installation of attic or wall insulation may result in air sealing improvements in addition to the typical energy savings attributed to increased insulation. Initial research during the evaluation period revealed varying perspectives on whether dense packed cellulose can be used to significantly reduce air infiltration,[31] but ADM did not identify any sources which quantified the magnitude of these effects. Moving forward, ADM recommends that the evaluation team monitor emerging research regarding the interaction between insulation and air infiltration as an ongoing research activity. If this research indicates that air infiltration energy savings resulting from insulation can be reliably quantified and are significant, these savings should be attributed to the program in the future.

[31] Reviewed documentation regarding these effects include literature from the Department of Energy National Renewable Energy Lab (http://www.nrel.gov/docs/fy00osti/26446.pdf), as well as a presentation from the North American Insulation Manufacturers Association (https://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/BETEC/1E.cottrell.pdf)

10. New Construction Program

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the Residential New Construction Program during the period January 2015 through December 2015.

10.1 Program Specific M&V Methodologies

The M&V approach for the New Construction program (NCP) is aimed at measuring the following:

- Numbers of homes built and sold through the program;
- Average annual kWh savings per home;
- Average kW reduction per home;
- Providing estimates of net-to-gross savings and free-ridership; and
- Estimating cost effectiveness of the NCP in PY6.

Table 3-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 10-1 Data Sources for Gross Impact Parameters – New Construction Program

Parameter	*Source*
Number of Homes Sold	Program Tracking Data, Drive-by Verification, and County Assessor Page Review
Unit Energy Consumption	Building Simulations using REMRate
Net –to-Gross-Ratio	Participant Surveying

10.1.1 Verification of Homes Constructed

The first aspect of conducting measurements of program activity was to verify the number of homes participating in the program. To begin the verification effort, ADM reviewed the tracking system data on reported homes to determine that all homes were eligible for the program. Additionally, the tracking system was reviewed to ensure that the proper data fields required to support this evaluation as well as future evaluations were included. The tracking system was reviewed for completeness, accuracy, and efficiency.

As an additional step, drive-by verification visits were completed for 10 of the homes to verify the existence and location of the homes.

10.1.2 Review of Ex Ante Savings per Home

Through the review of the database of program homes, ex ante savings for the New Construction program were found to be developed through the assignment of set values for each of the five types of efficient homes present in the PY6 program tracking data, namely Gold Star Electric Only, Gold Star Gas and Electric, Silver Star Electric Only, and Silver Star Gas and Electric, and Platinum Star Gas and Electric. The database savings for each home type are summarized below in Table 10-2. The kWh savings claimed for both configurations of the Gold and Silver home types did not change from PY5 to PY6. PY6 marked the first year that Platinum Star homes participated in the program.

Table 10-2 New Construction Database Savings by Home Type

Home Tier	*Fuel Type*	*kWh Savings in Database*	*Average kW Savings in Database*
Silver	Electric Only	4,035	0.95
Silver	Gas and Electric	1,519	0.90
Gold	Electric Only	7,154	1.45
Gold	Gas and Electric	1,551	1.31
Platinum	Gas and Electric	1,551	1.35

These savings estimates were developed through the use of EnergyGauge home models. EnergyGauge incorporates models for each efficient home and compares them to the energy usage of baseline homes. The savings in the database reflects the difference between the EnergyGauge home model outputs for the baseline home and the efficient home for each home tier and fuel type.

10.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) impacts

ADM interviewed participating builders to estimate a net-to-gross ratio for the Residential New Construction Program. The net-to-gross analysis was designed to assess both free-ridership and spillover effects, but interviewed builders did not indicate the presence of any spillover savings during PY6. Therefore, this section described ADM's approach to estimating free-ridership for the program.

Free ridership scores were developed for each interviewed builder by analyzing responses to three lines of questioning: program influence, building practices in the absence of the program, and co-participation in other rebate programs. The scoring for each line of questioning is detailed below, followed by the algorithm for calculating the overall net-to-gross ratio.

10.1.3.1 Program Influence

The Program Influence indicator variable is calculated using the response to the following:

- PI1: "We would like to identify which, if any, aspects of the program were important in your decision to build homes to a higher efficiency standard than is required by code. Please rate each of the following factors on a scale of 0 to 0, where 0 means that the factor was not at all important in your decision to build energy efficient homes, and 10 means that the factor was extremely important in your decision to build energy efficient homes."
- PI2: "How, if at all, have any of the resources offered by the program affected your success in selling energy efficient homes?"
- PI3: "How, if at all, have any resources offered by the program affected your building practices?"
- PI4: "Could you please tell me, in your own words, the influence the I&M Residential New Construction Program had on your building practices?"

With PI1, respondents are provided with a list of factors that are associated with the I&M program and were asked to rate the importance of each of them in their decision making process. These factors include:

- Information from CLEAResult or I&M staff;
- Technical assistance from HERS raters;
- The incentive provided by the program; and
- Program marketing and program informational literature.

The unadjusted Program Influence score is defined as the maximum rating provided by respondents for the above factors in PI1, converted to a percentage by dividing the score by 10. PI2, PI3, and PI4 serve as free-ridership mitigation variables, where respondents providing open-ended commentary indicating that the program has positively influenced their sales of efficient homes, or has affected their building practices, receive a 50% reduction in free-ridership for this variable. For example, a respondent providing a rating of 6 for Information from CLEAResult or I&M staff, and a rating of 8 for the incentive provided by the program, would receive a Program Influence score of (8/10) = 80%. This represents a free-ridership level of 20%. If this respondent also stated that the program has positively affected their sales of efficient homes or their building practices, their free-ridership rate would be adjusted to (0.2/2.0) = 0.1, or 10%, resulting in a final Program Influence Score of 90%.

10.1.3.2 Behavior Absent Program

The Behavior Absent Program indicator variable is calculated using the response to the following:

- BAP1: "On a scale of 0 to 10, where 0 represents not at all likely and 10 represents extremely likely, how likely would you be to build your homes to the same efficiency standard if the I&M Residential New Construction Program and incentive were not available?"; and
- BAP2: "If the I&M program and incentive were not available, how likely would your company be to build fewer homes to the same efficiency standard? Please answer on the same 0 to 10 scale where 0 means not at all likely and 10 means extremely likely."
- BAP3: "What factors influence decisions to include energy efficient equipment/materials/construction practices which exceed IECC 2009 building code requirements?"

Responses to BAP1 are divided by 10 to calculate the level of unadjusted free-ridership for the Behavior Absent Program variable. BAP2 and BAP3 serve as free-ridership mitigation factors, where respondents providing a score of 5 or greater receive a 50% reduction in free-ridership for the BAP variable and respondents providing an open-ended response to BAP3 indicating that their decision to build efficient homes is affected by financial factors receive another 50% reduction in free-ridership for this variable. Thus, a respondent meeting both of these mitigation criteria would receive a 100% reduction in free-ridership for this variable.

After the adjustment is applied, the BAP score is calculated by subtracting the adjusted BAP free-ridership from 1. For example, a respondent providing a response of 4 to BAP1 would receive an unadjusted BAP free-ridership value of (4/10) = 0.4, or 40%. If this respondent provided an answer of 6 to BAP2, their adjusted BAP free-ridership value would be (0.4/2.0) = 0.2, or 20%. Finally, their Behavior Absent Program score would be calculated as (1.0 – 0.2) = 0.8, or 80%.

10.1.3.3 Prior Experience

The Prior Experience indicator variable is calculated using the response to the following:

- PE1: "In the year prior to your enrollment in the I&M Residential New Construction Program, what percentage of your new homes in I&M's service territory would have met this program's specified Silver Star efficiency level (HERS of 75) or better?"
- PE2: "Did your company utilize a HERS rater for homes in I&M's service territory prior to your enrollment in the I&M Residential New Construction Program?"

Responses to PE1 serve as the level of unadjusted free-ridership for the Prior Experience variable. PE2 serves as a free-ridership mitigation factor, where respondents providing a response of "No" or "Don't know" receive a 50% reduction in free-ridership for the PE variable. After the adjustment is applied, the PE score is calculated by subtracting the adjusted PE free-ridership from 1. For example, a respondent providing a response of 30% to PE1 would receive an unadjusted PE free-ridership value of 0.3, or 30%. If this respondent provided a response of "No" to PE2, their adjusted PE free-ridership value would be (0.3/2.0) = 0.15, or 15%.

The final net-to-gross score is calculated by combining the above three variables as follows, where Program Influence accounts for 60% of the net-to-gross score and Behavior Absent Program and Prior Experience each account for 20% of the net-to-gross score:

Net-to-Gross Score = (0.6 * Program Influence Score) + (0.2 * Behavior Absent Program Score) + (0.2 * Prior Experience Score)

The net-to-gross scores are then weighted by the number of participating homes that each responding builder had in the program during PY6.

10.2 Impact Results

As the ADM estimated ex post gross electric savings and peak demand reductions through reviewing home specifications with REMRate Version 15. This section presents the results of the gross and net savings calculation activities.

10.2.1 Verification of Qualifying Program Homes

Homes were verified as existing and qualifying under the program through the review of drive-by site visits, county assessor page inspections, and HERS score reports. All sampled homes were verified to exist and qualify as part of the program. ADM performed 10 drive-by verification visits as part of this verification, and used builder interviews to confirm that the builders had received rebates for qualifying homes.

10.2.2 Verification of Home Characteristics

Typically, homes are verified on a site-by-site basis, with home characteristics representing the homes at each specific address. However, with limited information available for participating homes, a desk review of the EnergyGauge models used to report database energy savings was conducted for all available models. The EnergyGauge home models were found to be sufficient to represent a general case of the efficient homes found in the database.

The EnergyGauge input documents were first reviewed to determine the necessary home characteristics to re-model each home. The output energy consumption documents for the baseline and efficient homes were used to determine whether or not the energy consumption difference matched the database savings.

As with PY5, the EnergyGauge model output documents supported the energy savings for all but one of the home scenarios, the Silver tiered electric fuel home. While the savings found in the database for this home tier and fuel mix was 4,035 kWh, the EnergyGauge output documents supported savings of 5,769 kWh. For this case, the EnergyGauge model inputs provided were modeled in REMRate and the resulting realization rate was applied to the database savings to create the reported ex post savings. This approach was used so that only the model ex post and ex ante differences would be reflected in the realization rate.

10.2.3 Gross Annual Savings per Home

Gross annual savings were determined through the review and model of EnergyGauge input documentation characteristics into REMRate software, Version 15. The fuel summary reports from REMRate were then printed out, which provide annual energy consumption values for home heating, home cooling, hot water heating, and lighting and appliances. As there were only minor differences in the ex ante savings and home specifications in PY6 compared to PY5, the results of this review are very similar to those found for PY5.

10.2.3.1 Home Heating, Home Cooling, and Hot Water Heating

Heating, cooling, and water heating equipment upgrades were found to be consistent with typical upgrades found in other residential new construction programs. Home heating and cooling energy consumption is generally affected by efficiency improvements in both the cooling and heating equipment, and the building shell measures (such as wall and ceiling insulation). The upgrades to the building shell measures were also consistent with typical upgrades found in residential new construction programs.

Regarding cooling equipment, EnergyGauge consistently overestimated energy savings (relative to REMRate) from cooling equipment upgrades. This also occurred during PY5.

10.2.3.2 Lighting and Appliances

A review of the lighting and appliances energy consumption output documents showed that EnergyGauge is consistently underestimating savings for this component by 20%. RESNET standards dictate the appropriate energy consumption for lighting and appliances.

Differences were found in the lighting and appliance portion of the energy consumption outputs for the lighting, dryer, clothes washer, and miscellaneous categories. Comparing the EnergyGauge lighting outputs to RESNET specifications, it was discovered that the EnergyGauge outputs were only reporting the interior lighting category. Under RESNET and REMRate, there are additional fields for exterior and garage lighting. This difference accounts for an increase in REMRate reported lighting energy consumption.

Energy consumption was overestimated by EnergyGauge for clothes washers and miscellaneous categories. This also occurred during PY5.

Although there are minor differences for specific measures and home parameters, the EnergyGauge specifications closely match the REMRate models overall.

10.2.4 Gross Annual kWh Savings and Peak kW Reduction

The estimated gross impacts resulting from the PY6 New Construction program are summarized in Table 10-3. Table 10-4 and Table 10-5 show the audited and verified savings.

Table 10-3 Gross Impact Summary

Home Type	*PY6 Program Goals (kWh)*	*Number of Homes*	*Ex Ante kWh Savings per Home*	*Ex Ante Total kWh Savings*	*Ex Post kWh Savings per Home*	*Ex Post Total kWh Savings*	*Realization Rate*
Silver- Electric	731,022	11	4,035	44,385	4,696	51,660	116%
Silver- Gas & Electric		110	1,519	167,090	1,438	158,180	95%
Gold – Electric		1	7,154	7,154	8,116	8,116	113%
Gold – Gas & Electric		320	1,551	496,320	1,618	517,760	104%
Platinum – Gas & Electric		3	1,551	4,653	1,644	4,932	106%
Total		445	-	719,602	-	740,570	103%

Table 10-4 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
719,602	719,602	719,602	740,648	103%

Table 10-5 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*	*Realization Rate*
534.15	534.15	534.15	212.90	40%

10.2.5 Net Energy (kWh) and Peak Demand (kW) Impacts

To obtain net savings for the PY6 NCP, ADM surveyed program participants to develop estimates of free-ridership. In total, 10 builders fully responded to the survey request. Using the methodology described above in Section 10.1.3, ADM calculated a weighted net-to-gross ratio of 77% for the Residential New Construction Program for PY6. This is close to the PY5 assumed value of 80%. The net savings results for the PY6 NCP are displayed in Table 10-6.

Table 10-6 Net Impact Summary

Program	*Ex Ante Total kWh Savings*	*Ex Post Total kWh Savings*	*Net-to-Gross Ratio*	*Net Ex Post Total kWh Savings*	*Ex Post Total kW Savings*	*Net Ex Post Total kW Savings*
New Construction	719,602	740,648	77%	570,299	212.90	163.93

10.3 Process Evaluation

This chapter presents the results of the process evaluation for I&M's Residential New Construction Program during PY6. Based on findings during the PY5 evaluation, a primary focus of this process evaluation was the procedures and strategies used to recruit builders into the program. Specifically, the process evaluation component was designed to answer the following research questions:

- How effective were the marketing efforts for the program? Which marketing methods were most effective? Has builder recruitment increased over the past year?
- What were the most common measures installed to meet program eligibility guidelines?
- What changes can be made to the program's design or delivery to improve its effectiveness in builder recruitment, savings estimates, or other factors in future program years?

To address these researchable issues, ADM conducted surveys with participating builders, and program staff interviews with CLEAResult and I&M.

10.3.1 Builder Survey

ADM Associates surveyed a sample of builders who enrolled in the Residential New Construction program during PY6. The survey was designed to gauge builder interest in, satisfaction with, and engagement with the program, and to determine builders' baseline building practices prior to participating in the program. Builder survey responses were also used to inform the net savings analysis, described in Section 10.1.3 of this report. A total of 10 builders completed the survey, and this section highlights key findings from the survey effort.

10.3.1.1 Sources of Program Awareness

Builders stated that they learned about the Residential New Construction Program from a diverse range of options as summarized Table 10-7. As shown, two builders stated that they learned of the program from an I&M staff member, from an equipment vendor or contractor, word of mouth, or through a professional association. One builder reported learning about the program through a HERS rater, and one stated that they heard of the program from the Database of State Incentives for Renewables and Efficiency website. These results suggest that CLEAResult's outreach to HERS raters has had an impact on program awareness and encouraging builder participation.

Table 10-7 Sources of Program Awareness

Response	*Percent of Respondents (N = 10)*
From an I&M staff member	20%
From an equipment vendor or contractor	20%
Word of mouth	20%
Professional association	20%
From a HERS rater	10%
Other	10%

10.3.1.2 Effect of Program on the Decision to Build Energy Efficient Homes

To better understand the baseline efficiency of new homes built in the I&M service area, builders were asked what percentage of the homes they built prior to becoming involved with the program would have met the HERS score standard and been eligible for program incentives. Three respondents estimated that all of their previously built homes would have met the program's standards, three stated between 50-99% of their homes would have qualified, three stated between 25-50% of their homes would have qualified, and one did not know. Builders were then asked what percentage of new homes they build in the I&M territory would have met the programs Silver Star efficiency level. Three respondents stated that approximately 50% of their homes would have qualified, four stated that between 70-90% of their homes would have qualified, two builders stated all of their homes would have met the Silver Star level, and the final respondent did not know. This indicates that for participating builders, the baseline level of energy efficient for new construction in the I&M service territory is relatively high, with all respondents stating that at least half of their homes would have met the Silver Star efficiently level. However, these responses cannot be directly interpreted as program influence as multiple factors need to be considered.

Respondents rated the importance of several program elements affected their decision to build energy efficient homes on a scale of zero to ten, where zero meant the factor was not at all important and a score of ten meant the factor was extremely important in their decision to build energy efficient homes. The share of respondents who rated each factor as seven or higher is displayed in Figure 10-1. Respondents rated the incentive amounts offered as the most important, with an average of 7.6. Program marketing materials and other informational material was also rated relatively highly by respondents, with an average score of 5.7.

This indicates that these program factors had a moderate to high impact on the builders' decision to build energy efficient homes.

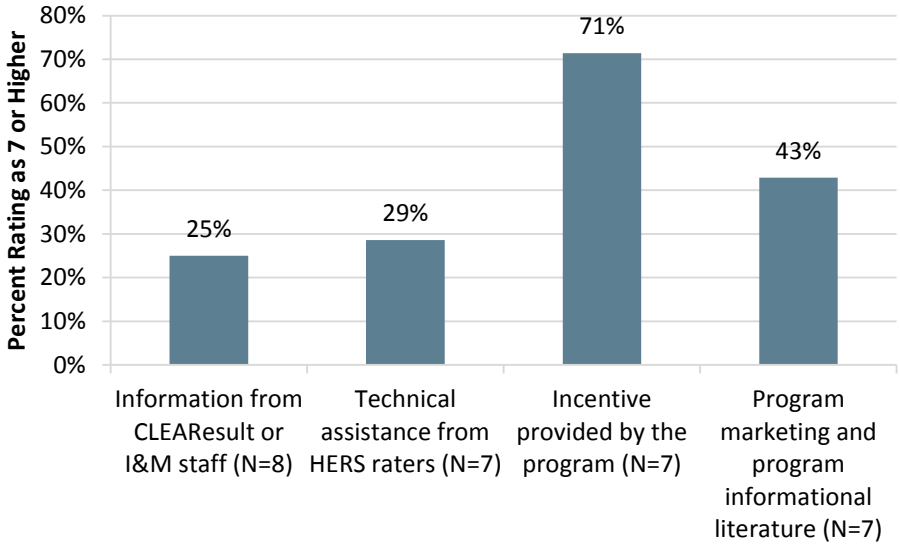


Figure 10-1 Program Elements Effect on Energy Efficiency

Three builders provided information on what building design features and equipment they incorporate to meet the HERS rating targets to receive program incentives. The measures implemented to meet the HERS rating targets varied across builders, although all builders incorporated efficient building envelopes and efficient furnaces. No builders reported implementing efficient water heaters and only one builder reported incorporating efficient lighting and only one reported installing efficient air conditioners.

10.3.1.3 Utilization of Program Support

Twenty percent of builders stated that they had attended program sponsored trainings. Only one respondent stated that they had received technical assistance from staff, which took the form of assistance provided by e-mail. Two respondents stated that they had received any marketing materials or support to market the program to their customers. When asked what marketing materials or support they had received, one respondent stated that they had received signage, and one respondent stated that they had received advice through e-mails with program staff on how to market the program to potential customers.

Builders were asked how the resources offered by the program affected their success in selling energy efficient homes. Two respondents offered commentary. One respondent stated that receiving the HERS rating for the homes lets potential customers know that the homes are energy efficient, and the other respondent stated that the program has had a positive effect with offering affordable housing options that are energy efficient. When asked how the program has affected their building practices, one respondent stated that the program encourages them to build more energy efficient homes.

Overall, four respondents reported attending training or receiving other forms of program support. Two possible explanations for the relatively low rate of use are that builders are generally unaware

of the availability of this support or that they are already well positioned to build and sell efficient homes. Future evaluations should consider assessing awareness of and interest in program support.

10.3.1.4 Satisfaction with the Program

Builders reported that they were satisfied with the New Construction Program. As seen in Figure 10-2, all builders stated that they were either satisfied or very satisfied with the overall program. 90% stated they were satisfied or very satisfied with the application process, and 90% stated they were satisfied or very satisfied with the efficiency requirements of the program. The remaining respondents stated that they were neither satisfied nor dissatisfied with the program elements.

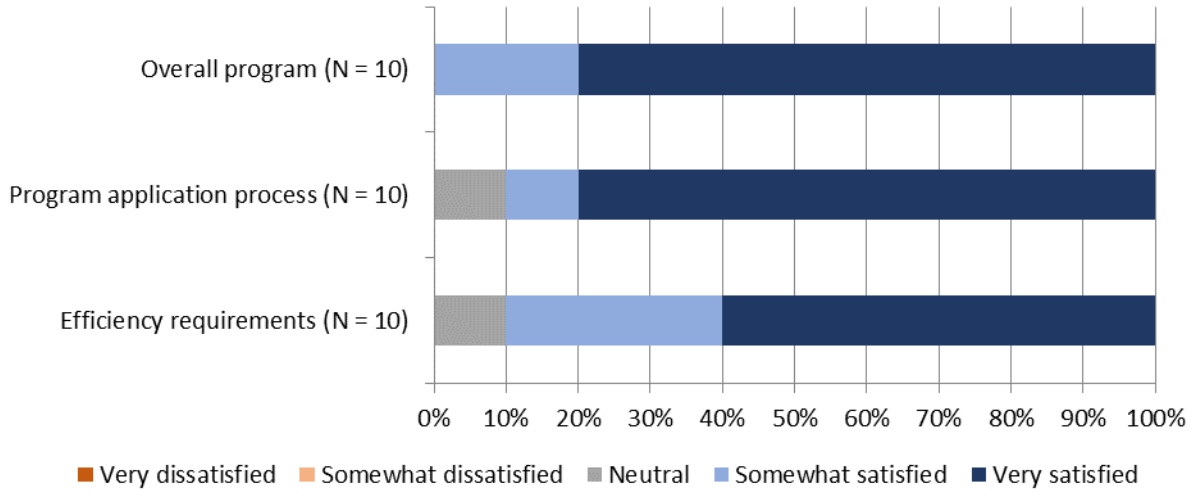


Figure 10-2: Satisfaction with Select Program Elements

Lastly, all survey respondents indicated that they plan to continue to participate in the program in 2016.

10.3.1.5 Barriers to Participation

Only one of the ten builders indicated that they had initial concerns about participating Residential New Construction Program. This builder explained that the requirements of the program including time and effort were a barrier to participation at first. Although this builder did participate in the program despite these concerns, ensuring and effectively communicating that the participation is straight forward could mitigate these concerns that may also be held by non-participating builders.

10.3.1.6 Participation in other Above-Code Efficiency Programs

Two respondents stated that they participate it the EPA's Energy Star New Homes program, and one stated they participate in a similar program in a different service territory. For most builders this program is the only above-code program that they participate in at this time.

10.3.2 Program Operations Perspective

This section summarizes the core findings of interviews conducted with I&M program staff and CLEAResult for the purposes of gaining insight into program structure, identifying program objectives, and assessing the extent to which there are future opportunities for program improvement. This section will summarize (1) the roles and responsibilities of the staff responsible for managing program operations, (2) any changes that have occurred to the program design or implementation procedures, and (3) any planned changes for PY7. In closing, key findings will highlight the most salient themes from the program areas and research activities described above.

10.3.2.1 Roles and Responsibilities

The New Construction Program team is comprised of staff from both I&M and the implementation contractor, CLEAResult. The evaluators interviewed staff from both organizations.

The I&M Energy Efficiency Consumer Programs Coordinator is responsible for overseeing the implementation contractor to ensure the New Construction Program stays within budget and reaches its goals. The program team at CLEAResult includes a Program Manager who coordinates communication with I&M regarding program performance and forecasting. A full-time Program Coordinator is responsible for delivering the monthly status reports, updating weekly scorecards, and maintaining the program tracking system. The Outreach Coordinator interfaces with participating and perspective builders. His primary roles are to resolve builder issues, recruit new builders, and support builders through the application process.

I&M Utility staff indicated the staffing resources improved greatly at the beginning of PY6. The new Program Manager was very focused on improving program support and data accuracy. Additionally, having a full-time Outreach Coordinator responsible for contractor communication and support was an improvement from the previous year, during which one staff person was responsible for all of these tasks. The I&M interviewee stated that the staffing resources are sufficient for effectively delivering and supporting the Residential New Construction Program.

10.3.2.2 Expanding the Builder Network

Program implementation staff significantly increased outreach efforts during PY6. CLEAResult staff utilized permit report data to target new construction projects that would benefit from program rebates. Staff indicated that a permit report was pulled on a weekly basis; the objective was to identify the builders who were initiating projects. Staff would target the builders that had multiple permits at one development location.

Most of the outreach was directly to builders via phone calls, emails or in-person appointments. Table 10-8 below provides a summary of all PY6 outreach activities. As a result of these efforts, the number of registered builders increased from 28 in PY5 to 47 in PY6. Staff indicated many of the new builders are building two to three homes a year, therefore they still need to increase outreach to larger production builders with higher project volumes.

Table 10-8 Summary of PY6 Outreach

Outreach Method	*Number of Occurrences*
Appointment	29
E-mail	19
Phone Call	37
Seminar	2
Total	87

Staff indicated they also held one seminar for builders and one for building code officials. The builder seminar discussed the Home Energy Rating System (HERS). During the seminar, HERS raters presented information on the HERS rating index and scoring methodology. Staff indicated the seminar was held in Fort Wayne in May of 2015 and was attended by approximately 12 builders.

The second seminar was targeted building code officials. The seminar was scheduled after program staff attended a Builders Home Show in Northern Indiana. At that event, program staff gave a brief presentation on the I&M Residential New Construction Program. Interest in the program initiated a seminar specifically for code officials that wanted to take a deeper dive into the HERS index system and program compliance. In late July, program staff hosted a meeting at the Elkhart County Home Builders Association office for approximately eight code offices from I&M's Indiana service territory. Code officials that attended were from Columbia City/Whitley County, St. Joseph, City of South Bend, Grant County, City of Nappanee. There were builders and architects that also attended the seminar.

Staff indicated both seminars were a success but they believe awareness is still low and the program could benefit form more event outreach in 2016.

10.3.2.3 Successes and Challenges

Staff was asked to provide feedback on the greatest successes and challenges of PY6. Mid-year staff was approached by a HERS rater who was involved in new construction, multi-family housing project. Program staff and the HERS rater discussed the energy savings potential with these building types and it was determined that not all of the units but some of them could qualify for program incentives. It was determined that the program would accept end-units in building with 4 units or less. To qualify, the end units can only have one shared wall and must have a separate electric meter. Staff indicated that these units are not different than duplexes, which already qualify for an incentive.

This builder completed 30 projects at the end of PY6, which was a significant boost in program activity and helped the program achieve its energy savings goals. Staff said that the multi-family building units that meet the same conditions will be added to the list of program eligible buildings types for PY7.

Staff also mentioned that program awareness is growing among code officials in the Indiana service territory. There are now several city permitting offices that have stared posting the program informational flyers and application on their office message boards. Feedback from staff suggests that efforts from HERS raters and code officials to promote the program incentives are good signals the program is achieving its intended outcomes of motivating the building industry to consider the benefits of exceeding the efficiency levels required by the building code.

Staff also indicated that in PY6 the program enforced a strict deadline; all applications had to be submitted by December 14, 2015 to receive a program rebate. Staff noted that in the past they were not as aggressive in enforcing the year-end deadline, however, implementing a strict cut-off date created a sense of urgency and drove additional participation in November and December. Staff plans to keep the deadline in place for PY7.

Staff was asked to comment on what they see as the greatest challenges to maintaining program momentum going forward. Staff believes awareness has increased significantly and will continue in PY7; however, there will be a saturation point within the building industry. Staff indicated that a customer facing market strategy will likely be necessary in the coming years.

Staff also indicated that in PY6 there were several projects turned down that utilized geo-thermal heating systems. These systems are ineligible for program rebates as are gas heated homes without air conditioning. According to staff, approximately 10% of the rejected homes were rejected due to a geo-thermal heating system.

10.3.2.4 Planned Changes for PY7

As a result of feedback from builders, program implementation staff worked to improve the application in PY7. The objective was to streamline the application process and reduce redundant data entry. Now the program application has two parts, part 1 contains builder information and part 2 contains the home information. Staring in PY7 if a builder has multiple homes in one program year, they only have to complete part 1 for the first submission of the year, and then only part 2 has to be completed on all subsequent applications. All applications will still require a signature and have the same terms and conditions on the back.

In PY7 the New Construction Program will accept end-units in multi-family buildings. The units must have one external wall and one shared wall. This decision was made after the successful project, which included 30 units in a multi-family development, which occurred late in PY6.

Staff indicated that no projects in PY6 qualified for platinum tier rebates. In PY7 the requirements for extended documentation will be omitted. Previously, a builder also had to receive a federal tax credit to qualify for a platinum tier rebate. Under the revised process, the HERS certificate is the only documentation required for a program incentive.

In PY7 all incentive levels will stay the same; however, deemed kWh savings for silver-tier homes with gas and electric systems will decrease. Deemed savings for homes with all electric systems

will increase. Table 10-9 provides a comparison of PY6 and PY7 incentives and deemed kWh savings values.

Table 10-9 Comparison of PY6 and PY7 Deemed kWh savings and incentives

	Savings (kWh)		*Incentive*
Measure	*2015*	*2016*	*Unchanged*
Silver G&E	1,519	1,439	$360
Silver All Elec	4,035	4,626	$600
Gold G&E	1,551	1,620	$540
Gold All Elec	7,154	7,958	$900
Platinum G&E	1,551	1,551	$600
Platinum All Elec	7,154	8,012	$1,000

10.3.3 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from the second year of program operations:

- **Utility and implementation staffing resources are sufficient for effectively administering the Residential New Construction Program.** A new Program Manager was hired in PY6 as well as a full-time Outreach Coordinator. The new hires have focused on growing the network of participating builders and have increased communication to the existing builder community.
- **Extensive outreach effort increased the number of registered builders from 28 to 47.** The PY6 marketing strategy was to focus on one-on-one outreach to builders by email, telephone, and in-person visits. These activities were augmented with two seminars geared towards HERS raters and building code officials. The outreach efforts in PY6 were successful at improving awareness within the building community and ultimately driving program savings. However, the frequency and geographic reach of these events was minimal. Staff specifically noted more outreach is necessary in not only the South Bend region, but also the southern regions of Marion and Muncie.
- **Builders are satisfied with the program.** Survey results indicate that builders are satisfied with the program overall and none reported dissatisfaction with the application process or the efficiency requirements. Furthermore, all survey respondents indicated that they would participate in the program in 2016 as well. Continuing the positive experience builders have with the program is important to the long term success of the program as it strives to retain current builders in addition to recruiting new builders.
- **Multi-family buildings with end units were accepted in PY6 and will be part of the New Construction Program in PY7.** The Program will accept end-units in building with four units or less, with only one shared wall and must have a separate electric meter. Staff indicated that these units are not different than duplexes, which already qualify for an incentive. The decision to include these units was made after a successful project with a similar building type came out of PY6.
- **The application process was streamlined.** The PY7 program application has 2 parts, 1 part for the builder information and 1 part for the project information. The builder will only have to fill out the builder information once. Then for every subsequent application the builder will

only be required to fill out part 2. Staff indicated this has simplified the application and was done in response to builder feedback.

The evaluator provides the following recommendation for future program operations:

- **Consider hosting additional events for builders, HERS raters, and code officials.** During PY6 only 2 events were hosted, feedback suggests that the program could benefit from additional outreach events. Specifically, targeting customer builders with small annual project volumes may be more efficiently targeted through these types of events.

11. Residential Energy Efficient Products

This chapter addresses the methodologies and impact findings of gross and net kWh savings and peak kW reductions, as well as process evaluation findings resulting from the evaluation of the appliances and lighting components of the Residential Energy Efficient Products program during the period January 2015 through December 2015.

11.1 Program Specific M&V Methodologies

The M&V approach for the Residential Energy Efficient Products program (EEP) is aimed at measuring the following:

- Numbers of appliances rebated and bulbs discounted and sold through the program;
- Average annual kWh savings per purchased appliance and bulb type;
- Average kW reduction per purchased measure;
- Providing estimates of net-to-gross savings and free-ridership; and
- Estimating cost effectiveness of the EEP in 2015.

Table 11-1 below summarizes the inputs needed for gross savings calculations and the source of each input.

Table 11-1 Data Sources for Gross Impact Parameters – Energy Efficient Products Program

Parameter	*Source*
Number of Measures Purchased	Program Tracking Data, Participant Surveying
Measure Energy Consumption	Indiana Technical Reference Manual
Measure Characteristics	Program Tracking Data, Participant Surveying
Net –to-Gross-Ratio	Participant Telephone Surveying (appliances), Participant intercept surveying (lighting)

11.1.1 Verification of Measures Purchased

A first aspect of conducting measurements of program activity is to verify the number of measures purchased and implemented ADM takes several steps in verifying the number of measures purchased and implemented which consists of the following:

- Validating program tracking data provided by Honeywell by checking for duplicate or erroneous entries;

- Verifying that measures are rebated according to the agreed-upon process between Honeywell and I&M; and
- Conducting verification surveys with a statistically valid sample of program participants. The focus of these verification surveys are to verify that customers listed in the program tracking database did indeed participate and that the number of measures claimed to be purchased was accurate.

