

# 2017 Portfolio Status Report of the Energy Efficiency and Peak Demand Response Programs

VOLUME III

APPENDICES H – I



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## APPENDIX H

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## EFFICIENT PRODUCTS PROGRAM

### 2017 Evaluation Report

Prepared for:

AEP OHIO



*A unit of American Electric Power*

May 11, 2018

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## EXECUTIVE SUMMARY

This report presents the results of the evaluation of the 2017 AEP Ohio Efficient Products for Business Program. The Executive Summary provides a high-level description of the program, key impact findings, key process findings, and recommendations stemming from these findings. Detailed methodology and additional general findings are contained in the body of the report following the Executive Summary.

The Efficient Products for Business Program (EP4B) offers incentives to nonresidential customers installing eligible high-efficiency electric equipment. The program provides a streamlined incentive application and quality control process intended to facilitate participation for customers interested in installing efficient technologies from a pre-qualified list. An implementation contractor delivers the program on behalf of AEP Ohio.

### ES.1 Program Participation

As shown in Table ES-1 and Table ES-1, the 2017 Efficient Products Program paid incentives on 2,141 projects constituting 150,141 MWh of *ex ante* reported annual energy savings. Compared to 2016, this reflects a one percent increase in total project count, a seven percent increase in reported energy savings, and a 16 percent increase in *ex ante* coincident summer peak demand savings.

**Table ES-1. Efficient Products Summary, 2016 and 2017 Program Years**

	2017 Program	2016 Program
Number of Projects	2,141	2,118
Total Incremental Participant Cost	\$42,575,045	\$44,418,298
Amount of Incentives Paid by AEP Ohio	\$9,617,347	\$11,545,416
<i>Ex Ante</i> Energy Savings (MWh)	150,141	140,354
<i>Ex Ante</i> Demand Savings (MW)	23.873	20.656

NOTE: Total Incremental Participant Cost is calculated by subtracting Total Incentives from Total Project Costs.

Source: Navigant review of AEP Ohio Program Tracking Database

**Table ES-2. Efficient Products 2017 Program Summary**

	2017 Program Goals	2017 Program, Reported
Program Budget	\$12,800,000	\$14,651,071
<i>Ex Ante</i> Energy Savings (MWh)	109,699	150,141
<i>Ex Ante</i> Demand Savings (MW)	31.550	23.873

Source: Navigant review of AEP Ohio Program Tracking Database

Table ES-3 shows that, of the 16 economic sectors served by the program in 2017, 73 percent of the program's projects came from seven sectors.

These seven sectors account for 77.4 percent of Efficient Products for Business program's energy savings, and 81.5 percent of the reported demand savings.

**Table ES-3. 2017 *Ex Ante* Activity by Economic Sector**

Economic Sector	Number of Projects	Ex Ante Savings			
		Energy kWh	Average kWh per Project	Demand kW	Average kW per Project
Assembly	116	3,465,160	29,872	618	5
College/University	68	2,419,604	35,582	482	7
Government/Municipal	122	8,464,068	69,378	1,570	13
Grocery	110	13,869,241	126,084	1,970	18
Hotel/Motel	27	1,591,900	58,959	52	2
Industrial/Manufacturing	233	37,196,384	159,641	6,159	26
Medical- Hospital	56	6,186,809	110,479	1,112	20
Medical- Nursing Home	17	688,101	40,477	91	5
Multifamily	25	3,080,766	123,231	405	16
Office	157	8,472,102	53,962	1,614	10
Outdoor Sports Complex	4	99,765	24,941	21	5
Restaurant	89	2,460,667	27,648	171	2
Retail/Service	618	30,904,999	50,008	5,133	8
School	204	13,865,823	67,970	2,397	12
Warehouse	79	6,574,828	83,226	1,029	13
Miscellaneous	216	10,800,781	50,004	1,048	5
<b>Total</b>	<b>2,141</b>	<b>150,140,998</b>	<b>70,127</b>	<b>23,873</b>	<b>11</b>

Note: Totals may not sum due to rounding.

To condense the categories, Navigant combined the following Building types: Large and Small Offices were combined into Offices; Large and Small Retail/Services were combined into Retail/Services; Conditioned, Refrigerated and Unconditioned Warehouse were all combined to Warehouse.

Source: Navigant review of AEP Ohio Program Tracking Database

## ES.2 Data Collection Activities

As part of the impact study, the evaluation team completed a detailed engineering review on project files accounting for 8.6 percent of the claimed *ex ante* energy savings. Table ES-4 provides an illustration of the impact measurement and verification (M&V) sample stratification and the level of review completed by the evaluation team within each stratum.

**Table ES-4. Impact Sampling Strata and Achieved Sampling**

Stratum by Approach and Energy Savings	Number of Projects in Population	Strata Weight by Energy	Sample Size
Large (>300 MWh/yr. or > 50 kW)	128	40%	13
Medium (100-300 MWh/yr. or >15 kW)	371	34%	19
Small (< 100 MWh and < 15 kW)	1,642	26%	25
<b>Total</b>	<b>2,141</b>	<b>100%</b>	<b>57</b>
<b>Percent of Ex Ante Savings</b>			<b>8.6%</b>

Source: Navigant review of AEP Ohio Program Tracking Database

## ES.3 Key Impact Findings and Recommendations

As shown in Table ES-5, the verified electricity savings exceed the 2017 targets of 110 GWh by 44 percent. However, verified coincident demand savings are 8.8 MW short of the 31.55 MW target. The *ex post* energy and utility coincident peak demand savings are 157,452 MWh/year and 22.8 MW. The realization rate for energy is 1.05, while the demand realization rate is 0.95. These results represent both increased program savings and increased realization rates compared to 2016. The kWh precision bounds are eight percent larger as well. Although the sample this year was slightly less representative than normal, these metrics clearly indicate that the program is healthy and not only functioning well, but continuing to grow and improve.

**Table ES-5. Impact Savings, Realization Rate and Sample Precision**

Metric	2017 Program Goals* (a)	Ex Ante (b)	Ex Post (c)	Realization Rate (RR) = (c) / (b)	Overall Relative Precision at 90% Confidence	Percent of Goal = (c) / (a)
Annual Energy Savings (MWh)	109,699	150,141	157,452	1.05	18.8%	143.5%
Coincident Peak Demand Reduction (MW)	31.550	23.873	22.763	0.95	27.4%	72.1%

Source: Energy Efficiency / Peak Demand Reduction (EE/PDR) Portfolio 2017 to 2020 Evaluation Plan, September 27, 2017

Regarding the Relative precision bounds noted in Table ES-5, the 18.8% confidence interval for energy savings is traced to a much higher than normal Coefficients of Variation (CV) in this random sample, particularly in the Large stratum, but also in the Medium stratum. Typically, both strata have much more homogeneous results. However, for 2017, the sample design was based on an average of CVs from the previous three evaluation cycles, which have traditionally been much more typical. Ultimately the mid-point of the realization range is very close to 1.0, but the distribution of the project level results is too

dispersed to keep the results within the 90/10 target.<sup>1</sup> Other key impact findings and recommendations include the following selected recommendations. Additional impact recommendations are included in Section 4.1 (Key Impact Findings and Recommendations).

The 2017 realization rates (defined as *ex post* savings divided by *ex ante* savings) are 1.05 for energy savings and 0.95 for demand savings. The 2017 Efficient Products for Business Program impact evaluation resulted in the following conclusions and recommendations.

**Impact Finding 1:** There was significantly more variability in the project-level realization rates in 2017 relative to the previous four years. Seventeen of the 54 projects sampled have a realization rate that differ from the reported values by more than +/- 50%; i.e., over 30 percent of the projects sampled have verified savings below 0.5 or above 1.5. Projects from all three strata (5 Large, 5 Medium, and 7 Small) are included in the list of projects where savings rates experienced significant adjustment during verification. The two primary causes for these savings adjustments are correcting business segment (updates baseline HOU), and using logged HOU for the as built (verified) case. (The lighting loggers are particularly impactful with controls based measures like occupancy sensors.) The quantity and magnitude of these adjustments, particularly the adjustments made for ten of the Large and Medium strata sites, are directly driving the wider than expected precision bounds.

**Impact Recommendation 1:** The implementation contractor should continue to refine the prescriptive savings for lighting measures; and, in particular, the default hours of use by building type. It is also important that the application approval process incorporate improved review of the business type assigned to each project. Also, following up on a recommendation from the 2016 evaluation report, Navigant has implemented improvements to our data intake and processing activities in order to facilitate the use of both 2016 and 2017 evaluation findings, in conjunction with future evaluation data, to help inform improvements to the prescriptive savings input assumptions. The Evaluator looks forward to expanding on this process in the second half of 2018 and working with the AEP Ohio to improve the input assumptions for 2018.

## ES.4 Key Process Findings and Recommendations

The following process recommendations are offered to help improve program effectiveness and efficiency, and further improve the overall experience of program participants. Additional process recommendations are included in Section Key Process Findings and Recommendations 3.3 (Key Process Findings and Recommendations).

The following process recommendations are offered to help improve program effectiveness and efficiency and further improve participant's experience of the program.

**Process Finding 1:** The separate databases for both the intake contractor and the implementation contractor do not provide transparency into a customer's full experience with the Process Efficiency

<sup>1</sup> Recognizing the coefficients of variation are unusually high for this evaluation cycle, Navigant revisited the sample design process and updated the CV (originally estimated using the average of the previous three years). Applying the achieved CV, we determined that in order to achieve 90/10 for both energy and demand impacts, the sample size increases by approximately 65 percent; N ~88.

program, including elapsed time from initial contact through final incentive payment, and reasons a customer may not complete their project.

**Process Recommendation 1:** The intake and implementation contractors should review the steps in their respective application processes to identify potential problem areas for individual customers, reasons applications are not converted to completed projects, and align the databases with the key project dates for (such as the application submittal date) that carry forward from one contractor to the next.

**Process Finding 2:** The program application and supporting documents do not provide consistent information to customers, making it difficult for a customer to understand the requirements of the program. The Process Efficiency, Efficient Products for Business, and Self Direct program application is a 20-page document outlining the application's guidelines, checklists, customer information needed and worksheets for the various end-use measures. For a Solution Provider or customer who is well versed in the program, the document provides everything needed to submit a project for an incentive. However, for a new customer the application can be overwhelming.

**Process Recommendation 2:** Review all of the program applications, terms and conditions, and specification sheets for consistency of information. In the application, clearly identify 1) the guidelines applicable to each program and 2) the checklist of required attachments. This could be accomplished using a matrix with the three programs as columns headers and the various step as rows; with a check mark designating which steps are needed for that program. (For example, Process Efficiency measures require pre-approval, other programs do not). Also, the Terms and Conditions for the three programs were in two separate documents; for ease of reference, include the Terms and Conditions in the Application. Consolidating all the needed information for each program will help the new customer navigate the process.

**Process Finding 3:** Two-thirds of customer respondents said they have not participated in other AEP Ohio energy efficiency programs before 2017. Additionally, more than 50 percent reported they were unaware of additional opportunities at their facility, while over two-thirds indicated they would participate in additional energy efficiency projects if AEP Ohio offered an incentive, (for end use technologies that already qualify for existing programs).

**Process Recommendation 3:** AEP Ohio should put a greater emphasis on cross-program marketing to increase customer awareness of AEP Ohio's comprehensive program services, including the consolidated outreach contractor's role to assist customers identify and implement energy efficiency opportunities. This may be addressed for example, through direct telephone outreach to program participants, or leaving program flyers during onsite visits, providing cross-program information along with the rebate check, or additional program awareness outreach.

## ES.4 Key Tracking Data and File Review Findings and Recommendations

With respect to the Project Tracking Database and Project Files, Navigant offers the following observations and recommendations for improved clarity and tracking.

**Tracking System Finding 1:** In reviewing the tracking database, Navigant found some fields were not completed for all applicants. Fourteen percent of contractor business names and twenty-one percent of contractor emails are missing, as well as square footage (17%). Five percent of customer phone number and nine percent of customer email addresses were also either Not Provided, NA or Blank.

**Tracking System Recommendation 1:** As part of the administrative review of applications, add a check to ensure information for fields, such as contractor business name and contractor email, as well as customer telephone and email, are complete and are entered into the database.

## 1. INTRODUCTION AND PURPOSE OF STUDY

The Efficient Products for Business Program offers incentives on pre-qualified equipment to nonresidential customers installing eligible high-efficiency electric equipment. The Efficient Products Program is marketed, administered, and delivered as a single program by AEP Ohio. The program is managed by an implementation contractor, in coordination with AEP Ohio.

The 2017 program year represents the ninth year of operation for this program. The program is delivered with the support of two contractors. DNV GL serves as the program's implementation contractor; and starting with PY17 CLEAResult assumed responsibility for customer outreach and as the program's clearinghouse (initial application assembly and initial review). As program outreach team and initial application clearinghouse, CLEAResult is the single point of contact for preliminary application review. As the implementation contractor, DNV GL processes the applications compiled by CLEAResult; reviews the projects to confirm savings; and, in due course, issues payment of incentives on behalf of AEP Ohio.

### 1.1 Evaluation Objectives

This report presents the findings from the impact and process evaluations of the AEP Ohio Efficient Products Program for 2017. The three major objectives of the evaluation were to:

- 1) Quantify energy and utility coincident peak demand savings impacts at the meter from the program during 2017.
- 2) Determine program cost-effectiveness.
- 3) Determine key process-related program strengths and weaknesses and identify ways in which the program can be improved.

Specific process evaluation questions are summarized in Section 2.2 (Key Evaluation Questions) and Section 3.3 (Process Evaluation Findings).

### 1.2 Evaluation Methods

Program impacts for the 2017 Efficient Products Program were evaluated in terms of electric energy and peak demand savings. A portion of the completed project population was sampled with the goal of achieving 90 percent confidence and a +/- 10 percent precision for both the program energy and demand savings.

The *ex post* energy and demand savings of the sampled projects were determined by engineering review of the project files, engineering review of the *ex ante* savings analysis, and onsite inspection and verification of the installed equipment. AEP Ohio system coincident peak savings are determined by a two-tier approach depending on the team's ability to directly log the equipment's use profile. For sites where the evaluation team was able to install temporary lighting data loggers, three distinct peak coincidence factors (CF) are calculated: utility coincident peak CF, PJM summer peak CF, and PJM winter peak CF. For sites where logging was not conducted, peak demand savings are calculated using the published coincidence factor for the given business segment and fixture location (interior vs exterior).



Data collection activities are summarized in Table 1-1. During the 2017 program evaluation, Navigant interviewed staff from AEP Ohio and the implementation contractors, reviewed program materials, and reviewed strategy documents to gain an understanding of program logic, expected inputs, outputs, and outcomes for the program.

**Table 1-1. Summary of Data Collection Activities**

Data Collection Type	Targeted Population	Supported Evaluation Activities
Review of Program Documentation	Program documentation and marketing materials for 2017 program	Process Evaluation
In-depth Telephone Interviews	AEP Ohio Program staff	Process Evaluation
	Implementation staff	Process Evaluation
Project File Review	Sample of completed projects	Impact Evaluation
Telephone Verification	Where project files were incomplete	Impact Evaluation
Telephone Survey	Participants	Process Evaluation
Onsite Verification	Where uncertainties in the savings calculations existed	Impact and Process Evaluation
Tracking Data Review	All program participants	Impact and Process Evaluation

*Source: Navigant Evaluation Plan*

## 2. METHODOLOGY

This section describes the methodology used to conduct the process and impact evaluations. A high-level overview of the steps taken to collect and analyze the data for this evaluation is described in Section 2.1. This is followed by a discussion of the research questions that guided the evaluation and the tasks completed as part of the process evaluation; including the review of tracking data, the marketing activities and participation. Finally, the methods used for primary data collection tasks and in analyzing the impact and process data are discussed.

### 2.1 Overview of Approach

The evaluation was driven by three overarching objectives: (1) quantify electric energy and utility coincident peak demand savings impacts from the 2017 program year, (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved, and (3) determine program cost-effectiveness. To meet these objectives, the evaluation team undertook the following activities.

- 1) **Evaluation Questions.** Established key evaluation questions as part of developing the 2017 Evaluation Plan with AEP Ohio staff.
- 2) **Tracking Data Review.** Reviewed the program tracking data collected by the implementation contractor and provided to the evaluation team by AEP Ohio.
- 3) **Review of Marketing Activities.** Reviewed the overall marketing activities and approach as implemented by the implementation contractor.
- 4) **Review of Participation.** Reviewed program participation by building type, program path, completion date, and geographic location.
- 5) **Primary Data Collection.** Performed primary data collection, including in-depth interviews with program staff and the implementation team, a file review for a randomly-selected sample of projects, and onsite verification for a subset of the sampled projects.
- 6) **Methods Used to Analyze Impact Data.** Navigant quantified energy and coincident peak demand reduction savings by reviewing project files. File reviews included verifying engineering calculations. Site visits were then conducted at the majority of sampled sites. Site visits included verification of equipment specifications, product counts, and metering of equipment operation.
- 7) **Methods Used to Analyze Process Data.** Navigant assessed the effectiveness of the program processes by analyzing program documents, the results of in-depth interviews with program staff at AEP Ohio, the implementation contractors, and conducted a review of program tracking data.

### 2.2 Key Evaluation Questions

Navigant worked with AEP Ohio to identify a number of key evaluation questions regarding the 2017 Efficient Products Program. The broad evaluation objectives for the Efficient Products for Business Program are consistent with portfolio goals outlined in the 2017 Evaluation Plan.

In summary, the three primary portfolio objectives were to: (1) quantify energy and peak demand<sup>2</sup> savings impacts from the program during 2017; (2) determine key process-related program strengths and weaknesses, and identify ways in which the program can be improved; and (3) review program cost-effectiveness.

To address these objectives, three broad Efficient Products evaluation questions were addressed by the study as a whole.

1. What is the status of implementing recommendations / issues identified in the 2016 evaluation?
2. How do the findings in the 2017 evaluation compare with findings from prior year evaluations?
3. Have changes made to the 2017 program been effective in increasing satisfaction and/or participation?

The following key research questions were addressed through a review of program data and interviews or surveys of those involved with the program.

## 2.2.1 Impact Evaluation

- 1) What are the verified (*ex post*) gross energy and peak demand savings from the program?
- 2) What were the realization rates and what were primary factors driving the realization rates? (Defined as evaluation-verified (*ex post*) savings divided by program-reported (*ex ante*) savings.)
- 3) Did the program meet the energy and peak demand savings goals? If not, why not?
- 4) What are the benefits, costs, and cost-effectiveness of the program?

The evaluation team calculated *ex post* savings using differing methodologies based on whether the measure is contained in the implementation contractor's Appendix A: AEP Ohio Prescriptive Measures Protocols, Business Incentives Program. For measures included in the Ohio TRM, *ex post* savings are based on the TRM methodologies. For measures not included in the Ohio TRM, the evaluation team applied established best practices methods, including independent research, for calculating energy and demand savings.

## 2.2.2 Process Evaluation

For the Process evaluation, Navigant assessed the effect of the program design and implementation strategy on program performance and customer satisfaction through a series of interviews and analysis of AEP Ohio's data tracking. The specific activities included:

1. In-depth phone interviews with program staff
2. In-depth interviews with Implementation staff

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<sup>2</sup> Navigant will evaluate both AEP Ohio specific peak demand impacts, and the peak demand impacts as defined by PJM, including winter peak period demand.

3. Telephone surveys with participants
4. Onsite participant surveys
5. In-depth review of participant tracking data

Collectively, these primary sources provided context on the following process questions.

### **Marketing and Participation**

1. Does the marketing effort appropriately meet current and future program participation goals?
2. Does the program outreach effectively increase awareness of program opportunities?
3. Are the messages included within program outreach clear and actionable?
4. What are the key interests and motivations for potential and actual participants beyond the financial incentive offered?
5. What are the key barriers to participation in the program?

### **Program Effectiveness and Satisfaction**

1. What improvements could be made to create a more effective program and to help increase energy and demand impacts?
2. Are participants and providers satisfied with the programs?
3. Have implementation changes effectively increased satisfaction and/or participation?

### **Administration and Delivery**

1. Is program administration functioning effectively?
2. Are there any problems with program delivery?
3. Are program tracking systems adequate? Are program tracking systems consistently maintained? Do program tracking systems contain all data required to support AEP Ohio supervision, program tracking, and evaluation?
4. Are program procedures documented and followed?
5. Is the implementation contractor meeting a key performance indicator?

### ***2.2.3 Efficient Products Specific Questions***

#### **Experience with Program**

1. Who assisted you with the program?
2. How would you rate the ease of finding information about the program?
3. How difficult or easy did you find the application process?
4. How satisfied were you with:
  - The amount of time spent from the beginning of the project to the time you received your incentive

- Communication you had with the program representatives?
  - Energy efficiency level required to qualify for an incentive?
  - The program overall?
5. Do you have any other feedback on the Efficient Products for Business program?

## **2.3 Tracking Data Review**

Program tracking data is critical for determining the impacts of the Efficient Products for Business Program. A copy of the program tracking data collected by the implementation contractors was provided by AEP Ohio to the evaluation team. The evaluation team reviewed all fields recorded on the application forms and key data fields in the database were reviewed to identify missing, incomplete, or inconsistent data. The data collected was also reviewed to identify any additional information that would be helpful in evaluating program performance. The evaluation team did not assess whether the tracking system was adequate for regulatory prudency reviews or corporate requirements.

## **2.4 Review of Marketing Activities**

Marketing collateral, application forms and other materials available from the AEP Ohio website were reviewed by the evaluation team. Additional marketing materials were requested from AEP Ohio and the implementation contractors. Information on marketing, communications and outreach efforts was also obtained from both AEP Ohio and the implementation contractors.

## **2.5 Review of Participation**

The evaluation team used the program tracking data to analyze program participation by a number of key factors including building type and completion date. The analysis focused on metrics such as number of participants and impact results. The results of this analysis are presented, in part, in the discussion of program activity in Section 3.3.4.

## **2.6 Interviews with Program and Implementation Contractor Staff**

In-depth qualitative interviews were completed with AEP Ohio and the implementation contractor staff. The purpose of these interviews was to understand how the program worked and how it was marketed for 2017. Discussion guides were developed allowing a structured but open-ended interview and provided to AEP Ohio for review. A free-flowing discussion resulted between interviewer and respondent. Staff experienced in program evaluations were used to perform the interviews. Interviews were conducted by telephone to provide flexibility to the respondents' schedules.

## **2.7 Interviews with Program Participants**

Navigant designed the customer surveys within a best practice research framework and worked with the Blackstone Group to field participant telephone surveys. The evaluation team developed the survey sample to achieve appropriate program level confidence and precision. To meet the targets and provide

the most representative data, the sample design controlled for confounding factors specific to the program and employed randomized selection to mitigate any possible biases. The evaluation team defined the survey population based on tracking data provided by AEP Ohio. Participants who received an onsite for the impact evaluation were not included in the participant telephone sample. Instruments were sent to the AEP Ohio compliance team for review. Navigant limited duplication of survey questions already asked by AEP Ohio and considered timing of surveys to limit customer confusion and fatigue.

## 2.8 Methods Used to Analyze Impact Data

Through a review of the tracking data, the evaluation team divided the completed projects into three strata based on *ex ante* energy and demand savings. A random sample was selected from each stratum to be reviewed by the evaluation team. Desk reviews were conducted on all sampled projects, including review of the prescriptive calculations provided by the implementer, product specification sheets, invoices, and any additional supporting documentation.

For most sites, the evaluation team produced a simple, yet site-specific metering and verification (M&V) plans. These M&V plans included site-specific questions, data requests, and logging plans. These sites were visited by experienced engineers who completed the tasks identified in the M&V plan. The site visits included inspection of equipment specifications and quantities, verification of hours of operation, collection of energy management system data and/or metered systems where required, and answering any outstanding questions.

The verification results of the sampled projects were statistically applied to the entire population of projects in determining the *ex post* savings. Additional detail related to the sample design and results extrapolation are provided in subsequent sections.

### 2.8.1 Impact Sample of Project Files

The impact sample for 2017 was chosen to achieve a 90% level of confidence and +/- 10% relative precision for the engineering review. The coefficients of variation used to inform this sample are based on the results achieved in previous years of evaluating this program.

The program was evaluated at the project level; and the project population was divided into three strata based on *ex ante* energy savings. There were some sites where multiple projects were completed during the 2017 program year. In this instance, only the projects randomly selected as part of the sample were selected. If a site was sampled in multiple programs (e.g., Efficient Products and Process Efficiency) then the evaluation team made every effort to bundle these site visits to minimize participant fatigue.

This stratified, random sampling approach resulted in a sample of 54 projects, comprising 8.6 percent of the reported program MWh savings. Table 2-1 provides additional context regarding the impact sample stratification and the level of review complete within each stratum.

Table 2-1. Impact Sampling Strata and Achieved Sampling

Stratum by Approach and Energy Savings	Strata Weight by <i>Ex Ante</i> Energy Savings	Number of Desk Reviews	Number of Onsite Reviews <sup>3</sup>
Large (>300 MWh/yr. or > 50 kW)	40%	13	12
Medium (100-300 MWh/yr. or >15 kW)	34%	17	17
Small (< 100 MWh and < 15 kW)	26%	24	20
Total		54	49
Percent of <i>Ex Ante</i> Savings			8.6%

Source: Navigant Analysis

### 2.8.2 Ex Post Energy Savings Calculation

Energy savings calculations were conducted in accordance with the 2017 Appendix A - AEP Ohio Prescriptive Measures Protocols, and standard engineering methods. Whenever possible, lighting data loggers were deployed to verify actual hours of use and to estimate peak coincidence factors. For exterior fixtures, prescriptive dusk-to-dawn hours were assumed. Lighting added as part of a building expansion (new load) was analyzed via lighting power density calculations using the building area method. Whenever possible, variable frequency drives (VFDs) with more than 10 HP were logged for a period of at least two weeks. Prescriptive approaches were applied to appliances and refrigeration equipment.

### 2.8.3 Realization Rates Calculation Method

Realization rates for each stratum were calculated with the following Equation 1:

#### Equation 1. Realization Rates

$$RR = \frac{\sum_{sampled} E_{ex-post}}{\sum_{sampled} E_{ex-ante}}$$

Where:

E = the electric energy savings or peak demand reduction for each project in the stratum

Realization rates in each stratum were applied to the sub-population of that stratum with the following equation:

#### Equation 2. Realization Rates in Each Stratum

$$E_{i,ex-post} = RR_{stratum} * E_{i,ex-ante}$$

<sup>3</sup> Onsite reviews are a subset of desk reviews. All buildings in the sample received at least a desk review, while some received an onsite review in addition to the desk review. If a building received both an onsite and a desk review it is counted in both the onsite and desk review totals.

## 2.9 Methods Used to Analyze Process Data

The purpose of the process evaluation is to assess the effect of the program structure and program implementation on program performance and customer satisfaction. The evaluation team's process efforts help to provide insights and recommendations to support the continued success of the Efficient Products program.

The main activity of the 2017 process evaluation for the Efficient Products for Business Program was interviews with key program and implementation contractor staff. In-depth qualitative interviews were completed with program managers and implementation contractor staff using interview guides designed to allow an open-ended discussion of key issues with respect to program operation, outreach and interactions with participants, and the challenges faced during 2017. In addition, participant telephone surveys and onsite interviews were conducted.



### 3. DETAILED EVALUATION FINDINGS

The Efficient Products Program exceeded its 2017 goal of 110 GWh achieving over 150 GWh, or 137 percent of goal. Lighting continues to be the major measure implemented by the participants comprising 83 percent of the energy saved for the Efficient Products Program. Even though the program achieved approximately seven percent more energy savings compared to 2016, the incentives paid were lower by 17 percent. This reduction was due in part due to the incentive for ENERGY STAR DesignLights Consortium (DLC)-approved LED lighting being reduced from \$0.35/kW to \$0.31/kW. The following section includes evaluation findings from both the process and impact evaluation of the Efficient Products Program.

#### 3.1 Program Activity

The 2017 program year represents the ninth year of operation for the Efficient Products for Business Program. Participation in 2017 (1,209 customers completed 2,141 projects) was consistent with 2016 (1,067 customers completed 2,118 projects). Similar to 2016, Small Retail/Service and Large Retail/Service and Industrial/Manufacturing were the main generators of the largest number of projects.

Total 2017 *ex ante* energy savings reported for the program amounted to 150,141 MWh and 23.87 MW. Compared to 2016, *ex ante* energy savings increased by seven percent (140,354 MWh in 2016) and demand savings increased by 16 percent (20.656 MW) compared to 2016.

One of the customers who participated in the program in 2017 completed 139 projects, another completed 56 projects, and five customers completed between 20 to 30 projects each. In total, 1,209 unique customers completed projects in 2017.

Incentives in 2017 decreased by 17 percent to \$9,617,347 compared to 2016. Incremental participant costs decreased to \$42,575,045 in 2017, down 4 percent vs. 2016. Total participant and incentive costs decreased by 7 percent to \$52,192,392. While the average incentive achieved \$0.064/kWh.

The average 2017 Efficient Products project saved just over 70 MWh per year, with an incremental participant cost of \$27,215 and incentive of \$4,487. Table 3-1 summarizes additional program indicators.

**Table 3-1. Program *Ex Ante* Summary, 2016 and 2017 Program Years**

	2017 Program	2016 Program
Total Incremental Participant Cost	\$42,575,045	\$44,418,298
Amount of Incentives	\$9,617,347	\$11,545,416
Number of Projects	2,141	2,118
<i>Ex Ante</i> Energy Savings Reported to Program (MWh)	150,141	140,354
<i>Ex Ante</i> Demand Savings Reported to Program (MW)	23.873	20.656

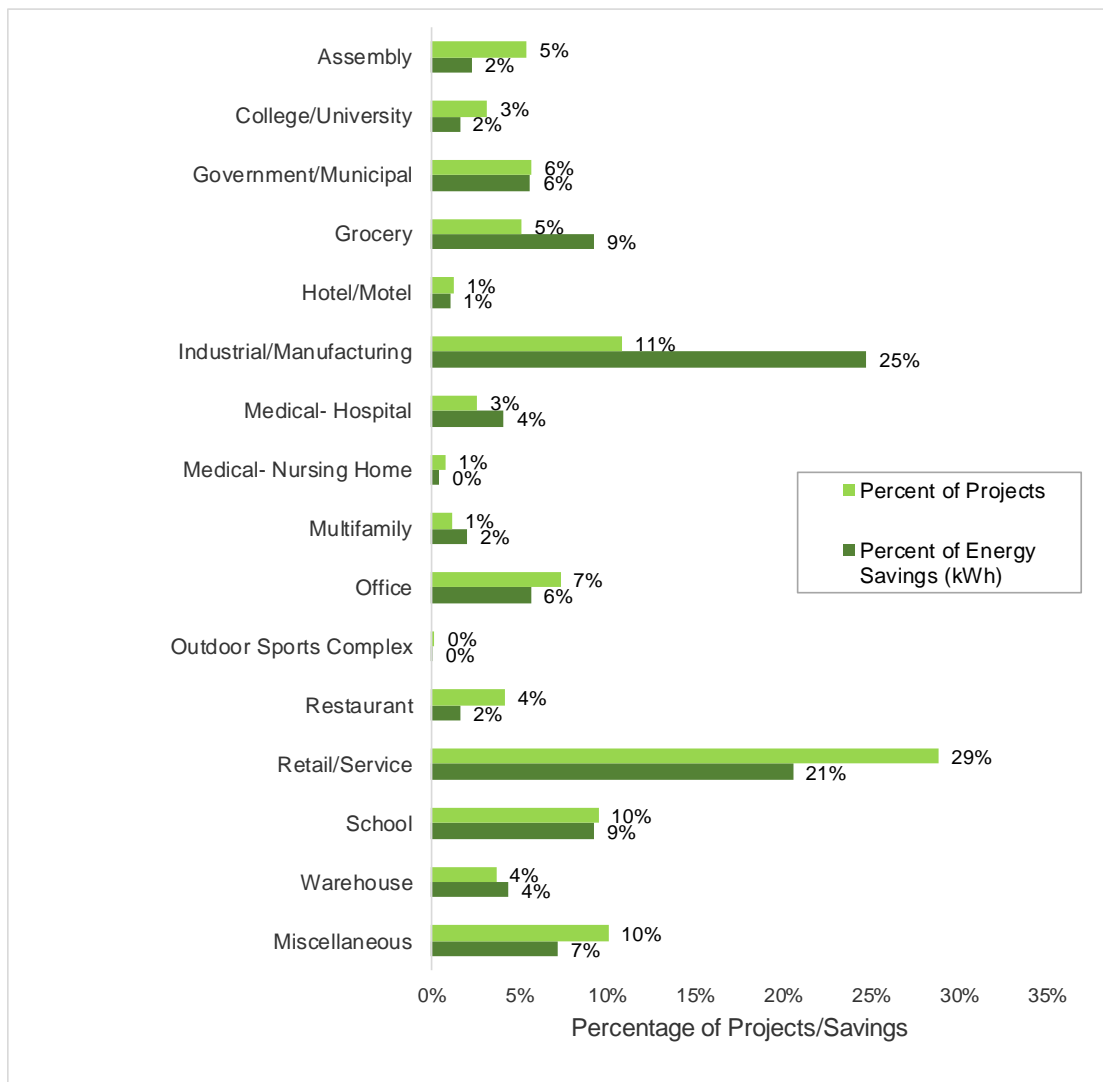
Source: Navigant review of AEP Ohio program database

Figure 3-1 shows the number of projects and the total energy savings by economic sector, based on information reported in the tracking database. The market sector with the most projects is the Retail and Service group. The 618 Retail & Service sector projects completed in 2017 are 29% of the program total; contribute 30.9GWh (21% of total) and 5.1MW (22% of total) to the total program impact.

In the 2017 program year, the majority of the energy savings (kWh) come from projects in the Industrial and Manufacturing sectors. These 233 projects are 11% of the applications; however, this segment contributed 37.2 GWh (25% of total) and 6.2 MW (26% of total).

Grocery stores and Schools also had significant savings of 14 GWh each. Combined, these sectors contribute 314 projects (15% of total), which add approximately 18% of the total program energy savings, and 18% of the total demand savings.

**Figure 3-1. 2017 Percentage of Projects and *Ex Ante* Energy Savings by Business Type (n=2,141)**



Source: Navigant review of AEP Ohio program database

Table 3-2 provides a more detailed breakdown of the 16 Economic Sectors served in 2017.

Combining the top segments called out above (Retail & Service, Industrial & Manufacturing; Grocery; and Schools), we find that these four segments cover 54 percent of the total projects, and two-thirds of both energy and demand savings. “Miscellaneous” category accounts for roughly 10 percent of the projects.

**Table 3-2. 2017 *Ex Ante* Energy Savings by Economic Sector (n=2,141)**

Economic Sector	Number of Projects	Ex Ante Savings			
		Energy kWh	Average kWh per Project	Demand kW	Average kW per Project
Assembly	116	3,465,160	29,872	618	5
College/University	68	2,419,604	35,582	482	7
Government/Municipal	122	8,464,068	69,378	1,570	13
Grocery	110	13,869,241	126,084	1,970	18
Hotel/Motel	27	1,591,900	58,959	52	2
Industrial/Manufacturing	233	37,196,384	159,641	6,159	26
Medical- Hospital	56	6,186,809	110,479	1,112	20
Medical- Nursing Home	17	688,101	40,477	91	5
Multifamily	25	3,080,766	123,231	405	16
Office	157	8,472,102	53,962	1,614	10
Outdoor Sports Complex	4	99,765	24,941	21	5
Restaurant	89	2,460,667	27,648	171	2
Retail/Service	618	30,904,999	50,008	5,133	8
School	204	13,865,823	67,970	2,397	12
Warehouse	79	6,574,828	83,226	1,029	13
Miscellaneous	216	10,800,781	50,004	1,048	5
<b>Average</b>	--	--	<b>70,127</b>	--	<b>11</b>
<b>Total</b>	<b>2,141</b>	<b>150,140,998</b>	--	<b>23,873</b>	--

Note: Totals may not sum due to rounding.

Source: Navigant review of AEP Ohio program database

To condense the categories, Navigant combined the following Building types: Large and Small Offices were combined into Offices; Large and Small Retail/Services were combined into Retail/Services; Conditioned, Refrigerated and Unconditioned Warehouse were all combined to Warehouse.

Three hundred twenty-two contractors (excluding projects without a contractor listed) completed Efficient Products projects in 2017. The tracking database was missing contractor names for 309 of the 2,141 projects (14%). Contractor email was missing for 21 percent of projects (446). Of the projects with participating contractors, 28 contractors completed more than 50 percent of the projects and achieved 37 percent of program savings.

Regarding measure mix within the program, lighting measures continue to dominate the program and accounted for 92 percent of all 2017 Efficient Products for Business measures and 83 percent of the energy savings. Refrigeration measures are the second largest measure category in terms of energy savings, and contributed three percent of projects and 7.5 percent of the program kWh savings.

Compared to 2016, this indicates a slight increase in savings from lighting measures, while the portion for program energy savings from refrigeration increased 2.7 percent.<sup>4</sup> The measures with the largest savings decreases from 2016 are VFDs and compressed air. Table 3-3 further illustrates the volume and quantity of program savings by each of the primary measure categories.

**Table 3-3. 2017 Measures by Category**

Measure Type	Number of Measures	% of Total Measures	Total Savings (kWh)	% of Total kWh	Total Savings (kW)	% of Total kW
Lighting	7,706	91.8%	124,824,107	83.1%	19,473	81.6%
Refrigeration	262	3.1%	11,188,865	7.5%	1,678	7.0%
HVAC	214	2.5%	5,256,541	3.5%	1,065	4.5%
VFD for HVAC	106	1.3%	3,853,619	2.6%	960	4.0%
Compressed Air	40	0.5%	2,948,744	2.0%	409	1.7%
VFD for Process	16	0.2%	1,540,474	1.0%	212	0.9%
Food Service	32	0.4%	392,265	0.3%	53	0.2%
Motor	14	0.2%	69,395	0.0%	9	0.0%
Agricultural	1	0.0%	10,368	0.0%	0	0.0%
Miscellaneous	3	0.0%	56,621	0.0%	15	0.1%
<b>Total</b>	<b>8,394</b>	<b>100%</b>	<b>150,140,998</b>	<b>100%</b>	<b>23,873</b>	<b>100%</b>

*Note: Totals may not sum due to rounding.*

*Source: Navigant review of AEP Ohio program database*

## 3.2 Impact Evaluation Findings

This section includes a summary and discussion of the evaluation-calculated electrical energy and peak demand savings for the 2017 Efficient Products Program. Annual electricity savings were calculated using findings from the deemed savings review, technical review of project documentations, and onsite analysis.

### 3.2.1 Summary of Impact Findings

The *ex post* energy and utility coincident peak demand annual savings for 2017 are 157,452 MWh and 22.8 MW. This result is 19.1 percent greater than the 2016 *ex post* program savings and 32.6 percent more than the 2016 coincident peak savings. The program exceeded the 2017 goal of 109,699 MWh

<sup>4</sup> The Refrigeration measure was 4.7 percent of program savings in 2016, and is 7.5 percent in PY17. In terms the individual measure savings, these increased from 6.65 GWh to 11.2 GWh, which is a 68 percent increase at the measure level. It is also noteworthy that the number of refrigeration measures decreased from 379 in PY16 to 262 in PY17. Combined, these metrics indicate that 31 percent fewer refrigeration projects were completed, but that these projects are (on average) 43 percent larger.

savings by 44 percent. However, the program may have missed<sup>5</sup> the goal of 31.55 MW in coincident demand reduction by approximately 8.8 MW, roughly 28 percent below target.

The realization rate for energy savings is 1.05, while the demand savings realization rate is 0.95. These results are shown in Table 3-4. and represent both increased program savings and increased realization rates relative to 2016.

**Table 3-4. Impact Savings, Realization Rate and Precision of Sample**

Metric	2017 Program Goals* (a)	Ex Ante (b)	Ex Post (c)	Realization Rate RR = (c) / (b)	Overall Relative Precision at 90% Confidence	Percent of Goal = (c) / (a)
Annual Energy Savings (MWh)	109,699	150,141	157,452	1.05	18.8%	144%
Coincident Peak Reduction (MW)	31.55	23.87	22.763	0.95	27.4%	72%

NOTE: ENERGY EFFICIENCY / PEAK DEMAND REDUCTION (EE/PDR) PORTFOLIO 2017 to 2020 Evaluation Plan, September 27, 2017

Source: Evaluation Analysis of Tracking Data and Sample Results

Table 3-5 provides a breakdown of reported and verified savings, both for projects processed through the standard Prescriptive Program, as well as the smaller subset of projects submitted and processed through the Bid4efficiency program track.

**Table 3-5. Ex Ante and Ex Post Savings and Realization Rates**

Metric	Energy Savings (kWh)	Demand Savings (kW)
Ex Ante Savings Standard Track	131,877,460	20,941
Ex Ante Savings Bid4Efficiency	18,263,538	2,932
Ex Ante Savings Total	150,140,998	23,873
Ex Post Savings Standard Track	138,668,980	20,482
Ex Post Savings Bid4Efficiency	18,782,938	2,281
Ex Post Savings Total	157,451,918	22,763
Realization Rate Standard Track	1.05	0.98
Realization Rate Bid4Efficiency	1.03	0.78
Realization Rate Overall Program	1.05	0.95

Source: Evaluation Analysis of Tracking Data and Sample Results

<sup>5</sup> The statistical precision bounds around the demand savings suggest that the verified program savings are 23 percent below the program's stated goal. However, the relative precision for the demand saving is +/-36 percent. Therefore, the program's demand savings goal is within this evaluation's error bounds.

As shown in the Table 3-4 and Table 3-5, the Efficient Products for Business Program exceeded the 2017 goals; realization rates remained strong (reflective of good accuracy in initial estimates of program impacts), and the 13 percent increase in verified kWh savings vs. that achieved in 2016 indicates the program is continuing to increase in impact. Similarly, *ex post demand* savings increased 36 percent relative to 2016.

This is notable in the context of observing the total project count increased by 1.1 percent compared to 2016. In other words, in 2017, the EP4B Program delivered greater savings than the previous year, with roughly the same number of projects, which on average provide greater savings. Also, as mentioned in the Process Evaluation section, this growth is achieved with a 16.8 percent reduction in incentives paid.

The primary drivers of the precision bounds coming in wider than the 90/10 target is the prevalence of the magnitude of variance within project savings, particularly in the Large strata, and are: 1) the use of project specific hours of use; 2) adjustments to the installed and baseline lighting wattages; and 3) the identification of some projects either only partially completed, or taken off-line for an extended period. These three influences combine to cause greater scatter among project level results, both greater than, and less than the prescriptive values.

The primary contributors to the realization rate adjustments are lighting projects with logged hours of use (HOU) that differ from the prescriptive HOU estimates in the implementation contractor's Appendix A: AEP Ohio Prescriptive Measures Protocols, Business Incentives Program.

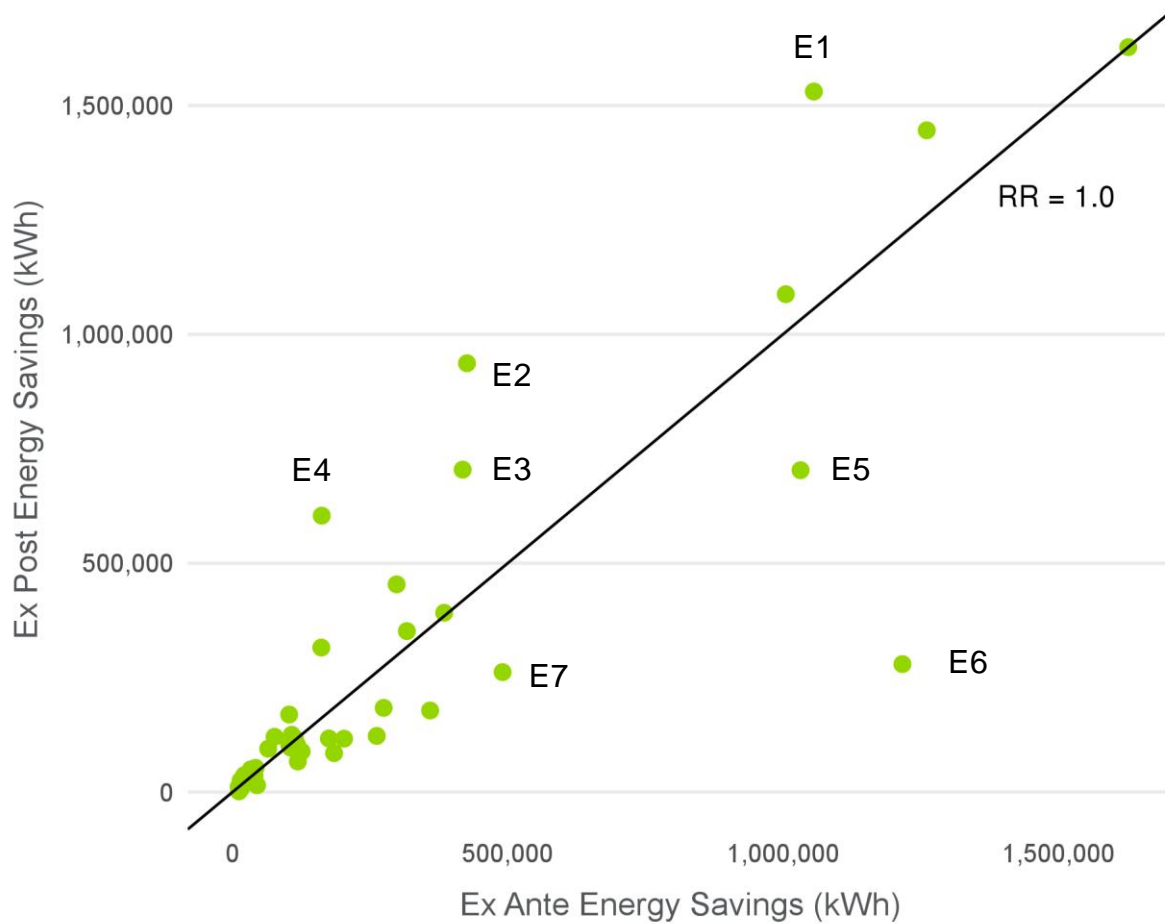
The delta-Watts aspect of the savings algorithm is the other key driver of the *ex post* adjustments to both energy savings and demand. Delta-Watts adjustments can occur due to minor adjustments to baseline fixture watts, or, more commonly, adjustments occur due to update to the fixture count impacted by the project (e.g., when the field staff is not able to locate all of the claimed lights onsite).

It is rare, but occasionally project savings are adjusted when the equipment was either temporarily or permanently removed due to subsequent renovations, or spaces have been vacated since the project was completed. This issue was identified in 2017, with a participant having already switched out a small portion of LEDs for options allowing for dimming in employee classrooms.

### 3.2.2 Evaluation Sample Level Impact Results

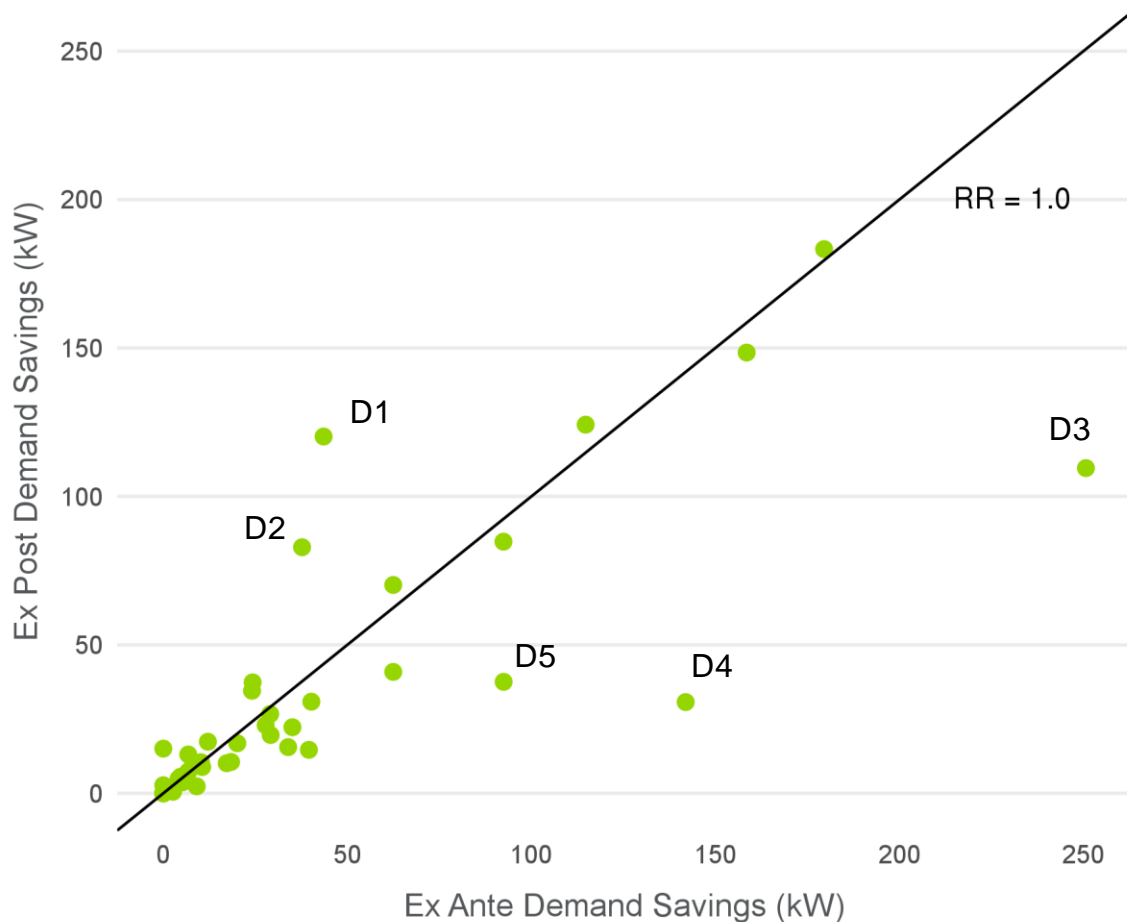
Figure 3-2 and Figure 3-3 show the *ex ante* and *ex post* savings of each sampled project for energy and demand savings, respectively. The black line on each of these charts represents a project level realization rate of 1.0 (100 percent). The data points above the diagonal line represent projects with realization rates greater than one, while data points below the line represent those with realization rates less than one.

Figure 3-2. Comparison of *Ex Ante* and *Ex Post* Energy Savings



Source: Evaluation Analysis of Tracking Data and Sample Results

Figure 3-3. Comparison of *Ex Ante* and *Ex Post* Demand Savings



Source: Evaluation Analysis of Tracking Data and Sample Results

To provide greater resolution on the clusters of projects found toward the smaller end of the scale in Figure 3-2 and Figure 3-3, APPENDIX B of this report contains additional exhibits focusing in on the smaller projects.

The primary driver for adjustments to individual project annual energy use (and savings) calculations is deviations in verified hours of use compared to the prescriptive values in the implementation contractor's APPENDIX A. This result is fully expected as the APPENDIX A approach is designed to use an average or typical use profile and savings. However, savings from this process are directly linked to a selection of the most common business segments. Annual energy estimates are very sensitive if the project is submitted with an incorrect business type, or if the correct business type is used, but with the wrong number of shifts.

The business type assignment is confirmed as part of the initial desk review each sampled project receives. However, when using prescriptive hours of use, there is still considerable uncertainty around the exact hours of use the equipment will experience on a site-by-site basis.



Because of the wide range in hours of use found within a given business segment, the evaluation team selects a subset of sampled projects that, in addition to the initial desk review, receive a site visit from the field team. Whenever feasible, the field team installs six to ten temporary lighting loggers per site. These loggers track each time a given light is cycled on or off and are installed for a period of, at minimum, two weeks. Longer deployments are not uncommon, particularly if the deployment period includes a holiday or other atypical shifts in use<sup>6</sup>.

For sites where it is not safe, practical, or cost effective to install a data logger, the evaluation team leverages customer self-reported hours of use for each of the primary space types and schedules impacted by the project. If time clocks are in place, this is noted during the on-site data collection process. Exterior, photocell controlled fixtures are given a fixed HOU based on an analysis of daily Civil Twilight times for Columbus, Ohio.

Shifting from Energy to Demand Realization Rates (RR), common factors that cause changes in this year's project level demand savings are:

- kW RR swings proportionately to corrections in lighting fixture counts, up or down.
- kW RR shifts (up or down) if the installed equipment is found to differ from that specified. (different product selected after initial application was submitted; exchanged to tune system)
- kW RR spikes tend to occur with lighting systems including occupancy sensors. Additionally, occupancy sensors tend to have a strong influence on a projects energy savings as well.
- kW RR are negative if the participant did not install all of the equipment (lamps in storage);
- kW RR is negative if the participant uninstalled a portion of the equipment. (lights providing the wrong color, burning out at an usual rate, energy efficiency measure was too dim/bright)

In addition to those common reasons to adjust demand savings, another prime driver of adjustments to the demand savings stems from corrections to the Utility System Peak Coincidence Factor (CF). Because the CF has such a strong and direct impact on the project (and program's) overall demand savings, Navigant's use of logged data is also adept at accurately assessing each site's unique coincidence factors. From this data, the evaluation team can very accurately assess each project's summer, winter, and utility system peak coincidence factors.

### ***3.2.2.1 Specific Drivers of Project-Level Energy Impact Adjustments***

This section provides a deeper level of context related to the outliers flagged in Figure 3-2. We have selected some projects that are particularly noteworthy in their ability to inform understanding of the general type and nature of adjustments made.

**E1** – This project is a large retailer where two opposing updates left the project's kWh RR at 1.45 and its kW RR at 0.91. The kWh increase is from significantly longer HOU. However, roughly half of the lamps were exchanged after the fact for a brighter option with slightly higher wattage.

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<sup>6</sup> Anomalies in occupancy (e.g., holidays or outage events) during the logger period are accounted for in the post-processing.

**E2** – This project is also found in the kW results figure, noted as point D2. This lighting project occurred at a large industrial facility included occupancy sensor-based controls. The kWh savings RR is 2.20, which is attributed to a much longer work day than initially reported. This may have been due, at least in part, to a misclassification of the number of shifts assigned to this site. The verified HOU significantly increase the baseline energy use, while the EE HOU are corrected sharply downward in conjunction with savings from occupancy sensors, as verified using logged data.

**E3** – The kWh RR is 1.68 based on an HOU adjustment that occurred based on the timeclock schedule that the field team verified during the site visit.

**E4** – This is the same site noted as D1 on Figure 3-3. This is a large office and light industrial complex that conducted multiple projects to upgrade their entire lighting system in stages. There is a pair of adjustments compounding each other to provide a particularly high kWh RR. In part, the occupancy sensors at this site are providing greater HOU savings than initially reported. Additionally, some of the originally incentivized equipment was failing quickly. The manufacturer replaced all linear LEDs with a newer, improved model at no additional cost.

**E5** – This large retail project is the same as noted as D3 on Figure 3-3. The primary adjustments made to this project are based on logged HOU and CF. The logged HOU was about two-thirds of the prescriptive assumption. The logged CF was just under 50 percent of the default used for the *ex ante* analysis. These two updates impact both kWh and kW savings in a detrimental way. The final RR for this project is 0.68 for kWh and 0.44 for demand.

**E6** – This large industrial/manufacturing project is the same site noted as D4 on Figure 3-3. The wattage realization rate is low because there are 100 fewer fixtures confirmed as upgraded vs. what was expected. Combined, these fixtures were expected to provide a 4.74 kW reduction in lighting load.

