

# State of Wisconsin Public Service Commission of Wisconsin

Focus on Energy Evaluation

*Residential Programs: ACES Impact  
Attribution*

Final: February 20, 2009

Evaluation Contractor: PA Consulting Group

Prepared by: Bryan Ward, Pam Rathbun, Laura Schauer,  
and Jeremy Kraft, PA Consulting Group



**focus on energy**<sup>sm</sup>

*The power is within you.*

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## TABLE OF CONTENTS

<b>1.</b>	<b>Executive Summary</b>	<b>1-1</b>
1.1	Overview	1-1
1.2	Key Findings	1-1
1.3	Organization of this Report	1-3
<b>2.</b>	<b>Methodology</b>	<b>2-1</b>
2.1	Sampling	2-1
2.2	Weighting Methodology	2-4
2.3	Target Respondent	2-5
<b>3.</b>	<b>Program Attribution and Spillover</b>	<b>3-1</b>
3.1	Program Attribution	3-1
3.2	Spillover	3-14
<b>4.</b>	<b>Process Findings</b>	<b>4-1</b>
4.1	Source of Program Information	4-1
4.2	Program Benefits	4-1
4.3	Barriers	4-2

## Appendices

<b>APPENDIX A:</b>	<b>Apartment and Condominium Efficiency Services Program Participant Survey</b>	<b>A-1</b>
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## 1. EXECUTIVE SUMMARY

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### 1.1 OVERVIEW

This report summarizes the results of primary data collection conducted in 2008 for the Apartment and Condominium Energy Services program (ACES). Results in this report are presented on the following topics, which are broken down by the whole building, direct install, and new construction components of the program.

- Program attribution
- Spillover
- Source of program information
- Perceived program benefits
- Barriers to energy efficiency installation.

The analysis for this report drew upon two primary research activities—telephone surveys with program participants (the survey instrument is provided in Appendix A) and on-site visits with program participants. PA Consulting Group interviewed 90 respondents, representing 127 individual projects between September 11 and October 7, 2008. In addition, Patrick Engineering conducted site visits to sixteen projects. When possible, the attribution survey was also completed at the time of the site visits (10 attribution surveys were completed through the on-site inspections with 10 respondents). These survey results have been integrated with the telephone survey results for this report. A subsequent report will be submitted that specifically addresses findings from the site visits that have implications for gross impacts.

### 1.2 KEY FINDINGS

This section summarizes the key findings. These findings, and supporting evidence for these findings, are detailed in the remainder of the report.

#### 1.2.1 Program impacts

***The overall net-to-gross ratio for the ACES program is 77.4 percent of the kWh savings and 67.4 percent of the therms savings. The direct install program component has the highest net kWh and therms ratios.*** The attribution rates for each of the ACES program components were calculated using participant self-reports through telephone interviews and the on-site visits (Table 1-1).

Table 1-1. Attribution Rate for ACES by Program Component

Program Component	Projects Surveyed/ Project Population	Measures	Project kWh Attribution Rate	90% Confidence Interval	Project Therms Attribution Rate	90% Confidence Interval
Direct install	59/271	112	85.7%	± 6.6%	88.0%	± 6.2%
New construction	13/22	63	63.6%	± 14.0%	43.0%	± 14.4%
Whole building	65/141	71	53.3%	± 7.5%	49.8%	± 7.5%
Overall	137/434	246	77.4%	± 4.9%	67.4%	± 5.4%

Data is weighted by savings and non-response.

***There is some evidence of program-related spillover savings; however, these savings could not be quantified in this analysis.*** The telephone survey suggests there is some evidence of spillover, although the savings cannot be calculated since the equipment was not inspected after the telephone survey. Of the 71 percent of respondents who had other properties in Wisconsin, 20 percent reported installing energy efficient equipment on their own, although participants' reports of program influence were mixed. The 2009 ACES detailed evaluation plan (DEP) will include a task to attempt to quantify this spillover.

### 1.2.2 Process findings

***Participants were most likely to hear of the program through ACES or Focus staff.***

Participants most frequently cited ACES or Focus staff when asked how they heard about the program. Participants also mentioned other property owners, mailings, and contact with the utility as other sources of information.

***The primary program benefit cited by participants was reduced energy costs.*** When asked what benefits they have realized at their property(s) as a result of participating in the program, participants most often cited reduced energy costs. Longevity or reliability of equipment, tenant goodwill, better understanding of energy efficiency options, and increased tenant comfort were other benefits mentioned frequently.

***Participants said they would participate again.*** Over 95 percent of participants said they would participate in the program again. Additionally, a majority of participants (over 80 percent) said they have already recommended the program to other owners and building managers.

***Respondents provided several areas for improvement for the program and discussed barriers to program participation.*** Finances and need for technical assistance were among the issues denoted. Participants had few suggestions for program changes. The few that were mentioned included a larger incentive or rebate, less paperwork, fewer requirements to get into the program, and more guidance and assistance from ACES representatives. Barriers participants reported when considering or seeking approval for new projects are budget and lack of capital. Direct install participants also cited lack of access to the units and time constraints as barriers.

## 1. *Executive Summary*

### **1.3 ORGANIZATION OF THIS REPORT**

The remainder of this report summarizes the study methodology (Chapter 2), the energy impacts of the program (Chapter 3), and additional process findings (Chapter 4). The survey instrument can be found in Appendix A.

## 2. METHODOLOGY

This chapter discusses the study methodology, including the sampling strategy identifying and speaking with the appropriate respondent.

### 2.1 SAMPLING

The ACES customer population includes projects in three program components: direct install, new construction, and whole building. WECC provided PA with the population of ACES participants from July 1, 2007, through March 31, 2008. Projects are defined by their customer ID number and the location in which the project was completed.

The sample was designed at a project, not a measure, level. For each sampled project, we included all measures for which we had data.

First, PA identified sample to be sent to Patrick Engineering for on-site inspection. The sample points selected for the onsite inspections were those with the largest documented savings. Twenty-eight projects were identified for on-site verification: twelve new construction, six direct install, and ten whole building projects. Patrick Engineering completed on-sites visits with sixteen of these projects (although attribution surveys were only conducted with ten projects).

From the remaining population, PA selected a census of new construction and whole building projects for the telephone survey. For direct install, PA selected all projects that comprised the top ten percent of the overall kWh/therms savings. PA then sampled a random selection of the remaining direct install projects.

Table 2-1 details the number of projects included in the study within each program component along with the number of projects surveyed. In total, telephone surveys or on-site visits were completed with 143 projects. Attribution questions were asked of 137 projects, which represented 100 respondents<sup>1</sup>.

**Table 2-1. ACES Sampling and Survey Summary by Program Component**

Program Component	Sampling Method	Population	On-site		Telephone	
			Sampled	Completed	Sampled	Completed
New construction	Census	22	12	8	15	10
Whole building	Census	141	10	4	131	61
Direct install	Sample	271	6	4	110	56
	Telephone random sample	199	NA	NA	38	19
	Telephone high savers (top 10%)	72	NA	NA	72	37
<b>Total</b>		<b>434</b>	<b>28</b>	<b>16</b>	<b>256</b>	<b>127</b>

<sup>1</sup> Some respondents represented multiple projects.

Table 2-2 details the response rate to the telephone survey by program component. To maximize the response rate, we made an average of six attempts over the field period to contact participants to complete the survey. In addition, experienced interviewers attempted to convert any refusals to complete the interview.

**Table 2-2. ACES Detailed Telephone Response Rate by Program Component**

	Direct Install	New Construction	Whole Building
<b>Starting sample</b>	<b>110</b>	<b>15</b>	<b>131</b>
No working number	8	0	8
No knowledgeable respondent	6	0	4
<b>Adjusted sample</b>	<b>96</b>	<b>15</b>	<b>119</b>
Refusal	3	0	5
Language Barrier	0	0	0
Active Sample	37	5	53
<b>Completed surveys</b>	<b>56</b>	<b>10</b>	<b>61</b>
<b>Response rate</b>	<b>58.3%</b>	<b>66.7%</b>	<b>51.3%</b>
<b>% of project kWh savings covered by survey</b>	<b>38.1%</b>	<b>63.9%</b>	<b>51.1%</b>
<b>% of project therms savings covered by survey</b>	<b>41.0%</b>	<b>4.4%<sup>2</sup></b>	<b>30.3%</b>

The types of measures sampled varied by program component. Tables 2-3 through 2-5 detail the types of measures included each program component, the number sampled from each category, number of measures represented in the survey data, and the percent of overall savings coverage. Note that summing the measures will not equal the number of projects detailed above as more than one measure type is typically installed for each project.

Only two types of measures are installed via the direct install program component—lighting and water saving measures (Table 2-3). The table shows the population, sample size, number of measures surveyed by sampling category—high savers (the top 10 percent from which a census was included) and the random sample group.

