CONSOLIDATED EDISON

2018 Building Energy Performance Pilot Program Evaluation Report

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EXECUTIVE SUMMARY

2018 BUILDING ENERGY PERFORMANCE PILOT EVALUATION

EMI CONSULTING

INTRODUCTION

This executive summary presents results of the initial evaluation of Consolidated Edison's Building Energy Performance (BEP) Pilot Program. Con Edison launched the BEP Pilot in 2018 to test whether interventions focused on building operations and maintenance (O&M) and tenant behavior can help achieve low-cost energy savings in commercial office buildings. The program took a holistic approach to energy consumption by offering multiple interventions, including:

- Engaging building operators in trainings, campaigns, and competitions related to energy efficient building operations and maintenance (O&M)
- Providing building operators with detailed data on their energy consumption
- Engaging tenants in energy efficiency campaigns within commercial office spaces

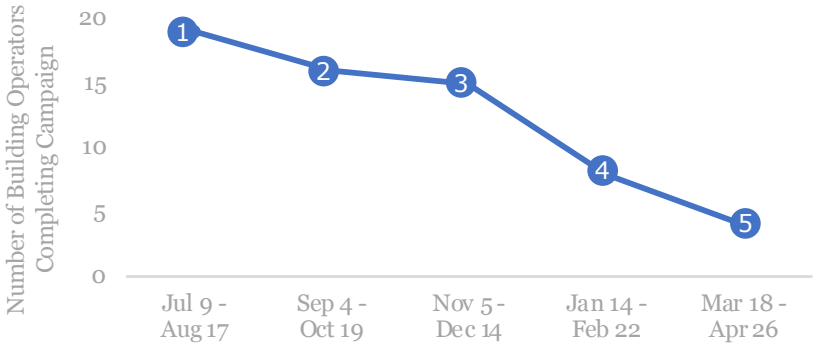
By focusing on behavioral and operational savings, the BEP Pilot was designed to target a different type of savings than Con Edison's existing equipment-based rebate programs have provided.

EMI Consulting, as part of the Navigant evaluation team, designed an evaluation to help Con Edison understand the BEP Pilot's effectiveness in achieving low-cost energy savings. However, based on the level of participant engagement during the first year of program implementation and evaluation, EMI Consulting and Con Edison decided that a full evaluation was premature and that research to support changes to program design would be more valuable.

This report focuses on documenting and distilling the lessons learned during the first year of program implementation and evaluation, before Con Edison decided to consider changes to program design.

PROGRAM ACTIVITY

Twenty-three buildings participated in the BEP Pilot. The Pilot included five building operator campaigns, each of which was focused around a specific O&M or behavioral activity. As program data demonstrates, campaign participation dropped over time — while 19 building operators participated in the first campaign, only four participated in fifth campaign.



Campaign	N
1 Optimize Outside Air	19
2 Building Automation System (BAS) Pitstop	16
3 Scheduling for Success	15
4 Fresh Look at Lighting	8
5 Shoulder Season Shape-up	4

EXECUTIVE SUMMARY

2018 BUILDING ENERGY PERFORMANCE PILOT EVALUATION

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LESSONS LEARNED

Building operators were expected to be a difficult group to engage, as was evident in Con Edison's experience with the BEP Pilot. Through analysis of program implementation and limited evaluation activities, we developed the following lessons learned:

It can be difficult to maintain engagement from building operators over time.

While 19 of 23 building operators participated in the first campaign, participation decreased with each subsequent campaign. Operators who only completed early campaigns reported already doing campaign activities or having the campaign not be applicable to their equipment, suggesting that it can be hard to maintain engagement if the program does not feel valuable or relevant to participants.

EXAMPLE: Four operators participated in only the first campaign. All four reported already taking all of the actions targeted by the campaign.

Many building operators are (or think they are) already implementing efficient O&M practices.

Across all the building operators surveyed, one of the top reasons that operators did not make program-targeted improvements was that they were already implementing the practice.

EXAMPLE: 9 of 15 building operators participating in the *Scheduling for Success* campaign #3 had already been utilizing a temperature setback for Zone Temperature Setpoints.

Tenant control of building equipment was an unexpected barrier.

Building operators reported that tenants had control of HVAC systems, outside air dampers, and lighting, and thus the building operator was not able to complete program-targeted activities.

EXAMPLE: 4 of 16 building operators participating in the *BAS Pitstop* campaign said that tenant-control of HVAC systems prevented them from making changes.

Program influence and impact varied widely from building to building.

While the sample was too small to generalize, we saw mixed survey results regarding how much building operators learned from campaigns and how often they were implementing targeted actions pre-campaign. The program campaign data also suggested considerable variability in engagement and potential for energy savings across buildings.

EXAMPLE: When asked to rate how much they learned through the *Optimize Outside Air* campaign on a scale of 1 to 10, two building operators rated a 3, and one each rated an 8 and 9.

1. INTRODUCTION

Consolidated Edison (Con Edison) launched the Building Energy Performance (BEP) Pilot Program in 2018 to test whether interventions focused on building operations and maintenance (O&M) and tenant behavior can help achieve low-cost energy savings in commercial office buildings. EMI Consulting, as part of the Navigant evaluation team, designed an evaluation to help Con Edison understand how effective the BEP program was in achieving low-cost energy savings. However, based on developments during the first year of program implementation and evaluation, EMI Consulting and Con Edison determined that a full evaluation was premature and that research to support changes to program design would be more valuable. This report focuses on documenting and distilling the lessons learned during the first year of program implementation and evaluation, before Con Edison decided to consider changes to program design and revise evaluation priorities.

The remainder of this section describes the BEP Pilot, as well as the original evaluation plan and mid-course changes to the evaluation approach. Section 2 describes results from the early evaluation tasks, including program staff interviews, program data analysis, and participant survey. Section 3 presents the key conclusions drawn from the initial evaluation efforts for the BEP program.

1.1 PROGRAM BACKGROUND

Consolidated Edison launched the BEP Pilot Program in 2018 to target energy savings in commercial office buildings. The program design aimed to take a holistic approach to reducing energy consumption within office buildings by offering multiple interventions, including (1) engaging building operators in trainings, campaigns, and competitions related to energy efficient building O&M, (2) providing building operators and/or owners with detailed data on their energy consumption, and (3) engaging tenants in campaigns related to energy efficiency within office spaces. The BEP Pilot was designed and implemented by Accelerated Innovations and was intended to complement Con Edison's existing equipment-based rebate programs by focusing on behavioral and operational savings. In addition to the program design, collateral, and software, Accelerated Innovations provided one local full-time Engagement Manager who served as the primary point-of-contact for program participants.

The primary goal of the BEP Pilot was to determine whether this type of program can help Con Edison achieve low-cost energy savings. The program was initially targeting energy savings of 4% at a lower cost per kWh than other programs being offered to this customer group. In addition, Con Edison was interested in lessons learned from the program about engaging with commercial property managers and building operators as they prepare to roll out initiatives to install smart meters and enhance customers' digital experience.