**E7** - This health care facility is the same site noted as D5 on Figure 3-3. This is a large and complex site with some areas restricted for patient care. The field team visually assessed the lighting in just over 80 percent of the space and extrapolated that count to reflect the inaccessible areas. The lighting count indicates an approximately 50 percent smaller total system size than expected. As this equipment was exchanged on a 1:1 basis, both the kWh and kW RR are roughly 0.5. Lighting loggers could not be used at this site, so the HOU remain the default hours per year as suggested in APPENDIX A.

### **3.2.2.2 Specific Drivers of Project-Level Demand Impact Adjustments**

In Figure 3-3, the most extreme RR shown all have a direct correlate in Figure 3-2. As the most common and impactful drivers of demand savings are identical, the following list correlates the demand point with the corresponding project previously discussed.

- D1** – Same as point E3 explained in the previous section.
- D2** – Same as point E2 explained in the previous section.
- D3** – Same as point E5 explained in the previous section.
- D4** – Same as point E6 explained in the previous section.
- D5** – Same as point E7 explained in the previous section.

### 3.3 Process Evaluation Findings

This section of the report focuses on findings from the Process Evaluation, which reviews aspects of the program operation other than the actual savings (which are covered in the Impact Evaluation). Process Evaluation aspects covers elements such as customer experience and satisfaction, ease of data flow and application processing, program marketing and messaging, data tracking, incentive calculations, consistency in application of prescriptive savings and cost, or any other elements that may lead to streamlining or improving the overall program effectiveness.

In 2017, the Efficient Products for Business Program offered incentives for prescriptive measures. The most significant 2017 program process change was a simplification of the application verification process, which was enacted across AEP Ohio's portfolio of business programs. In prior years applications for the AEP Ohio programs were directed to multiple implementation contractors. In 2017, an Outreach Coordinator was added to the implementation team, and applications for all AEP Ohio business programs were directed to this Outreach Coordinator, who reviewed everything for missing documentation before forwarding the complete application to the correct implementation contractor for engineering review. The 2017 process evaluation activities included detailed interviews with AEP Ohio's Program Administrators and the implementer, and telephone surveys with program participants.

#### 3.3.1 Marketing Efforts and Program Awareness

The Efficient Products for Business program is AEP Ohio's largest energy efficiency program and is marketed through multiple channels ranging from Customer Service Representatives (CSRs) to direct mailings. A concierge service was introduced in 2017 to help customers identify energy efficiency measures and navigate the application process.

##### 3.3.1.1 Program Material Review

AEP Ohio offers extensive customer-facing program materials. In its review, Navigant found some of the materials instructed participants to read and complete voluminous forms designed more for project stakeholders with technical expertise (such as contractors or design professionals). Table 3-6 lists the documents reviewed.

**Table 3-6. Efficient Products Program Materials Reviewed**

Document	Description	Notes
2017 Application Specifications	20-page pdf specification document	For three programs: Efficient Products for Business, Process Efficiency and Self-Direct
2017 AEPOhioEfficientProductsforBusiness_App Efficient Products for Business, Process Efficiency and Self-Direct program application 2018	22-page program application document	For three programs: Efficient Products for Business, Process Efficiency and Self-Direct
2017 EffProdForBus_FactSheet	Single page promotional flier	

Document	Description	Notes
2018 Terms and Conditions	6-page detailed terms and conditions for four programs	For four programs: Efficient Products for Business, Process Efficiency, New Construction, Data Centers. Only accessible by electronic link from the application form.
2017 AEP Ohio Quality Plan – FINAL	64-page WORD doc: AEP Ohio Business Incentives Program Quality Plan (January 1, 2017 – December 31, 2017)	Includes Efficient Products, Custom, and Self-Direct. (9-point font.)
EfficientProducts_ProcessEfficiency	2-page application checklist document	For three programs: Efficient Products for Business, Process Efficiency and Self-Direct
Website	<a href="https://aepohio.com/save/business/programs/PrescriptiveProgram.aspx">https://aepohio.com/save/business/programs/PrescriptiveProgram.aspx</a>	
Full_SolutionProvider_2018_02122018.xls	Searchable Excel spreadsheet of active SP's	

Source: Navigant Evaluation Team

In the review of these documents, Navigant found two over-arching issues: 1) the complexity and inconsistencies associated with the application and its supporting documents; and 2) difficulty finding information on the website for the Efficient Products for Business Program. While Navigant observes that the direct burden on customers is reduced due to outreach contractor and trade ally support, the organization of the website and program documents may provide a barrier to new or uninitiated customers.

The Efficient Products application is one of three programs included in the Efficient Products for Business, Process Efficiency and Self-Direct program 2017 application. The target audience for this application is unclear, as it contains sections a customer must complete, including project guidelines and terms. However, much of the document is written for an audience with technical or engineering background; it is complicated, and does not distinguish between the three programs (even though there are two sets of Terms and Conditions). The supporting specification documents and their relationship to the Efficient Products program can be confusing:

- It is not clear how the Application Specifications document relates to the actual Application. For example, the Application document includes tables with size categories and efficiency requirements not included in the Application Specifications document. (See HVAC, Motors and Drives)
- While the Specification document title references three programs (Efficient Products for Business, Process Efficiency and Self-Direct), the document does not clearly articulate how measure specifications relate to each program.
  - The measure specifications can be assumed to be for all three programs, until the reader gets to the Process Efficiency specifications on page 18 and finds "Projects that are NOT eligible for a Process Efficiency incentive include: Projects eligible for Efficient Products

for Business”. Only by way of deduction can one assume that measures on pages 3-16 are for Efficient Products.

- Page 19 includes New Construction specifications. The document does not reference that the New Construction requirements are only relative to the Self Direct Program.

The site does not provide customers with a matrix or map of the available programs, or information to guide the customer to help determine which program will best meet their needs. The Efficient Products Program could not be easily located through the AEP Ohio website with clicks from the AEP Ohio home page taking approximately five clicks to reach as outlined in Table 3-7.

**Table 3-7. Steps Taken to Find the Efficient Products Webpage**

Action	Landing Page
Go to AEP Ohio Home Page	<a href="https://www.aepohio.com/">https://www.aepohio.com/</a>
Click “Save Energy”	<a href="https://www.aepohio.com/save/residential/">https://www.aepohio.com/save/residential/</a> “Rebates & Savings Programs” (NOTE: This is a residential page)
Click “Rebates and Savings Program”	<a href="https://www.aepohio.com/save/residential/programs/">https://www.aepohio.com/save/residential/programs/</a> “Incentive Programs For Residents” (NOTE: This is a residential page)
Click “Business”	<a href="https://www.aepohio.com/save/business/">https://www.aepohio.com/save/business/</a> Business Savings Incentive Programs
Click “Energy Savings Programs”	<a href="https://www.aepohio.com/save/business/programs/">https://www.aepohio.com/save/business/programs/</a> Energy Saving Programs
Click “Program List”	<a href="https://www.aepohio.com/save/business/programs/PrescriptiveProgram.aspx">https://www.aepohio.com/save/business/programs/PrescriptiveProgram.aspx</a> Efficient Products for Business

Source: Navigant Evaluation Team

### 3.3.2 Program Requirements

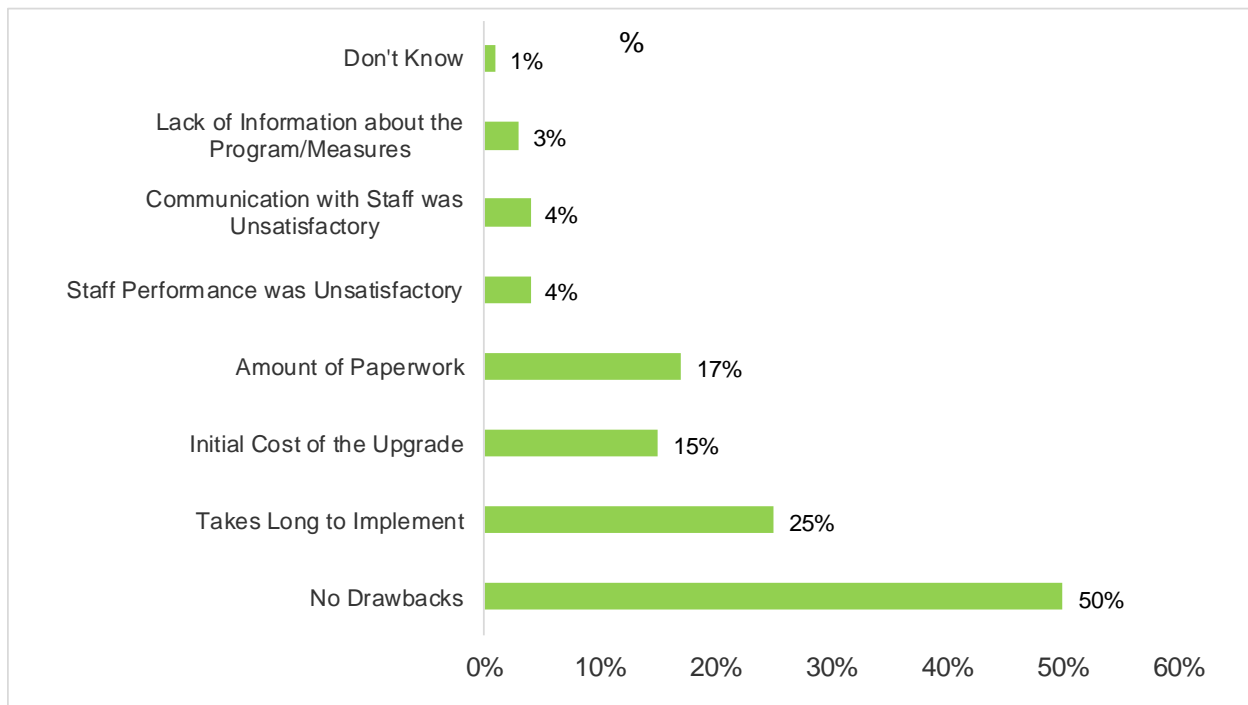
The program requirements for participation did not change in 2017. The Efficient Products Program is available to all AEP Ohio business customers participating in the Energy Efficiency and Peak Demand Response (EE/PDR) rider. Changes were made to the incentive structure for 2017; these changes are noted in Section 0.

### 3.3.3 Barriers to Participation

Barriers to participation are consistent with other prescriptive-based programs serving business customers like the Efficient Products Program. Interviews with the Program Coordinator and the Implementation contractor identified common barriers to participation are customers are extremely busy with their day-to-day responsibilities, making it difficult to identify energy efficiency measures, pursue bids, acquire the funding and implement the measures. The funding issue is further complicated by some customers needing to meet internal criteria, such as inclusion in the budgeting process, or payback

periods. The application concerns mentioned in Section 3.3.1.1 are also perceived as a barrier by some participants and likely have similar impact on discouraging near-participants from completing the process as noted in Figure 3-4

**Figure 3-4. Top Participant Reported Barriers to Participation**



Source: Navigant analysis of customer survey

### 3.3.4 Customer Enrollment Process

AEP Ohio changed the application processing from multiple implementers receiving applications to one, designating the outreach implementer to oversee the intake of all Efficient Products applications and conduct a review of each submitted application for accuracy and completeness. Streamlining the application intake reduced the number of back and forth exchanges between the customer and the implementers in completing the application. Table 3-8 and Table 3-9 provide a breakdown of the evaluation team's review of the supporting documentation provided in support of applications for the program, and the issues this review identified.

**Table 3-8. Efficient Products Application Issues**

Issue	Number Identified
Active AEP Ohio account verification	60
Incorrect incentive	15
Missing W-9	146
Missing project specifications	82
Scope of Work missing from application	88

Project Cost not provided	11
Signature is missing	121
Invoice is not provided	104
Incomplete or incorrect application	133
Other	33
<b>Total</b>	<b>793</b>

Source: Navigant analysis of outreach implementer database, Notes field. N=3,590.

Navigant reviewed the customer enrollment process, including the application forms; the intake contractor's review and approval of the applications process; the time required for review and approval of applications; and the approval review processes. The evaluation team identified 793 instances where incomplete supporting documentation contributed to delays in application processing. Application issues range from account verification to W-9 submittals.

**Table 3-9. Time Lag From Receipt of Application to Delivery to Implementer**

Reference	Number of Projects
0 -10 working days	2,991
More than 10 working days	1
More than 20 working days	0
More than 30 working days	0
More than 50 working days	0
Missing data entry	597
<b>Total</b>	<b>3,590</b>

Navigant analysis of outreach implementer database, N=3,590. Net workdays between the "Date Received" and "Date sent to Implementer" Incentive Payment Process.  
Source: Navigant analysis of outreach implementer database, Notes field. N=3,590.

The implementer reviews each application's energy savings to determine the incentive amount; upon review and approval of an application, the implementer disperses the incentive. Incentives are calculated based on prescriptive, per-unit savings. Incentives and costs are provided at the project level, and in the measures database, Incremental Cost and "Calc Incentives" are provided. Project incentives ranged from one percent to 100 percent of Project Costs<sup>7</sup>; the average incentive covered 25 percent of Project Costs. Incentives ranged from a low of \$19.92, to \$150,018.<sup>8</sup>

Navigant reviewed the time-lapse between the completion of the project and submittal of the application and found 791 projects had delays of more than 30 working days, see

<sup>7</sup> Ten projects were issued incentives in excess of 50 percent of the total project cost. Two of these 10 projects are B4Efficiency (B4E) projects; five of these were projects in hospitals. These fairly rare instance where the total incentive is above the normal program limits is attributed to additional funds that are issued on a temporary basis in order to promote a specific measure category.

<sup>8</sup> Sixty-four projects were issued an incentive more than \$25,000; of these 26 are B4E projects, the other 38 are not B4E. (See the previous footnote for additional context)



Table 3-10. Additionally, while 3,590 applications were sent from the outreach contractor to the implementation contractor, the program reported 2,141 completed projects. The cause of these delays and the gap between applications and projects is unclear, but should be reviewed to determine if the application process can be improved to reduce the timeframe.

**Table 3-10. Time-lapse of Project Completion to Application Submittal**

Time-lapse of Project Completion to Submittal of Final Application	Number of Projects
0-10 working days	672
More than 10 working days	405
More than 20 working days	273
More than 30 working days	387
More than 50 working days	404
<b>Total</b>	<b>2,141</b>

Source: Navigant review of AEP Ohio program implementer database. N=2,141, Net working days from FinalApplicationDateReceived to ActualProjectCompletionDate

Review of the length of the timeframe when the final application was submitted to when the incentive check was mailed showed a significant number took more than 30 working days for the customer to receive their payment.

Table 3-11 provides a further breakdown of the application time-lapse.

**Table 3-11. Timeframe to Receive Incentive Payment**

Time-lapse of Final Application to Incentive Mailed	Number of Projects
0 -10 working days	680
More than 10 working days	991
More than 20 working days	183
More than 30 working days	97
More than 50 working days	190
<b>Total</b>	<b>2,141</b>

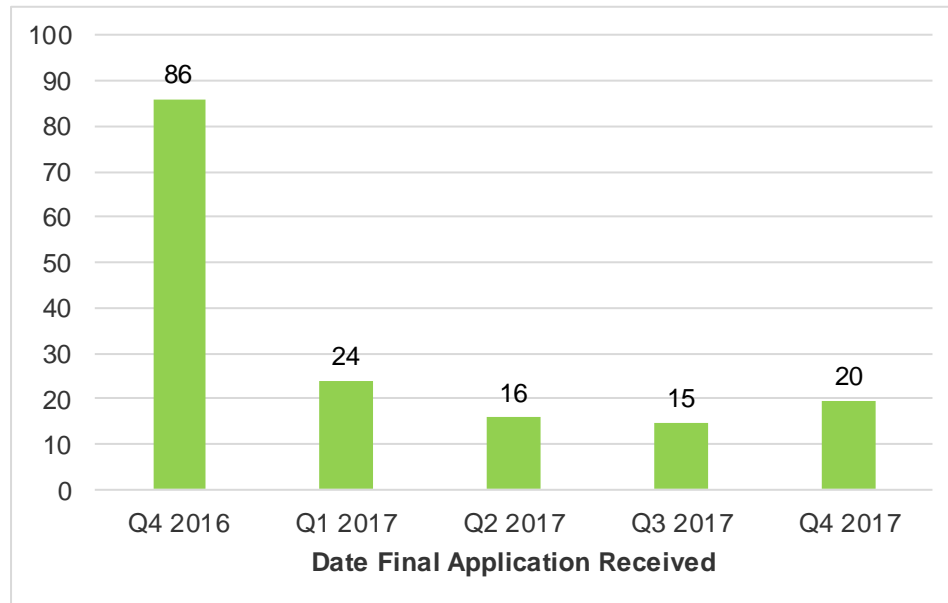
Source: Navigant review of AEP Ohio program implementer database. N=2,141, Net working days from FinalApplicationDateReceived to PaymentMailedDate.

The average elapsed time from the date when the final application was received and the check was mailed was 26 days. Notably, the length of time between the application completion date and the incentive payment date decreased from Q4 2016 to Q1 2017 (Figure 3-5), and remained steady at around 15-25 days.<sup>9</sup> The reduction in time is likely due to streamlining the intake process, but further research is warranted to document what caused the improvement and if it persists.

<sup>9</sup> The atypically long processing period in Q4-2016 is attributed to a delay of plan approval. Q4 projects completed at the end of 2016 were required to wait until February when contracts could be finalized after approval of the program plan in January 2018.



**Figure 3-5. Average Days Between Final Application Received and Incentive Paid**



Source: DNV GL tracking database

In addition, there were several changes in 2017 for some of the lighting incentive levels. These reductions did not affect participation as the Efficient Products Program exceed its 2017 goal by more than 40 GWh and the 2016 achievement by 10 GWh.

- In 2017, the incentive for LED Energy Star DesignLights Consortium(DLC)-approved lighting was reduced from \$0.35/kW to \$0.31/kW (watts reduced basis).
- The incentives for all CFLs were removed.
- The incentives for linear fluorescents were removed.
- The incentives for lower-wattage T-8s were removed; an incentive for T-8 replacement is available.
- In 2017, the incentive for Screw-in-LED lamps was reduced to \$4.50 per lamp.

There were some general changes to overall measures as well:

- The incentive for lighting control measures was revised slightly down; the previous incentive of \$0.35 decreased to \$0.31 per Watt-reduced.
- The incentive for EnergyStar or DLC certified lighting equipment other than controls (e.g., lamps and fixtures) was lowered from \$0.25 per Watt-reduced, down to \$0.22 per Watt-reduced.

### 3.3.5 Program Tracking Data Review

The program tracking database is used to record all information from program applications and to track the progress of applications through the process. While the evaluation team notes some fields were not

fully populated for all applications, our overall assessment is the tracking database is reasonable and accurately reflects the status of program applications. However, the evaluator did not address whether the tracking system is adequate for regulatory prudency reviews or corporate requirements. Findings from this analysis follow.

Efficient Products Program tracking data is relatively complete and high quality. Entries are entered and formatted in a uniform manner, and the dataset is well-organized. Visual inspection of the data did not reveal any entries were clearly in error, such as text recorded in numerical fields, inconsistent spelling or naming conventions, etc. Contractor contact and email were missing for approximately 14 percent and 21 percent of projects, respectively. Five percent of customer telephone numbers and nine percent of customer email addresses were either Not Provided, NA or Blank. However, as discussed in Section 3.3.8, 50 percent of the participant contact information proved to be outdated or unusable by the survey team.

The ability to identify the contractor or the customer for a given project is significant. If, for instance, AEP Ohio needs to analyze differences in some aspect of project performance between contractors, missing information would not allow for complete evaluation. Or, if follow up survey or direct marketing is to occur, a complete and accurate set of contact details is not only desired, but critical for the success of those supplemental outreach efforts.

The Program's tracking database records key dates of program activity from the perspective of the implementation contractor including: Pre Note Date Received, Pre Note Review as Signed Date, Pre-inspection Date, Pre-inspection Passed Date, Reservation Mailed Date, Reserve End Date, Final Application Date Received, Final Review Assigned Date, Estimated Project Completion Date, Actual Project Completion Date, Post-inspection Date, Client Approval Date, Payment Approval Date, and Payment Mailed Date. It should be noted these dates do not capture the full customer experience as the Outreach coordinator's information is not included. Therefore, the time elapsed from the submittal of the application to receipt of the incentive by the customer could not be tracked.

The evaluation team also used the program tracking data review process to confirm measure Effective Useful Life is being properly and consistently recorded. This review found a perfect match to the prescriptive EUL as noted in the Implementation Contractor's Appendix A: measure characterization documentation. Therefore, the Realization Rate for Effective Useful Life and its related term, Lifetime Energy savings, is 1.0, or 100 percent of the value reported in the program database.

Similarly, the expected measure costs as documented in the Implementation Contractor's Appendix A: measure characterization documentation is also carried forward in to the database in a correct and consistent manner. Therefore, no adjustment is needed to the reported measure cost data.

Navigant's analysis of the available tracking database dates provided the following findings:

- Out of the 14 date fields, five fields had data for all projects. These fields are the most important for tracking the status of the project; including Final Application Date Received, Final Review Assigned, Actual Project Completion Date, Payment Approval Date, and Payment Mailed Date.
- Five fields had between 775 and 800 projects, so likely these fields were unique to certain projects.

- Pre-inspection was required for 81 projects; post-inspection completed for 166 projects (7.8%); and utility approval was required for 68 projects.
- There is no date which shows for all projects the initial customer contact.
- On average, projects take 72 days from Actual Project Completion Date to Payment Mailed Date.
  - On the average, the Project Completion Date is 46 days before the Final Application Date Received.
  - Once the final application is received, an average of 26 days pass between receipt of the application and the date payment is mailed to the participant.
  - The 26 days for internal processing is inclusive of, on average, six days between Payment Approval Date and Payment Mailed Date.

The project database includes fields for Project Total Cost, Incremental Cost, Calc Incentives, Calc Incentives Prorated, and Payment Amount. None of these fields had missing data.

### ***3.3.6 Review of Program Activity by Solution Provider***

There are 323 Solution Providers listed in the dataset. Both the project size and the number of projects completed by Solution Provider varies widely across these program partners, and ranges from a single project to as many as 320 projects.

The evaluation team also reviewed the program database to initiate a process to gauge Solution Provider engagement and success in a manner that goes deeper than simply judging performance based primarily on the volume of projects and/or total achieved savings. In an effort to consider and promote the long-term sustainability of the program, we see potential for long-term program growth through the development of a process by which the program leadership team can identify Solution Providers not only performing well now, but that are also moving in the direction necessary to also meet future strategic goals. These future metrics will focus on rewarding innovation, expansion of underutilized measures, and promoting new or emerging measures.

### ***3.3.7 Verification and Due Diligence***

There are two levels of due diligence carried out as part of the program. The first level is the administrative element, ensuring information submitted to the program is processed accurately and recorded in the project tracking database as previously discussed. The second process is the engineering review of applications to ensure savings for a project are calculated correctly and result in the appropriate level of incentive for the customer, and verification inspections carried out by the implementation contractor to confirm measures have been implemented.

The application completeness verification process was updated in 2017. In prior years, applications for the AEP Ohio programs were directed to multiple implementation contractors. In 2017, an Outreach Coordinator was added, and applications for all AEP Ohio portfolio of business programs were directed to this Outreach Coordinator who reviewed everything for missing documentation before forwarding the complete application to the correct implementation contractor for engineering review. This change has dramatically reduced the time required for an application to be ready for engineering review.

In terms of information tracking, all projects are subject to an administrative review after the application has been received and entered into the program tracking database. This administrative review is then confirmed through a management review before information is provided to AEP Ohio. AEP Ohio then reviews all program application data provided by the implementation contractor and approves program incentives. Reviews for the Efficient Products for Business Program are relatively simple. Staff review the application and supporting documentation to determine compliance with program rules and determines the level of incentives.

No significant disputes were reported to have occurred during 2017. While the evaluation may determine a level of savings that differs from the applicant's initial estimate, these differences have generally represented differences in engineering judgement and have been resolved without issue. In most instances, program staff and Solution Providers indicated differences arose from legitimate differences in engineering opinion on how to estimate savings or represent an efficiency change in the building energy model. While such disputes have not been significant to-date, Navigant continues to recommend consideration be given to developing a formal process to provide a framework in case such disputes arise in the future.

### ***3.3.8 Participant Telephone Survey Analysis***

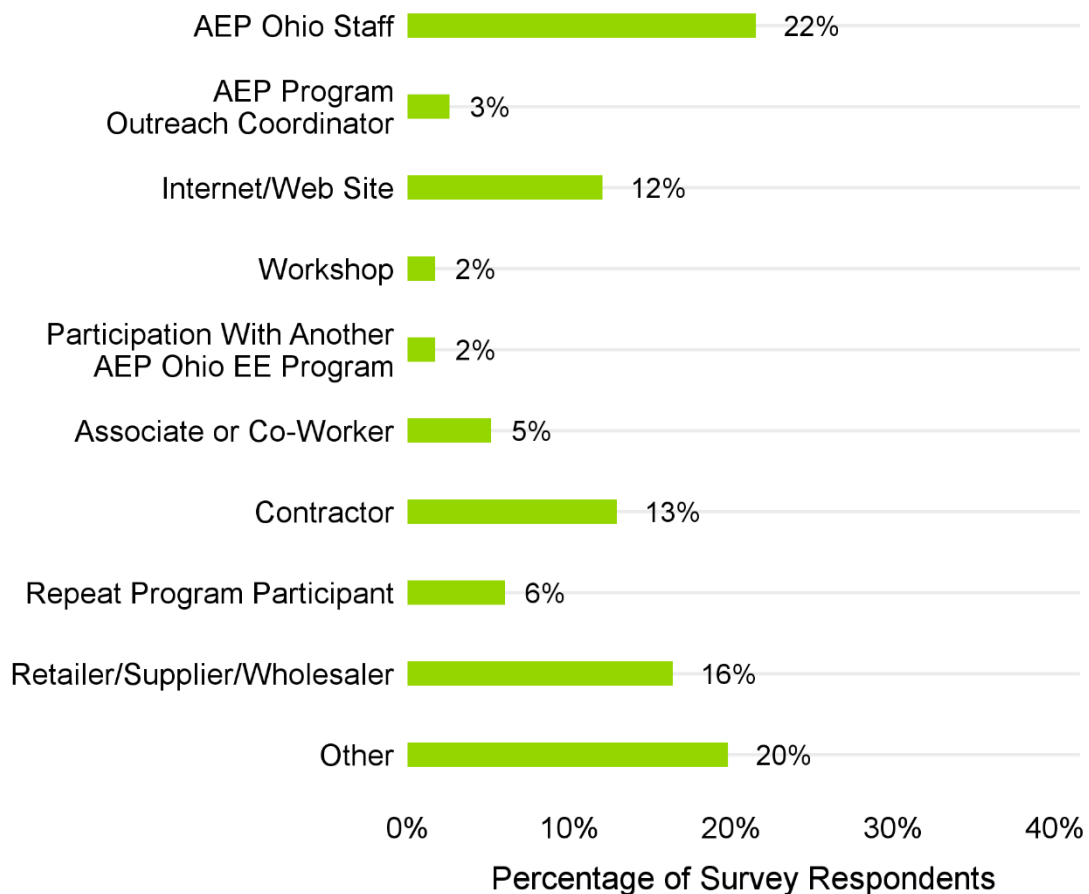
Participant telephone surveys were conducted in March 2018. The telephone surveys targeted a sample of 2017 Efficient Products for Business participants, except for those who were selected for an onsite as part of the impact sample. Of the 2,069 unique participant records that made up the potential survey population; of which 459 (50%) were found to have incomplete, inaccurate, or otherwise irrelevant (fax numbers, wrong numbers, disconnected numbers, etc.) contact details. These 459 participants were removed from the sample population, leaving 465 usable contacts. After making multiple attempts to call each of these 465 program participants, the evaluation team completed 78 surveys, which equates to a response rate of 17 percent. Significant findings from the detailed interviews with the Program Coordinator and implementation contractor, as well as the participant survey, are detailed in this section. Full responses to the participant survey are included in APPENDIX C.

The target sample size for this effort was 138 participants to achieve 90/10 on questions where in-line screening had the potential to reduce the responses for a portion of the questions by as much as half. However, response rates were lower than expected and the final survey was completed by 78 participants. This participation rate is greater than the number required to achieve 90/10 on most questions. Questions with number of participants (N) less than 55 are assumed to have precision bounds greater than +/- 10 percent, when assessed with 90 percent confidence intervals.

When asked whether they would participate in the program again, 75 of the 78 respondents said yes, they would participate again. Because this result is so consistent, a figure is not needed to provide additional context. However, this is an excellent confirmation that participants are generally satisfied with the program and their experience, and worth underscoring as a key take away from this survey.

Figure 3-6 shows how people heard about the program. Twenty-five respondents (22%) heard about the program from AEP Ohio staff, 19 participants (16%) heard about it from retailer/supplier/wholesaler, while 14 participants (12%) heard about it from the internet and 15 participants (13%) from a contractor, 23 respondents (20%) heard about it from other sources. Other responses included: other businesses, Ohio Interfaith Power and Light, ads from AEP Ohio, Energy Audit Company, Triple S Energy, word of mouth, AEP Ohio mailing, similar program at Paradigm Properties, Grace Energy Services, third-party rebate aggregator, advertisement on TV, and Electrical Distributer. Participant responses are in line with Navigant's understanding of how the program is marketed to customers which is through multiple sources.

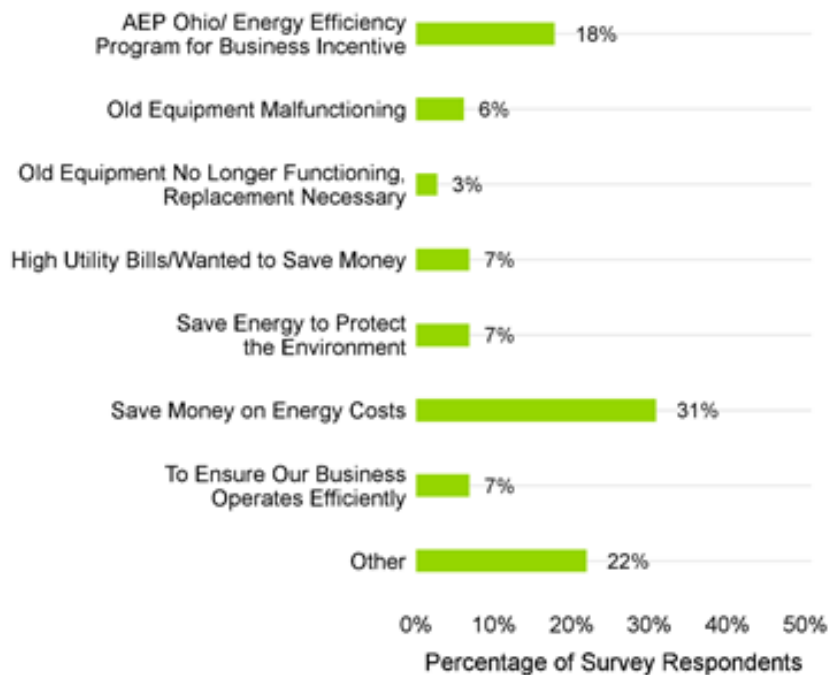
**Figure 3-6. How Did You First Learn of EP4B Program? (N=78; Multiple Responses)**



Source: Navigant analysis of customer survey

Participants identified saving money on energy costs (45 respondents) as the main reason to participate in the program (shown in Figure 3-7). Program incentive was identified as the second most important reason (26 respondents) for participating in the program. Thirty-two respondents said other reasons were most important. Other responses included: to make payback period shorter, quality of new equipment, lower maintenance costs, it's the right thing to do, aesthetics of the store, and to be greener in front of their own customers. These responses indicate saving money and receiving the incentive as the most important driver for participation.

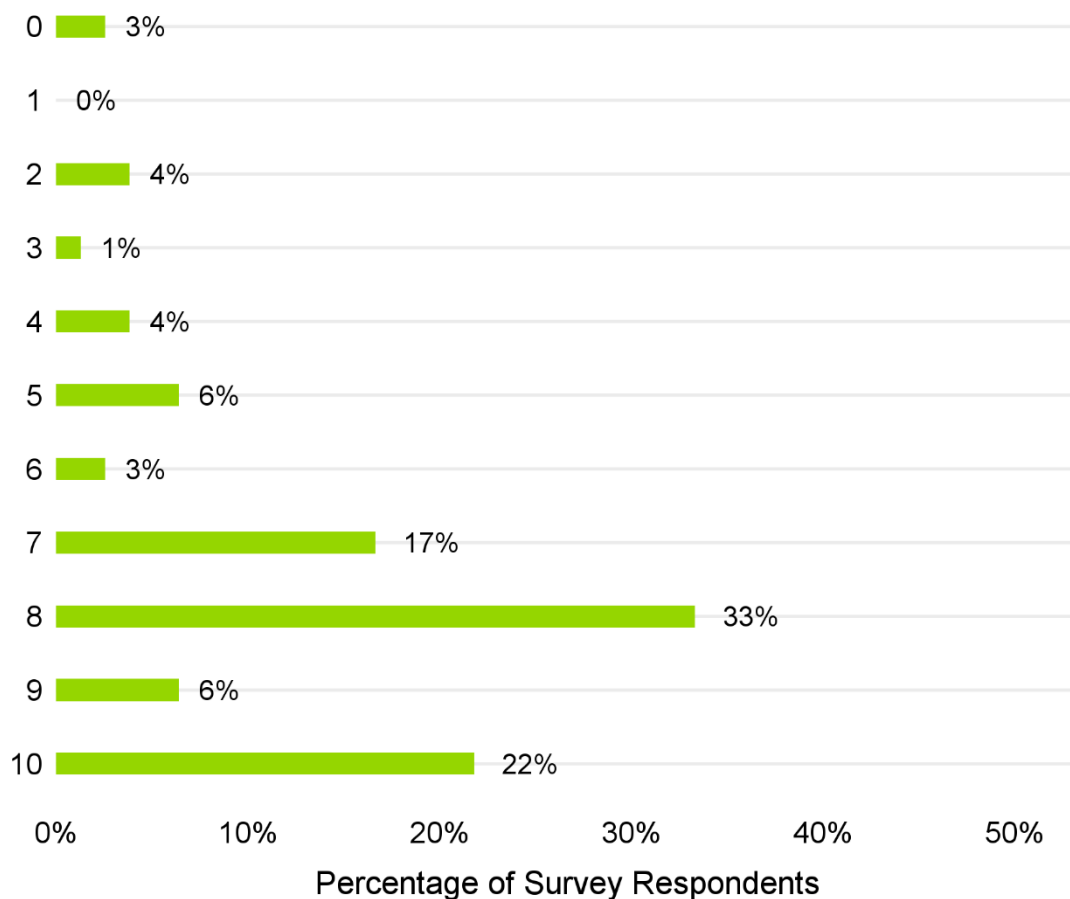
**Figure 3-7. What Were Main Reasons You Decided to Participate in EP4B Program? (N=78; Multiple Responses)**



Source: Navigant analysis of customer survey

Figure 3-8 presents the ease with which participants found information about the program. On a scale of 0-10, where 0 is very difficult, and 10 is very easy; 61 people (78%) responded with a score of seven (7) or higher. Overall, this results in an average score of 7.4 for the ease of finding program information. This is in the normal range, but does indicate some modest room for improvement.

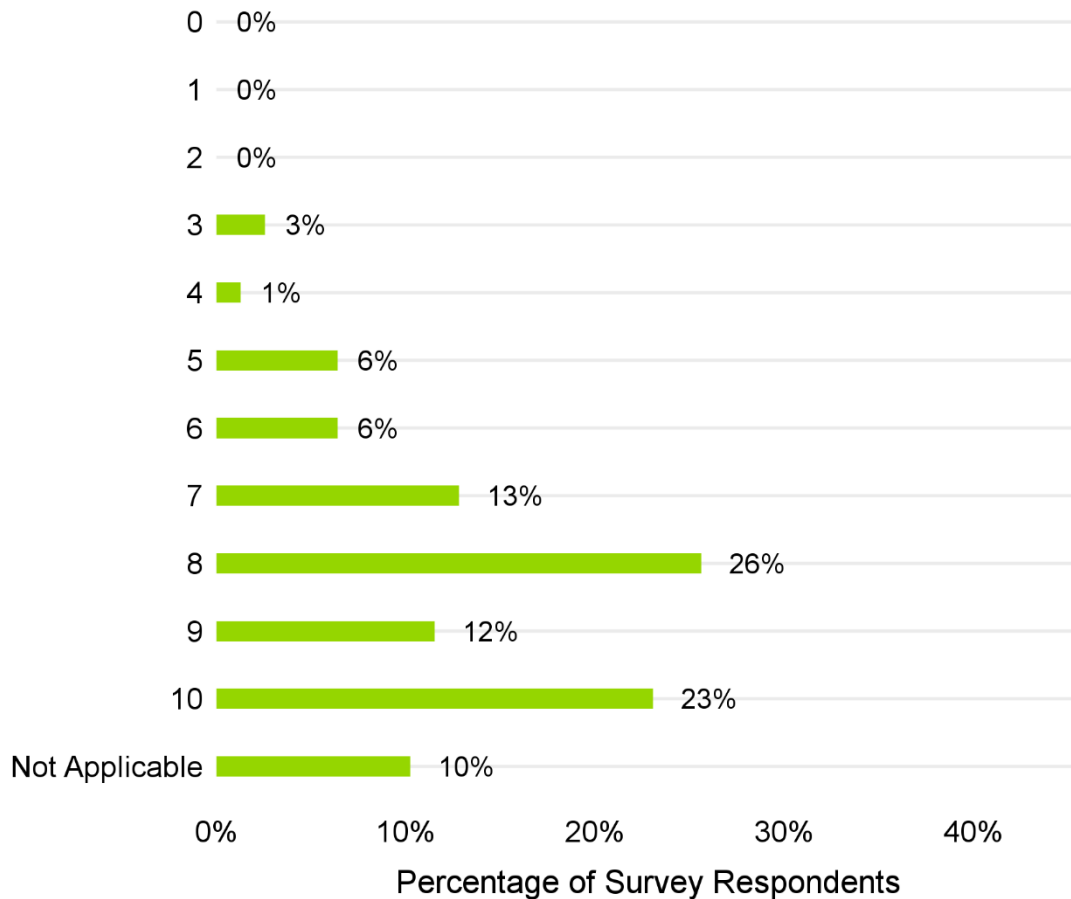
**Figure 3-8. How Would You Rate Ease of Finding Information About EP4B Program? (N=78; 0=Very Challenging, 10=Very Easy; NA/Don't Knows Not Shown)**



Source: Navigant analysis of customer survey

**Figure 3-9** presents the ease with which participants found the application process. On a scale of 0 to 10, where 0 is very difficult, and 10 is very easy; 57 people (73%) responded with a 7 or higher. Overall, this results in an average score of 7.9 for the ease of the application process. A score this high is positive reinforcement that the AEP Ohio deployment strategy is working and that a significant majority of participants are very happy with their application process.

**Figure 3-9. How Difficult or Easy Did You Find Application Process?? (N=78; 0=Difficult, 10=Easy)**

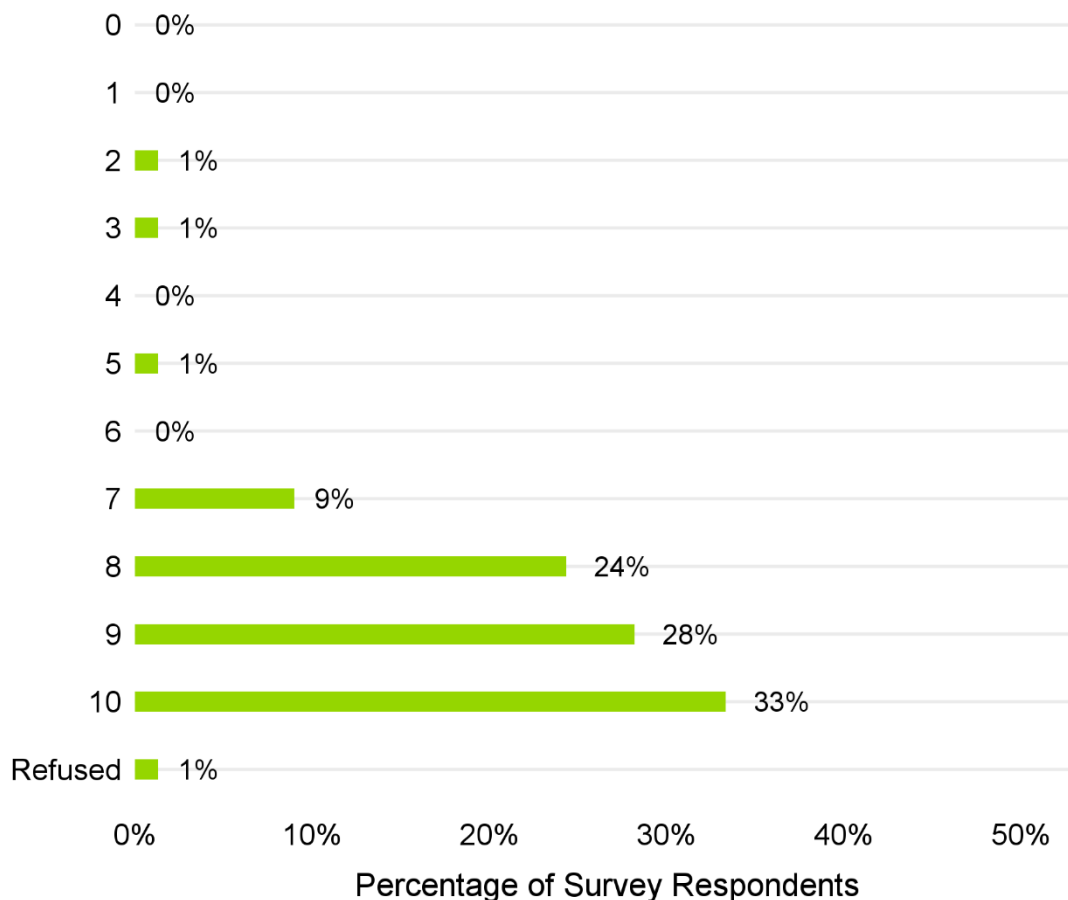


Source: Navigant analysis of customer survey



Figure 3-10 shows the overall participant satisfaction with the program. On a scale of 0-10, where 0 is not at all satisfied, and 10 is extremely satisfied; all but 4 participants responded with a 7 or better. Overall, this results in an average score of 8.7 for participants' overall satisfaction with the program. This is lower than the satisfaction from last year's onsite survey of 9.5. This year's participant was asked what they saw as barriers to participation. Common comments were the amount of time needed to implement a project, from scoping the equipment, to filling out the paperwork, and the upfront cost of equipment.

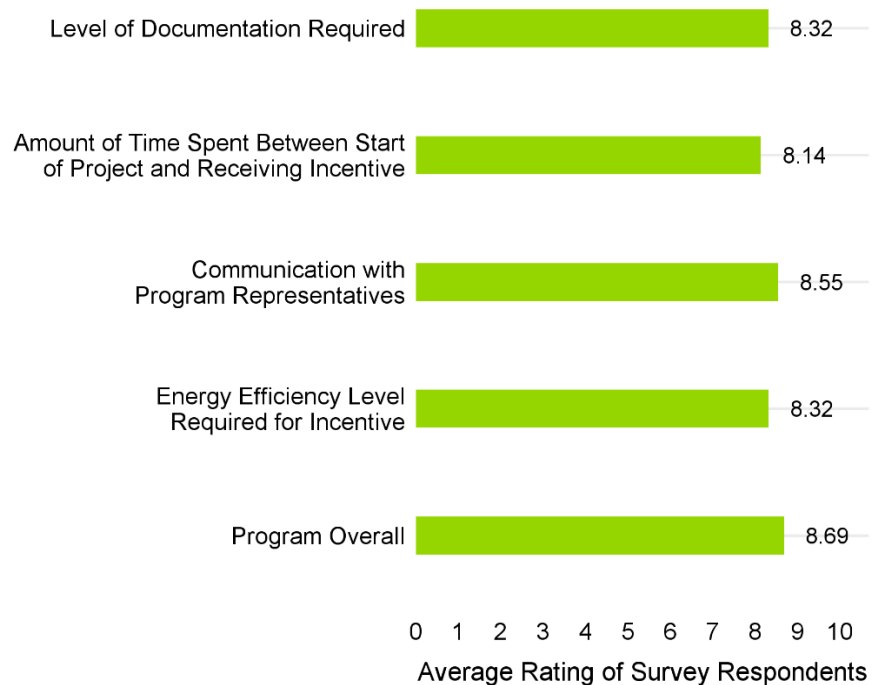
**Figure 3-10. How Satisfied Were You with EP4B Program Overall? (N=78; 0=Not Satisfied, 10=Very Satisfied)**



Source: Navigant analysis of customer survey

Figure 3-11 identifies the participants' level of satisfaction with various program elements. On average, participants were satisfied with all aspects of the program, including level of documentation required, amount of time spent between start of project and receiving incentive, communication with program representatives, energy efficiency level required for incentive, and the program overall. Each of these topics received a score ranging from 8.3 to 8.7 with an average of 8.4. The lowest rating was for understanding the efficiency level required for a given piece of equipment to qualify for the program.

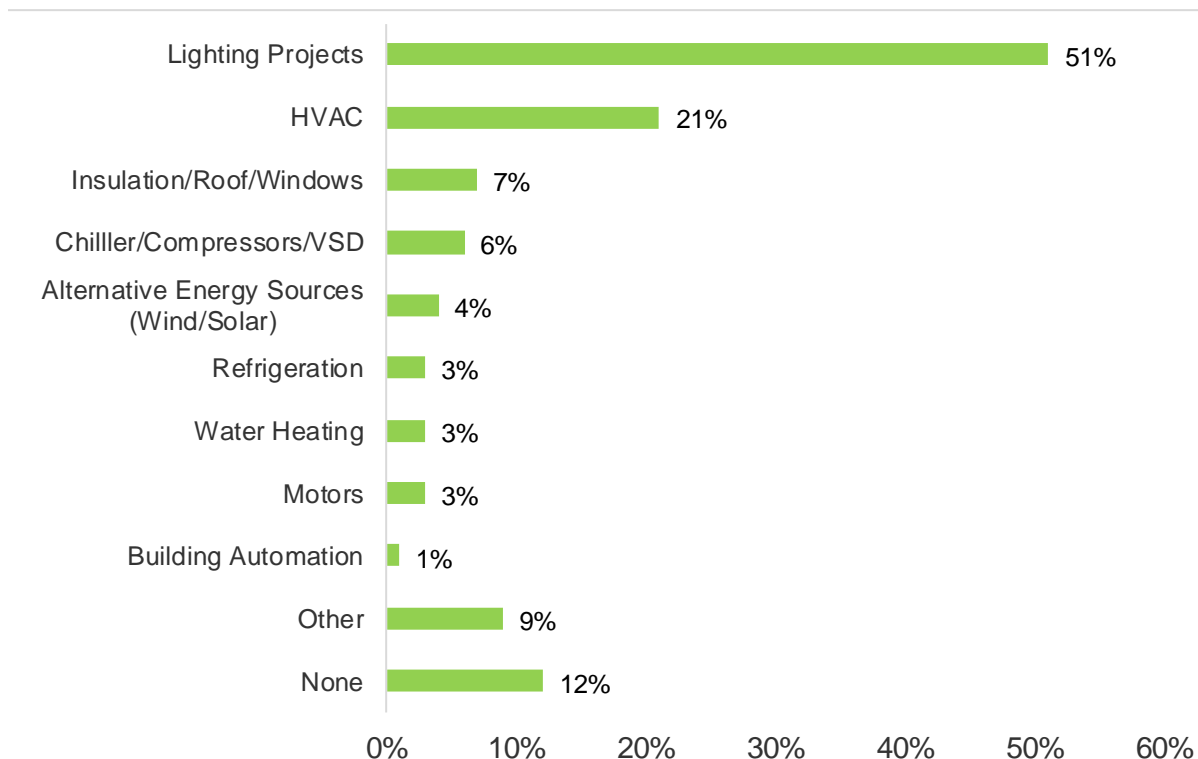
**Figure 3-11. Average Participant Satisfaction with Various Program Elements (N=78; 0=Not at All Satisfied, 10=Very Satisfied); NAs Not Shown)**



Source: Navigant analysis of customer survey

Figure 3-12 shows other energy efficiency projects that participants are interested in undertaking if there was a rebate to help offset the upfront costs. 41 respondents (51%) mentioned lighting projects, 14 respondents (21%) said HVAC equipment, and 8 respondents (12%) said no other projects. These results indicate customers may not be fully aware of the full breadth of measures supported through the Efficient Products for Business Program.

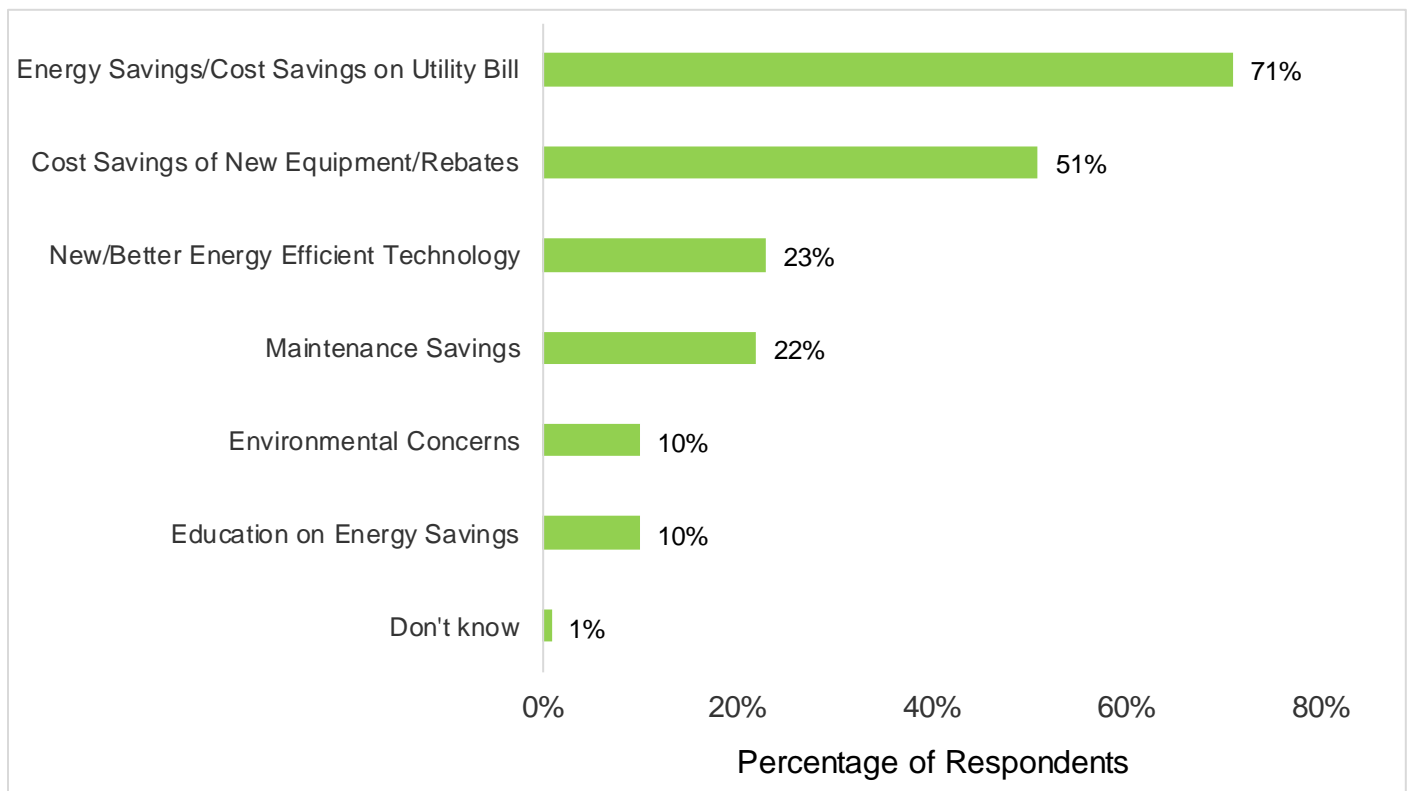
**Figure 3-12. What EE Projects Would You Undertake if There Was Rebate Available to Help Offset Upfront Costs? (N=78; NAs Not Shown; Multiple Responses)**



Source: Navigant analysis of customer survey

Figure 3-13 shows what participants mentioned as the main benefits of the program. Fifty-five respondents (71%) noted energy savings/cost savings on utility bill. Forty respondents (51%) mentioned cost savings of new equipment, rebates. Seventeen respondents (22%) noted maintenance savings and 18 respondents (23%) mentioned new/better energy efficient technology. These results confirm the priorities many businesses put on financial savings. While energy savings education ranks low in customers' perceived benefits, financial savings forecasts may be a valuable tool to persuade customers to invest in energy efficient equipment, and participate in the program (whether they recognize that as 'education,' as presented in this question, or not). Financial benefits include the simple return on investment calculations, as well as demonstrating reduced long-term maintenance costs.

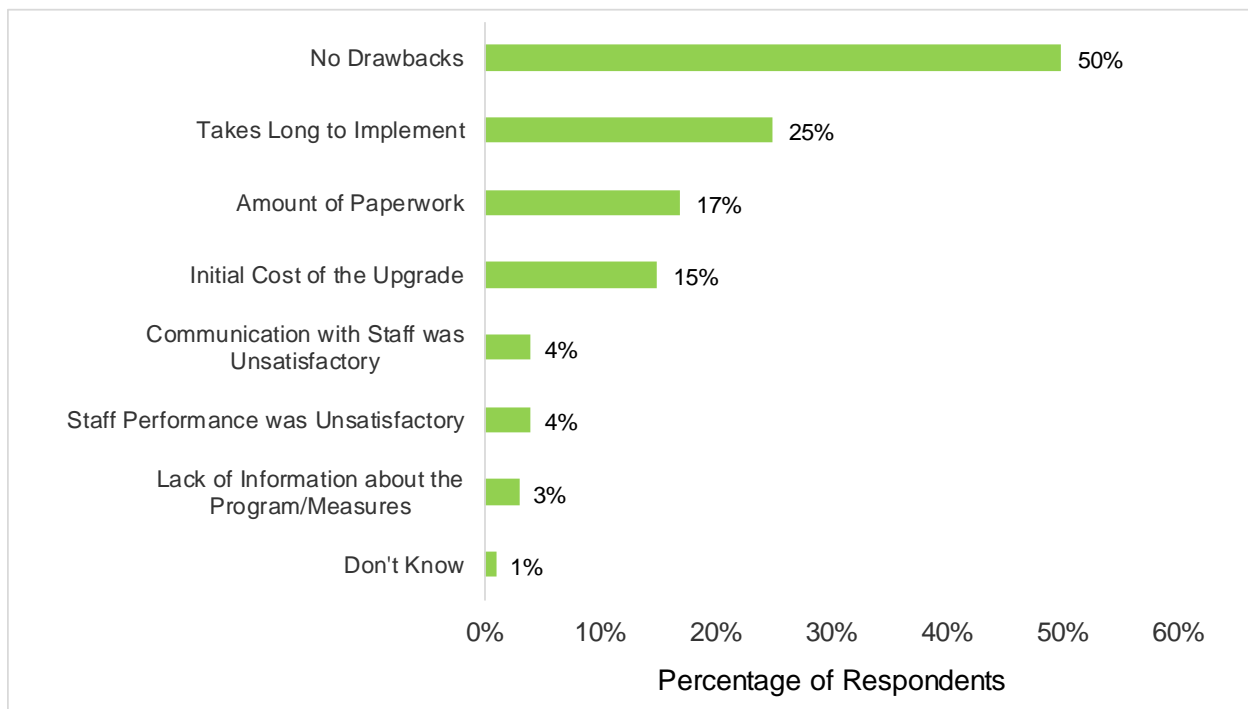
**Figure 3-13. What Are Main Benefit(s) to Participating in the EP4B Program? (N=78; Multiple Responses)**



Source: Navigant analysis of customer survey

Figure 3-14 identifies the drawbacks participating in the program that respondents mentioned. Thirty-six respondents (50%) said there were no drawbacks. Eighteen respondents (25%) said the program takes too long to implement, 12 respondents (17%) said the amount and difficulty of filling out the paperwork, while 11 respondents (15%) said the initial cost of the upgrade is a drawback. These results, indicating 25 percent of respondents believe the program takes too long to implement, and 17 percent have difficulty with paperwork, are consistent with Navigant's findings regarding delays in the processing of applications from both implementation contractors (see sections 3.3.4 and 0). Generally speaking, prescriptive programs should be expected to rapidly respond to completed applications; this may be an area of potential for AEP Ohio.