**Table 2-3. Direct Install Measures Surveyed for Net-to-Gross Estimates**

Measure		Direct Install Measures				
		Population	Sampled	Surveyed	kWh Savings Covered by Survey	Therms Savings Covered by Survey
Lighting	High savers	68	68	38	34.4%	N/A
	Random sample	198	38	16		
	Total	266	106	54		
Water saving devices	High savers	69	69	41	41.8%	41.0%
	Random sample	196	38	17		
	Total	265	107	58		

<sup>2</sup> As we surveyed many new construction projects with therm penalties and were unable to complete surveys with all projects with therm savings, our therm coverage for the new construction program is low.

Of the 22 new construction projects sampled, the majority installed heating, lighting, insulation, dishwashers, and/or water heating equipment. Table 2-4 presents the number of measures in the new construction program component and the number surveyed.

**Table 2-4. New Construction Measures Surveyed for Net-to-Gross Estimates**

Measure	New Construction Measures				
	Population	Sampled	Surveyed	kWh Savings Covered by Survey	Therms Savings Covered by Survey
AC	5	5	2	65.6%	N/A
Clothes washer	13	13	9	21.3%	32.5%
Dishwasher	14	14	9	25.4%	29.9%
Heating equipment	17	17	10	108.8% <sup>3</sup>	-29.3% <sup>4</sup>
Lighting	16	16	9	53.0%	N/A
Other	6	6	1	7.7	0.1%
Refrigerator	11	11	8	53.8%	N/A
Insulation	14	14	8	32.2%	34.7%
Water heating equipment	12	12	4	0.0% <sup>5</sup>	201.2% <sup>6</sup>
Water saving devices	7	7	3	100.0%	37.9%

Table 2-5 details the measures included in the whole building program component. Again, the most prevalent measures are heating and lighting equipment. Services include boiler tune-ups and temperature set-back agreements.

**Table 2-5. Whole Building Measures Surveyed for Net-to-Gross Estimates**

Measure	Whole Building Measures				
	Population	Sampled	Surveyed	kWh Savings Covered by Survey	Therms Savings Covered by Survey
AC	2	2	1	54.5%	N/A
Clothes washer	2	2	1	50.0%	50.0%
Dishwasher	1	1	0	0.0%	0.0%
Heating equipment	62	62	24	36.7%	27.6%
Services	23	23	6	N/A	56.6%
Lighting	48	48	30	56.3%	N/A
Other	1	1	0	0.0%	0.0%

<sup>3</sup> This coverage rate was obtained because we were not able to survey several projects that claimed therms penalties for water heating equipment.

<sup>4</sup> This coverage rate was obtained because we surveyed several projects that claimed therms penalties and did not reach projects that had therms benefits for heating equipment.

<sup>5</sup> All kWh savings for water heating equipment was captured by one project that we were unable to contact.

<sup>6</sup> See footnote #2.

Measure	Whole Building Measures				
	Population	Sampled	Surveyed	kWh Savings Covered by Survey	Therms Savings Covered by Survey
Refrigerator	2	2	1	84.8%	N/A
Insulation	8	8	4	100.0%	51.2%
Water heating equipment	9	9	4	51.1%	30.3%

## 2.2 WEIGHTING METHODOLOGY

The data was weighted to account for non-response and magnitude of annual first year savings. To ensure the survey data was reflective of the population (defined by first year kWh and therms savings), the data was stratified and savings weighted by program component, measure, and, in the case of direct install, high savers and random sample.

Savings weighting ensures that attribution for a specific measure has the appropriate impact on the overall attribution rate. Figure 1-1 provides a simplified illustration of how weighting by savings impacts the net-to-gross analysis. In this example, the analysis estimates the weighted net-to-gross ratio for a direct install project that installed lighting and electric water savings measures. Note that this table is for illustrative purposes only and does not represent actual calculations for a program component attribution rate.

**Figure 1-1. Illustration of the Impact of Weighting by Savings on Net-to-Gross Ratios**

Direct Install Lighting through Project	Direct Install Water Saving Measures through Project
<b>Hypothetical situation.</b>	
Calculated attribution rate = 75%	Calculated attribution rate = 25%
Annual savings = 10,000 kWh	Annual savings = 1,000 kWh
<b>Calculate kWh attributed savings.</b>	
Attributed savings = $10,000 * 75\% = 7,500$	Attributed savings = $1,000 * 25\% = 250$
<b>Sum the attributed savings and population savings.</b>	
Total attributed savings = $7,500 + 250 = 7,750$ kWh	
Annual project savings = $10,000 + 1,000 = 11,000$ kWh	
<b>Divide the total attributed savings by population savings to determine weighted attribution rate for project.</b>	
Net attribution rate = $7,750 / 11,000 = 70\%$	

As the illustration shows, lighting measures result in higher savings than water saving measures and subsequently has a greater impact on the overall attribution rate when weighted by savings.

### 2.3 TARGET RESPONDENT

Since one key objective of the data collection efforts was to understand the influence of the program in their decision to implement the energy efficiency measure(s), it was critical to identify the individual most responsible and involved in the decision-making process. The survey specifically asked if the respondent (identified via the program database) was directly involved in the decision-making process and, if not, attempted to identify the appropriate person to speak with.

The questions in the telephone survey that addressed this issue are as follows:

- C5** Were you personally involved in the decision of whether or not to install/receive the energy efficient [measure types] at [business name] in [city] through this program?
- C6** [IF PERSONALLY INVOLVED] Was anyone else within or outside your organization involved in the decision of whether to install/receive this equipment/ this service through this program? [COLLECT OTHER CONTACT NAMES IF NECESSARY]
- C7** [IF NOT PERSONALLY INVOLVED] Who else was involved in the decision of whether to install/receive this equipment/ these services at this location? How are they affiliated with this property and what was their role in the decision? [COLLECT OTHER CONTACT]

In order to minimize respondent burden and maximize response rate, respondents that were identified as being the primary contact for multiple projects were grouped together and called by a senior interviewer. Of the 127 projects interviewed by telephone, 53 were completed by a senior interviewer who interviewed 15 participants responsible for multiple projects.

In general, the individual we interviewed was the contact name identified in the database. Respondents were most likely to be the building owner or property manager, followed by the maintenance manager (Table 2-6)<sup>7</sup>. Out of the 90 respondents we spoke with via the telephone survey, only eight (or nine percent) were conducted with someone other than the person identified in the program data. A review of the data and responses indicate that these were the appropriate individuals to speak with and they were involved in the decision-making process.

There was an instance where two additional individuals were identified during the interview as being knowledgeable about the project. The individuals were involved in six projects. A senior interviewer contacted those individuals and completed interviews by speaking with both respondents. These respondents are included in the counts detailed in Table 2-6.

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<sup>7</sup> Interviewee title is self-defined through question F6, "What is your job title?"

Table 2-6. Telephone Survey Respondent Title

Respondent Title	Number of Respondents	Percent
Owner	30	33%
Property manager	23	26%
Maintenance manager	12	13%
General manager	6	7%
Business manager	5	6%
Executive	4	4%
Regional manager	3	3%
Maintenance staff	2	2%
Purchasing agent	1	1%
Interior coordinator	1	1%
VP construction manager	1	1%
Housing production supervisor/energy management	1	1%
Architect	1	1%
<b>Total</b>	<b>90</b>	<b>100%</b>

### 3. PROGRAM ATTRIBUTION AND SPILLOVER

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This chapter summarizes the study findings regarding the program attribution and program spillover.

#### 3.1 PROGRAM ATTRIBUTION

The attribution rate was calculated using participant self-reports through telephone interviews and on-site visits. The methodology for calculating program attribution is very similar to the Year 1 Net Savings approach (Y1NS) approach applied by KEMA as described in the memorandum *Business Programs Life Cycle Attribution Analysis Results* of December 2, 2008, but with one key difference. The efficiency attribution is either full attribution or no attribution. The majority of respondents who said less efficient could not describe the efficiency of equipment that they would have installed in the absence of the program. Therefore, all respondents that said the equipment they would have purchased would have been less efficient received 100 percent attribution for efficiency. This point is discussed further in this document.

Were we to calculate the Life Cycle Net Savings as KEMA reported in their memo, approximately 11 percent of the measures would be affected. Approximately half of those measures would receive only acceleration period savings. We have not included this approach at this time, but will be considering Life Cycle Net Savings for the next program cycle.

Before discussing the attribution rate calculations, we recognize the potential impacts of supply-side effects. This study was not designed to estimate or integrate supply-side effects. In the next evaluation cycle, we will investigate potential supply-side effects.

The attribution rate uses three points of reference: timing, efficiency, and quantity. This section discusses how we calculated values for each. The analysis does not include records where the respondent said the measure was no longer installed.

It was not possible to compute values for timing, efficiency, and quantity for all respondents because some participants were not able or refused to answer a specified question. For this reason, several imputations to the data were made before the calculation of timing, efficiency, and quantity program attribution rates. Likewise, adjustments to the calculation of the overall attribution rate were made to compensate for inconsistencies in the data. These steps are detailed in the sub-sections below.