11.1.2 Calculating Gross Annual kWh Savings and Peak kW Reduction

Ex ante savings for the Energy Efficient Products program were calculated using the Indiana Technical Reference Manual. For the impact evaluation effort, these savings estimates were assessed by developing separate gross measure energy consumption estimates for measures implemented through the program using existing TRM equations and models relating various household characteristics to estimated energy usage.

The following sections describe the specific algorithms and inputs used to calculate savings for each measure in the program.

11.1.2.1 High Efficiency Air Conditioner Savings Calculations

From the 2012 Indiana TRM, the *Central Air Conditioning (Time of Sale)* section was used to calculate energy savings for the installation of high efficiency air conditioning units. The following equation was used to calculate custom annual kWh savings dependent on participant information:

$$\Delta\text{kWh} = \frac{\left(\frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}}\right) \times FLH_{cool} \times BtuH}{1{,}000} \quad (1)$$

Parameters used in Equation 1 are as follows:

$SEER_{base}$	= Seasonal average efficiency in SEER of baseline Air Conditioning equipment, 13
$SEER_{ee}$	= Seasonal average efficiency in SEER of installed Air Conditioning equipment
FLH_{cool}	= Full Load Cooling Hours dependent upon location
BtuH	= Size of equipment in Btuh

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta\text{kW} = \frac{\left(\frac{1}{EER_{base}} - \frac{1}{EER_{ee}}\right) \times BtuH \times CF}{1{,}000} \quad (2)$$

Parameters used in Equation 2 are as follows:

EER_{base}	= Efficiency in EER of baseline Air Conditioning equipment, 11
EER_{ee}	= Efficiency in EER of installed Air Conditioning equipment
BtuH	= Size of equipment in Btuh

CF = Summer Peak Coincidence Factor for measure, 0.88

11.1.2.2 Ceiling Fan Savings Calculations

From the 2012 Indiana TRM, the *Ceiling Fan with ENERGY STAR Light Fixture (Time of Sale)* section was used to calculate energy savings for the installation of new ceiling fans. The following equation was used to calculate the annual kWh savings, resulting in a deemed savings of 108 kWh and 0.017 kW:

$$\Delta\text{kWh} = \left[\%_{low} \times (LowkW_{base} - LowkW_{ee}) + \%_{med} \times (MedkW_{base} - MedkW_{ee}) + \%_{high} \times (HighkW_{base} - HighkW_{ee})\right] \times Hours_{fan} + \left[(InckW - CFLkW) \times Hours_{light} \times (1 + WHF_e)\right] \quad (1)$$

Parameters used in Equation 1 are as follows:

$\%_{low}$ = Percent time on low speed, 40%
$\%_{med}$ = Percent time on medium speed, 40%
$\%_{high}$ = Percent time on high speed, 20%
$LowkW_{base}$ = Low speed baseline ceiling fan demand, 0.0152 kW
$LowkW_{ee}$ = Low speed ENERGY STAR ceiling fan demand, 0.0117 kW
$MedkW_{base}$ = Medium speed baseline ceiling fan demand, 0.0348 kW
$MedkW_{ee}$ = Medium speed ENERGY STAR ceiling fan demand, 0.0314 kW
$HighkW_{base}$ = High speed baseline ceiling fan demand, 0.0725 kW
$HighkW_{ee}$ = High speed ENERGY STAR ceiling fan demand, 0.0715 kW
$Hours_{fan}$ = Typical fan operating hours, 1,022
InckW = Incandescent bulb kW, 0.180 kW
CFLkW = CFL bulb kW, 0.042 kW
$Hours_{light}$ = Typical lighting operating hours, 1,277.5
WHF_e = Waste Heat Factor for Energy to account for HVAC interactions with efficient lighting, -0.059

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta\text{kW} = \left\{\left[\%_{low} \times (LowkW_{base} - LowkW_{ee}) + \%_{med} \times (MedkW_{base} - MedkW_{ee}) + \%_{high} \times (HighkW_{base} - HighkW_{ee})\right] + \left[(InckW - CFLkW) \times (1 + WHF_d)\right]\right\} \times CF \quad (2)$$

Parameters used in Equation 2 are as follows:

$\%_{low}$ = Percent time on low speed, 40%
$\%_{med}$ = Percent time on medium speed, 40%
$\%_{high}$ = Percent time on high speed, 20%
$LowkW_{base}$ = Low speed baseline ceiling fan demand, 0.0152 kW

$LowkW_{ee}$	= Low speed ENERGY STAR ceiling fan demand, 0.0117 kW
$MedkW_{base}$	= Medium speed baseline ceiling fan demand, 0.0348 kW
$MedkW_{ee}$	= Medium speed ENERGY STAR ceiling fan demand, 0.0314 kW
$HighkW_{base}$	= High speed baseline ceiling fan demand, 0.0725 kW
$HighkW_{ee}$	= High speed ENERGY STAR ceiling fan demand, 0.0715 kW
InckW	= Incandescent bulb kW, 0.180 kW
CFLkW	= CFL bulb kW, 0.042 kW
WHF_d	= Waste Heat Factor for Demand to account for HVAC interactions with efficient lighting, 0.057
CF	= Summer Peak Coincidence Factor for measure, 0.18

11.1.2.3 Energy Star Dehumidifier Savings Calculations

From the 2012 Indiana TRM, the *ENERGY STAR Dehumidifier (Time of Sale)* section was used to calculate energy savings for the installation of ENERGY STAR dehumidifier. The following equation was used to calculate the annual kWh savings:

$$\Delta\text{kWh} = \frac{AvCap \times 0.473 \times Hours}{24 \times L/kWh} \quad (1)$$

Parameters used in Equation 1 are as follows:

AvCap	= Average capacity (pints per day)
Hours	= Run hours per year, 1,620
L/kWh	= Liters of water per kWh consumed, as provided in tables

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta\text{kW} = \frac{\Delta\text{kWh} \times \text{CF}}{Hours} \quad (2)$$

Parameters used in Equation 2 are as follows:

ΔkWh	= Annual energy savings for ENERGY STAR dehumidifier
Hours	= Run hours per year, 1,620
CF	= Summer Peak Coincidence Factor for measure, 0.37

11.1.2.4 High Efficiency Heat Pumps Savings Calculations

From the 2012 Indiana TRM, the *Central Air Source Heat Pumps (Time of Sale)* section was used to calculate energy savings for the installation of high efficiency central heat pumps and ductless heat pumps. The following equation was used to calculate custom annual kWh savings dependent on participation information:

$$\Delta\text{kWh} = \frac{\left(\frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}}\right) \times FLH_{cool} \times BtuH}{1{,}000} + \frac{\left(\frac{1}{HSPF_{base}} - \frac{1}{HSPF_{ee}}\right) \times FLH_{heat} \times BtuH}{1{,}000} \quad (1)$$

Parameters used in Equation 1 are as follows:

$SEER_{base}$	= Seasonal average efficiency in SEER of baseline Air Source Heat Pump, 13
$SEER_{ee}$	= Seasonal average efficiency in SEER of installed Air Source Heat Pump
FLH_{cool}	= Full Load Cooling Hours dependent upon location
BtuH	= Size of equipment in Btuh
$HSPF_{base}$	= Heating Seasonal Performance Factor of baseline Air Source Heat Pump, 7.7
$HSPF_{ee}$	= Heating Seasonal Performance Factor of installed Air Source Heat Pump
FLH_{heat}	= Full Load Heating Hours dependent upon location

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta\text{kW} = \frac{\left(\frac{1}{EER_{base}} - \frac{1}{EER_{ee}}\right) \times BtuH \times CF}{1{,}000} \quad (2)$$

Parameters used in Equation 2 are as follows:

EER_{base}	= Efficiency in EER of baseline Air Source Heat Pump, 11
EER_{ee}	= Efficiency in EER of installed Air Source Heat Pump
BtuH	= Size of equipment in Btuh
CF	= Summer Peak Coincidence Factor for measure, 0.5

11.1.2.5 EC Motor Savings Calculations

From the 2012 Indiana TRM, the *Residential Electronically Commutated (EC) Motors* section was used to calculate energy savings for the installation of EC motors on HVAC fans. The Indiana TRM provides a deemed savings of 733 kWh and 0.07 kW for EC motors, therefore no additional calculations were needed for this measure.

11.1.2.6 Heat Pump Water Heaters Savings Calculations

From the 2012 Indiana TRM, the *Heat Pump Water Heaters (Time of Sale)* section was used to calculate energy savings for the installation of a heat pump water heater replacing an existing electric water heater. The following equation was used to calculate custom annual kWh savings dependent on participant information:

$$\Delta\text{kWh} = kWh_{base} \times \left(\frac{COP_{new} - COP_{base}}{COP_{new}}\right) + kWh_{cooling} - kWh_{heating} \quad (1)$$

Parameters used in Equation 1 are as follows:

kWh_{base}	= Average electric DHW consumption, 3,460
COP_{new}	= Coefficient of Performance of Heat Pump Water Heater, 2.0
COP_{base}	= Coefficient of Performance of standard electric water heater, 0.904
$kWh_{cooling}$	= Cooling savings from the conversion of heat in home to water heat, 180

Dependent on heating fuel as follows:

$kWh_{heating}$ = Electric Resistance, 1,577
$kWh_{heating}$ = Heat Pump (COP of 2.0), 779
$kWh_{heating}$ = Fossil Fuel, 0

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta kW = \Delta kW = \frac{\Delta kWh \times CF}{Hours} \quad (2)$$

Parameters used in Equation 2 are as follows:

ΔkWh = Annual energy savings for heat pump water heater
Hours = Full load hours of hot water heater, 2,533
CF = Summer Peak Coincidence Factor for measure, 0.346

11.1.2.7 Programmable Thermostats Savings Calculations

From the 2012 Indiana TRM, the *Programmable Thermostats (Time of Sale, Direct Install)* section was used to calculate energy savings for the installation of programmable thermostats. The following equation was used to calculate the annual kWh savings:

$$\Delta kWh = \Delta kWh_{cooling} + \Delta kWh_{heating} \quad (1)$$

$$\Delta kWh_{cooling} = \frac{\frac{1}{SEER} \times FLH_{cool} \times BtuH \times ESF_{cool}}{1{,}000} \quad (2)$$

$$\Delta kWh_{heating} = \frac{FLH_{heat} \times BtuH \times ESF_{heat}}{\eta Heat \times 3{,}412} \quad (3)$$

Parameters used in Equation 1, 2, and 3 are as follows:

SEER = Seasonal average efficiency in SEER of Air Conditioning equipment
FLH_{cool} = Full Load Cooling Hours dependent upon location
BtuH = Size of equipment in Btuh
ESF_{cool} = Cooling energy savings fraction, 0.09
FLH_{heat} = Full Load Heating Hours dependent upon location
ESF_{heat} = Heating energy savings fraction, 0.068
ηHeat = Efficiency in COP of Heating equipment

The parameters used to calculate saving also assume a baseline of the participant not having a previous programmable thermostat and that the current thermostat be programmed. ADM performed only three in-home visits (limited participant willingness to in-home visits resulted in

fewer visits then ADM would have liked to perform). All visits performed confirmed programmed thermostats and no prior programmed thermostats in home.

The TRM attributes no peak reduction savings to the installation of programmable thermostats.

11.1.2.8 Residential Variable Speed Pool Pump Savings Calculations

From the 2012 Indiana TRM, the *Residential Two Speed/Variable Speed Pool Pumps (Time of Sale)* section was used to calculate energy savings for the installation of variable speed pool pumps replacing standard single speed pumps. The following equation was used to calculate custom annual kWh savings dependent on participant:

$$\Delta\text{kWh} = \frac{HP \times LF \times 0.746 \times Hrs/Day \times Days/Yr \times ESF}{\eta Pump} \quad (1)$$

Parameters used in Equation 1 are as follows:

HP	= Horsepower of pump motor, 1.5
LF	= Load factor of pump motor, 0.66
ηPump	= Efficiency of pump motor, 0.325
Hrs/Day	= Assumed hours of pump operation per day, 6
Days/Yr	= Assumed number of days pool is in use per year, 100
ESF	= Energy savings factor for variable speed pool pump, 0.86

Following this, ADM calculated the peak kW reduction using the following TRM defined equation:

$$\Delta\text{kW} = \frac{HP \times LF \times 0.746 \times CF \times DSF}{\eta Pump} \quad (2)$$

Parameters used in Equation 2 are as follows:

HP	= Horsepower of pump motor, 1.5
LF	= Load factor of pump motor, 0.66
EEηPump	= Efficiency of pump motor, 0.325
DSF	= Demand savings factor for variable speed pool pump, 0.91
CF	= Summer Peak Coincidence Factor for measure, 0.83

11.1.2.9 Compact Fluorescent Lamp (CFL) Savings Calculations

Annual savings for an individual CFL are calculated as:

Annual kWh Savings (CFLs) = (CFL Watts × Delta Watts Multiplier × Hrs per Yr/1000) × WHF_e WHF_d × ISR

Where,

CFL Watts = Wattage of CFLs provided in the kit

Delta Watts Multiplier = Lookup table value from Indiana TRM for CFL light bulbs to represent the wattage reduction from an incandescent bulb

Hours per Year = Average hours of use per year

WHF_e = Waste Heat Factor for Energy to account for cooling savings from efficient lighting

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reductions (CFLs) = {(CFL Watts × Delta Watts Multiplier × CF)/ 1000} × $\mathbf{WHF_d}$ × ISR

Where;

CFL Watts = Wattage of CFLs provided in the kit

Delta Watts Multiplier = Lookup table value from Indiana TRM for CFL light bulbs to represent the wattage reduction from an incandescent bulb

$\mathbf{WHF_d}$ = Waste Heat Factor for Demand to account for cooling savings from lighting

CF = Peak Coincidence Factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

11.1.2.10 Residential LED Lamps Savings Calculations

Annual savings for LED bulbs are calculated as:

Annual kWh Savings (LEDs) = (($Watt_{base}$ – $Watt_{LED}$)/1000) × ISR × HOURS × (1+WHF_e $\mathbf{WHF_d}$)

Where,

$Watt_{base}$ = Wattage of baseline bulb, based on TRM lookup table

$Watt_{LED}$ = Wattage of LED

Hours per Year = Average hours of use per year

WHF_e = Waste Heat Factor for Energy to account for cooling savings from efficient lighting

ISR = In Service Rate or percentage of distributed units that are installed

Peak kW Reductions (LEDs) = (($Watt_{base}$ – $Watt_{LED}$)/1000) × ISR × CF × (1+$\mathbf{WHF_d}$)

Where;

$Watt_{base}$ = Wattage of baseline bulb, based on TRM lookup table

$Watt_{LED}$ = Wattage of LED

$\mathbf{WHF_d}$ = Waste Heat Factor for Demand to account for cooling savings from lighting

CF = Peak Coincidence Factor for measure

ISR = In Service Rate or percentage of distributed units that are installed

11.1.3 Calculating Net Energy (kWh) and Peak Demand (kW) Impacts

11.1.3.1 Appliances

Determining the net effects of the measure rebate portion of the EEPP requires estimating the percentage of energy savings from measure purchases that would have occurred without program intervention. ADM's methodology is to use self-report surveys with a sample of customers aimed at determining appliance purchasing decision making characteristics. The goal of these surveys is to elicit information from which to estimate the number of program eligible measures that the customer would have purchased in the counterfactual scenario where these program eligible measures were not discounted. Self-report survey methods for determining free ridership are generally recognized as susceptible to certain biases and error. There have been some efforts to estimate free ridership using consumer demand modeling when there is sufficient price variation within program time periods and products. These models often also consider program promotional activity and other variables besides price that may influence appliance sales. For the measure rebate portion of the 2015 EEPP, there was insufficient price variation within program eligible measures to estimate such models in a robust and reliable way. Instead, this evaluation relies on self-report survey data from ADM's telephone survey effort.

The survey effort was conducted using a telephone survey method. Surveys are conducted via telephone with customers who had purchasing qualifying appliance products from participating retailers. Survey respondents were asked a series of questions to elicit feedback regarding influences to their program eligible measure purchasing decisions. Each respondent was then assigned a free ridership score based on a consistent free ridership scoring algorithm. The free ridership scoring algorithm for the measure rebate surveys is shown on the following page in Figure 11-1. Respondent free ridership scores were based on financial ability to purchase the measure minus the rebate, prior planning of the purchase of the measure, importance of program in decision making, and likelihood of purchasing the measure without the rebate. Based upon the answers to these categories of questions, the respondents are placed in free-ridership percentiles, with scores of 0%, 25%, 50%, and 100% free-ridership. Scores were then averaged to estimate program level free ridership.

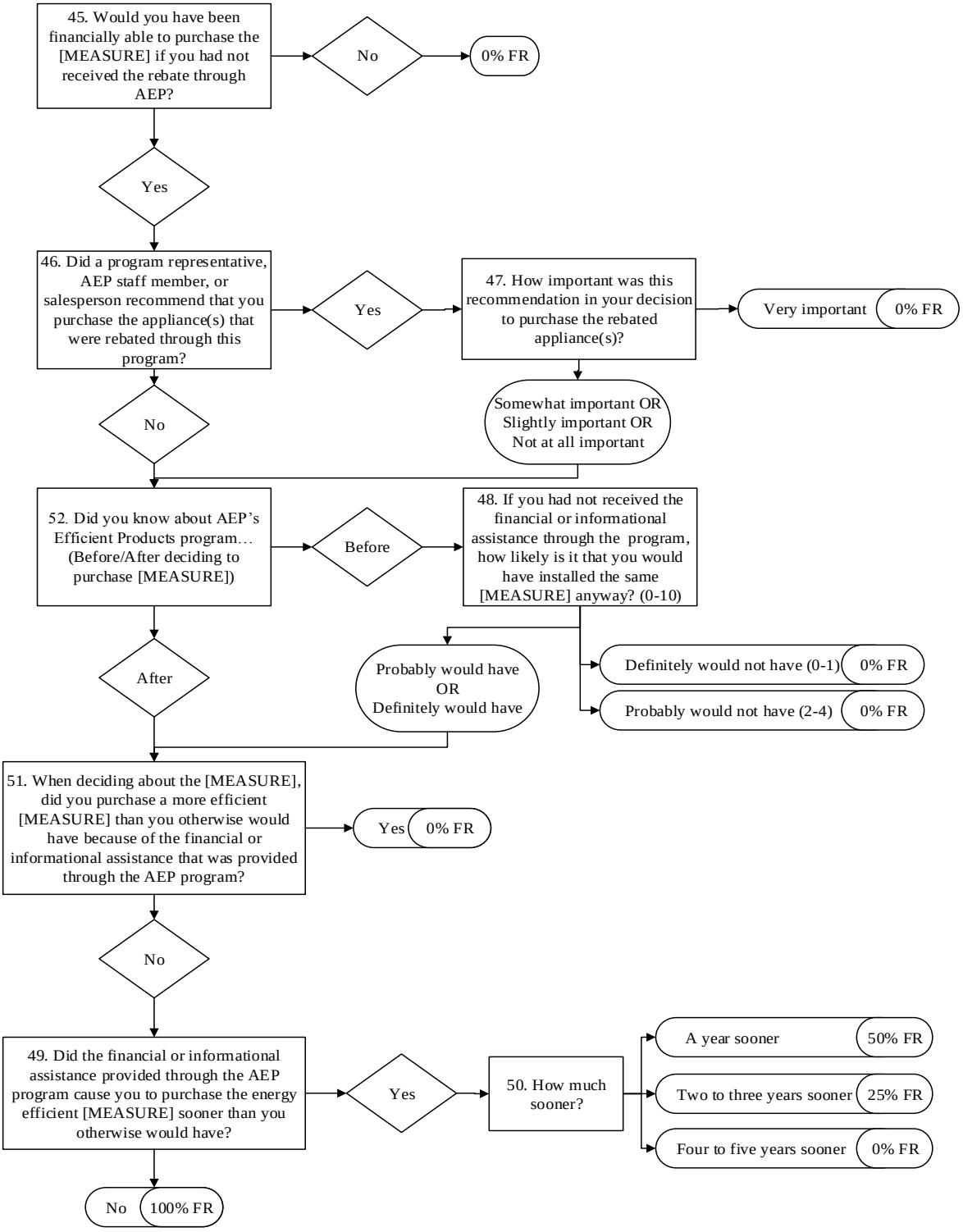


Figure 11-1: Free Ridership Scoring for Appliance Rebate Survey Respondents

11.1.3.1.1 Spillover Savings Assessment

In order to calculate spillover savings that are attributable to the REPP Appliances component, the participant survey included questions related to any additional energy efficiency purchases that have been made due to the customers' experience with the program. The survey prompts respondents with the following questions in order to identify additional purchases made:

- SO1: Because of your experience with the [Program], have you bought, or are you likely to buy, additional energy efficient items on your own without a financial rebate?
- SO2: Please indicate whether you have purchased any of the following items on your own since participating in the program, and indicate how many you have purchased.

Participants indicating one or more energy efficiency purchases are then be asked two questions in order to determine whether the energy savings resulting from that measure may be attributed to the program:

- SO3: On a scale of 0 to 10, where 0 represents "not at all important" and 10 represents "extremely important", how important was your experience with [Program] in your decision to purchase the items you just mentioned?
- SO4: On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely" how likely would you have been to make the additional purchases you just mentioned even if you had not participated in the [Program]?

Participants responding to question SO3 with a rating of 7 or higher, and responding to question SO4 with a rating of 3 or lower, are considered to have been motivated by the program to make these additional purchases, and the energy savings from these items are attributed to the program. Savings for spillover measures are calculated and then extrapolated to the population of respondents.

Once free-ridership and spillover rates are determined, ADM then estimates the Net-to-Gross Ratio (NTGR), calculated as:

NTGR = 1 – % Free-Ridership + Spillover Savings

11.1.3.2 Lighting

Determining the net effects of the lighting discounts requires estimating the percentage of energy savings from efficient lighting purchases that would have occurred without program intervention. Ideally, participating retailers could provide light bulb sales data for non-program time periods or from similar non-program retail locations. This data would provide adequate information from which to calculate the lift in CFL and LED sales attributable to the program price mark downs. However, retailers are reluctant to release sales data for this purpose because of the possibility that the data may be exposed to competitors or otherwise misused.

As a result, evaluating the net effects of the price discounts requires estimating free ridership without non-program sales data. For the current evaluation, these net effects were assessed using in-store intercept surveys. These surveys are conducted in-person with customers purchasing qualifying lighting products from participating retailers. The advantage of this methodology is it allows for discussion at the time of purchase, when customers are most likely to adequately describe their purchase making decision process. There are however drawbacks to this approach, including the fact that obtaining large sample sizes can be costly. Conducting surveys at retail locations with inconsistent customer traffic is usually cost-prohibitive. Conducting the surveys during program sponsored promotional events is usually most cost efficient, but may lead to certain biases associated with convenience sampling.

Intercept survey respondents were asked a series of questions to elicit feedback regarding influences to their light bulb purchasing decisions. Each respondent was then assigned a free ridership score based on a consistent free ridership scoring algorithm. The free ridership scoring algorithm for the in-store intercept surveys is shown on the following page in Figure 11-2. Respondent free ridership scores were weighted by kWh savings based on the bulbs they purchased at the time of interview. Scores were then averaged to estimate program level free ridership.

The final respondent FR score was calculated as follows (after applying any mitigating factor to the Prior Planning and Prior Experience variables):

0.2 * [Prior planning FR] + 0.2 * [Prior Experience FR] + 0.6 * [Behavior w/o Discount FR]

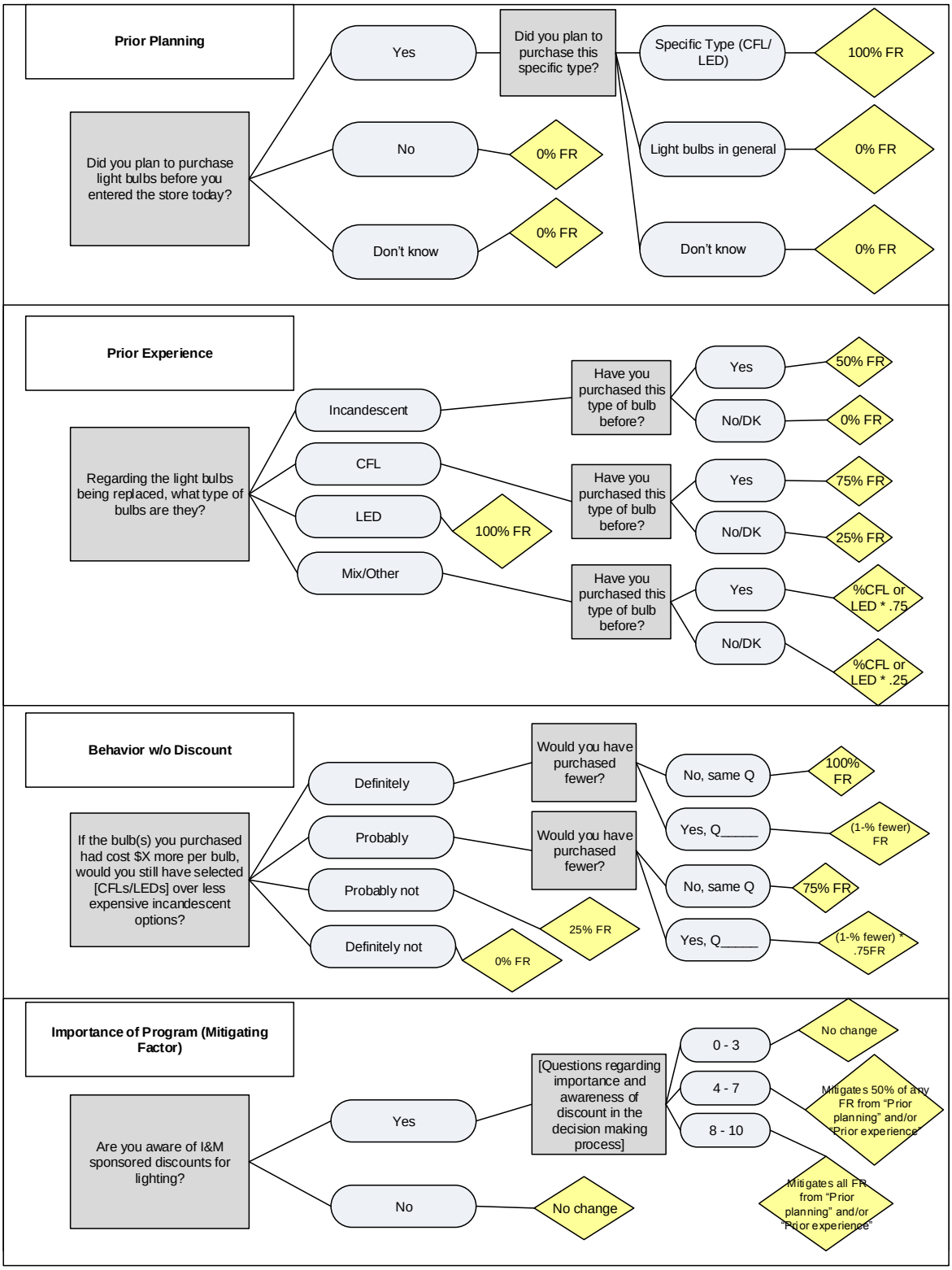


Figure 11-2: Free Ridership Scoring for Intercept Survey Respondents

11.2 Impact Results

ADM estimated ex post gross electric savings and peak demand reductions through detailed analysis of program tracking data and participant survey data. This section presents the results of the gross and net savings calculation activities.

11.2.1 Verification of Appliances Installed

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided by CLEAResult for accuracy. No duplicate entries were discovered. To verify that the number of units claimed in the program tracking database was accurate, ADM administered a telephone survey with a sample of program participants.

All 118 respondents who completed the participant survey verified that they had in fact participated in the program during 2015. Based on these verification rates, Table 11-2 reports the numbers of appliances purchased through the program during PY6 that were verified as being implemented and therefore program-eligible.

Table 11-2 Energy Efficient Products Verified

Measure Type	*Quantity Reported as Rebated*	*Verification Rate*	*Quantity of Units Verified as Program Eligible*
Air Conditioner	48	100%	48
Ceiling Fan	5	100%	5
Dehumidifier	470	100%	470
Ductless Heat Pump	15	100%	15
ECM Retrofit	354	100%	354
Heat Pump Water Heater	17	100%	17
Heat Pump	61	100%	61
Programmable Thermostat	395	100%	395
Variable Speed Pool Pump	13	100%	13
Total	1,378	100%	1,378

11.2.2 Verification of Lighting Installed

Following the 59 intercept surveys conducted with customers who had purchased discounted lighting through the program, ADM conducted follow-up surveys with 35 participants who had provided their contact information during the intercept survey. These follow-up surveys were conducted between 6 to 10 weeks after the intercept survey activity to allow time for customers to install the bulbs they had purchased. Based on the follow-up surveys, ADM found that the installation rate for bulbs purchased through the program was consistent with the 0.91 In Service Rate (ISR) for CFLs and the 1.0 ISR for LEDs specified by the Indiana TRM. The percentage of

bulbs installed by follow-up survey participants was slightly lower than the TRM-specified ISRs (93% overall) but ADM did not make an ISR adjustment as participants are likely to install additional bulbs within the months following the survey. For the ex post savings calculations, ADM applied the ISR of 0.91 to CFLs and the ISR of 1.0 to LEDs.

11.2.3 Gross Energy (kWh) and Peak Demand (kW) Impacts: Appliances

The estimated gross impacts resulting from the PY6 Energy Efficient Products – Appliances program are summarized in Figure 11-3. Table 11-4 and Table 11-5 show the audited and verified savings. The realization rate for the appliance portion of the program is 90%.

Table 11-3 Gross Impact Summary

Program	*PY6 Program Goals (kWh)*	*Peak Demand Savings (kW)*		*Annual Energy Savings (kWh)*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Energy Efficient Products	1,294,877	89.00	105.63	654,713	591,598	90%

Table 11-4 Gross Impact kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
654,713	654,713	654,713	591,598	90%

Table 11-5 Gross Impact kW

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
89.00	89.00	89.00	105.63

Figure 11-6 shows measure-level estimated gross impacts from the program.

Table 11-6 Measure Savings Summary

Measure Type	*Ex ante Annual Savings (kWh)*	*Ex post Annual Savings (kWh)*	*Realization Rate*
Air Conditioner	6,295	4,818	77%
Ceiling Fan	538	540	100%
Dehumidifier	103,400	100,110	97%
Ductless Heat Pump	135,732	98,837	73%
ECM Retrofit	259,482	259,482	100%
Heat Pump Water Heater	27,282	22,050	81%
Heat Pump	43,665	35,483	81%
Programmable Thermostat	60,340	52,297	87%
Variable Speed Pool Pump	17,979	17,979	100%
Total	654,713	591,598	90%

11.2.4 Gross Energy (kWh) and Peak Demand (kW) Impacts: Lighting

The estimated gross impacts resulting from the PY6 Energy Efficient Products – Lighting program are summarized in Table 11-7. Table 11-8 and Table 11-9 show the audited and verified savings. The realization rate for the lighting portion of the program is 98%.

Table 11-7 Gross Impact Summary, Lighting

Program	*PY6 Program Goals (kWh)*	*Peak Demand Savings (kW)*		*Annual Energy Savings, (kWh)*		*Realization Rate*
		Ex Ante	*Ex Post*	*Ex Ante*	*Ex Post*	
Energy Efficient Products - Lighting	18,452,000	1,319.00	1,284.08	11,077,430	10,808,089	98%

Table 11-8 Gross Impact kWh by Bulb Type

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Realization Rate*
11,077,430	11,077,430	11,077,430	10,808,089	98%

Table 11-9 Gross Impact kW Summary, Lighting

Ex Ante Peak kW Reduction	*Audited Peak kW Reduction*	*Verified Peak kW Reduction*	*Ex Post Peak kW Reduction*
1,319.00	1,319.00	1,319.00	1,284.08

Table 11-10 shows estimated gross impacts by bulb type from the program.

Table 11-10 Gross Impact kW by Bulb Type

Measure Type	*Ex ante Annual Savings (kWh)*	*Ex post Annual Savings (kWh)*	*Realization Rate*
CFLs	8,558,507	8,753,363	102%
LEDs	2,518,924	2,054,726	82%
Total	11,077,430	10,808,089	98%

11.2.5 Net Energy (kWh) and Peak Demand (kW) Impacts: Appliances

To obtain net savings for the appliances component of the 2015 REPP, ADM surveyed 118 participants who received rebates through the program to develop estimates of free-ridership and spillover.

Based upon this analysis, ADM estimates a net to gross rate of 50-68%, depending on measure type. The measure level net-to-gross ratios are calculated as 1- estimated free ridership + spillover savings. The free-ridership rate of each measure was applied in discounting annual kWh and kW savings for the measure rebate portion of the 2015 Residential Energy Efficient Products Program.

ADM estimated associated net-to-gross ratios (NTGRs) for all measures based on results from the participant survey. The free-ridership rate for heat pumps calculated during the 2015 evaluation (67%) was averaged with the free-ridership rate calculated for heat pumps during the 2014 evaluation (41%) due to the limited sample size available for this measure category.

Table 11-11 shows the free-ridership and overall NTGR found by each measure implemented through the program. The NTGRs shown for each appliance include a small amount of spillover savings, as one sampled survey participant reported having purchased and installed several energy efficient bulbs as a result of information they received through the program.

Table 11-11 NTGR By Measure

Measure Type	*Free Ridership Estimate*	*NTGR Estimate (1-FR + Spillover)*[32]
Air Conditioner	40%	61%
Ceiling Fan	50%	51%
Dehumidifier	47%	53%
Ductless Heat Pump	50%	50%
ECM Retrofit	32%	68%
Heat Pump Water Heater	37%	63%
Heat Pump	50%	50%
Programmable Thermostat	41%	59%
Variable Speed Pool Pump	50%	50%
Overall[33]	43%	57%

The final net-to-gross ratios and associated net savings for each measure of the program are shown in Table 11-2.