**Figure 3-14. What Are Drawbacks to Participating in EP4B Program? (N=78; NAs Shown; Multiple Responses)**



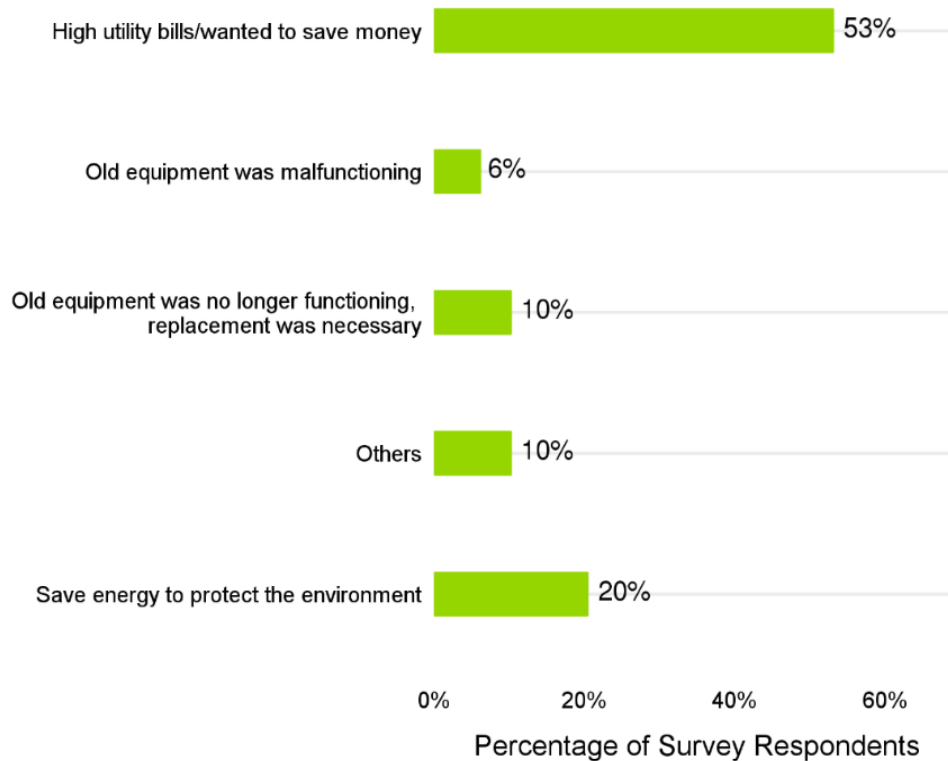
Source: Navigant analysis of customer survey

### 3.3.9 Participant Onsite Survey Analysis

Program participants were surveyed as part of the onsite impact evaluation data collection process. Navigant performed in-person interviews with 49 program participants. These interviews were different than the telephone surveys, however the two surveys were designed to complement and further bolster context gained from each other.

As shown in Figure 3-15, twenty-six respondents (53%) mentioned the primary reason for implementing the project/measure was to mitigate high utility bills or wanting to save money and energy. Another ten respondents (20%) mentioned saving energy to protect the environment. Participation due to existing equipment malfunctioning or otherwise not working correctly was cited by eight respondents (16%). These responses are consistent with other findings that businesses prioritize the financial benefits of their projects. Interestingly, the percentage of participants reporting environmental reasons as contributing to their decision was much higher in the onsite survey than the telephone survey. It may be customers speaking directly to an evaluator onsite respond differently to this question than those responding to a telephone survey. Regardless, the onsite results indicate customers do attribute some part of their energy efficiency projects to helping the environment.

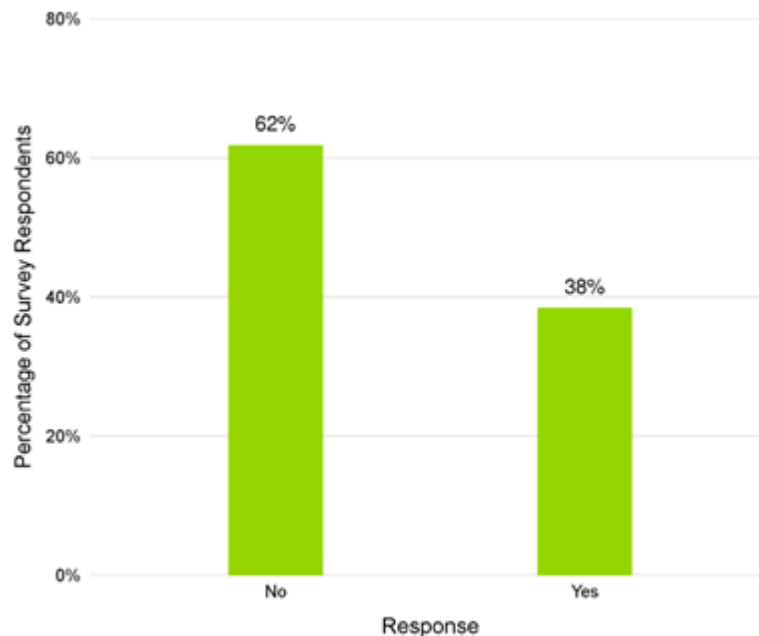
**Figure 3-15. What Were Main Reasons for Implementing Project/Measure? (N=49)**



Source: Navigant analysis of onsite customer survey

Eighteen (38%) participants participated in other AEP Ohio energy efficiency programs before 2017 as shown in Figure 3-16. The remaining 29 participants (62%) indicated this was their first time participating in an AEP Ohio rebate program. The majority of respondents who had previously participated (14 out of 18) participated in the Efficient Products (formerly Prescriptive) Program. This result shows participants are satisfied with the program and continue to participate year over year.

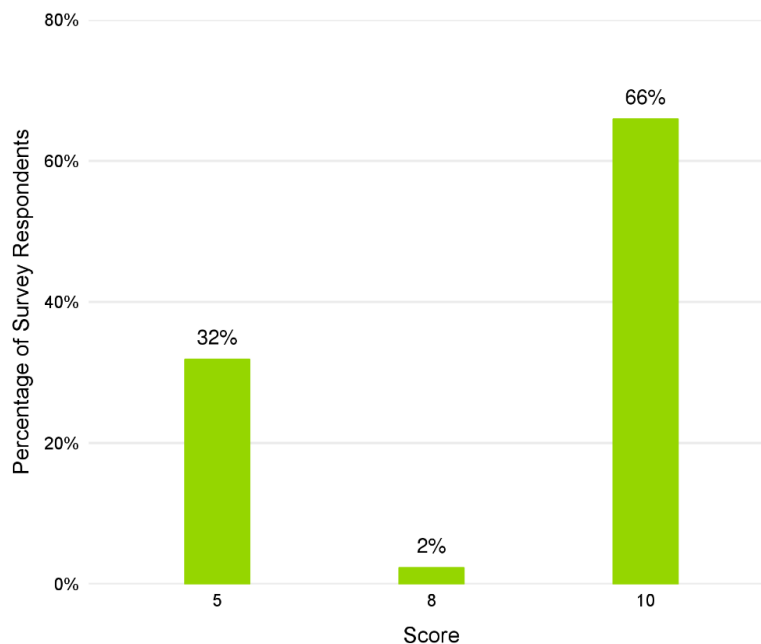
**Figure 3-16. Have You Participated in EP4B or Any Other AEP Ohio EE Programs Before 2017?  
(N=47)**



Source: Navigant analysis of onsite customer survey

Figure 3-17 presents the likelihood that respondents would recommend the program to others, on a scale of 0-10, where 0 is extremely unlikely and 10 is extremely likely. The majority of respondents (66%) gave a score of 10, while 14 respondents (32%) gave a score of 5. The average score is 8.3. This result contrasts with Figure 3-6 which indicates a small fraction of participants learned about the program from a business peer (associate or co-worker). AEP Ohio may have an opportunity to leverage the programs' satisfied customers to encourage their colleagues and peers to participate, either directly or through project case studies, etc.

**Figure 3-17. How Likely Are You to Recommend EP4B Program to Others? (N=44) (0=Extremely Unlikely, 10=Extremely Likely)**

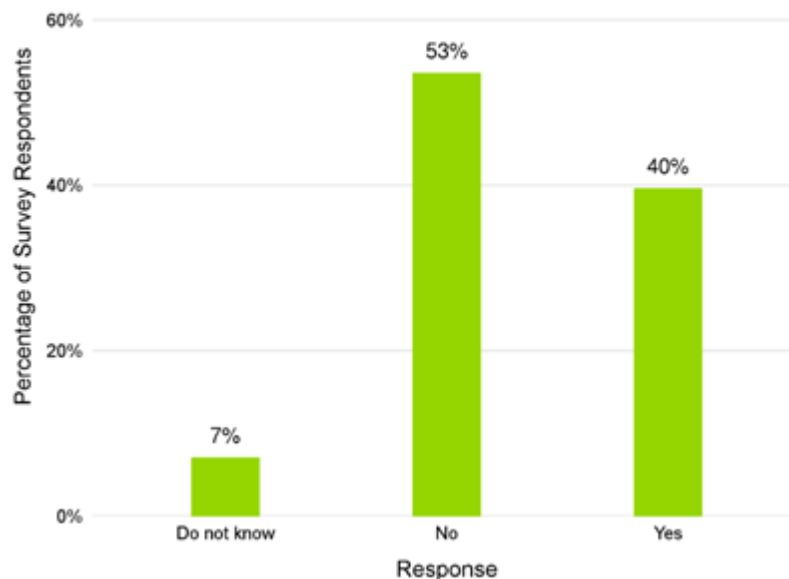


Source: Navigant analysis of onsite customer survey



During the onsite visit, participants were asked if any additional energy efficient projects were identified that they would like to implement (Figure 3-18). Interestingly, only 17 respondents (40%) are aware of other projects that could be pursued at this time while 23 respondents (53%) are not aware of any other projects they would like to initiate at the moment. Presumably, this high number of participants who are unaware of additional project actions in their facility is a result of the Efficient Products for Business program's narrow, prescriptive project focus without any onsite assistance, and may be attributed to lack of awareness of all the measures available. That said, customers may be open to messaging from AEP Ohio about other avenues to identify and implement energy efficiency opportunities. This may be addressed for example, by leaving program flyers after an onsite visit or providing program information along with the rebate check.

**Figure 3-18. Are You Aware of Any Additional EE Projects That Could Be Completed at Your Site You Have Decided Not to Pursue at This Time? (N=43; Don't Knows Not Shown)**



Source: Navigant analysis of onsite customer survey

### 3.4 Cost Effectiveness Review

This section addresses the cost effectiveness of the Efficient Products Program. Cost effectiveness is assessed using the Total Resource Cost (TRC) test. Table 3-12 summarizes the unique inputs used in the TRC test.

**Table 3-12. Inputs to Cost-Effectiveness Model for the AEP Ohio Efficient Products Program**

Item	Input
Measure Life	9
Number of Projects	2,141
Ex Post Annual Energy Savings (kWh)	157,451,918
Ex Post Coincident Peak Savings (kW)	22,763
Third Party Implementation Costs	\$3,524,527
Utility Administration Costs	\$1,509,198
Utility Incentive Costs	\$9,617,347
Incremental Participant Cost	\$42,575,045

*NOTE: Total Incremental Participant Cost is calculated by subtracting Total Incentives from Total Project Costs.  
Source: Navigant Analysis, including data provided directly by AEP Ohio.*

Based on these inputs, the TRC ratio is 1.3 and passes the TRC test. Table 3-13 summarizes the results of the cost-effectiveness tests. Results are presented for the Total Resource Cost test, the Participant Cost Test, the Ratepayer Impact Measure Test, and the Utility Cost Test.

**Table 3-13. Cost Effectiveness Results for the Efficient Products Program**

Benefit-Cost Test	Benefit/Cost Ratio
Total Resource Cost	1.3
Participant Cost Test	2.3
Ratepayer Impact Measure	0.6
Utility Cost Test	4.3

*Source: Navigant Analysis*

At this time, additional benefits related to reduction of greenhouse gas emissions have not been quantified in the calculation of the TRC. These additional benefits would increase the given TRC benefit/cost ratio.

## 4. KEY FINDINGS AND RECOMMENDATIONS

This section presents the key findings and recommendations from the 2017 Efficient Products for Business Program impact and process evaluations. These items are intended to consolidate and condense the key take-aways from the rest of the report, while offering actionable suggestions for the continuous improvement of the program.

### 4.1 Key Impact Findings and Recommendations

The 2017 realization rates (defined as *ex post* savings divided by *ex ante* savings) are 1.05 for energy savings and 0.95 for demand savings. The 2017 Efficient Products for Business Program impact evaluation resulted in the following conclusions and recommendations.

**Impact Finding 1:** There was significantly more variability in the project-level realization rates in 2017 relative to the previous four years. Seventeen of the 54 projects sampled have a realization rate that differ from the reported values by more than +/- 50%; i.e., over 30 percent of the projects sampled have verified savings below 0.5 or above 1.5. Projects from all three strata (5 Large, 5 Medium, and 7 Small) are included in the list of projects where savings rates experienced significant adjustment during verification. The two primary causes for these savings adjustments are correcting business segment (updates baseline HOU), and using logged HOU for the as built (verified) case. (The lighting loggers are particularly impactful with controls based measures like occupancy sensors.) The quantity and magnitude of these adjustments, particularly the adjustments made for ten of the Large and Medium strata sites, are directly driving the wider than expected precision bounds.

**Impact Recommendation 1:** The implementation contractor should continue to refine the prescriptive savings for lighting measures; in particular, the default hours of use by building type. It is also important that the application approval process incorporate improved review of the business type assigned to each project. Also, following up on a recommendation from the 2016 evaluation report, Navigant has implemented improvements to our data intake and processing activities in order to facilitate the use of both 2016 and 2017 evaluation findings, in conjunction with future evaluation data, to help inform improvements to the prescriptive savings input assumptions. The Evaluator looks forward to expanding on this process in the second half of 2018 and working with the AEP Ohio to improve the input assumptions for 2018.

**Impact Finding 2:** The majority of sampled projects received updates to the demand savings values. The two most common causes for these adjustments are: 1) the verification team identified a difference in reported vs. verified fixture counts (install rates); and 2) the *ex post* analysis leverages site-specific, peak coincidence factors derived specifically for each logged site based on the verified use profiles.

**Impact Recommendation 2:** Improved project documentation, including more detailed project descriptions and specific context on equipment placement, will help ensure field staff are able to locate equipment for verification. The findings and recommendations related to post-inspections will also help reduce the risk of incentivizing incomplete or projects with altered, yet unreported scope updates.

**Impact Finding 3:** Lighting measures continue to dominate the program, with 83 percent of the reported energy savings and 82 percent of the reported demand savings. The next highest contribution to savings is from refrigeration measures, which provided 7.5 percent of the energy savings, and seven percent of demand savings. Rounding out the 2017 measures, HVAC added 3.5 percent of energy reduction, and VFD for HVAC measures added 2.6 percent of energy savings. The remaining 3.3 percent of the energy savings are attributed to “other” measures, which as a measure category add less than two percent of the total. This “other” catch-all bin includes: compressed air, VFD for Process, food service, motor, agricultural, and any remaining, miscellaneous measures.

**Impact Recommendation 3a:** To diversify the program and ensure long term stability, program staff, the implementation contractors, and Solution Providers should look for opportunities to promote non-lighting measures. For example, program staff and implementation contractors can partner with HVAC contractors to teach them how to apply and underscore the benefit to their business.

**Impact Recommendation 3b:** Identify and target under participating markets, including, but not limited to hospitality, family-owned restaurants, grocery stores, and others identified in the program staff’s segmentation effort.

**Impact Recommendation 3c:** Leverage the data currently available in the tracking database, in combination with GIS software to identify areas of greatest and least program activity. Use this map to strategically target new areas and recruit additional trade allies in those areas.

**Impact Finding 4:** In previous program years, the measure mix has had a higher portion of VFD projects than were submitted this year. Also, those projects typically have excellent, reliable results. This year, VFD measures contributed to 1.5% of projects, adding 3.6% of reported kWh savings; and 4.9 percent of demand savings. This result suggests there is room for expanded recruitment and deployment around this group of measures, both HVAC and process-related controls. Many other measures are also available for customers, yet are rarely part of an application.

**Impact Recommendation 4:** AEP Ohio may benefit from addressing the programs continued heavy reliance on a monoculture of lighting measures. By encouraging Solution Providers to diversify the mix of measures they are promoting, and strategically supporting their marketing and outreach activities, AEP Ohio can ensure there is enough critical mass and momentum within the program to continue meeting (and exceeding) the program targets in the years ahead. As lighting measures continue to move toward saturating the market, incremental savings from fixture and lamp retrofits will decrease (instead of replacing T-12s with T-5s, or T-8s with LEDs), and the market will naturally shift toward updating older LEDs with new LEDs, or adding controls to existing lighting systems. This trend will follow the law of diminishing returns, whereby the program’s outsized reliance on lighting measures may lead to challenges in meeting annual savings goals. By encouraging a greater mix of measures now, and supporting both participant awareness and an expanding market for these measures, AEP Ohio can position itself for long-term stability within the Efficient Products for Business Program, and enhance growth more generally.

**Impact Finding 5:** The implementation contractor’s 2016 version of Appendix A provides Summer Coincidence Factor (CF) for lighting measures. However, this reference does not include CF-specific to the PJM Winter peak. Similarly, the implementation contractor’s Appendix A does not have winter specific, heating HVAC Interactive Factors.

**Impact Recommendation 5:** The implementation contractor's Appendix A prescriptive savings need to include a winter CF and interactive factor (IF). In particular, exterior fixtures previously did not contribute to AEP Ohio's summer peak demand reduction, but now should be assessed for potential contributions to PJM winter peak savings.

**Impact Finding 6:** For lighting measures, the implementation contractor's Appendix A provides estimates of HVAC interactive impacts for the summer period, which are subsequently used to adjust savings. However, this reference does not include HVAC interactive factor values specific to the PJM Winter peak.

**Impact Recommendation 6:** The implementation contractor's Appendix A should expand to include a Winter HVAC Interactive Factor (IF) distinct from the Summer Interactive Factor values currently in use. This estimate needs to be sensitive to the saturation of non-electric heating technologies.

## 4.2 Key Process Findings and Recommendations

The following process recommendations are offered to help improve program effectiveness and efficiency and further improve participant's experience of the program.

**Process Finding 1:** The separate databases for both the intake contractor and the implementation contractor do not provide transparency into a customer's full experience with the Process Efficiency program, including elapsed time from initial contact through final incentive payment, and reasons a customer may not complete their project

**Process Recommendation 1:** The intake and implementation contractors should review the steps in their respective application processes to identify potential problem areas for individual customers, reasons applications are not converted to completed projects, and align the databases with the key project dates (such as the application submittal date) that carry forward from one contractor to the next.

**Process Finding 2:** Review of the intake contractor and the implementation contractor databases identified common problems with application submittals to process the customer's application such as missing signatures, invoices, accurate scope of work, etc. A quarter of telephone survey respondents mentioned the program takes too long to implement as the largest drawback to the program. The difficulty of the application was also mentioned as a drawback by many phone survey respondents.

**Process Recommendation 2:** Simplify the application to include the bare minimum requirements the program needs to process the application and claim savings. Consider developing a standalone application for the Efficient Products for Business Program.

**Process Finding 3:** The program application and supporting documents do not provide consistent information to customers, making it difficult for a customer to understand the requirements of the program. The Process Efficiency, Efficient Products for Business, and Self Direct program application is a 20-page document outlining the application's guidelines, checklists, customer information needed and worksheets for the various end-use measures. For a Solution Provider or customer who is well versed in the program, the document provides everything needed to submit a project for an incentive. However, for a new customer the application can be overwhelming.

**Process Recommendation 3:** Review all program applications, terms and conditions, and specification sheets for consistency of information. In the application, clearly identify 1) the guidelines applicable to each program and 2) the checklist of required attachments. This could be accomplished using a matrix with the three programs as columns headers and the various step as rows; with a check mark designating which steps are needed for that program. (For example, Process Efficiency measures require pre-approval, other programs do not). Also, the Terms and Conditions for the three programs were in two separate documents; for ease of reference, include the Terms and Conditions in the Application. Consolidating all the needed information for each program will help the new customer navigate the process.

**Process Finding 4:** Two-thirds of customer respondents said they have not participated in other AEP Ohio energy efficiency programs before 2017. Additionally, more than 50 percent reported they were unaware of additional opportunities at their facility, while over two-thirds indicated they would participate in additional energy efficiency projects if AEP Ohio offered an incentive, (for end use technologies already qualify for existing programs).

**Process Recommendation 4:** AEP Ohio should put a greater emphasis on cross-program marketing to increase customer awareness of AEP Ohio's comprehensive program services, including the consolidated outreach contractor's role to assist customers identify and implement energy efficiency opportunities. This may be addressed for example, through direct telephone outreach to program participants, or leaving program flyers during onsite visits, providing cross-program information along with the rebate check, or additional program awareness outreach.

**Process Finding 5:** Close to 50 percent of telephone and onsite survey respondents mentioned saving money on energy cost was the most important reason for participating in the program. Most onsite respondents would recommend the program to others, and nearly all telephone survey respondents would participate in the program again. According to the telephone survey, participants were satisfied with all aspects of the program.

**Process Recommendation 5:** Promote the financial benefits of energy efficiency improvements in program messaging consistent with business priorities, including articulating typical return on investment available to businesses. Leverage the goodwill of satisfied customers to promote the program, either directly to their peers or through additional case studies.

**Process Finding 6:** The Efficient Products for Business Program could not be easily located through the AEP Ohio website with clicks from the AEP Ohio home page.

**Process Recommendation 6:** Develop a landing page on AEP Ohio's website that provides easily identifiable pathways for a customer to identify an appropriate service offering and find needed program information.

### 4.3 Key Tracking System and Project File Findings and Recommendations

With respect to the Project Tracking Database and Project Files, Navigant offers the following observations and recommendations for improved clarity and tracking.

**Tracking System Finding 1:** In reviewing the tracking database, Navigant found some fields were not completed for all applicants. Fourteen percent of contractor business names and twenty-one percent of contractor emails are missing, as well as square footage (17%). Five percent of customer phone number and nine percent of customer email addresses were also either Not Provided, NA or Blank.

**Tracking System Recommendation 1:** As part of the administrative review of applications, add a check to ensure information for fields, such as contractor business name and contractor email, as well as customer telephone and email, are complete and are entered into the database.

**Tracking System Finding 2:** The solution provider field (CBusName) was populated with 'Not Provided' for 14 percent of the projects, which also represent 14 percent of the *ex ante* program savings.

**Tracking System Recommendation 2:** The best solution is to ensure collection of this data in the early stages of the application, in parallel with collection of validated contact information.

## APPENDIX A. SAVINGS CALCULATION METHODOLOGY

$$\Delta kWh = (kW_{base} - kW_{ee}) \times [HOU \times (1 + IF_{energy})]$$

$$\Delta kW_{peak} = (kW_{base} - kW_{ee}) \times [CF \times (1 + IF_{demand})]$$

$$\Delta kWh = kW_{controlled} \times HOU \times (SVG_{ee}) \times (1 + IF_{energy})$$

$$\Delta kW_{peak} = kW_{controlled} \times (SVG_{ee}) \times (1 + IF_{demand}) \times CF$$

$$kW_{base} = Watts_{base} \times Qty_{base}$$

$$kW_{ee} = Watts_{ee} \times Qty_{ee}$$

**Table A-1. Hierarchy of Data Sources Used for Savings Analysis**

Value	Preferred Source	Secondary Source	Tertiary Source
Watts <sub>base</sub>	Tracking database	NA	NA
Watts <sub>ee</sub>	On Site Data	Tracking Database	Appendix A
Qty	On Site Data	Tracking Database	
HOU	Logged Data	Customer Interview/Posted hours	Appendix A
CF	Logged Data	Appendix A	
IF	Appendix A		
Building Type (For HOU, CF, and IF lookup)	On Site Data	Tracking Database	
SVG	Appendix A		

Source: Navigant Evaluation Team

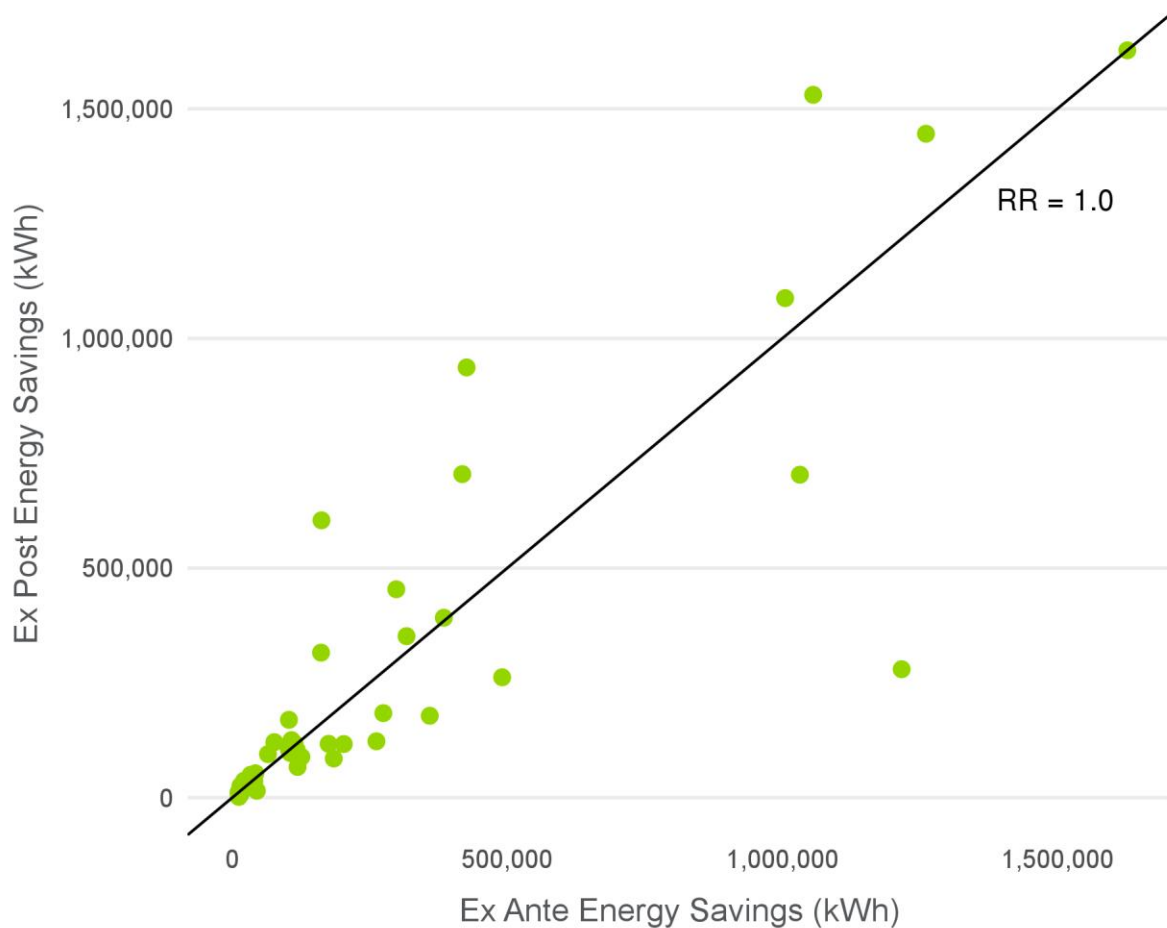


## APPENDIX B. DISTRIBUTION OF REALIZATION RATES FOR SAMPLED PROJECTS

The following Appendix is a supplemental look at the data provided in Section 3.2.2. Specifically, these exhibits provide a higher resolution look at the realization rates for projects sampled in the Small stratum.

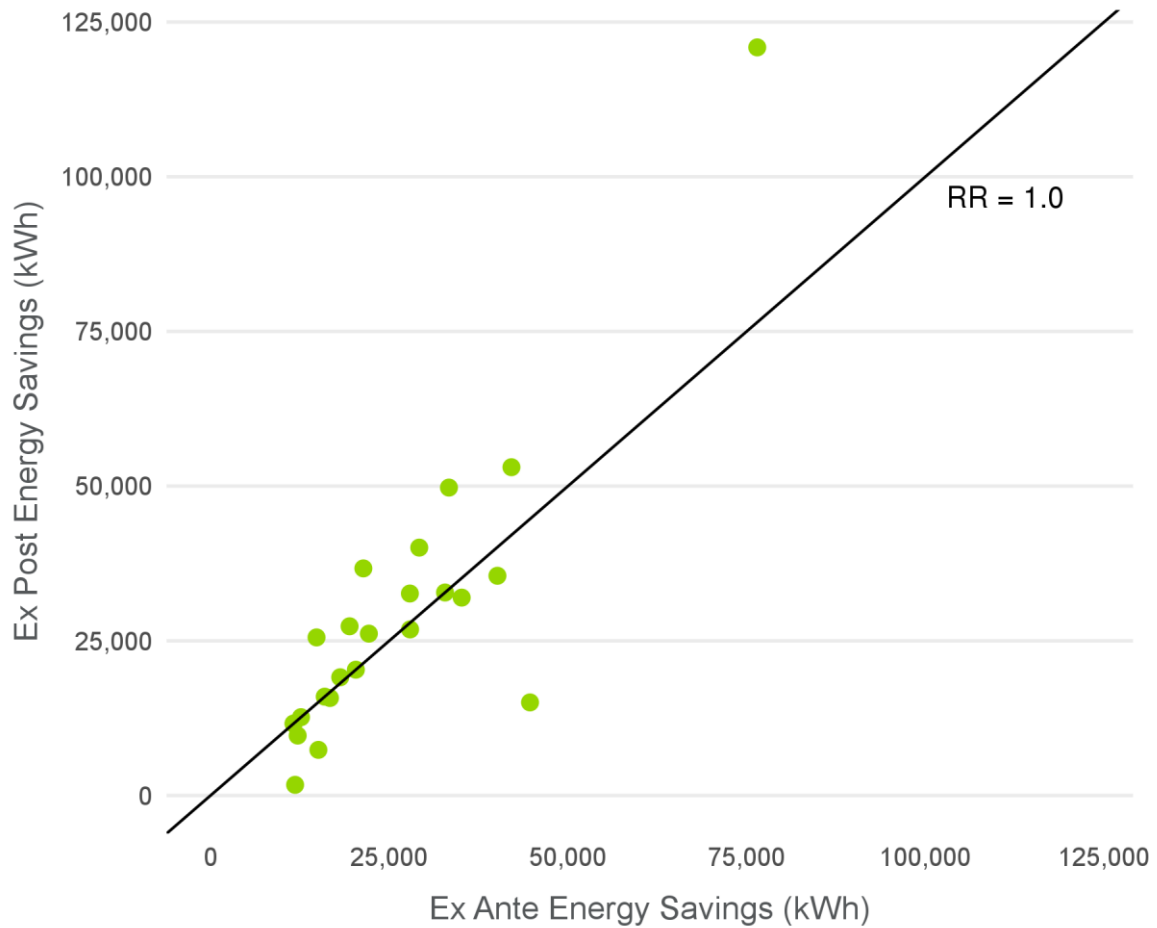
The black reference line shown in each of the following figures represents a Realization Rate of 1.0.

**Figure A-1. Comparison of *Ex Ante* and *Ex Post* Energy Savings for All Sampled Projects**



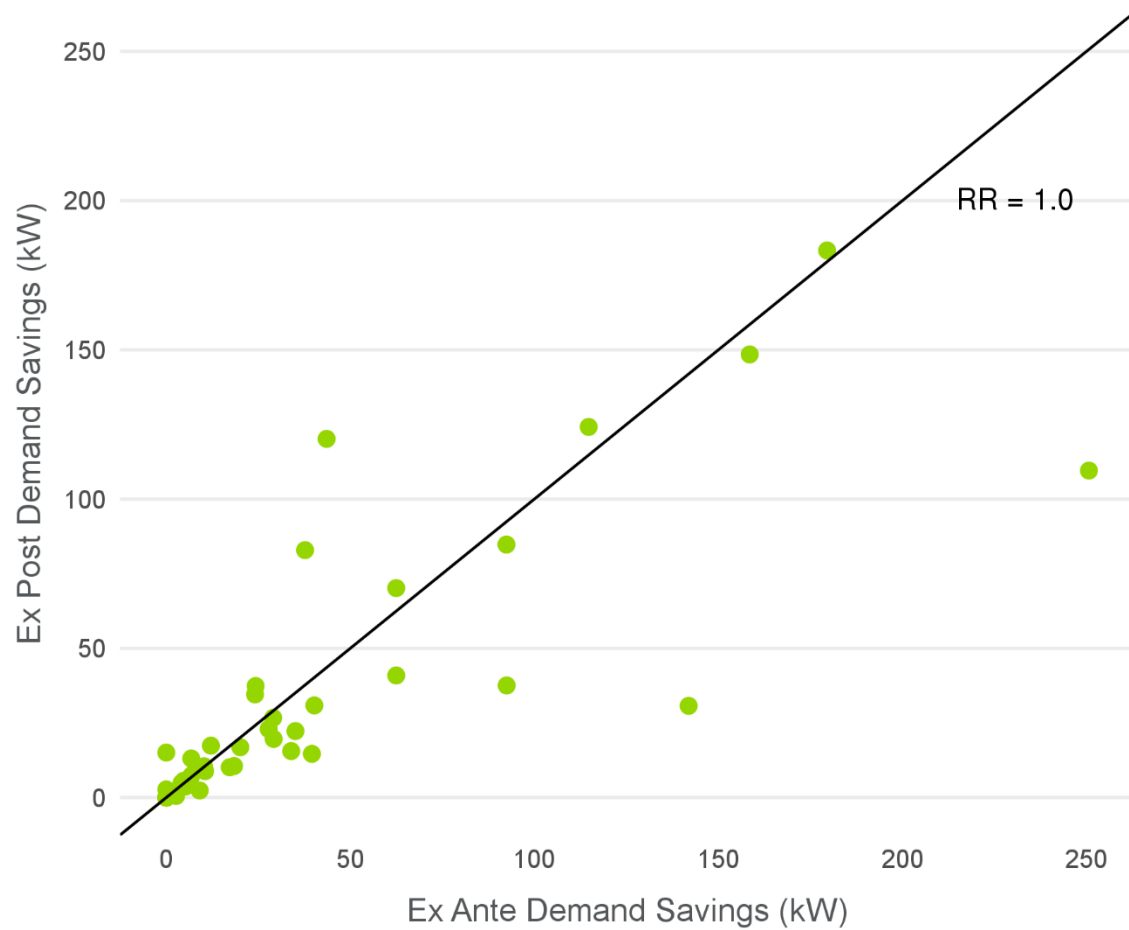
Source: Evaluation Analysis of Tracking Data and Sample Results

Figure A-2. Comparison of *Ex Ante* and *Ex Post* Energy Savings for Smaller Projects



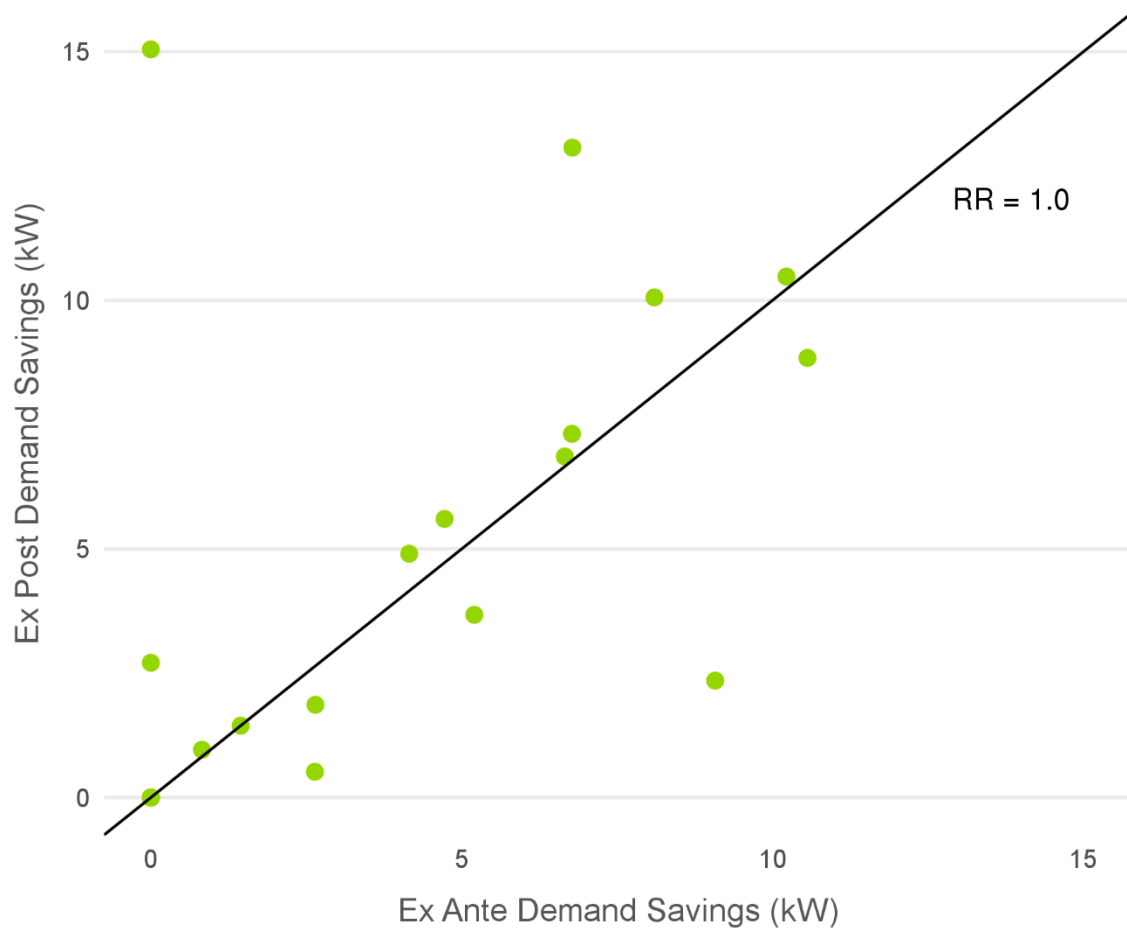
Source: Evaluation Analysis of Tracking Data and Sample Results

Figure A-3. Comparison of *Ex Ante* and *Ex Post* Demand Savings for All Sampled Projects



Source: Evaluation Analysis of Tracking Data and Sample Results

Figure A-4. Comparison of *Ex Ante* and *Ex Post* Demand Savings for Smaller Projects

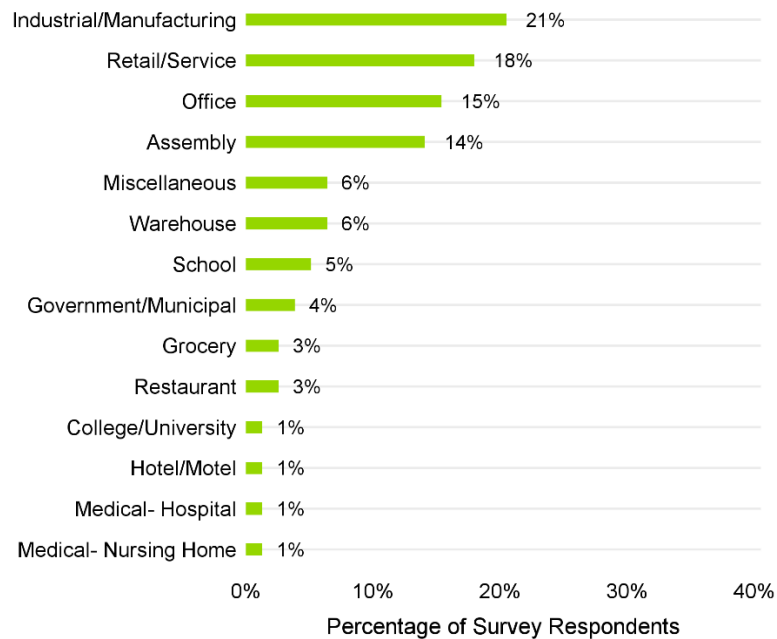


Source: Evaluation Analysis of Tracking Data and Sample Results

There are too many individual projects with Realization Rates that vary by more than +/- 20 percent from unity to justify detailed explanations of why each specific project was adjusted. However, Section 3.2 provides insight into the primary drivers for these savings adjustments across the sample as a whole.

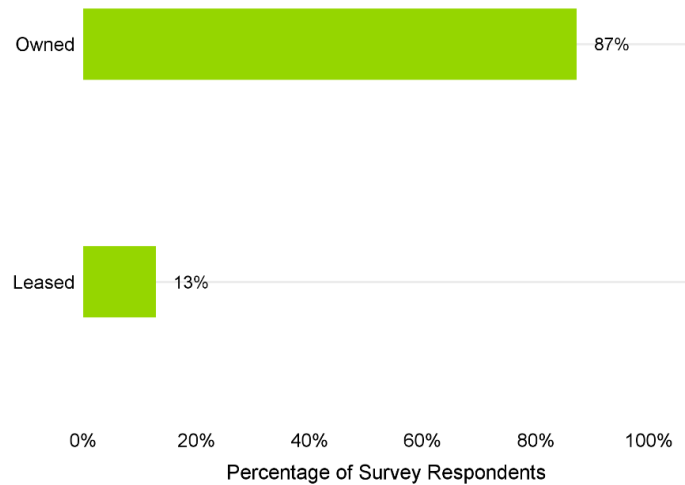
## APPENDIX C. PARTICIPANT TELEPHONE SURVEY RESULTS

Figure A-5. How Would You Categorize the Business Conducted at This Site? (N=78)



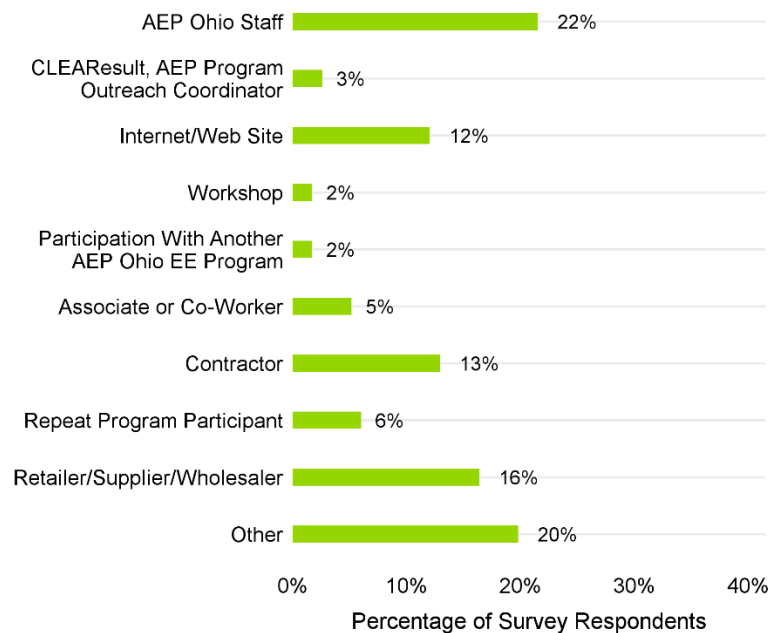
Source: Navigant analysis of customer survey

Figure A-6. Is Building Where Project Was Completed Owned or Leased? (N=78)



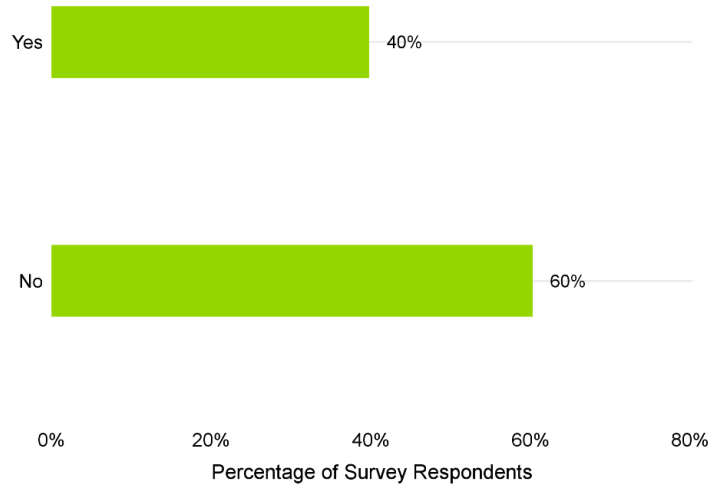
Source: Navigant analysis of customer survey

Figure A-7. How Did You First Learn of EP4B Program? (N=78; Multiple Responses)



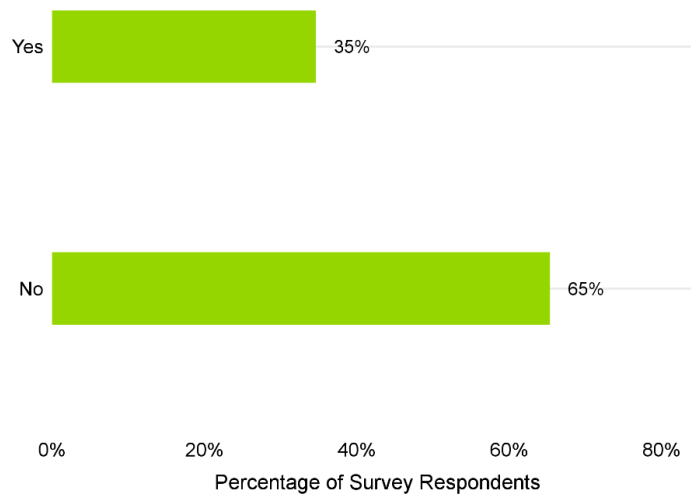
Source: Navigant analysis of customer survey

Figure A-8. Are You Aware of Other AEP Ohio EE Programs? (Process Efficiency (N=78))



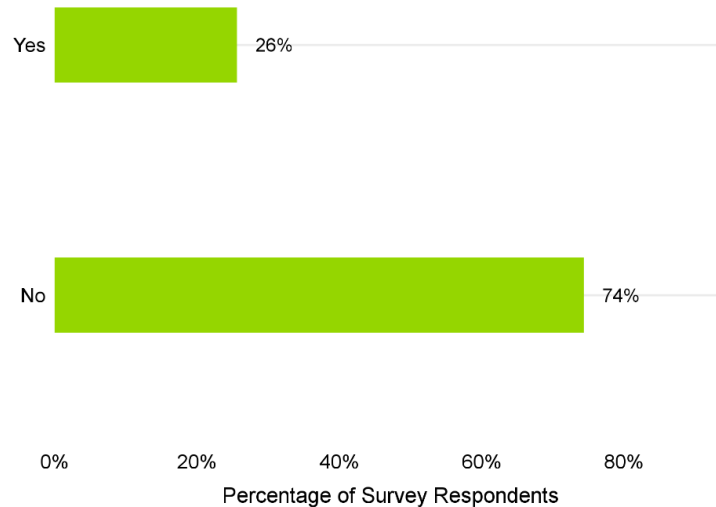
Source: Navigant analysis of customer survey

Figure A-9. Are You Aware of Other AEP Ohio EE Programs? (Self-Direct) (N=78)



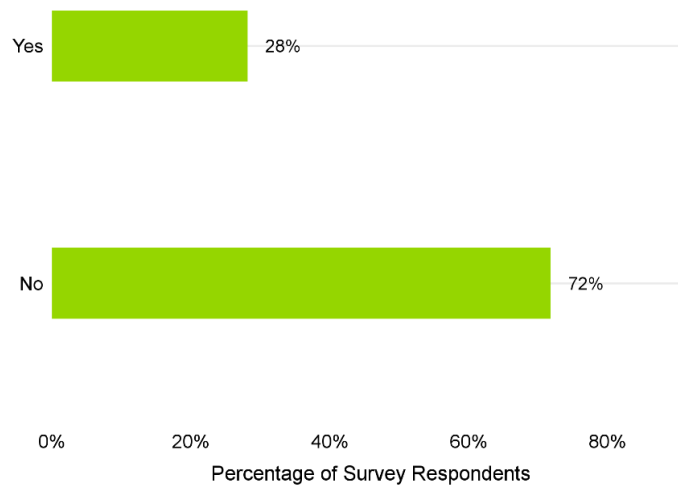
Source: Navigant analysis of customer survey

Figure A-10. Are You Aware of Other AEP Ohio EE Programs? (Retro-commissioning) (N=78)



Source: Navigant analysis of customer survey

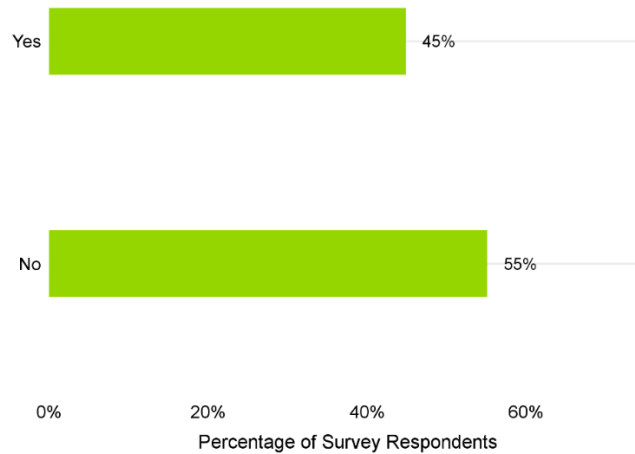
Figure A-11. Are You Aware of Other AEP Ohio EE Programs? (Data Center) (N=78)



Source: Navigant analysis of customer survey

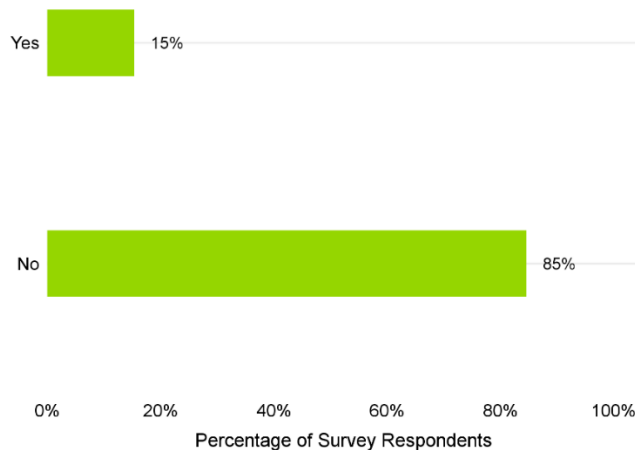


**Figure A-12. Are You Aware of Other AEP Ohio EE Programs? (Continuous Energy Improvement) (N=78)**



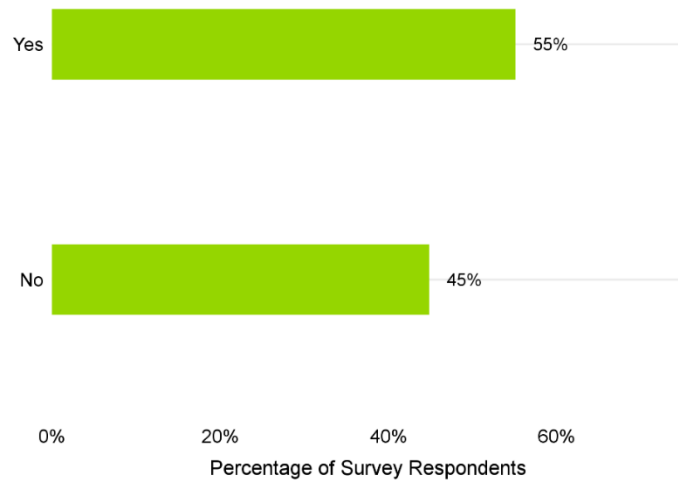
*Source: Navigant analysis of customer survey*

**Figure A-13. Are You Aware of Other AEP Ohio EE Programs? (Express) (N=78)**



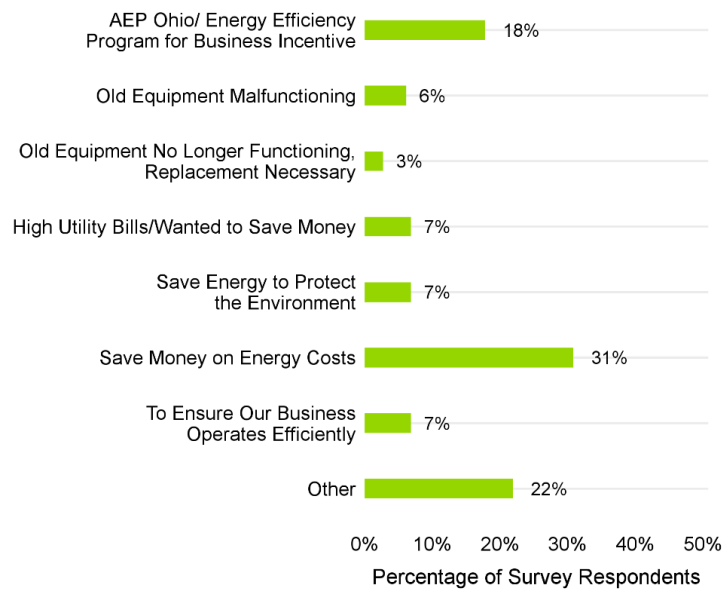
*Source: Navigant analysis of customer survey*

Figure A-14. Are You Aware of Other AEP Ohio EE Programs? (New Construction) (N=78)



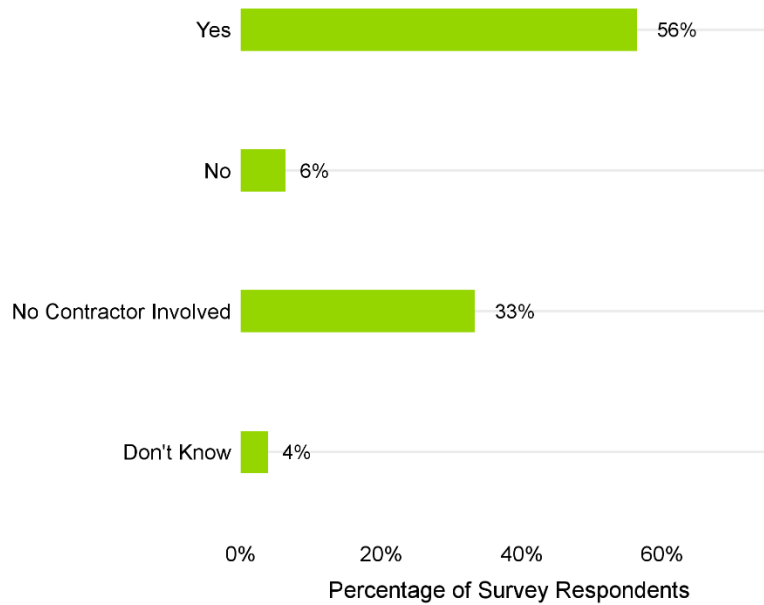
Source: Navigant analysis of customer survey

Figure A-15. What Were Main Reasons You Decided to Participate in EP4B Program? (N=78; Multiple Responses)



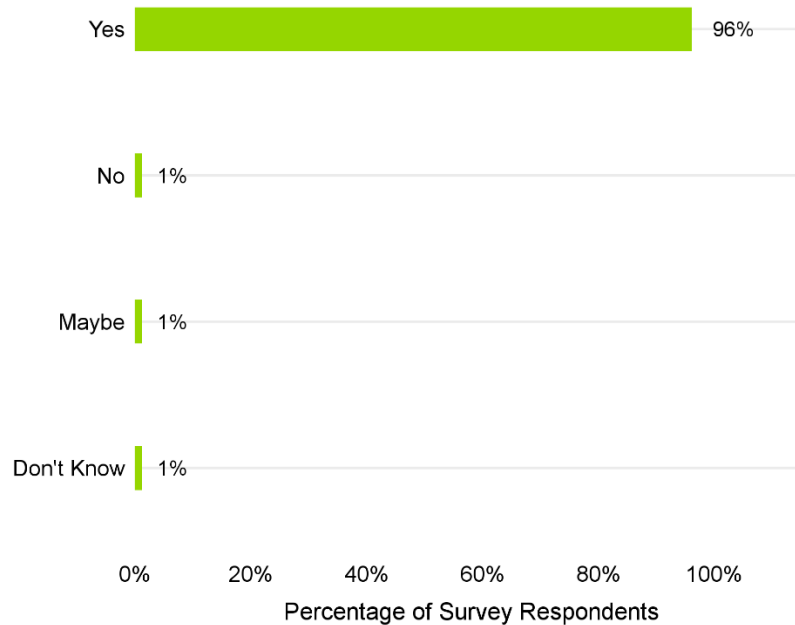
Source: Navigant analysis of customer survey

**Figure A-16. If a Contractor Installed Equipment, Were You Encouraged to Consider EE Options Meeting AEP Ohio's Program Recommendations? (N=78)**



*Source: Navigant analysis of customer survey*

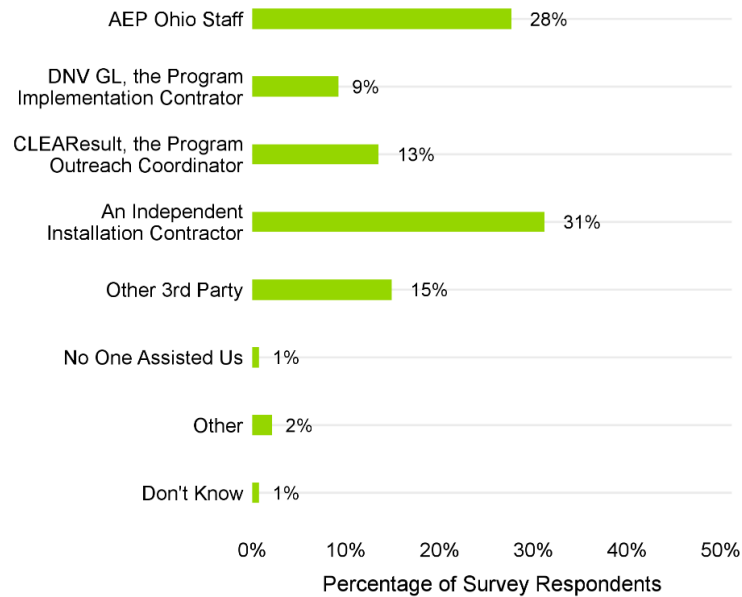
Figure A-17. Would You Participate in EP4B Program Again? (N=78)



Source: Navigant analysis of customer survey

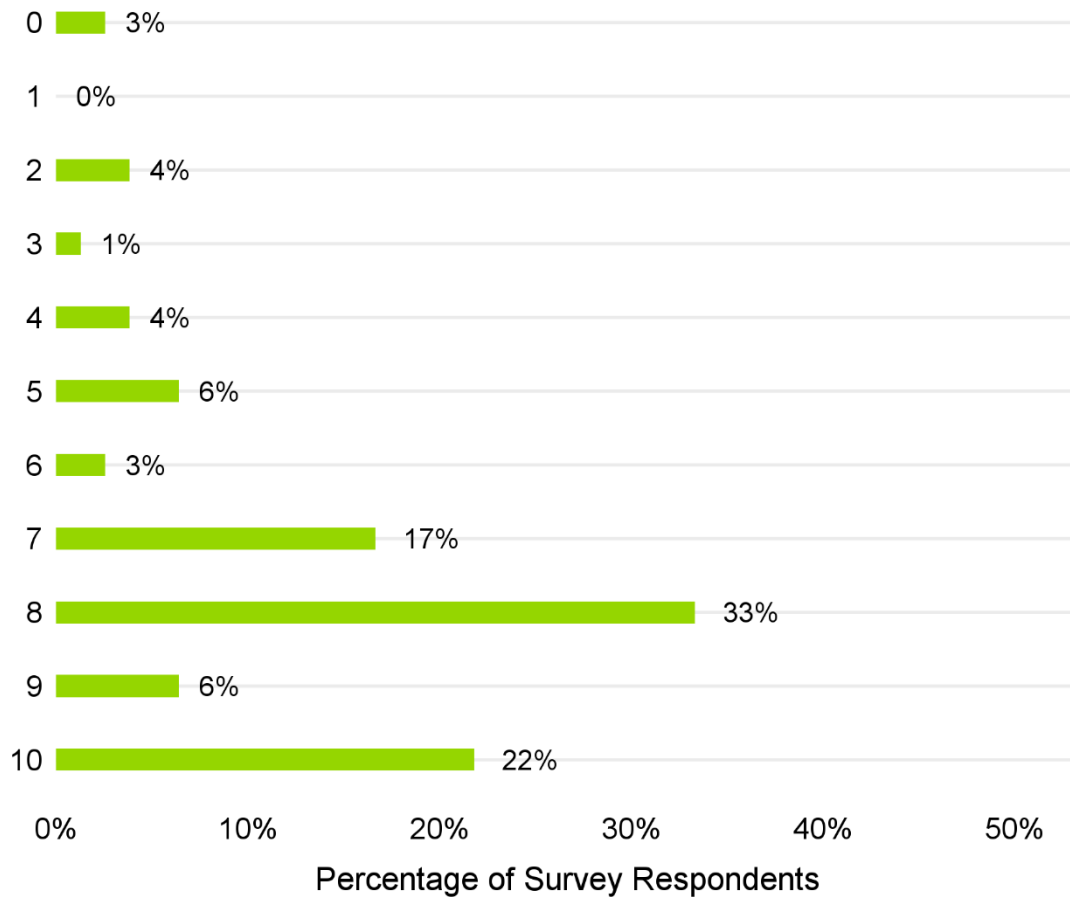
Why wouldn't you plan to participate in the program again? was asked only for respondents who wouldn't participate in the program again. Because this was only one respondent, no graph was created. The response by that one respondent was that he was not satisfied with the program, the equipment is still not installed, and the contractor was unprofessional.