Prior to assessing the timing, quantity, and efficiency, PA automatically assigned 100 percent attribution for those measures where respondents said they would not have installed the measure *at all* absent the program. The two questions related to this analysis are N16 and N17. If the respondent said “No” to both these questions, then the measure under review would automatically receive 100 percent attribution.

**N16** If the [measure type] had not been available through the Apartment and Condominium Efficiency Services program, would you have purchased any on your own/ pay to have service(s) done at the same time?

**N17** Would you have purchased it/had the service done at a later date?

### 3. Program Attribution and Spillover

Conversely, if the respondent said the measure was already installed prior to receiving program, no attribution was assigned to the measure associated with that project. N5 is the question that pertains to this analysis.

**N5** Now I would like to ask you some specific questions about [measure type]. Was any of this equipment/these services already installed/performed before you became aware of the incentives available through the Apartment and Condominium Efficiency Services program?

Seventeen measures received an attribution of zero percent because they said the measure was installed prior to becoming aware of the program (two of these 17 measures were from the same project). Table 3-1 details the measures reportedly installed prior to becoming aware of the program. All measures detailed are prescriptive measures with the exception of insulation, which is a custom measure. For both insulation measures, the follow-up attribution questions are consistent with the responses to N5.

**Table 3-1. Measures Installed Prior to Program Knowledge**

Measure	Number installed
AC	1
Clothes washer	1
Heating equipment	7
Insulation	2
Lighting	2
Refrigerator	1
Services	1
Water heater equipment	1

#### 3.1.1 Timing

The timing analysis is based on four variables (N16, N17, N18, and N19).

**N16** If the [IF DIRECT INSTALL OR SERVICE: free] [OTHER: incentivized] [measure type] had not been available through the Apartment and Condominium Efficiency Services program, would you have purchased any on your own/ pay to have service(s) done at the same time?

**N17** Would you have purchased it/had the service done at a later date?

**N18** When do you think you would have purchased it/done this?

**N19** (IF DON'T KNOW) Do you think you would have purchased it/done this within...? (READ: 1 year, 1–2 years, 3–4 years, never)

Respondents that said they would not have purchased any of the equipment at the same time were asked several follow-up questions related to timing (N17–N19). The timing data captured through N18 and N19 were recoded and combined into one item, TIME. This variable was calculated to equal the number of months the program accelerated the purchase and installation of the equipment.

### 3. Program Attribution and Spillover

If the respondent could not provide a response to N18, the interviewer asked the respondent to identify how much the program accelerated the installation by providing a range of years (N19). This range was recoded where the upper limit is the number of months captured in the data. For example, the response of “within a year” was recoded as 12 months and “between one and two years” was recoded as 24 months.

From this analysis, the acceleration rate is determined. Consistent with how attribution is historically calculated for the Business Programs per the attribution analysis memorandum prepared by KEMA, PA, and Ralph Prah<sup>8</sup>, the acceleration rate is calculated as the number of months the program accelerated installation divided by 48 months. Then the acceleration rate is applied to the timing attribution factor.

If the respondent could not provide any estimate of the influence of the program on their timing to install the equipment, the attribution rate was assumed to be 100 percent. This assumption is based on the idea that if they could not provide any sense of timing then the activity was not in the latter stages of planning and the program influenced installation. This hypothesis was compared against the planning questions and found to be consistent with the timing attribution score of 100 percent. For example, respondents that could not provide timing information stated that the ACES program first became involved “at the very start of planning,” “in the planning stage,” or that they “were not considering it at all before talking to the program.”

**Table 3-2. Calculation of Timing Attribution Factor**

Condition	Variables and Values	Timing Attribution Factor
The measure would have been installed at the same time in absence of the program.	N16 = Yes	0%
The measure would have never been installed in absence of the program.	N17 = No	100%
The measure would have been installed at a later date.	N17 = Yes	TIME/48 months
The respondent did not know if the measure would be installed at a later date or when that later date would be.	N17 = DK or N18 = DK	100%

#### 3.1.2 Efficiency

The efficiency attribution factor is calculated using four variables (N29a, N29b, N29c, and N30). Direct install measures and water saving devices were not asked the efficiency questions and were therefore assigned an efficiency attribution factor of 100 percent.

**N29a** If the incentive for the energy efficient [measure type] had not been offered under Apartment and Condominium Efficiency Services program, would you have purchased a less efficient [measure type]?

**N29b** What efficiency level would you have purchased?

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<sup>8</sup> KEMA, PA Consulting Group, and Ralph Prah, *Updated Attribution Analysis for Business Programs*, September 16, 2008.

**N29c** (IF QUANTITY > 1) What percent of the [measure type] would have been less efficient?

**N30** [IF EQUIPMENT] If the [IF DIRECT INSTALL: free] [IF NEW CONSTRUCTION OR WHOLE BUILDING: incentivized] [measure type] had not been offered under Apartment and Condominium Efficiency Services program, would you have purchased the same quantity of [measure type]?

**Table 3-3. Calculation of Efficiency Attribution Factor**

Condition	Variables and Values	Efficiency Attribution Factor
Direct install measures and water saving devices in the whole building or new construction program component.	NA	100%
Respondent would have purchased a less efficient measure and only one quantity of the measure was installed.	N29a = Yes	100%
Respondent would have purchased a less efficient measure and more than one quantity of the measure were installed.	N29a = Yes	Less efficient percent installed (N29c)

Records where the respondent answered “don’t know” for N29a or N29c were manually reviewed in order to assign a efficiency attribution factor. In order to minimize these unknown values, records in which the respondent did not know the amount of equipment that would have been less efficient were given an imputed efficiency attribution factor. This factor was calculated by finding the average attribution factor of like cases (same program element and less efficient equipment in the absence of the program). Three measures were assigned an imputed efficiency attribution factor of 75 percent.

**3.1.3 Quantity**

The quantity attribution factor is calculated using four variables (N16, N17, N30, and N31). Questions N30 and N31 of the quantity series were asked only if the measure quantity was greater than one and the respondent said they would have purchased the equipment at a later date. Therefore, we needed to refer to question N16 to determine quantity attribution for those cases where the measure quantity equaled one or where the respondent said they would not have purchased the equipment at a later date.

**N16** If the [IF DIRECT INSTALL OR SERVICE: free] [OTHER: incentivized] [measure type] had not been available through the Apartment and Condominium Efficiency Services program, would you have purchased any on your own/ pay to have service(s) done at the same time?

**N17** Would you have purchased it/had the service done at a later date?

**N30** If the [IF DIRECT INSTALL: free] [IF NEW CONSTRUCTION OR WHOLE BUILDING: incentivized] [measure type] had not been offered under Apartment and Condominium Efficiency Services program, would you have purchased the same quantity of [measure type]?

### 3. Program Attribution and Spillover

**N31** Would you have installed fewer or more [measure type]? [RECORD QUANTITY OF FEWER OR MORE]

If the respondent said they would not have purchased the measure without the program, then the program receives full credit for the quantity attribution. Conversely, if the respondent said they would have purchased the measure without the program and the measure quantity is greater than one, the quantity attribution equals zero percent.

Analysts referred to questions N30 and N31 to determine quantity attribution for cases where the measure quantity was greater than one and the respondent said they would have purchased the equipment in the absence of the program.

**Table 3-4. Calculation of Quantity Attribution Factor**

Condition	Variables and Values	Quantity Attribution Factor
The measure would not have been purchased without the program and only one measure installed.	N16 = No	100%
The measure would have been purchased without the program and only one measure installed.	N16 = Yes	0%
The measure would not have been installed and more than one measure installed.	N17 = No	100%
The respondent would have purchased the same quantity without the program.	N30 = Yes	0%
The respondent would have purchased fewer measures without the program.	N31 = Fewer	Number fewer reported /quantity installed
The respondent would have purchased additional measures without the program.	N31 = More or N31 = fewer but reported number is greater than quantity installed	0%

After this exercise, thirty-three measures were missing a quantity attribution. In these cases, the respondent said they would have purchased the equipment in the absence of the program, but said “don’t know” or “refused” for N30 or N31.

PA imputed these missing values using mean substitution. To ensure the differences in each program and quantity were captured, we determined the individual means of two cells: program element and quantity (one or greater than one). Additionally, only cases where respondents said they would have installed fewer measures were included in the means calculations. The mean attribution rates were also compared at a measure level and any differences were taken into consideration during the substitution. The resulting imputed quantity factor, along with the number of cases, is detailed below.

- Seven whole building measures with multiple quantities were assigned an imputed quantity attribution factor of 83 percent.
- Three whole building measures with a single quantity were assigned an imputed quantity attribution factor of 40 percent.

### 3. Program Attribution and Spillover

- One new construction measure with multiple quantities was assigned an imputed quantity attribution factor of 100 percent.
- One direct install measure with a single quantity was assigned an imputed quantity attribution factor of 48 percent.
- Twenty-one direct install measures with multiple quantities were assigned an imputed quantity attribution factor of 44 percent.

#### 3.1.4 Overall program attribution

Overall program attribution was calculated using a process in which each condition accounted for an exclusive set of records. Table 3-5 illustrates the 11 conditions used to assign the overall attribution for a particular measure and how the three attribution elements discussed above (timing, efficiency, and quantity) inform the overall attribution.