Recruitment for the program started in late 2017. Con Ed initially targeted Class A- and B+ office buildings located in a concentrated geographic area in lower

Manhattan to participate in the program. Con Edison first recruited building owners and/or property managers, but required that each owner provide a building operator to participate in program activities. Target candidates were buildings that met the following criteria: (1) had available interval data, (2) had a building management system in place, and (3) had not historically participated in Con Edison's equipment-based rebate programs or enrolled in New York City's Carbon Challenge. The program avoided buildings that had participated in a Con Ed program or the Carbon Challenge to (1) focus on buildings that presumably need more support reducing energy use and (2) make it possible to identify the impacts of the BEP Pilot without conflating the impacts of the pilot with other activities.

The BEP Pilot had an initial goal of enrolling 12 million square feet of qualifying office space. The program team recruited 27 buildings representing more than 12 million square feet to participate in the first year of the pilot. However, four buildings never engaged when the program launched and thus Con Edison decided not to consider them participants. Without these four buildings, the pilot had 23 buildings representing 10.4 million square feet enrolled.

The BEP Pilot officially launched in July 2018. As the first step, Accelerated Innovation's Engagement Manager met with the primary building operator from each participating building to explain the program and set up their login credentials to the program's online portal. This portal was central to the program design and allowed participants to access information about their historical and current energy usage, download collateral for program campaigns, log campaign activities, view results of program competitions, and access other program resources.

The primary program offering intended to drive savings was a series of *energy-savings campaigns* designed for building operators. The plan was to implement six building operator campaigns over the course of the first year of the pilot (one every other month). Each campaign was designed to encourage operators to verify an aspect of building operations, make adjustments as needed to improve efficiency, and log actions taken through the program portal. Building operators earned points for taking actions to verify and improve building O&M as part of a competition between buildings, with the intention that winners would be recognized at awards events. While Accelerated Innovations primarily communicated campaigns through email and the program portal, they also leveraged their Engagement Manager to visit each building during the campaign to explain the campaign and, when appropriate, guide the building operator through the activities. The program ultimately implemented five of the six planned building operator campaigns during the first year, as summarized in Section 2.2 below.

In addition to the building operator campaigns, the BEP Pilot planned to implement four *tenant-focused campaigns* to encourage building tenants to take targeted steps to be more energy efficient. Participating tenants would receive access to a website or mobile app that shared campaign information and offered a space for tenants to log action taken. However, Con Edison never expected tenant engagement to drive energy savings and did not require tenant engagement for buildings to participate in the BEP Pilot. Informed by past experience, both Con Edison and Accelerated

Innovations knew it would be difficult to enlist property managers to help engage tenants, given concerns about tenant privacy and the large number of tenants in participating buildings. While Con Edison did ask participating building owners to make their best effort to engage tenants, this was met with little uptake — and none of the tenant-focused campaigns were implemented.

1.2 ORIGINAL EVALUATION METHODOLOGY

Based on the original design of the BEP Pilot, EMI Consulting—as part of the Navigant evaluation team—designed a comprehensive evaluation of the first year of the pilot. This section summarizes the BEP Evaluation Plan, as originally designed in early 2018.[1] Because of lower-than-expected participant engagement with the program, Con Edison and EMI Consulting decided that it was premature to complete many of the tasks described in this section. Instead, we developed a revised evaluation plan that is described in Section 1.3.

EVALUATION OBJECTIVES

Table 1-1 summarizes the research objectives and their intended uses for the original BEP Evaluation Plan.

Table 1-1. Research Objectives and Intended Uses

Research Objectives	Uses
Estimate adjusted gross electric energy and demand savings	• Help Con Edison decide whether BEP is a cost-effective source of energy savings • Help Con Edison understand whether BEP can help support demand-management efforts
Assess how savings vary across sub-groups of interest	• Identify opportunities to target program for higher savings • Understand scalability of BEP to different types of customers
Understand whether the program influences participants to pursue capital projects to increase energy efficiency	• Help Con Edison understand whether BEP can help drive participation in equipment-based programs • Help Con Edison understand the potential for integrating O&M and equipment-based programs in the future
Understand what changes building operators make because of the BEP program	• Demonstrate the impacts the program is having and explain drivers of energy savings • Identify which campaigns are most effective
Understand participants' experiences with program elements and barriers to participation	• Identify opportunities to improve to the program
Assess success engaging tenants	• Identify opportunities to improve to the program
Assess ability for the program to track expected savings through automated savings analysis	• Understand whether program implementer's automated savings analysis could reliably track program savings and identify under-performing buildings

[1] For more details, see "Evaluation Plan for Con Edison's Commercial Behavior Program 2018-2019." Prepared for Consolidated Edison. April 24, 2018.

IMPACT EVALUATION TASKS

To estimate program impacts, the evaluation team planned to develop site-specific billing analysis models for each participant using 15-minute interval data. Using these models, we planned to compare consumption before and after enrolling in the BEP program, controlling for weather, changes in building occupancy, and any other changes in building equipment or usage. In addition, we planned to deduct any savings claimed through other Con Edison programs from BEP savings to avoid double counting of savings. The evaluation team planned to aggregate savings for each participant to estimate program-level savings, as well as savings by sub-groups of interest (as possible).

The evaluation team planned to estimate savings from the first year of the pilot at two periods: (1) interim savings measured after six months and (2) final first-year savings after one year of program implementation.

PROCESS EVALUATION TASKS

The evaluation team planned to conduct a process evaluation to help explain how effective the program was in delivering energy savings and identify potential areas for improvement. The process evaluation was designed to explore the following key research areas:

- Program Design and Delivery: The design and implementation of the program collateral, campaigns, informational tools, competitions, recognition events, etc.
- Building Operator Engagement: Building operators' participation in program campaigns, use of online tools and program resources, and changes made as part of the program. Benefits that building operators receive from education, campaigns, competitions, recognition, online tools, etc.
- Tenant Engagement: Tenant organizations' participation in program campaigns. Property managers experience with engaging tenant organizations.
- Program Satisfaction: Property managers' and building operators' satisfaction with the program.

To explore the research areas outlined above, the evaluation team planned to combine results from a number of tasks, which are summarized below in Table 1-2.

Table 1-2. Process Evaluation Tasks and Objectives

Task	Description	Objective(s)
Program documentation review	Review all program collateral	• Understand program goals and design • Inform data collection with participants
Program staff interviews	Interview program managers and implementation staff	• Understand program goals and design • Inform data collection with participants • Ensure evaluation tasks align with program staff priorities • Identify potential process related issues to explore through other evaluation activities
Program tracking system review	Analyze data collected by Accelerated Innovations as part of their engagement with participants	• Understand trends in campaign participation rates by sub-group • Understand types of changes participants do/do not make during campaigns • Understand the relative effectiveness of the various campaigns • Help explain drivers of gross savings results
Building operator online pulse survey	Field a very short, online "pulse" survey with building operators after each campaign	• Assess changes building operators did and did not make after each campaign, to help understand what impact the program is having on building operators' behavior and O&M practices • Understand barriers to participating in campaigns
Building operator and property manager interviews	Conduct in-depth interviews with property managers and building operators towards the end of the first year of the program	• Understand participants' experience with the program • Understand participants' barriers to fully participating in the program • Understand relative value of the various interventions and resources provided by the program • Understand persistence of program-targeted O&M changes • Understand if/how BEP program helps drive capital improvements and any market confusion around O&M and capital improvements being offered separately

The evaluation team started some of these tasks before Con Edison decided to redirect evaluation resources, including the documentation review, program staff interviews, tracking system review, and building operator pulse survey. The results from these efforts are detailed in Section 2.