Figure A-18. Who Assisted You with EP4B Program? (N=78; Multiple Responses)



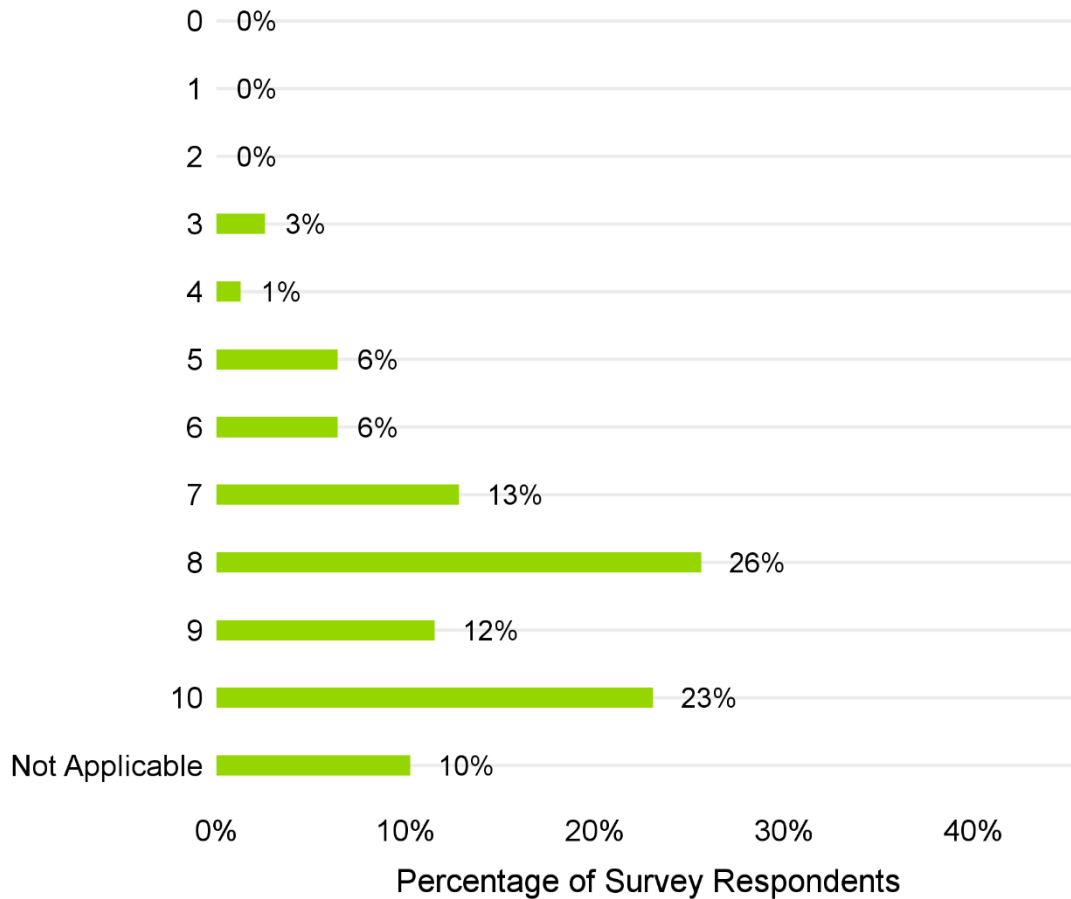
Source: Navigant analysis of customer survey

Figure A-19. How Would You Rate Ease of Finding Information About EP4B Program? (N=78; NAs Not Shown; 0=Very Challenging, 10=Very Easy)



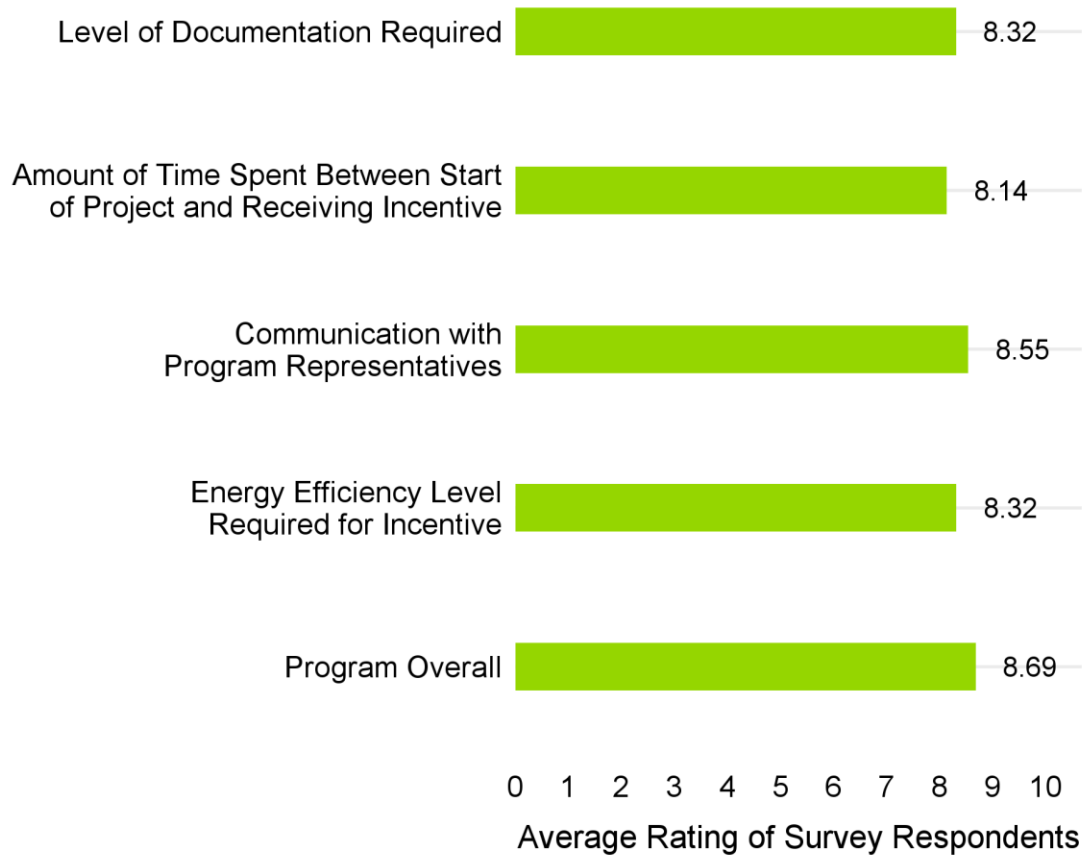
Source: Navigant analysis of customer survey

Figure A-20. How Difficult or Easy Did You Find Application Process? (N=78; NAs Not Shown, 0=Difficult, 10=Easy)



Source: Navigant analysis of customer survey

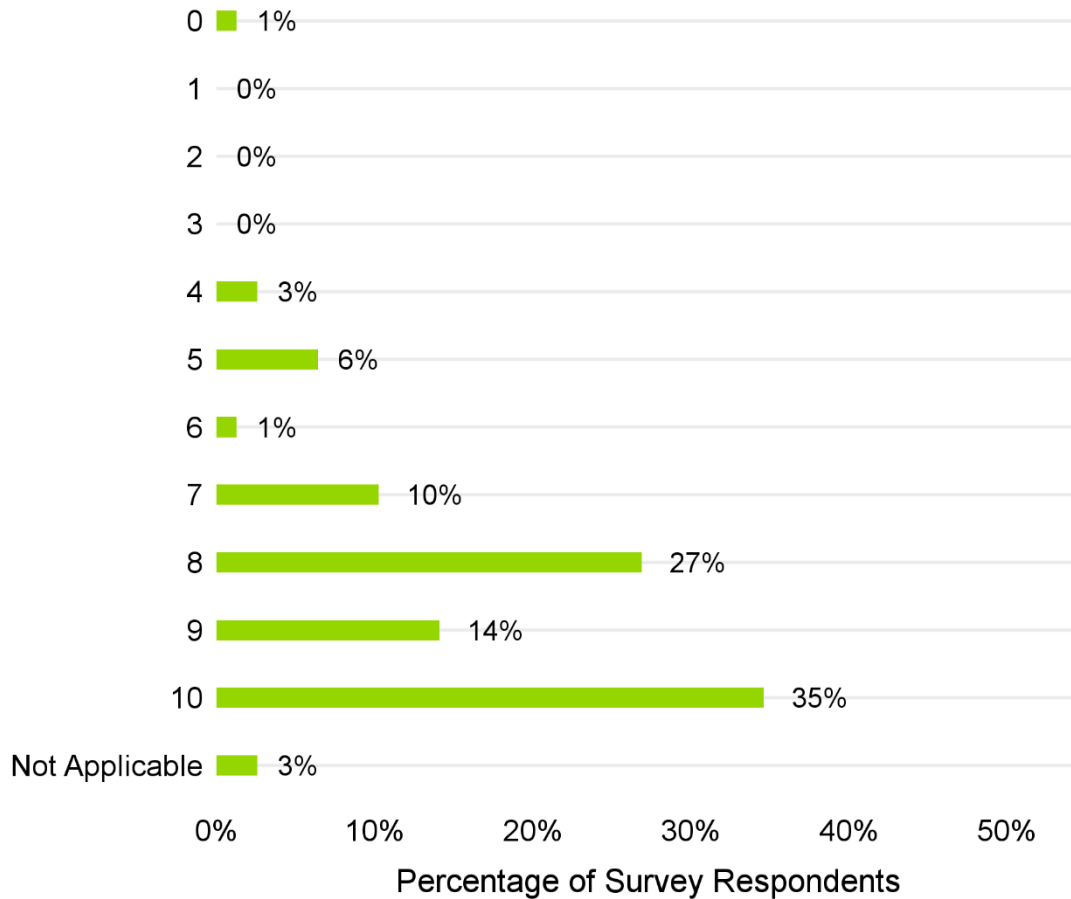
Figure A-21. How Satisfied Were You with Each of These Aspects of the Program? (N=78, NAs Not Shown, 0=Not Satisfied, 10=Very Satisfied)



Source: Navigant analysis of customer survey

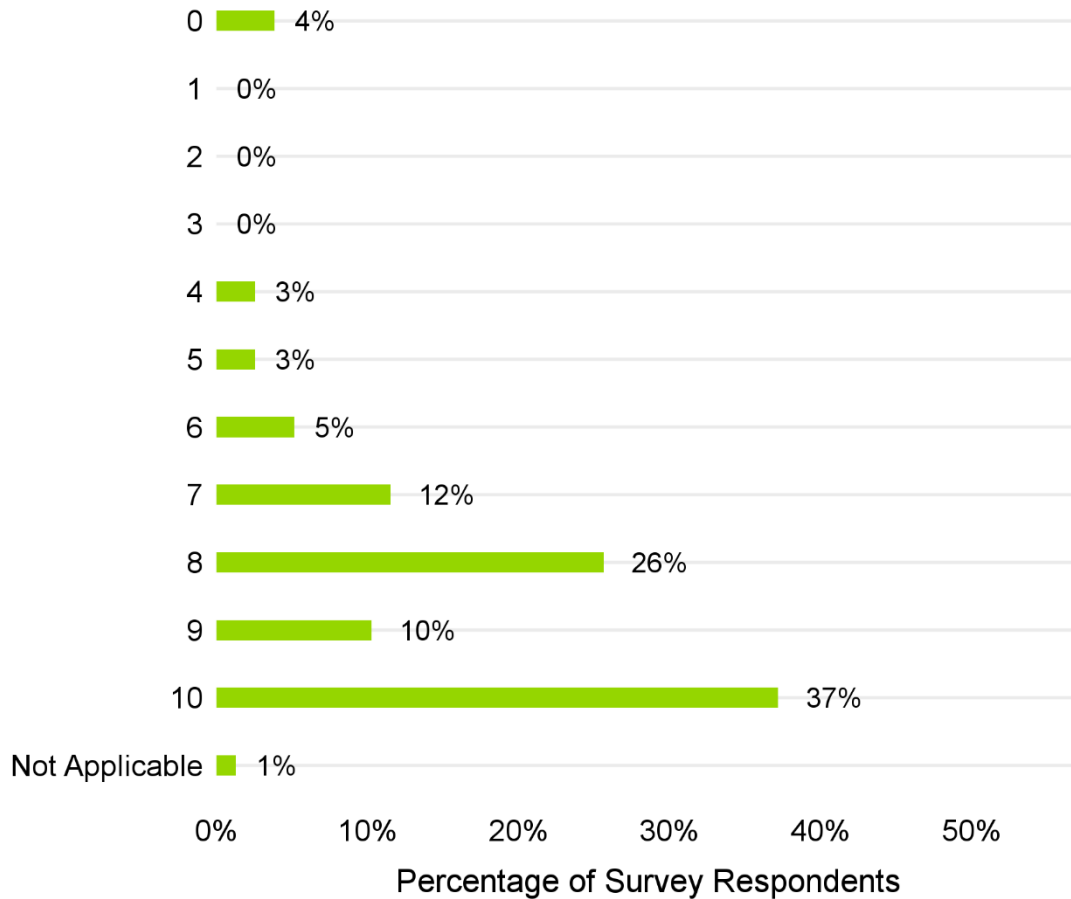


Figure A-22. How Satisfied Were You with Level of Documentation Required? (N=78; NAs Not Shown, 0=Not Satisfied, 10=Very Satisfied)



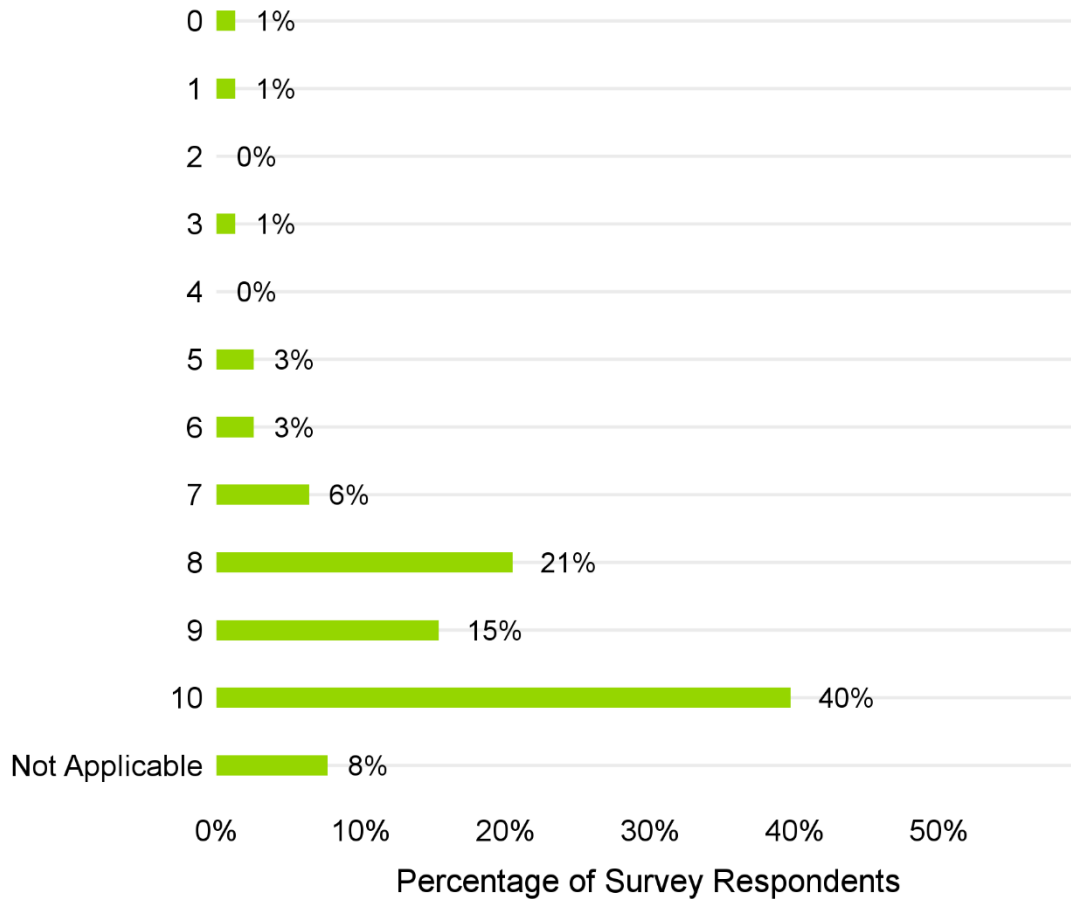
Source: Navigant analysis of customer survey

Figure A-23. How Satisfied Were You with Amount of Time Spent from Beginning of Project to Time You Received Incentive? (N=78; NAs Not Shown, 0=Not Satisfied, 10=Very Satisfied)



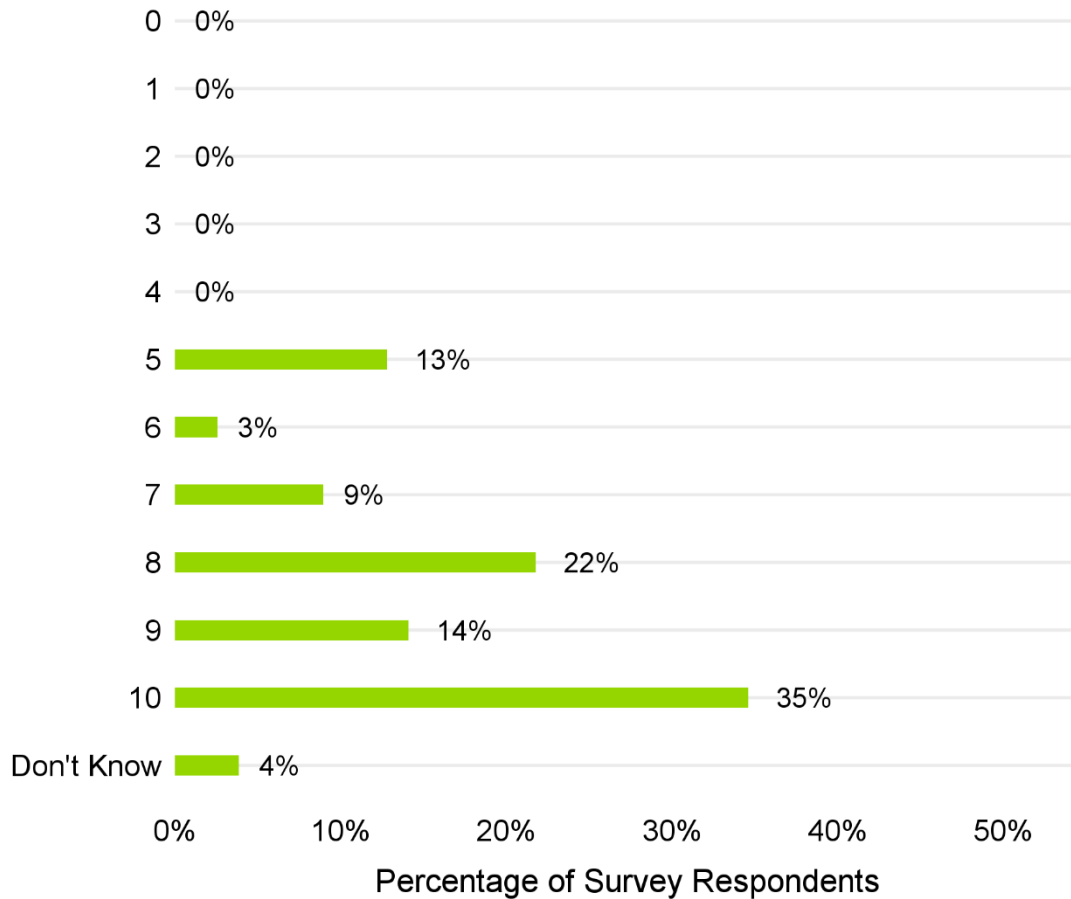
Source: Navigant analysis of customer survey

Figure A-24. How Satisfied Were You with Communication with Program Representatives? (N=78; NAs Not Shown, 0=Not Satisfied, 10=Very Satisfied)



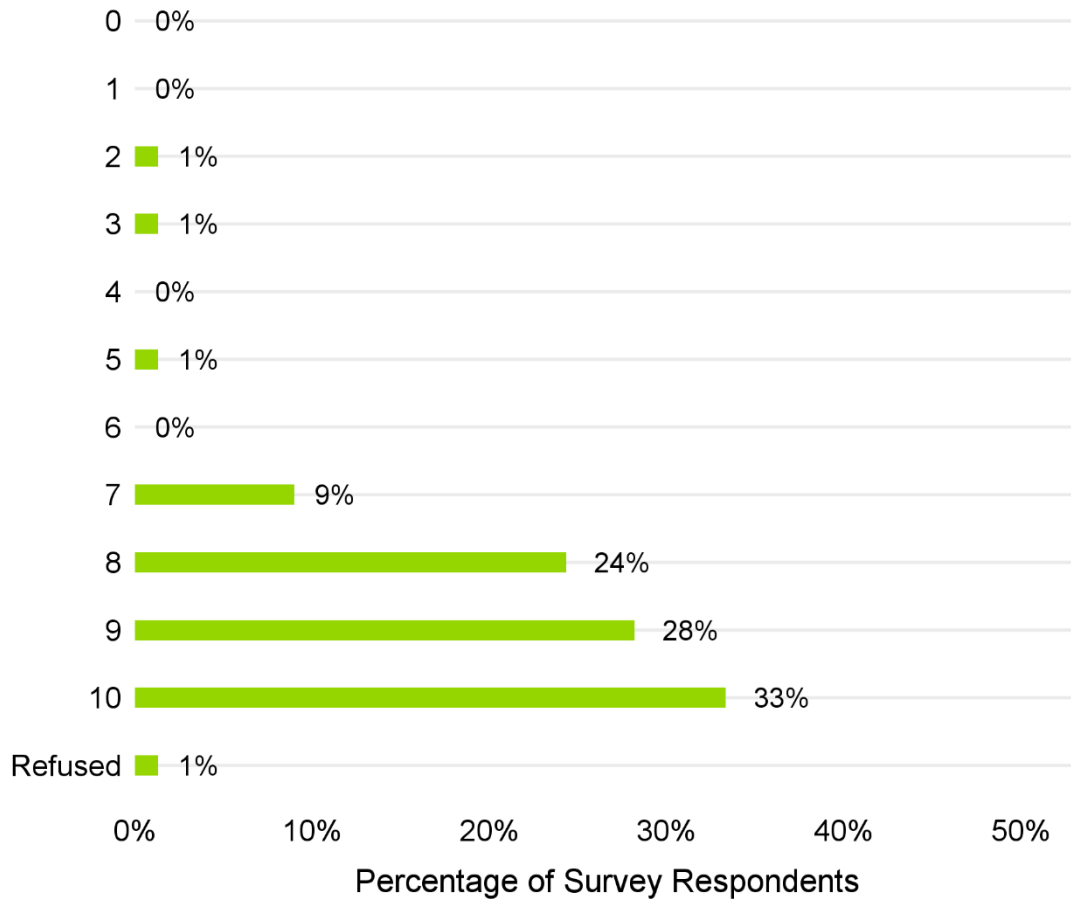
Source: Navigant analysis of customer survey

Figure A-25. How Satisfied Were You with EE Level Required to Qualify for Incentive? (N=78; NAs Not Shown, 0=Not Satisfied, 10=Very Satisfied)



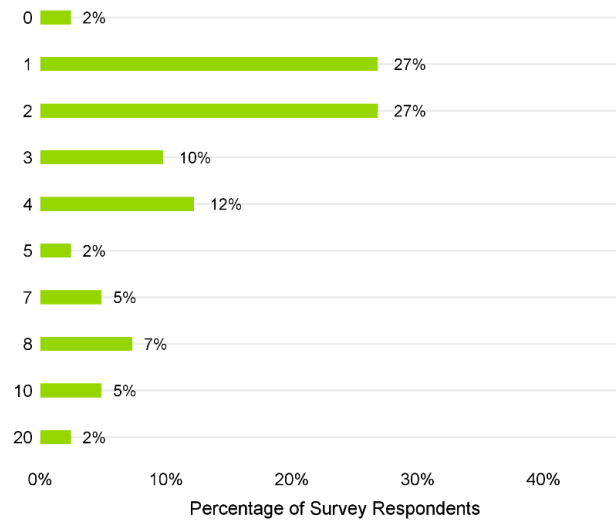
Source: Navigant analysis of customer survey

Figure A-26. How Satisfied Were You with EP4B Program Overall? (N=78; NAs Not Shown, 0=Not Satisfied, 10=Very Satisfied)



Source: Navigant analysis of customer survey

Figure A-27. How Many Hours Did It Take to Complete and Submit the Program Application?



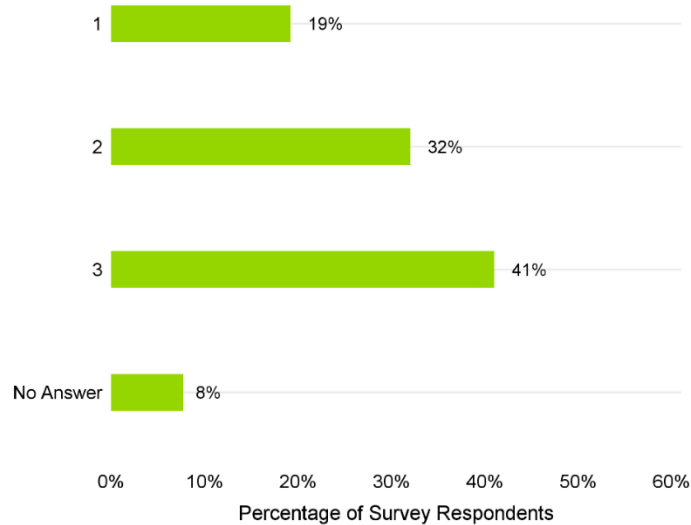
Source: Navigant analysis of customer survey

Figure A-28. Rank Influence for You NOT Being Able to Implement EE Measures (N=78; 1=Main Concern, 3=Low Concern)



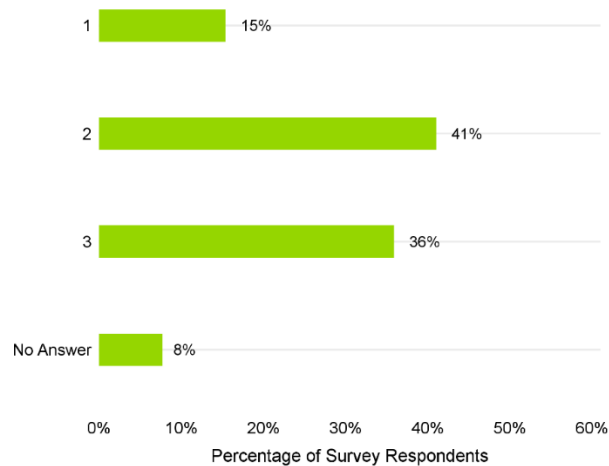
Source: Navigant analysis of customer survey

**Figure A-29. Rank Influence for You NOT Being Able to Implement EE Measures (Management Priority) (N=78; 1=Main Concern, 3=Low Concern)**



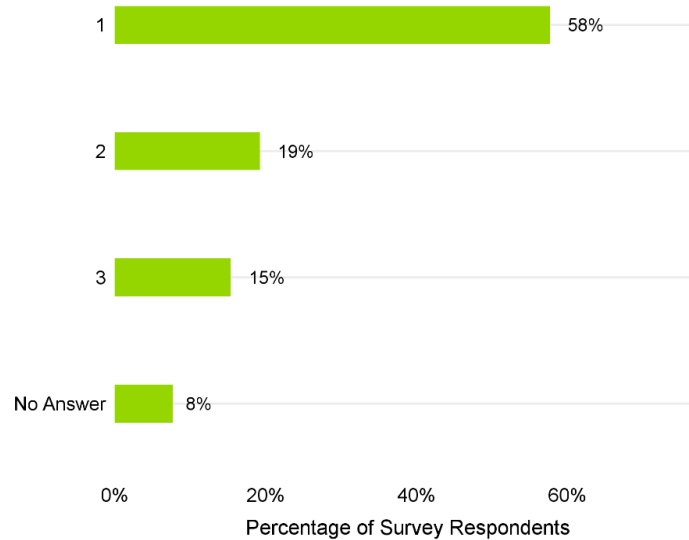
Source: Navigant analysis of customer survey

**Figure A-30. Rank Influence for You NOT Being Able to Implement EE Measures (Staff Time) (N=78; 1=Main Concern, 3=Low Concern)**



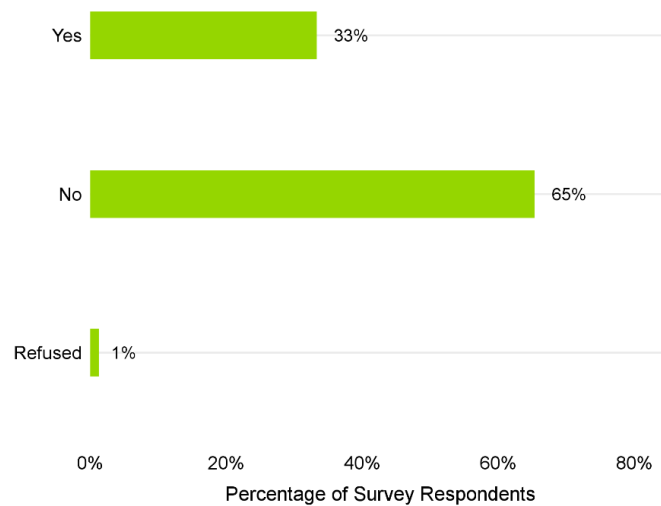
Source: Navigant analysis of customer survey

**Figure A-31. Rank Influence for You NOT Being Able to Implement EE Measures (Project Funding)**  
(N=78; 1=Main Concern, 3=Low Concern)



Source: Navigant analysis of customer survey

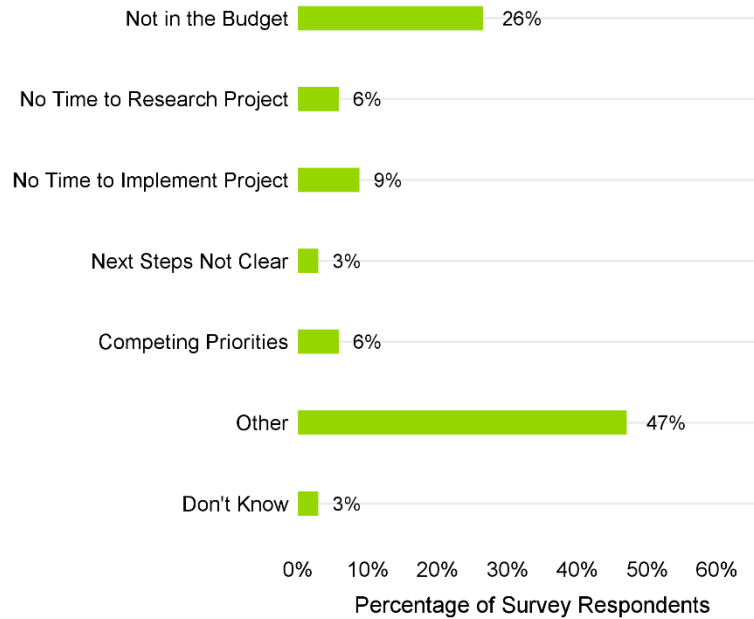
**Figure A-32. Do You Have EE Projects at Your Business on-Hold? (N=78)**



Source: Navigant analysis of customer survey

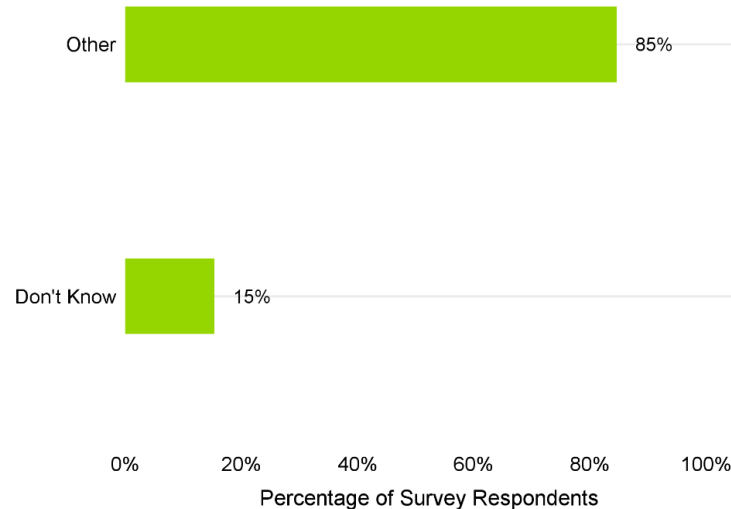


Figure A-33. Why Are Projects on-Hold? (N=27; Multiple Responses)



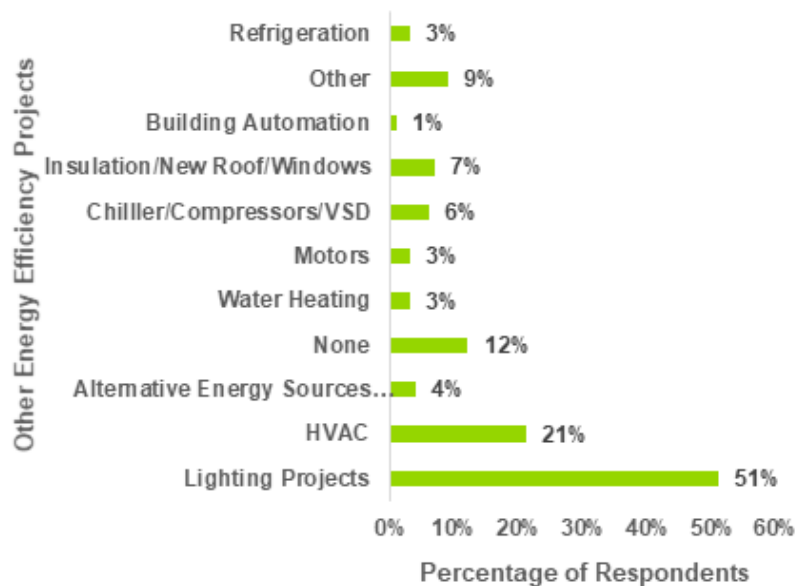
Source: Navigant analysis of customer survey

Figure A-34. What EE Projects Would You Undertake at Your Business if There was Rebate Available to Help Offset Upfront Costs? (N=78)



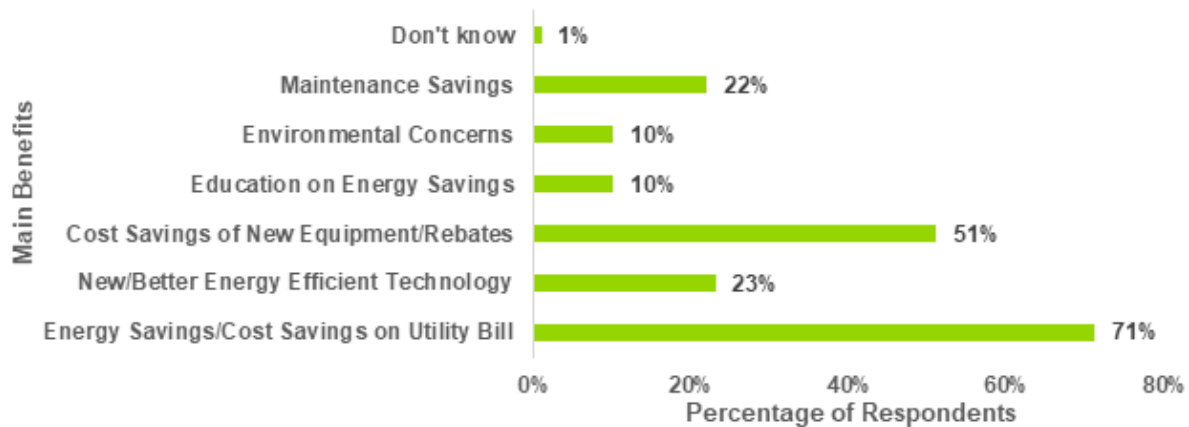
Source: Navigant analysis of customer survey

Figure A-35. What EE Projects Would You Undertake if There Was Rebate Available to Help Offset Upfront Costs? (N=78; Don't Knows Not Shown; Multiple Responses)



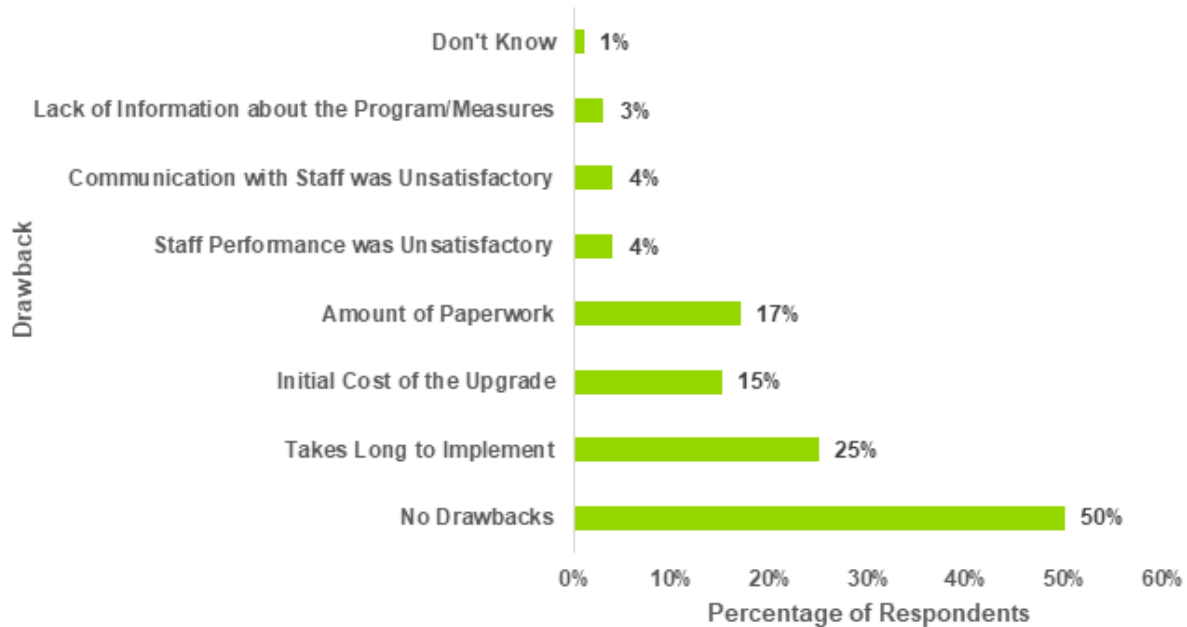
Source: Navigant analysis of customer survey

Figure A-36. What Are Main Benefits to Participating in AEP Ohio EP4B Program? (N=78; Don't Knows Not Shown; Multiple Responses)



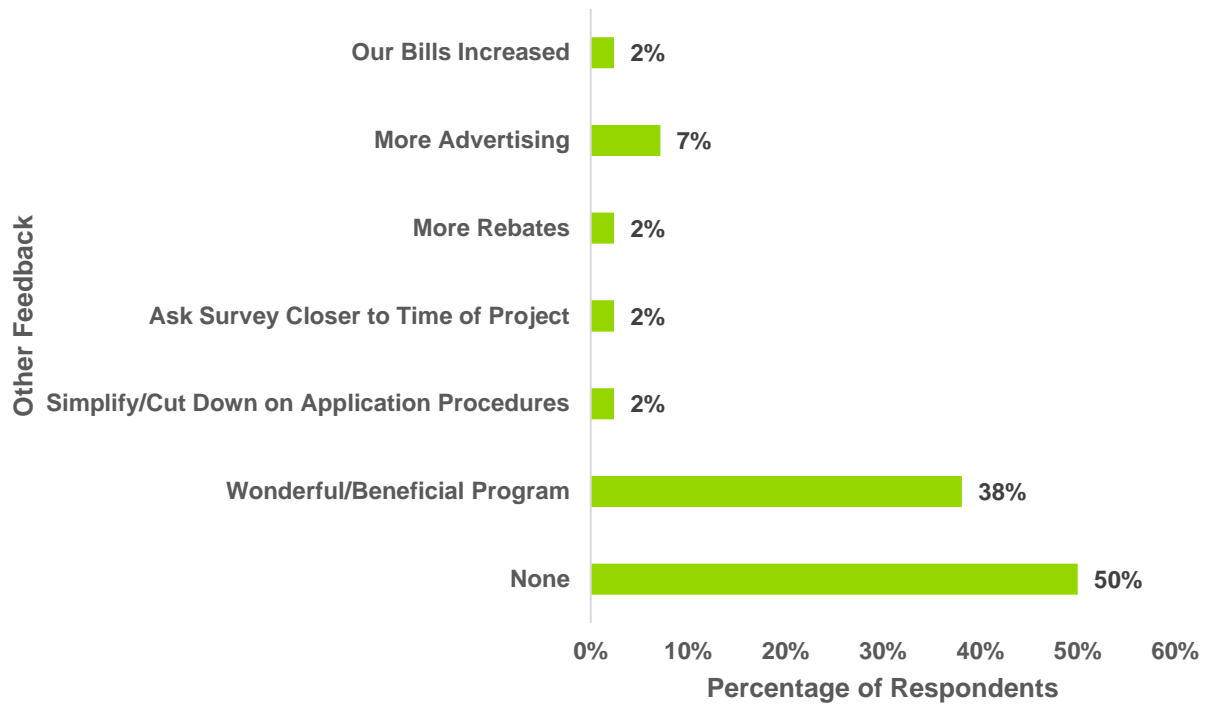
Source: Navigant analysis of customer survey

Figure A-37. What Are Drawbacks to Participating in AEP Ohio EP4B Program? (N=78; Don't Knows Not Shown; Multiple Responses)



Source: Navigant analysis of customer survey

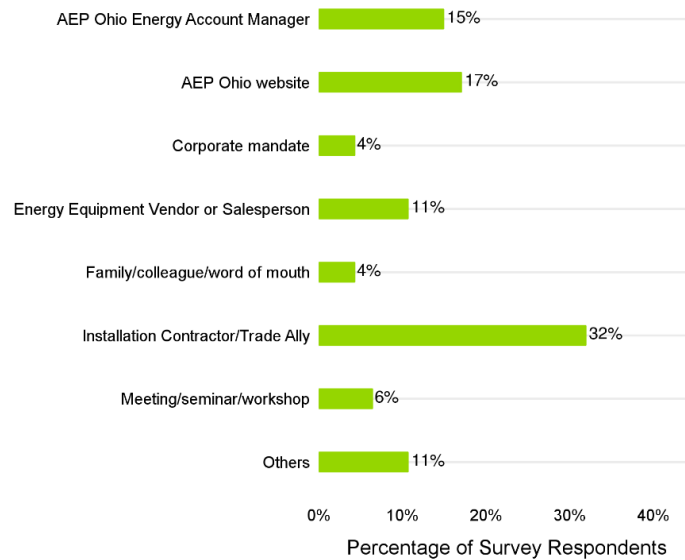
Figure A-38. Any Other Feedback on EP4B Program? (N=78; Don't Knows Not Shown; Multiple Responses)



Source: Navigant analysis of customer survey

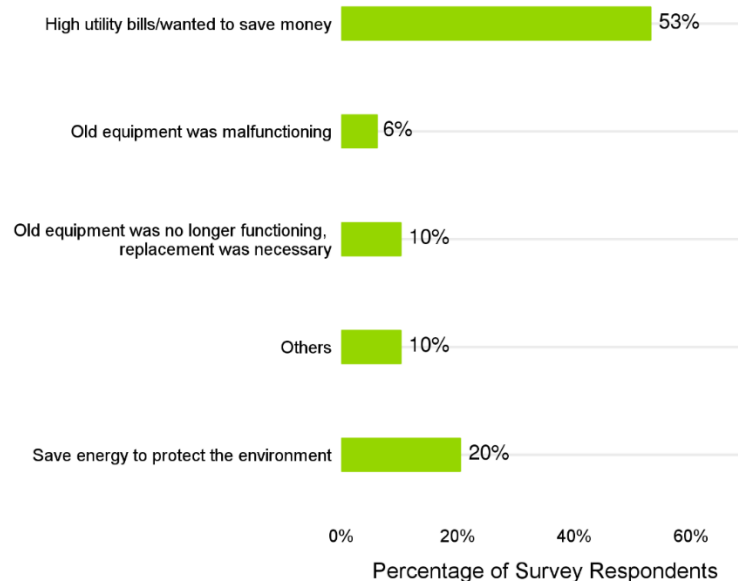
## APPENDIX D. PARTICIPANT ONSITE SURVEY RESULTS

Figure A-39. How Did You First Hear About EP4B Program? (N=47)



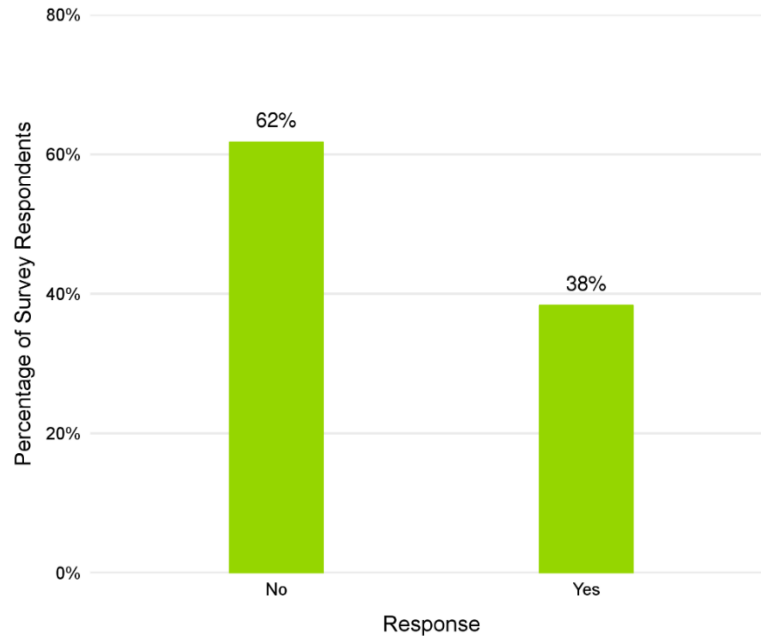
Source: Navigant analysis of customer onsite survey

Figure A-40. What Were Main Reasons for Implementing the Project/Measure? (N=49)



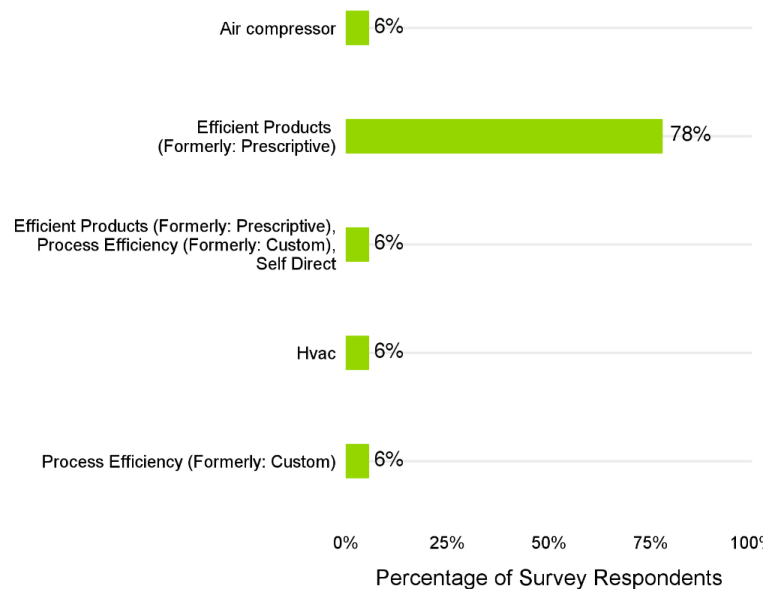
Source: Navigant analysis of customer onsite survey

Figure A-41. Have You Participated in EP4B Program or Any Other AEP Ohio EE Programs Before 2017? (N=47)



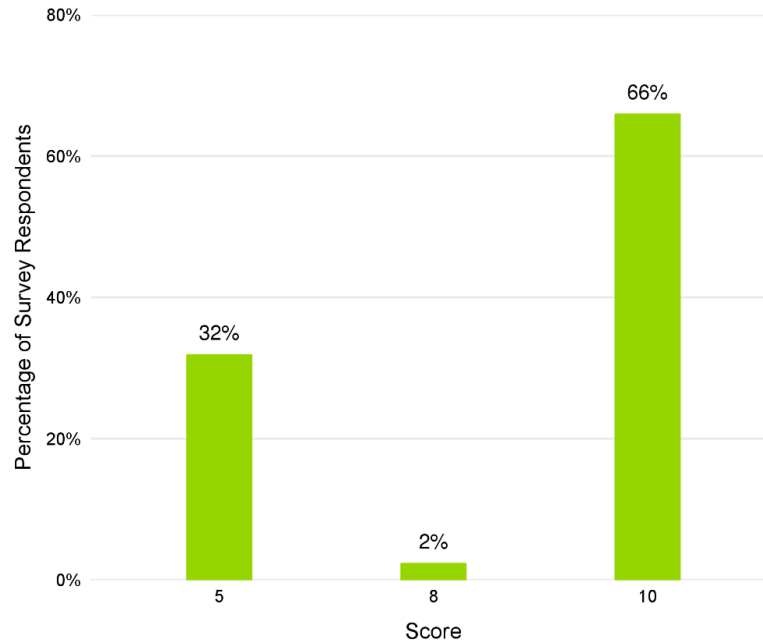
Source: Navigant analysis of customer onsite survey

Figure A-42. What Other AEP Ohio EE Programs Did You Participate In? (N=18)



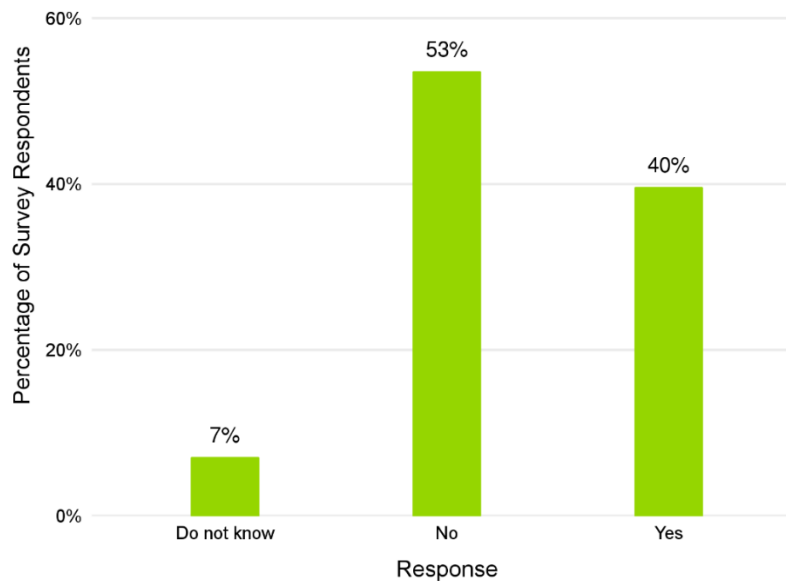
Source: Navigant analysis of customer onsite survey

**Figure A-43. How Likely Are You to Recommend EP4B Program to Others? (N=44; 0=Extremely Unlikely, 10=Extremely Likely)**



Source: Navigant analysis of customer onsite survey

**Figure A-44. Are You Aware of Any Additional EE Projects That Could Be Completed at Your Site That You Have Decided Not to Pursue at This Time? (N=43; Don't Knows Not Shown)**



Source: Navigant analysis of customer onsite survey

## APPENDIX E. PROGRAM MANAGER INTERVIEW GUIDE

Name of Interviewee:

Date:

Title:

Company:

Contact Information:

*[Note to Interviewer] The Interview Guide is a tool to guide process evaluation interviews with utility staff and implementation contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual played in the program's design and operation, i.e., where they have significant experiences for meaningful responses. The interviews will be audio taped and transcribed. Interviews in every case will be conducted by Navigant's process evaluation lead for the program to ensure full context and understanding for the interview, and to enable the interviewer to probe for the most meaningful questions and responses.*

### Roles and Responsibilities

1. Can you describe your roles and responsibilities and how they've changed over the last year for the [Insert Name] Program?
2. When considering the implementation contractor and AEP Ohio staff job functions, have there have been any substantial changes in the roles or people assigned to these programs in the past year compared to previous program years? If so, what were they?
3. How often do you meet with the implementation contractor(s) for the program, and in what manner? How does the implementation contractor share program progress? Are there times when it would have been helpful to have earlier updates?
4. How often are you in contact with the program Solution Providers (or Contractors)? What are you hearing from the SPs (Contractors)? And how do they provide feedback? (emails, calls, in person...)?
5. How would you describe your interaction with the Business Programs Manager, Andy McCabe?