[32] The free-ridership rate listed for Heat Pumps and Ductless Heat Pumps is comprised of an average of the heat pump free-ridership rate evaluated for the 2014 program and the heat pump free-ridership rate evaluated for the 2015 program.

[33] Free-ridership was weighted by savings.

Table 11-12 EEPP Appliances NTGR Results

Measure Type	*NTGR*	*Ex post Gross Annual Savings (kWh)*	*Ex post Gross Annual Savings (kW)*	*Net Ex Post Annual Savings (kWh)*	*Net Ex Post Annual Savings (kW)*
Air Conditioner	61%	4,818	7.68	2,919	4.61
Ceiling Fan	51%	540	0.09	273	0.04
Dehumidifier	53%	100,110	22.56	53,334	11.99
Ductless Heat Pump	50%	98,837	7.29	49,518	3.65
ECM Retrofit	68%	259,482	23.26	176,655	15.84
Heat Pump Water Heater	63%	22,050	3.01	13,902	1.90
Heat Pump	50%	35,483	15.42	17,778	7.72
Programmable Thermostat	59%	52,297	0.00	31,087	0.00
Variable Speed Pool Pump	50%	17,979	26.32	8,997	13.16
Total	57%	591,598	105.63	354,391	58.93

11.2.6 Net Energy (kWh) and Peak Demand (kW) Impacts: Lighting

To obtain net savings for the lighting component of the 2015 REPP, ADM conducted intercept surveys with 59 participants who purchased program-discounted bulbs to develop estimates of free-ridership.

Based upon this analysis, ADM estimates a net to gross of 51% for CFLs and 60% for LEDs. The individual bulb type net-to-gross ratios are calculated as 1- estimated free ridership. The free-ridership rate of each measure was applied in discounting annual kWh and kW savings for the measure rebate portion of the 2015 REPP - Lighting. The final net-to-gross ratios and associated net savings for each bulb type are shown in Table 11-13.

Table 11-13 EEPP Lighting Net Savings Results

Measure Type	*NTGR*	*Ex post Annual Savings (kWh)*	*Ex post Annual Savings (kW)*	*Net Ex Post Annual Savings (kWh)*	*Net Ex Post Annual Savings (kW)*
CFLs	51%	8,753,363	1,039.97	4,464,215	530.38
LEDs	60%	2,054,726	244.12	1,232,836	146.47
Total	53%	10,808,089	1,284.08	5,697,051	676.85

11.3 Process Evaluation

This chapter presents the results of the process evaluation for the lighting and appliances components of I&M's Residential Energy Efficient Products Program during PY6. As this is the first year that lighting discounts were brought into the umbrella of the Energy Efficient Products

Program rather than being a standalone program, the PY6 process evaluation for lighting discounts focuses on defining program design features, objectives, and initial performance, and establishes a baseline for comparison with future program years. PY6 marked the second year of operation for the appliance rebates component, the process evaluation for appliance rebates seeks to identify program changes since the prior year, and to identify any program improvements that have taken place as a result of previous evaluation findings.

This process evaluation is based upon analysis of program structure and interviews and surveys of participating I&M customers, I&M program staff, interviews with the program implementation contractor Honeywell, and program tracking data.

11.3.1 Evaluation Objectives

Key research questions to be addressed by this evaluation of PY6 activity for the appliance rebates component include:

- What changes to program design or delivery have occurred due to the shift in implementation contractors?
- Has the shift in implementation contractors had any positive or negative effect on customer satisfaction, attitudes towards energy efficiency, or program participation?
- What were the most common measures purchased by participants? Which measures do participants prefer?
- What changes can be made to the program's design or delivery to improve its effectiveness in future program years?

Key research questions to be addressed by this evaluation of PY6 activity for the lighting discounts component include:

- How well did I&M staff, implementation staff, market retailers and contractors, and participating customers work together? Are there data tracking and/or communication efficiencies that can be gained?
- How are retailers and contractors informing customers of the available incentives? Are they widely promoting the discounts to their customer base, or mainly using the incentives as a sales tool on a case-by-case basis? Is the implementation contractor influencing how retailers and contractors use the incentives in their business models?
- How do participants hear about the program? What share of participants learn of the incentives during the purchasing process?
- Were the program participants satisfied with their experience? What was the level of satisfaction with the work performed, the scheduling/application process, and other aspects of program participation? What are the perceived energy and non-energy benefits associated with the program?

- How aware are I&M customers of the CFL and LED discounts? Are there sufficient marketing materials in the retail stores? Are retail store associates aware of the buy-downs?
- How does the program account for potential savings leakage into other territories? Are there measures in place to minimize free-ridership and/or to encourage spillover savings?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the appliance rebates component of the Efficient Products Program is developed from a telephone survey of program participants. Insight into the customer experience with the lighting discount component of the program is developed both through in-store intercept surveys and follow-up telephone surveys with customers who purchased program-discounted lighting. The internal organization and operational efficiency of program delivery is examined through analysis of interviews conducted with I&M program staff, as well as the program implementer, Honeywell.

11.3.2 Summary of Primary Data Collection

In order to collect the necessary data for evaluating the program, ADM conducted several data collection activities.

- **Program documentation review:** This consisted of reviewing program documents such as rebate applications, program guidelines, and other literature in order to assess overall program structure and gather information for developing the participant survey.
- **Interview with I&M staff members:** Interviews with I&M staff members provided insight into program design features, program performance thus far, and any issues that had been encountered during the first program year for the lighting component of the program, and the second program year for the appliance component of the program. Additionally, these interviews addressed any upcoming changes that are planned for the PY7 program year.
- **Interview with Honeywell staff:** Honeywell program implementation staff was interviewed to provide further information regarding program design and operation. The implementer was asked questions about any initial program strategies, progress towards performance goals, and any operational issues that had occurred during the year.
- **Participant Surveys (appliances):** ADM conducted a telephone survey with a sample of customers receiving appliance rebates through the program to gather data on decision-making criteria and on the attitudes and behaviors of decision-makers. Participants were asked about their knowledge of the program, their level of satisfaction with the program, and their reasons for participating. The survey instrument for the survey is designed with several purposes in mind:
  - To verify the purchase and installation of appliances;
  - To identify the decision-making process for each participating customer; and,

- To identify whether any other energy efficiency measures have been installed at a site other than those associated with the Energy Efficient Products Program.

The PY6 survey instrument for the Efficient Products Program is very consistent with the instrument used for the PY5 evaluation. The primary topics addressed in the existing survey instrument include:

- How and when the customer heard about the program;
- How the customer made contact with the program;
- Interactions between the customer, implementation contractors, and/or I&M staff, etc.;
- Motivation for participating in the program;
- Customer satisfaction with installed measures; and
- Perceived non-energy benefits associated with the program.

- **Participant surveys (lighting):** ADM conducted both intercept and telephone surveys with customers who purchased discounted bulbs through the program. The primary details captured during the intercept surveys were as follows:
  - The quantity and wattage of the CFLs or LEDs they had purchased;
  - The planned location(s) of installation for these CFLs or LEDs;
  - The planned timing of the installation of these CFLs or LEDs;
  - The type of bulb(s) that will be replaced with the new CFLs or LEDs;
  - The extent of the customer's previous experience with CFLs or LEDs; and
  - The customer's decision making process when purchasing the CFLs or LEDs.

  The telephone surveys will focus on additional aspects of the customer experience with the program and decision making regarding energy efficiency, including:

  - Customer awareness of the program, rebates, and marketing;
  - Customer sentiment to CFLs and LEDs;
  - Customer purchase habits;
  - Response to the rebate or discount; and
  - Interactions between the customer, implementation contractors, and/or I&M staff, etc.;
  - Motivation for participating in the program;
  - Customer satisfaction with installed measures;
  - Perceived advantages and disadvantages of the program; and
  - Recommendations for program improvement.

11.3.3 Summary of Program Activity

Table 11-14 summarizes program activity by measure type. As shown, the incentive amounts per ex post kWh saved varied substantially across measures. Based on this review, staff should consider revising incentive amounts for certain measures to most effectively generate savings with the available incentive budget. For example, the $0.04 per kWh saved for pool pumps is particularly low, and the $50 incentive amount is below what is offered in other jurisdictions where incentive amounts tend to range from $100 - $250 per unit. Similarly, the incentive of $70 for programmable thermostats seems relatively high given the savings and relatively low cost of this measure.

Table 11-14 Summary of Appliance Component Program Activity

Measure	*Quantity*	*Average per Unit Gross Ex Post kWh Savings*	*Average Incentive Amount*	*Incentive Amount per kWh Saved*
Air Conditioner	48	100	200	$1.99
Ceiling Fan	5	108	25	$0.23
Dehumidifier	470	213	25	$0.12
Ductless Heat Pump	15	6,589	517	$0.08
ECM Retrofit	354	733	149	$0.20
Heat Pump	61	582	283	$0.49
Heat Pump Water Heater	17	1,297	350	$0.27
Programmable Thermostat	395	132	72	$0.54
Variable Speed Pool Pump	13	1,383	50	$0.04

11.3.4 Participant Survey Findings: Appliances

ADM conducted telephone surveys with appliance rebate participants as part of the evaluation effort for the Residential Efficient Products Program in PY6. These surveys were designed to gather information related to both the impact and process components of the program evaluation. Data collected via participant surveying are used in evaluating:

- Methods of initial customer awareness of the program;
- Customer demographics and characteristics;
- Customer decision making behaviors; and
- Customer satisfaction with the program.

In total, 118 customer participants who had purchased qualifying products and received rebates through the program during PY6 responded to the survey.

The primary purpose of the participant survey effort was to inform the net savings analysis. Thus, the majority of questions administered through the survey effort relate to free ridership indicator variables that are incorporated into the program impact evaluation. The results of these net savings questions are summarized in the net savings chapter of this report, while this chapter summarizes

the remaining questions that relate to participant satisfaction, reception to program marketing, and demographics and home characteristics.

11.3.4.1 Initial Program Engagement

Survey respondents were first asked how they had learned of the program. As shown in Table 11-15, over a third of respondents (35%) stated that they had learned of the program from a contractor. This is consistent with the program marketing strategy, which focuses on engaging market contractors to promote the program to their customers. Additionally, 36% of respondents stated that they learned about the program in a retail store. A high percentage of respondents also stated that they heard about the program directly through an I&M channel such as the I&M website (7%) and I&M bill inserts (14%). A small number of respondents reported hearing about the program through word of mouth (4%), and print ads (1%). None of the respondents reported learning about the program through social networking sites, or radio advertisements.

Table 11-15 Initial Source of Program Awareness

	Response	*Percent of Respondents* (N = 101)*
Could you tell me how you heard about the Residential Energy Efficient Products Program?	Retail store	36%
	Contractor	35%
	I&M Bill Insert	14%
	I&M website (www.electricideas.com)	7%
	Direct Mail from I&M	4%
	Word of mouth	4%
	Print Ad	1%
	Other	2%
	Don't know	3%

**Since respondents were able to select more than one response, the sum of the percentages in the table above can exceed 100%.*

Respondents were asked how they had obtained the program application. Approximately a third of respondents reported (28%) that they received the rebate application from a contractor, consistent with the percentage of respondents hearing about the program through a contractor. This suggests that contractors are successfully marketing the program to potential participants. Additionally, 32% of respondents reported they obtained the application from a retail store, and 27% of respondents reported that they obtained the application on the I&M website.

Table 11-16 Method of Obtaining Rebate Application, Appliance Rebate Participants

	Response	*Percent of Respondents (N = 101)*
Where did you obtain the rebate application?	In a retail store	32%
	From a contractor	28%
	From the I&M website (www.electricideas.com)	27%
	From another website	3%
	Other	8%
	Don't know	0%
	Refused	3%

11.3.4.2 Cross-Program Awareness

To gauge participant involvement in other energy efficiency offerings, respondents were asked about their awareness of and participation in several other programs that are part of the I&M energy efficiency portfolio. As some customers may be aware of incentives or discounts for particular equipment or measures, but may not know the name of the associated program, respondents were prompted with a description of each program rather than with the name of the program.

When asked if they were aware of at least one other I&M energy efficiency program, 22 (22%) survey respondents reported that they were. As shown in Table 11-17, these respondents were most commonly aware of the Appliance Recycling Program, followed by the Online Energy Check-Up Program.

Table 11-17 Cross-Program Awareness

Program Name	*Program Description*	*Yes, have heard of*	*N*	*Yes, have participated in*	*N*
Home Weatherization Program	A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation	59%	17	18%	17
Online Energy Check-Up Program	A program that provides an online energy check-up and suggestions for how you can save energy	72%	18	22%	18
Peak Reduction Program	A program that discounts your electric bill for using your air conditioner less during peak demand periods	44%	18	0%	16
Appliance Recycling	A program that provides a rebate for recycling your old refrigerator or freezer?	89%	19	26%	19
Efficient Products (Lighting)	A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats?	44%	18	6%	17

As relatively few respondents indicated being aware of any other efficiency programs, there is likely substantial potential for increased cross-program promotion within retail stores and through contractors.

11.3.4.3 Program Satisfaction

Survey respondents were asked to rate their level of satisfaction with several elements of their program experience. Responses were provided on a five-point scale ranging from *very satisfied* to *very dissatisfied*. Overall, satisfaction ratings were very high for each program element.

Table 11-18 Satisfaction with Selected Program Elements

Program Element	*Satisfaction Rating*						*N*
	Very satisfied	*Somewhat satisfied*	*Neutral*	*Somewhat dissatisfied*	*Very dissatisfied*	*Don't know*	
Rebate amount	57%	29%	6%	2%	1%	5%	101
Rebate application process	62%	23%	8%	2%	1%	4%	101
Communications with I&M and/or program staff	70%	20%	0%	10%	0%	0%	10
Savings you noticed on your electric bill since installing your new equipment	60%	32%	0%	4%	0%	4%	25
Overall equipment performance	78%	15%	2%	2%	2%	1%	101
Overall program experience	65%	23%	10%	1%	0%	1%	101

Eighty-eight percent of respondents reported that they were satisfied with the program overall and ratings of individual aspects of the program were equally high. No single component of the program garnered particularly high or low satisfaction ratings.

When asked to provide further information regarding their dissatisfaction, many respondents stated that they would have liked to receive a larger rebate or rebates for other measure types. It should be noted that the satisfaction instrument predominantly resulted in positive ratings, and that the instances of dissatisfaction were fairly infrequent.

When asked to provide further information about their program experiences, many respondents provided positive commentary such as:

> *"it was quick and I didn't have any issues with receiving the rebate"*
>
> *"Easy to use and apply and I love the rebates"*
>
> *"I got the rebate promptly and process was easy"*
>
> *"It was easy to do and the rebate came in a timely manner and I had no problem with it."*

Overall, these results suggest that the program is being well-received, and there do not appear to be many operational issues with program delivery.

11.3.4.4 Residence Characteristics

The survey also included two questions regarding the age and square footage of participant homes. This information was gathered in order to allow for tracking of participant residence characteristics over time, and may be useful for developing future promotional strategies or customer segmentation efforts. First, respondents were asked to provide the age of their residence. As shown

in Table 11-19, the majority of respondents stated that their home was built prior to the 1970's. Only eight percent of respondents stated that their home was built within the last 15 years.

Table 11-19 Participant Residence Age

	Response	*Percent of Respondents (N = 101)*
When was your home built?	Before 1970's	44%
	1970's	10%
	1980's	10%
	1990-1994	11%
	1995-1999	12%
	2000-2005	7%
	2006 or newer	1%
	Don't know	3%
	Refused	3%

Respondents were then asked to state the square footage of their homes. As shown in Table 11-20, 40% of respondents indicated that their home is 2,000 square feet or fewer, while 44% of respondents indicated that their home is greater than 2,000 square feet.

Table 11-20 Participant Residence Square Footage

	Response	*Percent of Respondents (N = 100)*
What is the approximate square footage of your home?	Less than 1,000	4%
	1,001-1,500	14%
	1,501-2,000	22%
	2,001-2,500	23%
	Greater than 2,500	21%
	Don't know	13%
	Refused	3%

Respondents were also asked to provide the number of bedroom, bathrooms, and full-time residents living in their home. The average number of reported bedrooms was 3.3, the average number of bathrooms was 2.3, and the average number of residents was 2.6.

11.3.5 Participant Survey Findings: Lighting

ADM conducted in-store intercept and telephone surveys with program participants as part of the evaluation effort for the lighting component of the Residential Efficient Products Program in PY6. These surveys were designed to gather information related to both the impact and process components of the program evaluation. Data collected via participant surveying are used in evaluating:

- Methods of initial customer awareness of the program;

- Customer demographics and characteristics;
- Customer decision making behaviors; and
- Customer satisfaction with the program.

The primary purpose of the intercept survey effort was to inform the net savings analysis on the measure-level. Thus, the majority of questions administered through the survey effort relate to free-ridership indicator variables that are incorporated into the program impact evaluation. The results of these net savings questions are summarized in the net savings chapter of this report, while this chapter summarizes the results of the follow-up telephone surveys that relate to participant satisfaction, reception to program marketing, and demographics and home characteristics.

In total, 35 customer participants who had purchased qualifying lighting products through the program during PY6 responded to the follow-up survey.

11.3.5.1 Cross-Program Awareness

In order to gauge participant involvement in other energy efficiency offerings, respondents were asked about their awareness of and participation in several other programs that are part of the I&M energy efficiency portfolio. As some customers may be aware of incentives or discounts for particular equipment or measures, but may not know the name of the associated program, respondents were prompted with a description of each program rather than with the name of the program.

Only 3 of the 35 survey respondents reported being aware of at least one other I&M energy efficiency program. As shown in Table 11-24, these customers were aware of most other programs, however only one respondent had participated in another I&M energy efficiency program.

Table 11-21 Cross-Program Awareness

Program Name	*Program Description*	*Yes, have heard of*	*N*	*Yes, have participated in*	*N*
Home Weatherization Program	A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation	67%	3	0%	3
Efficient Products (Appliances)	A program that offers discounts on light bulbs purchased at participating retailers?	67%	3	0%	3
Peak Reduction Program	A program that discounts your electric bill for using your air conditioner less during peak demand periods	67%	3	0%	3
Appliance Recycling	A program that provides a rebate for recycling your old refrigerator or freezer?	67%	3	0%	3
Online Energy Check-Up Program	A program that provides an online energy check-up and suggestions for how you can save energy	33%	3	33%	3

As very few respondents indicated being aware of any other efficiency programs, there is likely substantial potential for increased cross-program promotion.

11.3.5.2 Program Satisfaction

Survey respondents were asked to rate their level of satisfaction with several elements of their program experience. Responses were provided on a five-point scale ranging from *very satisfied* to *very dissatisfied*. Overall, satisfaction ratings were very high for each program element.

Table 11-22 Satisfaction with Selected Program Elements

Program Element	*Satisfaction Rating*						*N*
	Very satisfied	*Somewhat satisfied*	*Neutral*	*Somewhat dissatisfied*	*Very dissatisfied*	*Don't know*	
Energy savings	57%	3%	3%	0%	0%	37%	35
Discount amount	81%	6%	6%	0%	0%	6%	16
Selection of products that qualified for discounts	50%	31%	0%	0%	0%	19%	16
Quality of lighting	91%	0%	0%	3%	0%	6%	35
Information available in-store regarding lighting options	69%	26%	3%	0%	0%	3%	35

Respondents reported being very satisfied with all program elements. Participants were most satisfied with the quality of the lighting, and the discount amount. Only one participant reported dissatisfaction with any element of the program. When asked why they were dissatisfied, this respondent stated that they do not like the color of the light, and they feel it takes a while for the bulb to come to full brightness. Overall program participants report high satisfaction with the program.

11.3.5.3 Residence Characteristics

The survey also included two questions regarding the age and square footage of participant homes. This information was gathered in order to allow for tracking of participant residence characteristics over time, and may be useful for developing future promotional strategies or customer segmentation efforts. First, respondents were asked to provide the age of their residence. As shown in Table 11-19, the half of respondents stated that their home was built prior to the 1970's, and twenty-nine percent of respondents stated that their home was built within the last 15 years.

Table 11-23 Participant Residence Age

	Response	*Percent of Respondents (N = 35)*
When was your home built?	Before 1970's	49%
	1970's	3%
	1980's	14%
	1990-1994	0%
	1995-1999	3%
	2000-2005	6%
	2006 or newer	23%
	Don't know	3%
	Refused	0%

Respondents were then asked to state the square footage of their homes. As shown in Table 11-20, 60% of respondents indicated that their home is greater than 2,000 square feet, while 31% of respondents indicated that their home is 2,000 square feet or fewer.

Table 11-24 Participant Residence Square Footage

	Response	*Percent of Respondents (N = 35)*
What is the approximate square footage of your home?	Less than 1,000	0%
	1,001-1,500	26%
	1,501-2,000	6%
	2,001-2,500	23%
	Greater than 2,500	37%
	Don't know	6%
	Refused	3%

Respondents were also asked to provide information about the type of heating system and water heaters in their homes. Responses can be found in Figure 11-3 and Figure 11-4.

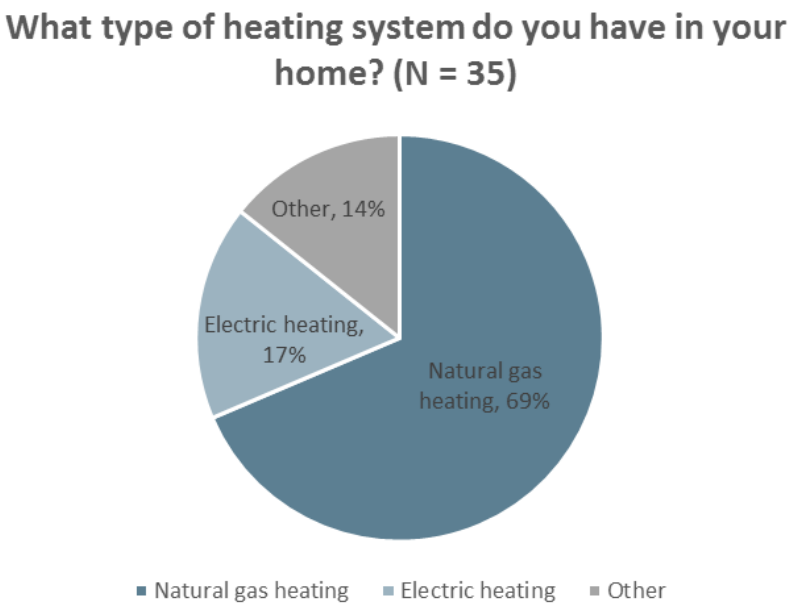


Figure 11-3: Type of Heating System

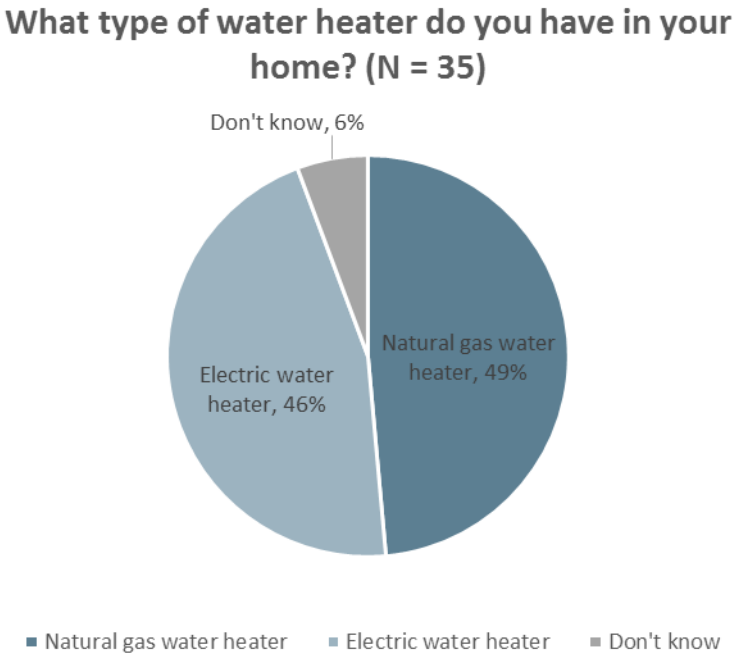


Figure 11-4: Type of Water Heater

11.3.6 Program Operations Perspective

This section summarizes the core findings of interviews conducted with I&M program staff and Honeywell for the purposes of gaining insight into program structure, identifying program objectives, and assessing the extent to which there are future opportunities for program improvement.

11.3.6.1. Program Staff Roles and Responsibilities

The PY6 program team was comprised of staff members from Indiana-Michigan and Honeywell. The evaluation team conducted interviews with the program managers from each organization to better understand how program operations.

The I&M team includes a Program Coordinator who was responsible for day-to-day program oversight and implementation contractor management. The Program Coordinator also approved marketing materials and worked closely with the implementation contractor to forecast program activity and increase participation in the program. Three additional staff members also support ed the lighting component in addition to supporting all residential programs. Those staff members were responsible for maintaining the monthly scorecard, marketing, and incentive processing.

The implementation team at Honeywell consisted of the Program Manager who was responsible for implementing the Energy Efficient Products Program, as well as the Home Weatherization Programs. The Program Manager was the primary point of contact for manufactures participating in the lighting component and worked with the retailers to obtain program data used to verify program discounted sales at each location. Two additional supported staff assist with project coordination and onsite visits to retailer locations, internally referred to as the circuit rider. The circuit rider was responsible for setting up in-store displays and performing retailer inspections, which includes documenting the inventory and price point as well as the verifying the promotional materials are properly displayed.

11.3.6.2. Program Activity

Program staff indicated that appliance rebate activity was likely not quite sufficient to meet the program's energy savings goal. Staff indicated that multiple factors likely accounted for the program falling short of its goal, but a key factor was that the program launched later than anticipated. The slow start resulted from delays in the selection of a new implementation contractor and once selected, a period of time was spent designing initial program materials and crafting outreach messages. As a result, the program was not fully launched until late April.

Similarly, the lighting component also fell short of its savings goal, which was also partly attributed to the selection of an implementation contractor taking longer than anticipated. As a result of the delays, the first in-store promotion was not held until March.

Staff also noted that there were fewer sales through dollar chain stores than was seen at other retailers. A key design consideration emphasized by I&M was that the discounts should be equally accessible by all residential customers. Thus, while the program might have been able to achieve higher sales volumes through retailers such as Costco and the Home Depot, it was important to also allocate budget to lower volume dollar chain stores. However, in September, budgets were revised to allocate more funds to discounts at higher volume stores.

Another factor that affected the programs performance was competition from non-program sponsored LED bulbs. To ensure that only bulbs of sufficient quality were discounted through the program, retailer discounts were only provided for ENERGY STAR® qualified light bulbs. However, with recent declines in LED prices, some non-ENERGY STAR® qualified bulbs are offered at prices that compete with the discounted qualified bulbs. The primary challenge for the program is to effectively communicate to customers the value of higher quality discounted bulbs, which may have better color rendering, longevity, and other characteristics. This educational effort is important not only for aiding the program in meeting its savings targets, but also to ensure that customers do not have negative experiences with lower quality light bulbs that cause them eschew solid state lighting in the future.

11.3.6.3. Energy Efficient Products Program Design

Staff discussed several changes made to the design of the appliance rebate component. Most notable was the new requirement that only registered contractors can install rebated equipment. Prior to project approval each contractor had to complete an application that demonstrated they met the requirements for participating in the program. This requirement took time to communicate to contractors and caused some initial confusion among contractors who had participated in the past. However, staff took steps to communicate the new requirement to contractors including in-person discussions about the changes. To address this type of challenge in the future, the implementation contractor, Honeywell, designed an outreach campaign that included a contractor-specific newsletter that would keep registered contractors informed of program changes.

Several other changes were made to program guidelines as well as to the incentives. One such change was that programmable thermostats must now be installed by a contractor, whereas self-installation was allowed in prior years.

Another change that was made that to the program was that beginning in the third quarter, rebates for SEER 15 central air conditioning units were offered. This addition bolstered program activity at the end of the program year and will remain as a program measure in 2016.

The approach to setting goals for the lighting component and projecting sales and how this information was used to select retailers and apportion budgets for discounts was discussed with program staff. The selection of stores was based on manufacturer-provided projections for retailer store sales of discounted bulbs. These sales are reviewed and stores are selected to ensure that residential customers of varying demographics have access to the discounts. Additionally, stores are selected to avoid offering discounts at too many locations in a single area.

Once stores were selected, staff requested that manufacturers provide projections based on the discount per lighting measure type. Once the projections were received from manufactures, staff created a budget based on quantities of various lighting measure types that were projected to be sold. These budget allocations were incorporated into the Memorandum of Understanding (MOU) that were executed by both I&M and the participating manufacture.

11.3.6.4. Program Marketing and Communication

Staff was asked to provide feedback regarding program marketing and outreach. Staff indicated program outreach occurred through several marketing channels. The primary channel for promoting rebates was through program contractors. Contractors received a quarterly newsletter, which informed them of program changes, and copies of program marketing materials. Figure 11-5 below displays an example of the newsletter's homepage. Contractors can see that what new measures have been added and view other program materials such as marketing mailers, bill inserts, and brochures.

Figure 11-5 Example of Energy Efficient Products Contractor Newsletter

Staff also discussed at outreach campaign that targeted customers with electric water heaters. Figure 11-6 displays the mailer that was sent to inform customers about rebates for high-efficiency water heaters.

Figure 11-6 Marketing Mailers Sent to Customers

Rebates were also promoted at retail locations, specifically, tear sheets were set up at equipment retailers such as Home Depot, Menards, and Lowe's. The tear sheets are small paper applications that provide program information to customers. Customers can quickly and conveniently review program incentive information at the point of sale.

Rebated appliances were promoted in conjunction with the promotion of lighting discounts during in-store events. Additionally, efficiencies were achieved by ensuring that display materials and tear sheets were in order and available during retailer visits.

11.3.6.5. Communication

Staff provided feedback regarding the level of communication between I&M and Honeywell throughout the program year. At the beginning of the program year, email and telephone communication occurred daily to ensure effective coordination and mutual understandings as the programs launched. Staff scheduled hour long discussions each week that covered program activity, marketing, invoicing, and inspections. Implementation staff indicated I&M staff was very accessible; I&M staff noted the same of Honeywell. All program staff stated that the level of communication adequately supported the administration and oversite needs of the program.

Honeywell generated monthly and weekly reports for I&M as well. This reporting tracked year-to-date savings, measure quantities, dollars spent, and the percent of the goal achieved. Project trackers were shared to communicate the status of deliverables, such as marketing materials. On a weekly basis Honeywell would provide a customer call tracker that detailed what customers were calling about and how Honeywell responded to the inquiries. I&M would also request ad hoc reports from the program tracking system when necessary.

Both Honeywell and I&M indicated that obtaining program tracking data for the programs was a challenge throughout the year. Staff said there were many times when the data format would

change or that I&M was not receiving the information they asked for. Staff indicated that when you have a new vendor there is always a period of adjustment, but unfortunately the accuracy of the tracking data never improved.

11.3.6.6. PY7 Changes

In 2016, a new implementation contractor has been hired to implement the lighting portion of the Energy Efficient Products Program. The products portion of the program will be self-implemented by I&M. I&M staff indicated that self-installed thermostats are going to be permitted again and central air conditioners will continue to receive rebates. The program will omit the requirement for contractors to be pre-approved to participate. Overall, staff indicated that they expect program activity to increase as they build on the momentum that was generated at the end of 2015.

11.3.7 Summary of Conclusions and Recommendations

The following presents a selection of key conclusions from the evaluation of the Energy Efficient Products Program.

- **Program fell short of its energy savings goals in PY6.** The appliance component achieved 51% of its ex ante gross kWh savings and lighting achieved 60% of its ex ante kWh savings. Factors related to the shortfall are the late start of the program, issues related to the program design such as requiring that thermostats are installed by contractors and not offering rebates for air conditioners until the last quarter of the program year, and smaller than expected sales of discounted lighting.
- **High participant satisfaction levels:** The survey results suggest that a high majority of participants are very satisfied with each element of their program experience, from the rebate amount to the performance of rebated measures. Eighty-eight percent of respondents reported that they were satisfied with the program overall and ratings of individual aspects of the program were equally high. No single component of the program garnered particularly high or low satisfaction ratings. Similarly, customers that purchased discounted lighting products were satisfied with the information provided in-stores about lighting options, the quality of the lighting products and the discount amounts.
- **Contractors and retail store materials are most frequently cited sources of program awareness.** The frequency with which customers learned of the program from contractors suggests that contractors remain engaged in the rebate program despite changes in program design and implementation contractor. Additionally, point of sales materials for the rebate component is also effective and generating program awareness.
- **A new contractor will provide implementation services for PY7 for the lighting portion of the program.** I&M will hire a new implementation contractor to deliver the lighting portion of the Energy Efficient Products Program and will self-implement the products portion of the program. Planned changes include no longer requiring that contractors are registered with the program to apply for rebates and allowing self-installed programmable thermostats.

The evaluator provides the following recommendations for the coming program year:

- **Proactively communicate program changes to program contractors.** Contractors have been an important source of program awareness for participating customers. Program staff should focus on communicating changes to program incentives and procedures to contractors to ensure that they remain aware of and engaged in the program.
- **Consider increasing variable speed pool pump incentives and decreasing programmable thermostat incentives.** A review of the incentive amounts for rebated measures indicates that incentive amounts for variable speed pool pumps are too low given the potential energy savings and volume of rebated measures. Thermostat incentives may be too high given the energy savings and cost of the units.