Conditions one through ten are mutually exclusive of each other and fairly cleanly assign attribution. However, in condition 11 the analysis could not assign an overall attribution for forty-seven measures due to missing data (e.g., “don’t know” responses). For these cases, the survey data were reviewed by PA to determine a final score using open-ended responses, consistency check questions (detailed next), and attribution elements that *were* assignable.

In the event the review process through condition 11 still drew inconclusive results, the cases were dropped from the analysis. This resulted in three measures being eliminated.

**Table 3-5. Overall Attribution Assignments at the Measure Level**

Condition	Timing Attribution (N16 – N19)	Efficiency Attribution (N29a – N30)	Quantity Attribution (N16, N17, N30, N31)	Overall Attribution (at measure-level)	Discussion	n
1	100%	100%	100%	100%	Attribution is 100 percent if the respondent said they would not have installed measure without the program, would have installed more than 48 months later, and would not have installed the same efficiency. Participants that said they would not have installed the measure in the absence of the program (N16 and N17) automatically received an attribution rating of 100 percent for that measure.	46
2	0%	0%	0%	0%	Respondents that said they would have installed the measure at the same time, would have installed the same efficiency, and would have installed the same or greater quantity of measures received zero percent attribution for that measure.	30
3	0%	0%	> 0%	0%	These respondents receive zero percent attribution, regardless of their claim that they would have installed fewer without the program, because they would have installed the same efficiency level in the absence of the program, indicating no program influence.	3
4	0%	> 0%	0%	Efficiency Attribution	These cases said they would have installed the equipment at the same time and in the same quantity; however, a portion of the equipment they would have installed would have been at a lower efficiency. The program receives credit for the portion that would have been replaced at a lower efficiency.	51
5	0%	100%	> 0%	100%	These cases said they would have installed the equipment at the same time, but would have installed a lesser quantity, all of which would have been lower efficiency. Because the program induced higher efficiency installation for the measure installed, the program receives 100 percent credit for those savings.	27

### 3. Program Attribution and Spillover



Condition	Timing Attribution (N16 – N19)	Efficiency Attribution (N29a – N30)	Quantity Attribution (N16, N17, N30, N31)	Overall Attribution (at measure-level)	Discussion	n
6	> 0%	0%	0%	Timing Attribution	This condition provides credit to the program for accelerating the retrofit or adoption of the technology, estimated in the timing attribution calculation.	4
7	> 0%	0%	> 0% AND < 100%	Quantity Attribution* Timing Attribution	This condition provides credit to the program for accelerating the retrofit or adoption of the technology. However, this acceleration is only applied to the quantity that would not have been installed in the absence of the program.	12
8	> 0%	100%	0%	100%	These cases said they would have installed the equipment at a different time and would have installed the same quantity, although all of the measures would have been of a lower efficiency. Because the program induced higher efficiency installation for the measure installed, the program receives 100 percent credit for those savings.	2
9	> 0%	> 0%	100%	100%	These cases said they would have installed the equipment at a later date in the absence of the program and a lesser quantity; however, they would have installed what would have been lower efficiency. The program receives credit because the equipment would have been replaced at a lower efficiency.	12
10 <sup>9</sup>	N5 = 1	NA	NA	0%	These respondents said the measure was installed prior to learning about program benefits. The program receives no credit for these measures.	16

<sup>9</sup> Records in which the respondent stated that the measure was already installed before he or she heard about the program are given zero percent attribution regardless of previous factors.

3. Program Attribution and Spillover



Condition	Timing Attribution (N16 – N19)	Efficiency Attribution (N29a – N30)	Quantity Attribution (N16, N17, N30, N31)	Overall Attribution (at measure-level)	Discussion	n
11	Manual review	Manual review	Manual review	Manual assignment	These cases were manually reviewed due to insufficient data, primarily resulting from “don’t know” and “refused” responses.	43
12	> 0%	> 0%	> 0% AND < 100%	Efficiency Attribution * Quantity Attribution * Timing Attribution	Listed last because it did not occur for this particular report, this condition would be fulfilled if the measure would have been installed later, a portion of which would have been a lower efficiency, and a lesser quantity. In this event, all three elements are multiplied together.	0

### 3.1.5 Consistency checks and final review

The last step in the attribution assignment process was to review the overall attribution factors on a measure level in light of responses to background and consistency check questions. Two PA consultants reviewed the results together and manually reviewed the attribution assignments, case-by-case, to determine (1) if the overall attribution factor was consistent with the consistency and background questions, (2) if there was inconsistency, whether the overall attribution rating should change, and (3) to agree upon what that change should be.

This was not a black and white process. Some respondents may have replied inconsistently with one question, then consistently with another. Therefore, the analysis attempted to take into account the full story and experiences discussed by the respondent. Additionally, due to the relatively subjective nature of the review, the overall attribution was changed *only when there was clear evidence that it should be different*.

The questions included in the consistency checks, and how those questions were used, are detailed below in Table 3-6. Not all consistency check questions were applicable to all measures reviewed.

**Table 3-6. Questions Manually Reviewed for Consistency with Attribution Rating**

Question	Use of Question
<b>N6</b> Did you have specific plans to install any of this equipment/have this service done before learning that you could get the [MEASURE] through the program?	Consistency check focused on planning process. Inconsistent if: <ul style="list-style-type: none"> <li>• Had plans and attribution=1</li> <li>• Did not have plans and attribution=0</li> </ul>
<b>N10</b> At what point in the planning, purchasing or installation process were you when you first began to talk with someone from the program?	Open-ended response to planning question reviewed with overall attribution assignment.
<b>N10b</b> What role did the Apartment and Condominium Efficiency Services program representative have on your decision to have an assessment done?	Open-ended response to planning question reviewed with overall attribution assignment.
<b>N10c</b> What role did the Apartment and Condominium Efficiency Services program representative have on your decision to install the energy efficient equipment?	Open-ended response to planning question reviewed with overall attribution assignment.
<b>N14</b> How many more years do you think [measure type] would have continued to function?	Provided context for the condition of the equipment and planning process.
<b>N32</b> On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is that you would have bought the same [measure type] if you had not received [IF DIRECT INSTALL OR SERVICE: it at no cost] [OTHER: this incentive] through the Apartment and Condominium Efficiency Services program?	Consistency check on likelihood to participate without program. Inconsistent if: <ul style="list-style-type: none"> <li>• N32&gt;5 and Attribution=1</li> <li>• N32&lt;5 and Attribution=0</li> </ul>
<b>N33</b> Can you please describe in your own words what impact, if any, the Apartment and Condominium Efficiency Services program had on your decision to install/receive [measure type] at the time you did?	Reviewed to make sure response to N32 made sense and understand program impact from respondent's perspective.

Question	Use of Question
<b>Interviewer Notes</b>	Interviewers were asked to record any comments or notes they felt to be pertinent to the client's decision-making processes and attribution rates. These notes were reviewed as another qualitative consistency check.

A final attribution variable was created and, based on this consistency review, either assigned the original estimate or a revised estimate. The analysis file contains the rationale for all attribution estimate changes. In total, seven measures were reassigned an attribution estimate; three to the favor of the program (i.e., a higher attribution).

### 3.1.6 Attribution rates

Table 3-7 details the attribution rate for each of the program components and the ACES program overall. Direct installation has the highest attribution rate—85.7 percent kWh attribution and 88 percent therms attribution. New construction had the next highest attribution rates, followed by whole building.

**Table 3-7. Attribution Rate for ACES by Program Component**

Program Component	Projects Surveyed/ Project Population	Measures	Project kWh Attribution Rate	90% Confidence Interval	Project Therm Attribution Rate	90% Confidence Interval
Direct install	59/271	112	85.7%	± 6.6%	88.0%	± 6.2%
New construction	13/22	63	63.6%	± 14.0%	43.0%	± 14.4%
Whole building	65/141	71	53.3%	± 7.5%	49.8%	± 7.5%
Overall	137/434 <sup>10</sup>	246	77.4%	± 4.9%	67.4%	± 5.4%

Data is weighted by savings and non-response.

The analysis of open-ended responses indicates that whole building participants were more likely to report hearing about the program toward the latter end of the planning process or at the point of equipment installation than new construction or direct install participants. Conversely, new construction participants involved the program early and made design decisions based on that involvement. A handful of open-ended comments that support this assertion are detailed below.

#### *Whole building comments*

“The owner would have purchased the high efficiency boiler anyway. He needed a boiler and heard of the rebate during the installation. He contacted Focus on Energy.”

“He knew that they were going to do an “upgrade” to the lighting and contacted the program to see if there were any rebates.”

<sup>10</sup> This number differs from Table 2-1 as not all on-site visits completed an attribution survey.

“[Respondent] was planning on installing the necessary wattage CFLs.”

“[ACES became involved] after planning.”

*New construction comments*

“[ACES became involved] when we started talking with the architects. [We] didn't start construction until January but talked to people in the prior June or July.”