1.3 REVISED EVALUATION METHODOLOGY

Based on developments during the first year of program implementation and evaluation, in early 2019 Con Edison and EMI Consulting decided to revise the evaluation plan outlined in Section 1.2 to provide Con Edison with insight to help make changes warranted to the program design. Because of the level and timing of participant engagement to date, Con Edison and EMI Consulting agreed that the original timing for an impact evaluation would be too soon to be able to measure savings. Moreover, participation was low in our pulse survey—the early evaluation task designed to help provide ongoing insight into program effectiveness—which meant that the survey did not provide useful insight into program performance.

In February 2019, the evaluation team developed a revised evaluation plan that focused on helping Con Edison understand the potential for an O&M program and whether mid-course changes to the BEP Pilot program design and delivery are warranted.[2] Instead of focusing solely on the BEP Pilot, the revised evaluation plan took a more holistic approach to understanding successful strategies to drive O&M savings within commercial office buildings, the targeted participant group.

The primary task of the revised evaluation was a review of peer utility O&M programs to help Con Edison understand elements that have made these programs successful and savings have been achieved through these programs. Through this effort, we collected data related to:

- Program design and delivery components common to successful O&M programs
- Challenges to O&M programs and methods programs have used to overcome them
- Verified savings through O&M programs
- Recent developments in how O&M programs are being implemented

To conduct this effort, the evaluation team first performed a review of relevant secondary resources and then conducted 14 semi-structured interviews with peer utilities. The evaluation team shared the results of this research with Con Edison through a separate deliverable in June 2019.[3]

The revised evaluation plan also called for a summative report to document key learnings from evaluation activities conducted to date. To that end, this report serves as a summary of learnings from the BEP evaluation.

[2] For more details, see "Revised Evaluation Plan for Con Edison's Commercial Behavior Program 2018-2019." Prepared for Consolidated Edison. February 20, 2019.
[3] EMI Consulting, "Building Energy Performance O&M Program Findings." June 17, 2019.

2. EVALUATION RESULTS AND OUTCOMES

This section describes the results of the first year of the BEP Pilot program evaluation, starting with results from ongoing discussions with Con Edison program staff. We then present results from the analysis of building operator campaign participation data and from the two building operator pulse surveys fielded.

2.1 PROGRAM STAFF INTERVIEWS

The evaluation team met regularly with the Con Edison Program Manager as the program was beginning. This section outlines the key insights into program successes and challenges discussed during those meetings. It also incorporates findings from our interviews with the Accelerated Innovations' Engagement Manager and review of program documentation.

PROGRAM RECRUITMENT

The first stage of the program was recruitment, during which the program implementer identified and recruited potential participants. Recruitment was slower than planned, although the program did eventually achieve its enrollment targets. One reason that recruitment was challenging was that the program actively avoided buildings participating in the New York City Carbon Challenge, which were the buildings most likely to be interested in energy efficiency. Instead, the program recruited from a pool that, in general, was not actively involved in energy efficiency projects or exploring energy efficiency measures. Another challenge to recruitment was timing: BEP started recruitment in December, which turned out to be a hard time of the year to recruit participants. This is typically the time of year that building operators are trying to determine their capital budget for the next year and thus are less able to commit to efforts that fall outside capital planning. Finally, it proved difficult to schedule recruitment meetings with all of the relevant building stakeholders, as this involved the building owner and all of the building operators working in a potential participating building.

The program was originally slated to finish recruitment in January 2018 and to launch in February 2018. Given the delays described below, recruitment continued into April 2018 and the program launch did not occur until July 2018, a five-month delay.

PROGRAM LAUNCH

The first step in launching the BEP Pilot was for the Engagement Manager to conduct an onboarding meeting with each building operator. During this meeting, he would explain the program and set up the program portal account for the building operator. However, a few unexpected technological issues related to the online program portal delayed these meetings and the program launch. First, there were difficulties linking the BEP program portal to Con Edison's interval consumption data, which was necessary for the program portal to display information on a building energy use's energy use. These difficulties related to (1)

the complexity of the data, and (2) the unique format required in order to use interval data for such purposes. These issues were ultimately resolved.

A second—and more challenging—technological barrier related to Con Edison's single sign-on integration where participants use the same login information to access the program portal as they do to log into the Con Edison online account for their building. The single sign-on integration proved to be difficult from both a technological and administrative perspective. Each account owner (i.e. bill payer) in a building had to provide authorization in order for the relevant building operator(s) to access data about their account and consumption. Because there can be multiple accounts and different bill payers for a single building, it took months to secure all the necessary permissions.

The Engagement Manager waited to schedule onboarding meetings with participants until after the single sign-on integration issues had been resolved and the building operator could use the program portal. This slowed down the timeline for getting all participants onboarded and ready for the first campaign. While he ultimately held some onboarding meetings before the portal access issues were resolved, the last participants did not receive access to the program portal until September 4, 2018.[4]

EARLY BUILDING OPERATOR CAMPAIGN ACTIVITY

The primary program activity designed to save energy was a series of building operator campaigns. Each campaign focused on a different component of building operations, including outside air usage, HVAC scheduling, lighting levels and scheduling, and economizer usage. The campaigns were primarily administered through the program portal. Building operators received emails about the campaign and, when they logged into the program portal, would see pop-up screens describing the current campaign. The campaigns described two or three actions for the building operator to take to improve energy efficiency, which included checking how equipment was currently working and making changes as needed. Building operators were asked to answer a series of questions in the program portal about what actions they took and what the outcomes of those actions were. The Engagement Manager planned to visit each building during each campaign to help walk them through the targeted activities. Each campaign lasted six weeks and a new campaign was introduced every other month. While the program worked to engage building operators to make targeted improvements during the campaign period, building operators were able to log campaign-related actions at any time — including after the campaign window concluded. The Con Edison Program Manager described the campaign dates as "guidelines"; while they wanted operators to participate during campaign, they understood that participants may take longer.

[4] Our understanding of portal access timing comes from the "Operator Orientation Date" field in the program tracking data. Only 21 of 23 buildings have a date value listed for this field, so it is unclear if/when the remaining two buildings received access.