12. Cost Effectiveness Testing

In evaluating the PY6 I&M Residential Portfolio, ADM performed cost-effectiveness testing at the program levels. In order to provide an evaluation of the overall impact of each of I&M's Residential programs relative to their costs, a portfolio of tests was conducted using the following inputs: verified gross kWh/kW savings, net kWh and kW savings, administration costs, incentive amounts, participant costs, cost of electric generation at peak and non-peak hours, market based prices of energy, I&M's weighted average cost of capital, and customer rate forecasts. The specific tests describe the impact of the program from varying perspectives. The five most widely accepted tests conducted in evaluations of energy efficiency programs across North America are summarized below:[34]

- Utility Cost Test (UTC): Comparison of program administrator costs to resource supply costs.
- Total Resource Cost Test (TRC): Comparison of program administrator and customer costs to utility resource savings.
- Ratepayer Impact Measure Test (RIM): Impact of the program on all ratepayers, including non-participants.
- Societal Cost Test (SCT): Comparison of total societal costs to resource savings and non-monetized benefits.
- Participant Cost Test (PCT): Comparison of costs and benefits from the perspective of the customer implementing the measures.

The key questions answered by each cost test are shown in Table 12-1.[35]

[34] National Action Plan for Energy Efficiency (2008). *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Energy and Environmental Economics, Inc. and Regulatory Assistance Project. <www.epa.gov/eeactionplan>

[35] http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf

Table 12-1 Questions Addressed by the Various Cost Tests

Cost Test	*Questions Addressed*
Participant Cost Test	■ Is it worth it to the customer to install energy efficiency? ■ Is the customer likely to want to participate in a utility program that promotes energy efficiency?
Ratepayer Impact Measure	■ What is the impact of the energy efficiency project on the utility's operating margin? ■ Would the project require an increase in rates to reach the same operating margin?
Utility Cost Test (Same as program administrator cost test (PACT))	■ Do total utility costs increase or decrease? ■ What is the change in total customer bills required to keep the utility whole?
Total Resource Cost Test	■ What is the regional benefit of the energy efficiency project including the net costs and benefits to the utility and its customers? ■ Are all of the benefits greater than all of the costs (regardless of who pays the costs and who receives the benefits)? ■ Is more or less money required by the region to pay for energy needs?
Societal Cost Test	■ What is the overall benefit to the community of the energy efficiency project including indirect benefits? ■ Are all of the benefits, including indirect benefits, greater than all of the costs (regardless of who pays the cost and who receives the benefits)?

Overall, the results of all five-cost effectiveness tests provide a more comprehensive picture than the use of any one test alone. The TRC and SCT cost tests help to answer whether energy efficiency is cost-effective overall. The PCT, UCT, and RIM help to answer where the selection of measures and design of the program is balanced from participant, utility, and non-participant perspectives respectively. The scope of the benefit and cost components included in each test ADM performed are summarized in Table 12-2[36].

[36] http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf

Table 12-2 Summary of Benefits and Costs Included in Each Cost-Effectiveness Test

Test	*Benefit*	*Costs*
PCT (Benefits and costs from the perspective of the customer installing the measure)	■ Incentive payments ■ Bill Savings ■ Applicable tax credits or incentives	■ Incremental equipment costs ■ Incremental installation costs
UCT (Perspective of utility, government agency, or third party implementing the program	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	■ Program overhead costs ■ Utility/program administrator incentive costs ■ Utility/program administrator installation costs
TRC (Benefits and costs from the perspective of all utility customers in the utility service territory)	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ■ Additional resource savings ■ Monetized environmental and non-energy benefits ■ Applicable tax credits	■ Program overhead costs ■ Program installation costs ■ Incremental measure costs
SCT (Benefits and cost to all in the utility service territory, state, or nation as a whole.	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution ■ Additional resource savings ■ Non-monetized environmental and non-energy benefits	■ Program overhead costs ■ Program installation costs ■ Incremental measure costs
RIM (Impact of efficiency measure on non-participating ratepayers overall)	■ Energy-related costs avoided by the utility ■ Capacity-related costs avoided by the utility, including generation, transmission, and distribution	■ Program overhead costs ■ Utility/program administrator incentive costs ■ Utility/program administrator installation costs ■ Lost revenue due to reduced energy bills

12.1 Incremental Cost Calculations

Using the Database for Energy Efficient Resources (DEER)[37], ADM compiled incremental costs by measure. The incremental costs were scaled from the measure level to the program level using the quantity of each measure as verified by ADM. These incremental costs are included in the PCT, TRC and SCT tests.

12.2 Effective Useful Life Calculations

ADM calculated the Effective Useful Life (EUL) by measure referencing the DEER EUL database. Those values were aggregated at the program level using a weighted average of EUL by gross kWh savings.

12.3 Cost Effectiveness Results by Program

Using the inputs sent to ADM from I&M and the software package DSMore, ADM calculated results for each of the five cost effectiveness tests. Table 12-3 displays the discount rate that was incorporated into the cost effectiveness analysis for each of the five test types.

Table 12-3 Discount Rate by Test Type

Test	*Discount Rate*
Utility Cost Test	7.29%
Total Resource Cost Test	7.29%
Ratepayer Impact Measure Test	7.29%
Societal Cost Test	5.00%
Participant Test	15.00%

The results of the above cost effectiveness tests and their corresponding benefits (numerator of each cost test) and total costs (denominator of each cost test) are presented in Table 12-4 through Table 12-14 below.

Table 12-4 Appliance Recycling Program Cost Effectiveness Test Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	1.80	$1,020,229	$567,361
Total Resource Cost Test	2.33	$1,020,229	$438,364
Ratepayer Impact Measure Test	0.54	$1,020,229	$1,892,752
Societal Cost Test	2.51	$1,101,369	$438,364
Participant Test	-	$2,125,423	-

[37] The DEER database can be downloaded here: http://www.energy.ca.gov/deer/

Table 12-5 Home Energy Reporting Program Cost Effectiveness Test Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	1.80	$2,148,912	$1,191,612
Total Resource Cost Test	1.80	$2,148,912	$1,191,612
Ratepayer Impact Measure Test	0.47	$2,148,912	$4,605,611
Societal Cost Test	1.80	$2,148,912	$1,191,612
Participant Test	-	$3,413,999	-

Table 12-6 Online Energy Check-Up Program Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	2.39	$1,247,490	$521,992
Total Resource Cost Test	2.41	$1,247,490	$517,616
Ratepayer Impact Measure Test	0.54	$1,247,490	$2,310,947
Societal Cost Test	2.59	$1,338,306	$517,616
Participant Test	-	$2,194,628	$327,494

Table 12-7 Peak Reduction Program Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	0.75	$464,497	$617,925
Total Resource Cost Test	1.57	$464,497	$296,333
Ratepayer Impact Measure Test	0.75	$464,497	$619,746
Societal Cost Test	1.57	$464,497	$296,333
Participant Test	-	$323,413	-

Table 12-8 Schools Energy Education Program Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	2.38	$1,538,968	$645,410
Total Resource Cost Test	2.56	$1,538,968	$601,219
Ratepayer Impact Measure Test	0.62	$1,538,968	$2,492,697
Societal Cost Test	2.76	$1,659,354	$601,219
Participant Test	-	$2,560,191	$438,697

Table 12-9 Home Weatherization Program Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	0.46	$135,855	$297,499
Total Resource Cost Test	0.47	$135,855	$288,326
Ratepayer Impact Measure Test	0.29	$135,855	$463,010
Societal Cost Test	0.57	$163,323	$288,326
Participant Test	3.33	$184,700	$55,503

Table 12-10 Income Qualified Weatherization Program Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	0.10	$21,939	$217,966
Total Resource Cost Test	0.11	$21,939	$208,566
Ratepayer Impact Measure Test	0.09	$21,939	$245,949
Societal Cost Test	0.12	$26,005	$208,566
Participant Test	-	$28,157	-

Table 12-11 New Construction Program Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	2.47	$1,089,358	$440,196
Total Resource Cost Test	1.96	$1,089,358	$557,060
Ratepayer Impact Measure Test	0.81	$1,089,358	$1,346,732
Societal Cost Test	2.48	$1,381,206	$557,060
Participant Test	2.05	$901,721	$439,693

Table 12-12 Energy Efficient Products Program – Appliances Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	1.05	$338,426	$320,808
Total Resource Cost Test	0.89	$338,426	$379,701
Ratepayer Impact Measure Test	0.49	$338,426	$686,492
Societal Cost Test	1.02	$386,500	$379,701
Participant Test	1.77	$571,667	$322,318

Table 12-13 Energy Efficient Products Program – Lighting Cost Effectiveness Results

Test	*Score*	*Benefits (2015 dollars)*	*Costs (2015 dollars)*
Utility Cost Test	3.30	$2,733,529	$828,770
Total Resource Cost Test	1.39	$2,733,529	$1,962,495
Ratepayer Impact Measure Test	0.62	$2,733,529	$4,387,749
Societal Cost Test	1.52	$2,980,515	$1,962,495
Participant Test	1.94	$5,954,616	$3,065,584

Table 12-14 summarizes the cost effectiveness testing results by program for each test performed.

Table 12-14 Cost Effectiveness Test Scores by Program

Program	*UCT*	*TRC*	*RIM*	*SCT*	*PCT*
Appliance Recycling	1.8	2.33	0.54	2.51	-
Home Energy Reporting	1.8	1.8	0.47	1.8	-
Online Energy Check-Up	2.39	2.41	0.54	2.59	-
Peak Reduction	0.75	1.57	0.75	1.57	-
Schools Energy Education	2.38	2.56	0.62	2.76	-
Home Weatherization	0.46	0.47	0.29	0.57	3.33
Income Qualified Weatherization	0.1	0.11	0.09	0.12	-
New Construction	2.47	1.96	0.81	2.48	2.05
Energy Efficient Products - Appliances	1.05	0.89	0.49	1.02	1.77
Energy Efficient Products - Lighting	3.3	1.39	0.62	1.52	1.94

Appendix A: Appliance Recycling Program Participant Survey Instrument

Indiana Michigan Power

Appliance Recycling Program 2015

Participant Telephone Survey

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. May I please speak with [CONTACT NAME]:_____)?

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power (I&M) about the Appliance Recycling program that your household participated in back in ___ [Month/Year]. Are you the person who is most familiar with having a refrigerator or freezer picked up for recycling through I&M's program?

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about the appliance that was picked up for recycling?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate I&M's Appliance Recycling program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 15 minutes. May I ask you a few questions?*
IF REFUSAL: THANK AND TERMINATE

VERIFICATION

1. Our program records indicate that you had __ **(quantity of refrigerators or freezers)** picked up for recycling through the Appliance Recycling program around ***[Month/Year]***. Is that correct?

1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY Q2 IF Q1=2]

2. How many refrigerators or freezers did you have recycled through the Appliance Recycling program?

1. _____ **[Record Quantity of Each Appliance] ->*[TOT_QTY]***
98. Don't know
99. Refused

AWARENESS

3. How did you first learn about **I&M**'s appliance pick-up and recycling program? **[**DO NOT READ, PROMPT IF NECESSARY]**.**
1. Newspaper/magazine/print media
2. Bill insert
3. Message printed on your bill
4. I&M Website (www.electricideas.com)
5. Friend or Relative (word-of-mouth)
6. TV ad
7. I&M Representative
8. I&M Brochure
9. Retailer/store
10. Community event
11. Social Networking site such as Facebook or Twitter
12. Other **[Specify]**_____.
98. Don't know
99. Refused

4. Did you hear about the program from any other sources? If so, which sources? [DO NOT READ, CHECK ALL THAT APPLY]
1. Did not hear about the program from any other sources
2. Newspaper/magazine/print media
3. Bill insert
4. Message printed on your bill
5. I&M Website (www.electricideas.com)
6. Friend or Relative (word-of-mouth)
7. TV ad
8. I&M Representative
9. I&M Brochure
10. Retailer/store
11. Community event
12. Social Networking site such as Facebook or Twitter
13. Other [Specify]_____.
98. Don't know
99. Refused

APPLIANCE DESCRIPTION AND RECYCLING DECISION

5. Now I'm going to ask you some specific questions about the [refrigerator, freezer] that was picked up and recycled**.** If you had more than one [refrigerator, freezer] picked up, please just choose one of them and answer the following questions for that one unit.

6. How old was your **[refrigerator, freezer]**? **[RECORD RESPONSE IN YEARS, ENTER "00" IF LESS THAN ONE YEAR]**?
1. _____ **[Record years]**
98. Don't know
99. Refused

7. Was the old **[refrigerator, freezer]** your primary or secondary (spare, auxiliary) unit?
1. Primary
2. Secondary
98. Don't know
99. Refused

8. Did you replace the old **[refrigerator, freezer]** with a new unit?
1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY Q9 IF Q8 **= 1]**

9. Which of the following best describes the [refrigerator, freezer] that replaced the old unit?
1. You bought the replacement New
2. You bought the replacement Used
3. You moved the replacement from somewhere else in the house
4. You moved the replacement from another home, or
5. You received the replacement from someone else?
98. Don't know
99. Refused

[DISPLAY Q10 IF Q8=1]

10. Would you have purchased a replacement **[refrigerator, freezer]** even if I&M's recycling program had not been offered?
1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY Q11 IF Q10=1]

11. Let me be sure I understand. Are you saying that you chose to purchase a new appliance because of I&M's appliance recycling program, or are you saying you would have purchased a new appliance regardless of the program?
1. Purchased new appliance because of program
2. Would have purchased a new appliance regardless
98. Don't know
99. Refused

12. For the majority of 2014, where within your home was the **[refrigerator, freezer]** located?
1. Kitchen
2. Garage
3. Porch/patio
4. Basement
5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other **[Specify]** _____
98. Don't know
99. Refused

13. Thinking about the year prior to recycling the [refrigerator, freezer]**,** was it plugged in and running … **[READ ALL]**
1…All the time
2…For special occasions only
3…During certain months of the year only, or
4…Never plugged in or running
98. Don't know
99. Refused

[DISPLAY Q11 IF Q10 = 2 OR 3]

14. If you were to add up the total amount of time it was running in the year prior to being picked up, how many months would that be? Your best estimate is okay. **[Get nearest month]**
1… _____ **[RECORD NUMBER OF MONTHS 1-11]**
2…All the time
98. Don't know
99. Refused

15. Was the **[refrigerator, freezer]** still in working condition when it was picked up (by working condition I mean did the unit turn on and produce cold air)?

1…Yes
2…No
3…It worked but had some problems
98. Don't know
99. Refused

[DISPLAY Q13 IF Q12 = 2 OR 3]

16. What was wrong with the unit? (If respondent is unsure, ask "would it turn on and produce cold air?")
1. Wouldn't turn on
2. Wouldn't keep food/room cold ENOUGH
3. Wouldn't keep food/room cold at all
4. Too loud
5. Don't know, but would produce cold air
6. Don't know, but would NOT produce cold air
7. Other **[Specify]** _____
98. Don't know
99. Refused

17. Had you already considered disposing of the **[refrigerator, freezer]** before you heard about **I&M**'s appliance recycling program? By dispose of, I mean getting the appliance out of your home by any means including selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center yourself.
1…Yes
2…No
98. Don't know
99. Refused

18. What would you have most likely done with the **[refrigerator, freezer]** if I&M's program had not been available?

[Read list unless respondent indicates choice without reading the list]

1…Sold it to a private party
2…Sold it to a used appliance dealer
3…Kept it and continued to use it
4…Kept it and stored it unplugged
5…Given it away to a private party, such as a friend or a neighbor
6…Given it away to a charity organization, such as Goodwill Industries or a church
7…Put it on a curb with a "Free" sign on it
8…Had it removed by the dealer you got your new or replacement [refrigerator, freezer] from
9…Taken it to a dump or recycling center

10. Hired someone to take it to a dump or recycling center
11. Gotten rid of it some other way [**Specify**]_____
98. Don't know
99. Refused

19. What is the MAIN reason you chose to get rid of your **[refrigerator, freezer]** through **I&M**'s program over other methods of disposing of your appliance?
[If multiple are mentioned, ask: "Of those, which is the main reason?" Do not read, accept one answer only.]

[If respondent says: "I didn't need or want the [refrigerator, freezer]," respond "Yes, but why did you choose to discard it through I&M's program rather than through another method?"]

1…Cash/incentive payment
2…Free pick-up service/others don't pick up/don't have to take it myself
3…Environmentally safe disposal/recycled/good for environment
4…Recommendation of a friend/relative
5…Recommendation of retailer/dealer
6…Utility sponsorship of the program
7…Easy way/convenient
8…Never heard of any others/only one I know of
9…Other **[Specify]**
98. Don't know
99. Refused

20. Would you have participated in the program if the amount of the rebate had been less, but appliance pick-up was still provided at no cost?
1. Yes
2. No
3. Maybe
98. Don't know
99. Refused

[DISPLAY Q18 IF Q17 = 1 OR 3 OR 98 OR 99]

21. Would you have participated in the program with no rebate check altogether, if appliance pick-up was still provided at no cost?
1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY FIRST REPLACEMENT UNIT SECTION IF Q8 = 1]
FIRST REPLACEMENT UNIT SECTION

Please think about the [refrigerator, freezer] that *replaced* the one that was removed.

22. Which of the following best describes the [refrigerator, freezer] that replaced the old unit?

6. You bought the replacement New
7. You bought the replacement Used
8. You moved the replacement from somewhere else in the house
9. You moved the replacement from another home, or
10. You received the replacement from someone else?

100. ..... Don't know
101. ..... Refused

[DISPLAY Q20 IF Q19 = 1 OR 2]

23. Did you purchase this replacement appliance from a Sears store?

1. Yes
2. No
3. Don't know
4. Refused

[DISPLAY Q21 IF Q20 = 1]

24. Did you sign up for the recycling program through Sears as well?

1. Yes
2. No
3. Don't know
4. Refused

[DISPLAY Q22 IF Q21 = 1]

25. Did the fact that Sears offered appliance pick-up and recycling motivate you to purchase a replacement appliance?

1. Yes
2. No
3. Don't know
4. Refused

[DISPLAY Q23 IF Q22 = 1]

26. How did this motivate you to purchase a replacement appliance? [OPEN ENDED, VERBATIM]:

_____

_____

[DISPLAY Q24 IF Q21 = 1]

27. When you purchased the replacement appliance, did you ask about I&M's recycling program or did the sales representative bring it up on their own?

1. I asked about it
2. The sales representative brought it up

3. Other *(Specify: _____)*
4. Don't know
5. Refused

[DISPLAY Q25 IF Q20 = 1]

28. Did you pick up your replacement appliance from the Sears store, or did Sears deliver it to you?

1. Picked it up at Sears
2. Sears delivered it
3. Don't know
4. Refused

[DISPLAY Q26 IF Q20 = 1]

29. On a scale of *very dissatisfied* to *very satisfied*, how satisfied are you with the quality and quantity of information provided about the recycling program by Sears staff in the retail store?

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied nor dissatisfied
4. Satisfied
5. Very satisfied
6. Don't know
7. Refused

[DISPLAY Q27 IF Q26 = 1 OR 2]

30. Why are you dissatisfied with the information that was provided? [OPEN ENDED, VERBATIM]:
_____
_____
_____

[DISPLAY Q28 IF Q19 = 1, 2, 4, OR 5]

31. Did you acquire the replacement [refrigerator, freezer] before or after the old [refrigerator, freezer] was picked up? **[RECORD ONLY ONE RESPONSE]**
1. Before
2. After
3. Got it the same day
98. Don't know
99. Refused

[DISPLAY Q29 IF Q28 = 1 OR 2]

32. How long **[BEFORE / AFTER FROM Q28]** the old one was picked-up did you get the replacement [refrigerator, freezer]? **[READ RESPONSE LIST; RECORD ONLY ONE RESPONSE]**
1. Within one to two weeks
2. Over two weeks, but less than two months
3. Within two to three months
4. Within four to six months
5. Within seven to twelve months (one year)
6. More than twelve months (one year)
7. Other (Please specify) [DO NOT READ] _____
98. Don't know [DO NOT READ]
99. Refused [DO NOT READ]

[DISPLAY Q30 IF Q19 = 2 OR IF Q28 = 1 AND Q29 = 6)]

33. How old is this replacement [refrigerator, freezer]?
[NUMERIC OPEN END; RECORDED IN YEARS]
1. Less than one year
98. Don't know
99. Refused

[DISPLAY Q31 IF REPLACEMENT_UNIT = REFRIGERATOR]

34. Please keep thinking about the refrigerator that replaced the recycled unit. Does this replacement refrigerator have …
1. A single door, with a freezer compartment inside
2. Two doors, side by side, with a freezer on one side
3. Two doors, top and bottom, with a freezer on the top
4. Two doors, top and bottom, with a freezer on the bottom
5. Three doors with a freezer door on the bottom
6. Other-specify _____
98. Don't know

99. Refused

[DISPLAY Q32 IF REPLACEMENT_UNIT = FREEZER]

35. Please keep thinking about the freezer that replaced the recycled freezer. Is this replacement freezer…

7. A chest freezer
8. An upright freezer
9. Other-specify _____
98. Don't know
99. Refused

36. Is the replacement [refrigerator, freezer] frost-free or manual defrost? **[DO NOT READ RESPONSE LIST; RECORD ONLY ONE RESPONSE]**

1. Frost free
2. Manual defrost
3. Other-specify _____
98. Don't know
99. Refused

37. Is your replacement [refrigerator, freezer] larger, smaller or about the same size as the one that the program removed for you? **[DO NOT READ RESPONSE LIST; RECORD ONLY ONE RESPONSE]**

1. Larger
2. Smaller
3. About the Same Size
98. Don't know
99. Refused

PROGRAM SIGN-UP PROCESS SECTION

"Now I have some questions about your experience with the program sign-up process."

38. Once you decided to participate, the first step was signing up for the program. Are you the one that signed up, or did someone else in your household sign up?
1. I signed up
2. Someone else signed up
98. Don't know
99. Refused

[DISPLAY Q58 IF Q57 = 1]

39. Did you sign up online or on the phone?
1. Telephone
2. Online
3. Other _____
98. Don't know
99. Refused

[DISPLAY ONLINE SIGNUP SECTION IF Q58 = 2]
ONLINE SIGNUP SECTION

40. Was it easy to find the sign up screen on the I&M website?
1. Yes
2. No
98. Don't know
99. Refused

41. Did the website answer all your questions about the appliance recycling program?
1. Yes
2. No
3. Not applicable
98. Don't know
99. Refused

42. Did you receive confirmation that your online sign up had been successful?
1. Yes
2. No
3. Not applicable
98. Don't know
99. Refused

[DISPLAY PHONE SIGNUP SECTION IF Q58 = 1]
PHONE SIGNUP SECTION

43. Was the representative you spoke to on the telephone polite and courteous?
1. Yes
2. No
3. Not applicable
98. Don't know

99. Refused

44. Did the representative answer all your questions about the program?
1. Yes
2. No [SPECIFY: _____]
3. Not applicable
98. Don't know
99. Refused

45. Did you have to call more than once?
1. Yes
2. No
3. Not applicable
98. Don't know
99. Refused

[DISPLAY Q65 IF Q64 = 1]

46. Why did you need to call more than once?
1. [RECORD OPEN END]
98. Don't know
99. Refused

[DISPLAY Q66 IF Q57 = 1]

47. Were you able to schedule a pick-up date and time that was convenient for you?
1. Yes
2. No
98. Don't know
99. Refused

APPLIANCE PICK UP INTRO

48. Did you have any interaction with the person that collected your old refrigerator?
1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY APPLIANCE PICK UP SECTION IF Q67 = 1]
APPLIANCE PICK UP SECTION

49. Was the person who collected the old [appliance] courteous and professional?
1. Yes
2. No
98. Don't know
99. Refused

50. Was the [appliance] plugged in at the time of pick-up?
1. Yes
2. No
98. Don't know
99. Refused

51. Did the person who collected the old [appliance] check to see that [it/they] still worked?
1. Yes
2. No
98. Don't know
99. Refused

52. Did the person who collected the old refrigerator cut the cord on the [appliance] at the time of pick up?
1. Yes
2. No
98. Don't know
99. Refused

PROGRAM SATISFACTION SECTION

"Now I have some questions about your satisfaction with your participation in the program."

53. How satisfied were you with the rebate amount? Would you say you were: Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied??
1. Very satisfied

2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

54. From the time you had the appliance(s) picked up, about how many weeks did it take to receive your rebate?**]**
1. Record # of weeks_____
98. Don't know
99. Refused

[DISPLAY Q74 IF Q73 = NUMBER OF WEEKS]

55. How satisfied were you with how long it took to receive the rebate? Would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

56. How satisfied were you with the scheduling of the pick-up of your old appliance(s)?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

57. How satisfied were you with the actual pick up of your old [refrigerator, freezer]?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

[DISPLAY Q77 IF Q75 = 4 OR 5, OR Q76 = 4 OR 5]

58. Why were you dissatisfied?

1. Record Verbatim_____
98. Don't know
99. Refused

59. In the course of participating in **I&M's** program, how often did you contact **I&M** or program staff with questions?
1. Never
2. Once
3. 2 or 3 times
4. 4 times or more
98. Don't know
99. Refused

[DISPLAY Q79 IF Q78 = 2 OR 3 OR 4]

60. How did you contact them? **[CHECK ALL THAT APPLY]**
1. Phone
2. Email or fax
3. Letter
4. In person
98. Don't know
99. Refused

[DISPLAY Q80 IF Q78 = 2 OR 3 OR 4]

61. And how satisfied were you with your communications with **I&M** and program staff? Would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

[DISPLAY Q81 IF Q80 = 4 OR 5]

62. Why were you dissatisfied?
1. Record Verbatim_____
98. Don't know
99. Refused

63. Have you noticed any savings on your electric bill since removing your old appliance(s)?
1. Yes
2. No
3. Not sure

98. Don't know
99. Refused

[DISPLAY Q83 IF Q82 = 1]

64. How satisfied are you with any savings you noticed on your electric bill since removing your old appliance(s)? Would you say you were: Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied??

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

98. Don't know
99. Refused

65. If you were rating your overall satisfaction with the **I&M** Appliance Recycling program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

98. Don't know
99. Refused

66. Why do you give it that rating?

1. Record Verbatim_____

98. Don't know
99. Refused

67. Do you have any suggestions to improve **I&M's** Appliance Recycling program?

1. Yes, Record Verbatim_____
2. No

98. Don't know
99. Refused

CROSS-PROGRAM AWARENESS SECTION

68. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs you have heard of and which you have participated in:

	Have heard of			Have applied for or received		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.						
A program that offers discounts on light bulbs purchased at participating retailers.						
A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that discounts your electric bill for using your air conditioner less during peak demand periods						

[DISPLAY Q94 IF ANY IN Q93, "HAVE HEARD OF"=1]

69. Which sources did you learn about the programs from? [Check all that apply.]

1. Newspaper/magazine/print media
2. Bill insert
3. Message printed on your bill
4. Friend or Relative (word-of-mouth)
5. TV ad
6. I&M Representative
7. I&M Brochure
8. Retailer/store
9. Community event
10. Social Networking site such as Facebook or Twitter
11. I&M Program Website
12. Other [Specify]_____.

98. Don't know
99. Refused

70. Have you visited I&M's Electric Ideas website (electricideas.com) that provides information on ways that I&M can help you save energy?
1. Yes
2. No
98. Don't know
99. Refused

71. Why did you visit the Electric Ideas website?
1. To learn about I&M programs to help me save energy
2. To enroll in an I&M energy efficiency program
3. To get tips on how I can save energy
4. General curiosity
5. Other
98. Don't know
99. Refused

DEMOGRAPHICS SECTION

"Now I have just a few final questions about your home and energy use."

72. When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]
1. Verbatim____
2. Before 1970's
3. 1970's
4. 1980's
5. 1990-1994
6. 1995-1999
7. 2000-2005
8. 2006 or newer
98. Don't know [DON'T READ]
99. Refused

73. What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]
1. Verbatim____
2. Less than 1,000
3. 1,001-1,500
4. 1,501-2,000
5. 2,001-2,500

6. Greater than 2,500
98. Don't know [DON'T READ]
99. Refused

74. How many bedrooms are there in your home?
1. Quantity:____
98. Don't know [DON'T READ]
99. Refused

75. What type of heating system do you have in your home?
1. Natural gas heating
2. Electric heating
3. Combination of types (Specify):_____
4. Other (Specify): _____
98. Don't know [DON'T READ]

76. What type of water heater do you have in your home?
1. Natural gas water heater
2. Electric water heater
3. Other (Specify): _____
98. Don't know [DON'T READ]

77. How many bathrooms are there in your home?
1. Quantity:____
98. Don't know [DON'T READ]
99. Refused

78. How many showers are there in your home?
1. Quantity:____
98. Don't know [DON'T READ]
99. Refused

79. Including yourself, how many people currently live in your home year-round?
1. Quantity:____
98. Don't know [DON'T READ]
99. Refused

80. I'm going to read off a list of income ranges, please indicate which range your total household income falls. Is the total annual income of your household:
1. Less than $25,000
2. $25,000 - $35,000
3. $36,000 - $50,000
4. $51,000 – $75,000
5. $76,000 - $100,000
6. Greater than $100,000
98. Don't know [DON'T READ]
99. Refused

81. What's the highest level of education you've completed? [DON'T READ]

1. Did not graduate high school
2. High school graduate
3. Associates degree, vocational/technical school, or some college
4. Four-year college degree
5. Graduate or professional degree

98. Don't know
99. Refused

82. Do you have any other comments that you would like to relay to I&M about energy efficiency in residences or about this or other programs?
[VERBATIM] _____
_____
_____

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at mailto:imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix B: Home Energy Reporting Program Participant Survey Instrument

Indiana Michigan Power

Home Energy Reporting Program 2015

Participant Questionnaire

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power about the Home Energy Reporting program. Are you the person who is most familiar with the home energy reports that you are receiving as part of this program?

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about your household's participation in this program?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate I&M's Home Energy Reporting program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. May I ask you a few questions?*
[IF NO: THANK RESPONDENT AND TERMINATE INTERVIEW]

1. Program records indicate that you are a part of the Indiana Michigan Power Home Energy Reports program and as a result you are receiving reports in the mail and/or electronically that summarize your energy usage at home and provide recommended actions that can be taken to save you energy. Do you recall receiving these home energy reports during 2015?
    a. Yes
    b. No [THANK RESPONDENT AND TERMINATE INTERVIEW]
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q2 IF EMAIL_RECIPIENT = "YES"]

2. Some customers have received home energy reports electronically in addition to receiving paper reports. Program records show that these electronic reports have been sent to you. Do you recall receiving electronic home energy reports in your email?
    a. Yes
    b. No
    98. Don't know

99. Prefer not to answer

[DISPLAY Q3 IF Q2 = 1]

3. What is your preferred method of receiving home energy reports?
    a. I prefer to receive the reports electronically through email
    b. I prefer to have the reports physically mailed to me
    c. I do not have a preference
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q4 IF Q2 = 1]

4. Which of the two formats, electronic vs. hardcopy, has been more useful to you in terms of providing information about your energy use?
    a. Electronic reports
    b. Hardcopy reports
    c. Both have been equally useful
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q5 IF Q2 = 1]

5. Which of the two formats, electronic vs. hardcopy, has been more useful to you in terms of providing information about energy saving actions you can take in your home?
    a. Electronic reports
    b. Hardcopy reports
    c. Both have been equally useful
    98. Don't know
    99. Prefer not to answer

6. The reports include recommendations on how to save energy within your home. Have you implemented any of these recommendations?
    a. Yes
    b. No
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q7 IF Q6 = 1]

7. What have you implemented? [DO NOT READ. SELECT ALL THAT APPLY]
    a. Cleaning or replacing furnace filters
    b. Using LED light bulbs
    c. Replacing incandescent light bulbs with CFLs
    d. Adjusting water heater temperature
    e. Adding water heater pipe wrap or water heater jackets
    f. Adding door sweeps, window sealing, or other building envelope items
    g. Turning off lights when not in use
    h. Unplugging appliances when not in use
    i. Reducing air conditioner usage

j. Reducing heating system usage
k. Washing clothes with cold water
l. Purchasing energy efficient appliances
m. Other (please specify): _____
98. Don't know
99. Prefer not to answer

8. How useful have the reports been for helping you understand what you could to do to reduce your household's energy consumption?
   a. Very Useful
   b. Somewhat Useful
   c. Slightly Useful
   d. Not Useful
   98. Don't know
   99. Prefer not to answer

[DISPLAY Q9 IF Q8 = 4]

9. Why was this information not useful? [RECORD VERBATIM RESPONSE]

ONLINE PORTAL AND CHALLENGE EMAILS

10. The program also has an online portal that you can access that shows more detailed information about your home's electricity usage. Have you logged into this online portal?
    a. Yes
    b. No
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q11 IF Q10 = 2]

11. Why haven't you logged into the online portal?
    a. Was not aware of the portal
    b. Not interested in saving energy right now
    c. Did not know how to access the portal
    d. Did not know how to use the portal
    e. Did not think the portal would provide useful information
    f. Did not have the time to use the portal
    g. Other [RECORD VERBATIM]
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q12 IF Q10 = 1]

12. On a scale of 1 to 5, where 1 represents "Completely Disagree" and 5 represents "Completely Agree", please rate your agreement or disagreement with the following statements:

a. The communication informing me about the online portal was easy to understand
b. The set up process for the online portal was easy
c. The website was visually appealing
d. The website was easy to navigate
e. The information was easy to understand
f. The information helped me reduce my household's energy use

13. Have you received Energy Challenge Emails from I&M, containing energy saving challenges that you can implement in your home?
    a. Yes
    b. No
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q14 IF Q13 = 1]

14. What do you do with the Challenge Emails?
    a. I read them but have never taken the challenge
    b. I read them and have taken at least one challenge
    c. I read them and have taken all challenges
    d. I do not read them
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q15 IF Q13 = 1]

15. On a scale of 1 to 5, where 1 represents "Very dissatisfied" and 5 represents "Very satisfied", how satisfied are you with the Challenge Emails?
    1. Very dissatisfied
    2. Dissatisfied
    3. Neutral
    4. Satisfied
    5. Very satisfied

[DISPLAY Q16 IF Q15 = 1 OR 2]

16. Why are you dissatisfied with the Energy Challenge Emails?

CROSS-PROGRAM AWARENESS

The following questions relate to additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment.