### Program Design

6. Have the program materials, your procedural documentation or outreach documents for any of the three programs changed since last year? If so, can you send me the most current version?
7. What have been the key challenges in implementing the program in the past year? What steps have you taken to overcome these challenges?
8. Is the program on track to meet the filed savings goals? What about internal savings goals?
9. What other key performance indicators do you use to measure the performance of the program? Are you on track to meet those goals?
10. Regarding Navigant's Conclusions and Recommendations from last year's evaluation report, where are you in the process of implementing Navigant's recommendations? Please note any recommendations that will not be implemented and the corresponding reasoning.



11. Have there been any significant changes to the program (delivery, components, etc.) in 2017, and do you have any significant changes planned for 2018? Why were/are these changes made, and how do they affect program performance?
12. Have there been any changes to measures offered in 2017? Are there any planned changes on the horizon? From your perspective, does the program rely on a particular measure or end use to meet its goals? Do you have suggestions for measures that should be added?
13. Have you made any changes to incentive levels in 2017, and do you plan to make any in 2018?
14. How active are account managers in the program? In what ways do account managers improve the customer experience? Are any improvements needed in the role account managers play?

### **Customer Experience**

15. Please describe your interactions with Program participants. (Have any issues or areas for improvement been identified?)
16. Describe a typical first engagement with a new participant.
  - a. How is the first connection typically made?
  - b. Who is engaged from the participant side?
  - c. How is the program introduced to someone not wholly familiar?
  - d. What technical assistance is offered?
17. How often and at what points do you visit participant project sites in person? How do you select the sites to be visited? Which staff are responsible for visiting sites? How often does the site visit identify energy efficiency measures or future energy efficiency projects not already under consideration? Are those recommendations ever put in writing, and if so would you send some examples?
18. How do you decide if you should meter baseline conditions? What thresholds trigger metering?

### **Customer Satisfaction**

19. From your perspective, how satisfied are Business customers with the range of programs offered by AEP Ohio? What are some common complaints you hear, and what are some common positive comments you hear from customers?
20. Do you have a sense of how satisfied customers are with various aspects of this specific program (application process, time to process incentives, interaction with implementation contractor, AEP Ohio staff, or SP (contractor), etc.)?
  - a. Are you taking any steps to promote greater participant satisfaction?
  - b. Are you tracking the results from those steps? If so how and what are the results?
21. Have customers indicated any issues with, or are confused by, any program requirements or documentation?
22. How are customer problems, concerns, issues handled post-installation? Is there a call center? Who is it staffed by? Do the implementation contractors talk to customer directly and fix any issues?
23. Have some customers who could be eligible for the program declined to participate? If so, why?
24. From the customer's perspective, what are the perceived barriers to participation?

25. How is the program overcoming these barriers? Have Solution Providers (Contractors) and Implementation Contractors been successful at removing these barriers to participation? If so, how, if not, why?
26. Are there any program requirements that have caused projects to be ineligible or unfeasible?
27. Have you seen any change in the value placed on “non-energy” benefits to program participants? Please describe.

28. How has customer opt-out affected participation?

### Marketing

29. Please describe the program marketing approach in your own words. Include all relevant components, and describe how effective you think they are.

Have you seen any changes in the key motivations and perceived barriers for program participants?

30. Is the current level of marketing sufficient and does it address all measure end-use categories equally well, or are some over or under represented?

Please describe customer recruitment/marketing strategy used in the last year.

- a. Have you targeted specific market segments?
- b. How have you identified potential participants?
- c. What outreach and marketing activities have you conducted in the past year?
- d. How are efforts carried out consistently across the AEP Ohio service territory?

31. Are there additional customer segments you think the program could market to in order to increase participation?
32. What marketing/outreach activities worked well? Which didn't work as well as expected?
33. How could marketing for the program be improved?
34. Have you conducted outreach / recruitment / education / marketing activities for Solution Providers (Contractors)? Have you considered creating a qualified Solution Provider (contractor) network? Was there a Solution Provider (contractor) bonus in 2017?
35. Does the program provide any recognition or acknowledgement (i.e. a certificate or plaque) to program participants or Solution Providers (contractors)? If yes, please describe.
36. Does the program follow-up with past participants (whom may not have been contacted in a year or more) to see if other opportunities exist for new projects?
37. What role does the Website play in generating interest and participation by customers, and how has this changed over time? Are there improvements still needed?
38. Based on your experience, do you believe an increase in the level of resources available for marketing and outreach could increase program participation and savings?
  - a. IF YES – ASK - Would that hold true if the resources were made available by reducing the level of incentives available?

### **Implementation**

39. What processes work really well in the program, and what processes need improvement? (e.g., communication, time processing applications, customer interaction, marketing, relationship between utility and implementation contractor, etc.)
40. Can you explain the application intake procedures, and any changes that have been made over the last year? (I.e. new on-line application form). How have these been accepted by participants?
41. Does this program offer or require pre-applications or application pre-approval? If yes, please explain.
42. When do you advise the participant of incentive amounts available?
43. What are the follow-up procedures with “stale” applications?
  - a. How are projects reviewed to see if they are stalled? What options are available to move them forward?
  - b. How does the implementer track “drop outs” (participants who have chosen not to proceed under the program)?
    - i. What proportion of customers “drop out”
    - ii. What causes customers to “drop out”?
44. Is the implementation contractor meeting your expectations for the Program? If not, what could be improved?
45. Please describe your interactions with Solution Providers (contractors) involved in the program. (Have any issues or areas for improvement been identified?)
46. Has the involvement of Solution Providers (contractors) in the program changed in the last year?
47. Do you know how many Solution Providers (contractors) were active in 2017, and is this number increasing or decreasing, and why?

Do you have a sense of Solution Providers’ (contractors) overall satisfaction with their participation in the program in 2017 and in working with the implementation contractors? Have you noticed or heard any changes from past years?

Overall do you feel that Business programs have adequate networks of Solutions Providers, or are there some Programs, end uses, or geographic areas that are not well covered?

48. Are the Solution Providers (contractors) meeting your expectations for the Program? If not, what could be improved?

### **Data Tracking and Quality Control**

49. Can you walk us through the QA/QC procedures?
50. Can you describe the quality control procedures in place to ensure complete information is obtained, and accurate information is entered into the database?
51. How do you verify customer and equipment eligibility? How do you determine whether equipment being replaced is functional, being replaced on burn-out, obsolescence or need for new capacity? (To determine baseline and calculate savings eligible for incentive).

52. At what point do you visit participant project sites to conduct final inspections or verifications? (For programs with multiple paths such as NRNC, ask for specific results for each pathway.)
  - a. How are sites selected?
  - b. Who is responsible for conducting verification?
  - c. How are the results documented?
  - d. What is the process, and who is responsible for resolving disparities?
53. Have there been any changes to how the program verifies participant savings estimates?
54. Have there been any changes to the structure of the program database or how it is maintained? (For programs with multiple implementation contractors; how is consistent data quality assured?)
55. Have you encountered any projects where it was unclear whether the project was eligible?

### **Summary Questions**

56. Do you have any other comments, concerns or suggestions about the program that we did not discuss that you would like to make sure I know about?
57. Are there any areas that you would particularly like to see us delve into deeper in the process evaluation this year or questions you really want answered?

### **Efficient Products Specific Questions**

58. In what ways have the recommendations from the last evaluation been implemented?
 

If needed, reference:

  - a. Have you used GIS to identify areas of greatest and least program activity in order to strategically target new areas?
  - b. Has a field been added to track PJM winter peak demand?
  - c. Has there been an assessment of AEP Ohio key Account reps and whether they have the proper bandwidth to maintain communications?

## APPENDIX F. IMPLEMENTATION CONTRACTOR INTERVIEW GUIDE

### AEP Ohio Evaluation for the Energy Efficiency Program for Business Programs 2017 Implementation Contractor In-Depth Interview Guide

Name of Interviewee:

Date:

Title:

Company:

Contact Information:

Interviewer:

*[Note to Interviewer] The Interview Guide is a tool to guide process evaluation interviews with implementation contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual played in the program's design and operation, i.e., where they have significant experiences for meaningful responses. The interviews will be audio taped and transcribed. Interviews in every case will be conducted by a member of Navigant's process evaluation team to ensure full context and understanding for the interview, and to enable the interviewer to probe for the most meaningful questions and responses.*

#### Roles and Responsibilities

1. Can you describe your roles and responsibilities, and how they've changed over the last year for the [Insert Name] Program?
2. When considering the implementation contractor and AEP Ohio staff job functions, have there have been any substantial changes in the roles or people assigned to these programs in the past year compared to previous program years? If so, what were they?
3. How often do you meet with the AEP Ohio staff for the program, and in what manner? How does your firm share the program's progress with AEP Ohio?
4. How often are you in contact with the program Solution Providers? What are you hearing from the SPs? And how do they provide feedback? (emails, calls, in person...)?

#### Program Design

5. Have the program materials, your procedural documentation or outreach documents for any of the three programs changed since last year? If so, can you send me the most current version?
6. What have been the key challenges in implementing the program in the past year? What steps have you taken to overcome these challenges?
7. Is the program on track to meet the filed savings goals? What about your contracted savings goals?
8. What other key performance indicators do you use to measure the performance of the program? Are you on track to meet those goals?
9. Next, I'd like to ask about significant changes to the program in 2017, and whether you have any significant changes planned for 2018? Changes would include:

- a. Program Delivery
- b. Measures (added, removed, or changes)
- c. Incentives
- d. Application forms or processes

Can you describe the reasoning for the changes, and how they affect program performance?

- 10. From your perspective, does the program rely on a particular measure or end use to meet its goals? Do you have suggestions for measures that should be added?
- 11. How active are account managers in the program? In what ways do account managers improve the customer experience? Are any improvements needed in the role account managers play?

### Customer Experience

- 12. Please describe your interactions with Program participants. (Have any issues (e.g., customer service, measure offerings, program design, application, etc.) or areas for improvement been identified?)
- 13. Next, we'd like to discuss the experience of new participants.
  - a. What percentage of your program's customers are first time customers?
  - b. How is the first connection typically made?
  - c. Who is engaged from the participant side?
  - d. How is the program introduced to someone not wholly familiar?
  - e. What technical assistance is offered?
- 14. How often and at what points do you visit participant project sites in person? How do you select the sites to be visited? Which staff are responsible for visiting sites? How often does the site visit identify energy efficiency measures or future energy efficiency projects not already under consideration? Are those recommendations ever put in writing, and if so would you send some examples?
- 15. How do you decide if you should meter baseline conditions? What thresholds trigger metering?

### Customer Satisfaction

- 16. From your perspective, how satisfied are Business customers with the range of programs offered by AEP Ohio? What are some common complaints you hear, and what are some common positive comments you hear from customers?
- 17. Do you have a sense of how satisfied customers are with various aspects of this specific program (application process, time to process incentives, interaction with implementation contractor, AEP Ohio staff, or SP, etc.)?
  - a. Are you taking any steps to promote greater participant satisfaction?
  - b. Are you tracking the results from those steps? If so how and what are the results?
- 18. Have customers indicated any issues with, or are confused by, any program requirements or documentation?
- 19. How are customer problems, concerns, issues handled post-installation? Is there a call center? Who is it staffed by?

20. Have some customers who could be eligible for the program declined to participate? If so, why?
21. From the customer's perspective, what are the perceived barriers to participation?
22. How is the program overcoming these barriers? Have you as the Implementation Contractor or the Solution Providers been successful at removing these barriers to participation? If so, how, if not, why?
23. Are there any program requirements that have caused projects to be ineligible or unfeasible?
24. Have you seen any changes in the key motivations and perceived barriers for program participants?
  - a. Have you seen any change in the value placed on "non-energy" benefits to program participants? Please describe.
25. How has customer opt-out affected participation?

### Marketing

26. Please describe the program marketing approach in your own words. Include all relevant components, and describe how effective you think they are.  
  
Have you seen any changes in the key motivations and perceived barriers for program participants?
27. Is the current level of marketing sufficient and does it address all measure end-use categories equally well, or are some over or under represented?
28. Please describe customer recruitment/marketing strategy used in the last year.
  - a. Are specific market segments targeted?
  - b. Have potential participants been identified?
  - c. What outreach and marketing activities have you conducted in the past year?
  - d. How are efforts carried out consistently across the AEP Ohio service territory?
29. Are there additional customer segments you think the program could market to in order to increase participation?
30. What marketing/outreach activities worked well?
  - a. Which didn't work as well as expected?
  - b. How could marketing for the program be improved?
31. Have you conducted outreach / recruitment / education / marketing activities for Solution Providers (trade allies)? Have you considered creating a qualified Solution Provider network? (SP Qs N/A to Express, NRNC, CEI, ???) Was there a Solution Provider bonus in 2017?
32. Does the program provide any recognition or acknowledgement (i.e. a certificate or plaque) to program participants or Solution Providers? If yes, please describe.
33. Does the program follow-up with past participants (whom may not have been contacted in a year or more) to see if other opportunities exist for new projects?
34. What role does the Website play in generating interest and participation by customers, and how has this changed over time? Are there improvements still needed?

35. Based on your experience, do you believe an increase in the level of resources available for marketing and outreach could increase program participation and savings?
- a. IF YES – ASK - Would that hold true if the resources were made available by reducing the level of incentives available?

### **Implementation**

36. What processes work well in the program, and what processes need improvement? (e.g., communication, time processing applications, customer interaction, marketing, relationship between utility and implementation contractor, etc.)
37. Can you explain the application intake procedures, and any changes that have been made over the last year? (I.e. new on-line application form). How have these been accepted by participants?
38. Does this program offer or require pre-applications or application pre-approval? If yes, please explain.
39. When do you advise the participant of incentive amounts available?
40. What are the follow-up procedures with “stale” applications?
- a. How are projects reviewed to see if they are stalled? What options are available to move them forward?
- b. How do you track “drop outs” (participants who have chosen not to proceed under the program)?
- i. What proportion of customers “drop out”?
- ii. What causes customers to drop out?
41. Please describe your interactions with Solution Providers involved in the program. (Have any issues or areas for improvement been identified?)
42. Has the role of Solution Providers in the program changed in the last year?
43. Do you know how many Solution Providers were active in 2017, and is this number increasing or decreasing, and why?
44. Are the Solution Providers meeting your expectations for the Program? If not, what could be improved?
45. Do you have a sense of Solution Providers’ overall satisfaction with their participation in the program in 2017 and in working with the implementation contractors? Have you noticed or heard any changes from past years?
46. Overall do you feel that Business programs have adequate networks of Solutions Providers, or are there some Programs, end uses, or geographic areas that are not well covered?

### **Data Tracking and Quality Control**

47. Can you describe the quality control procedures in place to ensure complete information is obtained, and accurate information is entered into the database?



48. Have there been any changes to the structure of the program database or how it is maintained?  
(For programs with multiple implementation contractors; how is consistent data quality assured?)
49. How do you verify customer and equipment eligibility? How do you determine whether equipment being replaced is functional, being replaced on burn-out, obsolescence or need for new capacity? (To determine baseline and calculate savings eligible for incentive).
50. Have you encountered any projects where it was unclear whether the project was eligible?
51. Have there been any changes to how the program verifies participant savings estimates?
52. In your role of Implementation Contractor, how often and at what points do you visit participant project sites in person, including any final inspection or verification? (For programs with multiple paths such as NRNC, ask for specific results for each pathway.)
  - a. How are sites selected?
  - b. Who is responsible for conducting verification?
  - c. How are the results documented?
  - d. What is the process, and who is responsible for resolving disparities?

### **Summary Questions**

53. Do you have any other comments, concerns or suggestions about the program that we did not discuss that you would like to make sure I know about?
54. Are there any areas that you would particularly like to see us delve into deeper in the process evaluation this year or questions you really want answered?

### **Efficient Products Specific Questions**

55. In what ways have the recommendations from the last evaluation been implemented?  
If needed, reference:
  - a. Have you done anything to refine the prescriptive savings for lighting measures?
  - b. When using T12 as the baseline, are you using electronic ballast?
  - c. Have you done anything to diversify measure mix? Has there been a push to install VFDs? Have you modified the savings approach for VFDs?
  - d. Have you added a field to track PJM winter peak demand?
  - e. Have you added a winter CF and IF to Appendix A?
  - f. Have you reviewed your post inspection target goals in 2017 and whether you are meeting those?
  - g. Have you made a plan to provide feedback to Solution Providers about their performance? Or create a contractor rating / performance feedback system? (CLEARResult)
  - h. Have you implemented incentives to pace project application over the year? (CLEARResult)
  - i. Do you review the types, sources, and quantities of application errors? (CLEARResult)

- j. Have you shifted any measures from Efficient Products to Process Efficiency? Have you set up a system to recognize if a measure should shift?

## APPENDIX G. AEP OHIO EFFICIENT PRODUCTS FOR BUSINESS PHONE SURVEY INTERVIEW GUIDE

From Tracking Data:	
Date	
Name of Interviewee	
Title	
Company	
Contact Information	
Interviewer	
Project Reference (name)	
Brief Project Description (Location / type of measures)	

*The survey is designed to address the following research questions:*

Cross Cutting Research Questions:	Survey Questions
1. Does the program outreach effectively increase awareness of program opportunities?	1,2
2. Are the messages included within program outreach clear and actionable?	1
3. What are the key interests and motivations for potential and actual participants beyond the financial incentive offered?	3,16
4. What are the key barriers to participation in the program?	6,12,13,14,17
5. What improvements could be made to create a more effective program and to help increase energy and demand impacts?	15
6. Are participants and providers satisfied with the programs?	5,8,9,10,11
Efficient Products for Business Program Specific Research Questions:	
7. Collect feedback and assess potential for immediate improvement, and particular attention will also be applied looking toward future opportunities for program improvements (e.g. identifying emerging measures of interest to the participant base).	7, 8, 9, 10, 18

### Introduction:

*[ASK FOR NAMED CONTACT]*

Hello, my name is \_\_\_\_\_, from Blackstone and I'm calling on behalf of AEP Ohio's energy efficiency programs. We are conducting a review of AEP Ohio's Efficiency Products for Business energy efficiency program. The reason for calling you today is to ask about your experience with the program. Our objective in conducting this survey is to better understand how effective the program has been, and how it might be improved in future years.

*[If they express hesitation, use an appropriate combination of the following.]*

*[Overcoming objections:]*

- *[Confidentiality]* We are an independent firm and your responses will remain confidential and only presented in aggregate along with responses from other survey participants.
- *[Not the right person]* – That's fine, do you know who would be more appropriate to talk to? Do you have their contact details? *[RECORD NEW CONTACT]*
- *[Security]* Your responses will not affect your ability to participate in the program in the future.
- *[Sales concern]* I am not selling anything. On behalf of AEP Ohio, I simply want to understand what factors were important to your company's decision to participate in the program.
- *[Contact]* If you would like to talk with someone from AEP Ohio about this survey, the contact is: **AEP Ohio –Brian Billing**– available by phone at (614) 883 7806 or e-mail at: [bfbilling@aep.com](mailto:bfbilling@aep.com)

QS1. We understand your firm participated in the AEP Ohio program for a new building/renovation project located at \_\_\_\_\_, is this correct?

QS2. [If they say no] Did you participate in the \_\_\_\_\_ program in 2017? [If no, thank them for their time, hang up].

[If yes] Can you tell the address of the facility that did participate in the program: \_\_\_\_\_.

QS3. [If the address is correct] Great, the survey will take approximately 10-15 minutes and you will receive a \$15 a gift card in appreciation of your time spent with us. Is now a good time to talk?

*(If they say no:)*

QS4. May I schedule another time?

## Firmographics

I'd like to ask you few general questions about your company, specifically at *[SITE\_ADDRESS]*.

F1. How would you categorize the business conducted at this site?

*[Record verbatim]*

98. DON'T KNOW

99. REFUSED

*[Elaborate if needed. This should be the main business activity that occurs at this location. For example, is it an office, a warehouse, a store?]*

F2. Is the building where the project was completed owned or leased?

1. Owned

2. Leased

98. DON'T KNOW

99. REFUSED

## Awareness & Motivation

1. How did you first learn of the AEP Ohio *Efficient Products for Business* program?

*[DO NOT READ; PROBE IF NEEDED]* multi-response

1. AEP Ohio staff

2. CLEAResult, AEP Ohio's program Outreach coordinator
3. Internet / Web site
4. Workshop
5. Participation with another AEP Ohio EE program (specify)
6. Architect
7. Engineering firm
8. Energy Modeler
9. Industry/Trade Association
10. Advertising/Trade Publication
11. Commissioning Agent
12. Associate or Co-Worker
13. Contractor
14. Repeat program participant
15. Retailer / Supplier / Wholesaler
16. DNV GL – AEP Ohio's program Implementer

97. Other: \_\_\_\_\_

98. Don't know

99. Refused

2. Are you aware of these other AEP Ohio Energy Efficiency Programs?

*[Record Yes/No response for each]*

1. Process Efficiency (Formerly: Custom)
2. Self-Direct
3. Retro-commissioning
4. Data Center
5. Continuous Energy Improvement
6. Express
7. New Construction

97. Other, please specify: \_\_\_\_\_

These next questions all relate to the building which participated in the Efficient Products for Business program in 2017.

3. What were the main reasons your company decided to participate in the program?

*[DO NOT READ; PROBE IF NEEDED]* multi-response

1. AEP Ohio/ Energy Efficiency Program for Business incentive
2. Special deal from contractor
3. Recommended by contractor
4. Product was on sale at store
5. Old equipment was malfunctioning
6. Old equipment was no longer functioning, replacement was necessary
7. High utility bills/wanted to save money
8. Save energy to protect the environment
9. Program Technical assistance
10. Required by company headquarters or owner
11. To demonstrate our company's belief in energy efficiency
12. Save money on energy costs
13. To ensure our business operates efficiently
14. CLEAResult, AEP Ohio's program Outreach coordinator

15. DNV GL – AEP Ohio’s program Implementer  
97. OTHER (SPECIFY) \_\_\_\_\_  
98. DON’T KNOW  
99. REFUSED
4. If a contractor installed the equipment, did they encourage you to consider energy efficient options that met AEP Ohio’s program recommendations?
1. Yes  
2. No  
3. No contractor was involved  
98. DON’T KNOW  
99. REFUSED
5. Would you participate in the program again?
1. YES  
2. NO [ASK Q6.]  
3. MAYBE  
98. DON’T KNOW  
99. REFUSED
6. [ASK IF Q5 = 2] Why wouldn’t you plan to participate in the program again? [DO NOT READ; SELECT ALL THAT APPLY]
1. PROGRAM INCENTIVES ARE NOT SUFFICIENT  
2. TECHNICAL ASSISTANCE ISSUES  
3. PROGRAM ADMINISTRATIVE REQUIREMENTS TOO BURDENSOME  
4. PROGRAM STAFF RELATIONSHIP ISSUES  
5. NO PROJECTS PLANNED IN THE FORESEEABLE FUTURE  
6. CHANGE IN BUSINESS STRATEGY IN RELATION TO BUILDING NEEDS  
7. EFFICIENT EQUIPMENT REQUIRED FOR INCENTIVES DID NOT MEET OUR NEEDS  
8. OUR BUSINESS OPTED OUT OF THE AEP OHIO EE/PDR PROGRAMS  
97. OTHER (SPECIFY) \_\_\_\_\_  
98. DON’T KNOW  
99. REFUSED
7. Who assisted you with the program?
- [READ LIST; SELECT ALL; PROBE FOR ADDITIONAL]
1. AEP Ohio Staff  
2. DNV GL, the program Implementation Contractor  
3. CLEAResult, the program outreach coordinator  
4. An independent installation contractor  
5. Other 3rd party  
6. No one assisted us / we did it all.  
97. OTHER (SPECIFY) \_\_\_\_\_  
98. DON’T KNOW  
99. REFUSED

## Experience with Program

I am now going to ask a few questions about your experience with the program.

8. How would you rate the ease of finding information about the program using a scale of 0-10 where 0 represents very challenging and 10 represents very easy?  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE  
 98. DON'T KNOW  
 99. REFUSED
9. How difficult or easy did you find the application process using a scale of 0-10 where 0 represents difficult and 10 represents easy?  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE  
 98. DON'T KNOW  
 99. REFUSED
10. Again, using a scale of 0-10 where 0 represents not satisfied and 10 represents very satisfied, how satisfied were you with:
  - a) The level of documentation required?  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE  
 98. DON'T KNOW  
 99. REFUSED
  - b) The amount of time spent from the beginning of the project to the time you received your incentive  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE  
 98. DON'T KNOW  
 99. REFUSED
  - c) Communication you had with the program representatives?  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE  
 98. DON'T KNOW  
 99. REFUSED
  - d) Energy efficiency level required to qualify for an incentive?  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE  
 98. DON'T KNOW  
 99. REFUSED
  - e) The program overall?  
*[RECORD NUMBER 0-10]*  
 96. NOT APPLICABLE

98. DON'T KNOW  
99. REFUSED
11. How long did it take to complete and submit the program application? *[THIS IS INTENDED TO CAPTURE TIME ACTUALLY SPENT ON THE DOCUMENT (MINUTES OR HOURS) NOT TOTAL ELAPSED TIME.]*  
*[RECORD TIME]*  
96. NOT APPLICABLE (Respondent did not complete application)  
98. DON'T KNOW  
99. REFUSED
12. Using a ranking from 1-3, where 1 = main concern and 3 = low concern, please rank the following on its influence for you NOT being able to implement energy efficient measures.  
*[Rank 1, 2, 3, 4 (if applicable)]*  
  
Programming: We will use #4 for "Other" – this should not be a forced response. If only 3 is ranked by respondent, please allow them to continue if "Other" is not ranked.  
1. Management priority  
2. Staff time  
3. Project funding  
97. Other \_\_\_\_\_ "You have ranked 4 for "other" in the previous question.  
Please explain why."  
98. DON'T KNOW  
99. REFUSED
13. Do you have energy efficiency projects at your business that are on-hold?  
1. Yes *[Ask Q 14]*  
2. No  
98. DON'T KNOW  
99. REFUSED
14. *[If Q13= 1] Why are those projects on-hold? [DO NOT READ; SELECT ALL THAT APPLY]*  
1. Not in the budget  
2. Staff does not have the time to research the project  
3. Staff does not have time to implement the project  
4. Next steps are not clear  
5. Competing priorities  
97. Other \_\_\_\_\_  
98. DON'T KNOW  
99. REFUSED
15. What energy efficiency projects would you undertake at your business if there was a rebate available to help offset the upfront costs?  
*[Record verbatim]*  
98. DON'T KNOW  
99. REFUSED
16. What do you see as the main benefit(s) to participating in the AEP Ohio Efficient Products for Business Program?



*[Record verbatim]*

98. DON'T KNOW

99. REFUSED

17. What do you see as the drawbacks to participating in the [Efficient Products for Business](#) program?

*[Record verbatim]*

98. DON'T KNOW

99. REFUSED

18. Do you have any other feedback on the [Efficient Products for Business](#) program?

*[Record verbatim]*

98. DON'T KNOW

99. REFUSED

Please replace to read: Thank you for your time and feedback! We will send you your \$15 gift card within 2 weeks. Can you confirm the email we have on file is correct: [Insert Email\_Address from sample file]?

If email address is incorrect from the sample, please include an option for our interviewers to correct email address.

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## APPENDIX I

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## PROCESS EFFICIENCY PROGRAM

### 2017 Evaluation Report

Prepared for:

AEP OHIO



*A unit of American Electric Power*

May 8, 2018

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## EXECUTIVE SUMMARY

The Process Efficiency Program provides a streamlined incentive application and quality control process intended for non-residential customers interested in purchasing and installing efficient technologies not included on the pre-qualified list of measures employed by the Efficient Products for Business Program. Custom equipment includes controls, injection molding machines, variable speed air compressors and other compressed air measures, cooling or heating coil replacement, insulation, process efficiency improvements and other miscellaneous measure installations. Process Efficiency Program applications can also include prescriptive measures receiving incentives as though these were submitted through the Efficient Products for Business Program.

AEP Ohio's Bid4efficiency program, a subset of the Process Efficiency program, is a reverse auction for financial incentives for projects over \$25,000. This program provides incentives ranging from \$25,000 to \$1,000,000 for energy efficiency improvements.

This document presents a summary of the findings and results from the evaluation of the AEP Ohio 2017 Process Efficiency Program for the period January 1, 2017 through December 31, 2017.<sup>1</sup>

### ES.1 Program Participation

In 2017, the AEP Ohio Process Efficiency Program completed 62 projects, installing 157 measures for 50 unique AEP Ohio customers. The *ex ante* energy savings dropped 13 percent between 2016 and 2017, although *ex ante* demand savings have continued to increase over the past three years and is slightly higher in 2017 compared to 2016.

Each project contained at least one custom measure which placed the project in the Process Efficiency Program. Applications could also contain Efficient Products for Business Program measures that were co-submitted and are also counted only through the Process Efficiency Program. The prescriptive measures included in the Process Efficiency Program are evaluated as though these were submitted through the Efficient Products for Business Program by applying prescriptive realization rates to those measures. Table ES-1 provides a summary of 2017 Process Efficiency Program reported results. Process Efficiency Program projects are enrolled through two different incentive channels, Process Efficiency incentives and Bid4efficiency incentives.

---

<sup>1</sup> 2017 program participation is based on an implementation contractor payment mailed date between January 1, 2017 and December 31, 2017.

**Table ES-1. Process Efficiency Summary, 2016 and 2017 Program Years**

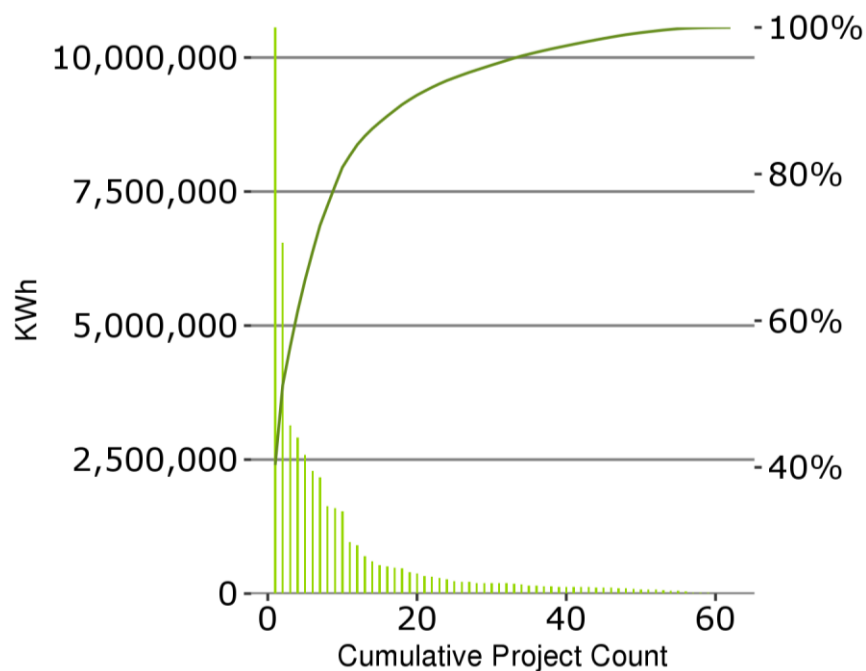
	2017 Program	2016 Program
Total Incremental Participant Cost	\$22,648,346	\$20,034,582
Amount of Incentives Paid by AEP Ohio	\$1,558,341	\$1,522,175
Ex Ante Energy Savings (MWh)	46,464	53,482
Ex Ante Demand Savings (MW)	4.934	4.665

NOTE: Total Incremental Participant Cost is calculated by subtracting Total Incentives from Total Project Costs.

Source: Navigant review of AEP Ohio Program Tracking Database

Figure ES-1 presents the energy savings by project and the cumulative program savings for 2017. The steep initial curve indicates that several very large projects drive a very large portion of program savings. The distribution of project sizes informs the sampling strategy.

**Figure ES-1. Cumulative Project Count (n=62)**



Source: Navigant review of AEP Ohio Program Tracking Database

Table ES-2 presents the 2017 program summary. The 2017 reported program budget was under the goal for 2017 by four percent. While *Ex Ante* energy savings were over the program goal by 11 percent, the *Ex Ante* demand savings were under by 30 percent.

**Table ES-2. Process Efficiency 2017 Program Summary**

	2017 Program Goals	2017 Program, Reported
Program Budget	\$3,900,000	\$3,761,196
<i>Ex Ante</i> Energy Savings (MWh)	42,004	46,464
<i>Ex Ante</i> Demand Savings (MW)	7.020	4.934

Source: Navigant review of AEP Ohio Program Tracking Database

Table ES-3 present the summary of savings for the 2017 program year, by economic sector. Forty-two projects (68%) came from the Industrial sector, accounting for 90 percent of energy savings and 86 percent of demand savings.

**Table ES-3. 2017 Summary of Savings by Economic Sector**

Economic Sector	Number of Projects		Ex Ante Savings			
			Energy kWh		Demand kW	
College/University	1	1.6%	1,631,712	3.5%	267.16	5.4%
Government/Municipal	2	3.2%	1,024,910	2.2%	95.23	1.9%
Grocery	2	3.2%	279,255	0.6%	41.46	0.8%
Industrial/Manufacturing	42	67.7%	41,763,487	89.9%	4,221.11	85.6%
Large Office	2	3.2%	235,024	0.5%	21.50	0.4%
Medical- Hospital	4	6.5%	623,375	1.3%	184.90	3.7%
Miscellaneous	3	4.8%	231,871	0.5%	6.07	0.1%
School	2	3.2%	340,511	0.7%	66.27	1.3%
Small Office	1	1.6%	9,732	0.0%	-	0.0%
Small Retail/Service	3	4.8%	323,625	0.7%	30.37	0.6%
<b>Total</b>	<b>62</b>	<b>100.0%</b>	<b>46,463,501</b>	<b>100.0%</b>	<b>4,934.07</b>	<b>100.0%</b>

Source: Navigant review of AEP Ohio Program Tracking Database

## ES.2 Data Collection Activities

Primary data collection included in-depth qualitative interviews with AEP Ohio program managers and implementation contractor staff, and review of program tracking data. Marketing activities, program web sites, application forms and other program inputs were also analyzed. As part of the process study, the evaluation team worked with a survey house to field participant telephone surveys.

As part of the impact study, the evaluation team completed an engineering review on project files accounting for 79 percent of the claimed *ex ante* energy savings. Projects accounting for 33 percent of the *ex ante* energy savings also underwent an onsite review. Table ES-4 provides a summary of the impact measurement and verification (M&V) sample stratification and the level of review completed by the evaluation team within each stratum.

**Table ES-4. Impact Sampling Strata and Achieved Sampling**

Stratum by Approach and Energy Savings	Number of Projects	Strata Weight by Energy Savings	Number of Desk Reviews	Number of Onsite Reviews <sup>2</sup>
Large (>2,000 MWh/yr.)	7	65%	7	3
Medium (>600 MWh/yr., <2,000 MWh/yr.)	7	17%	5	0
Small (>0 MWh, < 600 MWh)	48	16%	6	1
Prescriptive Measures	NA	2%	0	0
<b>Total</b>	<b>62</b>	<b>100%</b>	<b>18</b>	<b>4</b>
<b>Percent of Ex Ante Savings</b>	<b>-</b>	<b>-</b>	<b>79%</b>	<b>33%</b>

Source: Navigant analysis

## ES.3 Key Impact Findings and Recommendations

As summarized in

Table ES-5, the verified energy savings significantly exceeded the 2017 targets of 42 GWh; however, the demand savings did not meet the coincident demand reduction goal. The *ex post* energy and summer coincident demand savings are 48,989 MWh/year and 3.73 MW respectively. The realization rate for energy is 1.05, while the demand realization rate is 0.76. These results represent both increased program savings and increased realization rates compared to 2016 for energy savings, but decreased program savings and realization rates for demand savings.

**Table ES-5. Impact Savings, Realization Rate and Sample Precision**

Metric	2017 Program Goals* (a)	Ex Ante (b)	Ex Post (c)	Realization Rate RR = (c) / (b)	Overall Relative Precision at 90% Confidence	Percent of Goal = (c) / (a)
<b>Annual Energy Savings (MWh)</b>	42,004	46,464	48,989	1.05	0.9%	117%
<b>Coincident Peak Demand Reduction (MW)</b>	7.02	4.93	3.73	0.76	19.5%	53%

SOURCE: ENERGY EFFICIENCY/PEAK DEMAND REDUCTION (EE/PDR) PORTFOLIO 2017 to 2020 Evaluation Plan, September 27, 2017

Other key impact findings and recommendations include the following selected recommendations. Additional impact recommendations are included in Section 4.1.

**Impact Finding 1:** Demand savings should be characterized based on average savings during the various peak periods, including AEP Ohio peak and PJM summer peak. Errors include using average equipment load rather than coincident peak load, and comparing dissimilar pre- and post- logging data.

<sup>2</sup> Onsite reviews are a sub-set of desk reviews. All buildings in the sample received at least a desk review, while some received an onsite review in addition to the desk review. If a building received both an onsite and a desk review, it is counted in both the onsite and desk review totals.

**Impact Recommendation 1a:** Ensure demand savings are estimated consistently and accurately from project to project and recorded in the tracking data separately for AEP Ohio and PJM summer. This will improve the accuracy of PJM estimates and reduce uncertainty.

**Impact Finding 2:** Several projects relied on pre- and post-energy use and production data as the basis for energy savings. The pre- and post- data presented in the original application often represent no changes to customer operations, but may highlight differences due to the logging period rather than meaningful differences in the energy profile itself.

**Impact Recommendation 2a:** First, ensure process improvements can be quantified, make sense from an engineering perspective, and do not simply reflect production or yield increases. Require additional pre- and post- data to ensure seasonal trends are accounted for. Use pre-retrofit production levels rather than post-production levels, where appropriate, based on counterfactual options for production increases to calculate final energy savings, and consider a dual baseline for increased production. In other cases where production should be consistent, use both pre- and post-data as the average production and normalize data accordingly.

**Impact Recommendation 2b:** For projects with hourly data, especially projects where equipment is used intermittently, ensure the pre- and post-data represents differences in efficiencies and not simply differences in usage during the limited logging period. Additional logger data is helpful if there are significant intermittencies observed.

## ES.4 Key Process Findings and Recommendations

The following process recommendations are offered to help improve program effectiveness and efficiency, and further improve the overall experience of program participants. Additional process recommendations are included in Section 4.2.

**Process Finding 1:** The separate databases for both the intake contractor and the implementation contractor do not provide transparency into a customer's full experience with the Process Efficiency program, including elapsed time from initial contact through final incentive payment, and reasons a customer may not complete their project.

**Process Recommendation 1:** The intake and implementation contractors should review the steps in their respective application processes to identify potential problem areas for individual customers.

**Process Finding 2:** The Process Efficiency, Efficient Products for Business, and Self Direct program application is a 20-page document outlining the application's guidelines, checklists, customer information needed and worksheets for the various end-use measures. For a Solution Provider or customer who is well versed in the program, the document provides everything needed to submit a project for an incentive. However, for a new customer the application can be overwhelming.

**Process Recommendation 2:** The application should clearly identify 1) the guidelines applicable to each program and 2) the checklist of required attachments. This could be accomplished using a matrix with the three programs as column headers and the various step as rows; with a check mark designating which steps are needed for that program. (For example, Process Efficiency measures require pre-approval, other programs do not). Also, the Terms and Conditions for the three programs were in two separate documents. For ease of reference, include the Terms and

Conditions in the Application. Consolidating all of the needed information for each program will help a new customer navigate the process.

## 1. INTRODUCTION AND PURPOSE OF STUDY

The Process Efficiency Program offers incentives to non-residential customers who install eligible high-efficiency electric equipment in the current program year and are not covered under other AEP Ohio energy efficiency programs. The Process Efficiency Program provides a streamlined incentive application and quality control process intended to facilitate ease of participation for customers interested in installing eligible efficient technologies.

The AEP Ohio Business Sector Programs are marketed, administered, and delivered as an integrated program by AEP Ohio. The Process Efficiency Program is managed by an implementation contractor in coordination with AEP Ohio.

### 1.1 Evaluation Objectives

This report presents the findings from the impact and process evaluations of the AEP Ohio Process Efficiency Program for 2017. The three major objectives of the evaluation were to:

- 1) Quantify energy and summer peak demand savings impacts at the meter from the program during 2017.
- 2) Determine key process-related program strengths and weaknesses and identify ways in which the program can be improved.
- 3) Determine program cost-effectiveness.

Specific process evaluation questions are summarized in Section 2.2 (Key Evaluation Questions) and Section 0 (Process Evaluation Findings).

### 1.2 Evaluation Overview

The impact evaluation activities and methodologies used for the Process Efficiency Program varied from project to project and are detailed in Section 3.2. The impact evaluation sample was designed to achieve a 90/10 level of confidence and relative precision at the program level for energy and demand impacts. A stratified ratio estimation protocol based on *ex ante* energy savings magnitude and sample within each stratum was used. Navigant then stratified projects into large, medium, and small strata based on the magnitude of claimed savings, with each stratum roughly representing a third of overall program savings. This method ensures a large portion of program savings are evaluated and tends to lead to a near-census of the largest projects and a comparable number of medium and small projects.

An engineering-based desk review was completed for all projects selected under the sampling approach, while onsite visits and/or telephone interviews were completed for a subset of the desk-reviewed projects. These efforts targeted projects with high impacts, complex measures, or high uncertainty around key parameters. Navigant used engineering-based judgment to determine which method to use for each evaluated project in the sample.

Table 1-1 outlines the data collection activities for 2017. Targeted completes are estimates for both desk and onsite visits, and will vary based on program participation.



**Table 1-1. 2017 to 2020 Data Collection Activities – Process Efficiency**

Data Collection Activity	Targeted Completes	Actual Completes
Program Manager Interviews	1-2	2
Implementation Contractor Interviews	1-2	2
Participant Telephone Surveys	30	14
Project Desk Reviews	15-20	18
Project Onsite Visits	5	4

*Source: Navigant Analysis*

## 2. METHODOLOGY

This section describes the methodology used to conduct the process and impact evaluations. A high-level overview of the steps taken to collect and analyze the data for this evaluation is described in Section 2.1. This is followed by a discussion of the research questions that guided the evaluation and the tasks completed as part of the process evaluation; including the review of tracking data, the marketing activities and participation. Finally, the methods used for primary data collection tasks and in analyzing the impact and process data are discussed.

### 2.1 Overview of Approach

The evaluation was driven by three overarching objectives: (1) quantify electric energy and summer coincident demand savings impacts from the 2017 program year, (2) determine key process-related program strengths and weaknesses and identify ways in which the program can be improved, and (3) determine program cost-effectiveness. To meet these objectives, the evaluation team undertook the following activities.

- 1) **Evaluation Questions.** Navigant established key evaluation questions as part of developing the 2017 Evaluation Plan with AEP Ohio staff.
- 2) **Tracking Data Review.** Navigant reviewed the program tracking data collected by the implementation contractor and provided to the evaluation team by AEP Ohio.
- 3) **Review of Marketing Activities.** Navigant reviewed the overall marketing activities and approach as implemented by the implementation contractor and AEP Ohio.
- 4) **Review of Participation.** Navigant reviewed program participation by building type, project size, completion date, and geographic location.
- 5) **Primary Data Collection.** Navigant performed primary data collection, including in-depth interviews with program staff and the implementation team, participant telephone interviews, a file review for a randomly-selected sample of projects, and onsite verification for a subset of the sampled projects.
- 6) **Methods Used to Analyze Impact Data.** Navigant quantified energy and coincident peak demand reduction savings by reviewing project files. File reviews included verifying baseline selection, determination of incremental costs, quantifying hours of operation, reviewing inputs and assumptions, and reviewing selected engineering algorithms. In some cases, Navigant either reached out to the implementation contractor or to customers via telephone to confirm uncertainties. Where uncertainties still existed in the savings calculations, onsite visits were conducted. Onsite visits included verification of equipment specifications and quantities, collection of energy management system data, and metering of equipment.
- 7) **Methods Used to Analyze Process Data.** Navigant assessed the effectiveness of the program processes by analyzing program documents, reviewing the results of in-depth interviews with program staff at AEP Ohio and the implementation contractors, analyzing participant telephone interview responses, and conducting a review of program tracking data.

## 2.2 Key Evaluation Questions

Navigant worked with AEP Ohio to identify a number of key evaluation questions regarding the 2017 Process Efficiency Program. Three broad evaluation questions were addressed by the evaluation study as a whole.

- 1) What is the status of implementing recommendations / issues identified in the 2016 evaluation?
- 2) How do the findings in the 2017 evaluation compare with findings from prior year evaluations?
- 3) Have changes made to the 2017 program been effective in increasing satisfaction and/or participation?

The following key research questions were addressed through a review of program data and interviews or surveys of those involved with the program. Table 2-1 lists the research questions to be addressed in the evaluation and the information sources used to identify each question.

**Table 2-1. 2017 Evaluation Questions**

Research Objective	Information Sources	
	Database, Secondary Data Review & Onsites	Staff/ Implementation Contractors
<b>Impact Questions</b>		
1. What were the evaluated <i>ex post</i> savings that were achieved in 2017?	√	-
2. Does the as found baseline stipulated in SB310 affect project and program energy and demand savings compared to industry best practices for baseline determination?	√	-
3. Are the bi-weekly engineering review meetings for large projects accomplishing their goal of reducing the risk of large <i>ex post</i> adjustments that significantly affect program realization rates?	√	√
4. Are demand savings, including AEP Ohio peak, PJM summer, and PJM winter peak estimated in a consistent manner from project to project?	√	-
<b>Process Questions</b>		
1. What is the effect of customer opt-out on program participation?	-	√
2. Are project costs relative to the appropriate baseline captured accurately and consistently within the program?	√	√
3. What is the level of involvement of trade allies in driving process efficiency projects, and are there opportunities to further increase efficiency or encourage more comprehensive energy and demand savings?	√	√
4. Which customer market segments participate in the program, and are there barriers specific to certain market segments?	√	√

Source: ENERGY EFFICIENCY / PEAK DEMAND REDUCTION (EE/PDR) PORTFOLIO 2017 to 2020 Evaluation Plan, September 27, 2017

## **2.3 Tracking Data Review**

Program tracking data is critical for determining the impacts of the Process Efficiency Program. A copy of the program tracking data collected by the implementation contractors was provided by AEP Ohio to the evaluation team. The evaluation team reviewed all fields recorded on the application forms and key data fields in the database were reviewed to identify missing, incomplete, or inconsistent data. The data collected was also reviewed to identify any additional information that would be helpful in evaluating program performance. The evaluation team did not assess whether the tracking system was adequate for regulatory prudence reviews or corporate requirements.

## **2.4 Review of Marketing Activities**

Marketing collateral, application forms and other materials available from the AEP Ohio website were reviewed by the evaluation team. Additional marketing materials were requested from AEP Ohio and the implementation contractors. Information on marketing, communications and outreach efforts was also obtained from both AEP Ohio and the implementation contractors.

## **2.5 Review of Participation**

The evaluation team used the program tracking data to analyze program participation by a number of key attributes including building type and completion date. The analysis focused on metrics such as number of participants and impact results. The results of this analysis are presented, in part, in the discussion of program activity in Section 3.

## **2.6 Interviews with Program and Implementation Contractor Staff**

In-depth qualitative interviews were completed with AEP Ohio and the implementation contractor staff. The purpose of these interviews was to understand how the program worked and how it was marketed for 2017. Discussion guides were developed allowing a structured but open-ended interview and provided to AEP Ohio for review. A free-flowing discussion resulted between interviewer and respondent. Staff experienced in new building programs and program evaluations were used to perform the interviews. Interviews were conducted by telephone to provide flexibility to the respondents' schedules.

## **2.7 Methods Used to Analyze Impact Data**

Through a review of the tracking data, the evaluation team divided the completed projects into four strata based on *ex ante* energy savings and the types of measures included. A random sample was selected from each stratum to be reviewed by the evaluation team. Desk reviews were conducted on all sampled projects. Reviews included engineering calculations of energy and demand savings claims as well as verification of baseline and as-built assumptions. If uncertainties in the savings calculation existed, Navigant performed additional follow-up including reaching out to the implementation contractor for clarification, telephone calls to the customer, or site visits. Site visits inspected equipment specifications and quantities, verified hours of operation, collected energy management system data and/or metered systems where required, and answered any outstanding questions. The results of the verification of the sampled projects were statistically applied to the entire population of projects to determine *ex post* savings.

## 2.7.1 Impact Sample of Project Files

The impact sample for 2017 was chosen to achieve a 90% level of confidence and +/- 10% relative precision for the engineering review. The program was evaluated at the project and measure levels and the completed projects were divided into four strata based on *ex ante* energy savings.

The evaluation team first removed savings from prescriptive projects from the population, then sorted the projects from largest to smallest *ex ante* kWh savings and placed them into strata, attempting to achieve a relatively even distribution of cumulative standard deviation in electric energy savings between strata to minimize overall sample size. The prescriptive measure stratum was not sampled due to its relative insignificance in the Process Efficiency Program. This approach resulted in a total sample of 18 projects to be selected for engineering review. In the end, Navigant completed desk reviews on a sample comprising 79 percent of the reported program MWh savings. Table 2-2 provides a summary of the impact measurement and verification (M&V) sample stratification and the level of review completed by the evaluation team within each stratum.

**Table 2-2. Impact Sampling Strata and Achieved Sampling**

Stratum by Approach and Energy Savings	Number of Projects	Strata Weight by Energy	Number of Desk Reviews	Number of Onsite Reviews <sup>3</sup>
Large (>2,000 MWh/yr)	7	65%	7	3
Medium (>600 MWh/yr, <2,000 MWh/yr)	7	17%	5	0
Small (>0 MWh, < 600 MWh)	48	16%	6	1
Prescriptive Measures	NA	2%	0	0
<b>Total</b>	<b>62</b>	<b>100%</b>	<b>18</b>	<b>4</b>
<b>Percent of Ex Ante Savings</b>	<b>-</b>	<b>-</b>	<b>79%</b>	<b>33%</b>

## 2.7.2 Ex Post Project Savings Calculation

Energy savings calculations were conducted following common engineering-based algorithms based on the evaluations teams' expertise and data availability. Sound engineering principles, such as motor equations, fan curves, and HVAC performance is often coupled with logged equipment data and billing data, as appropriate, to derive impact savings estimates. The inherent nature of the Process Efficiency Program requires a variety of techniques, and adjustments generally include the following:

- Hours of use and hourly operational characteristics
- Baseline and efficient equipment specifications
- Additional pre- and post-installation data, coupled with an appropriate normalization scheme
- Other changes, such as analysis methodology

<sup>3</sup> Onsite reviews are a sub-set of desk reviews. All project in the sample received at least a desk review, while some received an onsite review in addition to the desk review. If a project received both an onsite and a desk review, it is counted in both the onsite and desk review totals.