“[ACES became involved] day one.”

“[ACES became involved] when we were talking with the architects which was 6 months prior to beginning construction.”

“[ACES became involved] early on.”

Although the sample was selected to be representative at the project level, Tables 3-8 through 3-10 provide measure-specific results which may be informative for program design. These estimates should be interpreted cautiously in light of the number of projects represented in the measure category analysis. There may not be sufficient observations at the measure level to support estimates of attribution with high levels of precision. The confidence intervals included in the tables provide a gauge as to the precision levels at the measure level.

Table 3-8 presents the attribution rate for lighting and water saving devices. While one would expect the attribution rate for these two measures to be similar to each other, lighting receives a significantly higher attribution factor than water saving devices. This difference is driven by one participant with six projects that had “a firm policy with regard to the environment.” This participant already had plans in place to replace showerheads and faucet aerators. However, the program incentive drove their decision to install high efficient lighting.

**Table 3-8. Direct Install Attribution Rate by Measure**

	<b>kWh Measure Attribution Rate</b>	<b>90% Confidence Interval</b>	<b>Therms Measure Attribution Rate</b>	<b>90% Confidence Interval</b>	<b>Surveyed</b>
Lighting	94.2%	± 4.6%	N/A	N/A	54
Water saving devices	77.3%	± 8.0%	88.0%	± 6.2%	58
<b>Total</b>	<b>85.7%</b>	<b>± 6.6%</b>	<b>88.0%</b>	<b>± 6.2%</b>	<b>112</b>

Data is weighted by savings and non-response.

Table 3-9 shows that lighting and water measures resulted in a low attribution rate compared with other measures. A review of the data shows that relatively large projects received attribution rates of zero percent within these measure categories. These respondents said they had purchased and/or installed their equipment prior to speaking with the program and said the program had no influence on their decisions<sup>11</sup> for these measures.

<sup>11</sup> Per N32, where 10 = No influence, respondents said “10”.

Table 3-9. New Construction Attribution Rate by Measure

Measure	kWh Measure Attribution Rate	90% Confidence Interval	Therms Measure Attribution Rate	90% Confidence Interval	Surveyed
AC	67.4%	± 42.2%	N/A	N/A	2
Clothes washer	21.1%	± 12.4%	61.4%	± 14.8%	9
Dishwasher	69.6%	± 15.0%	69.8%	± 15.0%	9
Heating equipment	94.9%	± 7.3%	-34.9% <sup>12</sup>	± 15.9%	10
Lighting	25.2%	± 15.7%	N/A	N/A	9
Other	100.0%	N/A <sup>13</sup>	N/A	N/A	1
Refrigerator	48.1%	± 15.1%	N/A	N/A	8
Insulation	99.5%	± 2.7%	80.6%	± 15.5%	8
Water heating equipment	N/A	N/A	22.7%	± 28.1%	4
Water saving devices	43.7%	± 35.6%	0.0%	± 0%	3
<b>Total</b>	<b>63.6%</b>	<b>± 14.0%</b>	<b>43.0%</b>	<b>± 14.4%</b>	<b>63</b>

Data is weighted by savings and non-response.

Table 3-10 details the attribution factors by measure for whole building participants. Three measures—air conditioning, clothes washers, and refrigerators—yielded a kWh savings attribution factor of zero percent. According to the respondent, all of these measures were already installed before hearing of the ACES program. Water heating equipment yielded a kWh savings attribution rate of zero percent but a very high therms savings attribution rate.

Table 3-10. Whole Building Attribution Rate by Measure

Measure	kWh Measure Attribution Rate	90% Confidence Interval	Therms Measure Attribution Rate	90% Confidence Interval	Surveyed
AC	0%	N/A	N/A	N/A	1
Clothes washer	0%	N/A	0%	N/A	1
Heating equipment	20.0%	± 10.5%	50.6%	± 13.1%	24
Services	N/A	N/A	25.4%	± 25.1%	6
Lighting	55.4%	± 9.1%	N/A	N/A	30
Refrigerator	0.0%	N/A	N/A	N/A	1
Insulation	56.5%	± 28.8%	34.7%	± 27.7%	4
Water heating equipment	0%	± 0%	94.2%	± 14.3%	4
<b>Total</b>	<b>53.3%</b>	<b>± 7.5%</b>	<b>49.8%</b>	<b>± 7.5%</b>	<b>71</b>

Data is weighted by savings and non-response.

<sup>12</sup> The negative attribution rate of therms savings represents that new constructions projects with heating equipment therms penalties stated program attribution while projects with therms savings did not.

<sup>13</sup> Confidence intervals are not applicable for a sample size of one.

### 3.2 SPILLOVER

The telephone survey contained a number of questions to investigate whether program participants had installed additional energy efficient equipment outside the program and, if so, what influence the program had on their decision to do this on their own. The survey did not attempt to quantify the energy savings attributable with spillover (e.g., quantity installed, efficiency level), as this would require on-sites to determine energy savings at these sites. Therefore, this analysis is a qualitative indicator of spillover.

All participants that had additional 4+ unit properties in the state of Wisconsin (71 percent of respondents) were asked if they purchased or were considering purchasing similar energy efficiency measures at their other properties **without program assistance**. Among these, 20 percent reported already installing other energy efficient equipment at their properties without program assistance

Direct install participants reported the highest rate of spillover with 34 percent of the participants with other properties either considering purchases or already making purchases (Table 3-11). New construction participants are least likely to report spillover, with 11 percent of the participants saying they had already implemented energy efficiency measures on their own.

**Table 3-11. Self-reported Energy Efficiency Purchases/Plans Outside of the Program**

Considered and/or Implemented Energy Efficient Measures	Direct Install (n=47)	New Construction (n=9)	Whole Building (n=34)
Yes, considering	4%	0%	15%
Yes, installed energy efficient measures	30%	11%	9%
No, not considering	64%	89%	71%
Don't know	2%	0%	6%

Participants that said they purchased additional energy efficient measures outside of the program were asked what types of equipment they purchased (Table 3-12). The most frequently reported technologies included lighting, water saving devices, water heaters, heating equipment, and insulation.

**Table 3-12. Number of Respondents Mentioning Specific Energy Efficiency Equipment Installed Outside of the Program after Participation**

	Direct Install	New Construction	Whole Building
Heating	0	0	1
Lighting	10	0	1
Insulation	0	0	1
Water heating	0	1	2
Water saving devices	5	0	0

The program played a role in some participants' decision to purchase additional efficient equipment on their own. Several participants who reported purchasing or were considering purchasing additional equipment said the program was very influential in this decision. One participant that represented several direct install projects commented, "It was important because it demonstrated the savings. It was the main factor in my decision."

### 3. Program Attribution and Spillover

Additionally, one new construction participant also felt the program would impact their installation decisions in other buildings within the state. This individual said they would use the information provided through the program to inform additional purchasing decisions. “We are going to look at some of the suggestions from this project and apply them towards the project in Superior, Wisconsin.”

However, there are cases where the participant said they install energy efficient equipment as standard practice and did not attribute the additional purchases to the program. One participant who represented six projects (five direct install projects and one whole building project) claimed that they would purchase new energy efficient equipment “as much as possible.” This participant had a “firm policy with regard to the environment.” For this participant, the program had little or no influence on this participant’s spillover purchases.

## 4. PROCESS FINDINGS

### 4.1 SOURCE OF PROGRAM INFORMATION

All participants were asked how they heard about the incentive available through the ACES program. The most frequent response was from ACES or Focus staff (Table 4-1). Participants also frequently became aware of the program incentive through other property owners, mailings, and contact with the utility. Direct install and whole building participants also said they previously participated in the program.

Whole building projects also became aware of the incentive through a contractor or vendor. This is consistent with the planning timelines of whole building projects where the program representatives are involved later in the planning process.

**Table 4-1. How Participants Heard about ACES**

Heard about the program through...	Direct Install (n=52)	New Construction (n=9)	Whole Building (n=56)
ACES staff	52%	70%	38%
Other property owners	18%	0%	7%
Mailing or literature	4%	10%	15%
Utility company	7%	10%	5%
Meeting, exhibit, trade show	2%	0%	2%
Contractor or vendor	2%	0%	12%
Designer or architect	2%	0%	5%
Advertisements	0%	0%	3%
Research (e.g., Internet)	0%	10%	2%
Inspectors	0%	0%	2%
Personal acquaintance	2%	0%	3%
Previous participation	9%	0%	8%

### 4.2 PROGRAM BENEFITS

Participants were asked what benefits, if any, they have realized at their property(s) as a result of participating in the program. For both direct install and whole building participants, reduced energy costs was the benefit cited most often from program participation (Table 4-2). Direct install participants also said that tenant goodwill and the longevity of the equipment installed were benefits of program participation.

New construction participants most often reported a better understanding of energy efficient options and the money saved from the rebates as the benefits from program participation. Open-ended responses to survey questions indicate that the program becomes more involved in new construction projects in the planning stages; therefore, it is consistent that one of the greatest benefits for these participants is learning about energy efficient options.