17. Have you heard of any other rebates, incentives, or energy efficiency services offered by I&M?
    1. Yes
    2. No
    3. Don't know

18. Please tell me which of the following programs you have heard of and which you have received or applied for:

	Have heard of			Have applied for or received		
Incentive Type	Yes	No	DK	Yes	No	DK
A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.						
A program that offers discounts on light bulbs purchased at participating retailers.						
A program that offers weatherization improvements for your home such as air sealing and adding insulation.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that discounts your electric bill for using your air conditioner less during peak demand periods						

[DISPLAY Q19 IF ANY IN Q0, "HAVE HEARD OF"= 1]

19. Did you learn about the programs through the home energy report?
    1. Yes
    2. No
    98. Don't know
    99. Prefer not to answer

[DISPLAY Q20 IF ANY IN Q0, "HAVE HEARD OF"= 1]

20. Which of these other sources, if any, did you learn about the programs from? [Check all that apply.]
    1. Newspaper/magazine/print media
    2. Bill insert

3. Message printed on your bill
4. Friend or Relative (word-of-mouth)
5. TV ad
6. I&M Representative
7. I&M Brochure
8. Retailer/store
9. Community event
10. Social Networking site such as Facebook or Twitter
11. I&M Program Website
12. Other [Specify]_____.

98. Don't know

99. Prefer not to answer

21. On a scale of 1 to 5, where "5"; is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following?

Element of program Experience	***Very Satisfied***	***Somewhat Satisfied***	***Neutral***	***Somewhat Dissatisfied***	***Very Dissatisfied***	***Don't Know***
Any savings on your monthly utility bill since receiving the reports	5	4	3	2	1	98
Information provided through the reports	5	4	3	2	1	98
Frequency of receiving the reports	5	4	3	2	1	98
Overall program experience	5	4	3	2	1	98

[DISPLAY Q22 IF ANY ROW IN Q21 = 1 OR 2]

22. *(If any item in Q21 rated 2 or 1)* Why were you dissatisfied?

_____

_____

_____

HOME CHARACTERISTICS

Finally, the following questions relate to your home's characteristics.

23. How many bedrooms are there in your home?
    1. Quantity:____[RECORD QUANTITY]
    98. Don't know [DON'T READ]
    99. Prefer not to answer

24. Do you have electric or gas water heating in your home?
    a. Gas
    b. Electric

c. Other
98. Don't know
99. Prefer not to answer

25. How many bathrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Prefer not to answer

26. How many showers are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Prefer not to answer

27. Including yourself, how many people currently live in your home year-round?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Prefer not to answer

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix C: Online Energy Check-Up Program Participant Survey Instrument

Indiana Michigan Power

Online Energy Checkup Program 2015

Verification and Net-to-Gross Survey Questionnaire

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. May I please speak with [CONTACT NAME]:_____)?

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power about the Online Energy Checkup program that your household participated in this year. Are you the person who is most familiar with your household's participation in this program?

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about your household's participation in this program?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate I&M's Online Energy Checkup program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 10 minutes. May I ask you a few questions?*

1. Our records indicate that you participated in I&M's Online Energy Checkup program by completing an on-line energy Checkup and receiving a kit in the mail with low-cost energy efficient items for installation in your home. Is that correct?
    1. Yes
    2. No *[THANK RESPONDENT AND TERMINATE INTERVIEW]*
    3. Don't know *("Is there someone in the household who may be familiar?")*

[DISPLAY Q2 IF Q1 = 1]

2. The energy efficiency kit sent to you contained several items for you to use in your home. I'd like to ask about the items that you received. *(For each of the items listed below, ask how many they used, how many of those original items are still in use, and how many of those original items they have replaced on their own.)*

Measure Type (Number available in Online Energy Checkup kit)	*Quantity Used from Online Energy Checkup Kit*	*Quantity Still in Use from Online Energy Checkup Kit*	*Additional Quantity Purchased and Installed Since Receiving Online Energy Checkup Kit*
1-13w CFL			
2-18w CFL			
1-23w CFL			
1-9w LED			
2 LED night lights (.5w) [GAS ONLY]			
2 energy efficient shower heads [ELECTRIC ONLY]			
2 bathroom aerators [ELECTRIC ONLY]			
1 kitchen aerator [ELECTRIC ONLY]			
1 digital thermometer			

[DISPLAY Q3 IF ANY ROW IN Q2, "QUANTITY USED FROM ONLINE ENERGY CHECKUP KIT" = 0]

3. Why did you choose not to use the remaining items? (Didn't have time, didn't like a specific item, etc.): [RECORD VERBATIM RESPONSE]

   _____
   _____
   _____

4. In addition to the items you received, did the Online Energy Checkup program provide you with recommendations for energy savings in your home?
   1. Yes
   2. No
   98. Don't know
   99. Refused

[DISPLAY Q5 IF Q4 = 1]

5. Now I would like to ask you about the recommendations you received from the Online Energy Checkup. For each of the following energy efficiency improvements, can you tell me if it was recommended and if you implemented the recommendation?

	Was recommended			Implemented recommendation		
Recommendation Type	Yes	No	DK	Yes	No	DK

Modifying thermostat or heater settings						
Weatherizing your home such as air sealing						
Replacing refrigerators or freezers with more efficient models						
Replacing lighting in your home with more energy efficient lights						
Modifying water heater temperature						
Replacing your water heater with a more efficient water heater						
Window replacement						
Other						

6. Before completing the Online Checkup, how would you rate your familiarity with ways to save energy in your home?
    1. Very familiar
    2. Somewhat familiar
    3. A little familiar
    4. Not at all familiar
    98. Don’t know
    99. Refused

7. As a result of completing the Online Checkup, how would you now rate your familiarity with ways to save energy in your home?
    1. Very familiar
    2. Somewhat familiar
    3. A little familiar
    4. Not at all familiar
    98. Don’t know
    99. Refused

8. How useful did you find the recommendations that were provided by the online energy Checkup?
    1. Very useful
    2. Somewhat useful
    3. Only slightly useful
    4. Not at all useful
    98. Don’t know
    99. Refused

[DISPLAY Q9 IF Q8 = 3 OR 4]

9. What would have made these recommendations more useful to you?
_____
_____
_____

10. Before you heard of the program, did you have specific plans to purchase these kit items that were sent to you as part of the program?
    1. Yes
    2. No

[DISPLAY Q11 IF Q10 = 1]

11. What items did you have planned? [RECORD VERBATIM RESPONSE]

[DISPLAY Q12 IF Q10 = 1]

12. During which of the following time periods did you learn of the Online Energy Check Up program?
    1. After deciding to replace items in my home with these same energy efficient items but before I had purchased these items on my own
    2. After I had purchased these same energy efficient items on my own but before I had installed them
    3. After I had already replaced some of the items in my home with these energy efficient items
    4. Some other time (please describe): _____
    98. Don't know
    99. Refused

13. How did you first learn about I&M's Online Energy Checkup program? [DO NOT READ, PROMPT IF NECESSARY.
    1. Newspaper/magazine/print media
    2. Bill insert
    3. Message printed on your bill
    4. I&M Website (www.electricideas.com)
    5. Friend or Relative (word-of-mouth)
    6. TV ad
    7. I&M Representative
    8. I&M Brochure
    9. Retailer/store
    10. Community event
    11. Social Networking site such as Facebook or Twitter
    12. Other **[Specify]**_____.
    98. Don't know
    99. Refused

14. Did you hear about the program from any other sources? If so, which sources? [DO NOT READ, CHECK ALL THAT APPLY]

1. Did not hear about the program from any other sources
2. Newspaper/magazine/print media
3. Bill insert
4. Message printed on your bill
5. I&M Website
6. Friend or Relative (word-of-mouth)
7. TV ad
8. I&M Representative
9. I&M Brochure
10. Retailer/store
11. Community event
12. Social Networking site such as Facebook or Twitter
13. Other [Specify]_____.

98. Don't know

99. Refused

15. Why did you choose to participate in this program?
    1. To learn about ways to save money on energy bill(s)
    2. Environmental reasons
    3. The items were provided free of charge
    4. Other (please specify): _____

16. Thinking about your reasons for completing the online audit, please tell me if the following considerations were very important, somewhat important, slightly important, or not at all important to your decision to participate. [RANDOMIZE ORDER OF ITEMS]

	Very important	Slightly important	Slightly important	Not at all important	Don't know
I wanted to receive the items that were provided in the kit					
I wanted to learn how to save energy by completing the online audit					

17. How likely is it that you would have purchased all the items in the kit IF YOU HAD NOT participated in the I&M sponsored Online Energy Check Up program?
    1. Definitely would have purchased all the items in the kit on my own
    2. Probably would have purchased all the items in the kit on my own
    3. Probably would not have purchased the items in the kit on my own
    4. Definitely would not have purchased all the items in the kit on my own

18. Would you have been financially able to purchase the items in the energy efficiency kit without the Online Energy Check Up kit from Indiana Michigan Power?
    1. Yes
    2. No
    98. Don't know
    99. Refused

19. Did you install any of the items from the energy efficiency kit earlier than you otherwise would have because they were provided at no cost to you through the program?
    1. Yes
    2. No, program did not affect timing of installation

[DISPLAY Q20 IF Q19 = 1]

20. When would you otherwise have purchased and installed the items?
    1. Less than 6 months later
    2. 6-12 months later
    3. 1-2 years later
    4. 3-5 years later
    5. More than 5 years later
    98. Don't know
    99. Refused

21. Before you participated in I&M's Online Energy Checkup program, had you purchased and used any energy efficient items in your home?
    1. a. Yes (Please explain): _____
    2. b. No

[DISPLAY Q22 IF Q21 = 1]

22. Did you apply for and/or receive a financial incentive for those items?
    1. Yes
    2. No
    98. Don't know

[DISPLAY Q23 IF Q22 = 2]

23. Why didn't you apply for or receive a financial incentive for those items?
    1. Didn't know about financial incentives
    2. Didn't know whether the items qualified for financial incentives
    3. Financial incentive was insufficient
    4. No financial incentive was offered
    5. Other (please specify): _____

AUDIT TOOL EXPERIENCE

24. How many times have you logged on to the audit tool? Would you say…
    1. Just the one time
    2. Two to three times
    3. Three to five times
    4. More than five times
    98. Don't know

25. Overall, how easy or difficult was it to navigate the Online Checkup audit website? Would you say…
    1. Very easy
    2. Somewhat easy
    3. Neither easy nor difficult
    4. Somewhat difficult
    5. Very difficult
    98. Don't know

[DISPLAY Q26 IF Q25 = 4 OR 5]

26. Why was it difficult to navigate the Online Checkup Audit website? [RECORD VERBATIM]

27. Was it easy or difficult to provide the information about your home characteristics and the type of equipment in it while completing the online audit? Would you say…
    1. Very easy
    2. Somewhat easy
    3. Neither easy nor difficult
    4. Somewhat difficult
    5. Very difficult
    98. Don't know

[DISPLAY Q28 IF Q27 = 4 OR 5]

28. What information was difficult to provide? [RECORD VERBATIM]

SPILLOVER SECTION

29. Because of your experience with the Online Energy Checkup Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial incentive or rebate?
    1. Yes, have already bought non-incentivized energy efficient items because of my experience with the program
    2. Yes, likely to buy energy efficient items because of my experience with the program
    3. No

4. Don't know

[DISPLAY Q30 IF Q29 =1]

30. For each of the following items please tell me if you purchased on your own and how many you purchased. If you have purchased something that is not included in the table, please describe the additional items in as much detail as you can. *(In the following table, please indicate the quantity of each item type purchased, or specify another item type and quantity)*

Measure Type	***Quantity Purchased***
CFLs	
LED bulbs	
Water Heater Pipe Insulation	
Water Heater Jacket/Blanket/Insulation	
Energy Efficient Bathroom Aerators	
Energy Efficient Kitchen Aerator	
Energy Efficient Showerhead	
LED Nightlights	
Digital Thermometer	
Other:	

[DISPLAY Q31 IF Q29 =1]

31. What primarily motivated you to purchase these energy efficient items?
    1. The energy savings I would achieve
    2. Guidance from the Online Energy Checkup Program
    3. The quality of the energy efficient item(s)
    4. The fact that the item(s) were on sale
    5. Other (please explain): _____
    6. Don't know

[DISPLAY Q32 IF Q29 =1]

32. Have you installed all of these items?
    1. Yes, have installed all of the items listed
    2. No, have only installed some of the items listed (please specify): _____
    3. No, have not installed any of the items listed
    4. Don't know

[DISPLAY Q33 IF Q32 = 1 OR 2]

33. In what month and year did you install these items?

_____

_____

[DISPLAY Q34 IF Q32 = 1 OR 2]

34. How important was your experience with the Online Energy Checkup Program in your decision to purchase and install these additional items?
    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    5. Don't know

[DISPLAY Q35 IF Q32 = 1 OR 2]

35. How important was your past participation in any programs offered by I&M in your decision to purchase and install these additional items?
    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    5. Don't know

CROSS-PROGRAM AWARENESS

36. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs have you have heard of and which you have received or applied for:

	Have heard of			Have applied for or received		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.						
A program that offers discounts on light bulbs purchased at participating retailers.						
A program that offers rebates for making weatherization improvements to your home						

such as air sealing and adding insulation.						
A program that provides a rebate for recycling your old refrigerator or freezer						
A program that discounts your electric bill for using your air conditioner less during peak demand periods						

[DISPLAY Q37 IF ANY ROW IN Q36, "HAVE HEARD OF" = 1]

37. Did you learn about the programs through the Online Energy Checkup audit that you completed?
    6. Yes
    7. No
    98. Don't know
    99. Refused

[DISPLAY Q38 IF ANY ROW IN Q36, "HAVE HEARD OF" = 1]

38. Which of these other sources, if any, did you learn about the programs from? [Check all that apply.]
    1. Newspaper/magazine/print media
    2. Bill insert
    3. Message printed on your bill
    4. Friend or Relative (word-of-mouth)
    5. TV ad
    6. I&M Representative
    7. I&M Brochure
    8. Retailer/store
    9. Community event
    10. Social Networking site such as Facebook or Twitter
    11. I&M Program Website
    12. Other [Specify]_____.
    98. Don't know
    99. Refused

39. Have you visited I&M's Electric Ideas website (electricideas.com) that provides information on ways that I&M can help you save energy?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q40 IF Q39 = 1]

40. Why did you visit the Electric Ideas website?
    1. To learn about I&M programs to help me save energy

2. To enroll in an I&M energy efficiency program
3. To get tips on how I can save energy
4. General curiosity
5. Other
98. Don't know
99. Refused

41. On a scale of 1 to 5, where "5"; is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following?

Element of program Experience	***Very Satisfied***	***Somewhat Satisfied***	***Neutral***	***Somewhat Dissatisfied***	***Very Dissatisfied***	***Don't Know***
Performance of the energy efficient items and improvements used	5	4	3	2	1	DK
Savings on your monthly bill	5	4	3	2	1	DK
The effort required for completing the online energy Checkup	5	4	3	2	1	DK
Contents of the Online Energy Checkup kit	5	4	3	2	1	DK
Recommendations provided in in the Online Energy Checkup	*5*	*4*	*3*	*2*	*1*	*DK*
Overall program experience	5	4	3	2	1	DK

[DISPLAY Q42 IF ANY ROW IN Q41 = 1OR 2]

42. (If any item in Q18 rated 2 or 1) Why were you dissatisfied with [Program Element]?

DEMOGRAPHICS

"Now I have just a few final questions about your home and energy use."

43. When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Before 1970's
    3. 1970's
    4. 1980's
    5. 1990-1994
    6. 1995-1999
    7. 2000-2005

8. 2006 or newer
98. Don't know [DON'T READ]
99. Refused

44. What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Less than 1,000
    3. 1,001-1,500
    4. 1,501-2,000
    5. 2,001-2,500
    6. Greater than 2,500
    98. Don't know [DON'T READ]
    99. Refused

45. How many bedrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

46. What type of heating system do you have in your home?
    1. Natural gas heating
    2. Electric heating
    3. Combination of types (Specify):_____
    4. Other (Specify): _____
    98. Don't know [DON'T READ]

47. What type of water heater do you have in your home?
    1. Natural gas water heater
    2. Electric water heater
    3. Other (Specify): _____
    98. Don't know [DON'T READ]

48. How many bathrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

49. How many showers are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

50. Including yourself, how many people currently live in your home year-round?
    1. Quantity:____
    98. Don't know [DON'T READ]

99. Refused

51. Do you have any other comments that you would like to relay to I&M about energy efficiency in residences or about this or other programs?
_____
_____
_____

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at mailto:imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix D: Peak Reduction Program Participant Survey Instrument

Indiana Michigan Power

2015 Residential Peak Reduction Program

Participant Telephone Survey

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power about the Peak Reduction program, which your household participated in during this past summer. Are you the person who is most familiar with your household's participation in this program?

(IF CONFUSED OR UNCERTAIN) *The Peak Reduction Program reduces home energy use by adjusting your air conditioner during critical energy demand periods. Does this sound familiar?*

(IF CONTINUED UNCERTAINTY OR NOT RIGHT PERSON) *May I please speak to the person who would know the most about your household's participation in this program?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate Indiana Michigan Power Company's (I&M's) Residential Peak Reduction program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 5 minutes. May I ask you a few questions?*

1. Our records indicate that you enrolled in I&M's Residential Peak Reduction program and had a cycling switch installed on your air conditioner in order to reduce energy usage during critical periods. Is this correct?
    1. Yes
    2. No *[THANK RESPONDENT AND TERMINATE INTERVIEW]*
    3. Don't know *("Is there someone in the household who may be familiar?")*

[DISPLAY Q2 IF Q1 = 1]

2. How did you first learn about **I&M**'s Residential Peak Reduction Program? **[**DO NOT READ, PROMPT IF NECESSARY]**.**
    1. Newspaper/magazine/print media

2. Bill insert
3. Message printed on your bill
4. I&M Website (www.electricideas.com)
5. Friend or Relative (word-of-mouth)
6. TV ad
7. I&M Representative
8. I&M Brochure
9. Retailer/store
10. Community event
11. Social Networking site such as Facebook or Twitter
12. Other **[Specify]**_____.

98. Don't know

99. Refused

3. Did you hear about the program from any other sources? If so, which sources? [DO NOT READ, CHECK ALL THAT APPLY]
    1. Did not hear about the program from any other sources
    2. Newspaper/magazine/print media
    3. Bill insert
    4. Message printed on your bill
    5. I&M Website (www.electricideas.com)
    6. Friend or Relative (word-of-mouth)
    7. TV ad
    8. I&M Representative
    9. I&M Brochure
    10. Retailer/store
    11. Community event
    12. Social Networking site such as Facebook or Twitter
    13. Other [Specify]_____.

    98. Don't know

    99. Refused

4. How would you prefer to get information from I&M about programs like this in the future?
    1. Utility direct mailing such as a letter or postcard
    2. Telephone call from I&M
    3. Program website
    4. Email from I&M
    5. Bill inserts
    6. Other

5. Why did you choose to participate in this program? (select all that apply)
    1. The opportunity to participate in an energy savings program
    2. Program was recommended to me by I&M
    3. Receiving monthly bill credit
    4. Not home when AC is cycled

5. Other (please specify)

6. Of all the things that interested you about the program, what was the most important reason for your decision to participate in the program?
   1. The opportunity to participate in an energy savings program
   2. Program was recommended to me by I&M
   3. Receiving monthly bill credit
   4. Not home when AC is cycled
   5. other (please specify)

7. Before your decision to participate in the Peak Demand Program, did you have any concerns about participating in it?
   1. Yes
   2. No
   3. Don't Know

[DISPLAY Q8 IF Q7 = 1]

8. What concerns did you have?
   1. Concerned about being uncomfortable during energy reduction events
   2. Concerned about the load control device damaging my air conditioning unit
   3. Concerned about the utility having the ability to control or shut off my AC
   4. Other (Please specify)

9. Which of the following statements best describes the way you used your central air conditioner last summer?
   1. Not used at all (Do not read)
   2. Turned on only a few days or nights when really needed
   3. Turned on quite a bit
   4. Turned on just about all summer

10. I have some questions regarding the contractor who visited your home to install the switch. On a scale of 1 to 5, where "5"; is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following?

Element of program Experience	*Very Satisfied*	*Somewhat Satisfied*	*Neutral*	*Somewhat Dissatisfied*	*Very Dissatisfied*	*Don't Know*
Professionalism of the contractor who installed the cycling switch	5	4	3	2	1	DK
How quickly the contractor installed the cycling switch.	5	4	3	2	1	DK
Quality of work conducted by the contractor	5	4	3	2	1	DK

[DISPLAY Q11 IF ANY ROW IN Q10 = 2 OR 1]

11. Why were you dissatisfied with [Program Element]?

    _____
    _____
    _____

12. Were you at home during any of the energy reduction events that reduced the cooling from your air conditioner?
    1. Yes
    2. No

[DISPLAY Q13 IF Q12 = 1]

13. How many events were you at home for? _____

[DISPLAY Q14 IF Q12 = 1]

14. How could you tell that an energy reduction event was occurring?
    1. The house was warmer than usual
    2. I didn't hear the air conditioner run as often
    3. I looked at the thermostat and saw that the temperature had increased
    4. I&M notified me of the specific event in advance
    5. Other (Please specify)

[DISPLAY Q15 IF Q14 = 3]

15. On average how many degrees did the temperature increase inside the home?
    1. 1 to 3 degrees
    2. 3 to 6 degrees
    3. 6 to 10 degrees
    4. 10 and above degrees
    98. Don't know
    99. Refused

[DISPLAY Q16 IF Q12 = 1]

16. Thinking about the events that occurred when you were home, how uncomfortable or comfortable were you with the temperature of your home during the energy reduction events?
    1. Very uncomfortable
    2. Somewhat uncomfortable
    3. Neutral
    4. Somewhat comfortable
    5. Very comfortable
    98. Don't know
    99. Refused

17. Did any events occur when you were not at home?

1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY Q18 IF Q17 = 1]

18. About how many events occurred when you were not at home?

[DISPLAY Q19 IF Q17 = 1]

19. How did you know that energy reduction events had taken place when you were not home during the event?
    1. The house was warmer than usual when I came home
    2. The air conditioner was not running when I returned home
    3. Someone else informed me that an event had occurred
    4. I&M notified me of the specific event in advance
    5. Other (Please specify)

[DISPLAY Q20 IF Q17 = 1]

20. Did any events occur when no one was in your home?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q21 IF Q20 = 1]

21. How many events occurred when no one was home?

22. When you signed up for the program, did you have an expectation for how many events would occur during the summer?
    1. Yes
    2. No
    3. Don't know

[DISPLAY Q23 IF Q22 = 1]

23. Was the number of events that occurred this summer about what you were expecting when you signed up for the program, more than you were expecting, or fewer than you were expecting?
    1. More than expected
    2. About what was expected
    3. Fewer than expected
    4. Don't know

[DISPLAY Q24 IF Q23 = 1]

24. Do you think that the number of events that occurred this year was acceptable or that too many events occurred?
    1. The number of events was acceptable
    2. Too many events occurred
    3. Don't know

[DISPLAY Q25 IF Q24 = 2]

25. What would be the greatest number of events that you would say is acceptable?

26. The program allows you to call a telephone number to opt out of up to two non-emergency events. Did you opt out of any non-emergency events this year?
    1. Yes
    2. No

[DISPLAY Q27 IF Q26 = 1]

27. How many events did you opt out of this summer?
    1. One
    2. Two
    3. Don't know

[DISPLAY Q28 IF Q26 = 1]

28. Why did you choose to opt out of the event(s)?
    1. The temperature increase was/would be uncomfortable
    2. Didn't want I&M to control my energy use
    3. Afraid it might damage my central air conditioner
    4. Didn't like the time period when the energy reduction events would happen
    5. Health reasons
    6. Problems with the Peak Reduction program device installation
    7. Other

29. Have you spoken with staff at the call center for any purpose related to your participation in the program?
    1. Yes
    2. No
    3. Don't know

[DISPLAY Q30 IF Q29 = 1]

30. How satisfied are you with how your call was handled by the call center staff? Would you say…
    1. Very satisfied
    2. Satisfied
    3. Neither satisfied nor dissatisfied
    4. Dissatisfied

5. Very dissatisfied
6. Don't know

[DISPLAY Q31 IF RESPONDENT = "DROP_OUT"]

31. I understand that your household decided not to participate and dropped out of the program. Can you please tell why that is? (select all that apply)
    1. The temperature increase was/would be uncomfortable
    2. Didn't want I&M to control my energy use
    3. Didn't understand how the program worked
    4. Didn't understand the energy reduction events
    5. Didn't understand what the program was trying to accomplish
    6. Afraid it might damage my central air conditioner
    7. Didn't like the time period when the energy reduction events would happen
    8. Health reasons
    9. Problems with the Peak Reduction program device installation
    10. Didn't like the number of days a year when energy reduction events would occur
    11. Other (Please Specify)

[DISPLAY Q32 IF RESPONDENT = "DROP_OUT"]

32. Which, if any, of the following would have encouraged you to remain in the program?
    1. Nothing would have encouraged me to remain in the program
    2. A better explanation of the program
    3. An increased incentive amount
    4. Shorter event lengths
    5. Fewer event days
    6. Other (Please specify)

[DISPLAY Q33 IF RESPONDENT = "DROP_OUT"]

33. Of all the reasons for your decision to stop participating in the program, which reason is the most important?
    1. The temperature increase was/would be uncomfortable
    2. Didn't want I&M to control my energy use
    3. Didn't understand how the program worked
    4. Didn't understand the energy reduction events
    5. Didn't understand what the program was trying to accomplish
    6. Afraid it might damage my central air conditioner
    7. Didn't like the time period when the energy reduction events would happen
    8. Health reasons
    9. Problems with the Peak Reduction program device installation
    10. Didn't like the number of days a year when energy reduction events would occur
    11. Other (Please Specify)

34. Do you plan to participate in the program next year?
    1. Yes
    2. No
    3. Don't know
    4. Refused

[DISPLAY Q35 IF Q34 = 2]

35. Are there any specific changes that could be made to the program that would motivate you to participate next year?

36. On a scale of 1 to 5, where "5"; is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following?

Element of program Experience	*Very Satisfied*	*Somewhat Satisfied*	*Neutral*	*Somewhat Dissatisfied*	*Very Dissatisfied*	*Don't Know*
The information provided that explained the program requirements	5	4	3	2	1	DK
The initial enrollment process for the program	5	4	3	2	1	DK
The scheduling process for equipment installation	5	4	3	2	1	DK
The monthly bill credit	5	4	3	2	1	DK

[DISPLAY Q37 IF ANY ROW IN Q36 = 2 OR 1]

37. Why were you dissatisfied with [Program Element]?

    _____
    _____
    _____

38. Now I would like to understand how your experience with the Peak Reduction program has affected your satisfaction with I&M as your utility. Did it……?
    1. Greatly improve your satisfaction
    2. Somewhat improve your satisfaction
    3. Make no difference in your satisfaction
    4. Somewhat decrease your satisfaction
    5. Greatly decrease your satisfaction

[DISPLAY Q39 IF Q38 = 4 OR 5]

39. Will you please tell me why your satisfaction with I&M has decreased?

    _____
    _____

40. Has the program increased your familiarity with ways to save energy in your home?
    1. Yes
    2. No

3. Don't know
4. Refused

41. Has the program caused you to change anything about your energy usage behavior in your home?
    1. Yes
    2. No
    3. Don't know
    4. Refused

[DISPLAY Q42 IF Q41 = 1]

42. What has the program caused you to change?

_____

_____

43. Have you recommended the program to friends, family members, or colleagues?
    1. Yes
    2. No
    3. Don't know
    4. Refused

[DISPLAY Q44 IF Q43 = 2]

44. Based on your experience with the Peak Reduction Program, how likely are you to recommend it to your friends, family members, or colleagues?
    1. Very likely
    2. Somewhat likely
    3. Somewhat unlikely
    4. Very unlikely
    5. Don't know
    6. Refused

SPILLOVER SECTION

45. Because of your experience with the Peak Reduction Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial incentive or rebate?
    1. Yes, have already bought non-incentivized energy efficient items because of my experience with the program
    2. Yes, likely to buy energy efficient items because of my experience with the program
    3. No
    4. Don't know

[DISPLAY Q46 IF Q45 =2]

46. We'd like to call you in a few months for a very short follow-up about other energy efficiency purchases, if that would be alright. Please provide us with the best person to contact and their phone number:

_____
_____

[DISPLAY Q47 IF Q45 =1]

47. For each of the following items please tell me if you purchased on your own and how many you purchased. If you have purchased something that is not included in the table, please describe the additional items in as much detail as you can. *(In the following table, please indicate the quantity of each item type purchased, or specify another item type and quantity)*

Measure Type	*Quantity Purchased*
CFLs	
Water Heater Pipe Insulation	
Water Heater Jacket/Blanket/Insulation	
LED Light Bulbs	
Low Flow Bathroom Aerators	
Low Flow Kitchen Aerator	
Low Flow Showerhead	
LED Nightlights	
Other:	

[DISPLAY Q48 IF Q45 =1]

48. What primarily motivated you to purchase these energy efficient items?
    1. The energy savings I would achieve
    2. Guidance from the Peak Reduction Program
    3. The quality of the energy efficient item(s)
    4. The fact that the item(s) were on sale
    5. Other (please explain): _____
    6. Don't know

[DISPLAY Q4939 IF Q45 =1]

49. Have you installed all of these items?
    1. Yes, have installed all of the items listed
    2. No, have only installed some of the items listed (please specify):
       _____
    3. No, have not installed any of the items listed
    4. Don't know

[DISPLAY Q50 IF Q49 = 1 OR 2]

50. In what month and year did you install these items?

_____
_____

[DISPLAY Q51 IF Q49 = 1 OR 2]

51. How important was your experience with the Peak Reduction Program in your decision to purchase and install these additional items?
    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    5. Don't know

[DISPLAY Q52 IF Q49 = 1 OR 2]

52. How important was your past participation in any programs offered by I&M in your decision to purchase and install these additional items?
    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    5. Don't know

CROSS-PROGRAM AWARENESS

53. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs have you have heard of and which you have received or applied for:

	Have heard of			*Have applied for or received*		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.						
A program that offers discounts on light bulbs purchased at participating retailers.						
A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that discounts your electric bill for using your air						

conditioner less during peak demand periods						

[DISPLAY Q54 IF ANY ROW IN Q53, "HAVE HEARD OF" = 1]

54. Which sources did you learn about the programs from?
    1. Newspaper/magazine/print media
    2. Bill insert
    3. Message printed on your bill
    4. Friend or Relative (word-of-mouth)
    5. TV ad
    6. I&M Representative
    7. I&M Brochure
    8. Retailer/store
    9. Community event
    10. Social Networking site such as Facebook or Twitter
    11. I&M Program Website
    12. Other [Specify]_____.
    98. Don't know
    99. Refused

55. Have you visited I&M's Electric Ideas website (electricideas.com) that provides information on ways that I&M can help you save energy?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q56 IF Q55 = 1]

56. Why did you visit the Electric Ideas website?
    1. To learn about I&M programs to help me save energy
    2. To enroll in an I&M energy efficiency program
    3. To get tips on how I can save energy
    4. General curiosity
    5. Other
    98. Don't know
    99. Refused

DEMOGRAPHICS

"Now I have just a few final questions about your home and energy use."

57. When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Before 1970's

3. 1970's
4. 1980's
5. 1990-1994
6. 1995-1999
7. 2000-2005
8. 2006 or newer
98. Don't know [DON'T READ]
99. Refused

58. What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Less than 1,000
    3. 1,001-1,500
    4. 1,501-2,000
    5. 2,001-2,500
    6. Greater than 2,500
    98. Don't know [DON'T READ]
    99. Refused

59. How many bedrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

60. What type of heating system do you have in your home?
    1. Natural gas heating
    2. Electric heating
    3. Combination of types (Specify):_____
    4. Other (Specify): _____
    98. Don't know [DON'T READ]
    99. Refused

1. What type of water heater do you have in your home?
    1. Natural gas water heater
    2. Electric water heater
    3. Other (Specify): _____
    98. Don't know [DON'T READ]
    99. Refused

61. How many bathrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

62. How many showers are there in your home?

1. Quantity:____
98. Don't know [DON'T READ]
99. Refused

63. Including yourself, how many people currently live in your home year-round?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

64. Do you have any other comments that you would like to relay to I&M about energy efficiency in residences or about this or other programs?
    _____
    _____
    _____

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix E: School Energy Education Program Participant Survey Instruments

Indiana Michigan Power

School Energy Education Program 2015

Verification and Net-to-Gross Questionnaire (Parent-Guardian)

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello, may I please speak with [question("option value"), id="1410", option="18008"]?

My name is [Interviewer Name] and I'm calling on behalf of Indiana Michigan Power. Our records indicate that your child received an Energy Savings Kit through a program at their school earlier this year. Are you the person who would be most familiar with your household's receipt of the Energy Savings Kit?