The first campaign, *Optimize Outside Air*, launched in early July 2019 — before all of the single sign-on integrations issues had been resolved and before all building operators had been onboarded into the program. The implementation of this campaign faced a few challenges. First, it took longer than anticipated to resolve all sign-on issues and to get each building operator set up with the program portal. For example, at the time of campaign launch, only 7 of 23 building operators had full access to the program portal. Operators without portal access were sent the campaign materials via email. The Engagement Manager followed up with them via email, but without portal access they could not log campaign activities. There were also some issues early on where campaign information was not properly displaying on the program portal. When the campaign ended, 9 of 23 buildings still did not have access to the portal.

The second building operator campaign, *Building Automation System (BAS) Pitstop*, also faced challenges. Because of the complexity of the campaign, nearly all buildings were still working on the campaign at conclusion of the campaign period. *BAS Pitstop* required buildings to do trending and metering, which took longer than planned to complete. In part this had to do with equipment availability: the BEP Pilot provided metering equipment for participants to use, but did not have enough for each building, so some buildings had to wait for access to this equipment. In addition, due to a change Accelerated Innovation made to its servers, the sign-on integration continued to be an issue during the campaign. Because some operators were not able to access the program portal during the campaign, the Engagement Manager had to work with building operators to ensure they logged campaign responses *after* the access issues were resolved.

One early finding that emerged during the launch of the first campaigns was that tenants control more of some buildings' equipment than expected. The Program Manager explained that the program was designed around Class A buildings with central plants, and less for Class B buildings with more individual control of equipment. The program had not wanted to implement two versions of each campaign—one for central control and one for tenant control of equipment—so it originally tried to avoid Class B buildings. To reach its goals, the program ultimately expanded its recruitment criteria to include Class B buildings. The Program Manager thought that, in the future, they might want to design campaigns for buildings with more tenant control. However, he did not want to work with tenants directly because then they would have to engage with closer to 100 tenants, rather than 20 buildings, which would be harder and less effective, especially if tenants were not Con Ed customers.

Another early finding during the first months of the BEP Pilot was that building operators were interested in implemented changes to their buildings that extended beyond O&M improvements. As the Engagement Manager visited participants regularly to discuss their buildings' energy usage, he reported that some operators also wanted his help with energy efficiency capital projects. For example, the Engagement Manager shared a customer tracking file in November 2018 that described plans for capital projects at six participating buildings. Because Con Edison was interested in understanding the impact of BEP Pilot alone, helping

building operators with capital projects was discouraged during the pilot period. However, this did raise a question about whether the program could provide more value to participants—and possibly Con Edison—by integrating capital measures alongside the focus on operations and maintenance.

2.2 PORTAL DATA ANALYSIS

As described above, the program implemented a series of campaigns focused on engaging building operators around specific O&M practices. This section provides insight into program activity and effectiveness based on building operator campaign data extracted from the BEP program portal, starting with overall trends in campaign participation followed by detailed findings from each campaign. There are a number of reasons that this analysis may not fully capture program activity, as detailed in the Limitations section below.

OVERALL CAMPAIGN PARTICIPATION

Building operators' campaign participation decreased over time, at least as represented by their responses to campaign questions in the program portal.[5] As shown in Table 1-1, operators for 19 of the 23 participating buildings logged actions for the first campaign, *Optimize Outside Air*, in the program portal. That number decreased for each subsequent campaign. While 17 and 15 buildings participated in the second and third campaigns, respectively, only eight and four buildings participated in the fourth and fifth campaigns. This is not unexpected; by the time of the fourth and fifth campaigns, Con Edison had decided to wind down the program and thus did not work as hard to engage and push building operators to complete the campaigns.

Table 2-1. Summary of Building Operator Campaign Participation

Campaign	Campaign Dates	Number of Buildings Participating	Percent of Buildings Participating
Challenge 1: Optimize Outside Air	Jul 9 - Aug 17, 2018	19	83%
Challenge 2: BAS Pitstop	Sep 4 - Oct 19, 2018	16	70%
Challenge 3: Scheduling for Success	Nov 5 - Dec 14, 2018	15	65%
Challenge 4: Fresh Look at Lighting	Jan 14 - Feb 22, 2019	8	35%
Challenge 5: Shoulder Season Shape-up	Mar 18 - Apr 26, 2019	4	17%

Based on data extracted from program portal August 4, 2019.

The drop-off in campaign participation is mirrored in Figure 2-1, which shows campaign participation by building. While four buildings completed all five

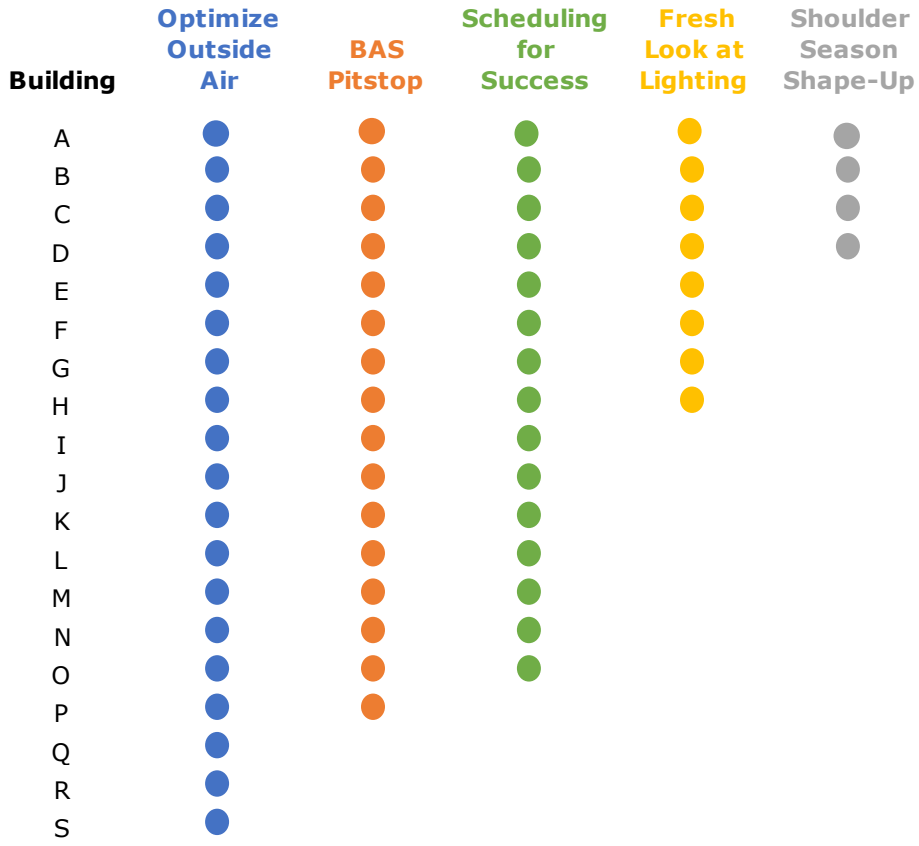
[5] Building operators may have taken the actions targeted by a campaign without logging the actions in the online program portal. As we did not collect data from building operators after the first two pulse surveys, we do not have insight into the extent this happened.

campaigns, the remaining buildings stopped participating completely at some point. No building missed a campaign and then went on to complete a later campaign; rather, once a building missed a campaign, they did not go on to participate in future campaigns. It should be noted that this graph does not include the four buildings that never completed any campaign.