### 2.7.3 Realization Rates Calculation Method

The statistical method of ratio estimation was used for combining individual realization rates from the sample projects into an estimate of *ex post* energy savings for the population.<sup>4</sup> In the case of a separate ratio estimator, a separate energy savings realization rate is calculated for each stratum and then combined – and weighted by savings in each stratum. These steps are matched to the stratified random sampling method used to create the sample for the program. The standard error was used to estimate the error bound around the estimate of *ex post* energy savings and demand reduction. Additionally, because 1.9% of energy savings from the program are derived from prescriptive measures following the methodology for the Efficient Products for Business Program, the realization rate and error associated with these measures is combined with the other stratum to calculate final *ex post* verified program savings. Navigant believes that the Efficient Products for Business realization rate more accurately represents the verified savings associated with these measures than unrelated process efficiency measures. Realization rates for each stratum were calculated with the following equation:

#### Equation 1. Realization Rates for Each Stratum

$$RR = \frac{\sum_{sampled} E_{ex-post}}{\sum_{sampled} E_{ex-ante}}$$

Where:

E = the electric energy savings or peak demand reduction for each project in the stratum

Realization rates in each stratum were applied to the project population of that stratum with the following equation:

#### Equation 2. Realization Rates for Each Stratum Applied to Project Population

$$E_{i,ex-post} = RR_{stratum} * E_{i,ex-ante}$$

## 2.8 Methods Used to Analyze Process Data

The purpose of the process evaluation is to assess the effect of the program structure and program implementation on program performance and customer satisfaction. The evaluation team's process efforts help to provide insights and recommendations to support the continued success of the Process Efficiency program. The process activities for 2017 were relatively limited as there were no significant program changes between the 2016 and 2017 program years.

The main activity of the 2017 process evaluation for the Process Efficiency Program was interviews with key program and implementation contractor staff. In-depth qualitative interviews were completed with program managers and implementation contractor staff using interview guides designed to allow an open-ended discussion of key issues with respect to program operation, outreach and interactions with participants, and the challenges faced during 2017. Telephone surveys were also conducted with program participants.

<sup>4</sup> A full discussion of ratio estimation can be found in Sampling: Design and Analysis, Lohr, 2010 2<sup>nd</sup> Edition, pp. 144-145.

## 3. DETAILED EVALUATION FINDINGS

The following section includes evaluation findings from both the process and impact evaluation of the Process Efficiency Program.

### 3.1 Program Activity

The 2017 program year represents the ninth year of operation for the Process Efficiency Program<sup>5</sup>. In 2017, the program completed 62 projects, which is a decrease from the 72 completed in 2016. Fifty unique customers completed projects in 2017, with some customers completing multiple projects throughout the year. One of the customers who participated in the program in 2017 completed eight projects. In total, the 62 projects included implementation of 157 measures.

Table 3-1 shows the breakdown of projects and measures based on the program tracts, including Custom, Bid4Efficiency, and prescriptive. All of these savings comprise the Process Efficiency program, but highlight the drivers of program participation and savings. The Bid4Efficiency option is responsible for driving the majority of energy savings, while prescriptive measures indicate that customers are taking advantage of coupling these additional measures within their project application for simplicity.

**Table 3-1. Program Projects, Measures, and *Ex Ante* Savings**

Metric	Custom Track	Bid4Efficiency Option	Prescriptive Co-Submitted	Total Custom <i>Ex Ante</i> Value
Number of Projects	38	24	12 <sup>6</sup>	62
Number of Measures	41	24	92	157
Annual Energy Savings (MWh)	7,908	37,655	901	46,464
Peak Demand Savings (kW)	1,021	3,784	129	4,934

Source: Navigant review of AEP Ohio Program Tracking Database

Total 2017 *ex ante* energy savings reported for the program amounted to 46,464 MWh, and *ex ante* demand reductions reported under the program totaled 4.934 MW. Compared to 2016, *ex ante* energy savings decreased by 13 percent (53,482 MWh in 2016) and demand savings increased by 6 percent (4.67 MW) compared to 2016.

Incentives in 2017 increased by two percent to \$1,558,341 compared to 2016. Incremental participant costs increased by 13 percent in 2017 to \$22,648,346 as compared to 2016. Total participant and incentive costs increased by twelve percent to \$24,206,687. The average 2017 Process Efficiency project saved 749 MWh. Table 3-2 summarizes the key program indicators.

<sup>5</sup> Initially the program was referred to as the Custom Program.

<sup>6</sup> Projects with prescriptive measures did not add to the project count as they were always coupled with a custom measure on the Custom track or the Bid4Efficiency option.

**Table 3-2. Program *Ex Ante* Summary, 2016 & 2017 Program Years**

	2017 Program	2016 Program
Total Incremental Participant Cost	\$22,648,346	\$20,034,582
Amount of Incentives	\$1,558,341	\$1,522,175
<i>Ex Ante</i> Energy Savings Reported to Program (MWh)	46,464	53,482
<i>Ex Ante</i> Demand Savings Reported to Program (MW)	4.934	4.67

Source: Navigant review of AEP Ohio Program Tracking Database

Table 3-3 and Figure 3-1 presents program activity by economic sector. Forty-two projects (68%) came from the Industrial sector, leading to 90 percent of energy savings and 86 percent of demand savings. Medical-Hospital was the second largest category in terms of projects with four projects (6%), however, this segment only accounted for one percent of energy savings and four percent of demand savings. Other segments accounted for up to 3 projects each.

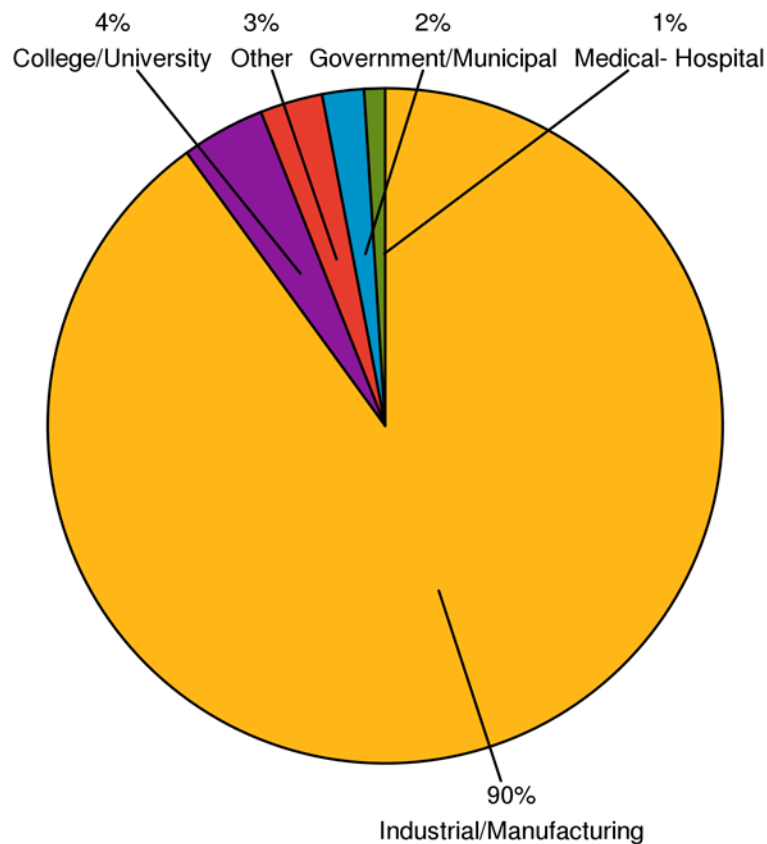
**Table 3-3. 2017 Program Activity by Economic Sector**

Economic Sector	Number of Projects	<i>Ex Ante</i> Savings	
		Energy kWh	Demand kW
College/University	1	1,631,712	267.16
Government/Municipal	2	1,024,910	95.23
Grocery	2	279,255	41.46
Industrial/Manufacturing	42	41,763,487	4,221.11
Large Office	2	235,024	21.50
Medical- Hospital	4	623,375	184.90
Miscellaneous	3	231,871	6.07
School	2	340,511	66.27
Small Office	1	9,732	-
Small Retail/Service	3	323,625	30.37
<b>Total</b>	<b>62</b>	<b>46,463,501</b>	<b>4,934.07</b>

Source: Navigant review of AEP Ohio Program Tracking Database



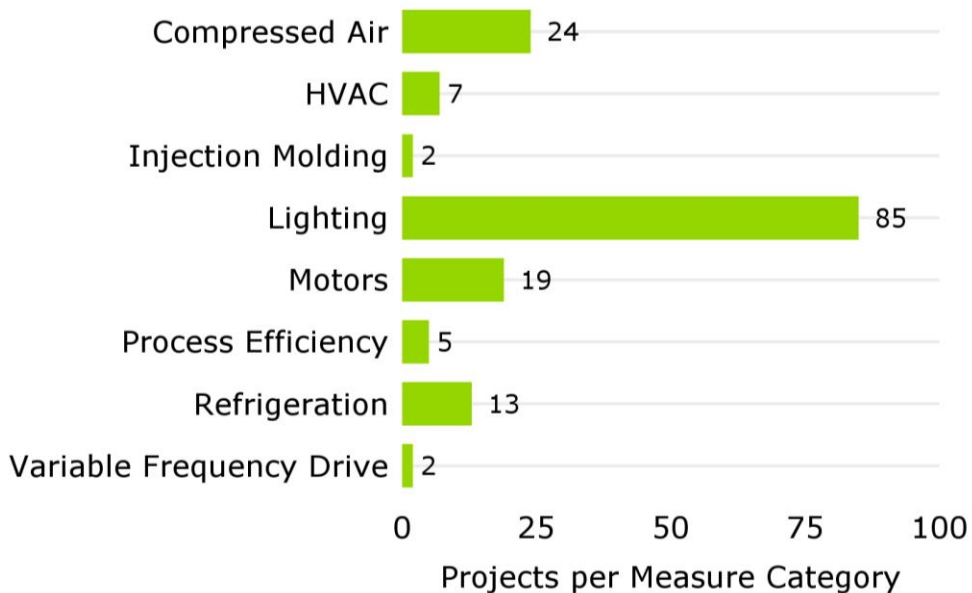
Figure 3-1. Energy Savings by Economic Sector, 2017 Program (n=62)



Source: Navigant review of AEP Ohio Program Tracking Database

There was a total of 157 measures installed through the program. Figure 3-2 presents the frequency of measure types for the program. There were a total of 85 lighting measures (54% of total) followed by 24 compressed air measures (15% of total) and motors accounted for 19 measures (12%). Other measures included 13 refrigeration (8%), and various other measures.

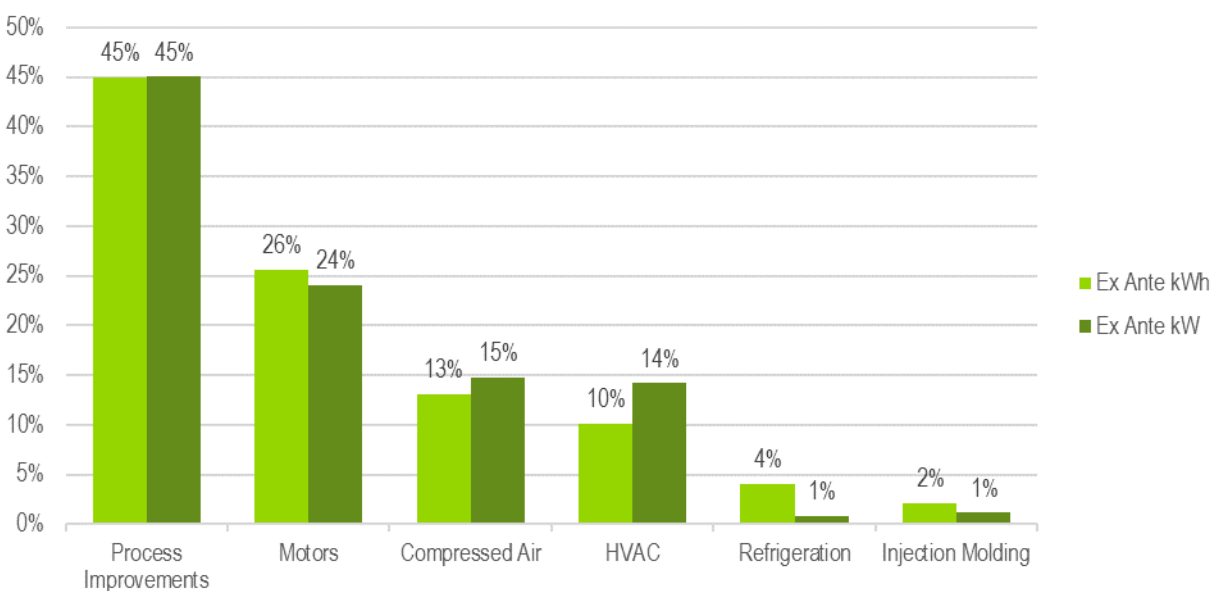
Figure 3-2. Frequency of Measure Type (n=157)



Source: Navigant review of AEP Ohio Program Tracking Database

Figure 3-3 presents energy and demand savings by measure type, excluding the small contribution from prescriptive tract measures. Process efficiency measures make up the largest measure group with 45 percent of energy savings, followed by motors (26%), compressed air (13%), and HVAC (10%).

Figure 3-3. Energy and Demand Savings by Measure Type



Source: Navigant review of AEP Ohio Program Tracking Database

## 3.2 Impact Evaluation Findings

This section includes a summary and discussion of the evaluation-calculated electrical energy and peak demand savings for the 2017 Process Efficiency Program. Annual electricity savings were calculated using the data collected through document reviews and field visits for the sample of sites.

### 3.2.1 Summary of Impact Findings

The *ex post* energy and summer coincident demand annual savings for 2017 are 48,989 MWh and 3.73 MW respectively. This result exceeded the 2017 goal of 42,004 MWh savings, but did not meet the goal of 7.02 MW coincident demand reduction. The realization rate for energy savings was found to be 1.05, while the demand savings realization rate was found to be 0.76. Relative precision values for the 90 percent confidence interval are 0.9 percent and 19.5 percent for energy and demand, respectively. These results are shown in Table 3-4 and represent both increased program energy savings and increased energy realization rates compared to 2016.

**Table 3-4. Impact Savings, Realization Rate and Relative Precision**

Metric	2017 Program Goals* (a)	Ex Ante (b)	Ex Post (c)	Realization Rate RR = (c) / (b)	Overall Relative Precision at 90% Confidence	Percent of Goal = (c) / (a)
<b>Annual Energy Savings (MWh)</b>	42,004	46,464	48,989	1.05	0.9%	117%
<b>Coincident Peak Reduction (MW)</b>	7.02	4.93	3.73	0.76	19.5%	53%

*Source: Energy Efficiency / Peak Demand Reduction (EE/PDR) Portfolio 2017 to 2020 Evaluation Plan, September 27, 2017. Evaluation analysis of AEP Ohio tracking data from January 19, 2017.*

In general, the project-level energy realization rates across strata were loosely grouped around 1.00 with a few notable exceptions. Exceptions were instances where evaluators disagreed with the estimation methods used in the *ex ante* calculation or additional post-installation data changed the annual savings estimates. The lower electric demand realization rate is largely driven by two projects that exhibited significant deviation from claimed *ex ante* demand savings, and is explored further in the following section.

The 2017 *ex post* energy savings exceeded program goals, while the *ex post* demand savings fell short. Several large projects contributed significantly to the program impacts. Prior evaluations have demonstrated the year-to-year success of the program relies on these large projects, but more projects, even if smaller, will tend to reach more commercial and industrial participants who can benefit from the program. Many projects have energy impacts that occur off-peak and several related to productivity improvements, thus energy savings may be proportionally larger than demand savings.

### 3.2.2 Realization Rate Driving Factors

Navigant estimated *ex post* program impacts based on the methodology outlined in Section 2.7. Observations from the verification experience were that the implementation team and AEP Ohio have a quality control approach that appears sufficient to prevent systemic inaccuracies, ensures energy savings

are realized, processes applications in a fair manner, and ensures rebate payments are appropriate. A few projects, however, received either high or low energy and demand realizations rates, as explained later in this section. Table 3-5 shows project verified savings and realization rates for all 18 projects sampled for the impact evaluation organized based on the order they were sampled for the impact analysis.

**Table 3-5. Project Evaluated Savings and Realization Rates**

Project	<i>Ex Ante</i>		<i>Ex Post</i>		Realization Rate	
	MWh	kW	MWh	kW	MWh	kW
Industrial 1	6,549	817	6,855	0	105%	0%
Industrial 2	2,587	257	1,972	178	76%	69%
Industrial 3	3,135	355	3,062	346	98%	98%
Industrial 4	2,917	339	2,573	299	88%	88%
University 1	1,632	267	1,632	262	100%	98%
Industrial 5	966	41	966	41	100%	100%
Industrial 6	2,172	248	1,997	234	92%	95%
Industrial 7	200	22	200	22	100%	100%
Industrial 8	58	17	58	7	100%	40%
Industrial 9	2,290	212	6,091	599	266%	282%
Industrial 10	698	53	630	47	90%	90%
Industrial 11	119	0	119	0	100%	-
Industrial 12	10,561	941	10,627	948	101%	101%
Industrial 13	1,539	171	1,452	210	94%	123%
Industrial 14	605	27	567	27	94%	100%
Industrial 15	71	-28	74	11	104%	-41%
Industrial 16	267	201	267	24	100%	12%
Industrial 17	472	66	435	29	92%	44%

Source: Navigant Analysis

Table 3-6 provides a high-level summary of the changes made to the *ex ante* savings. Reasons for changes reflect primarily one-off changes or interpretation of the data and project context, and are explored in further detail below for the sites that were identified as major contributors to the program level realization rates.

**Table 3-6. Project Explanation for Changes in Estimates**

Site	Explanation
Industrial 1	Incorporated additional arc furnace data to normalize production, which increased energy savings slightly. Demand savings zeroed out based on billing data for arc furnace and operating characteristics from customer. Coincident peak demand was constant in pre- and post- periods, consistent with expected arc furnace operation to maximize ladle capacity for all furnace heats.
Industrial 2	Corrected power factor vs. percent full load amps curve used to calculate baseline kW. Implementation contractor used an incorrect regression calculation.
Industrial 3	Minor adjustment to normalize hourly data.
Industrial 4	Adjusted motor load factor. There was reasonable uncertainty around the load factor for the baseline motor; the implementation contractor used 85%, while Navigant used 75%.
University 1	No adjustments
Industrial 5	No adjustments
Industrial 6	Normalize to both pre- and post-retrofit data. Customer indicated that production did not change, so differences in pre- and post-data were artifacts of the specific logging period. The implementation contractor used post-retrofit CFM data, while Navigant averaged both pre- and post- to develop a more general profile of energy use.
Industrial 7	No adjustments
Industrial 8	No adjustments for energy; large adjustment to demand savings due to lower assumed coincidence factor based on limited data availability.
Industrial 9	Corrected power factor vs. percent full load amps curve used to calculate baseline kW. Implementation contractor used an incorrect regression calculation. Like Industrial 2 above, except baseline motor was larger because it previously served multiple boilers.
Industrial 10	Followed similar methodology for deriving energy and demand savings as implementation contractor, except without several intermediate rounding steps that the implementation contractor performed. These rounding steps were compounded through several engineering algorithms resulting in meaningful discrepancies.
Industrial 11	No adjustments
Industrial 12	Minor adjustments to power factor for one small motor.
Industrial 13	Adjusted chiller energy models to account for more realistic operating characteristics. <i>Ex ante</i> models used average values rather than extrapolating temperatures beyond those directly metered. Navigant averaged two models, representing both a floor and a ceiling for expected energy consumption.
Industrial 14	Normalized annual air profile using both pre- and post- data, rather than just post-data.
Industrial 15	Normalized motor usage using both pre- and post-data based on identical operating characteristics before and after motor replacement. Demand savings were most affected due to intermittent operation.
Industrial 16	No adjustments for energy; large adjustment to demand due to normalizing pre/post data.
Industrial 17	Normalized data to account for production differences in pre- and post-periods for injecting molding machine upgrades.

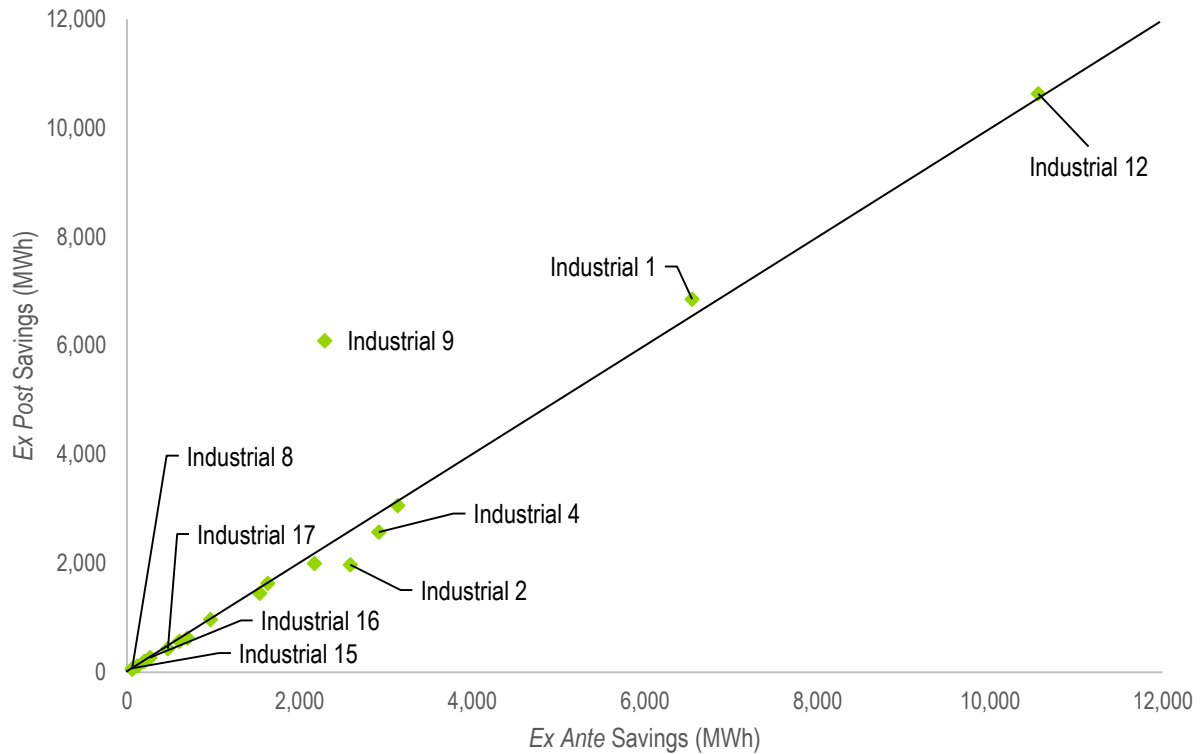
Source: Navigant Analysis

Navigant identified several key drivers of differences in verified savings that warrant additional discussion.

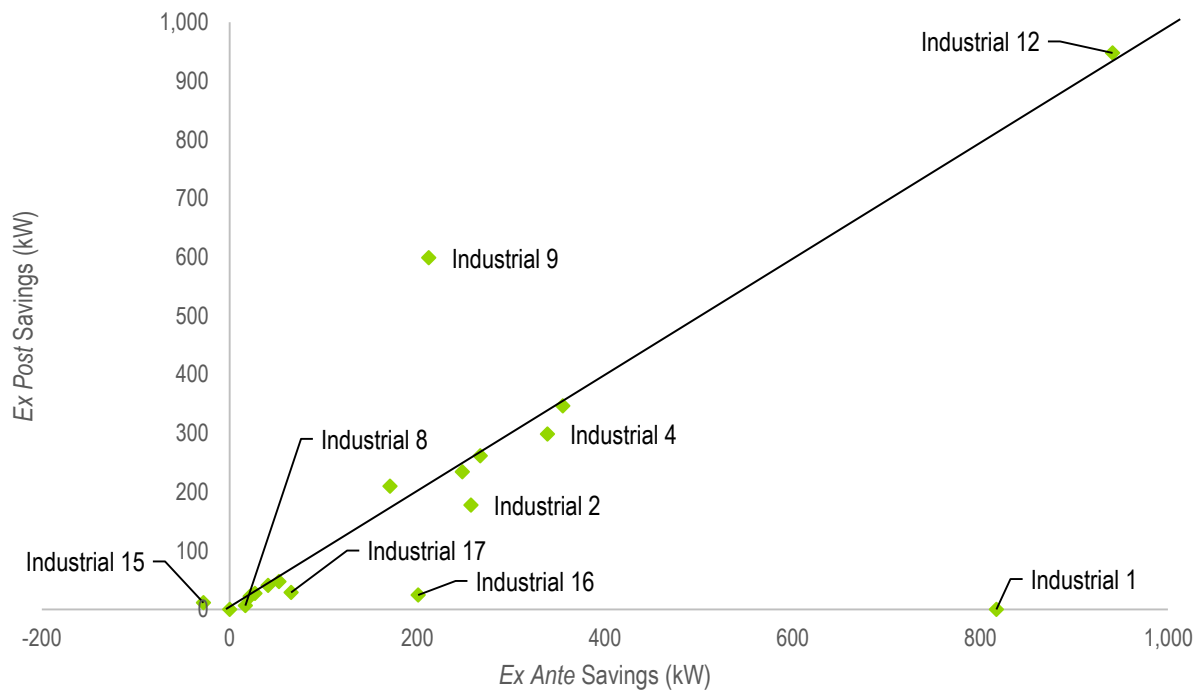
1. **Large Motor Replacements.** For these types of projects, understanding the baseline condition is typically the most difficult aspect. There is often limited documentation of motor loading and power factor, which is necessary to interpret logged current (amps) data. When there is reasonable doubt about the motor loading or power factor, conservative assumptions should be used to ensure that the program is not overstating impacts. For two projects, the implementation contractor used a DOE-derived curve to correlate the motor load to the power factor. This method is reasonable, but Navigant found errors in the calculation itself.
2. **Energy Intensity Projects.** For these types of projects, energy is correlated to a unit of production (e.g. per widget, per CFM, per lb., etc.) This allows the energy data to be normalized to production, and then extrapolated using production schedules to derive annual energy savings. There is risk that production is different when using limited (e.g. less than month) pre- and post-data. In some cases, there is an accompanying production increase, while in others there is no change to production itself. Generally, pre-production rates should be used as the basis for energy savings, but when the customer confirms that operation did not change because of the efficiency project, both pre- and post-data can be averaged to more accurately represent operational characteristics. Additionally, there is significant risk that demand savings are not accurately characterized due to slight differences in operation for measures with variable schedules. In these cases, post-data can be normalized to pre-data to ensure that the demand savings calculation is appropriate.
3. **Questionable Projects.** Navigant reviewed one large project that was not clearly an energy efficiency project. There was opportunity for back and forth discussions between Navigant, the implementation contractor, AEP Ohio, and the customer, but due to timing constraints Navigant was unable to fully understand the project in advance of project payment. This underscores the need for the implementation contractor to develop detailed project summaries with all key assumptions defined to ensure that there is agreement about difficult projects.
4. **Demand Savings.** Several projects did not calculate coincident demand savings accurately. In some cases, demand was simply recorded as the average of energy savings during the facility open hours, which does not account for operational differences month-to-month and hour-by-hour. In other cases, average demand savings were recorded, even when these did not occur during the peak period. While this may be useful to track for the customer and may affect their utility bill, this is not the same as coincident summer peak demand savings. For some projects where there was no clear operational adjustment, no demand savings should be realized (e.g., customer was able to eliminate the night shift to meet production requirements).

Figure 3-4 and Figure 3-5 show a comparison of *ex ante* and *ex post* savings for all of the sampled projects. This gives a graphical representation of the realization rates where projects above the line have a realization rate above 1.00 and projects below have a realization rate below 1.00. Key projects labeled in the figures are explored in further detail below.

Figure 3-4. *Ex Post* vs *Ex Ante* Energy Savings



Note that only projects where verified results differed from reported estimates are labeled.  
Source: Navigant Analysis.

Figure 3-5. *Ex Post* vs *Ex Ante* Demand Savings


Source: Navigant Analysis

**Industrial 1.** This project claimed energy and demand savings from an optimized steel casting method that reduced the steel needed for risers. This in turn reduced the quantity of steel processed by the arc furnace, resulting in energy savings. Navigant agrees with the implementation contractor for the energy calculation, but zeroed out the demand savings because there was no evidence that the arc furnace reduced run hours during the coincident demand period. The implementation contractor assumed an average savings throughout the day. The customer indicated that they attempt to maximize ladle capacity for all furnace heats, resulting in the same demand pre- and post- because the furnace itself did not change. Detailed (15 minute) billing data for the site confirms that energy use during the coincident period was not affected by this energy efficiency project.

**Industrial 2 and Industrial 9.** These two projects were very similar (same customer, same measure). In each case a large motor was replaced with a much smaller motor with a VFD. The *ex ante* savings attempted to characterize the baseline energy profile from current data and CFM. This was done using a curve to correlate the motor load to the power factor. This calculation was not correct, however, resulting in erroneous calculated power data. Navigant corrected this calculation for the *ex post* savings value.

**Industrial 4.** This is another motor replacement project, but the uncertainty was caused by difficulty estimating the motor load from available data. The implementation contractor used 85 percent, while Navigant believes that 75 percent is more appropriate based on a motor load study and a DOE study detailing optimizing motor efficiencies. Based on available fan characteristics, Navigant believes the baseline motor was sized correctly for the fan. There was no pre-metering for this project.

**Industrial 8.** This project is a relatively simple motor replacement, but there was uncertainty surrounding the operational schedule. The project documentation listed 8,670 hours, 6,500 hours, and 3,000 hours.



Ultimately, 3000 annual hours was used as the basis for ex ante savings, with a coincidence factor of 0.865. The motor is used as part of an ammonia chiller for batch cooling processes, and is expected to run intermittently throughout the year. Navigant chose to use a more conservative coincidence factor based on average usage throughout the entire year. For this project, a robust pre-review, potentially with metering of the existing motor, would clarify the baseline conditions.

**Industrial 12.** While this project had a realization rate close to 100 percent, there was significant doubt whether this project should have qualified as an energy efficiency project at all. Navigant agrees with the implementation contractor that this project should qualify based on the simple fact that there was not a clear consensus around which necessary retrofit was optimal for the customer long term, and they chose the most electrically efficiency option available to them despite it likely generating higher estimated costs in the future. This was complicated by the fact that this project also had the lowest upfront cost compared to alternatives. The incentive mechanism underlying this program assumes that the incentive drives adoption of energy efficiency measures by lowering upfront costs. For very large industrial facilities with access to significant capital, this simple equation can become further complicated when there are very large ongoing operating costs, including other fuel sources beyond electricity. Navigant found that the electrically efficient option, while having the lowest upfront costs, was also estimated to have a higher annual operating cost based on estimated coal and natural gas prices. For this reason, Navigant believes that this project was completed in the spirit of energy efficiency and should qualify under the program, but notes that incentive money may be better spent on projects where the upfront cost is a hurdle to adoption of energy efficiency. In addition, the program requirements limit the incentive to 50 percent of incremental costs, which are zero for this project when only considering upfront capital costs.

**Industrial 15, Industrial 16, and Industrial 17.** The implementation contractor calculated negative demand savings for this motor replacement project (Industrial 15) high demand savings for an air compressor project (Industrial 16), and high demand savings for an injection molding replacement project (Industrial 17). Navigant believes the methods used by the implementation contractor are incorrect because dissimilar pre- and post- logging periods were used to derive demand savings for all of these projects. This is due to intermittent operation of the equipment during the logging period. Navigant normalized the post-data to the pre-data so that intermittencies were not a factor for the demand savings calculation.

### 3.3 Process Evaluation Findings

The main activity of the 2017 process evaluation for the Process Efficiency program was interviews with key program and implementation contractor staff. In-depth qualitative interviews were completed with program managers and implementation contractor staff using interview guides designed to allow an open-ended discussion of key issues with respect to program operation, outreach and interactions with participants, and the challenges faced during 2017. In addition, in-depth participant telephone surveys were conducted and discussed further in section 3.3.8.

#### 3.3.1 Marketing Efforts and Program Awareness

The Process Efficiency program's focus is to reduce a customer's energy and demand usage through incentives for the purchase of energy efficient equipment and the implementation of process improvements. The program is marketed through multiple channels ranging from Customer Service Representatives to direct mailings.

A Concierge Service was introduced in 2017 to assist customers in identifying energy efficiency measures in their facilities and navigating the application process. This service works with customers who know what measures need to be addressed, but do not have the needed staff to research the equipment options and complete the applications.

### 3.3.1.1 Program Material Review

AEP Ohio offers extensive customer-facing program materials. In its review, Navigant found some of the materials instructed participants to read and complete voluminous forms designed more for a contractor or a design professional. Table 3-7 lists the documents reviewed.

**Table 3-7. Process Efficiency Program Materials Reviewed**

Program Materials	Description	Additional Information
2017 Application Specifications	20-page pdf application	Covered programs: Efficient Products for Business, Process Efficiency and Self-Direct
Application Terms & Conditions and Final Payment Agreement	6-page document, only available through electronic link from the application document	
Efficient Products for Business, Process Efficiency and Self-Direct program application 2018	22-page program application for 3 programs	Covered Programs: Efficient Products for Business, Process Efficiency and Self-Direct
2017 ProcEff_FactSheet	Single page informational flyer	
Web page: Process Efficiency	<a href="https://aepohio.com/save/business/programs/ProcessEfficiencyProgram.aspx">https://aepohio.com/save/business/programs/ProcessEfficiencyProgram.aspx</a>	
2017_Emotor_FactSheet	Single page informational flyer	
2017_Emotor_Rewind_Application	4-page application form	
Hannon Electric Case Study	2-page description of a certified motor rewind business	
Web Page: EMotor Rewind	<a href="https://aepohio.com/save/business/programs/EmotorRewindProgram.aspx">https://aepohio.com/save/business/programs/EmotorRewindProgram.aspx</a>	
2017-2018 Bid 4 Efficiency Program Guidelines	11-page guidelines document for customers.	<a href="https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20Program%20Guidelines%202017%20-%2020072617%20v2.pdf">https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20Program%20Guidelines%202017%20-%2020072617%20v2.pdf</a>
Bid4efficiency Frequently Asked Questions	11-page faq doc	<a href="https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20FAQ%202017%2020072617%20v2.pdf">https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20FAQ%202017%2020072617%20v2.pdf</a>
Bid4efficiency Brochure	2-page summary	<a href="https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20Customer%20Brochure%202017%20-%2020081417.pdf">https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20Customer%20Brochure%202017%20-%2020081417.pdf</a>
2017 Bid4efficiency Fact Sheet	Single page brochure	

Links to 7 supporting documents: Diagram of Participation Process 2017-2018 Program Guidelines FAQ's Customer Brochure Solution Provider Brochure List of 2018 Auction Winners Read more about out Bid 4 Efficiency program			<a href="https://aepohio.com/save/business/programs/EnergyEfficiencyAuction/">https://aepohio.com/save/business/programs/EnergyEfficiencyAuction/</a>
Web Page: Bid 4 Efficiency			
Solution Provider Brochure	2-page brochure to encourage solution provider participation		<a href="https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20Solution%20Provider%20Brochure%202017%20-%20081417.pdf">https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/B4E%20Solution%20Provider%20Brochure%202017%20-%20081417.pdf</a>
List of 2018 Auction Winners	Single page grid of winners and contact info		<a href="https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/2018_Bid4Efficiency_winners_final.pdf">https://aepohio.com/global/utilities/lib/docs/save/business/programs/aepohio/EnergyEfficiencyAuction/2018_Bid4Efficiency_winners_final.pdf</a>

Source: Navigant review of AEP Ohio Documents Provided

In the review of these documents, Navigant found two over-arching issues: 1) the complexity and inconsistencies associated with the application and its supporting documents; and 2) difficulty finding information on the website for Process Efficiency.

The Process Efficiency application is one of three programs included in the Efficient Products for Business, Process Efficiency and Self-Direct program application 2018. The target audience for this application is unclear as it contains sections a customer must complete with guidelines and terms included. However, much of the form is written for an audience with a technical or engineering background; is complicated, and does not distinguish between programs (even though there are two sets of Terms and Conditions). The supporting specification documents and their relationship to the Process Efficiency program can be confusing:

- It is not clear how the Application Specifications document relates to the actual Application. The Application includes tables with size categories and efficiency requirements that are not included in the Application Specifications. (See HVAC, Motors and Drives)
- While the document title references three programs (Efficient Products for Business, Process Efficiency and Self-Direct), the document does not clearly articulate how measure specifications relate to each program.
  - The measure specifications can be assumed to be for all three programs, until the reader gets to the Process Efficiency specifications on page 18 and finds that "Projects that are NOT eligible for a Process Efficiency incentive include: Projects eligible for Efficient Products for Business". Only by way of deduction can one assume that measures on pages 3-16 are for Efficient Products for Business.

AEP Ohio's website does not provide customers with a matrix or map of the available programs, or which one might best meet their needs. The Process Efficiency program could not be easily located through the

AEP Ohio website with clicks from the AEP Ohio home page, depending on the knowledge of the website, taking approximately five to six clicks to get to as outlined in Table 3-8.

**Table 3-8. Process Efficiency Webpage Steps**

Action	Landing Page
Go to Ohio Home Page	<a href="https://www.aepohio.com/">https://www.aepohio.com/</a>
Click "Save Energy"	<a href="https://www.aepohio.com/save/residential/">https://www.aepohio.com/save/residential/</a> "Rebates & Savings Programs" (NOTE: This is a residential page)
Click "Rebates and Savings Programs"	<a href="https://www.aepohio.com/save/residential/programs/">https://www.aepohio.com/save/residential/programs/</a> "Incentive Programs For Residents"
Click "Business"	<a href="https://www.aepohio.com/save/business/">https://www.aepohio.com/save/business/</a> Business Savings Incentive Programs
Click "Energy Savings Programs"	<a href="https://www.aepohio.com/save/business/programs/">https://www.aepohio.com/save/business/programs/</a> Energy Saving Programs
Click "Program List"	<a href="https://www.aepohio.com/save/business/programs/PrescriptiveProgram.aspx">https://www.aepohio.com/save/business/programs/PrescriptiveProgram.aspx</a> Efficient Products for Business
Click "Process Efficiency" (from list of 17 programs)	<a href="https://www.aepohio.com/save/business/programs/ProcessEfficiencyProgram.aspx">https://www.aepohio.com/save/business/programs/ProcessEfficiencyProgram.aspx</a> Process Efficiency Program

Source: Navigant Analysis of Program Website

### 3.3.2 Program Requirements

No program requirements were changed in 2017. The Process Efficiency program is available to all AEP Ohio business customers participating in the Energy Efficiency and Peak Demand Response (EE/PDR) rider.

#### 3.3.3 Barriers to Participation

Process Efficiency projects by definition are more complicated projects needing technical assistance to resolve a process and/or energy efficiency issue. These projects do not have a prescribed solution; rather a custom solution is often required. The need for a technical evaluation of the issue presents a barrier for customers who may not have the bandwidth of time, expertise or money to address the issue.

Also, on January 1, 2017, the new Opt-out mechanism established by SB 310 went into effect, allowing large customers to not pay AEP Ohio's cost recovery Energy Efficiency rider, and therefore not participate in the energy efficiency programs. The barrier for participation arises when the person deciding to stay in or opt-out of the rider does not work in the facility with high consumption and therefore is not aware of the need for staying in the rider and participating in the energy efficiency programs.

#### 3.3.4 Customer Enrollment Process

Navigant reviewed the customer enrollment process, including the application forms, the intake contractor's review and approval of the applications process; the time required for review and approval of

applications; and the approval review processes and found of the 170 project applications submitted, 62 projects were completed. Some applications contained issues requiring additional steps from the intake contractor. Table 3-9 and Table 3-10 provide a further breakdown of the analysis of the submitted projects.

**Table 3-9. Process Efficiency Application Issues**

Issue	Process Efficiency
Active AEP Account Verification	2
Missing W-9	12
Missing project specifications	13
Scope of Work missing from application	12
Project Cost is not provided	5
Signature is missing	5
Invoice is not provided	2
Incomplete or incorrect Application	10
Other	2
<b>Total</b>	<b>63</b>

Source: Navigant analysis of application intake contractor database, Notes field. N=170

**Table 3-10. Time Lag from Receipt of Application to Delivery to Implementer**

Reference	Number of Projects
0 -10 days	123
More than 10 days	0
More than 20 days	0
More than 30 days	0
More than 50 days	0
Missing data entry	47
<b>Total</b>	<b>170</b>

Source: Navigant analysis of application intake contractor database. N=170. Net workdays between the "Date Received" and "Date sent to Implementer"

AEP Ohio changed the application processing from multiple implementers receiving applications to one, designating a single implementer to oversee the intake of all Process Efficiency applications and conduct a review of each submitted application for accuracy and completeness. Streamlining the application intake reduced the number of back and forth exchanges between the customer and the implementers in completing the application.

The evaluation team found that 62 of the Process Efficiency projects had application issues ranging from account verification to W-9 submittals.

## 3.3.5 Incentive Payment Process

The implementer reviews each application's energy savings to determine the incentive amount; upon review and approval of an application, the implementer disperses the incentive.

Navigant reviewed the time-lapse between the completion of the project and submittal of the application and found 25 projects had delays of over 30 working days, see Table 3-11. The cause of these delays is unclear but should be reviewed to determine if the application process can be improved to reduce the timeframe.

**Table 3-11. Time-Lapse of Project Completion to Final Application Submittal**

Time-lapse of Project Completion to submittal of Final Application	Number of Projects
0-10 days	22
More than 10 days	12
More than 20 days	3
More than 30 days	5
More than 50 days	20
<b>Total</b>	<b>62</b>

*Source: Navigant analysis of implementer database. N=62, Net working days from FinalApplicaionDateReceived to ActualProjectCompletionDate*

Review of the length of the timeframe when the final application was submitted to when the incentive check was mailed showed a significant number took over 30 working days for the customer to receive their payment, Table 3-12 provides a further breakdown.

**Table 3-12. Timeframe to Receive Incentive Payment**

Time-lapse of Final Application to Incentive Mailed	Number of Projects
0-10 days	3
More than 10 days	8
More than 20 days	10
More than 30 days	10
More than 50 days	31
<b>Total</b>	<b>62</b>

*Source: Navigant analysis of implementer database. N=62, Net working days from FinalApplicationDateReceived to PaymentMailedDate.*

## 3.3.6 Program Tracking Data Review

The Process Efficiency Program evaluation team has periodic access to extracts from AEP Ohio's tracking database to monitor program activity. The team thoroughly reviewed the Process Efficiency

Program tracking dataset as a key component of the process evaluation. The tracking data process review included analysis of completeness and overall quality of the tracking data and analysis of the tracking data to answer process-related research questions.

The database extract spreadsheet includes a project level dataset with project total impacts, application submittal and status data, and internal approval information. Project data was linked by a unique project number to measure level records. Each project could have one or more linked measures of the same or different end-uses.

In general, the implementation contractor maintains quality and accurate data in the tracking system. Navigant did not identify any serious deficiencies, errors or patterns of missing data. The tracking system is adequate for planning all aspects of the program's evaluation, however, the evaluator did not address whether the tracking system is adequate for regulatory prudence reviews or corporate requirements.

### ***3.3.6.1 Tracking Data Quality and Completeness***

High quality, complete data is critical to enabling successful process and impact evaluations. The process team completed a high-level review of Process Efficiency Program tracking data, and an in-depth analysis of the completeness of a sample of key variables. Process evaluation tracking data review allows us to gauge whether the Process Efficiency Program tracking is complete enough to support impact and process analyses and to identify potential areas for improvement.

The Process Efficiency Program tracking data reviewed by Navigant has already undergone review and correction by AEP Ohio, and is high quality and mostly complete. The majority of entries are entered and formatted in a uniform manner, and the dataset as a whole is well-organized. A visual investigation of the data did not reveal any entries that were clearly in error, such as text recorded in numerical fields, inconsistent spelling or naming conventions, etcetera. However, there were several fields with missing data such as the participant's email, estimated square footage, reservation mailed date and reservation end date.

For a sample of process-related variables, the process evaluation team analyzed data completeness. Key dates were complete, though other critical information such as contractor and participant contact fields, were not entirely complete.

The ability to identify and contact, if needed, participants and contractors active in the program is essential. Compared with participant contact information, which was either 98 percent (email) or 95 percent (telephone) completed, contractor contact fields had somewhat more missing entries. Contractor business name, contact and email were 94 percent, 92 percent, and 82 percent complete (Self performed projects were counted as complete), respectively. As these are all fields we might reasonably expect to be complete on applications, this identifies an area for improvement in data collection for the program.

Visual inspection of the tracking data revealed the square footage variable was missing for 24 percent of projects, which was around the same as 2016. However, it could be that square footage information is collected, but never used in analysis. This observation led to the general observation that if variables are deemed important enough to collect, then a goal should be to improve their completeness.



## 3.3.6.2 Participation Characteristics

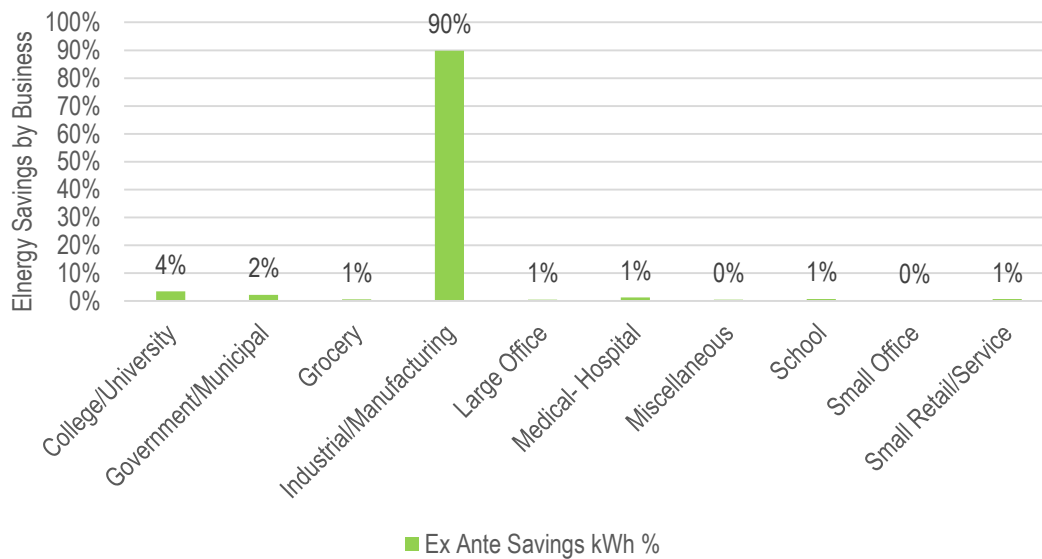
The participation graphics in this section indicate the program is well-established and built around a core of participation by industrial manufacturing customers. Program participation decreased from 2016 to 2017, as well as the number of projects (50 customers completing 62 projects in 2017, while there were 62 customers completing 72 projects in 2016). The largest business type, industrial and manufacturing, contributed more projects to the program in 2017 (42 projects) than all the other business types combined (20 total). Table 3-13 illustrates that this mix of firms has not changed significantly between 2016 and 2017, though industrial/manufacturing has increased slightly in prominence (68% of all projects), as well as small retail/service and miscellaneous saw some growth, while government/municipal, grocery and decreased. In terms of percent contribution to total program savings, industrial/manufacturing increased from 81 percent of *ex ante* energy savings in 2016 to 90 percent in 2017, and dwarfs the contribution of other business types (Figure 3-6). Table 3-13 and Figure 3-7 show a more detailed breakdown of participants and contribution to overall program savings by sector type. The top three sectors with the highest percentage of savings were Paper Mills & Products, Refining & Rubber and Primary Metals & Heavy Manufacturing.

**Table 3-13. Project Count by Economic Sector**

Participant	2016	2017
Industrial/Manufacturing	47	42
Government/Municipal	5	2
Large Office	4	2
Grocery	4	2
Medical- Hospital	3	4
School	2	2
College/University	2	1
Large Retail/Service	1	0
Hotel/Motel	1	0
Restaurant	1	0
Conditioned Warehouse	1	0
Unconditioned Warehouse	1	0
Small Office	0	1
Miscellaneous	0	3
Assembly	0	0
Multifamily	0	0
Small Retail/Service	0	3

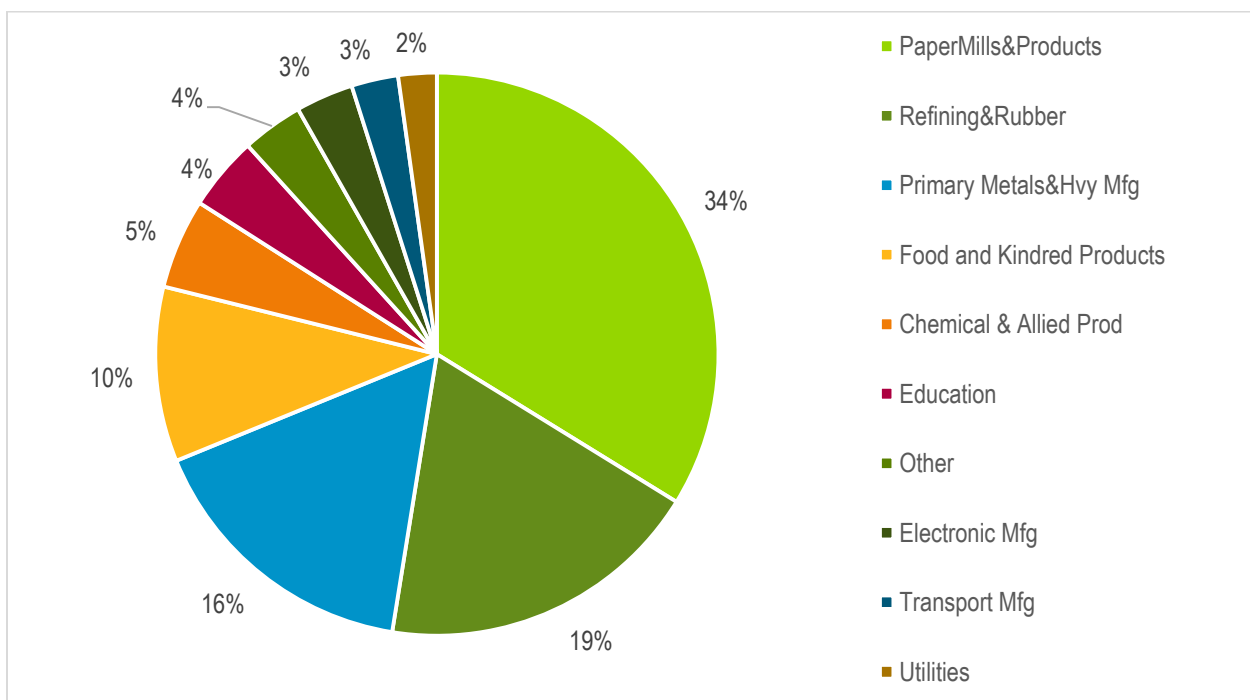
Source: Navigant review of AEP Ohio Program Tracking Database

**Figure 3-6. 2017 Percentage of Program Level *Ex Ante* Energy Savings by Economic Sector**



Source: Navigant review of AEP Ohio Program Tracking Database

**Figure 3-7. 2017 Percentage of Program Level *Ex Ante* Energy Savings by Sector Type**



Note: Other category includes: Farm, Fish Forest; Heavy Construction; Car Sales & Service; Fin Ins Real Estate; Grocery Stores; Health; Blanks; and Unknowns.  
Source: Navigant review of AEP Ohio Program Tracking Database

### ***3.3.7 Verification and Due Diligence***

There are two levels of due diligence carried out as part of the program. The first level is the administrative element, ensuring information submitted to the program is processed accurately and recorded in the project tracking database as previously discussed. The second process is the engineering review of applications to ensure savings for a project are calculated correctly and result in the appropriate level of incentive for the customer, and verification inspections carried out by the implementation contractor to confirm measures have been implemented.

No significant disputes were reported to have occurred during 2017. While the evaluation may determine a level of savings that differs from the applicant's initial estimate, these differences have generally represented differences in engineering judgement and have been resolved without issue. In most instances, program staff and solution providers indicated differences arose from legitimate differences in engineering opinion on how to estimate savings or represent an efficiency change in the building energy model. While such disputes have not been significant to-date, Navigant continues to recommend consideration be given to developing a formal process to provide a framework in case such disputes arise in future.

To support the engineering review, AEP Ohio provided project documentation in electronic format for each sampled project. Documentation included materials from the applicant (invoices, measure specification sheets, vendor proposals) and implementation contractor (calculation spreadsheets and verification photos and site reports). This documentation was provided by uploading to a secure file transfer site. In general, Navigant found the project documentation thorough and complete, but could benefit from additional organization so that assumptions and methodologies are clearly detailed and can easily be located.

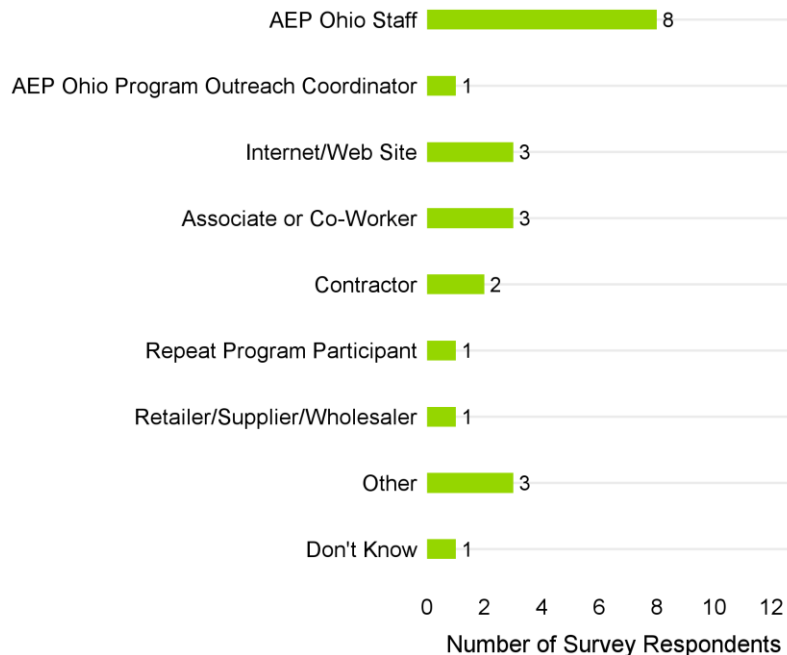
The evaluation found all documents required according to the project tracking milestones and incentive calculations were accurate according to the calculation rubric, and program materials were sufficient to provide detail about the program processes.

Navigant has met regularly with the implementation contractor to discuss issues relating to how projects will be evaluated in terms of their energy and demand savings. Feedback from the implementation contractor has indicated this communication has been helpful in avoiding misunderstandings related to the approach used in the impact evaluation, particularly with respect to more complex or unusual projects under the custom stream.

### ***3.3.8 Participant Phone Survey Analysis***

Participant phone surveys were conducted in March 2018. Fourteen participants were surveyed. Figure 3-8 shows how people heard about the program (each respondent could choose multiple responses). Eight respondents heard about the program from AEP Ohio staff; which is understandable given many of the Process Efficiency participants fall into the large C&I category and have account representative/engineers assigned to them. Three heard about it from the internet and another three from an associate or co-worker. Two heard about it from contractors. Three respondents heard about it from other sources. Other sources included the Efficiency Smart program and one customer asking around. Only one participant heard of the program from the Outreach coordinator which suggests there is an opportunity to reach the small to medium size customer and increase participation levels.