1. (IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about the Energy Savings Kit sent to your home through your child's school?*
2. (IF RIGHT PERSON)*. We are speaking with households that received through their children's school an Energy Savings Kit from Indiana Michigan Power (I&M). We would appreciate it if you would take about 15 minutes to complete a survey about how the kit was used in your home. After you complete the survey we will send you a $10 gift card to thank you for your time. May I ask you some questions?**

3. According to our records, you received an Energy Savings Kit supplied by I&M that was requested through your child's school. Is that correct?*
( ) Yes [PROCEED WITH INTERVIEW]
( ) No [THANK AND TERMINATE]
( ) Refused [THANK AND TERMINATE]
READ: Your Energy Savings Kit should have included three 13-watt CFLs, two 23-watt CFLs, one LED night light, one 9-watt LED bulb, one kitchen aerator, one energy efficient showerhead, and one filter tone. In the next few questions I'll ask whether each of these was included in your kit.

4. Did you receive any 13 watt CFLs in your Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

5. Did you receive any 23 watt CFLs in your Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

6. Did you receive an LED Night Light in your Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

7. Did you receive a faucet aerator in your Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

8. Did you receive a 9-watt LED bulb in your Energy Savings kit?
( ) Yes
( ) No
( ) Don't know

9. Did you receive an energy efficient showerhead in your Energy Savings Kit?
( ) Yes
( ) No
( ) Don't know

10. Did you receive a filter tone in your Energy Savings Kit? (If necessary: "The filter tone is a device that is placed in your air conditioner or heating system and works as an alarm that lets you know when it is time to replace your filter.")
( ) Yes
( ) No
( ) Don't know

11. Were any of the kit items broken or not working when you received them?*
( ) Yes
( ) No
( ) Don't know

12. Which items were broken or not working when your received them?
_____
_____
_____

13. Did you contact anyone about the items that were broken or not working?*
( ) Yes
( ) No
( ) Don't know

14. Whom did you contact?*
_____
_____
_____

15. Was the item replaced?*
( ) Yes
( ) No

16. When you received the Energy Savings Kit containing CFL light bulbs and other energy efficient products, did you install any of these products?*
( ) Yes
( ) No
( ) Don't know

17. Why didn't you install any of the items in the Energy Savings Kit?*
( ) I didn't like any of the products
( ) I haven't had time yet
( ) I gave the entire kit to someone else
( ) Other reason (please specify):
_____*

18. Did you install any of the **CFL LIGHT BULBS** provided in the Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

19. Did you install all of the **CFL LIGHT BULBS** included in the Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

20. Why didn't you install any of the CFLs?*
( ) Waiting until currently installed light bulbs burn out
( ) Don't like the color of CFLs
( ) CFLs make a strange sound
( ) The CFLs don't fit in the fixtures where I would have installed them
( ) Other (Specify): _____

21. What did you do with the bulbs that you did not install in or around your home?
( ) I am storing them for future use
( ) I gave them away to friends and family
( ) I installed all of the CFL Bulbs…the other(s) were missing
( ) I installed all of the working CFL Bulbs…the other(s) were defective

( ) I disposed of them at a household hazardous waste collection site.
( ) Other (Specify): _____*

22. How many of the **13-watt Spiral CFL** bulbs did you install (up to a maximum of 3 bulbs)?*

---

23. For the **13-watt CFL** bulbs that you installed, where did you install these bulbs? (Leave blank if you do not know where the bulbs were installed)*
_____Living room
_____Bathroom
_____Kitchen
_____Outdoors
_____Family Room
_____Bedroom
_____Garage
_____Hallway
_____Office
_____Laundry Room
_____Dining Room
_____Other

In order to proceed, the sum of the bulbs in the above column must match the number of bulbs indicated in the previous question.

24. How many of the **23-watt Spiral CFL** bulbs did you install (up to a maximum of 2 bulbs)?*

---

25. For the **23-watt CFL** bulbs that you installed, where did you install these bulbs? (Leave blank if you do not know where the bulbs were installed)*
_____Living room
_____Bathroom
_____Kitchen
_____Outdoors
_____Family Room
_____Bedroom
_____Garage
_____Hallway
_____Office
_____Laundry Room
_____Dining Room
_____Other

26. Did you install the faucet aerator that was included in the Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

27. Where in the home was the **FAUCET AERATOR** installed?*

	Kitchen	Laundry Room	Bathroom	Garage	Other
Faucet Aerator	( )	( )	( )	( )	( )

28. Why didn't you install the Faucet Aerator? (Check all that apply)
[ ] Already have faucet aerator(s) installed
[ ] Did not understand how to install
[ ] Doesn't fit my faucet (my kit didn't include a gender adapter)
[ ] Doesn't fit my faucet (gender adapter did not fit my faucet)
[ ] My well water supply pressure is too low
[ ] My city water supply pressure is too low
[ ] I've tried them in the past and they clog up too quickly
[ ] Other (Specify): _____

29. Did you install the **NIGHT LIGHT** provided in the Energy Savings Kit?*
( ) Yes
( ) No
( ) Don't know

30. If you did not install the **NIGHT LIGHT**, what did you do with it?*
( ) Still in box
( ) Thrown away
( ) Given to someone else
( ) Other (please specify): _____

31. Please describe where the **Night Light** was installed.*
( ) Where there was no night light before (new night light)
( ) Where a standard night light was previously installed

32. What did you do with the **OLD** night light?*
( ) I threw it away
( ) I moved it to a new location and still use it
( ) I put it in storage for later use
( ) I gave it away
( ) Don't know

33. Did you install the 9-watt LED bulb that was included in your Energy Savings Kit?
( ) Yes
( ) No
( ) Don't know

34. Where did you install the 9-watt LED bulb?*
( ) Living room
( ) Bathroom
( ) Kitchen
( ) Outdoors
( ) Family Room
( ) Bedroom
( ) Garage
( ) Hallway
( ) Office
( ) Laundry Room
( ) Dining Room
( ) Other: _____*
( ) Don't know/Can't remember

35. Why didn't you install the 9-watt LED bulb?
( ) I don't like the color of LEDs
( ) I didn't have anywhere to install it
( ) I haven't had time to install it yet
( ) The LED was broken when I received it
( ) Other: _____

36. What did you do with the 9-watt LED?
( ) I am storing it for future use
( ) I gave it away to friends and family
( ) I disposed of them at a household hazardous waste collection site.
( ) Other (Specify): _____*

37. Did you install the energy efficient showerhead that was included in your Energy Savings Kit?
( ) Yes
( ) No
( ) Don't know

38. Why didn't you install the showerhead that was included in the kit?
( ) I am waiting for my current showerhead to need replacement
( ) I don't like energy efficient showerheads
( ) I didn't know how to install the showerhead
( ) I haven't had time to install the showerhead
( ) Other: _____

39. Did you install the filter tone that was included in your Energy Savings Kit?
( ) Yes
( ) No
( ) Don't know

40. Why didn't you install the filter tone that was included in the kit?
( ) I didn't know how to install the filter tone
( ) I didn't like the idea of a filter alarm
( ) We already have a filter tone device installed
( ) I haven't had time to install the filter tone
( ) Other: _____

41. What single item from the Energy Savings Kit was **MOST** useful to you?*
( ) CFL Bulbs
( ) Faucet Aerator
( ) LED Night Light
( ) LED bulb
( ) Filter Tone
( ) Shower head
( ) Other: _____
( ) Don't know

42. Which wattage CFL bulb was most useful to you?*
( ) 13 Watt CFL
( ) 23 Watt CFL
( ) I would have preferred a different wattage (please specify):
_____

43. What other items do you think would be useful to send in future Energy Savings Kits?

---

44. How satisfied or dissatisfied are you with the performance and quality of the CFL bulbs?*
( ) Very satisfied
( ) Satisfied
( ) Neither satisfied or dissatisfied
( ) Dissatisfied
( ) Very dissatisfied
( ) Don't know

45. Why are you dissatisfied?
_____
_____
_____
_____

46. How satisfied or dissatisfied are you with the performance and quality of the faucet aerators?*
( ) Very satisfied
( ) Satisfied
( ) Neither satisfied or dissatisfied

( ) Dissatisfied
( ) Very dissatisfied
( ) Don't know

47. Why are you dissatisfied?

_____
_____
_____

48. How satisfied or dissatisfied are you with the performance and quality of the LED night light?*
( ) Very satisfied
( ) Satisfied
( ) Neither satisfied or dissatisfied
( ) Dissatisfied
( ) Very Dissatisfied
( ) Don't know

49. Why are you dissatisfied?

_____
_____
_____
_____

50. How satisfied or dissatisfied are you with the performance and quality of the 9-watt LED bulb?*
( ) Very satisfied
( ) Satisfied
( ) Neither satisfied or dissatisfied
( ) Dissatisfied
( ) Very Dissatisfied
( ) Don't know

51. Why are you dissatisfied?

_____
_____
_____

52. How satisfied or dissatisfied are you with the performance and quality of the showerhead?*
( ) Very satisfied
( ) Satisfied
( ) Neither satisfied or dissatisfied
( ) Dissatisfied
( ) Very Dissatisfied
( ) Don't know

53. Why are you dissatisfied?

_____
_____
_____
_____

54. How satisfied or dissatisfied are you with the performance and quality of the filter tone?*
( ) Very satisfied
( ) Satisfied
( ) Neither satisfied or dissatisfied
( ) Dissatisfied
( ) Very Dissatisfied
( ) Don't know

55. Why are you dissatisfied?

_____
_____
_____
_____

56. Before you received I&M's Energy Savings kit, did you have similar energy saving items installed in your home?

	Yes	No	Don't know
CFLs	( )	( )	( )
Faucet Aerators	( )	( )	( )
LED night light(s)	( )	( )	( )
LED bulbs	( )	( )	( )
Energy efficient or Water efficient Showerheads	( )	( )	( )
Filter Tone	( )	( )	( )

57. Before you received the Energy Savings Kit, about what percent of the light bulbs installed in your home were CFLs?
( ) Fewer than 10%
( ) 10%
( ) 20%
( ) 30%
( ) 40%
( ) 50%
( ) 60%
( ) 70%
( ) 80%
( ) 90%
( ) More than 90%
( ) Don't know
( ) Refused

58. Before you received the Energy Savings Kit, about what percent of the light bulbs installed in your home were LEDs?
( ) Fewer than 10%
( ) 10%
( ) 20%
( ) 30%
( ) 40%
( ) 50%
( ) 60%
( ) 70%
( ) 80%
( ) 90%
( ) More than 90%
( ) Don't know
( ) Refused

59. Before you received the kit, did you have specific plans to purchase any of the following items that were included in the kit?

	Yes	No	Don't know
CFLs	( )	( )	( )
Faucet Aerators	( )	( )	( )
LED night light(s)	( )	( )	( )

LED bulbs	( )	( )	( )
Energy efficient or Water efficient Showerheads	( )	( )	( )
Filter Tone	( )	( )	( )

60. If you and your child had not received the Energy Savings Kit, how likely would you have been to purchase any of the following items on your own?

	Definitely would have purchased	Probably would have purchased	Probably would not have purchased	Definitely would not have purchased	Don't know	Refused
CFLs	( )	( )	( )	( )	( )	( )
Standard LED bulbs	( )	( )	( )	( )	( )	( )
LED night light	( )	( )	( )	( )	( )	( )
Energy efficient or Water efficient showerheads	( )	( )	( )	( )	( )	( )
Filter tone	( )	( )	( )	( )	( )	( )
Faucet aerators	( )	( )	( )	( )	( )	( )

61. If you and your child had not received the Energy Savings Kit, do you think you would have...
( ) Not purchased any CFLs on my own
( ) Purchased some CFLs on my own, but fewer than were offered in the kit
( ) Purchased exactly as many CFLs on my own as were included in the kit
( ) Purchased more CFLs on my own than were included in the kit
( ) Don't know
( ) Refused

62. How many CFLs do you think you would have purchased on your own if you had not received the kit?
( ) Quantity: _____
( ) Don't know
( ) Refused

63. If you and your child had not received the Energy Savings Kit, do you think you would have...
( ) Not purchased any LED bulbs on my own
( ) Purchased exactly one LED bulb on my own
( ) Purchased more than one LED bulb on my own
( ) Don't know
( ) Refused

64. How many LED bulbs do you think you would have purchased on your own if you had not received the kit?
( ) Quantity: _____
( ) Don't know
( ) Refused

65. When do you think you would have purchased any of the following items if you had never received them through the energy Savings kit?

	Within 6 months	Within 12 months	After 1-2 years	After more than 2 years	Never
CFLs	( )	( )	( )	( )	( )
LEDs	( )	( )	( )	( )	( )
LED night lights	( )	( )	( )	( )	( )
Energy efficient shower heads	( )	( )	( )	( )	( )
Filter tone	( )	( )	( )	( )	( )
Faucet aerators	( )	( )	( )	( )	( )

66. Before receiving the energy saving kit, how would you rate your familiarity with ways to save energy in your home?*
( ) Very familiar
( ) Somewhat familiar
( ) A little familiar
( ) Not at all familiar
( ) Don't know

67. As a result of receiving the energy saving kit, how would you now rate your familiarity with ways to save energy in your home?*
( ) Very familiar
( ) Somewhat familiar
( ) A little familiar
( ) Not at all familiar
( ) Don't know

68. Aside from installing the items from the Energy Savings Kit, have you or your child changed anything about how you use energy in your home as a result of receiving the kit?
( ) Yes
( ) No
( ) Don't know

69. What have you or your child changed about how you use energy in your home? (DO NOT READ. Select all that apply)
[ ] Turn off lights when not in use
[ ] Use our windows to help manage the temperature in the home
[ ] Adjust thermostat settings/Decrease use of heating and cooling equipment
[ ] Decrease water heater temperature
[ ] Unplug appliances when not in use
[ ] Avoid using high energy items during peak times
[ ] Use cold water for washing
[ ] Wash only full loads in the clothes washer
[ ] Take shorter baths or showers
[ ] Adjust freezer/refrigerator temperature
[ ] Other: _____
[ ] Don't know

70. Because of your experience with the Energy Savings Kit offered through I&M's Schools Energy Education Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial rebate?
( ) Yes, have already bought non-incentivized items on my own because of this program
( ) Yes, am likely to buy non-incentivized items on my own because of the program
( ) No
( ) Don't know

71. Please indicate whether you have purchased any of the following items on your own since receiving the energy Savings kit, and indicate how many you have purchased.
CFLs: _____
LED bulbs: _____
Faucet aerators: _____
Energy efficient showerheads:
_____
Filter tones: _____
LED night lights: _____
Other (please describe): _____

72. On a scale of 0 to 10, where 0 represents "not at all important" and 10 represents "extremely important", how important was your experience with I&M's School Energy Education Program in your decision to purchase the items you just mentioned?
( ) 10 - Extremely important
( ) 9
( ) 8
( ) 7
( ) 6
( ) 5
( ) 4
( ) 3
( ) 2
( ) 1
( ) 0 - Not at all important
( ) Don't know
( ) Refused

73. Have you heard of any other rebates, incentives, or energy efficiency programs offered by I&M?
( ) Yes
( ) No
( ) Don't know

74. Please tell me which of the following programs you have heard of and which you have participated in:

	Have heard of			Have participated in		
	Yes	No	Don't know	Yes	No	Don't know
A program that offers rebates for purchasing energy efficient, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats	( )	( )	( )	( )	( )	( )

A program that offers discounts on light bulbs purchased at participating retailers	( )	( )	( )	( )	( )	( )
A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation	( )	( )	( )	( )	( )	( )
A program that provides an online energy checkup and suggestions for how you can save energy	( )	( )	( )	( )	( )	( )
A program that discounts your electric bill for using your air conditioner less during peak demand periods	( )	( )	( )	( )	( )	( )
A program that offers a rebate for recycling your old refrigerator or freezer	( )	( )	( )	( )	( )	( )

75. How did you learn about these other I&M programs? [Check all that apply]
( ) Newspaper/magazine/print media
( ) Bill insert
( ) Message printed on your utility bill
( ) Friend, relative, neighbor or colleague (word-of-mouth)
( ) Television advertisement
( ) Directly from an I&M representative
( ) I&M energy efficiency brochure
( ) Retailer/store
( ) Community event
( ) Social networking site (e.g. Facebook, Twitter)
( ) I&M program website (www.electricideas.com or IndianaMichiganPower.com)
( ) Information included in the Energy Savings Kit
( ) Other: _____
( ) Don't know

Finally, I have a few questions about your home. Please note that all of this information will remain confidential and will not be associated with your personal information.

76. What type of heating system do you have in your home?
( ) Natural gas heating
( ) Electric heating
( ) Don't know
( ) Combination of types (Specify):
_____
( ) Other (Specify): _____

77. How many bedrooms are there in your home?
( ) Quantity: _____

( ) Refused

78. What type of water heater do you have in your home?
( ) Natural gas water heater
( ) Electric water heater
( ) Don't know
( ) Other (Specify): _____

79. How many bathrooms are there in your home?
( ) Quantity: _____
( ) Refused

80. Including yourself, how many people currently live in your home year-round?
( ) Quantity: _____
( ) Refused

81. As a "Thank You" for completing this survey, which of the following $10 gift cards would you prefer?
( ) Walmart
( ) Lowe's
( ) No preference
( ) [I would prefer to not receive a gift card]

82. In order to send you the $10 gift card, I would like to confirm your mailing address. Our records show that your address is as follows, please correct as necessary.

Name: _____
Street Address: _____
City: _____
State: _____
Zip Code: _____

83. Do you have any other comments that you would like to relay to I&M about energy efficiency for homes or about this or other programs? [Verbatim]
_____
_____
_____
_____
Your gift card will be sent to you in the next 3-4 weeks. This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Indiana Michigan Power
School Energy Education Program 2015
Verification and Feedback Questionnaire (Instructors)

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. May I please speak with [INSTRUCTOR NAME NAME]: _____)?

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power about the School Energy Education Program that you and your classroom participated in this year. Are you the person who is most familiar with your classroom's participation in this program? [IF NOT SURE: CLARIFY THAT THE PROGRAM PROVIDED ENERGY SAVINGS KITS FOR TEACHERS TO DISTRIBUTE TO THEIR STUDENTS]

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about your classroom's participation in this program?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate I&M's School Energy Education Program and the energy savings kit that is included in the program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 10 minutes. May I ask you a few questions?*

52. We have in our records that during 2015, you received [SHIPMENT_NUMBER] [KIT_NUMBER] energy savings kits to distribute to your students. Is this correct?
    5. Yes
    6. No
    100. Don't know
    101. Refused

[DISPLAY Q2 IF Q1 = 1]

53. How many energy savings kits did you receive during 2015?
    Record Quantity: _____

54. Were all of these kits distributed to students?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q4 IF Q3 = 2]

55. Of the kits you received, how many kits were not distributed to students?
    Record Quantity: _____

[DISPLAY Q5 IF Q3 = 2]

56. What happened to the kits that were not distributed to students? [DO NOT READ OPTIONS. SELECT ALL THAT APPLY]
    1. I am storing them to distribute to students at a later date
    2. I gave them to another teacher
    3. I am storing the kits, but have no specific plans to distribute them
    4. I threw the kits away or recycled them
    5. I installed the kit items in my home
    6. I installed the kit items in the school
    7. I returned the kits to the program coordinator
    8. Other: _____
    98. Don't know
    99. Refused

57. Did you receive the energy savings kits in a timely manner?
    1. Yes
    2. No
    98. Don't know
    99. Refused

58. Did the program provide you with a Teacher Book of lesson plans to incorporate into your curriculum?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q7 IF Q6 = 1]

59. Have you incorporated the lesson plans provided by the program into your curriculum?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q8 IF Q7 = 2]

60. Why haven't you incorporated these lesson plans into your curriculum?
    OPEN-ENDED:
    _____
    _____

61. Did the program provide you with any educational materials aside from the Teacher Book?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q10 IF Q9 = 1]

62. What other educational materials did the program provide?
    OPEN-ENDED:
    _____

[DISPLAY Q11 IF Q9 = 1]

63. Have you used these other educational materials in the classroom?
    1. Yes
    2. No
    98. Don't know
    99. Refused

64. On a scale of 1 to 5 where 1 equals very dissatisfied and 5 equals very satisfied, how satisfied are you with the educational materials that were provided to you through the program, including the Teacher Book?
    1. Very dissatisfied
    2. Dissatisfied
    3. Neither satisfied nor dissatisfied
    4. Satisfied
    5. Very satisfied
    98. Don't know
    99. Refused

[DISPLAY Q13 IF Q12 = 1 OR 2]

65. Why are you dissatisfied with the educational materials?
    OPEN-ENDED:
    _____

66. Have you heard any feedback from students regarding their use of the items that were provided in the energy savings kits?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q15 IF Q14 = 1]

67. Has this feedback been positive, negative, or both?

1. Positive
2. Negative
3. Both
98. Don't know
99. Refused

[DISPLAY Q16 IF Q15 = 1 OR 3]

68. Can you please describe the positive feedback provided by students about the energy savings kits?
OPEN-ENDED:
_____

[DISPLAY Q17 IF Q15 = 2 OR 3]

69. Can you please describe the negative feedback provided by students about the energy savings kits?
OPEN-ENDED:
_____

70. On a scale of 1 to 5 where 1 equals very dissatisfied and 5 equals very satisfied, how satisfied are you with the contents of the energy savings kits that were provided through the program?
    1. Very dissatisfied
    2. Dissatisfied
    3. Neither satisfied nor dissatisfied
    4. Satisfied
    5. Very satisfied

[DISPLAY Q19 IF Q18 = 1 OR 2]

71. Why are you dissatisfied with the contents of the energy savings kits?
OPEN-ENDED:
_____

72. On a scale of 1 to 5 where 1 equals very dissatisfied and 5 equals very satisfied, how satisfied are you with I&M's School Energy Education Program as a whole?
    1. Very dissatisfied
    2. Dissatisfied
    3. Neither satisfied nor dissatisfied
    4. Satisfied
    5. Very satisfied
    6. Don't know
    7. Refused

[DISPLAY Q21 IF Q20 = 1 OR 2]

73. Why are you dissatisfied with the School Energy Education Program as a whole? OPEN-ENDED:
    _____

74. Do you have any recommendations for improving the School Energy Education Program?
    1. Yes (Please specify): _____
    2. No
    98. Don't know
    99. Refused

75. Is there anything else you would like to say about the School Energy Education Program, about Indiana Michigan Power energy efficiency programs, or about energy efficiency in general?
    1. Yes (Please specify): _____
    2. No
    98. Don't know
    99. Refused

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix F: Home Weatherization Program Participant Survey Instrument

Indiana Michigan Power

2015 Home Weatherization Program

Participant Telephone Survey

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. May I please speak with [CONTACT NAME]:_____)?

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power about the Home Weatherization program. Are you the person who is most familiar with your household's participation in this program?

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about your household's participation in this program?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate I&M's Home Weatherization program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. May I ask you a few questions?*

1. Our records indicate that you participated in I&M's Home Weatherization program by completing an energy audit and receiving energy efficiency improvements in your home. Do you recall participating in this program?
    1. Yes
    2. No
    3. Don't know

[DISPLAY Q2 IF Q1 = 2 or 3]

2. Is there anyone else in your household who may be familiar with your household's participation in the program?
    1. Yes
    2. No *[THANK RESPONDENT AND TERMINATE INTERVIEW]*
    3. Don't know*[THANK RESPONDENT AND TERMINATE INTERVIEW]*

[DISPLAY Q3 IF Q2 = 1]

3. May I speak with that person?
    1. Yes *[RESTART INTERVIEW WITH NEW RESPONDENT]*
    2. No *[THANK RESPONDENT AND TERMINATE INTERVIEW]*
    3. Don't know/No answer *[THANK RESPONDENT AND TERMINATE INTERVIEW]*

RESPONDENT BACKGROUND

At this time, I'd like to let you know that your responses to this survey will be kept completely confidential. I'll begin with a few questions about your decision to participate in the program.

4. How did you learn of the Home Weatherization program sponsored by I&M? *(Select all that apply)*
    1. Approached directly by representative of the program
    2. Received a letter in the mail about the program
    3. An I&M representative mentioned it
    4. The I&M website
    5. Friends or colleagues
    6. An architect, engineer or energy consultant
    7. An equipment vendor or building contractor
    8. Past experience with the program
    9. Other (Specify): _____

5. What is the main reason you decided to participate in the program?
    1. To save money on energy bill(s)
    2. Environmental reasons
    3. I&M paid a portion of the total cost of the items installed
    4. Other (Specify): _____
    5. Don't know

[DISPLAY Q6 IF (NTG TRIGGER) = YES]

6. How likely is it that you would have hired a professional contractor to perform a home audit like the Home Weatherization program offers IF I&M did not offer the Home Weatherization Program?
    1. Definitely would have
    2. Probably would have
    3. Probably would not have
    4. Definitely would not have
    5. Don't know

[DISPLAY Q7 IF (INSULATION) = YES]

7. Our records indicate that insulation was installed in your home as part of this program. Is that correct?

1. Yes
2. No
3. Don’t know/Refused

[DISPLAY INSULATION NET TO GROSS SECTION IF (INSULATION) = YES, (NTG TRIGGER) = YES, AND Q7 = 1]

INSULATION NET TO GROSS SECTION

Next, I have some questions about the insulation that was installed in your home through the program.

8. For the Insulation that was conducted in your home, did you have plans to conduct this Insulation in your home before participating in the I&M Home Weatherization program?
    1. Yes
    2. No
    3. Don’t know/Refused

[DISPLAY Q9 IF Q8 = 1]

9. When did you learn of the Home Weatherization program?
    1. After deciding to install the insulation but before purchasing it on my own or receiving a quote from a contractor
    2. After I had purchased the Insulation items or received a contractor quote for the Insulation, but before I had installed it
    3. After I had already installed some amount of the insulation in my home (please specify what you had already installed): _____
    4. Some other time (please describe): _____
    5. Don't know/Refused

10. On a scale of 0 to 10 where 0 represents “Not at all likely” and 10 represents “Extremely likely”, how likely would you have been install the insulation in your home on your own if the I&M Home Weatherization Program were not available?
    1. [Record response 0-10]
    2. Don’t know/Refused

11. Would you have been financially able to install the insulation without the Home Weatherization program from I&M?
    1. Yes
    2. No
    3. Don't know/Refused

12. Did you have the Insulation installed earlier than you otherwise would have without the program?

1. Yes
2. No, program did not affect timing of Insulation
3. Don't know/Refused

[DISPLAY Q13 IF Q12 = 1]

13. When would you otherwise have had the Insulation installed?
    1. Less than 6 months later
    2. 6-12 months later
    3. 1-2 years later
    4. 3-5 years later
    5. More than 5 years later
    6. Don't know/Refused

[DISPLAY Q14 IF (AIR SEALING) = YES]

14. Our records indicate that air sealing improvements were installed in your home as part of this program. Is that correct?
    1. Yes
    2. No
    3. Don't know/Refused

[DISPLAY AIR SEALING NET TO GROSS SECTION IF (AIR SEALING) = YES, (NTG TRIGGER) = YES, AND Q14 = 1]

AIR SEALING NET TO GROSS SECTION

Next, I have some questions about the air sealing improvements that were conducted in your home through the program.

15. For the air sealing that was conducted in your home, did you have plans to conduct this air sealing in your home before participating in the I&M Home Weatherization program?
    1. Yes
    2. No
    3. Don't know/Refused

[DISPLAY Q16 IF Q15 = 1]

16. When did you learn of the Home Weatherization program?
    1. After deciding to conduct air sealing but before purchasing the items on my own or receiving a quote from a contractor
    2. After I had purchased the air sealing items or received a contractor quote for the air sealing, but before I had conducted it
    3. After I had already conducted some portion of the air sealing in my home (please specify what you had already installed): _____
    4. Some other time (please describe): _____
    5. Don't know/Refused

17. On a scale of 0 to 10 where 0 represents "Not at all likely" and 10 represents "Extremely likely", how likely would you have been install the air sealing improvements in your home on your own if the I&M Home Weatherization Program were not available?
    1. [Record response 0-10]
    2. Don't know/Refused

18. Would you have been financially able to have the air sealing conducted without the Home Weatherization program from I&M?
    1. Yes
    2. No
    3. Don't know/Refused

19. Did you have the air sealing conducted earlier than you otherwise would have without the program?
    1. Yes
    2. No, program did not affect timing of air sealing
    3. Don't know/Refused

[DISPLAY Q20 IF Q19 = 1]

20. When would you otherwise have had the air sealing conducted?
    7. Less than 6 months later
    8. 6-12 months later
    9. 1-2 years later
    10. 3-5 years later
    11. More than 5 years later
    12. Don't know/Refused

[DISPLAY Q21 IF (DUCT SEALING) = YES]

21. Our records indicate that duct sealing was performed in your home through this program. Is that correct?
    1. Yes
    2. No
    3. Don't know/Refused

[DISPLAY DUCT SEALING NET TO GROSS SECTION IF (DUCT SEALING) = YES, (NTG TRIGGER) = YES, AND Q21= 1]

DUCT SEALING NET TO GROSS SECTION

Next, I have some questions about the duct sealing that was conducted in your home through the program.

22. For the duct sealing that was conducted in your home, did you have plans to conduct this duct sealing in your home before participating in the I&M Home Weatherization program?

1. Yes
2. No
3. Don’t know/Refused

[DISPLAY Q23 IF Q22 = 1]

23. When did you learn of the Home Weatherization program?
    1. After deciding to conduct duct sealing but before purchasing the items on my own or receiving a quote from a contractor
    2. After I had obtained the duct sealing equipment or received a contractor quote for the duct sealing, but before I had conducted it
    3. After I had already conducted some portion of the duct sealing in my home
    4. Some other time (please describe): _____
    5. Don't know/Refused

24. On a scale of 0 to 10 where 0 represents “Not at all likely” and 10 represents “Extremely likely”, how likely would you have been install the duct sealing in your home on your own if the I&M Home Weatherization Program were not available?
    1. [Record response 0-10]
    2. Don’t know/Refused

25. Would you have been financially able to have the duct sealing conducted without the Home Weatherization program from I&M?
    1. Yes
    2. No
    3. Don't know/Refused

26. Did you have the duct sealing conducted earlier than you otherwise would have without the program?
    1. Yes
    2. No, program did not affect timing of duct sealing
    3. Don’t know/Refused

[DISPLAY Q27 IF Q26 = 1]

27. When would you otherwise have had the duct sealing conducted?
    1. Less than 6 months later
    2. 6-12 months later
    3. 1-2 years later
    4. 3-5 years later
    5. More than 5 years later
    6. Don’t know/Refused

DIRECT INSTALL MEASURES NET TO GROSS SECTION

Next, I have some questions about the items that were installed in your home through the program.

28. Our records show that the following items were installed in your home through this program [READ ONLY ITEMS LISTED IN CONTACT LIST]. Please confirm whether the item(s) were installed in your home:

Measure Type	*Received? (Y/N)*
LED bulbs	
CFL bulbs	
Energy efficient shower head	
Faucet aerator – Kitchen	
Faucet aerator – Bathroom	
Water heater pipe wrap	

[DISPLAY Q29-Q34 IF AT LEAST ONE ITEM IN Q28 = "YES"]

29. Keeping the items that you received in mind, did you have plans to install any of these items in your home before participating in the I&M Home Weatherization program?
    1. Yes, I had already planned to install all of these items
    2. Yes, I had already planned to install some of these items (please specify which items): _____
    3. No
    4. Don't know/Refused

[DISPLAY Q30 IF Q29 = 1 OR 2]

30. When did you learn of the Home Weatherization program?
    1. After deciding to install these items but before purchasing them on my own
    2. After I had purchased these items but before I had installed them
    3. After I had already installed some or all of these items
    4. Some other time (please describe): _____
    5. Don't know

31. On a scale of 0 to 10, where 0 represents "Not at all likely" and 10 represents "Extremely likely", how likely would you have been to install these items in your home on your own if the I&M Home Weatherization Program were not available?
    1. [Rating from 0-10]
    2. Don't know/Refused

32. Would you have been financially able to purchase and install these items without the Home Weatherization program from I&M?
    1. Yes
    2. No
    3. Don't know/Refused

33. Were these items installed earlier than you otherwise would have installed them on your own without the program?
    1. Yes
    2. No, program did not affect timing of installation
    3. Don't know/Refused

[DISPLAY Q34 IF Q33 = 1]

34. When would you otherwise have installed these items?
    1. Less than 6 months later
    2. 6-12 months later
    3. 1-2 years later
    4. 3-5 years later
    5. More than 5 years later

[DISPLAY Q35 IF RESPONDENT RECEIVED LED LIGHTING (TRACKING DATA)]

35. We have it in our records that you received [LED_QUANTITY] energy efficient LED light bulbs through the Home Weatherization Program. Can you please tell me where these energy efficient LED light bulbs were installed in your home? I'll list some room types, so please let me know how many of the LED bulbs, if any, were installed in each of the following rooms:

Room Type	*#Bulbs*
Kitchen	
Living Room	
Outdoor	
Family Room	
Garage	
Bedroom	
Bathroom	
Hall/Entry	
Laundry Room	

36. What type of bulb did the LEDs replace?
    1. Compact fluorescent bulbs (CFLs)
    2. Incandescent bulbs
    3. Neither – bulbs were installed in a new fixture
    4. Both

[DISPLAY Q37 IF Q36 = 2 OR 4]

37. Were the incandescent bulbs still operating when they were removed, or were they already burnt out?
    1. All operating
    2. Some operating
    3. All burnt out

DISPLAY CFL LIGHTING SECTION IF RESPONDENT RECEIVED CFL LIGHTING (TRACKING DATA)]
CFL LIGHTING SECTION

38. We have it in our records that you received [CFL_QUANTITY] Compact Fluorescent light bulbs (CFLs) through the Weatherization Program. These bulbs typically have a spiral shape as opposed to the rounded bulb shape of typical bulbs. Can you please tell me where these CFL light bulbs were installed in your home? I'll list some room types, so please let me know how many of the CFL bulbs, if any, were installed in each of the following rooms:

Room Type	*#Bulbs*
Kitchen	
Living Room	
Outdoor	
Family Room	
Garage	
Bedroom	
Bathroom	
Hall/Entry	
Laundry Room	

39. What type of bulb did the CFLs replace?
    1. Existing CFLs
    2. Incandescent bulbs
    3. Neither – bulbs were installed in a new fixture
    4. Both

[DISPLAY Q40 IF Q39 = 2 OR 4]

40. Were the incandescent bulbs still operating when they were removed, or were they already burnt out?
    1. All operating
    2. Some operating
    3. All burnt out

[DISPLAY Q41 IF CFL OR LED LIGHTING SECTIONS DISPLAYED]

41. How many hours per day do you spend in each of the following rooms?
    1. Bedroom _____
    2. Bathroom _____
    3. Hallway/Entry room _____
    4. Laundry Room _____

ITEM REMOVAL

42. Have any of the items or improvements that you received through the program been removed or reversed since they were installed?
    1. Yes (please specify what has been removed or reversed): _____
    2. No
    3. Don't know/Refused

PRIOR EXPERIENCE SECTION

43. Before you participated in the Indiana Michigan Power Home Weatherization program, had you purchased and used any energy efficient items or improvements in your home?
    1. Yes (Please explain): _____ _____ _____ _____
    2. No
    3. Don't know/Refused

[DISPLAY Q44 IF Q43 = 1]

44. Did you apply for and/or receive a financial incentive for any of those items?
    1. Yes
    2. No
    3. Don't know/Refused

BEHAVIORAL SAVINGS SECTION

45. Since your participation in the Home Weatherization program, have you done any of the following? (Select all that apply)
    a. Turned off lights when you leave the room
    b. Unplug unused appliances
    c. Washed your clothes in cold water
    d. Installed a water heater tank wrap
    e. Installed a programmable thermostat or programmed an existing one?