To understand why buildings stopped participating in campaigns, we examined responses from buildings that only participated in early campaigns. While we do not have the data needed on building operators' reasons to answer this conclusively, the data is consistent with the idea that *some* operators may be more likely to stay engaged if they are finding the campaigns relevant and/or useful. For example, the three buildings that only participated in the first campaign reported that they were already doing all of the actions targeted by that campaign and made no changes after working through campaign activities. By contrast, the four buildings that completed all five campaigns reported that they made at least one change to building O&M during each campaign, suggesting that they may have been finding more value from the program.[6]

[6] The one building that dropped off after the second campaign did not have an airside economizer, meaning parts of the campaign would have been applicable to them, although they did identify other issues with their building as part of the campaign. Results were mixed for buildings that dropped off after the third campaign in terms of whether they had made changes through that campaign. Among the four buildings that dropped off after the fourth campaign, none had made any improvements through that campaign.

Figure 2-1. Building Operator Campaign Participation by Building

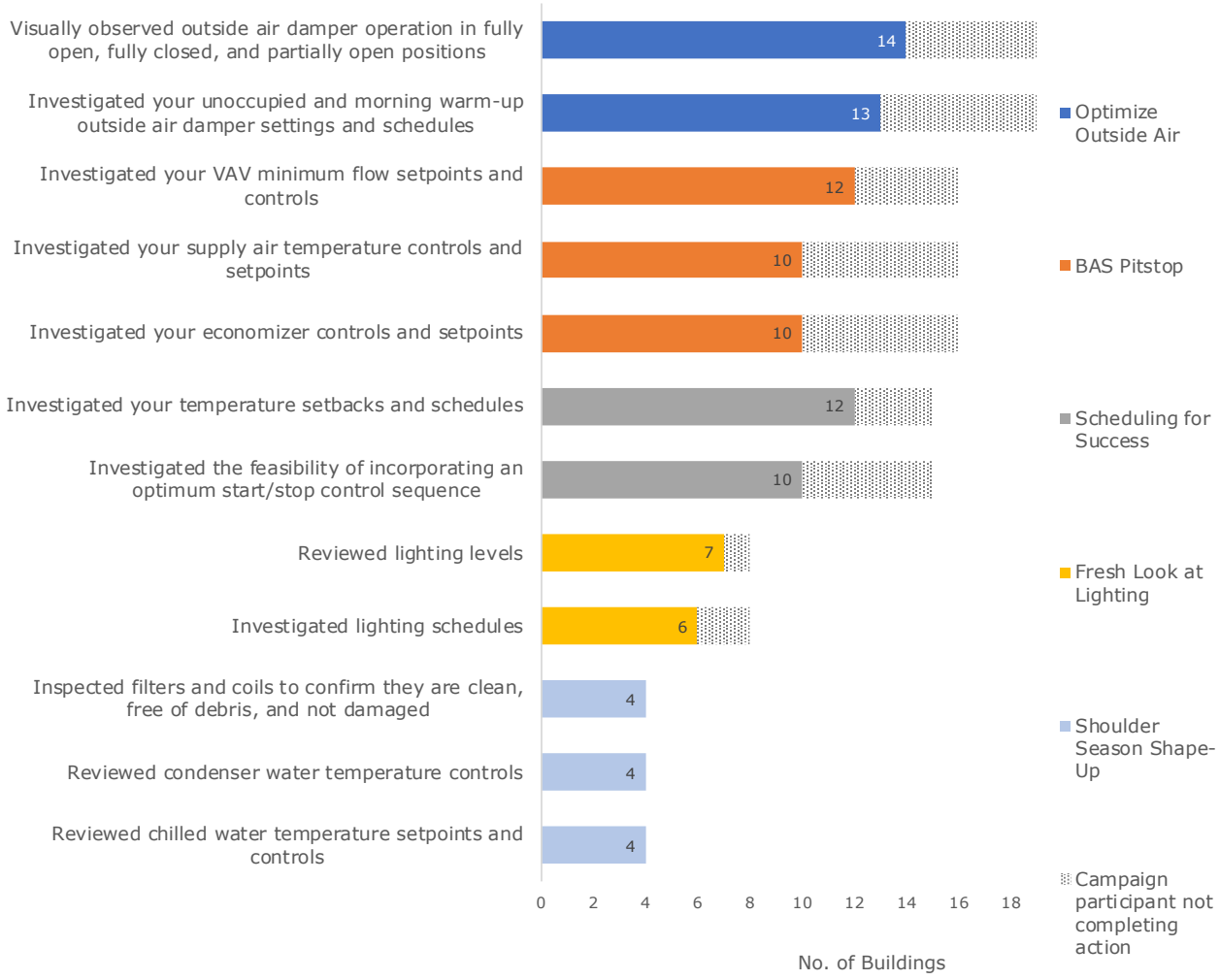


Note: Only includes buildings that completed at least one campaign.

Each campaign was designed around two or three key activities that building operators were asked to perform. Building operators were asked to confirm whether they completed each activity by checking a check box in the program portal. Figure 2-2 shows the extent to which each targeted action was completed, by campaign. For example, for the *Optimize Outside Air* campaign, operators for 14 buildings visually observed outside air damper operation in fully open, fully closed, and partially open positions, while the remaining five operators who participated in the campaign (as indicated by answering any campaign question) did not report inspecting their dampers (indicated by the patterned grey bar).

As with overall campaign participation, the number of targeted activities completed by building operators decreased over time. It is also interesting to note that a number of operators who participated in each campaign did not complete all of the targeted actions, especially for the first three campaigns. The reasons why are explored in more detail in the campaign-specific questions below.