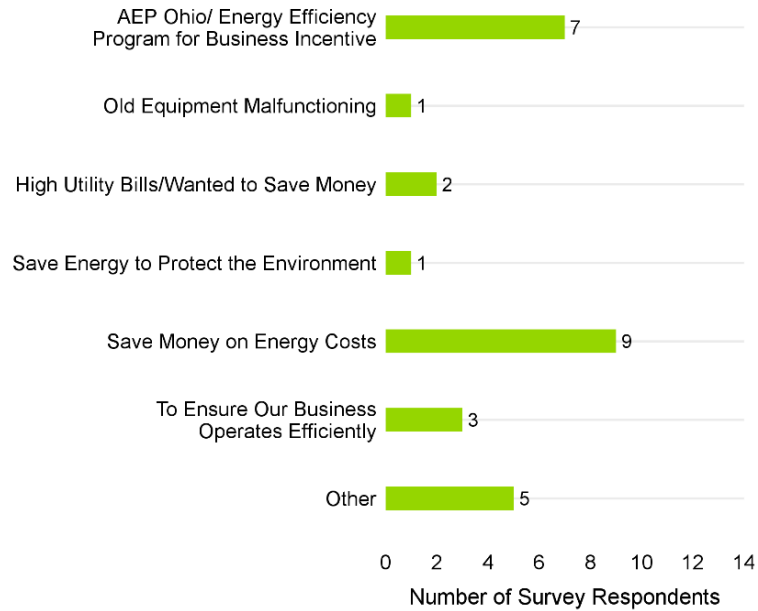
Figure 3-8. How Participants Heard of Process Efficiency Program?



Source: Navigant analysis of customer survey

Figure 3-9 shows the main reasons participants decided to participate in the program (each respondent could choose multiple responses). Nine respondents wanted to save money on energy costs, and seven respondents wanted to receive the program incentive. Three respondents also noted wanting to ensure their business operates efficiently. Other responses included: reduction in capital expense, reduction in emissions, made customer look at things that they might not have considered. The financial benefits driving participation in Process Efficiency is consistent with other programs. However, it does show the importance of providing all the financial benefits – including non-energy benefits such as reduced maintenance costs – are provided to the customer to help in the calculation of a realistic payback.

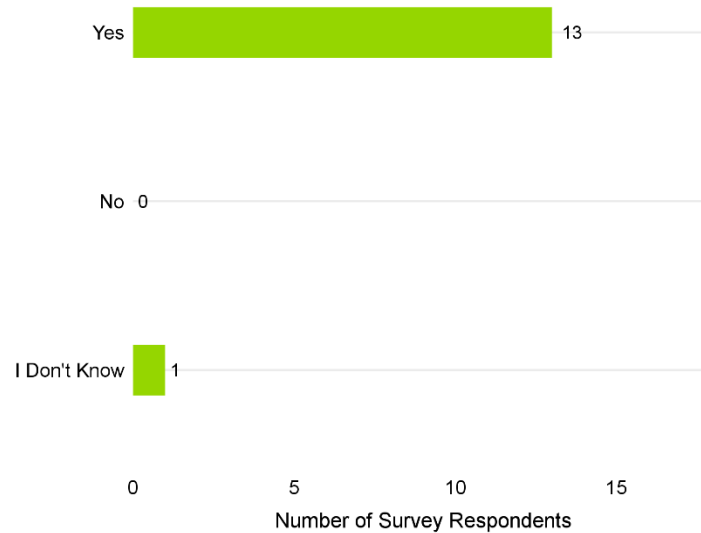
Figure 3-9. Main Reasons for Participation



Source: Navigant analysis of customer survey

Figure 3-10 shows the Process Efficiency program is well received amongst its participants with 93% willing to participate again in the future.

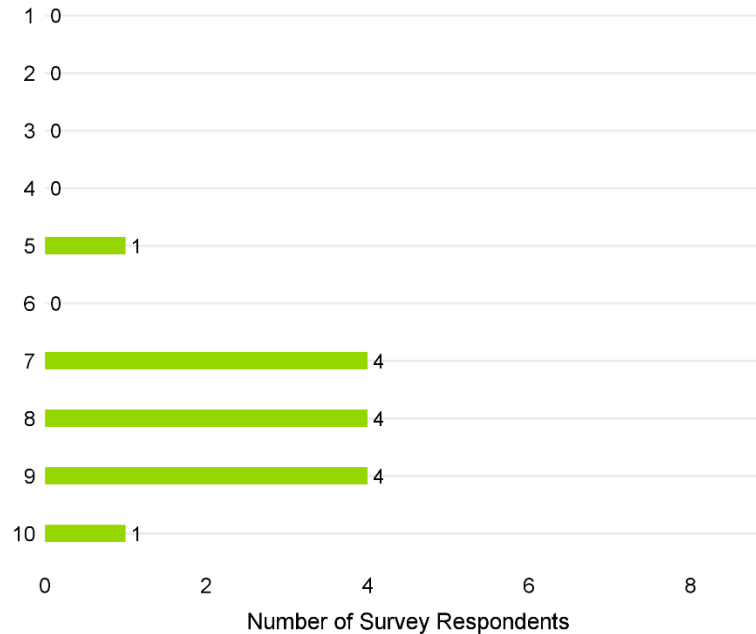
**Figure 3-10. Participate in Program Again**



*Source: Navigant analysis of customer survey*

Figure 3-11 shows the ease of finding information about the program. On a scale of 0-10, where 0 represents very challenging and 10 represents easy, most respondents said finding information was relatively straightforward, with an overall score of 7.9. This is consistent with the finding that 66 percent of the respondents heard of the program through AEP Ohio staff minimizing their efforts.

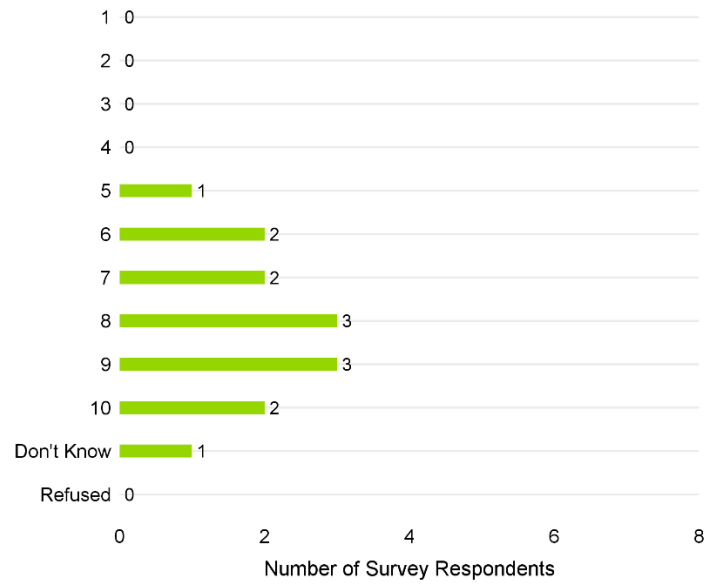
Figure 3-11. Rate of Ease in Finding Program



Source: Navigant analysis of customer survey

Figure 3-12 presents the ease of the application process. On a scale of 0-10, where 0 represents very difficult and 10 represents easy, most respondents said the application process was somewhat easy. The overall score is 7.8. Although the application is over 20 pages long, many of the larger projects have assistance from the Outreach and Implementation contractor in completing the application, removing a barrier to participation and resulting in the high perception of ease in completion.

Figure 3-12. Application Process Ease of Use

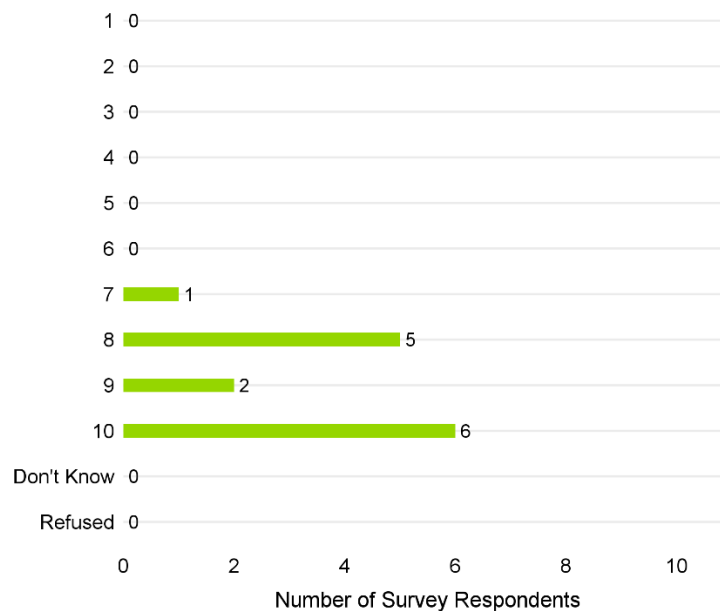


Source: Navigant analysis of customer survey



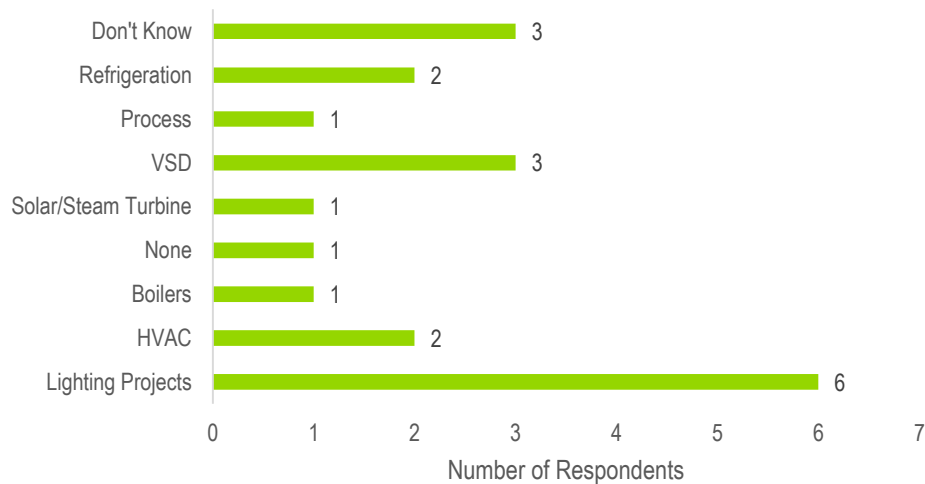
Figure 3-13 shows the overall program satisfaction. On a scale of 0-10, where 0 represents not satisfied and 10 represents very satisfied, most respondents said they were very satisfied. The overall score is 8.9. This overall score confirms the earlier findings of customer satisfaction regarding the financial benefits of participation, the customer's willingness to participate again in the future, and ease of completing the program application reflecting the customer's overall experience with the program.

**Figure 3-13. Overall Program Satisfaction**



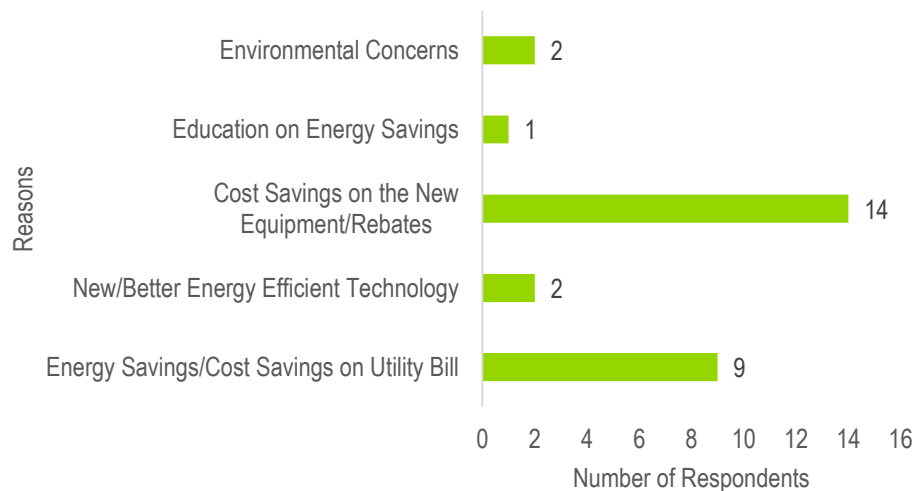
Source: Navigant analysis of customer survey

Figure 3-14 shows other energy efficiency projects that respondents would undertake if rebates were available to help offset the upfront costs (each respondent could choose multiple measures). Six respondents listed lighting projects, three respondents listed VSDs, and two each listed refrigeration and HVAC. The majority of projects listed are currently eligible for the Process Efficiency program demonstrating that some current participants are not fully aware of the measure options the Process Efficiency program offers.

**Figure 3-14. Projects to Undertake if Rebate Available**


Source: Navigant analysis of customer survey

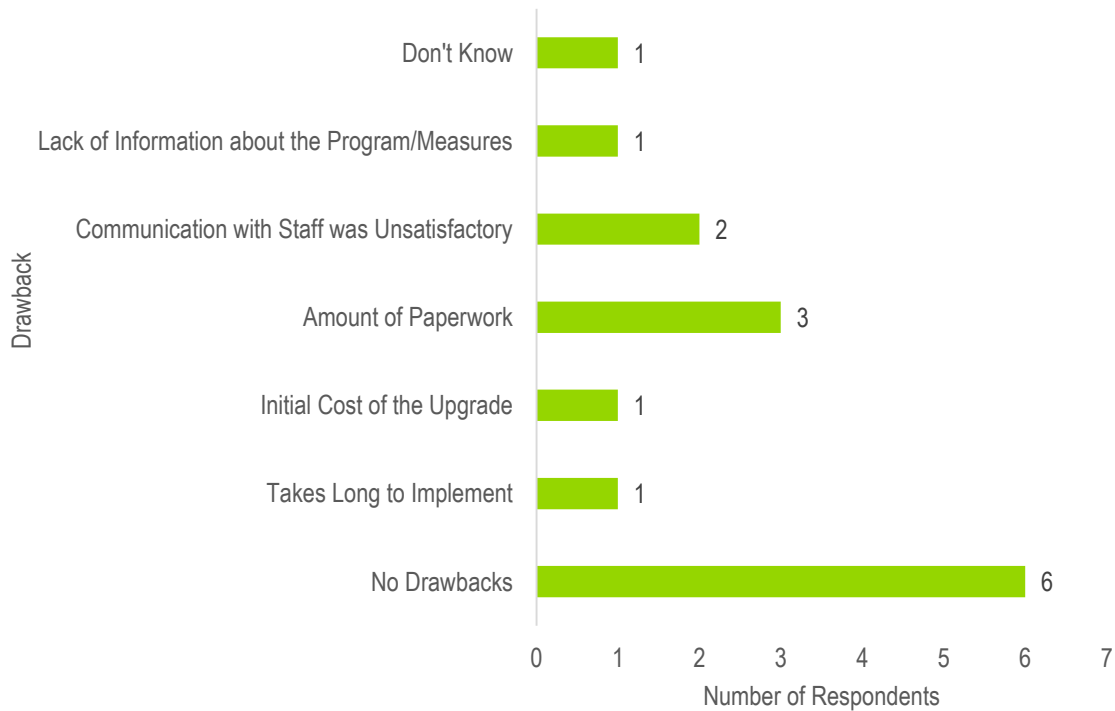
Figure 3-15 presents what participants saw as the main benefit to participating in the program (multiple responses could be selected). Fourteen respondents said rebates were the main benefit, nine respondents said energy savings/cost savings on utility bills. Others mentioned environmental concerns, new energy efficient technology, and education on energy savings. Figure 3-15 further supports the earlier discussion of the financial benefits of the Process Efficiency program being a driver for participation. But it also highlights the need to provide the customer with all of the benefits energy efficiency improvements can provide.

**Figure 3-15. Main Benefits to Participating in the Process Efficiency Program**


Source: Navigant analysis of customer survey

Figure 3-16 shows what participants listed as drawbacks to participating in the program. Six respondents saw no drawbacks, three listed the paperwork, while two were unsatisfied with staff communications. One of the respondents who was unsatisfied with both the paperwork and communications mentioned that their energy advisor changed a number of times making it difficult to communicate the site's needs and how to help them.

**Figure 3-16. Drawback to Participating in the Process Efficiency Program**



Source: Navigant analysis of customer survey

### 3.4 Cost Effectiveness Review

This section addresses the cost effectiveness of the Process Efficiency Program. Cost effectiveness is assessed using the Total Resource Cost (TRC) test. Table 3-14 summarizes the unique inputs used in the TRC test.

**Table 3-14. Inputs to Cost-Effectiveness Model for the Process Efficiency Program**

Item	Input
Measure Life	18
Participants	62
<i>Ex Post</i> Annual Energy Savings (kWh)	48,989,050
<i>Ex Post</i> Coincident Peak Savings (kW)	3,733.65
Third Party Implementation Costs	\$1,569,636
Utility Administration Costs	\$633,220
Utility Incentive Costs	\$1,558,341
Incremental Participant Cost	\$22,648,346

*Source: Program Tracking Database*

Based on these inputs, the TRC ratio is 1.3 and the Process Efficiency Program passes the TRC test. Table 3-15 summarizes the results of the cost-effectiveness tests. Results are presented for the Total Resource Cost test, the Participant Cost Test, the Ratepayer Impact Measure Test, and the Utility Cost Test.

**Table 3-15. Cost Effectiveness Results for the Process Efficiency Program**

Benefit-Cost Test	Benefit/Cost Ratio
Total Resource Cost	1.3
Participant Cost Test	1.7
Ratepayer Impact Measure	0.8
Utility Cost Test	8.3

*Source: AEP Ohio*

At this time, additional benefits related to reduction of greenhouse gas emissions have not been quantified in the calculation of the TRC. These additional benefits would increase the given TRC benefit/cost ratio.

## 4. KEY FINDINGS AND RECOMMENDATIONS

This section presents the key findings and recommendations from the 2017 Process Efficiency program impact and process evaluations.

### 4.1 Key Impact Findings and Recommendations

The impact results for the 2017 Custom Program are shown in Table 4-1, which shows the *ex ante* savings claimed by the program, the evaluated savings, and the 2017 realization rates. In 2017, the program achieved 49.0 GWh energy savings and 3.73 MW peak demand savings. The realization rate for 2017 was 105 percent for energy and 76 percent for demand savings. Reasons for adjustments to savings estimates were varied but not systemic. Generalized adjustments are described below:

- Navigant corrected errors in power factor calculation for motors.
- Navigant normalized pre- and post-production data differently than the implementation contractor in several cases.
- Navigant calculated peak demand savings differently, with a primary goal of comparing like-for-like operating efficiencies for processes that were identical in both the pre- and post-periods.
- Supplemental production and billing data acquired by the evaluation team modified some results.

**Table 4-1. Program Savings and Realization Rates for 2017**

	2017 Program Goals <sup>1</sup> (a)	<i>Ex Ante</i> Savings <sup>2</sup> (b)	<i>Ex Post</i> Savings (c)	Realization Rate RR = (c) / (b)	Percent of Goals = (c) / (a)
Energy Savings (MWh)	42,004	46,464	48,989	1.05	117%
Demand Savings (MW)	7.02	4.93	3.73	0.76	53%

Sources: <sup>1</sup>ENERGY EFFICIENCY / PEAK DEMAND REDUCTION (EE/PDR) PORTFOLIO 2017 to 2020 Evaluation Plan, September 27, 2017. <sup>2</sup>Evaluation analysis of AEP Ohio tracking data from January 12, 2017.

The 2017 Process Efficiency Program impact evaluation resulted in several findings and recommendations:

**Impact Finding 1:** Demand savings should be characterized based on average savings during the various peak periods, including AEP Ohio peak and PJM summer peak. Errors include using average equipment load rather than coincident peak load, and comparing dissimilar pre- and post- logging data.

**Impact Recommendation 1a:** Ensure demand savings are estimated consistently and accurately from project to project and recorded in the tracking data separately for AEP Ohio and PJM summer. This will improve the accuracy of PJM estimates and reduce uncertainty. Ensure new implementation engineers are trained on the differences between non-coincident peak, AEP Ohio peak, and PJM summer peak.

**Impact Finding 2:** Several projects relied on pre- and post-energy use and production data as the basis for energy savings. The pre- and post- data presented in the original application often represent no changes to customer operations, but may highlight differences due to the logging period rather than meaningful differences in the energy profile itself.

**Impact Recommendation 2a:** First, ensure process improvements can be quantified, make sense from an engineering perspective, and do not simply reflect production or yield increases. Require additional pre- and post- data to ensure seasonal trends are accounted for. Use pre-retrofit production levels rather than post-production levels, where appropriate, based on counterfactual options for production increases to calculate final energy savings, and consider a dual baseline for increased production. In other cases where production should be consistent, use both pre- and post-data as the average production and normalize data accordingly.

**Impact Recommendation 2b:** For projects with hourly data, especially projects where equipment is used intermittently, ensure the pre- and post-data represents differences in efficiencies and not simply differences in usage during the limited logging period. Additional logger data is helpful if there are significant intermittencies observed.

**Impact Finding 3:** There are often difficulties assessing baseline operating conditions when customers engage with the program later in the retrofit process. In some cases, baseline equipment may already be removed and it is thus impossible to perform data logging to confirm operational characteristics. There is also limited ability for trade allies and the implementation contractor to push efficiency levels as high as possible.

**Impact Recommendation 3a:** The program should enforce its requirement to submit a pre-application prior to purchasing equipment or otherwise committing to a project, which will help ensure viable projects move forward in an orderly manner. Encourage Solution Providers to work with large customers on a proactive basis to assist in creating value for customers through energy efficiency. This action has the additional benefit of encouraging additional pre-retrofit data logging, and a better understanding of the baseline conditions. If there is difficulty assessing baseline energy consumption but projects are otherwise viable, conservative assumptions should be used. (e.g., low motor load factor).

**Impact Recommendation 3b:** Process projects that submit applications later in the retrofit cycle as Self-Direct projects.

**Impact Finding 4:** Some projects have complex economics that affect the customers' decision-making process, including costs beyond electricity and upfront equipment costs. Projects are being incentivized when initial project cost was negative, i.e. the efficient project was less expensive initially than the baseline cost.

**Impact Recommendation 4a:** Do not provide incentives to projects that have negative incremental project costs. Ensure total and incremental project costs for complex projects are accurately characterized and documented in the project specific documentation.

**Impact Recommendation 4b:** Make sure terms and conditions clearly state that incremental cost refers to initial capital investment and not O&M cost or other fuel costs.

**Impact Finding 5:** Process efficiency projects that do not involve a direct capital expenditure that is solely related to energy efficiency need to show extensive documentation as to why the decision is primarily motivated by electrical energy costs. If there are primary reasons outside of energy efficiency to do the project then it is not an energy efficiency project. The burden of proof is on the participant or the contractor to provide necessary documentation.

**Impact Recommendation 5:** Be conservative in approving process efficiency projects that fit into this category. Manage customer expectations regarding the length of time required to prove the project and if an incentive will be offered at all until a final decision is made.

**Impact Finding 6:** Several large motor retrofit projects did not accurately characterize baseline energy consumption.

**Impact Recommendation 6:** Ensure that power factor and load factor are reasonable and supported by pre-retrofit logging, equipment measurements, and/or detailed operational characteristics from the site engineer. Consider more conservative estimates when there is significant uncertainty for any motor parameters.

## 4.2 Key Process Findings and Recommendations

The following process recommendations are offered to help improve program effectiveness and efficiency and further improve participant's experience of the program.

**Process Finding 1:** The separate databases for both the intake contractor and the implementation contractor do not provide transparency into a customer's full experience with the Process Efficiency program, including elapsed time from initial contact through final incentive payment, and reasons a customer may not complete their project.

**Process Recommendation 1:** The intake and implementation contractors should review the steps in their respective application processes to identify potential problem areas for individual customers.

**Process Finding 2:** The Process Efficiency, Efficient Products for Business, and Self Direct program application is a 20-page document outlining the application's guidelines, checklists, customer information needed and worksheets for the various end-use measures. For a Solution Provider or customer who is well versed in the program, the document provides everything needed to submit a project for an incentive. However, for a new customer the application can be overwhelming.

**Process Recommendation 2:** In the application, clearly identify 1) the guidelines applicable to each program and 2) the checklist of required attachments. This could be accomplished using a matrix with the three programs as columns headers and the various step as rows; with a check mark designating which steps are needed for that program. (For example, Process Efficiency measures require pre-approval, other programs do not). Also, the Terms and Conditions for the three programs were in two separate documents; for ease of reference, include the Terms and Conditions in the Application. Consolidating all of the needed information for each program will help the new customer navigate the process.

**Process Finding 3:** The program application and supporting documents were not consistent in the information provided, making it difficult for a customer to understand the requirements of the program.

**Process Recommendation 3a:** Review all of the program applications, terms and conditions, and specification sheets for consistency of information.

**Process Finding 4:** The Process Efficiency program could not be easily located through the AEP Ohio website with a minimum of four clicks from the AEP Ohio home page.

**Process Recommendation 4:** Develop a landing page on AEP Ohio's website that provides easily identifiable pathways for a customer to find the needed programs and information.

**Process Finding 5:** In the telephone survey, respondents said they mainly heard about the program from AEP Ohio staff. The internet and co-workers were also mentioned. Respondents generally participated in the program because they wanted to save money, or receive the incentive. Overall, participants were satisfied with all aspects of the program and they would participate again. However, some participants list the difficulty of filling out the paperwork as a drawback to the program.

**Process Recommendation 5a:** Keep providing a high-quality program to maintain high customer satisfaction. Work on reducing paperwork and ensure participants can get help in filling it out.

**Process Recommendation 5b:** When developing the program messaging include aspects that may help the customer justify the expenditure such as supporting their corporate sustainability goals, reducing maintenance costs, improving the employee's comfort, and reducing greenhouse gases.

**Process Finding 6:** Industrial and manufacturing sector projects and measures continued to dominate the program in 2017. The AEP Ohio Program Coordinator indicated interest in expanding marketing efforts, including increasing outreach and targeted marketing to other customer segments outside of industrial and manufacturing.

- **Process Recommendation 6a:** There is an opportunity to diversify the participating customer base by implementing Solution Provider requirements. Currently, a few Solution Providers bring in the majority of the savings and specialize in industrial/manufacturing customers. By encouraging different Solution Providers to participate and grow their businesses, either through training, additional research on barriers to entry, and creating limited-time incentives, the customer type and measure type could diversify.
- **Process Recommendation 6b:** Several participants indicated that there were other measures they were interested in installing if rebates were available, indicating that there are opportunities for expanding measure depth within the Process Efficiency Program, or channeling customers to other relevant business programs. The majority of measures listed are currently eligible for incentives, demonstrating that some current participants are not fully aware of the measure options available to them.

### 4.3 Key Tracking System and Project File Findings and Recommendations

With respect to the Project Tracking Database and Project Files, Navigant offers the following observations and recommendations for improved clarity and tracking.



**Tracking System Finding 1:** The program databases of the intake and implementation contractors do not align the projects by date. Not having the initial application submittal date in the implementation contractor's database makes it impossible to track the customer experience from the application's initial submittal to the intake contractor, through to the payment of the invoice by the implementation contractor.

**Tracking System Recommendation 1:** The intake contractor's database should have clear indication for the date of first project contact, and date application is submitted to implementation contractor. Both of these dates should carry to the implementation contractor to allow analysis of a customers' full experience with the program

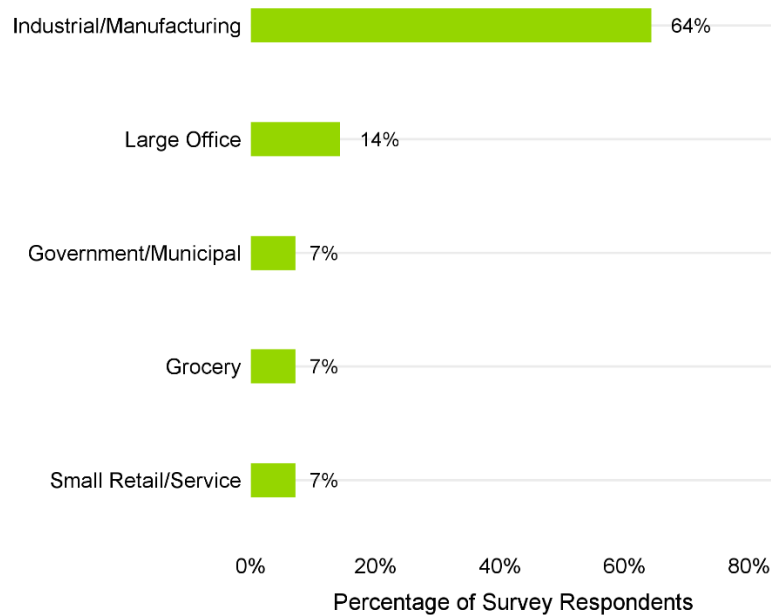
**Tracking System Finding 2:** In reviewing the tracking database, Navigant found some fields were not completed for all applicants. Most critically the email address, PJM summer and winter savings, and square footage were missing for some of the projects.

**Tracking System Recommendation 2:** As part of the administrative review of applications, add a check to ensure information for fields are complete and are entered into the database. Add new database fields specifically for PJM summer and winter demand savings.

## APPENDIX A. PARTICIPANT PHONE SURVEY RESULTS

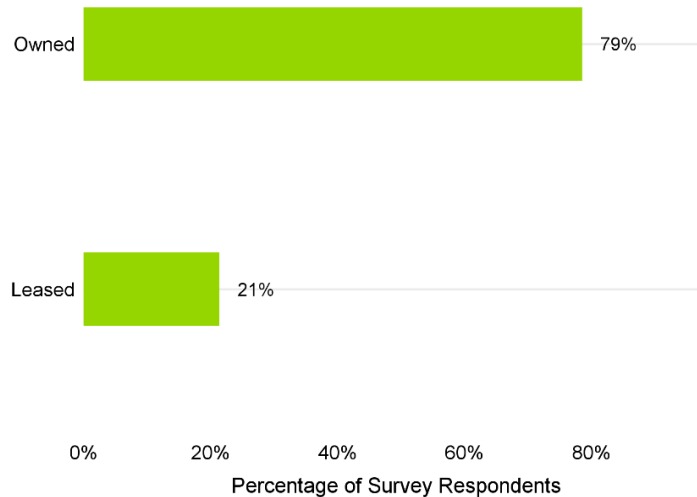
Following are results for each question from the participant telephone survey.

**Figure A-1. How would you categorize business conducted at this site? (n=14)**



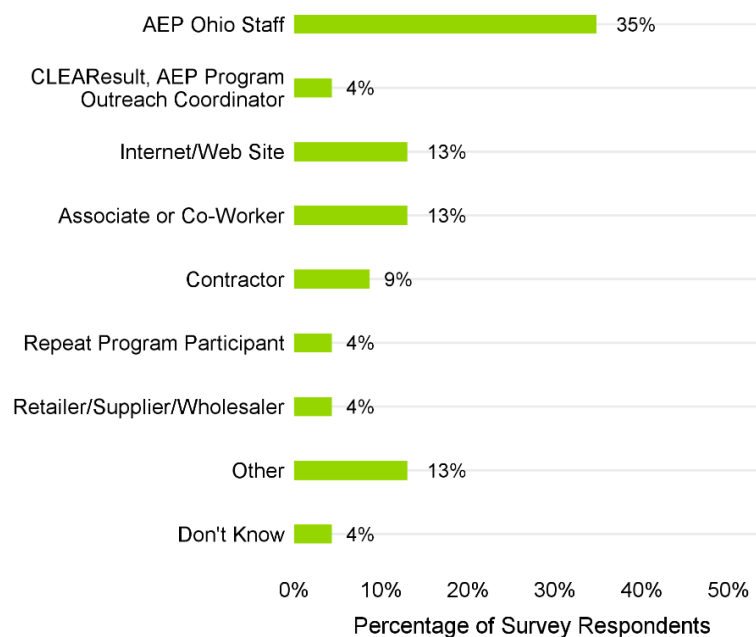
*Source: Navigant analysis of customer survey*

Figure A-2. Is building where project was completed owned or leased? (n=14)



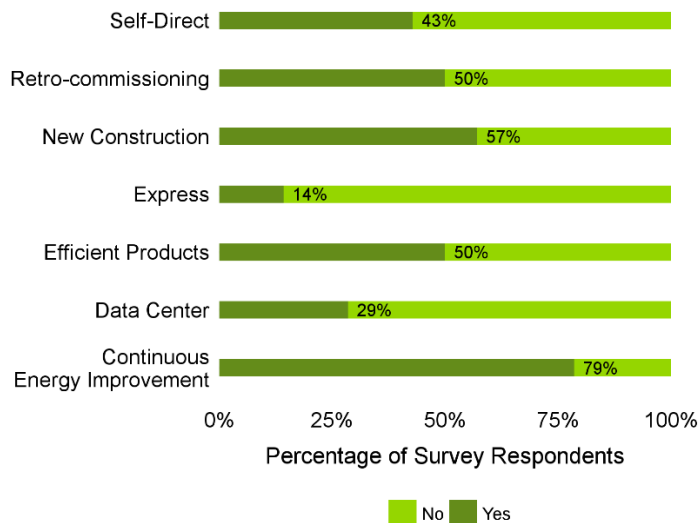
Source: Navigant analysis of customer survey

Figure A-3. How did you first learn of PE Program? (n=14; multiple responses)



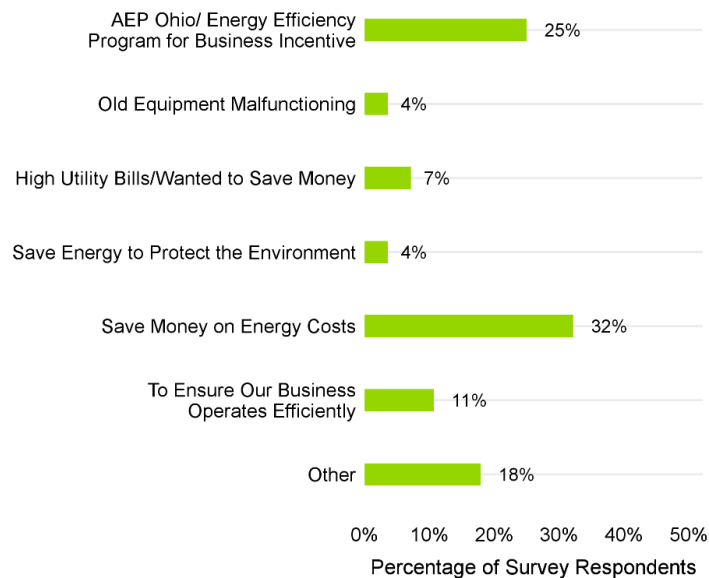
Source: Navigant analysis of customer survey

Figure A-4. Awareness of Other Business Program? (n=14)



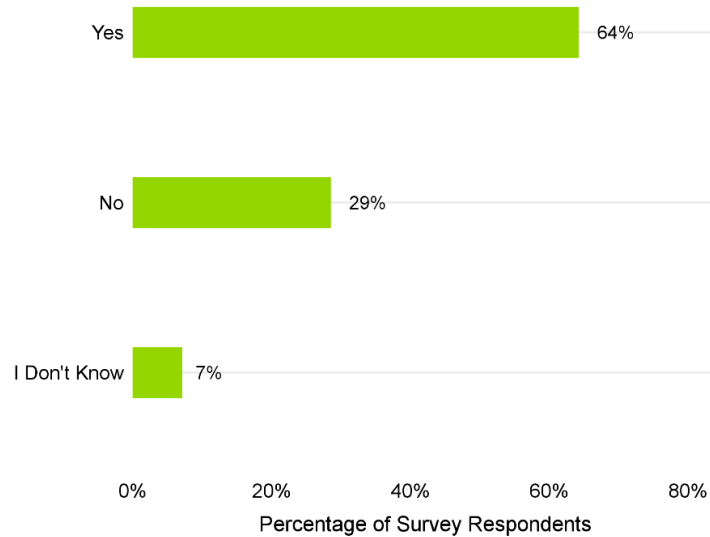
Source: Navigant analysis of customer survey

Figure A-5. What were main reasons your company decided to participate in PE Program? (n=14; multiple responses)



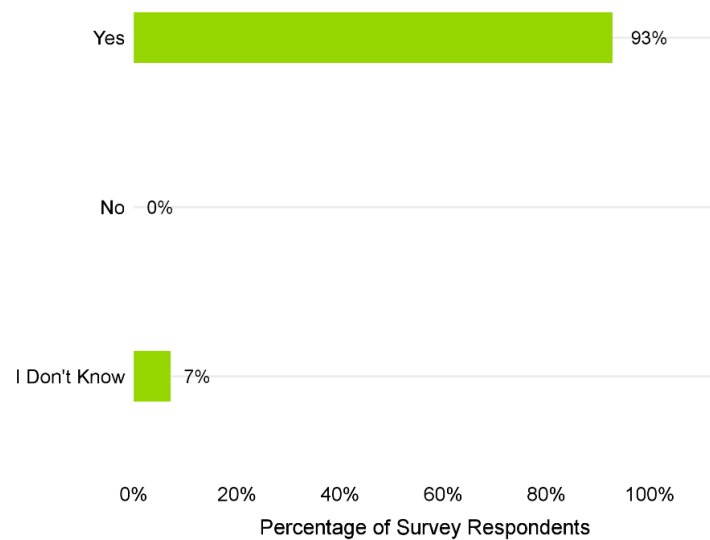
Source: Navigant analysis of customer survey

**Figure A-6. If contractor installed equipment, were you encouraged to consider efficiency options that met AEP Ohio's program recommendations? (n=14)**



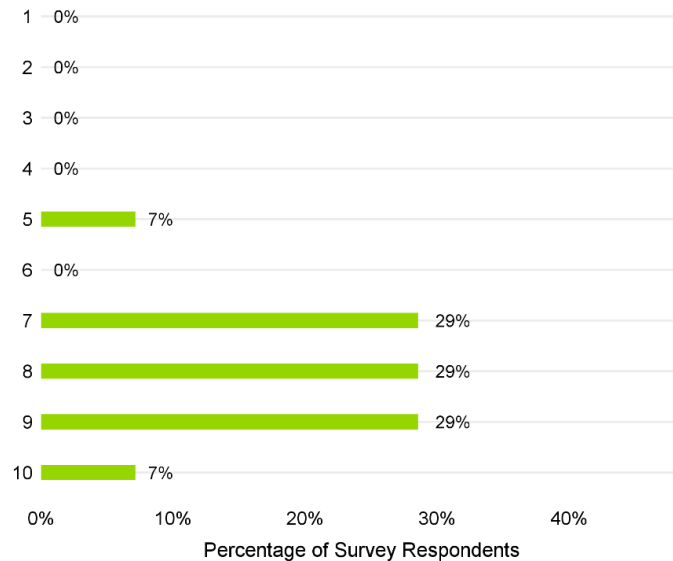
Source: Navigant analysis of customer survey

**Figure A-7. Would you participate in the PE Program again? (n=14)**



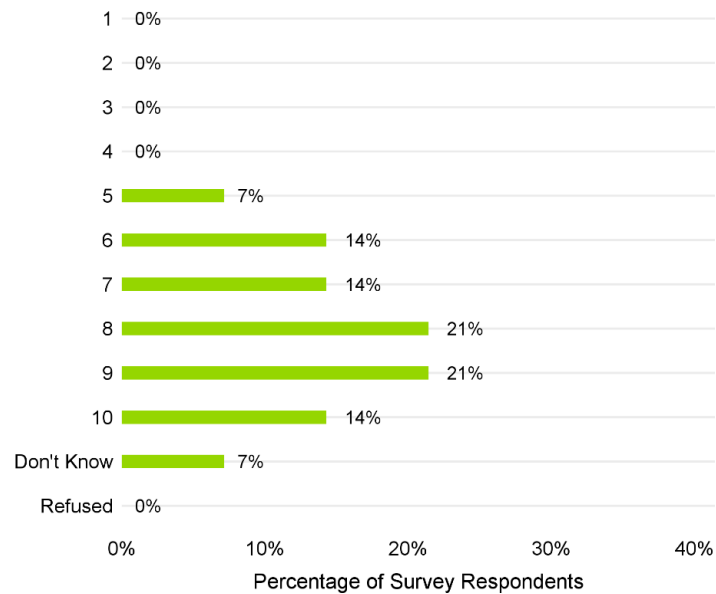
Source: Navigant analysis of customer survey

Figure A-8. How would you rate ease of finding information about PE Program (0=very challenging; 10=very easy)? (n=14)



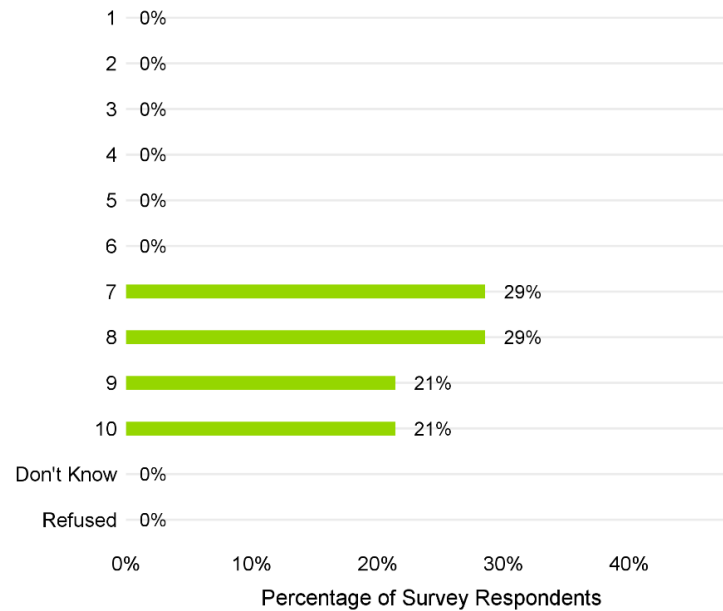
Source: Navigant analysis of customer survey

Figure A-9. How difficult or easy did you find application process (0=difficult; 10=easy)? (n=14)



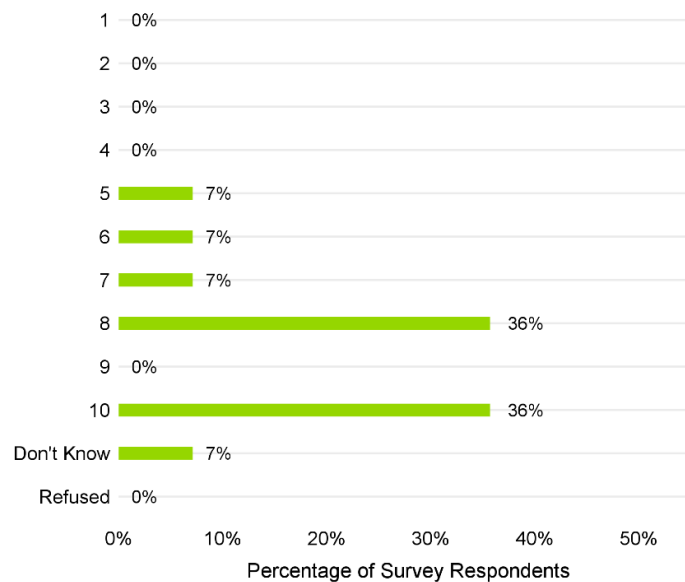
Source: Navigant analysis of customer survey

Figure A-10. How satisfied were you with level of documentation required (0=not satisfied; 10=very satisfied)? (n=14)



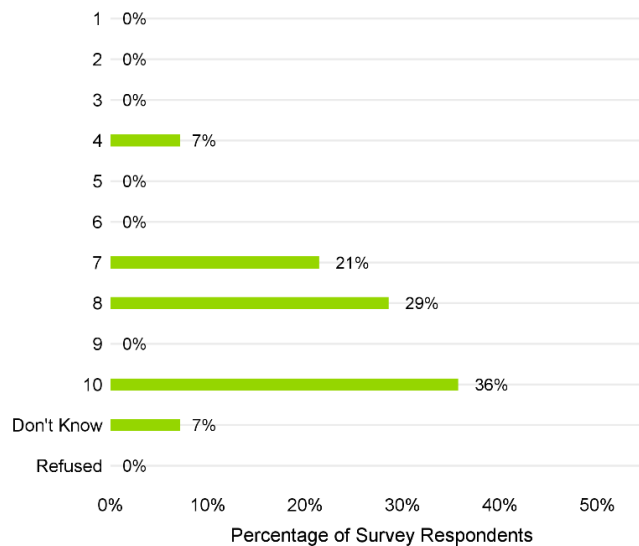
Source: Navigant analysis of customer survey

Figure A-11. How satisfied were you with amount of time spent from beginning of project to time you received incentive (0=not satisfied; 10=very satisfied)? (n=14)



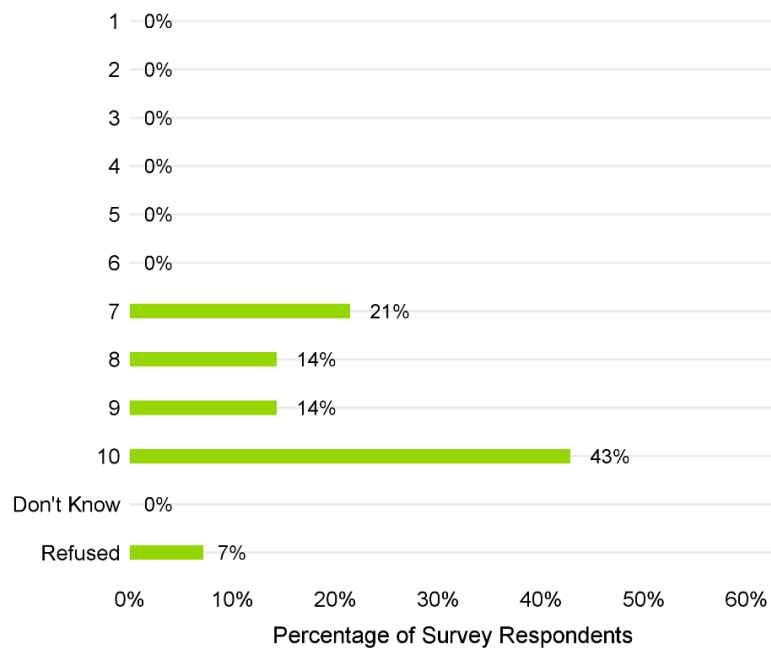
Source: Navigant analysis of customer survey

Figure A-12. How satisfied were you with communication with program representatives (0=not satisfied; 10=very satisfied)? (n=14)



Source: Navigant analysis of customer survey

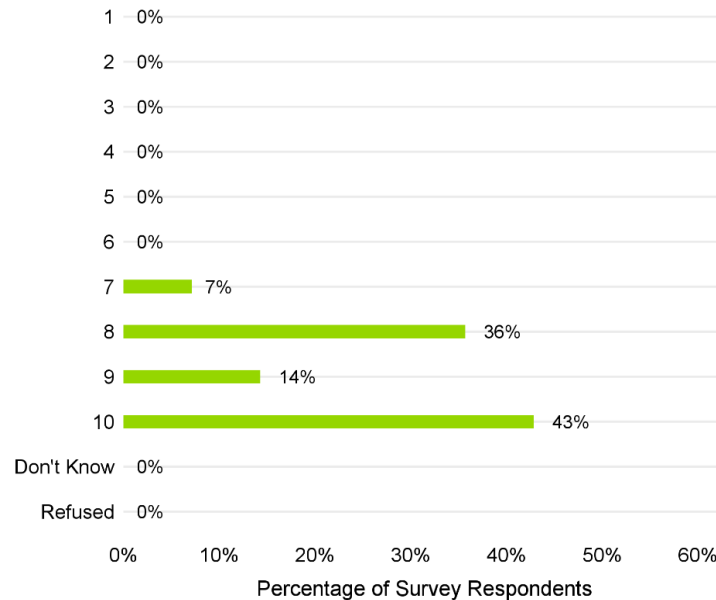
Figure A-13. How satisfied were you with EE level required to qualify for incentive (0=not satisfied; 10=very satisfied)? (n=14)



Source: Navigant analysis of customer survey

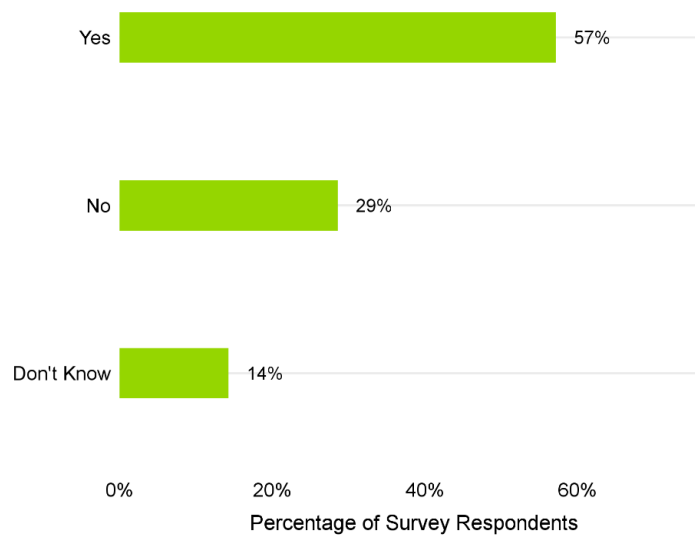


Figure A-14. How satisfied were you with PE Program overall (0=not satisfied; 10=very satisfied)?  
(n=14)



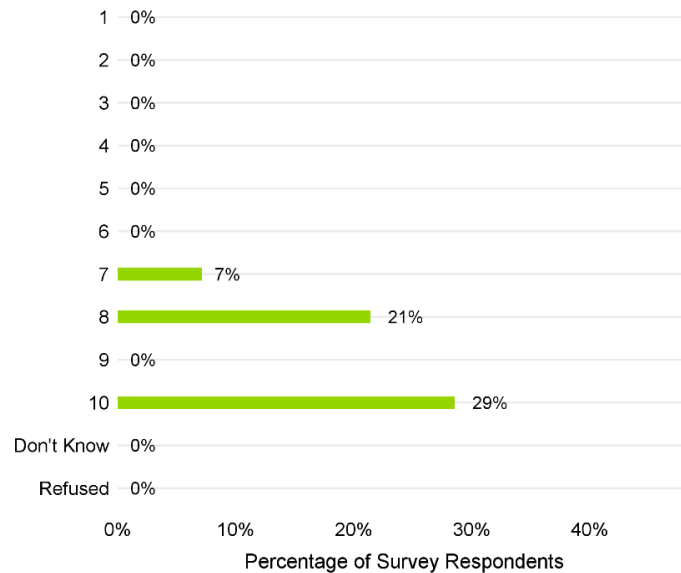
Source: Navigant analysis of customer survey

Figure A-15. When you first applied to program, was there kickoff meeting with AEP Ohio team to discuss project goal? (n=14)



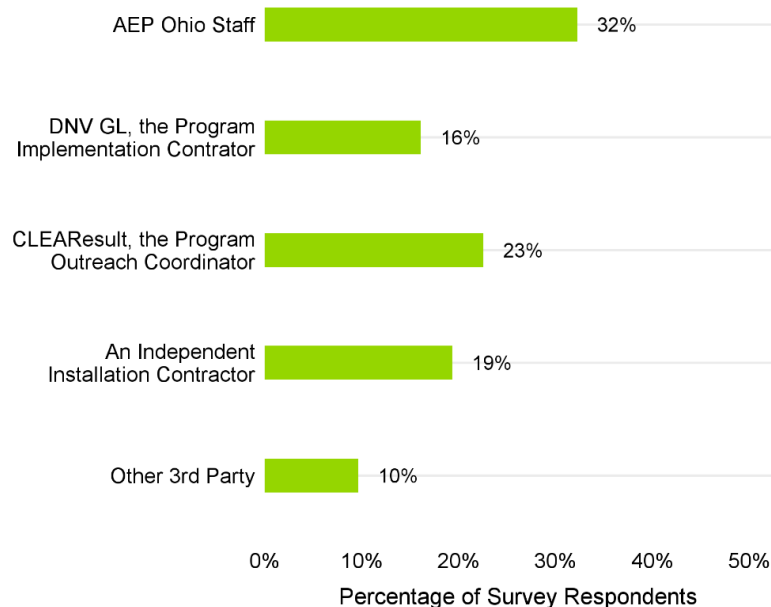
Source: Navigant analysis of customer survey

Figure A-16. Have you been pleased with way PE Program has addressed goals you set in kickoff meeting (0=not at all pleased; 10=very pleased)? (n=8)



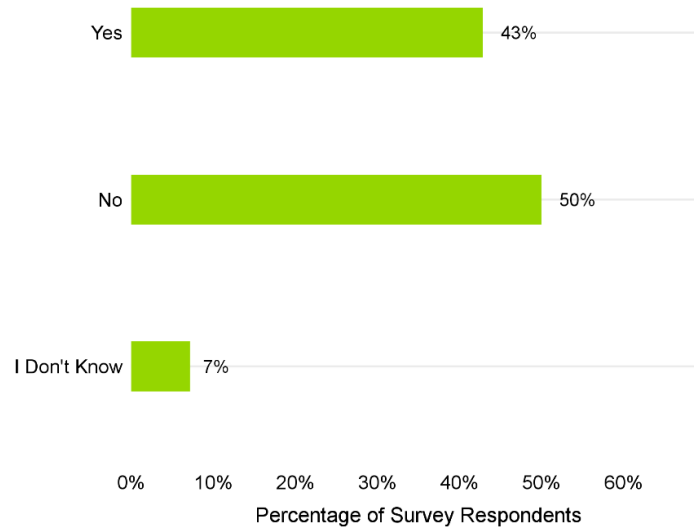
Source: Navigant analysis of customer survey

Figure A-17. Who assisted you with PE Program (#)? (n=14; multiple responses)



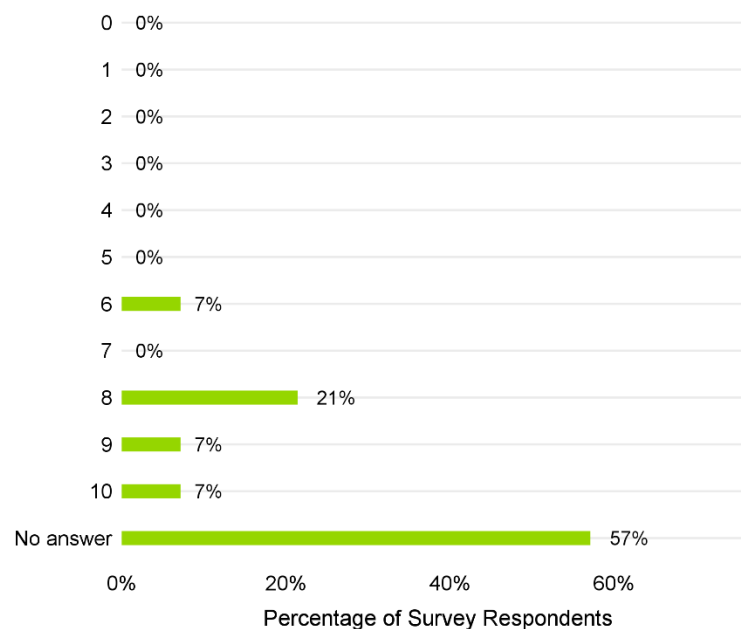
Source: Navigant analysis of customer survey

Figure A-18. Was there written review of initial project with suggestions for improvement? (n=14)



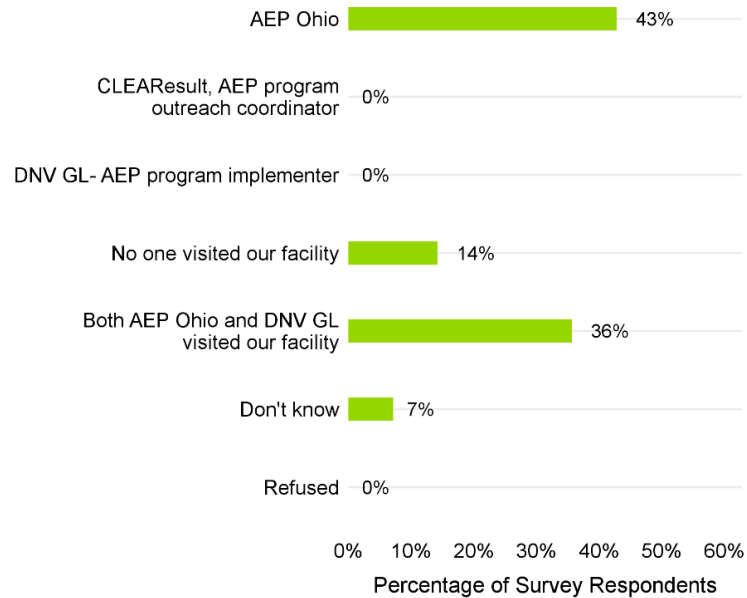
Source: Navigant analysis of customer survey