Display if lighting:

46. In which rooms have you started turning off lights? [SELECT ALL THAT APPLY]
    a. Bedroom
    b. Bathroom
    c. Living room
    d. Kitchen
    e. Hallway
    f. Dining room
    g. Garage
    h. Outdoor/exterior
    i. Other: _____

47. Did you start turning off lighting when you leave the room before or after participating in the Home Weatherization Program?
    a. Before participating in the program
    b. After participating in the program

    If A: Have you turned off the lights in additional rooms since participating in the program?

48. Thinking about the lights that you turn off since you participated in the program, are these traditional incandescent bulbs, Compact Fluorescent Bulbs (CFLs), or LEDs?
    a. CFLs
    b. LEDs
    c. Incandescent bulbs
    d. Mixture (how many of each?): _____
    e. Don't know

49. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Home Weatherization Program in your decision to turn off your lights when you're not occupying the room?

    Record Rating 0-10: _____

50. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to turn off your lights when not occupying the room had you not participated in the Home Weatherization Program?

    Record Rating 0-10: _____

Display if appliances:

51. What appliances do you unplug when not in use?
    a. TV

b. Computer
c. Washer
d. Dryer
e. Microwave
f. Gaming system
g. Portable heater
h. Other – please specify: _____

52. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the program in your decision to unplug your appliances when not in use?

    Record Rating 0-10: _____

53. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to unplug your appliances when not in use had you not participated in the Home Weatherization Program?

    Record Rating 0-10: _____

Display if laundry in cold water:

54. How many loads of laundry do you do per week?
    Number of loads: _____

55. How many loads of laundry did you wash in cold water per week prior to participating in the Home Weatherization Program?
    Number of loads: _____

56. How many loads do you wash in cold water per week since participating in the Home Weatherization Program?
    Number of loads: _____

Display the following two questions if # in question 11 is greater than # in question 10 (that is, additional loads of laundry are washed in cold water since participating in the program):

57. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Home Weatherization Program in your decision to wash additional loads of laundry in cold water?

    Record Rating 0-10: _____

58. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to wash additional loads of laundry in cold water had you not participated in the Home Weatherization Program?

    Record Rating 0-10: _____

Display if water heater tank wrap:

59. Did you install water heater tank wrap before or after you participated in the Home Weatherization Program?
    a. Before participating in the program
    b. After participating in the program

60. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Home Weatherization Program in your decision to install water heater tank wrap?

    Record Rating 0-10: _____

61. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install water heater tank wrap had you not participated in the Home Weatherization Program?

    Record Rating 0-10: _____

Display if programmable thermostat:

62. Did you [install / program existing] thermostat before or after you participated in the Home Weatherization Program?
    a. Before participating in the program
    b. After participating in the program

63. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Home Weatherization Program in your decision to [install / program existing] programmable thermostat?

    Record Rating 0-10: _____

64. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to [install / program existing] programmable thermostat had you not participated in the Home Weatherization Program?

    Record Rating 0-10: _____

SPILLOVER SECTION

65. Because of your experience with the Home Weatherization Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial incentive or rebate?
    1. Yes, have already bought non-incentivized energy efficient items because of my experience with the program
    2. Yes, likely to buy energy efficient items because of my experience with the program

3. No
4. Don't know

[DISPLAY Q66 IF Q65 =1]

66. For each of the following items please tell me if you purchased on your own and how many you purchased. If you have purchased something that is not included in the table, please describe the additional items in as much detail as you can. *(In the following table, please indicate the quantity of each item type purchased, or specify another item type and quantity)*

Measure Type	*Quantity Purchased*
CFLs	
Water Heater Pipe Measures	
Water Heater Jacket/Blanket/Measures	
LED Light Bulbs	
Low Flow Bathroom Aerators	
Low Flow Kitchen Aerator	
Low Flow Showerhead	
LED Nightlights	
Other:	

[DISPLAY Q67 IF Q65 =1]

67. What primarily motivated you to purchase these energy efficient items?
    1. The energy savings I would achieve
    2. Guidance from the Home Weatherization Program
    3. The quality of the energy efficient item(s)
    4. The fact that the item(s) were on sale
    5. Other (please explain): _____
    6. Don't know

[DISPLAY Q68 IF Q65 =1]

68. Have you installed all of these items?
    1. Yes, have installed all of the items listed
    2. No, have only installed some of the items listed (please specify): _____
    3. No, have not installed any of the items listed
    4. Don't know

[DISPLAY Q69 IF Q68 = 1 OR 2]

69. In what month and year did you install these items?

_____

_____

[DISPLAY Q14 IF Q68 = 1 OR 2]

70. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Home Weatherization Program in your decision to install these additional items?
    Record Response 0-10: _____

[DISPLAY Q71 IF Q68 = 1 OR 2]

71. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install these additional items had you not participated in the Home Weatherization Program?
    Record Response 0-10: _____

CROSS-PROGRAM AWARENESS

72. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs have you have heard of and which you have received or applied for:

	Have heard of			*Have applied for or received*		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.						
A program that offers discounts on light bulbs purchased at participating retailers.						
A program that offers a rebate for recycling your old refrigerator or freezer.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that discounts your electric bill for using your air conditioner less during peak demand periods						

[DISPLAY Q73 IF ANY ROW IN Q72, "HAVE HEARD OF" = 1]

73. Which sources did you learn of these programs from? [Check all that apply.]
    1. Newspaper/magazine/print media
    2. Bill insert
    3. Message printed on your bill
    4. Friend or relative (word-of-mouth)
    5. TV ad
    6. I&M representative
    7. I&M brochure

8. Retailer/store
9. Community event
10. Social networking site such as Facebook or Twitter
11. I&M program website
12. Other [specify]_____.
98. Don't know
99. Refused

74. Have you visited I&M's Electric Ideas website (electricideas.com) that provides information on ways that I&M can help you save energy?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q75 IF Q74 = 1]

75. Why did you visit the Electric Ideas website?
    1. To learn about I&M programs to help me save energy
    2. To enroll in an I&M energy efficiency program
    3. To get tips on how I can save energy
    4. General curiosity
    5. Other
    98. Don't know

PROGRAM SATISFACTION

Now I'd like to ask you about your satisfaction with several aspects of this program.

76. On a scale of 1 to 5, where "5" is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following?

Element of program Experience	*Very Satisfied*	*Somewhat Satisfied*	*Neutral*	*Somewhat Dissatisfied*	*Very Dissatisfied*	*Don't Know*
Performance of the items or improvements installed	5	4	3	2	1	DK
Savings on your monthly bill	5	4	3	2	1	DK
The effort required for the program application process	5	4	3	2	1	DK
Usefulness of the energy audit	5	4	3	2	1	DK
Information provided by I&M	5	4	3	2	1	DK
Quality of work conducted by the installer	5	4	3	2	1	DK
Overall program experience	5	4	3	2	1	DK

[DISPLAY Q77 IF ANY ROW IN Q76 = 1 OR 2]

77. Why were you dissatisfied with [program Element]?

_____
_____
_____

DEMOGRAPHICS

Now I have just a few final questions about your home and energy use.

78. When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Before 1970's
    3. 1970's
    4. 1980's
    5. 1990-1994
    6. 1995-1999
    7. 2000-2005
    8. 2006 or newer
    98. Don't know [DON'T READ]
    99. Refused

79. What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Less than 1,000
    3. 1,001-1,500
    4. 1,501-2,000
    5. 2,001-2,500
    6. Greater than 2,500
    98. Don't know [DON'T READ]
    99. Refused

80. How many bedrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

81. What type of heating system do you have in your home?
    1. Natural gas heating
    2. Electric heating
    3. Combination of types (Specify):_____
    4. Other (Specify): _____
    98. Don't know [DON'T READ]

99. Refused

82. What type of water heater do you have in your home?
    1. Natural gas water heater
    2. Electric water heater
    3. Other (Specify): _____
    98. Don't know [DON'T READ]
    99. Refused

83. How many bathrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

84. How many showers are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

85. Including yourself, how many people currently live in your home year-round?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

86. Do you have any other comments that you would like to relay to I&M about energy efficiency in residences or about this or other programs?
    _____
    _____
    _____

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix G: Income Qualified Weatherization Program Participant Survey Instrument

Indiana Michigan Power

2015 Income Qualified Weatherization Program

Participant Telephone Survey

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. May I please speak with [CONTACT NAME]:_____)?

Hello. My name is _____ and I am calling on behalf of Indiana Michigan Power about the Weatherization Program. Are you the person who is most familiar with your household's participation in this program?

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about your household's participation in this program?*

REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) *We are conducting a study to evaluate I&M's Weatherization Program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 10 minutes. May I ask you a few questions?*

1. Our records indicate that you participated in I&M's Weatherization Program by completing an energy audit and receiving several energy efficiency improvements in your home. Do you recall participating in this program?
    1. Yes
    2. No
    3. Don't know

[DISPLAY Q2 IF Q1 = 2 or 3]

2. Is there anyone else in your household who may be familiar with your household's participation in the program?
    1. Yes
    2. No *[THANK RESPONDENT AND TERMINATE INTERVIEW]*
    3. Don't know*[THANK RESPONDENT AND TERMINATE INTERVIEW]*

[DISPLAY Q3 IF Q2 = 1]

3. May I speak with that person?
    1. Yes *[RESTART INTERVIEW WITH NEW RESPONDENT]*
    2. No *[THANK RESPONDENT AND TERMINATE INTERVIEW]*
    3. Don't know/No answer *[THANK RESPONDENT AND TERMINATE INTERVIEW]*

RESPONDENT BACKGROUND

At this time, I'd like to let you know that your responses to this survey will be kept completely confidential. I'll begin with a few questions about your decision to participate in the program.

4. How did you learn of the Weatherization Program sponsored by I&M? *(Select all that apply)*
    1. Approached directly by representative of the program
    2. Received a letter in the mail about the program
    3. An I&M representative mentioned it
    4. The I&M website
    5. Friends or colleagues
    6. An architect, engineer or energy consultant
    7. An equipment vendor or building contractor
    8. Past experience with the program
    9. Other (Specify): _____

5. What is the main reason you decided to participate in the program?
    1. To save money on energy bill(s)
    2. Environmental reasons
    3. I&M paid a portion of the total cost of the items installed
    4. Other (Specify): _____
    5. Don't know

[DISPLAY LED LIGHTING SECTION IF RESPONDENT RECEIVED LED LIGHTING (TRACKING DATA)]
LED LIGHTING SECTION

6. We have it in our records that you received [LED_QUANTITY] LED light bulbs through the Weatherization Program. Can you please tell me where these LED light bulbs were installed in your home? I'll list some room types, so please let me know how many of the LED bulbs, if any, were installed in each of the following rooms:

Room Type	*#Bulbs*
Kitchen	
Living Room	
Outdoor	
Family Room	
Garage	
Bedroom	
Bathroom	
Hall/Entry	
Laundry Room	

7. What type of bulb did the LEDs replace?
    1. CFLs
    2. Incandescent bulbs
    3. Neither – bulbs were installed in a new fixture
    4. Both

[DISPLAY Q8 IF Q7 = 2 OR 4]

8. Were the incandescent bulbs still operating when they were removed, or were they already burnt out?
    1. All operating
    2. Some operating
    3. All burnt out

[DISPLAY CFL LIGHTING SECTION IF RESPONDENT RECEIVED CFL LIGHTING (TRACKING DATA)]
CFL LIGHTING SECTION

9. We have it in our records that you received [CFL_QUANTITY] Compact Fluorescent light bulbs (CFLs) through the Weatherization Program. These bulbs typically have a spiral shape as opposed to the rounded bulb shape of typical bulbs. Can you please tell me where these CFL light bulbs were installed in your home? I'll list some room types, so please let me know how many of the CFL bulbs, if any, were installed in each of the following rooms:

Room Type	*#Bulbs*
Kitchen	
Living Room	
Outdoor	
Family Room	
Garage	
Bedroom	
Bathroom	
Hall/Entry	
Laundry Room	

10. What type of bulb did the CFLs replace?
    1. Existing CFLs
    2. Incandescent bulbs
    3. Neither – bulbs were installed in a new fixture
    4. Both

[DISPLAY Q11 IF Q10 = 2 OR 4]

11. Were the incandescent bulbs still operating when they were removed, or were they already burnt out?
    1. All operating
    2. Some operating
    3. All burnt out

[DISPLAY Q12 IF CFL OR LED LIGHTING SECTIONS DISPLAYED]

12. How many hours per day do you spend in each of the following rooms?
    1. Bedroom _____
    2. Bathroom _____
    3. Hallway/Entry room _____
    4. Laundry Room _____

ITEM REMOVAL

13. Have any of the items or improvements that you received through the program been removed or reversed since they were installed?
    1. Yes (please specify what has been removed or reversed): _____
    2. No
    3. Don't know/Refused

BEHAVIORAL SAVINGS SECTION

14. Since your participation in the Weatherization Program, have you done any of the following? (Select all that apply)
    1. Turned off lights when you leave the room
    2. Unplug unused appliances
    3. Washed your clothes in cold water
    4. Installed a water heater tank wrap
    5. Installed a programmable thermostat or programmed an existing one?

Display if lighting:

15. In which rooms have you started turning off lights? [SELECT ALL THAT APPLY]
    1. Bedroom
    2. Bathroom
    3. Living room
    4. Kitchen
    5. Hallway
    6. Dining room
    7. Garage
    8. Outdoor/exterior
    9. Other: _____

16. Did you start turning off lighting when you leave the room before or after participating in the Weatherization Program?
    1. Before participating in the program
    2. After participating in the program

    If 1: Have you turned off the lights in additional rooms since participating in the program?

17. Thinking about the lights that you turn off since you participated in the program, are these traditional incandescent bulbs, Compact Fluorescent Bulbs (CFLs), or LEDs?
    1. CFLs
    2. LEDs
    3. Incandescent bulbs
    4. Mixture (how many of each?): _____
    5. Don't know

18. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Weatherization Program in your decision to turn off your lights when you're not occupying the room?

    Record Rating 0-10: _____

19. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to turn off your lights when not occupying the room had you not participated in the Weatherization Program?

    Record Rating 0-10: _____

Display if appliances:

20. What appliances do you unplug when not in use?
    1. TV
    2. Computer
    3. Washer
    4. Dryer
    5. Microwave
    6. Gaming system
    7. Portable heater
    8. Other – please specify: _____

21. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the program in your decision to unplug your appliances when not in use?

    Record Rating 0-10: _____

22. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to unplug your appliances when not in use had you not participated in the Weatherization Program?

    Record Rating 0-10: _____

Display if laundry in cold water:

23. How many loads of laundry do you do per week?
    Number of loads: _____

24. How many loads of laundry did you wash in cold water per week prior to participating in the Weatherization Program?
    Number of loads: _____

25. How many loads do you wash in cold water per week since participating in the Weatherization Program?
    Number of loads: _____

Display the following two questions if # in question 11 is greater than # in question 10 (that is, additional loads of laundry are washed in cold water since participating in the program):

26. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Weatherization Program in your decision to wash additional loads of laundry in cold water?

    Record Rating 0-10: _____

27. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to wash additional loads of laundry in cold water had you not participated in the Weatherization Program?

    Record Rating 0-10: _____

Display if water heater tank wrap:

28. Did you install water heater tank wrap before or after you participated in the Weatherization Program?
    1. Before participating in the program
    2. After participating in the program

29. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Weatherization Program in your decision to install water heater tank wrap?

    Record Rating 0-10: _____

30. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install water heater tank wrap had you not participated in the Weatherization Program?

    Record Rating 0-10: _____

Display if programmable thermostat:

31. Did you [install / program existing] thermostat before or after you participated in the Weatherization Program?
    1. Before participating in the program
    2. After participating in the program

32. On a scale from 0-10 where 0 is not at all important and 10 is extremely important, how would you rate the importance of the Weatherization Program in your decision to [install / program existing] programmable thermostat?

    Record Rating 0-10: _____

33. On a scale from 0-10 where 0 is not at all likely and 10 is extremely likely, how likely would you have been to [install / program existing] programmable thermostat had you not participated in the Weatherization Program?

Record Rating 0-10: _____

CROSS-PROGRAM AWARENESS

34. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs have you have heard of and which you have received or applied for:

	Have heard of			*Have applied for or received*		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that offers rebates for purchasing energy efficient air conditioners, heat pumps, water heaters, ceiling fans, dehumidifiers, pool pumps, and programmable thermostats.						
A program that offers discounts on light bulbs purchased at participating retailers.						
A program that offers a rebate for recycling your old refrigerator or freezer.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that discounts your electric bill for using your air conditioner less during peak demand periods						

[DISPLAY Q35 IF ANY ROW IN Q34, "HAVE HEARD OF" = 1]

35. Which sources did you learn of these programs from? [Check all that apply.]
    1. Newspaper/magazine/print media
    2. Bill insert
    3. Message printed on your bill
    4. Friend or relative (word-of-mouth)
    5. TV ad
    6. I&M representative
    7. I&M brochure
    8. Retailer/store
    9. Community event
    10. Social networking site such as Facebook or Twitter
    11. I&M program website
    12. Other [specify]_____.
    98. Don't know
    99. Refused

36. Have you visited I&M's Electric Ideas website (electricideas.com) that provides information on ways that I&M can help you save energy?
    1. Yes
    2. No
    98. Don't know
    99. Refused

[DISPLAY Q37 IF Q36 = 1]

37. Why did you visit the Electric Ideas website?
    1. To learn about I&M programs to help me save energy
    2. To enroll in an I&M energy efficiency program
    3. To get tips on how I can save energy
    4. General curiosity
    5. Other
    98. Don't know

PROGRAM SATISFACTION

Now I'd like to ask you about your satisfaction with several aspects of this program.

38. On a scale of 1 to 5, where "5" is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following?

Element of program Experience	*Very Satisfied*	*Somewhat Satisfied*	*Neutral*	*Somewhat Dissatisfied*	*Very Dissatisfied*	*Don't Know*
Performance of the items or improvements installed	5	4	3	2	1	DK
Savings on your monthly bill	5	4	3	2	1	DK
The effort required for the program application process	5	4	3	2	1	DK
Usefulness of the energy audit	5	4	3	2	1	DK
Information provided by I&M	5	4	3	2	1	DK
Quality of work conducted by the contractor	5	4	3	2	1	DK
Overall program experience	5	4	3	2	1	DK

[DISPLAY Q39 IF ANY ROW IN Q38 = 1 OR 2]

39. Why were you dissatisfied with [program Element]?

_____

_____

_____

DEMOGRAPHICS

Now I have just a few final questions about your home and energy use.

40. When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Before 1970's
    3. 1970's
    4. 1980's
    5. 1990-1994
    6. 1995-1999
    7. 2000-2005
    8. 2006 or newer
    98. Don't know [DON'T READ]
    99. Refused

41. What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Less than 1,000
    3. 1,001-1,500
    4. 1,501-2,000
    5. 2,001-2,500
    6. Greater than 2,500
    98. Don't know [DON'T READ]
    99. Refused

42. How many bedrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

43. What type of heating system do you have in your home?
    1. Natural gas heating
    2. Electric heating
    3. Combination of types (Specify):_____
    4. Other (Specify): _____
    98. Don't know [DON'T READ]
    99. Refused

44. What type of water heater do you have in your home?
    1. Natural gas water heater
    2. Electric water heater
    3. Other (Specify): _____

98. Don't know [DON'T READ]
99. Refused

45. How many bathrooms are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

46. How many showers are there in your home?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

47. Including yourself, how many people currently live in your home year-round?
    1. Quantity:____
    98. Don't know [DON'T READ]
    99. Refused

48. Do you have any other comments that you would like to relay to I&M about energy efficiency in residences or about this or other programs?
    _____
    _____
    _____

Would you be willing to allow the evaluator of the program to visit your home in order to verify the installation of items from this program? This visit will take a minimum of 15 minutes and no longer than 45 minutes (depending on the amount of items or improvements installed). You will receive a $25 gift card to Walmart for your participation at the end of the visit, regardless if some of the items or improvements have been removed.

1. Yes (Thank you, the evaluator may contact you shortly depending on how many visits are needed)
2. No

This completes the survey. If you have any additional questions regarding this survey or the program please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for your time!

Appendix H: New Construction Program Builder Survey Instrument

Indiana Michigan Power

2015 Residential New Construction Program

Builder Telephone Survey

1) Builder Company Name_____
2) Builder Contact Name_____
Introduction
Hello, may I please speak with [question("value"), id="74"]. My name is _____ and I am calling on behalf of Indiana Michigan Power about the Residential New Construction program that [question("value"), id="73"] participated in. Are you the person who is most familiar with the building specifications and energy efficiency improvements implemented by your company in qualifying for this program?

(IF NOT RIGHT PERSON) May I please speak to the person who would know the most about your company's participation in this program? REPEAT INTRODUCTION AND CONTINUE

(IF RIGHT PERSON) We are conducting a study to evaluate I&M's Residential New Construction program, and are contacting you because [question("value"), id="73"] is listed as a participating builder. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. The interview will take approximately 10 minutes. May I ask you a few questions?

3) How did you first learn about the I&M Residential New Construction Program?
( ) From the I&M website (www.electricideas.com)
( ) From a HERS rater
( ) From a realtor
( ) From an I&M staff member
( ) From a CLEAResult staff member
( ) From an equipment vendor or contractor
( ) From program brochures or marketing literature
( ) From a trade show or trade publication
( ) Other: _____
( ) Don't know
( ) Refused

4) Do you plan to participate in the 2016 I&M Residential New Construction program?

( ) Yes
( ) No
( ) Don't know
( ) Refused
Logic: Hidden unless: Question "Do you plan to participate in the 2016 I&M Residential New Construction program?" #4 is one of the following answers ("No")

5) Why don't you plan on participating in the program in 2016?
_____

Logic: Dynamically shown if "Do you plan to participate in the 2016 I&M Residential New Construction program?" = Yes

6) By the end of this year, what percentage of your residences built in the I&M service territory in 2015 will meet the efficiency standards of the I&M Residential New Construction Program?
_____

7) What "measures" are typically employed to qualify for the I&M program?
[ ] Ceiling Insulation - R38 + Blown-In Insulation
[ ] Ceiling Insulation - Cathedral Ceiling w/ Spray Foam
[ ] Wall Insulation - R-19 Blown-In Insulation
[ ] Wall Insulation - Spray Foam
[ ] Windows - Low E Window Glazing
[ ] Windows - Low E Window Glazing with Argon
[ ] Weather Stripping
[ ] Air Conditioner 14 SEER
[ ] Air Conditioner 15 SEER
[ ] Air Conditioner 16 SEER
[ ] Furnace 92 AFUE
[ ] Furnace 95 AFUE
[ ] Furnace 98 AFUE
[ ] High Efficiency Hot Water Heater
[ ] Tankless Hot Water Heater
[ ] Energy Star Appliances
[ ] CFLs (Screw based)
[ ] CFLs (Pin based)
[ ] Lighting Improvements (Screw-based, hardwired fixtures, canned lighting)
[ ] Cool Roofs
[ ] 2x6 Exterior Walls
[ ] Ceiling Insulation R-32
[ ] R-15 Wall Insulation
[ ] Radiant Barrier
[ ] LEDs
[ ] Furnace 93 AFUE
[ ] Furnace 96 AFUE

[ ] Reduced Duct Leakage
[ ] Advanced Framing
[ ] Infiltration Reduction
[ ] Insulate Slab
[ ] Other (please specify):: _____
[ ] Don't know
[ ] Refused

8) Do residents/buyers have the ability to select certain upgrades for your homes, or do all homes receive a predetermined set of measures?
( ) Residents/buyers elect certain upgrades
( ) Homes receive a predetermined set of measures
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Do residents/buyers have the ability to select certain upgrades for your homes, or do all homes receive a predetermined set of measures?" #8 is one of the following answers ("Residents/buyers elect certain upgrades") Dynamically shown if "Do residents/buyers have the ability to select certain upgrades for your homes, or do all homes receive a predetermined set of measures?" = Residents/buyers elect certain upgrades

9) What upgrades are offered?
_____
_____

Logic: Hidden unless: Question "Do residents/buyers have the ability to select certain upgrades for your homes, or do all homes receive a predetermined set of measures?" #8 is one of the following answers ("Residents/buyers elect certain upgrades") Dynamically shown if "Do residents/buyers have the ability to select certain upgrades for your homes, or do all homes receive a predetermined set of measures?" = Residents/buyers elect certain upgrades

10) For each upgrade, what percentage of residents elect to purchase the upgrades?
_____

11) Did your company utilize a HERS rater for homes in I&M's service territory prior to your enrollment in the I&M Residential New Construction Program?
( ) Yes
( ) No
( ) Don't know
( ) Refused

12) We would like to identify which, if any, aspects of the program were important in your decision to build homes to a higher efficiency standard than is required by code. Please rate each of the following factors on a scale of 0 to 10, where 0 means that the factor was not at all important in your decision to build energy efficient homes, and 10 means that the factor was extremely important in your decision to build energy efficient homes.

- Information from CLEAResult or I&M staff
- Technical assistance from HERS raters
- The incentive provided by the program
- Program marketing and program informational literature

13) On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely", how likely would you be to build your homes to the same efficiency standard if the I&M Residential New Construction Program and incentive were not available?
( ) 0 - Not at all likely
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5
( ) 6
( ) 7
( ) 8
( ) 9
( ) 10 - Extremely likely
( ) Don't know
( ) Refused

Logic: Show/hide trigger exists. Hidden unless: Question "On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely", how likely would you be to build your homes to the same efficiency standard if the I&M Residential New Construction Program and incentive were not available?" #13 is one of the following answers ("7","8","9","10 - Extremely likely")

14) If the I&M program and incentive were not available, how likely would your company be to build **fewer** homes to the same efficiency standard? Please answer on the same 0 to 10 scale where 0 means "not at all likely" and 10 means "extremely likely".
( ) 0 - Not at all likely
( ) 1
( ) 2
( ) 3
( ) 4
( ) 5
( ) 6

( ) 7
( ) 8
( ) 9
( ) 10 - Extremely likely
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "If the I&M program and incentive were not available, how likely would your company be to build **fewer** homes to the same efficiency standard? Please answer on the same 0 to 10 scale where 0 means "not at all likely" and 10 means "extremely likely"." #14 is one of the following answers ("7","8","9","10 - Extremely likely")

15) For that scenario where you would possibly build fewer homes to the same efficiency standard, what percentage fewer homes would be built to your current efficiency standard? (If clarification is needed: "Assuming that the program and rebate were not available, what percentage of the energy efficient homes you currently build would be built to a lower efficiency standard?")
( ) 0% (Would build all homes to the current efficiency standard)
( ) 10%
( ) 20%
( ) 30%
( ) 40%
( ) 50%
( ) 60%
( ) 70%
( ) 80%
( ) 90%
( ) 100% (Would build all homes to a lower efficiency standard)
( ) Other (Must be a percentage):
_____*
( ) Don't know
( ) Refused

16) Could you please tell me, in your own words, the influence the I&M Residential New Construction Program had on your building practices?
_____
_____

17) In the year prior to your enrollment in the I&M Residential New Construction Program, what percentage of your new homes in I&M's service territory would have met this program's specified Silver Star efficiency level (HERS of 75) or better?
( ) None
( ) 10%
( ) 20%

( ) 30%
( ) 40%
( ) 50%
( ) 60%
( ) 70%
( ) 80%
( ) 90%
( ) 100%
( ) Don't know
( ) Refused

18) What factors influence decisions to include energy efficient equipment/materials/construction practices which exceed IECC 2009 building code requirements?

_____
_____
_____
_____

19) Does your company perform duct leakage testing on your homes?
( ) Yes on a sample of homes
( ) Yes on ALL homes (100%)
( ) No our company does not perform duct leakage testing
( ) Don't know
( ) Refused

20) Does your company perform infiltration testing on your homes?
( ) Yes on a sample of homes
( ) Yes on ALL homes (100%)
( ) No our company does not perform infiltration testing
( ) Don't know
( ) Refused

21) Do you currently build any homes that would meet the I&M program's efficiency requirements but will not receive an incentive through the program?
( ) Yes
( ) No
( ) Don't know
( ) Refused

Logic: Show/hide trigger exists. Hidden unless: Question "Do you currently build any homes that would meet the I&M program's efficiency requirements but will not receive an incentive through the program?" #21 is one of the following answers ("Yes")

22) Are these homes located within the I&M service territory?
( ) Yes

( ) No
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Are these homes located within the I&M service territory?" #22 is one of the following answers ("Yes") Dynamically shown if "Are these homes located within the I&M service territory?" = Yes

23) Can you briefly describe why these homes will not receive an incentive through the program?
_____
_____

24) Do you participate in any other above-code programs such as the following?
[ ] EPA's "Energy Star New Homes" program
[ ] Department of Energy "Builder Challenge"
[ ] USGBC LEED "Green Building Program"
[ ] "Environments for Living (EFL)"
[ ] Other (please specify): _____
[ ] None of the above
[ ] Don't know
[ ] Refused

Logic: Hidden unless: Question "Do you participate in any other above-code programs such as the following?" #24 is one of the following answers ("EPA\'s \"Energy Star New Homes\" program","Department of Energy \"Builder Challenge\"","USGBC LEED \"Green Building Program\"","\"Environments for Living (EFL)\"","Other (please specify)") Dynamically shown if "Do you participate in any other above-code programs such as the following?" = Other (please specify)

25) You specified an additional program above. What percentage of homes in I&M's service territory were rebated through this other program?
_____
_____

26) Can you provide (or direct us to) descriptive materials for your 2015 models?
_____
_____

27) Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any training through the program?
( ) Yes
( ) No
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any training through the program?" #27 is one of the following answers ("Yes")

28) What training have you received?

_____

29) Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any technical support through the program?
( ) Yes
( ) No
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any technical support through the program?" #29 is one of the following answers ("Yes")

30) What technical support have you received?

_____

31) Thinking about your involvement with the Residential New Construction Program, since you first participated have you received any marketing support through the program?
( ) Yes
( ) No
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Thinking about your involvement with the Residential New Construction Program, since you first participated have you received any marketing support through the program?" #31 is one of the following answers ("Yes")

32) What marketing support have you received?

_____

Logic: Hidden unless: ((Question "Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any technical support through the program?" #29 is one of the following answers ("Yes") OR Question "Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any training through the program?" #27 is one of the following answers ("Yes")) OR Question "Thinking about your involvement with the Residential New Construction Program, since you first participated have you received any marketing support through the program?" #31 is one of the following answers ("Yes"))

33) How, if at all, have any of the resources offered by the program affected your success in selling energy efficient homes?

_____

Logic: Hidden unless: ((Question "Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any training through the program?" #27 is one of the following answers ("Yes") OR Question "Thinking about your involvement with the I&M Residential New Construction Program, since you first participated have you received any technical support through the program?" #29 is one of the following answers ("Yes")) OR Question "Thinking about your involvement with the Residential New Construction Program, since you first participated have you received any marketing support through the program?" #31 is one of the following answers ("Yes"))

34) How, if at all, have any of the resources offered by the program affected your building practices?

_____

35) If the I&M Residential New Construction Program and rebate weren't available, what codes or standards would your homes follow in 2015? [DO NOT READ]
[ ] Code - IRC 2009 (with modifications)
[ ] Code - IECC 2006
[ ] Code - IECC 2009
[ ] Other
[ ] Don't know
[ ] Refused

36) Prior to your decision to participate the I&M Residential New Construction Program, did you perceive potential barriers or disadvantages to participating in the program?
( ) Yes
( ) No
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Prior to your decision to participate the I&M Residential New Construction Program, did you perceive potential barriers or disadvantages to participating in the program?" #36 is one of the following answers ("Yes")

37) What barriers or disadvantages did you perceive?