Figure 2-2. Participants' Actions Taken as Part of Each Campaign



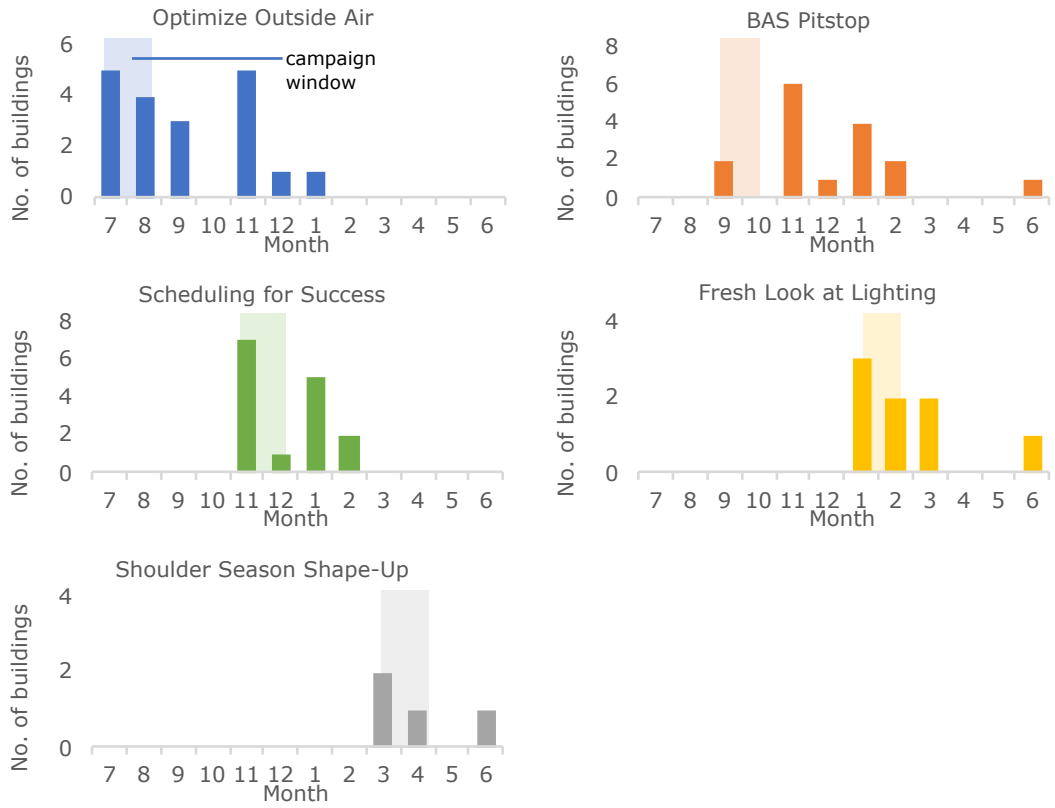
The completion of a campaign activity did not necessarily indicate that the operator made a change that increased their building's efficiency. For example, a building operator could complete the action of observing outdoor air damper operations as requested, but then conclude that the outdoor dampers are already operating optimally. The following section details the changes operators made through each campaign to better understand the potential for energy savings.

Campaign Participation Timing

To better understand the time required for building operators to participate in campaigns, we next looked at the distribution of *when* building operators completed the last question for each campaign. Figure 2-3 shows the timing of when building operators completed each campaign compared to the campaign window (as represented by the light background shading). For the first two campaigns, it took building operators months after the campaign ended to finish the activities. This can at least partially be explained by (1) the early technical difficulties getting each building operator access to the program portal, and (2) the time needed to do

metering and trending for the *BAS Pitstop* campaign. However, the remaining three campaigns all had building operators completing the campaign after the campaign window. While we did not do primary research with building operators to understand timing issues, this does suggest that it can take time to engage building operators to make O&M improvements.

Figure 2-3. Timing of Building Operator Campaign Completion Relative to Campaign Window



Note: Shaded area on each graph shows the official campaign window.

INDIVIDUAL CAMPAIGN PARTICIPATION

This section provides an overview of the specific changes operators made during each campaign. It focuses on the changes that could potentially result in energy savings, to help understand qualitatively what the potential for program savings were.

OPTIMIZE OUTSIDE AIR CAMPAIGN

Building operators reported few changes that could have increased the energy efficiency of their building as part of the *Optimize Outside Air* campaign. A total of 4 of the 19 participating building operators made at least one change through the campaign that may have resulted in energy savings, as detailed below.

As shown in Table 2-2, only 3 of 14 building operators observed an issue when inspecting their outdoor air damper operation (two of whom resolved the issue during the campaign). The remaining operators reported that their dampers were operating as expected. It is important to note that the three operators who observed an issue did not necessarily save energy; rather, throughout this section we highlight the *potential* for energy savings based on operators' actions during campaigns. Similarly, only two operators reported changing their fresh air schedules and settings as part of the campaign. Most operators (12) reported already setting fresh air to 0% during unoccupied hours and building warm-up, implying they were already adopting efficient practices. When asked to provide feedback on the campaign, three operators mentioned that outdoor air dampers were controlled by tenants.

Table 2-2. Optimize Outside Air Campaign Outcomes

Campaign Question	Response	No. of Buildings
What was perceived when you visually verified outside air damper operation in fully open, fully closed, and partially open positions?	Damper operation was as expected, modulating between fully open and fully closed with a tight closure	11
	We observed some issues with damper operation which were resolved immediately	2
	We observed some issues with damper operation which will be resolved soon	1
After completing these activities, does your facility keep outside air dampers closed when the building is unoccupied and during morning warm-up?	Yes - We improved or slightly modified our fresh air schedules and settings	2
	Yes - We already were setting fresh air to 0% during these times	12
	No - We are not reducing fresh air during unoccupied hours or during building warm-up	1
	No - We cannot reduce fresh air to 0%	2
	No - Other	2

Responses that may have produced energy savings in orange text.

BAS Pitstop Campaign

Based on portal data, building operators implemented more changes that may have increased the energy efficiency of their building as part of the *BAS Pitstop* campaign. A total of 9 of the 16 participating building operators made at least one change through the campaign that may have resulted in energy savings, as detailed below.

As shown in Table 2-3, five building operators reduced VAV minimum flow setpoints as part of the campaign. Four operators reported making a change to their economizer operators, although two of these were logged as "other" changes with no information about whether these would have increased efficiency. Six operators reported making controls changes related to supply air temperature, including (1) implementing a new reset strategy, (2) improving an existing reset strategy or (3)

raising the supply air temperature setpoint. While some operators were able to make changes through the campaign, others faced barriers: only four of the operators had an airside economizer (targeted by this campaign, versus four with a waterside economizer and seven with no economizer). Four operators said that the tenants controlled HVAC systems and, as a result, they were not able to complete campaign activities.

Table 2-3. BAS Pitstop Campaign Outcomes

Campaign Question	Response	No. of Buildings
Were any changes made to VAV minimum flow setpoints?	Yes - We reduced VAV minimum flow setpoints to 20% or less	2
	Yes - We reduced VAV minimum flow setpoints to 21% or higher	3
	No - All VAV minimum flow setpoints were determined to be appropriate	2
	No - Other	4
	No - We believe there may be opportunity to reduce minimum flow setpoints but didn't make any changes	4
	Not Applicable - We did not review VAV minimum flow setpoints or do not have any VAV systems	1
Were any changes to your economizer operations made?	Yes - We improved high-limit shutoff controls	2
	Yes - Other	2
	No - We have a waterside economizer or did not review economizer controls	6
	Not Applicable - We do not use an economizer	6
Were any controls changes made related to supply air temperature?	Yes - we implemented a new reset strategy	1
	Yes - we improved an existing reset strategy	3
	Yes - we raised supply air temperature to a higher fixed setpoint	2
	No - it was determined there is no opportunity to implement or improve supply air temperature control	4
	Other	6

Responses that may have produced energy savings in orange text.

Scheduling for Success Campaign

Results from the third campaign, *Scheduling for Success*, also indicated that a minority of operators took actions with potential for energy savings. This campaign asked building operators to investigate the temperature setbacks and schedule of their building, as well as the feasibility of incorporating an optimum start/stop sequence. A total of 6 of the 15 participating building operators made at least one change through the campaign that may have resulted in energy savings, as detailed below.