Figure A-19. How well do you feel suggestions PE Program made have improved efficiency of your project (0=not much improved; 10=significantly improved)? (n=14)



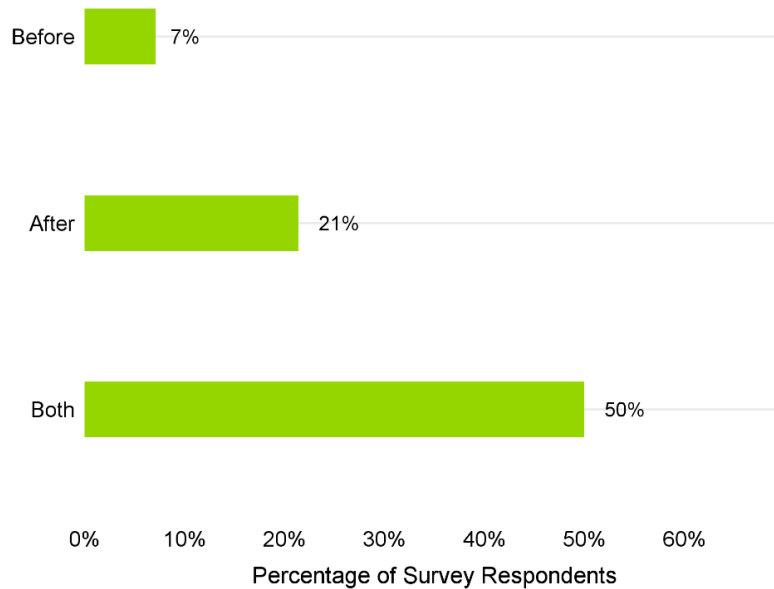
Source: Navigant analysis of customer survey

Figure A-20. Did representative visit your facility for the project? (n=14)



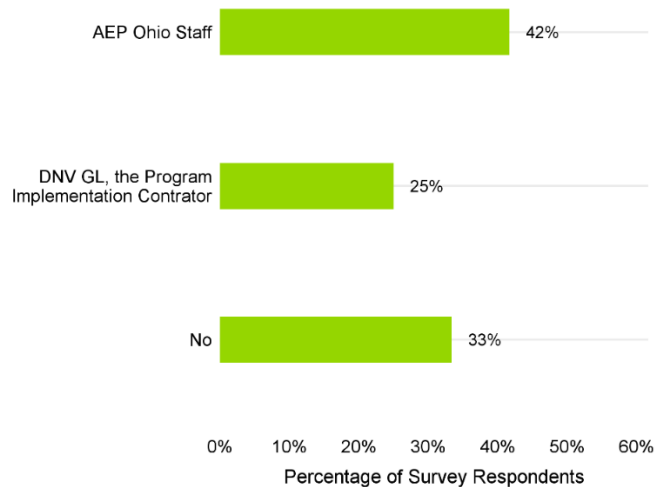
Source: Navigant analysis of customer survey

Figure A-21. Did representative visit before, or after work on the project started? (n=11)



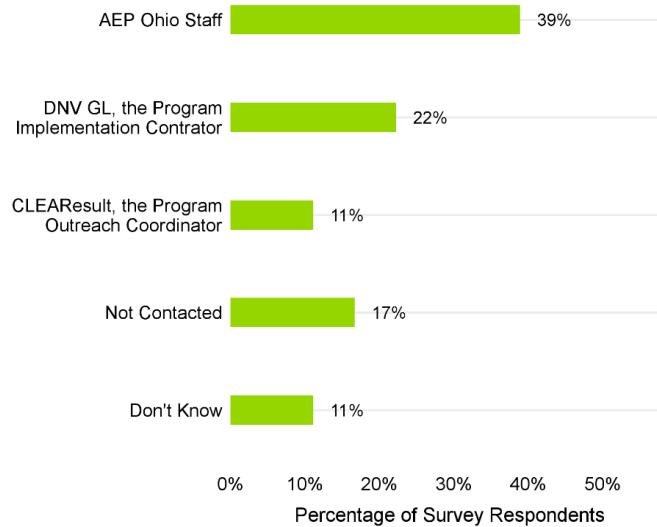
Source: Navigant analysis of customer survey

Figure A-22. Did a representative identify additional measures or projects during site visit? (n=12; multiple responses)



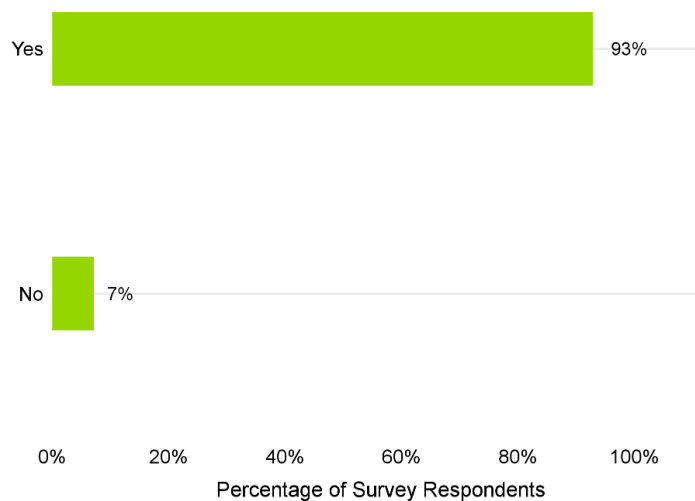
Source: Navigant analysis of customer survey

**Figure A-23. Were you contacted after project was completed by a representative to check-in on completed project or ask about other projects you are considering? (n=14; multiple responses)**



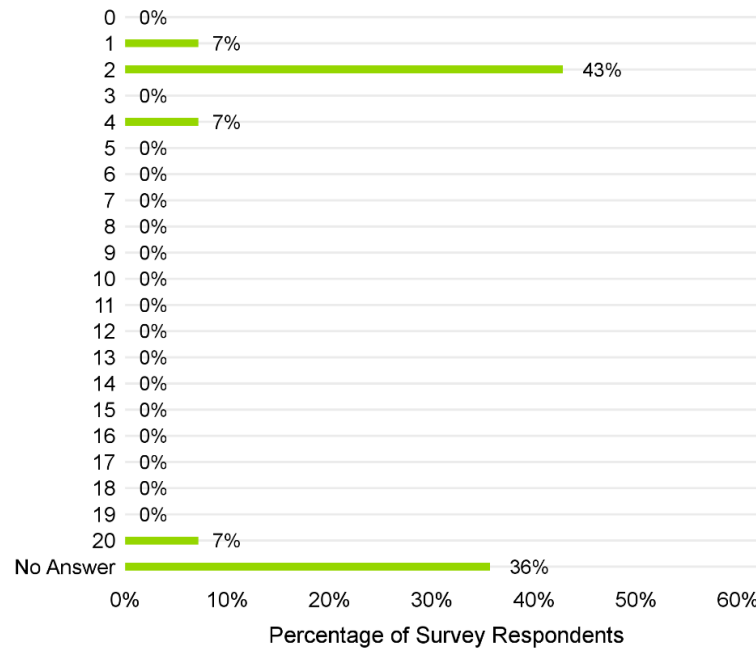
Source: Navigant analysis of customer survey

**Figure A-24. Were costs for EE aspect of your project easy to identify and submit to AEP Ohio? (n=14)**



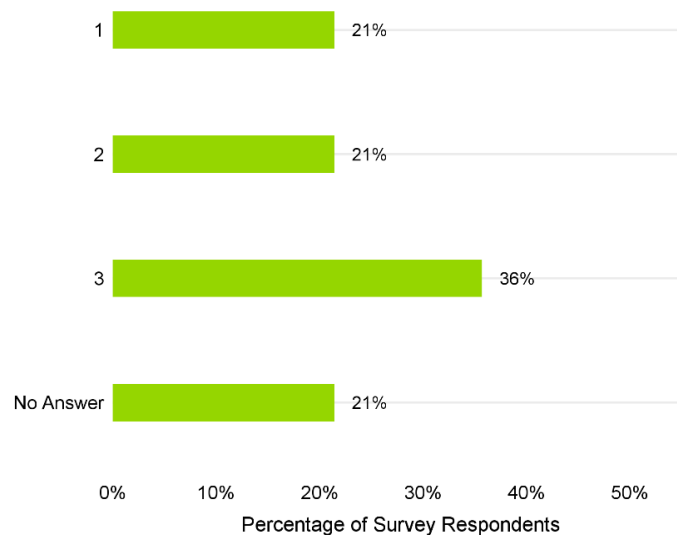
Source: Navigant analysis of customer survey

Figure A-25. How long did it take to complete and submit program application? (n=14)



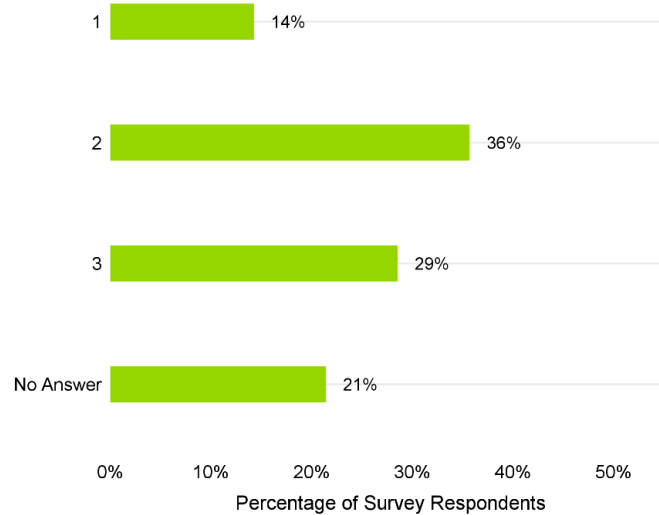
Source: Navigant analysis of customer survey

Figure A-26. Rank on influence for you NOT being able to implement EE measures (management priority, 1=main concern; 3=low concern)? (n=14)



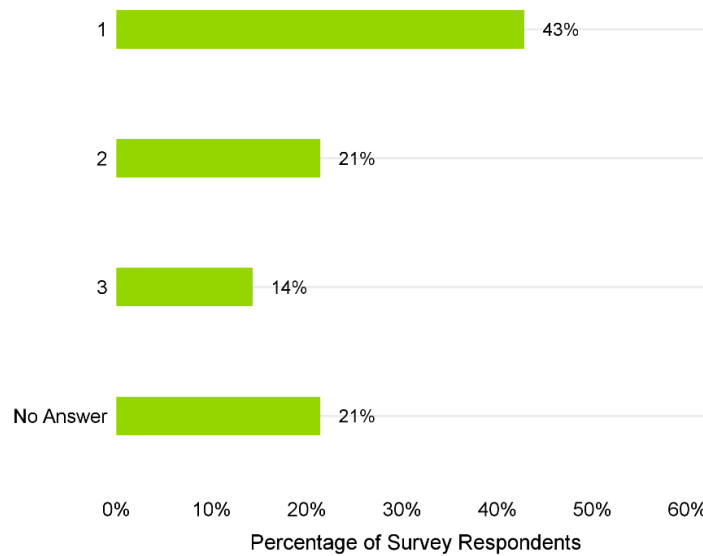
Source: Navigant analysis of customer survey

**Figure A-27. Rank on influence for you NOT being able to implement EE measures, (Staff Time, 1=main concern; 3=low concern)? (n=14)**



Source: Navigant analysis of customer survey

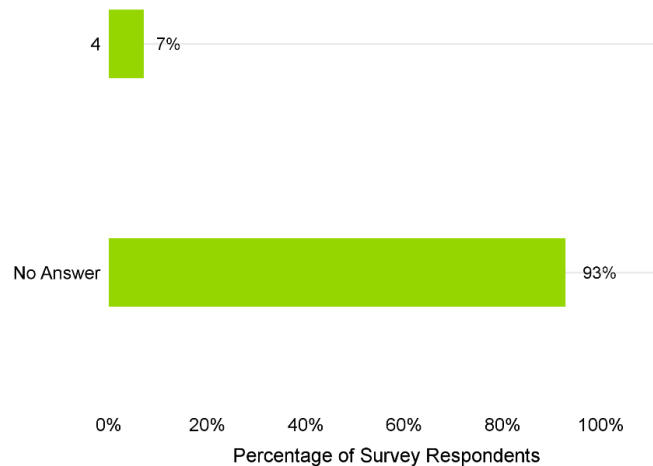
**Figure A-28. Rank on influence for you NOT being able to implement EE measures (Project Funding, 1=main concern; 3=low concern)? (n=14)**



Source: Navigant analysis of customer survey

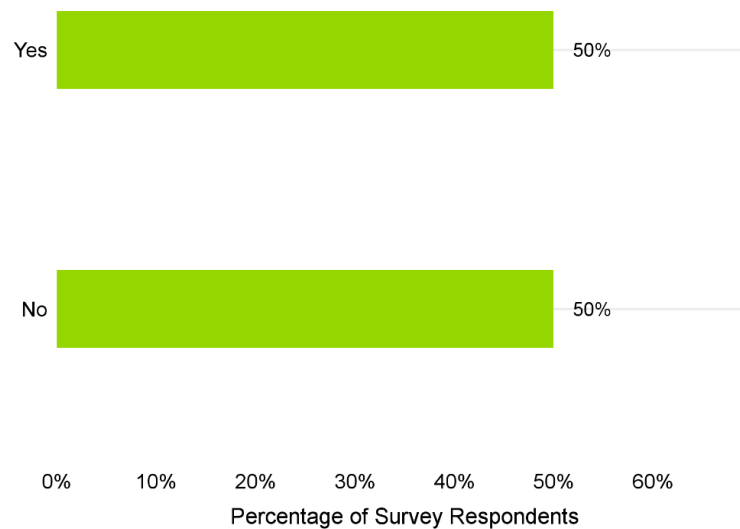


Figure A-29. Rank on influence for you NOT being able to implement EE measures (Other; 1=main concern; 3=low concern)? (n=14)



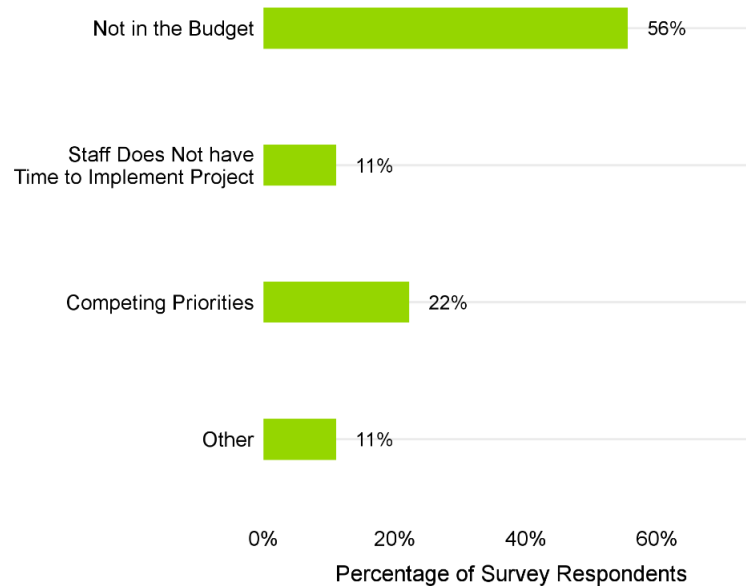
Source: Navigant analysis of customer survey

Figure A-30. Do you have EE projects on-hold at your business? (n=14)



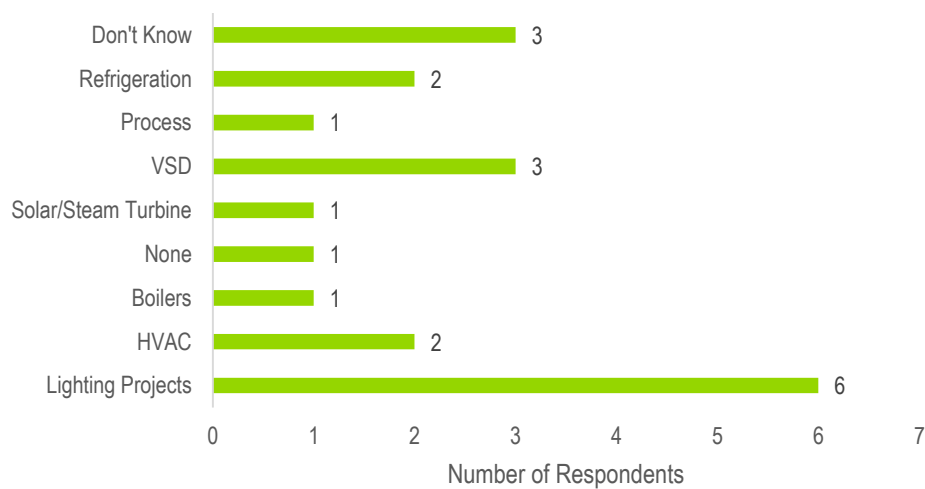
Source: Navigant analysis of customer survey

Figure A-31. Why are those projects on-hold? (n=7; multiple responses)



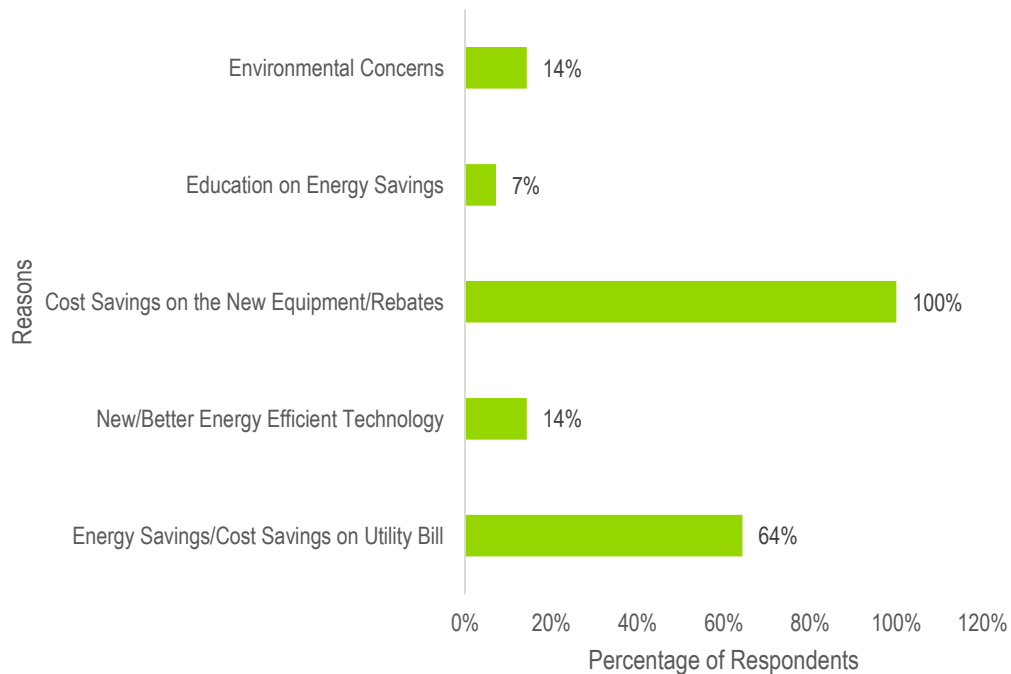
Source: Navigant analysis of customer survey

Figure A-32. What EE projects would you undertake if there was a rebate to help offset costs? (n=14; multiple responses)



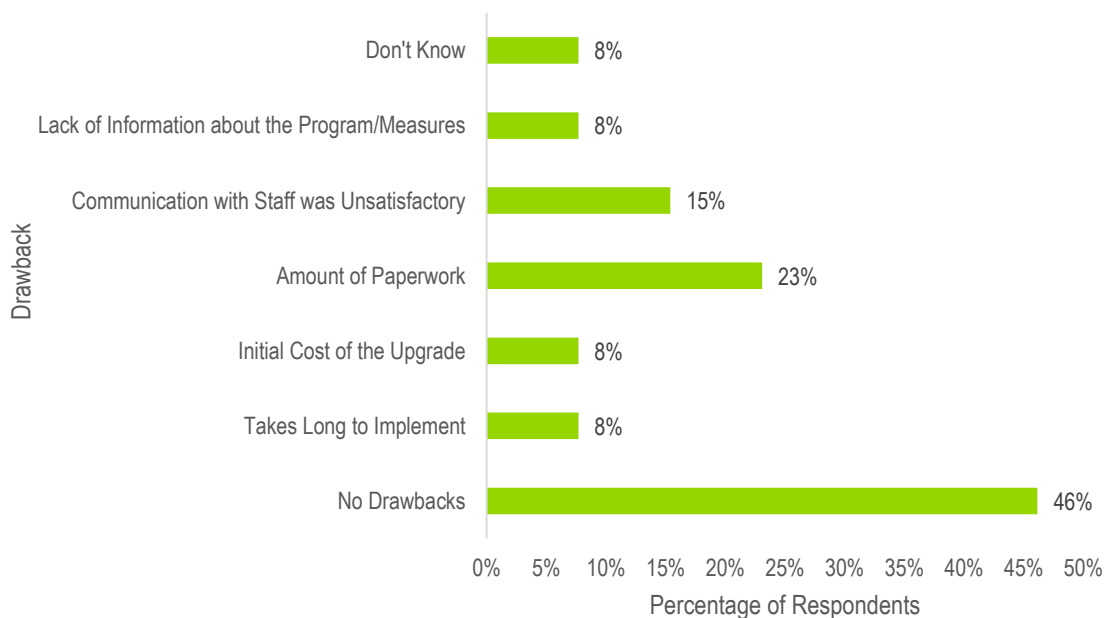
Source: Navigant analysis of customer survey

Figure A-33. What are main benefits to participating in PE Program? (n=14; multiple responses)



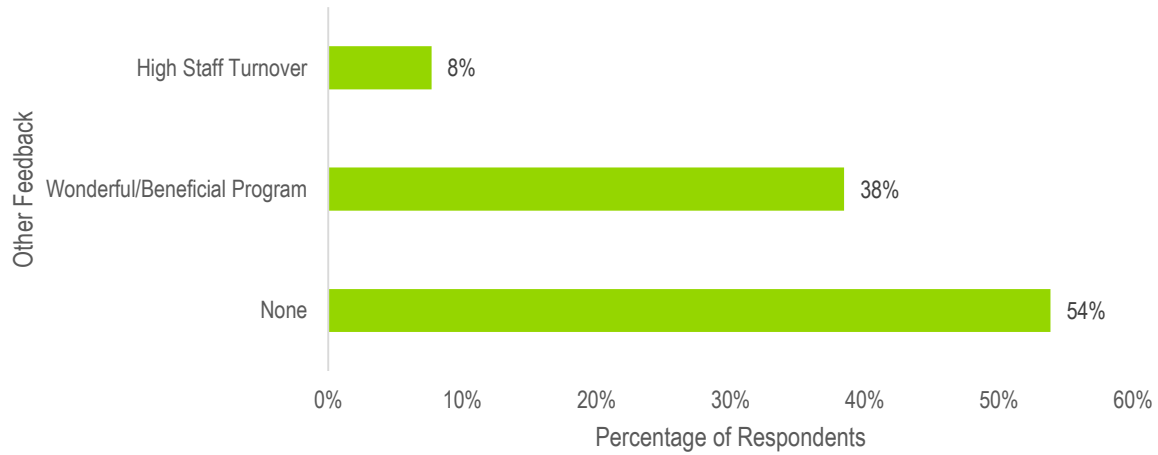
Source: Navigant analysis of customer survey

Figure A-34. What do you see as drawbacks to participating in PE Program? (n=13; multiple responses)



Source: Navigant analysis of customer survey

Figure A-35. Do you have other feedback on PE Program? (n=13; multiple responses)



Source: Navigant analysis of customer survey

## APPENDIX B. AEP OHIO EVALUATION FOR THE ENERGY EFFICIENCY PROGRAM FOR BUSINESS PROGRAMS

### 2017 Program Manager In-Depth Interview Guide

Name of Interviewee:

Date:

Title:

Company:

Contact Information:

*[Note to Interviewer] The Interview Guide is a tool to guide process evaluation interviews with utility staff and implementation contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The depth of the exploration with any particular respondent will be guided by the role that individual played in the program's design and operation, i.e., where they have significant experiences for meaningful responses. The interviews will be audio taped and transcribed. Interviews in every case will be conducted by Navigant's process evaluation lead for the program to ensure full context and understanding for the interview, and to enable the interviewer to probe for the most meaningful questions and responses.*

#### Roles and Responsibilities

1. Can you describe your roles and responsibilities and how they've changed over the last year for the [Insert Name] Program?
2. When considering the implementation contractor and AEP Ohio staff job functions, have there have been any substantial changes in the roles or people assigned to these programs in the past year compared to previous program years? If so, what were they?
3. How often do you meet with the implementation contractor(s) for the program, and in what manner? How does the implementation contractor share program progress? Are there times when it would have been helpful to have earlier updates?
4. How often are you in contact with the program Solution Providers (or Contractors)? What are you hearing from the SPs (Contractors)? And how do they provide feedback? (emails, calls, in person...)?
5. How would you describe your interaction with the Business Programs Manager, Andy McCabe?

#### Program Design

6. Have the program materials, your procedural documentation or outreach documents for any of the three programs changed since last year? If so, can you send me the most current version?
7. What have been the key challenges in implementing the program in the past year? What steps have you taken to overcome these challenges?
8. Is the program on track to meet the filed savings goals? What about internal savings goals?

9. What other key performance indicators do you use to measure the performance of the program? Are you on track to meet those goals?
10. Regarding Navigant's Conclusions and Recommendations from last year's evaluation report, where are you in the process of implementing Navigant's recommendations? Please note any recommendations that will not be implemented and the corresponding reasoning.
11. Have there been any significant changes to the program (delivery, components, etc.) in 2017, and do you have any significant changes planned for 2018? Why were/are these changes made, and how do they affect program performance?
12. Have there been any changes to measures offered in 2017? Are there any planned changes on the horizon? From your perspective, does the program rely on a particular measure or end use to meet its goals? Do you have suggestions for measures that should be added?
13. Have you made any changes to incentive levels in 2017, and do you plan to make any in 2018?
14. How active are account managers in the program? In what ways do account managers improve the customer experience? Are any improvements needed in the role account managers play?

### Customer Experience

15. Please describe your interactions with Program participants. (Have any issues or areas for improvement been identified?)
16. Describe a typical first engagement with a new participant.
  - a. How is the first connection typically made?
  - b. Who is engaged from the participant side?
  - c. How is the program introduced to someone not wholly familiar?
  - d. What technical assistance is offered?
17. How often and at what points do you visit participant project sites in person? How do you select the sites to be visited? Which staff are responsible for visiting sites? How often does the site visit identify energy efficiency measures or future energy efficiency projects not already under consideration? Are those recommendations ever put in writing, and if so would you send some examples?
18. How do you decide if you should meter baseline conditions? What thresholds trigger metering?

### Customer Satisfaction

19. From your perspective, how satisfied are Business customers with the range of programs offered by AEP Ohio? What are some common complaints you hear, and what are some common positive comments you hear from customers?
20. Do you have a sense of how satisfied customers are with various aspects of this specific program (application process, time to process incentives, interaction with implementation contractor, AEP Ohio staff, or SP (contractor), etc.)?

- a. Are you taking any steps to promote greater participant satisfaction?
- b. Are you tracking the results from those steps? If so how and what are the results?
- 21. Have customers indicated any issues with, or are confused by, any program requirements or documentation?
- 22. How are customer problems, concerns, issues handled post-installation? Is there a call center? Who is it staffed by? Do the implementation contractors talk to customer directly and fix any issues?
- 23. Have some customers who could be eligible for the program declined to participate? If so, why?
- 24. From the customer's perspective, what are the perceived barriers to participation?
- 25. How is the program overcoming these barriers? Have Solution Providers (Contractors) and Implementation Contractors been successful at removing these barriers to participation? If so, how, if not, why?
- 26. Are there any program requirements that have caused projects to be ineligible or unfeasible?
- 27. Have you seen any change in the value placed on "non-energy" benefits to program participants? Please describe.
- 28. How has customer opt-out affected participation?

### **Marketing**

- 29. Please describe the program marketing approach in your own words. Include all relevant components, and describe how effective you think they are.
- Have you seen any changes in the key motivations and perceived barriers for program participants?
- 30. Is the current level of marketing sufficient and does it address all measure end-use categories equally well, or are some over or under represented?
- Please describe customer recruitment/marketing strategy used in the last year.
- a. Have you targeted specific market segments?
  - b. How have you identified potential participants?
  - c. What outreach and marketing activities have you conducted in the past year?
  - d. How are efforts carried out consistently across the AEP Ohio service territory?
- 31. Are there additional customer segments you think the program could market to in order to increase participation?
  - 32. What marketing/outreach activities worked well? Which didn't work as well as expected?
  - 33. How could marketing for the program be improved?
  - 34. Have you conducted outreach / recruitment / education / marketing activities for Solution Providers (Contractors)? Have you considered creating a qualified Solution Provider (contractor) network? Was there a Solution Provider (contractor) bonus in 2017?

35. Does the program provide any recognition or acknowledgement (i.e. a certificate or plaque) to program participants or Solution Providers (contractors)? If yes, please describe.
36. Does the program follow-up with past participants (whom may not have been contacted in a year or more) to see if other opportunities exist for new projects?
37. What role does the Website play in generating interest and participation by customers, and how has this changed over time? Are there improvements still needed?
38. Based on your experience, do you believe an increase in the level of resources available for marketing and outreach could increase program participation and savings?
  - a. IF YES – ASK - Would that hold true if the resources were made available by reducing the level of incentives available?

### **Implementation**

39. What processes work really well in the program, and what processes need improvement? (e.g., communication, time processing applications, customer interaction, marketing, relationship between utility and implementation contractor, etc.)
40. Can you explain the application intake procedures, and any changes that have been made over the last year? (I.e. new on-line application form). How have these been accepted by participants?
41. Does this program offer or require pre-applications or application pre-approval? If yes, please explain.
42. When do you advise the participant of incentive amounts available?
43. What are the follow-up procedures with “stale” applications?
  - a. How are projects reviewed to see if they are stalled? What options are available to move them forward?
  - b. How does the implementer track “drop outs” (participants who have chosen not to proceed under the program)?
    - i. What proportion of customers “drop out”
    - ii. What causes customers to “drop out”?
44. Is the implementation contractor meeting your expectations for the Program? If not, what could be improved?
45. Please describe your interactions with Solution Providers (contractors) involved in the program. (Have any issues or areas for improvement been identified?)
46. Has the involvement of Solution Providers (contractors) in the program changed in the last year?
47. Do you know how many Solution Providers (contractors) were active in 2017, and is this number increasing or decreasing, and why?

Do you have a sense of Solution Providers’ (contractors) overall satisfaction with their participation in the program in 2017 and in working with the implementation contractors? Have you noticed or heard any changes from past years?



Overall do you feel that Business programs have adequate networks of Solutions Providers, or are there some Programs, end uses, or geographic areas that are not well covered?

48. Are the Solution Providers (contractors) meeting your expectations for the Program? If not, what could be improved?

### **Data Tracking and Quality Control**

49. Can you walk us through the QA/QC procedures?
50. Can you describe the quality control procedures in place to ensure complete information is obtained, and accurate information is entered into the database?
51. How do you verify customer and equipment eligibility? How do you determine whether equipment being replaced is functional, being replaced on burn-out, obsolescence or need for new capacity? (To determine baseline and calculate savings eligible for incentive).
52. At what point do you visit participant project sites to conduct final inspections or verifications? (For programs with multiple paths such as NRNC, ask for specific results for each pathway.)
- How are sites selected?
  - Who is responsible for conducting verification?
  - How are the results documented?
  - What is the process, and who is responsible for resolving disparities?
53. Have there been any changes to how the program verifies participant savings estimates?
54. Have there been any changes to the structure of the program database or how it is maintained? (For programs with multiple implementation contractors; how is consistent data quality assured?)
55. Have you encountered any projects where it was unclear whether the project was eligible?

### **Summary Questions**

56. Do you have any other comments, concerns or suggestions about the program that we did not discuss that you would like to make sure I know about?
57. Are there any areas that you would particularly like to see us delve into deeper in the process evaluation this year or questions you really want answered?

### **Process Efficiency Specific Questions**

- In what ways have the recommendations from the last evaluation been implemented?

If needed, reference:

- Have all projects submitted pre-applications?
- Has a field been added to track PJM winter peak demand?

### **Process Questions**

- What is the effect of customer opt-out on program participation?
- Are project costs relative to the appropriate baseline captured accurately and consistently within the program?

3. What is the level of involvement of trade allies in driving process efficiency projects, and are there opportunities to further increase efficiency or encourage more comprehensive energy and demand savings?
4. Which customer market segments participate in the program, and are there barriers specific to certain market segments?

## APPENDIX C. IMPLEMENTATION CONTRACTOR INTERVIEW GUIDE

### AEP Ohio Evaluation for the Energy Efficiency Program for Business Programs 2017 Implementation Contractor In-Depth Interview Guide

Name of Interviewee:

Date:

Title:

Company:

Contact Information:

Interviewer:

*[Note to Interviewer] The Interview Guide is a tool to guide process evaluation interviews with implementation contractors. The guide helps to ensure the interviews include questions concerning the most important issues being investigated in this study. Follow-up questions are a normal part of these types of interviews. Therefore, there will be sets of questions that will be more fully explored with some individuals than with others. The interviews will be audio taped and transcribed. Interviews in every case will be conducted by a member of Navigant's process evaluation team to ensure full context and understanding for the interview, and to enable the interviewer to probe for the most meaningful questions and responses.*

#### Roles and Responsibilities

1. Can you describe your roles and responsibilities, and how they've changed over the last year for the [Insert Name] Program?
2. When considering the implementation contractor and AEP Ohio staff job functions, have there have been any substantial changes in the roles or people assigned to these programs in the past year compared to previous program years? If so, what were they?
3. How often do you meet with the AEP Ohio staff for the program, and in what manner? How does your firm share the program's progress with AEP Ohio?
4. How often are you in contact with the program Solution Providers? What are you hearing from the SPs? And how do they provide feedback? (emails, calls, in person...)?

#### Program Design

5. Have the program materials, your procedural documentation or outreach documents for any of the three programs changed since last year? If so, can you send me the most current version?
6. What have been the key challenges in implementing the program in the past year? What steps have you taken to overcome these challenges?
7. Is the program on track to meet the filed savings goals? What about your contracted savings goals?
8. What other key performance indicators do you use to measure the performance of the program? Are you on track to meet those goals?

9. Next, I'd like to ask about significant changes to the program in 2017, and whether you have any significant changes planned for 2018? Changes would include:

- a. Program Delivery
- b. Measures (added, removed, or changes)
- c. Incentives
- d. Application forms or processes

Can you describe the reasoning for the changes, and how they affect program performance?

10. From your perspective, does the program rely on a particular measure or end use to meet its goals? Do you have suggestions for measures that should be added?
11. How active are account managers in the program? In what ways do account managers improve the customer experience? Are any improvements needed in the role account managers play?

### Customer Experience

12. Please describe your interactions with Program participants. (Have any issues (e.g., customer service, measure offerings, program design, application, etc.) or areas for improvement been identified?)
13. Next, we'd like to discuss the experience of new participants.
- a. What percentage of your program's customers are first time customers?
  - b. How is the first connection typically made?
  - c. Who is engaged from the participant side?
  - d. How is the program introduced to someone not wholly familiar?
  - e. What technical assistance is offered?
14. How often and at what points do you visit participant project sites in person? How do you select the sites to be visited? Which staff are responsible for visiting sites? How often does the site visit identify energy efficiency measures or future energy efficiency projects not already under consideration? Are those recommendations ever put in writing, and if so would you send some examples?
15. How do you decide if you should meter baseline conditions? What thresholds trigger metering?

### Customer Satisfaction

16. From your perspective, how satisfied are Business customers with the range of programs offered by AEP Ohio? What are some common complaints you hear, and what are some common positive comments you hear from customers?
17. Do you have a sense of how satisfied customers are with various aspects of this specific program (application process, time to process incentives, interaction with implementation contractor, AEP Ohio staff, or SP, etc.)?
- a. Are you taking any steps to promote greater participant satisfaction?
  - b. Are you tracking the results from those steps? If so how and what are the results?

18. Have customers indicated any issues with, or are confused by, any program requirements or documentation?
19. How are customer problems, concerns, issues handled post-installation? Is there a call center? Who is it staffed by?
20. Have some customers who could be eligible for the program declined to participate? If so, why?
21. From the customer's perspective, what are the perceived barriers to participation?
22. How is the program overcoming these barriers? Have you as the Implementation Contractor or the Solution Providers been successful at removing these barriers to participation? If so, how, if not, why?
23. Are there any program requirements that have caused projects to be ineligible or unfeasible?
24. Have you seen any changes in the key motivations and perceived barriers for program participants?
  - a. Have you seen any change in the value placed on "non-energy" benefits to program participants? Please describe.
25. How has customer opt-out affected participation?

## **Marketing**

26. Please describe the program marketing approach in your own words. Include all relevant components, and describe how effective you think they are.  
  
Have you seen any changes in the key motivations and perceived barriers for program participants?
27. Is the current level of marketing sufficient and does it address all measure end-use categories equally well, or are some over or under represented?
28. Please describe customer recruitment/marketing strategy used in the last year.
  - a. Are specific market segments targeted?
  - b. Have potential participants been identified?
  - c. What outreach and marketing activities have you conducted in the past year?
  - d. How are efforts carried out consistently across the AEP Ohio service territory?
29. Are there additional customer segments you think the program could market to in order to increase participation?
30. What marketing/outreach activities worked well?
  - a. Which didn't work as well as expected?
  - b. How could marketing for the program be improved?
31. Have you conducted outreach / recruitment / education / marketing activities for Solution Providers (trade allies)? Have you considered creating a qualified Solution Provider network? (SP Qs N/A to Express, NRNC, CEI, ???) Was there a Solution Provider bonus in 2017?

32. Does the program provide any recognition or acknowledgement (i.e. a certificate or plaque) to program participants or Solution Providers? If yes, please describe.
33. Does the program follow-up with past participants (whom may not have been contacted in a year or more) to see if other opportunities exist for new projects?
34. What role does the Website play in generating interest and participation by customers, and how has this changed over time? Are there improvements still needed?
35. Based on your experience, do you believe an increase in the level of resources available for marketing and outreach could increase program participation and savings?
  - a. IF YES – ASK - Would that hold true if the resources were made available by reducing the level of incentives available?

### **Implementation**

36. What processes work well in the program, and what processes need improvement? (e.g., communication, time processing applications, customer interaction, marketing, relationship between utility and implementation contractor, etc.)
37. Can you explain the application intake procedures, and any changes that have been made over the last year? (I.e. new on-line application form). How have these been accepted by participants?
38. Does this program offer or require pre-applications or application pre-approval? If yes, please explain.
39. When do you advise the participant of incentive amounts available?
40. What are the follow-up procedures with “stale” applications?
  - a. How are projects reviewed to see if they are stalled? What options are available to move them forward?
  - b. How do you track “drop outs” (participants who have chosen not to proceed under the program)?
    - i. What proportion of customers “drop out”?
    - ii. What causes customers to drop out?
41. Please describe your interactions with Solution Providers involved in the program. (Have any issues or areas for improvement been identified?)
42. Has the role of Solution Providers in the program changed in the last year?
43. Do you know how many Solution Providers were active in 2017, and is this number increasing or decreasing, and why?
44. Are the Solution Providers meeting your expectations for the Program? If not, what could be improved?

45. Do you have a sense of Solution Providers' overall satisfaction with their participation in the program in 2017 and in working with the implementation contractors? Have you noticed or heard any changes from past years?
46. Overall do you feel that Business programs have adequate networks of Solution Providers, or are there some Programs, end uses, or geographic areas that are not well covered?

#### **Data Tracking and Quality Control**

47. Can you describe the quality control procedures in place to ensure complete information is obtained, and accurate information is entered into the database?
48. Have there been any changes to the structure of the program database or how it is maintained? (For programs with multiple implementation contractors; how is consistent data quality assured?)
49. How do you verify customer and equipment eligibility? How do you determine whether equipment being replaced is functional, being replaced on burn-out, obsolescence or need for new capacity? (To determine baseline and calculate savings eligible for incentive).
50. Have you encountered any projects where it was unclear whether the project was eligible?
51. Have there been any changes to how the program verifies participant savings estimates?
52. In your role of Implementation Contractor, how often and at what points do you visit participant project sites in person, including any final inspection or verification? (For programs with multiple paths such as NRNC, ask for specific results for each pathway.)
  - a. How are sites selected?
  - b. Who is responsible for conducting verification?
  - c. How are the results documented?
  - d. What is the process, and who is responsible for resolving disparities?

#### **Summary Questions**

53. Do you have any other comments, concerns or suggestions about the program that we did not discuss that you would like to make sure I know about?
54. Are there any areas that you would particularly like to see us delve into deeper in the process evaluation this year or questions you really want answered?

#### **Process Efficiency Specific Questions**

1. In what ways have the recommendations from the last evaluation been implemented?

If needed, reference:

- a. As an additional review step for large projects, have you used facility interval data to test the reduction in energy usage of projects and confirm the persistence of energy savings?
- b. For energy intensity projects, have you made changes to the way data is collected? e.g., requiring additional pre- and post- data to ensure seasonal trends are accounted for. Collecting hourly data. Using pre-retrofit production levels rather than post to calculated final energy savings. Consider a dual baseline for increased production.

- c. Have you enforced the requirement of pre-applications?
- d. Have you quantified other efficiency improvements and load changes in both the pre- and post- conditions?

**Process Questions**

- 5. What is the effect of customer opt-out on program participation?
- 6. Are project costs relative to the appropriate baseline captured accurately and consistently within the program?
- 7. What is the level of involvement of trade allies in driving process efficiency projects, and are there opportunities to further increase efficiency or encourage more comprehensive energy and demand savings?
- 8. Which customer market segments participate in the program, and are there barriers specific to certain market segments?



## APPENDIX D. PROCESS EFFICIENCY PROGRAM PARTICIPANT PHONE SURVEY GUIDE

From Tracking Data:	
Date	
Name of Interviewee	
Title	
Company	
Contact Information	
Interviewer	
Project Reference (name)	
Brief Project Description (Location / type of measures)	

*The survey is designed to address the following research questions:*

Cross Cutting Research Questions:	Survey Questions
1. Does the program outreach effectively increase awareness of program opportunities?	1, 2
2. Are the messages included within program outreach clear and actionable?	1, 2, 3
3. What are the key interests and motivations for potential and actual participants beyond the financial incentive offered?	3, 24
4. What are the key barriers to participation in the program?	20, 21, 22, 25
5. What improvements could be made to create a more effective program and to help increase energy and demand impacts?	8, 9, 10
6. Are participants and providers satisfied with the programs?	6, 7, 8, 9, 10, 12, 24
Process Efficiency Program Specific Research Questions:	
7. What customer market segments or types of projects participate in the program? Are any barriers specific to certain customer market segments?	F1, F2
8. Are project costs relative to the appropriate baseline captured accurately and consistently within the program?	19
9. What is the level of involvement of trade allies in driving process efficiency projects, and are there opportunities to further increase efficiency or encourage more comprehensive energy and demand savings?	4, 11, 12, 13, 14, 15, 16, 17, 18

### Introduction:

[ASK FOR NAMED CONTACT]

Good afternoon. Hello, my name is \_\_\_\_\_, from Blackstone and I'm calling on behalf of AEP Ohio's energy efficiency programs. We are conducting a review of AEP Ohio's Process Efficiency energy efficiency program. The reason for calling you today is to ask about your experience with the program. Our objective in conducting this survey is to better understand how effective the program has been, and how it might be improved in future years.

*[If they express hesitation, use an appropriate combination of the following.]*

*[Overcoming objections:]*

- *[Confidentiality]* We are an independent firm and your responses will remain confidential and only presented in aggregate along with responses from other survey participants.
- *[Not the right person]* – That's fine, do you know who would be more appropriate to talk to? Do you have their contact details? *[RECORD NEW CONTACT]*
- *[Security]* Your responses will not affect your ability to participate in the program in the future.
- *[Sales concern]* I am not selling anything. On behalf of AEP Ohio, I simply want to understand what factors were important to your company's decision to participate in the program.
- *[Contact]* If you would like to talk with someone from AEP Ohio about this survey, the contact is: **AEP Ohio –Brian Billing**– available by phone at (614) 883 7806 or e-mail at: [bfbilling@aep.com](mailto:bfbilling@aep.com)

QS1. We understand your firm participated in the AEP Ohio program for a new building/renovation project located at \_\_\_\_\_, is this correct?

QS2. [If they say no] Did you participate in the \_\_\_\_\_ program in 2017? [If no, thank them for their time, hang up].

[If yes] Can you tell the address of the facility that did participate in the program: \_\_\_\_\_.

QS3. [If the address is correct] Great, the survey will take approximately 10-15 minutes and you will receive a \$15 a gift card in appreciation of your time spent with us. Is now a good time to talk?

*(If they say no:)*

QS4. May I schedule another time?

### Firmographics

I'd like to ask you few general questions about your company, specifically at *[SITE\_ADDRESS]*.

F1. How would you categorize the business conducted at this site?

*[Record verbatim]*

98. DON'T KNOW

99. REFUSED

*[Elaborate if needed. This should be the main business activity that occurs at this location. For example, is it an office, a warehouse, a store?]*

F2. Is the building where the project was completed owned or leased??

1. Owned

2. Leased

98. DON'T KNOW

99. REFUSED

## Awareness & Motivation

1. How did you first learn of the AEP Ohio [Process Efficiency](#) program? Multi response

*[DO NOT READ; PROBE IF NEEDED]*

1. AEP Ohio staff
2. Implementer program staff
3. Internet / Web site
4. Workshop
5. Participation with another AEP Ohio EE program (specify)
6. Architect
7. Engineering firm
8. Energy Modeler
9. Industry/Trade Association
10. Advertising/Trade Publication
11. Commissioning Agent
12. Associate or Co-Worker
13. Contractor
14. Repeat program participant
15. Retailer / Supplier / Wholesaler
16. AEP Ohio program Implementer
97. Other: \_\_\_\_\_
97. Don't know
98. Refused

2. Are you aware of these other AEP Ohio Energy Efficiency Programs?

*[Record Yes/No response for each]*

1. Efficient Products for Business (Formerly: Prescriptive)
2. Self-Direct
3. Retro-commissioning
4. Data Center
5. Continuous Energy Improvement
6. Express
7. New Construction

97. Other, please specify: \_\_\_\_\_ Please have 97= other as optional an NOT a forced response

These next questions all relate to the building which participated in the [Process Efficiency](#) program in 2017.

3. What were the main reasons your company decided to participate in the program?

*[DO NOT READ; RECORD ALL, PROBE IF NEEDED]*

1. AEP Ohio/ Energy Efficiency Program for Business incentive
2. Special deal from contractor
3. Recommended by contractor
4. Product was on sale at store
5. Old equipment was malfunctioning
6. Old equipment was no longer functioning, replacement was necessary
7. High utility bills/wanted to save money
8. Save energy to protect the environment

9. Program technical assistance
  10. Required by company headquarters or owner
  11. To demonstrate our company's belief in energy efficiency.
  12. Save money on energy costs
  13. To ensure our business operates efficiently
  14. Implementer, AEP Ohio program Outreach coordinator
  15. - AEP Ohio program Implementer
  16. Measures were not offered as part of the Efficient Products for Business program
  97. Other, please specify: \_\_\_\_\_
  98. DON'T KNOW
  99. REFUSED
4. If a contractor installed the equipment, did they encourage you to consider energy efficient options that met AEP Ohio's program recommendations?
1. Yes
  2. No
  3. No contractor was involved
  98. DON'T KNOW
  99. REFUSED
5. Would you participate in the program again?
1. YES
  2. NO [ASK Q6.]
  3. MAYBE
  98. DON'T KNOW
  99. REFUSED
6. [ASK IF Q5 = 2] Why wouldn't you plan to participate in the program again? [DO NOT READ; SELECT ALL THAT APPLY]
1. Program incentives are not sufficient
  2. Technical assistance issues
  3. Program administrative requirements too burdensome
  4. Program staff relationship issues
  5. No projects planned in the foreseeable future
  6. Change in business strategy in relation to building needs
  7. Efficient equipment required for incentives did not meet our needs
  8. OUR BUSINESS OPTED OUT OF THE AEP OHIO EE/PDR PROGRAMS
  97. OTHER (SPECIFY) \_\_\_\_\_
  98. DON'T KNOW
  99. REFUSED

## Experience with Program

I am now going to ask a few questions about your experience with the program.

7. How would you rate the ease of finding information about the program using a scale of 0-10 where 0 represents very challenging and 10 represents very easy?
- [RECORD NUMBER 0-10]
98. DON'T KNOW
  99. REFUSED

8. How difficult or easy did you find the application process using a scale of 0-10 where 0 represents difficult and 10 represents easy?

[RECORD NUMBER 0-10]

- 98. DON'T KNOW
- 99. REFUSED

9. Again, using a scale of 0-10 where 0 represents not satisfied and 10 represents very satisfied, how satisfied were you with:

- a) The level of documentation required?

[RECORD NUMBER 0-10]

- 98. DON'T KNOW
- 99. REFUSED

- b) The amount of time spent from the beginning of the project to the time you received your incentive

[RECORD NUMBER 0-10]

- 98. DON'T KNOW
- 99. REFUSED

- c) Communication you had with the program representatives?

[RECORD NUMBER 0-10]

- 98. DON'T KNOW
- 99. REFUSED

- d) Energy efficiency level required to qualify for an incentive?

[RECORD NUMBER 0-10]

- 98. DON'T KNOW
- 99. REFUSED

- e) The program overall?

[RECORD NUMBER 0-10]

- 98. DON'T KNOW
- 99. REFUSED

10. When you first applied to the program, was there a kickoff meeting with the AEP Ohio team to discuss project goals?

1. Yes [Ask Q11]

- 2. No
- 98. Don't know
- 99. Refused

11. [IF Q10 = 1] On a scale of 0 to 10, with 0 being not at all pleased and 10 being very pleased, have you been pleased with the way that the program has addressed the goals you set in the kickoff meeting?

[NUMERIC OPEN-END, RANGE 0-10]

- 98. DON'T KNOW
- 99. REFUSED

[All Respondents]

12. Who assisted you with the program?
- [READ LIST; SELECT ALL; PROBE FOR ADDITIONAL]*
1. AEP Ohio Staff
  2. The program Implementation Contractor
  3. Implementer, the program outreach coordinator
  4. An independent installation contractor
  5. Other 3rd party
  97. OTHER (SPECIFY) \_\_\_\_\_
  6. No one assisted us / we did it all.
  98. DON'T KNOW
  99. REFUSED
13. Was there a written review of the initial project with suggestions for improvement?
1. Yes [ask Q14]
  2. No
  98. Don't know
  99. Refused
14. [If Q13 = 1 ask Q14] On a scale of 0 to 10, with 0 being not much improved and 10 being significantly improved, how well do you feel that the suggestions the program has made have improved the efficiency of your project?
- [NUMERIC OPEN-END, RANGE 0-10]*
98. DON'T KNOW
  99. REFUSED
15. Did AEP Ohio or implementation contractor representatives visit your facility for the project?
1. AEP Ohio *[Ask Q16 and Q17]*
  2. AEP Ohio's program Outreach coordinator *[Ask Q16 and Q17]*
  3. AEP Ohio's program Implementer *[Ask Q16 and Q17]*
  4. No one visited our facility
  5. Both AEP Ohio and the program implementer visited our facility *[Ask Q16 and Q17]*
  98. DON'T KNOW
  99. REFUSED
- [If Q15. = 4, skip to Q18]
16. *[If Q15= 1, 2, 3 or 5]* Did they visit before, or after work on the project started?
1. Before
  2. After
  3. Both
  98. DON'T KNOW
  99. REFUSED
17. *[Ask if Q15=1, 2, 3 or 5]* Did AEP Ohio, AEP Ohio's program Implementer or AEP Ohio's program Outreach coordinator representatives identify additional measures or projects during their site visit? Multi Response
1. AEP Ohio

2. AEP Ohio's program Implementer
  3. AEP Ohio's program Outreach coordinator
  4. No
  98. DON'T KNOW
  99. REFUSED
18. Were you contacted after your project was completed by AEP Ohio, AEP Ohio's program Implementer or AEP Ohio's program Outreach coordinator staff to check-in on your completed project or ask about any other projects you are considering? Multi Response
1. AEP Ohio
  2. AEP Ohio's program Implementer
  3. AEP Ohio's program Outreach coordinator
  4. I was not contacted
  98. DON'T KNOW
  99. REFUSED
19. Were costs for the energy efficiency aspect of your project easy to identify and submit to AEP Ohio?
1. Yes
  2. No
  98. DON'T KNOW
  99. REFUSED
- Q190. (ASK IF Q19=1, 2) [Record verbatim comments]
- 19a. How long did it take to complete and submit the program application? *[THIS IS INTENDED TO CAPTURE TIME ACTUALLY SPENT ON THE DOCUMENT (MINUTES OR HOURS) NOT TOTAL ELAPSED TIME.]*
- [RECORD TIME]*
97. NOT APPLICABLE (Respondent did not complete application)
  98. DON'T KNOW
  99. REFUSED
20. Using a ranking from 1-3, where 1 = main concern and 3 = low concern, please rank the following on its influence for you NOT being able to implement energy efficient measures.
- [Rank 1, 2, 3, 4 (if applicable)]*
- Programming: We will use #4 for "Other" – this should not be a forced response. If only 3 is ranked by respondent, please allow them to continue if "Other" is not ranked.
1. Management priority
  2. Staff time
  3. Project funding

97. Other \_\_\_\_\_
98. DON'T KNOW
99. REFUSED
21. Do you have energy efficiency projects at your business that are on-hold?
1. Yes *[Ask Q 22]*
  2. No
98. DON'T KNOW
99. REFUSED
22. *[If Q21= 1] Why are those projects on-hold? [DO NOT READ; SELECT ALL THAT APPLY]*
1. Not in the budget
  2. Staff does not have the time to research the project
  3. Staff does not have time to implement the project
  4. Next steps are not clear
  5. Competing priorities
97. Other \_\_\_\_\_
98. DON'T KNOW
99. REFUSED
23. What energy efficiency projects would you undertake at your business if there was a rebate available to help offset the upfront costs?
- [Record verbatim]*
98. DON'T KNOW
99. REFUSED
24. What do you see as the main benefits to participating in the AEP Ohio Process Efficiency program?
- [Record verbatim]*
98. DON'T KNOW
99. REFUSED
25. What do you see as the drawbacks to participating in the Process Efficiency program?
- [Record verbatim]*
98. DON'T KNOW
99. REFUSED
26. Do you have any other feedback on the Process Efficiency program?
- [Record verbatim]*
98. DON'T KNOW
99. REFUSED



Please replace to read: Thank you for your time and feedback! We will send you your \$15 gift card within 2 weeks. Can you confirm the email we have on file is correct: [Insert Email Address from sample file]?

If email address is incorrect from the sample, please include an option for our interviewers to correct email address

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**Case No(s). 18-0835-EL-EEC**

Summary: Annual Report - Ohio Power Company submits the 2017 Portfolio Status Report pursuant to Rule 4901:1-39-05(C), Ohio Administrative Code  
(Part 3 of 6) electronically filed by Mr. Steven T Nourse on behalf of Ohio Power Company