**Table 4-2. Reported Benefits of Program Participation**

Benefits of Participation	Direct Install (n=56)	New Construction (n=10)	Whole Building (n=61)
Reduced energy costs	71%	20%	61%
Increase lighting levels	11%	0%	20%
Increase safety	0%	0%	8%
Increase tenant comfort	9%	0%	13%
Better understanding of energy efficiency options	5%	60%	5%
Better understanding of maintenance issues	4%	0%	5%
Save money through rebates	0%	70%	2%
Longevity or reliability of equipment	23%	0%	5%
Tenant goodwill	21%	10%	2%
No results as of yet	11%	10%	18%

Participants were also asked whether or not they would participate in the program again in the future and if they have recommended the program to other building owners or managers. A majority of participants across all project types would participate again (96 percent of direct install, 100 percent of new construction, and 98 percent of whole building participants).

Not only would they participate again, but a majority of participants said they also recommended the program to other owners and building managers. Direct install participants were most likely to say they had already recommended the program (93 percent), followed by whole building (82 percent) and new construction (80 percent) participants.

When asked about suggested improvements to the program, a majority of participants suggested no changes. Those who did offer a suggestion cited a greater incentive or rebate, less paperwork, fewer requirements to get into the program, and more guidance and assistance from the ACES representatives.

### 4.3 BARRIERS

Interviewers asked participants about the barriers they face when considering or seeking approval for new projects. This question was asked of respondents about all project improvements in general and was not specifically related to projects incentivized through ACES. Budget and lack of capital were frequently listed as concerns, although more so for new construction participants (Table 4-3). For direct install projects, participants also listed lack of access to the units and time constraints.

One-fifth of new construction participants noted the difficulty in determining the return on investment as a barrier. This was also one of the areas noted by participants where the program helped them to decide to install the energy efficient equipment—helping them understand the return on investment.

**Table 4-3. Reported Barriers Faced for New Projects**

	<b>Direct Install (n=56)</b>	<b>New Construction (n=10)</b>	<b>Whole Building (n=61)</b>
Budget	46%	70%	44%
Lack of capital	23%	60%	26%
Lack of easy access to apartments	23%	0%	5%
Time constraints	25%	0%	12%
Lack of resources to implement	0%	10%	12%
Approval by board or owner	5%	0%	15%
Difficult in determining return on investment	9%	20%	12%
Look or design	0%	10%	2%
Condition of existing equipment	4%	0%	3%

**APPENDIX A: APARTMENT AND CONDOMINIUM EFFICIENCY SERVICES PROGRAM  
PARTICIPANT SURVEY**

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**FILLS:**

**Measure type:** All equipment except for five services

- 1 Air conditioner
- 2 Clothes washer
- 3 Dishwasher
- 4 Heating equipment
- 5 Services
- 6 Lighting
- 7 Other
- 8 Refrigerator
- 9 Insulation equipment
- 10 Water heater equipment
- 11 Water saving devices

**Measure:** Specific measures within measure type categories

**Introduction**

Hello, my name is \_\_\_\_\_ and I am calling on behalf of the Wisconsin Focus on Energy Apartment and Condominium program. May I speak with [**contact name**]?

- 1 Yes
- 2 No [attempt to convert; if R not available, ask for the person who is responsible for making decisions about purchasing new equipment for this property]

According to our records, your facility in [**city**] participated in the Apartment and Condominium Efficiency Services program within the past 12 months. I'm with PA Consulting Group, an independent research firm, and I am calling to learn about your experiences with the [**measure types(s)**] this facility received through the Apartment and Condominium program within the past 12 months.

I'm not selling anything; I'd just like to ask your opinion about this program. I'd like to assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone.

(Who is doing this study: The Public Service Commission of Wisconsin, which oversees the Focus on Energy and Apartment and Condominium program, is overseeing evaluations of the energy efficiency programs being installed through different programs.)

(Why are you conducting this study: Studies like this help the state of Wisconsin better understand property owners' and managers' need for and interest in energy programs and services.)

(Timing: This survey should take less than 15 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-935-4277)

(Sales concern: I am not selling anything; we would simply like to learn about your experience with the [measures type] you received through the Apartment and Condominium program. Your responses will be kept confidential. If you would like to talk with someone from the Public Service Commission about this study, feel free to call Oscar Bloch at 608-264-8267. If you would like to talk with the Apartment and Condominium program, feel free to call Carter Dedolph at 608-249-9322, extension 315)

(NOTE: For all questions, "DON'T KNOW" and "REFUSED" will be coded if offered as a response.)

### Identification of Appropriate Decision Maker(s)

**C1** Do you recall participating in the Apartment and Condominium Efficiency Services [in unit direct install program/whole building program/new construction program]?

- 1 Yes (SKIP TO C5)
- 2 No
- D DON'T KNOW

**C2** (FILL WITH APPROPRIATE DESCRIPTION FROM BELOW) Let me give you some more information about the program.

**DIRECT INSTALL:** Under the Apartment and Condominium Efficiency Services program In-Unit Direct Install program, contractors replace existing incandescent light bulbs with compact fluorescent lamps (CFLs) and replace showerheads and faucet aerators with new low-flow versions throughout all dwelling units in the building. This equipment is installed at no cost to the property owner.

**WHOLE BUILDING EXISTING:** Under the Apartment and Condominium Efficiency Services program Whole Building program, multi-family residential building owners receive an audit report that outlines energy efficiency improvements that could be made to the property, and discusses rebates you could receive for voluntarily installing recommended lighting improvements and other energy conservation measures to buildings' common areas and systems.

**NEW CONSTRUCTION:** Under the Apartment and Condominium Efficiency Services program New Construction program, multi-family residential building owners work with program staff to identify energy efficiency improvements that could be made for their newly constructed buildings. You would have also received an engineering analysis of the estimated energy savings from installing recommended measures as well as the actual incentives you could get for following through with the recommendations.

ALL: Do you recall participating in this program?

- 1 Yes (*SKIP TO C5*)
- 2 No
- D DON'T KNOW

**C3** (*ASK IF DOESN'T RECALL ANY OF THESE MEASURES*) Is it possible that someone else at this property would know about the **[measure types]** you received through the APARTMENT AND CONDOMINIUM EFFICIENCY SERVICES **[in unit direct install program/ whole building program/new construction program]**? (*RECORD ONE NUMBER*)

- 1 Yes
- 2 No (*THANK AND TERMINATE*)
- D DON'T KNOW (*THANK AND TERMINATE*)
- R REFUSED (*THANK AND TERMINATE*)

**C4** May I please speak with that person? (*RECORD ONE NUMBER*)

- 1 Yes (*BEGIN THE SURVEY AGAIN WITH THIS NEW RESPONDENT*)
- 2 No (*TERMINATE*)
- D DON'T KNOW (*TERMINATE*)
- R REFUSED (*TERMINATE*)

**C5** Were you personally involved in the decision of whether or not to install/receive the energy efficient **[measure types]** at **[business name]** in **[city]** through this program?

- 1 Yes
- 2 No (*SKIP TO C7*)

**C6** Was anyone else within or outside your organization involved in the decision of whether to install/receive this equipment/ this service through this program?

- 1 Yes
- 2 No (*SKIP TO C8*)
- D DON'T KNOW (*SKIP TO C8*)
- R REFUSED (*SKIP TO C8*)

**C7** Who else was involved in the decision of whether to install/receive this equipment/ these services at this location? How are they affiliated with this property and what was their role in the decision?

Name	Title	Phone number	Probe for role:

*(IF R WAS INVOLVED IN THE DECISION, CONTINUE; ELSE TERMINATE AND DIAL ONE OF DECISION MAKERS IN C7)*

**C8** Do you own or manage the property in [city]?

- 1 Own
- 2 Manage
- 3 Other (SPECIFY)

**C9** How many buildings are there at this property?

- \_\_\_\_\_ buildings
- D DON'T KNOW
- R REFUSED

**C10** How many total rental units are in this/these building(s)?

- \_\_\_\_\_ units
- D DON'T KNOW
- R REFUSED

**C11** *(IN UNIT DIRECT INSTALL)* What percent of these units have one shower? What percent have two showers? What percent have three or more showers?

- \_\_\_\_\_ % 1 shower
- \_\_\_\_\_ % 2 showers
- \_\_\_\_\_ % 3 or more showers

**C13** Including the building(s) in [city], how many different buildings with four or more rental units do you [own/manage] in Wisconsin?

- \_\_\_\_\_ buildings
- D DON'T KNOW
- R REFUSED

**C14** Including the building(s) in [city], how many total rental units do you [own/manage] in Wisconsin?

- \_\_\_\_\_ units
- D DON'T KNOW
- R REFUSED

**Context and Decision Making**

**V1\_A** According to the program records, this property received an energy assessment, which identified opportunities for installing energy efficiency measures or practices to improve the efficiency of this facility. Is this correct?