As shown in Table 2-4, of the 15 participating building operators, one implemented a new Zone Temperature setback and/or expanded the use of temperature setbacks, while three implemented a new AHU Supply Air Temperature setback

and/or expanded the use of temperature setbacks. An additional building operator reported modifying their existing AHU Supply Air Temperature setback to better align with comfort/occupancy, but it is less clear that a comfort-driven change would help save energy. Three building operators reported implementing a new optimum start/stop function, which may have increased their buildings' efficiency. The reasons that other operators did not make efficiency improvements were similar to the other campaigns: either tenants controlled the HVAC equipment or the actions were not applicable to their building. In addition, a plurality of operators said they had already been using a setback for their Zone Temperature (nine participants) and AHU Supply AHU (five participants), while three had already been implementing an optimum start/stop.

Table 2-4. Scheduling for Success Campaign Outcomes

Campaign Question	Response	No. of Buildings
Is a nighttime, weekend and holiday setback of 6°F-12°F for Zone Temperature Setpoints incorporated into building automation system?	No – we are not utilizing temperature setback	3
	No – we cannot utilize temperature setback	2
	Yes – we have been utilizing a setback and no changes were made	9
	Yes – we implemented a new setback and/or expanded the use of temperature setbacks	1
Is a nighttime, weekend and holiday setback of 6°F-12°F of AHU Supply Air Temperature Setpoint incorporated into building automation system?	No – we are not utilizing temperature setback	1
	No – we cannot utilize temperature setback	4
	Yes – we have been utilizing a setback and no changes were made	5
	Yes – we have been utilizing a setback and we modified it slightly to better align with occupancy/comfort	1
	Yes – we implemented a new setback or expanded the use of temperature setbacks	3
Is the facility currently utilizing an optimum start and/or optimum stop sequence?	No – other reason	3
	No – the building automation system cannot implement optimum start/stop	3
	No – we cannot implement start/stop due to lack of controls capabilities	2
	Yes – we have been utilizing optimum start/stop	3
	Yes – we implemented a new optimum start/stop function	3

Responses that may have produced energy savings in orange text.

Fresh Look at Lighting Campaign

Eight operators participated in the *Fresh Look at Lighting* campaign — fewer than the previous campaigns — which asked participants to review lighting levels and schedules. A total of three of the eight participating building operators made at least one change through the campaign that may have resulted in energy savings, as detailed below.

As shown in Table 2-5, three operators adjusted lighting levels in common areas while one adjusted lighting levels in tenant areas. Two operators changed lighting schedules or control upgrades to better align with occupancy.

Table 2-5. Fresh Look at Lighting Campaign Outcomes

Campaign Question	Response	No. of Buildings
Were any needed changes in lighting levels identified in common/core areas?	No – We found no opportunities to improve lighting levels	1
	Not Applicable – We did not review lighting levels in common/core areas	2
	Yes – Some lighting levels were adjusted to better match recommended levels	3
	No response	2
Were any needed changes in lighting levels identified in tenant areas?	No – We found no opportunities to improve lighting levels	2
	No – We identified areas to improve lighting levels but didn't know how to implement those changes	1
	Not Applicable – We did not review lighting levels in tenant areas	4
	Yes – Some lighting levels were adjusted to better match recommended levels	1
Were any needed changes in lighting schedules identified in common/core areas?	No – We found no opportunities to change lighting schedules	4
	Not Applicable – We did not review lighting schedules in tenant areas	1
	Yes – Some lighting schedules or control upgrades were changed to better align with occupancy	2
	No response	1

Responses that may have produced energy savings in orange text.

Shoulder Season Shape-Up Campaign

The final campaign, *Shoulder Season Shape-Up*, only had four participating buildings. This campaign asked building operators to review condenser water temperature controls, review chilled water temperature setpoints and controls, and inspect filters and coils to confirm they were clean, free of debris, and undamaged. A total of two of the four participating building operators made at least one change through the campaign that may have resulted in energy savings, as detailed below.

As shown in Table 2-5, one operator refined an existing reset strategy or changed their fixed chilled water temperature setpoint, while two operators said they did not have a chilled water system.[7] No operators changed their condenser water temperature setpoint controls. Two operators replaced, repaired, or cleaned filters of coils as part of the campaign. With overlap across the activities, two buildings may have saved energy as part of this campaign.

[7] While two said they do not have chilled water systems, all four operators checked the box for having reviewed their chilled water system setpoints, indicating some contradiction in responses

Table 2-6. Shoulder Season Shape-Up Campaign Outcomes

Campaign Question	Response	No. of Buildings
Were any changes to the chilled water temperature setpoint control implemented?	No – our existing control strategies are sufficient	1
	Not Applicable – We do not have a chilled water system or did not review the control sequences or trending	2
	Yes - we refined an existing reset strategy or changed our fixed chilled water temperature setpoint	1
Were any issues observed with the filters or coils that were inspected?	No – all filters and coils observed were in fine working condition	2
	Yes – Many filters or coils were replaced, repaired, or cleaned	1
	Yes – Some filters or coils were replaced, repaired, or cleaned	1
Were changes made to condenser water temperature setpoint controlled?	No – our existing controls were determined to be sufficient	4

Responses that may have produced energy savings in orange text.

LIMITATIONS

It is important to note that the results of this section may not fully capture building operators' engagement with the program and implementation of energy-savings changes. First, it is possible that building operators reviewed campaign material and made changes to their building without recording the actions in the program portal. Second, building owners may have been making changes other than those targeted by campaigns. The program team understood that not all campaigns would be applicable to all buildings. Because the Engagement Manager did not want buildings unengaged with the program for too long, he planned to work on more custom actions with buildings when the current campaign was not applicable to their building. Because we never conducted the planned in-depth interviews with building operators, we are not able to assess the extent to which the program influenced O&M improvements, aside from those tracked in the program portal.

2.3 PULSE SURVEY

The primary data collection task planned for the evaluation was a series of pulse surveys with building operators, administered at the conclusion of each building operator campaign. The objective of the pulse surveys was to provide early and continuous feedback on how effective the building operator campaigns were through campaign-specific information on the following topics:

- How much building operators learned from each campaign
- How much each campaign influenced building operators to make changes to their current O&M practices
- Why building operators do not participate in campaigns (for operators that do not log campaign actions in the program portal)

We designed two versions of the pulse survey: one for building operators who had participated in the relevant campaign, and one for building operators who had not participated in the campaign. Campaign "participation" was defined as having logged at least one action in the program portal during the campaign. Building operators who had not logged an action through the portal were given the option to say that they *had* conducted the campaign activities, despite not logging in them in the portal.

The pulse survey was designed to complement information that the program was collecting from building operators as part of each campaign.[8] As detailed above, the campaigns collected data on what actions building operators took through the campaign, as well as the outcome of those actions. The pulse survey, on the other hand, asked participating building operators whether these actions represented a *change* from their typical O&M practices. For example, the *Optimize Outside Air* campaign asked building operators to (1) confirm that they had visually observed outside air damper operation in fully open, fully closed, and partially open positions, and (2) record what they had found when doing so. To complement this, the pulse survey asked how often building operators had observed outdoor air damper operations before the campaign and how much they learned from the campaign. Based on our experience evaluating similar programs, we have found that this question of change is important to understanding the effectiveness of O&M programs – if building operators are already implementing efficient O&M practices, then a program that targets these practices may not produce much savings.