_____

Logic: Hidden unless: Question "Prior to your decision to participate the I&M Residential New Construction Program, did you perceive potential barriers or disadvantages to participating in the program?" #36 is one of the following answers ("Yes")

38) Did I&M implement any specific policy or program-design change that removed or reduce these barriers?
( ) Yes
( ) No
( ) Don't know
( ) Refused

39) How satisfied are you with the efficiency requirements of the I&M Residential New Construction Program?
( ) Very satisfied
( ) Somewhat satisfied
( ) Neutral
( ) Somewhat dissatisfied
( ) Very dissatisfied
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "How satisfied are you with the efficiency requirements of the I&M Residential New Construction Program?" #39 is one of the following answers ("Somewhat dissatisfied","Very dissatisfied")

40) Why are you dissatisfied with the energy efficiency requirements of the program?
_____
_____

41) How satisfied are you with the program application process?
( ) Very satisfied
( ) Somewhat satisfied
( ) Neutral
( ) Somewhat dissatisfied
( ) Very dissatisfied
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "How satisfied are you with the program application process?" #41 is one of the following answers ("Somewhat dissatisfied","Very dissatisfied")

42) Why are you dissatisfied with the program application process?
_____
_____

43) Overall, how satisfied are you with the I&M Residential New Construction Program as a whole?
( ) Very satisfied
( ) Somewhat satisfied

( ) Neutral
( ) Somewhat dissatisfied
( ) Very dissatisfied
( ) Don't know
( ) Refused

Logic: Hidden unless: Question "Overall, how satisfied are you with the I&M Residential New Construction Program as a whole?" #43 is one of the following answers ("Somewhat dissatisfied","Very dissatisfied")

44) Why are you dissatisfied with the program as a whole?
_____

45) Would you like to provide I&M with any additional feedback or specific recommendations?
_____
_____

Thank You!
Thank you for taking our survey. Your response is very important to us.

Appendix I: Energy Efficient Products Program Participant Survey Instruments

Indiana Michigan Power (I&M)

2015 Residential Energy Efficient Products Program

Appliance Rebate Verification and Net-to-Gross Survey Questionnaire

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

1. Hello. My name is _____ with _____, and I am calling on behalf of Indiana Michigan Power (I&M). We are speaking with households that participated in I&M's Residential Energy Efficient Products Program. Our records indicate that you received a rebate or discount for a [MEASURE_SET] through this program. Do you recall participating in this program?
    1. Yes
    2. No
    3. Don't know
    4. Refused [THANK RESPONDENT AND TERMINATE INTERVIEW]

2. Is it possible that someone else in your household would be familiar with this equipment purchase?

    1. Yes
    2. No [THANK AND TERMINATE]
    3. Don't Know [THANK AND TERMINATE]
    4. Refused [THANK AND TERMINATE]

3. May I speak with that person?

    1. Yes [RECYCLE THROUGH Q1 and Q2 WITH NEW RESPONDENT]
    2. No [THANK AND TERMINATE]
    3. Don't Know [THANK AND TERMINATE]
    4. Refused [THANK AND TERMINATE]

4. Great, thank you. First I want to assure you that I'm not selling anything. We are calling program participants to verify information about the products and rebate received and to assess customer satisfaction with the products. May I take a few minutes to talk with you about the product or products you received and how satisfied you have been with the product(s) and rebate program? Your responses will be kept confidential.

    1. Yes [PROCEED WITH INTERVIEW]
    2. No [THANK TERMINATE]
    3. Refused [THANK AND TERMINATE]

5. First, I would like to verify the products you received through the program during 2015. As a reminder, our records indicate that you received a rebate or discount for a [MEASURE_SET] this year. Is that correct? **[IF RESPONDENT DISAGREES WITH PROGRAM RECORDS, GO BACK TO Q2]**

    [READ ITEM FOR WHICH REBATE WAS PAID; RECORD ANSWER INDICATED BY RESPONDENT]

	Yes	No	DK	NA
1. Air conditioner		01	02	98 99
2. Heat pump	01	02	98	99
3. Heat pump water heater		01	02	98 99
4. Electronically commutated motor	01	02	98	99
5. Programmable thermostat	01	02	98	99
6. Energy Star ceiling fan		01	02	98 99
7. Energy Star dehumidifier	01	02	98	99
8. Variable speed pool pump	01	02	98	99

6. Next, could you tell me how you heard about the Residential Energy Efficient Products Program? [DO NOT READ; INDICATE ALL THAT APPLY]

    1. I&M Bill Insert
    2. Direct Mail from I&M
    3. I&M website (www.electricideas.com)
    4. Retail Store
    5. Contractor

6. Print Ad
7. Social Networking site such as Facebook or Twitter
8. Radio
9. Word-of-Mouth
10. Other (specify)
11. Specify Other: _____

7. How long had you known about the program and its rebates before you decided to participate in the program?

    1. Learned about program at time of purchase
    2. Less than a week
    3. Less than a month
    4. A month or more
    5. Don't know
    6. Refused
    7. Specify Other: _____

8. Where did you obtain the rebate application?

    1. From the I&M website (www.electricideas.com)
    2. From another website
    3. In a retail store
    4. From a contractor
    5. Other
    6. Don't know
    7. Refused
    8. Specify Other: _____

[DISPLAY AIR CONDITIONER SECTION IF Q5, "AIR CONDITIONER" = 01]
AIR CONDITIONER SECTION

9. Do you currently use the air conditioner that was rebated under the Residential Energy Efficient Products Program?
    1. Yes
    2. No
    3. Don't know
    4. Refused

10. Was this air conditioner purchased:
    1. To replace a functioning unit
    2. To replace a broken unit
    3. Not a replacement

4. Refused

[DISPLAY Q11 IF Q10 = 1 OR 2]

11. What did you do with your old unit?
    1. Still have it
    2. Recycled through a recycling program
    3. It was picked up by the delivering retailer
    4. Took it to the dump
    5. Sold it for scrap metal
    6. Sold for parts
    7. Sold or gifted unit to an individual
    8. Sold or donated to an organization/company.
       Company name: _____
    9. Don't know
    10. Refused

[DISPLAY Q12 IF Q11 = 1]

12. Is your old unit:
    1. Not in use
       In use

13. How many months out of the year do you run this air conditioner?
    1. Record number of months: _____

14. During these months, how many hours per day is the air conditioner running, on average?
    1. Record hours per day: _____

[DISPLAY Q15 IF Q5, "AIR CONDITIONER" = 02]

15. Do you currently own an air conditioner?
    1. Yes
    2. No
    3. Refused

[DISPLAY HEAT PUMP SECTION IF Q5, "HEAT PUMP" = 01]
HEAT PUMP SECTION

16. Do you currently use this heat pump that was rebated under the Residential Energy Efficient Products Program?

1. Yes
2. No
3. Refused

17. Was this heat pump purchased:
    1. To replace a functioning unit
    2. To replace a broken unit
    3. Not a replacement
    4. Refused

[DISPLAY Q25 IF Q24 = 1 OR 2]

18. What did you do with your old unit?
    11. Still have it
    12. Recycled through a recycling program
    13. It was picked up by the delivering retailer
    14. Took it to the dump
    15. Sold it for scrap metal
    16. Sold for parts
    17. Sold or gifted unit to an individual
    18. Sold or donated to an organization/company.
        Company name: _____
    19. Don't know
    20. Refused

[DISPLAY Q26 IF Q25 = 1]

19. Is your old unit:
    2. Not in use
    3. In use

[DISPLAY Q27 IF Q5, "HEAT PUMP" = 02]

20. Do you currently own a heat pump?
    1. Yes
    2. No
    3. Refused

[DISPLAY PROGRAMMABLE THERMOSTAT SECTION IF Q5, "PROGRAMMABLE THERMOSTAT" = 01]
PROGRAMMABLE THERMOSTAT SECTION

21. Do you currently use this programmable thermostat that was rebated under the Residential Energy Efficient Products Program?
    1. Yes

2. No
3. Refused

22. Does your home have central air conditioning?
    1. Yes
    2. No
    3. Refused

[DISPLAY Q37 IF Q5, "PROGRAMMABLE THERMOSTAT" = 02]

23. Do you currently own a programmable thermostat?
    1. Yes
    2. No
    3. Refused

[DISPLAY Q38 IF Q37 = 1]

24. How old is your current programmable thermostat?
    1. Less than a year old
    2. 1-2 years old
    3. 3-5 years old
    4. 6-10 years old
    5. More than 10 years old
    6. Don't know
    7. Refused

[DISPLAY ENERGY STAR CEILING FAN SECTION IF Q5, "ENERGY STAR CEILING FAN" = 01]
ENERGY STAR CEILING FAN SECTION

25. Do you currently use the Energy Star Ceiling Fan that was rebated under the Residential Energy Efficient Products Program?
    1. Yes
    2. No
    3. Refused

26. Was this ceiling fan purchased:
    1. To replace a functioning unit
    2. To replace a broken unit
    3. Not a replacement
    4. Refused

[DISPLAY Q53 IF Q52 = 1 OR 2]

27. What did you do with your old unit?
    1. Still have it
    2. Recycled through a recycling program
    3. It was picked up by the delivering retailer
    4. Took it to the dump
    5. Sold it for scrap metal
    6. Sold for parts
    7. Sold or gifted unit to an individual
    8. Sold or donated to an organization/company.
       Company name: _____
    9. Don't know
    10. Refused

[DISPLAY Q54 IF Q53 = 1]

28. Is your old unit:
    1. Not in use
    2. In use

[DISPLAY Q55 IF Q5, "ENERGY STAR CEILING FAN" = 02]

29. Do you currently own a ceiling fan?
    1. Yes
    2. No
    3. Refused

[DISPLAY DEHUMIDIFIER SECTION IF Q5, "DEHUMIDIFIER" = 01]
DEHUMIDIFIER SECTION

30. Do you currently use the dehumidifier that was rebated under the Residential Energy Efficient Products Program?
    1. Yes
    2. No
    3.
    4. Refused

31. Was this dehumidifier purchased:
    1. To replace a functioning unit
    2. To replace a broken unit
    3. Not a replacement
    4. Refused

[DISPLAY Q53 IF Q52 = 1 OR 2]

32. What did you do with your old unit?
    1. Still have it
    2. Recycled through a recycling program
    3. It was picked up by the delivering retailer
    4. Took it to the dump
    5. Sold it for scrap metal
    6. Sold for parts
    7. Sold or gifted unit to an individual
    8. Sold or donated to an organization/company.
       Company name: _____
    9. Don't know
    10. Refused

[DISPLAY Q54 IF Q53 = 1]

33. Is your old unit:
    1. Not in use
    2. In use

[DISPLAY Q55 IF Q5, "DEHUMIDIFIER" = 02]

34. Do you currently own a dehumidifier?
    1. Yes
    2. No
    3. Refused

[DISPLAY ELECTRIC HEAT PUMP WATER HEATER SECTION IF Q5, "ELECTRIC HEAT PUMP WATER HEATER" = 01]
ELECTRIC HEAT PUMP WATER HEATER SECTION

35. Do you currently use the water heater that was rebated under the Residential Energy Efficient Products Program?
    1. Yes
    2. No
    3. Refused

36. Was this water heater purchased:
    1. To replace a functioning unit
    2. To replace a broken unit
    3. Not a replacement
    4. Don't recall
    5. Refused

[DISPLAY Q65 IF Q64 = 1 OR 2]

37. What did you do with your old unit?
    1. Still have it
    2. Recycled through a recycling program
    3. It was removed by the installer
    4. Took it to the dump
    5. Sold it for scrap metal
    6. Sold for parts
    7. Sold or gifted unit to an individual
    8. Sold or donated to an organization/company.
       Company name: _____
    9. Don't know
    10. Refused

[DISPLAY Q66 IF Q65 = 1]

38. Is your old unit:
    1. Not in use
    2. In use

[DISPLAY Q67 IF Q5, "WATER HEATER" = 02]

39. Do you currently own a water heater?
    1. Yes
    2. No
    3.
    4. Refused

[DISPLAY POOL PUMP SECTION IF Q5, "POOL PUMP" = 01]
POOL PUMP SECTION

40. Do you currently use the pool pump that was rebated under the Residential Energy Efficient Products Program?
    1. Yes
    2. No
    3. Refused

41. Was this pool pump purchased:
    1. To replace a functioning unit
    2. To replace a broken unit
    3. Not a replacement
    4. Don't recall
    5. Refused

[DISPLAY Q77 IF Q76 = 1 OR 2]

42. What did you do with your old unit?
    1. Still have it
    2. Recycled through a recycling program
    3. It was removed by the installer
    4. Took it to the dump
    5. Sold it for scrap metal
    6. Sold for parts
    7. Sold or gifted unit to an individual
    8. Sold or donated to an organization/company.
       Company name: _____
    9. Don't know
    10. Refused

[DISPLAY Q78 IF Q77 = 1]

43. Is your old unit:
    1. Not in use
    2. In use

[DISPLAY Q79 IF Q5, "POOL PUMP" = 02]

44. Do you currently own a pool pump?
    1. Yes
    2. No
    3. Refused

FREE RIDERSHIP

[ASK THE FOLLOWING FOR EACH APPLIANCE REBATED]

45. Would you have been financially able to purchase the [MEASURE] if you had not received the rebate offered by I&M?
    1. Yes
    2. No
    3. Don't know
    4. Refused

46. Did a program representative, I&M staff member, salesperson, or contractor recommend that you purchase the equipment that were rebated through this program?
    1. Yes
    2. No
    3. Don't know
    4. Refused

[DISPLAY Q89 IF Q88 = 1]

47. How important was this recommendation in your decision to purchase the rebated equipment?

1. Very important
2. Somewhat important
3. Only slightly important
4. Not at all important
5. Don't know
6. Refused

48. On a scale of 0 to 10 where 0 represents "Not at all likely" and 10 represents "Extremely likely", if you had not received the financial or informational assistance through the I&M program, how likely is it that you would have purchased the same [MEASURE] anyway?
    1. Response from 0 – 10: _____
    2. Don't know
    3. Refused

49. Did the financial or informational assistance provided through the I&M program cause you to purchase the energy efficient [MEASURE] sooner than you otherwise would have?
    1. Yes
    2. No
    3. Don't know
    4. Refused

[DISPLAY Q93 IF Q92 = 1]

50. How much sooner?
    1. A year sooner
    2. Two to three years sooner
    3. Four to five years sooner
    4. Don't know
    5. Refused

51. When deciding about the [MEASURE], did you purchase a more efficient [MEASURE] than you otherwise would have because of the financial or informational assistance that was provided through the I&M program?
    1. Yes
    2. No
    3. Don't know
    4. Refused

52. Did you know about I&M's Residential Energy Efficient Products Program…
    Before starting the process of purchasing the [MEASURE]
    1. After researching [MEASURE]s but before deciding to purchase
    2. After deciding to purchase [MEASURE]

3. Don't know
4. Refused

SPILLOVER SECTION

53. Because of your experience with the Residential Energy Efficient Products Program, have you bought any additional energy efficient items on your own without a financial incentive or rebate?
    5. Yes, have already bought non-incentivized energy efficient items because of my experience with the program
    6. No
    7. Don't know

[DISPLAY Q98 IF Q97 =1]

54. For each of the following items please tell me if you purchased on your own and how many you purchased. If you have purchased something that is not included in the table, please describe the additional items in as much detail as you can. *(In the following table, please indicate the quantity of each item type purchased, or specify another item type and quantity)*

Measure Type	***Quantity Purchased***
Refrigerator	
Freezer	
Dehumidifier	
Air Purifier	
Clothes Washer	
Electric Heat Pump Water Heater	
CFLs	
Water Heater Pipe Insulation	
Water Heater Jacket/Blanket/Insulation	
LED Light Bulbs	
Low Flow Bathroom Aerators	
Low Flow Kitchen Aerator	
Low Flow Showerhead	
LED Nightlights	
Windows	
Air sealing improvements	
Attic insulation	

Wall insulation	
Other:	

[DISPLAY Q99 IF Q97 =1]

55. Have you installed all of these items?
    5. Yes, have installed all of the items listed
    6. No, have only installed some of the items listed (please specify): _____
    7. No, have not installed any of the items listed
    8. Don't know

[DISPLAY Q100 IF Q99 = 1 OR 2]

56. In what month and year did you install these items?
    _____
    _____

[DISPLAY Q101 IF Q99 = 1 OR 2]

57. On a scale of 0 to 10 where 0 represents "Not at all important" and 10 represents "Extremely important", how important was your experience with the Efficient Products Program in your decision to purchase and install these additional items?
    1. Record Number 0 – 10: _____
    2. Don't know
    3. Refused

[DISPLAY Q102 IF Q99 = 1 OR 2]

58. On a scale of 0 to 10 where 0 represents "Not at all likely" and 10 represents "Extremely likely", how likely would you have been to purchase these additional items if you had never participated in the Energy Efficient Products Program?

    1. Record Number 0 – 10: _____
    2. Don't know
    3. Refused

CROSS-PROGRAM AWARENESS

59. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs have you have heard of and which you have received or applied for:

	Have heard of			Have applied for or received		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that provides in-store discounts on energy efficient lighting						
A program that provides incentives and pick-up services for recycling old refrigerators and freezers.						
A program that offers rebates for making weatherization improvements to your home such as air sealing and adding insulation.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that provides a device that helps manage your air conditioner usage during summer months						

[DISPLAY Q104 IF ANY ROW IN Q103, "HAVE HEARD OF" = 1]

60. Which sources did you learn of these programs from? [Check all that apply.]
    13. Newspaper/magazine/print media
    14. Bill insert
    15. Message printed on your bill
    16. Friend or Relative (word-of-mouth)
    17. TV ad
    18. I&M Representative
    19. I&M Brochure
    20. Retailer/store
    21. Community event
    22. Social Networking site such as Facebook or Twitter
    23. I&M Program Website (www.electricideas.com)
    24. Other [Specify]_____.
    98. Don't know
    99. Refused

PROGRAM SATISFACTION

I'd like to ask you just a few more questions about your satisfaction with the I&M Residential Energy Efficient Products Program.

61. How satisfied were you with the rebate amount? Would you say you were:

    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    6. Refused
    7. Don't know

62. Did you fill out your own rebate application, or did a contractor or sales representative do it for you?
    1. I filled it out
    2. A contractor or salesperson filled it out
    3. Other: _____
    4. Don't know
    5. Refused

[DISPLAY Q107 IF Q106 = 1]

63. How satisfied were you with the rebate application process? Would you say you were:
    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    6. Refused
    7. Don't know

64. Did you have any interactions with I&M or program staff?
    1. Yes
    2. No
    3. Don't know
    4. Refused

[DISPLAY Q109 IF Q108 = 1]

65. How satisfied were you with your communications with I&M and/or program staff? Would you say you were:

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Refused
7. Don't know

[DISPLAY Q110 IF Q105 OR Q107 OR Q109 = 4 OR 5]

66. Why were you dissatisfied? [Record Verbatim or Refused=98, Don't know=99]

1. _____

[ASK THE FOLLOWING FOR EACH APPLIANCE REPORTED]

67. Have you noticed any savings on your electric bill since installing your new [MEASURE_GENERIC]/removing your old [APPLIANCE]?

1. Yes
2. No
3. Not sure
4. Refused
5. Don't know

[DISPLAY Q112 IF Q111 = 1]

68. How satisfied are you with any savings you noticed on your electric bill since installing your new [MEASURE_GENERIC]/removing your old [APPLIANCE]? Would you say you were:

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. I didn't notice any savings
7. Refused
8. Don't know

69. How satisfied are you with your new [MEASURE_GENERIC]? Would you say you were: Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, or Very Dissatisfied?

1. Very satisfied
2. Somewhat satisfied

3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Refused
7. Don't know \

[DISPLAY Q114 IF Q112 OR Q113 = 4 OR 5]

70. Why aren't you satisfied? [Record Verbatim or Refused=98, Don't know=99]
    1. _____

71. Finally, if you were rating your overall satisfaction with the I&M Residential Energy Efficient Products Program, would you say you were:

    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    6. Refused
    7. Don't know

72. Why do you give it that rating?

    _____
    _____
    _____

HOME CHARACTERISTICS

73. When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Before 1970's
    3. 1970's
    4. 1980's
    5. 1990-1994
    6. 1995-1999
    7. 2000-2005
    8. 2006 or newer

9. Don't know (don't read)
10. Refused

74. What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]
    1. Verbatim____
    2. Less than 1,000
    3. 1,001-1,500
    4. 1,501-2,000
    5. 2,001-2,500
    6. Greater than 2,500
    7. Don't know (don't read)
    8. Refused

75. How many bedrooms are there in your home?
    1. Quantity:____
    2. Don't know (don't read)
    3. Refused

76. How many bathrooms are there in your home?
    1. Quantity:____
    2. Don't know (don't read)
    3. Refused

77. Including yourself, how many people currently live in your home year-round?
    1. Quantity:____
    2. Don't know (don't read)
    3. Refused

78. Do you have any comments about the Residential Energy Efficient Products Program, or any suggestions with regard to how it might be improved?

    Comments (if any): _____
    _____
    _____

If you have any further question or comments for Indiana Michigan Power (I&M) please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for you time. Have a great day/evening.

Indiana Michigan Power

Efficient Products Program

Residential Upstream Lighting Intercept Survey Questionnaire

Interviewer: _____ Date of Interview: _____/_____/_____

Name of retail store: _____ Store Address: _____

Hello. My name is _____. I am conducting a brief survey on lighting purchases for Indiana Michigan Power (I&M). May I ask you a few questions? We're offering a $10 gift card for completed surveys.

1. First, I'd like to record some details about the type of light bulbs you selected for purchase. Do you mind if I record some information from the packaging?
   (*If refused, thank and terminate interview*)

Package #	Bulb Type	Specialty CFL?	Quantity of Bulbs	Bulb Wattage	Marked Equivalent Wattage	Bulb Lumens	Program bulbs?
Options →	*CFL, LED, Halogen, Std. Inc.*	*No (standard spiral), reflector, A-lamp, Globe lamp, dimmable lamp, 3-way lamp*	*Numerical*	*Numerical*	*Numerical*	*Numerical*	*Y/N*
1							
2							
3							
4							
5							
6							
7							

Thanks, now I'd like to ask you a few questions about your light bulb selections today.

1. Can you tell me which of the following best describes the building where you plan to install these light bulbs?
    a. Single family home or duplex
    b. Other residence, such as apartment or condo
    c. Business location
    d. Other:_____(record)
2. When do you plan to install the light bulbs you are purchasing?
    a. Plan to install all within one week of purchase **(SKIP 3)**
    b. Plan to install some and shelve remainder for installation at later date
    c. Plan to shelve all for installation at later date **(SKIP 3)**
3. Approximately how many of the light bulbs do you plan to install within one week? Your best estimate is OK.
    a. Record Number:_____
4. Of the bulbs you will not install within one week, how many do you anticipate you will install within one year from now? Your best estimate is OK.
    a. Record Number:_____
5. What, if anything, will these light bulbs replace?
    a. Burnout existing light bulbs
    b. Existing light bulbs that are still functional
    c. New lamp/socket **(SKIP 6)**
    d. Mixture:_____(describe, with as much detail as possible)
6. Regarding the light bulbs being replaced, what type of bulbs are they?
    a. Incandescent
    b. CFL
    c. LED
    d. Mixture: _____(describe, with as much detail as possible, estimated percentage?)
    e. Other: _____ (describe, with as much detail as possible, estimated percentage?)

7. Did you plan to purchase light bulbs before you entered the store today?
    a. Yes

b. No **(READ 8, SKIP 9)**
c. Don't know **(READ 8, SKIP 9)**

8. I noticed the type of light bulb(s) you selected for purchase is (are) [CFL(s)/LED(s)]. Have you purchased this type of light bulb before?

   a. Yes
   b. No
   c. Don't know

9. Before entering the store today, did you plan to purchase this specific bulb type or just light bulbs in general?

   a. Specific bulb type
   b. Light bulbs in general
   c. Don't know

Questions 10 – 11 are for Program CFL purchasers only. For Non "Program CFL" purchasers, skip to Q12.

10. If the CFLs that you selected cost [$X] more per package, would you still choose CFLs as opposed to cheaper incandescent/halogen options? **Note:** The $X per package is $1*# of bulbs in program discounted package. See the guide at bottom of survey for specifics. **Note: (read options)**

    a. Definitely would have still purchased CFLs
    b. Probably would have still purchased CFLs
    c. Probably would not have still purchased CFLs **(SKIP 11)**
    d. Definitely would not have still purchased CFLs **(SKIP 11)**

11. Again, imagine the CFLs you selected today cost [$X] more per package. Do you think you would have purchased fewer CFLs today at that price? How many fewer?

    a. Yes: Quantity:_____
    b. No, same quantity.

Questions 12 – 13 are for Program LED purchasers only. For Non "Program LED" purchasers, skip to Q14.

12. If the LEDs that you selected cost $3 more per bulb, would you still choose LEDs as opposed to cheaper CFLs or incandescent/halogen options? **(read options)**

    a. Definitely would have still purchased LEDs
    b. Probably would have still purchased LEDs
    c. Probably would not have still purchased LEDs **(SKIP 13)**
    d. Definitely would not have still purchased LEDs **(SKIP 13)**

13. Again, imagine the LEDs you selected today cost $3 more per bulb. Do you think you would have purchased fewer LEDs today at that price? How many fewer?

    a. Yes: Quantity:_____
    b. No, same quantity.
    c. Don't know.

14. Are you aware that Indiana Michigan Power (I&M) is sponsoring discounts on energy efficient light bulbs in this retail store? These discounts are already reflected in the listed pricing for select products.
    a. Yes (aware)
    b. No (not aware) **(SKIP 15&16&17&18)**
15. Were you aware of these I&M sponsored discounts before you entered the store today?
    a. Yes (aware)
    b. No (not aware)
16. How did you become aware of the I&M sponsored discounts?
    a. In-store promotional event representative
    b. In-store signage/marketing materials
    c. Store salesperson
    d. I&M website
    e. Other:_____(describe)
17. How important would you say the information you gained from the [answer to Q16] was to your decision to purchase the bulbs you have selected? Please use a scale from 1 to 10 where 1 is not important at all and 10 is very important. **(Record for each answer given to Q16)**
    a. Record Score 1-10: _____
    b. Record Score 1-10: _____
    c. Record Score 1-10: _____
    d. Record Score 1-10: _____
18. How important would you say the actual I&M sponsored price discount was to your decision to purchase the bulbs you have selected? Again, please use a scale from 1 to 10, where 1 is not important at all and 10 is very important.
    a. Record Score 1-10: _____
19. Could you briefly describe in your own words what made you choose the specific light bulbs you selected as opposed to other options?
    a. Record Verbatim:

    _____

    _____

    _____

    _____

    _____

Would you be willing to leave your name and telephone number in order to be contacted for a brief follow-up survey by telephone? Once you complete this survey you will be sent another $10

gift card. Your contact information will not be used for any purpose other than contacting you for this follow-up survey in a few weeks.

Name:	
Address:	
City/State:	
Zip:	
Phone Number:	

Thank you very much for your time.

Indiana Michigan Power

2015 Residential Efficient Products Program (Lighting)

Satisfaction and Spillover Questionnaire

Interviewer: _____ Date of Interview: _____/_____/_____
Respondent: _____ Address: _____

Hello. My name is _____ with _____, and I am calling on behalf of Indiana Michigan Power. As you may recall, we interviewed you back in <MONTH> regarding your CFL/LED (and/or) purchase at <INSERT RETAILER NAME> while you were in-store. Do you have a few minutes to answer some questions regarding your satisfaction with the bulbs purchased? You will be sent a $10 gift card after this call.

1. When you were surveyed in the retail store, we recorded that you were purchasing [QTY] CFLs/LEDs. Have you installed all [QTY] of those bulbs?
    a. Yes
    b. No
    c. Don't know
    d. Refused
2. Of those [QTY] bulbs that you purchased that day, how many have you installed?
    a. Quantity: _____
    b. Don't know
    c. Refused
3. How many of the remaining CFLs/LEDs do you plan to install before <MONTH> 2016?
    a. Quantity: _____
    b. Don't know
    c. Refused
4. On a scale of 1 – 5, with "1" meaning "very dissatisfied" and "5" meaning "very satisfied", how satisfied were you with:
    [ASK IN RANDOM ORDER, WITH ITEM (E) ALWAYS LAST, ONLY DISPLAY C AND E IF <PROGRAM BULBS> = "YES']

	1 Very Dissatisfied	2	3	4	5 Very Satisfied	Don't know or no answer
A. The quality of lighting from your CFLs/LEDs	❑	❑	❑	❑	❑	❑
B. The energy savings from CFLs/LEDs	❑	❑	❑	❑	❑	❑
C. The amount of the discount	❑	❑	❑	❑	❑	❑
D. The selection of qualifying products	❑	❑	❑	❑	❑	❑
E. The level of information available in-store regarding lighting options	❑	❑	❑	❑	❑	❑

5. Why were you dissatisfied with [COMPONENT SCORED < 3]? [ENTER VERBATIM RESPONSE]

SPILLOVER SECTION [DISPLAY SECTION IF <PROGRAM BULBS> = "YES"]

6. Because of your experience with the Efficient Products Program, have you bought, or are you likely to buy, additional energy efficient items on your own without a financial incentive or rebate?
    8. Yes, have already bought non-incentivized energy efficient items because of my experience with the program
    9. Yes, likely to buy energy efficient items because of my experience with the program
    10. No
    11. Don't know

7. We would like to know which additional energy efficient items you have purchased as a result of the lighting discount program. For each of the following items indicate if you have purchased the item because of your experience with this program, and how many you purchased. Please do not include any items for which you received a utility incentive or program discount. If you have purchased something that is not included in the table, please describe the additional items in as much detail as you can. (In the following table, please indicate the quantity of each item type purchased, or specify another item type and quantity)

Measure Type	***Quantity Purchased***
CFLs	
Water Heater Pipe Insulation	

Water Heater Jacket/Blanket/Insulation	
LED Light Bulbs	
Low Flow Bathroom Aerators	
Low Flow Kitchen Aerator	
Low Flow Showerhead	
LED Nightlights	
Large Appliances (specify)	
Small Appliances (specify)	
Windows	
Air sealing improvements	
Attic insulation	
Wall insulation	
Other:	

8. Have you installed all of these items?
    9. Yes, have installed all of the items listed
    10. No, have only installed some of the items listed (please specify): _____
    11. No, have not installed any of the items listed
    12. Don't know

9. In what month and year did you install these items?
_____

10. On a scale of 0 to 10 where 0 represents "Not at all important" and 10 represents "Extremely important", how important was your experience with the Efficient Products lighting discounts program in your decision to purchase and install these additional items?
    4. [RECORD RESPONSE 0-10]
    5. Don't know
    6. Refused

11. On a scale of 0 to 10 where 0 represents "Not at all likely" and 10 represents "Extremely likely", how likely would you have been to purchase and install these additional items if you had never purchased discounted bulbs through the Efficient Products lighting discounts program?
    1. [RECORD RESPONSE 0-10]
    2. Don't know
    3. Refused

12. In your own words, can you please describe how the Efficient Products lighting discounts program influenced your decision to purchase and install these additional items?

    _____

CROSS-PROGRAM AWARENESS

13. Have you heard of any rebates, incentives or energy efficiency services offered by I&M?
    a. Yes
    b. No
    c. Don't know
    d. Refused

14. Now I would ask you about some additional rebates, incentives, and services that I&M offers to help its customers save electricity by purchasing energy efficient equipment. Please tell me which of the following programs have you have heard of and which you have received or applied for:

	Have heard of			Have applied for or received		
Incentive Type	Yes (1)	No (2)	DK (98)	Yes (1)	No (2)	DK (98)
A program that provides rebates for purchasing energy efficient appliances.						
A program that provides incentives and pick-up services for recycling old refrigerators and freezers.						
A program that offers weatherization improvements for your home such as air sealing and adding insulation.						
A program that provides an online energy checkup and suggestions for how you can save energy.						
A program that provides a device that helps manage your air conditioner usage during summer months						

[DISPLAY Q15 IF ANY ROW IN Q14, "HAVE HEARD OF" = 1]

15. Which sources did you learn of these programs from? [Check all that apply.]
    25. Bill insert
    26. Message printed on your bill
    27. Friend or Relative (word-of-mouth)
    28. TV ad
    29. I&M Representative
    30. I&M Brochure
    31. Retailer/store
    32. Community event
    33. Social Networking site such as Facebook or Twitter
    34. I&M Program Website
    35. Newspaper/magazine/print media
    36. Other [Specify]_____.
    98. Don't know
    99. Refused

16. When was your home built?
    a. Before 1970's
    b. 1970's
    c. 1980's
    d. 1990-1994
    e. 1995-1999
    f. 2000-2005
    g. 2006 or newer
    h. Don't know
    i. Refused
    j. Exact year: _____

17. What is the approximate square footage of your home?
    a. _____
    b. Don't know
    c. Refused

18. How many bedrooms are there in your home?
    a. _____
    b. Don't know
    c. Refused

19. How many bathrooms are there in your home?
    a. _____
    b. Don't know
    c. Refused

20. What type of heating system do you have in your home?

a. Natural gas heating
b. Electric heating
c. Don't know
d. Refused
e. Combination of types: _____
f. Other: _____

21. What type of water heater do you have in your home?
    a. Natural gas water heater
    b. Electric water heater
    c. Don't know
    d. Refused
    e. Other: _____

22. How many showers are there in your home?
    a. _____
    b. Don't know
    c. Refused

23. Including yourself, how many people currently live in your household?
    a. _____
    b. Don't know
    c. Refused

[DISPLAY Q24 **IF <PROGRAM BULBS> = "YES"]**

24. Do you have any comments about the Efficient Products program, or any suggestions with regard to how it might be improved? :
    _____
    _____
    _____
    _____

25. This completes the survey. To thank you for taking this survey, you will be sent a $10 Walmart gift card. What address would you like the card to be sent to?

    Address:_____

If you have any further question or comments for Indiana Michigan Power (I&M) please contact I&M at imenergyefficiencyprograms@aep.com. Thank you very much for you time. Have a great day/evening.