- 1 Yes
- 2 No (SPECIFY WHAT IS INCORRECT)
- D DON'T KNOW
- R REFUSED

**[REPEAT V1b-V1f FOR EACH APPLICABLE MEASURE TYPE].**

**V1\_B** According to the program records, this property received [quantity] [measures] through the APARTMENT AND CONDOMINIUM EFFICIENCY SERVICES [in unit direct install program/whole building program/new construction program]. Does this sound correct?

- 1 Yes
- 2 No (SPECIFY WHAT IS INCORRECT)
- D DON'T KNOW
- R REFUSED

**V1C\_a** (IF QUANTITY > 1 AND EQUIPMENT) Based on what you have seen or heard, approximately what percent of these are still installed and in operation?

- \_\_\_\_\_ %
- D DON'T KNOW
- R REFUSED

**V1C\_b** (IF QUANTITY=1 AND EQUIPMENT) Is this still installed and operating?  
(IF MEASURE DESCRIPTION = THERMOSTAT SET BACK) Is the thermostat still set back?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

**V1D\_a** (IF QUANTITY > 1 AND V1C\_a NE 100% & EQUIPMENT) Why are some/all of these no longer installed and operating?

(INDICATE ALL THAT APPLY)

- 1 Equipment didn't work properly
- 2 Equipment failed/broke
- 3 Tenants took them when they moved
- 4 Wrong size—too small or too large
- 5 Didn't like the color
- 6 Didn't like appearance/unattractive
- 7 Poor water flow
- 8 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

**V1D\_b** (IF QUANTITY=1 AND V1C\_b =NO AND EQUIPMENT) Why is this no longer installed and operating?

(IF MEASURE DESCRIPTION = THERMOSTAT SETBACK) Why did someone change the temperature setting?

(INDICATE ALL THAT APPLY)

- 1 Equipment didn't work properly
- 2 Equipment failed/broke
- 3 Tenants took them when they moved
- 4 Wrong size—too small or too large
- 5 Didn't like the color
- 6 Didn't like appearance/unattractive
- 7 Poor water flow
- 8 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

(IN UNIT DIRECT INSTALL SKIP BACK TO V1B OR TO V2 IF LAST MEASURE TYPE)

**V1E** (IF EQUIPMENT) Our records indicate that you received about [incentive amount] from the Apartment and Condominium Efficiency Services program to offset the cost of the [measure] Does this amount sound about right?

- 1 Yes (SKIP TO V2)
- 2 No
- D DON'T KNOW
- R REFUSED

**V1F** (IF EQUIPMENT) What would you estimate to be the actual amount of the incentive you received?

- \$ \_\_\_\_\_
- D DON'T KNOW
  - R REFUSED

**V2** (IF EQUIPMENT) Which of the following best describes this project; was it a new construction project, building expansion, replacement of existing equipment, modification to existing equipment, or something else?

- 1 New construction
- 2 Building expansion
- 3 Replacement of existing equipment
- 4 Modification to existing equipment
- 5 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

Next I'd like to better understand how equipment decisions are currently made for this property.

**N1** [IF OWN: Do you/IF MANAGE: Does your management company or the building owner] have policies that specify factors to consider when purchasing new equipment for multifamily properties?

- 1 Yes
- 2 No (SKIP TO N3)
- D DON'T KNOW (SKIP TO N3)
- R REFUSED (SKIP TO N3)

**N2** What factors are considered when purchasing new equipment? (SPECIFY: PROBE on payback, return on investment, efficiency guidelines)

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**N3** What are some of the major obstacles or barriers that you face when [IF OWN: considering/IF MANAGE: seeking approval for] a new project? (*DO NOT READ; INDICATE ALL THAT APPLY*)

- 1 Budget
- 2 Lack of capital
- 3 Lack of easy access to apartments
- 4 Time constraints
- 5 Lack of resources to implement
- 6 Other (*SPECIFY*)
- D DON'T KNOW
- R REFUSED

**N4** How did you hear about the [IF DIRECT INSTALL: free] [IF NEW CONSTRUCTION OR WHOLE BUILDING: assessment and incentive of] **[measure type(s)]** available through the Apartment and Condominium Efficiency Services program? (*DO NOT READ; INDICATE ALL THAT APPLY*)

- 1 From Apartment and Condominium Efficiency Services program/Focus/Franklin Energy staff
- 2 From a meeting/exhibit/trade show (*SPECIFY NAME, DATE*)
- 3 From a contractor/equipment vendor (*SPECIFY NAME*)
- 4 From a designer/architect (*SPECIFY NAME*)
- 5 From other property owners
- 6 Mailing/Literature (*SPECIFY*)
- 7 Advertisement (*SPECIFY*)
- 8 Other (*SPECIFY*)
- D DON'T KNOW
- R REFUSED

**[REPEAT N5-N33 FOR EACH MEASURE TYPE EXCEPT FOR IF EQUIPMENT IS NO LONGER INSTALLED (V1C\_a=0 OR V1C\_b=2) OR TEMPERATURE SET BACK IS ONLY MEASURE AND WAS CHANGED (V1C\_b=2) ]**

*(SKIP TO N6 IF DIRECT INSTALL)*

**N5** Now I would like to ask you some specific questions about **[measure type]**. Was any of this equipment/these services already installed/performed before you became aware of the incentives available through the Apartment and Condominium Efficiency Services program?

- 1 Yes (*SPECIFY WHAT WAS ALREADY INSTALLED*) (*SKIP TO N11*)
- 2 No
- D DON'T KNOW
- R REFUSED

**N6** [IF DIRECT INSTALL: Now I would like to ask you some specific questions about **[measure type]**]. Did you have specific plans to install any of this equipment/have this service done before learning that you could get [DIRECT INSTALL OR SERVICE: it at no cost/OTHER: an incentive for purchasing it] from the Apartment and Condominium Efficiency Services program?

- 1 Yes
- 2 No (SKIP TO N10)
- D DON'T KNOW (SKIP TO N10)
- R REFUSED (SKIP TO N10)

**N7** What were you planning to do? (PROBE TO GET EFFICIENCY, QUANTITY, AND TIMING OF PLANS)

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**N8** Did you have to make any changes to your plans in order to receive the [IF DIRECT INSTALL OR SERVICE: free] [OTHER: assessment and rebate of] **[measure type]** through the program?

- 1 Yes
- 2 No (SKIP TO N10)
- D DON'T KNOW (SKIP TO N10)
- R REFUSED (SKIP TO N10)

**N9** What changes did you have to make to your plans? (PROBE FOR CHANGES TO EFFICIENCY, QUANTITY, TIMING)

- 1 Efficiency changes: \_\_\_\_\_
- 2 Quantity changes: \_\_\_\_\_
- 3 Timing changes: \_\_\_\_\_
- 4 Other changes: \_\_\_\_\_

**N10** At what point in the planning, purchasing or installation process were you when you first began to talk with someone from the Apartment and Condominium Efficiency Services program?

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**N10b** What role did the Apartment and Condominium Efficiency Services program representative have on your decision to have an assessment done?

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**N10c** What role did the Apartment and Condominium Efficiency Services program representative have on your decision to install the energy efficient equipment?

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*(IF NEW CONSTRUCTION OR SERVICE MEASURE, SKIP TO N15)*

**N11** Did this [measure type] replace (an) existing [measure type]?

- 1 Yes
- 2 No *(SKIP TO N15)*
- D DON'T KNOW *(SKIP TO N15)*
- R REFUSED *(SKIP TO N15)*

**N12** How would you describe the working condition of the old equipment? Was it in good, fair, or poor working condition?

- 1 Good
- 2 Fair
- 3 Poor
- D DON'T KNOW
- R REFUSED

**N13** Approximately how many years had the [IF QUANTITY >1: majority of the] old equipment been installed at this building? Would you say less than 2 years, 3–5 years, 6–10 years, 11–15 years, or more than 15 years?

- 1 Less than 2 years
- 2 3–5 years
- 3 6–10 years
- 4 11–15 years
- 5 More than 15 years
- D DON'T KNOW
- R REFUSED

**N14** How many more years do you think **[measure type]** would have continued to function?

- 1 Less than 2 years
- 2 3–5 years
- 3 6–10 years
- 4 11–15 years
- 5 More than 15 years
- D DON'T KNOW
- R REFUSED

**N15** Do you know what the total cost for this equipment/service would have been if you had not received [DIRECT INSTALL AND SERVICE: it at no cost/OTHER: this incentive] from the Apartment and Condominium Efficiency Services program?

- 1 Yes (*SPECIFY*)
- 2 No
- D DON'T KNOW
- R REFUSED

**Direct Attribution—Timing**

**N16** If the [IF DIRECT INSTALL OR SERVICE: free] [OTHER: incentivized] **[measure type]** had not been available through the Apartment and Condominium Efficiency Services program, would you have purchased any on your own/ pay to have service(s) done at the same time?

- 1 Yes (*SKIP TO N23*)
- 2 No
- D DON'T KNOW
- R REFUSED

**N17** Would you have purchased it/had the service done at a later date?

- 1 Yes
- 2 No (*SKIP TO N33*)
- D DON'T KNOW
- R REFUSED

**N18** When do you think you would have purchased it/done this?

- \_\_\_\_\_ months \_\_\_\_\_ years (*SKIP TO N20*)  
D DON'T KNOW  
R REFUSED (*SKIP TO N20*)

**N19** (*IF DON'T KNOW*) Do you think you would have purchased it/done this within. . . ?  
(*READ LIST*)

- 1 1 year  
2 1–2 years  
3 3–4 years  
4 Never  
D DON'T KNOW  
R REFUSED

### Consistency—Timing

**N20** (*DO NOT ASK FOR NEW CONSTRUCTION OR IF MEASURE IS SERVICE; ASK ONLY IF OLD MEASURE WAS IN POOR WORKING CONDITION, N12=POOR, OR SAYS THAT IT WOULDN'T HAVE RUN FOR MORE THAN 2 YEARS, N14=LESS THAN 2 YEARS, AND SAYS WOULDN'T HAVE PURCHASED THE NEW EQUIPMENT WITHIN 2 YEARS—N18 > 2 OR N19 > 2*)

Earlier you said that the old [**measure type**] [was in poor working condition/wouldn't have run for more than 2 years]. Would you actually have waited [fill with N18 OR N19 YEAR] years to purchase a new [**measure type**] if the program had not been available?

- 1 Yes→Why do you say that? \_\_\_\_\_  
2 No  
D DON'T KNOW  
R REFUSED

**N21** (DO NOT ASK FOR NEW CONSTRUCTION OR IF MEASURE IS SERVICE; ASK ONLY IF OLD MEASURE WAS IN GOOD WORKING CONDITION, N12=GOOD, OR SAYS THAT IT WOULD HAVE RUN FOR MORE THAN 5 YEARS, N14 > 3-5 YEARS, AND SAYS WOULD HAVE PURCHASED THE NEW EQUIPMENT AT SAME TIME, N16=1) Earlier you said that the old [measure type] [was in good working condition/would have run for at least 3-5 more years]. Would you actually have purchased [measure type] at that same time if the program had not been available?

- 1 Yes→Why do you say that? \_\_\_\_\_
- 2 No
- D DON'T KNOW
- R REFUSED

**N22** (IF N20 OR N21 = NO) When do you think you would have purchased this equipment  
Would you have purchased it/them within...? (READ LIST)

- 1 1 year
- 2 1–2 years
- 3 3–4 years
- 4 Never
- D DON'T KNOW
- R REFUSED

**Direct Attribution—Efficiency and Quantity**

*Efficiency*

[IF SERVICE, SKIP TO N32]

[IF WATER SAVING DEVICE, SKIP TO N30]

**N23** DIRECT INSTALL AND EQUIPMENT: Before installing this efficient [measure type], had you installed [measure type] of the same high efficiency level at this (IF C13 >1: or another) property without receiving an incentive like you received from the Apartment and Condominium Efficiency Services program?

WHOLE BUILDING AND EQUIPMENT: Before installing this [measure type], had you installed [measure type] of the same high efficiency level at this (IF C13>1: or another) property without receiving an incentive like you received from the Apartment and Condominium Efficiency Services program?

NEW CONSTRUCTION AND C13>1: Before installing this [measure type], had you installed [measure type] of the same high efficiency level in another property without receiving an incentive like you received from the Apartment and Condominium Efficiency Services program?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

*[IF DIRECT INSTALL OR WATER SAVING DEVICES, SKIP TO N30]*

**N24** Prior to talking with anyone from the Apartment and Condominium Efficiency Services program, did you know that energy efficient [measure type] came in different ranges of efficiency levels?

- 1 Yes
- 2 No (*SKIP TO N27*)
- D DON'T KNOW (*SKIP TO N27*)
- R REFUSED (*SKIP TO N27*)

**N25** Do you know what the range of efficiency levels is?

- 1 Yes (*DESCRIBE*)
- 2 No
- D DON'T KNOW
- R REFUSED

**N26** How did you first learn that they came in different efficiency levels?

- 1 Colleagues
- 2 Rental association
- 3 Advertising/news articles
- 4 Sales person
- 5 Other (*SPECIFY*)
- D DON'T KNOW
- R REFUSED

**N27** Did the Apartment and Condominium Efficiency Services program representative talk with you about the range of efficiency levels available for energy efficient [**measure type**]?

- 1 Yes
- 2 No (*SKIP TO N29*)
- D DON'T KNOW
- R REFUSED

**N28** What did the representative say about efficiency levels?

- 
- D DON'T KNOW
  - R REFUSED

**N29a** If the incentive for the energy efficient [**measure type**] had not been offered under Apartment and Condominium Efficiency Services program, would you have purchased a less efficient [**measure type**]?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

**N29b** What efficiency level would you have purchased?

- 
- D DON'T KNOW
  - R REFUSED

**N29c** (IF QUANTITY > 1) What percent of the [measure type] would have been less efficient?

\_\_\_\_\_%  
D DON'T KNOW  
R REFUSED

*Quantity*

(QUANTITY QUESTIONS ARE ONLY ASKED IN CASES WHERE THE SAMPLE VARIABLE QUANTITY IS > 1)

**N30** [IF EQUIPMENT] If the [IF DIRECT INSTALL: free] [IF NEW CONSTRUCTION OR WHOLE BUILDING: incentivized [measure type] had not been offered under Apartment and Condominium Efficiency Services program, would you have purchased the same quantity of [measure type]?

1 Yes (SKIP TO N32)  
2 No  
D DON'T KNOW  
R REFUSED

**N31** [IF EQUIPMENT] Would you have installed fewer or more [measure type]?

1 Fewer (RECORD QUANTITY)  
2 More (RECORD QUANTITY)  
D DON'T KNOW  
R REFUSED

**Consistency—Overall**

**N32** On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is that you would have bought the same [measure type] if you had not received [IF DIRECT INSTALL OR SERVICE: it at no cost] [OTHER: this incentive] through the Apartment and Condominium Efficiency Services program?

\_\_\_\_\_  
D DON'T KNOW  
R REFUSED

**N33** Can you please describe in your own words what impact, if any, the Apartment and Condominium Efficiency Services program had on your decision to install/receive [measure type] at the time you did?

---

**Spillover**

[IF HAS NO OTHER 4+ UNIT PROPERTIES, SKIP TO S4]

**S1** Since participating in the Apartment and Condominium Efficiency Services program, are you considering or have you installed similar energy efficiency measures at your other properties without program assistance?

- 1 Yes, considering
- 2 Yes, already have implemented
- 3 No, not considering (SKIP TO S4)
- D DON'T KNOW (SKIP TO S4)
- R REFUSED (SKIP TO S4)

**S2** (IF S5=CONSIDERING OR DONE) What [are you considering doing/have you done?] PROBE ON ALL SPECIFICS BELOW; RECORD VERBATIM

Location of installation: \_\_\_\_\_  
Type of measure: \_\_\_\_\_  
Quantity of measure: \_\_\_\_\_  
How know is EE: \_\_\_\_\_

**S3** What role did your previous participation in Apartment and Condominium Efficiency Services program have on your decision to install this/these energy efficiency measure(s) on your own? RECORD VERBATIM; PROBE TO DETERMINE IF WAS SOLE CAUSE OR ONE OF SEVERAL REASONS

---

**Satisfaction**

**S4** Have you had any complaints or problems regarding the installation or operation of the new equipment/services provided?

- 1 Yes
- 2 No (SKIP TO S8)
- D DON'T KNOW (SKIP TO S8)
- R REFUSED (SKIP TO S8)

**S5** What were the complaints or problems?

---

**S6** What has been done to resolve these complaints or problems?

---

**S7** Are you satisfied with this outcome?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

**S8** What benefits, if any, have you realized at this property as a result of participating in Apartment and Condominium Efficiency Services program? DO NOT READ; RECORD ALL THAT APPLY

- 1 Reduced energy costs
- 2 Increased lighting levels
- 3 Increase safety
- 4 Increase in tenant comfort
- 5 Better understanding of energy efficient options
- 6 Better understanding of maintenance issues
- 7 Other (SPECIFY)
- D DON'T KNOW
- R REFUSED

**S9** Would you participate in this program again in the future?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

**S10** Have you recommended the program to other building owners or managers?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

**S11** What changes, if any, to the program would you recommend?

---

**S12** Other than the Apartment and Condominium Efficiency Services program, have you participated in any other programs offered through Focus on Energy?

- 1 Yes
- 2 No
- D DON'T KNOW
- R REFUSED

### **Firmographics**

**F1** How long have you [**owned/managed**] the property at [**location**]?

- \_\_\_\_\_ years
- D DON'T KNOW
- R REFUSED

**F6** What is your job title?

- 1 Owner
- 2 Maintenance manager
- 3 Maintenance staff
- 4 Property manager
- 5 Purchasing agent
- 6 Other (*SPECIFY*)
- R REFUSED

That's all the questions I have. Do you have any questions or comments?

*(THANK AND TERMINATE)*