The pulse survey also asked about barriers to full participation in the campaign. Both participant and non-participant building operators were asked about the challenges they faced to taking the actions targeted by the campaign. Non-participant building operators were also asked about campaign awareness, barriers to reviewing program collateral, and the challenges they faced to logging actions in the portal.

The pulse survey was designed to be an online survey that building operators would be emailed a link to within two weeks of the end of each building operator campaign. Survey respondents were entered into a drawing for a $50 gift card to help increase response rates and decrease bias from having the only survey responses come from engaged operators.

OPTIMIZE OUTSIDE AIR SURVEY RESULTS

The first building operator pulse survey was fielded at the conclusion of the *Optimize Outside Air* campaign. While this campaign officially ran from July 9 to August 17, due to the technical issues described above, some operators did not have access to campaign questions in the program portal until mid-September. To

[8] During our evaluation of a similar program for Duke Energy, we used data collection efforts to verify the accuracy of self-reported data building operators enter to into the program portal as part of campaigns. We found this data to be accurate enough to rely on for evaluation purposes. This allows us to use data collection to complement rather than verify program data.

ensure that we were not conflating portal access issues with campaign non-participation, we delayed fielding the pulse survey with all building operators until portal access issues were resolved.[9] Of the 23 building operators who were invited to complete the survey, we received:

- 4 completed surveys by operators who logged campaign actions in the portal
- 0 completed surveys by operators who did not log actions in portal

Because of the small number of completed surveys, results should be interpreted as a qualitative indicator of the experience of survey respondents, rather than a generalizable reflection on all participants' experiences.

Respondent Characteristics

To understand how experienced building operators were with O&M in general — and, specifically, the O&M needs of their current building — we asked respondents how long they had been at their current position. All four respondents reported being at their current position for 5 or more years (which was the longest option of the multiple-choice answers provided).

To better understand how established the O&M policies of participating buildings were prior to the BEP Pilot, we asked building operators if their buildings had any protocols or standard practices for operation and maintenance of any energy using equipment before signing up for the BEP Pilot. Two of the four survey respondents reported that they had protocols or standard practices for the O&M of energy using equipment prior to their participation in the BEP Pilot.

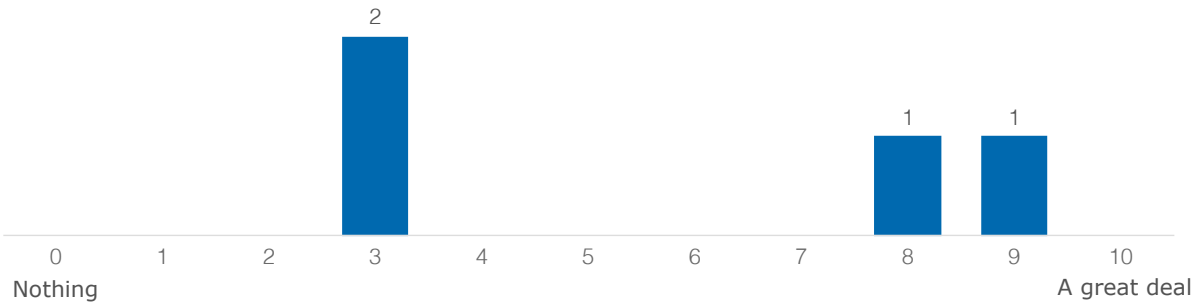
We also asked respondents to indicate which actions they took as part of the campaign. While this data was collected through the campaign, this allowed us to ensure that survey questions were sensible and also enabled us to identify actions that building operators may have taken but not logged in the program portal. All four survey respondents reported they visually inspected outdoor air dampers in various operating positions during the campaign, which matched their data in the program portal. Three of the four respondents reported that they reviewed outdoor air damper settings for times the building was not fully occupied during the campaign. This does not fully match data from the program portal, where all four respondents had logged taking this action. Because of the small sample size and brief nature of the survey, we were not able to identify the reason for this discrepancy.

[9] To ensure the survey was timely, we did send the survey out to 10 building operators who had already completed the campaign on September 10, 2018. The remaining survey invites were sent out on September 26, 2018, after portal issues were resolved. All building operators were sent two follow-up reminders asking them to take the survey.

Campaign Influence

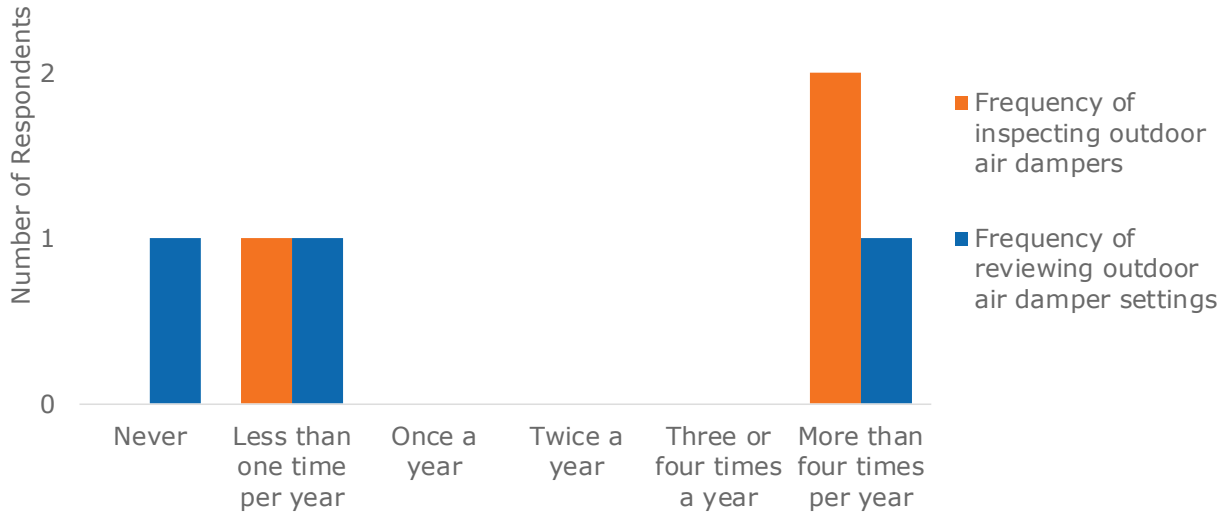
To understand the influence of the *Optimize Outside Air* campaign, we first asked respondents to rate how much they learned (if anything) from the campaign about optimizing outside air systems on a 10-point scale, where 0 meant "Nothing" and 10 meant "A great deal." As shown in Figure 2-4, the responses were mixed: two of the respondents rated their learning as a 3, while one each respectively rated learning as an 8 and 9.

Figure 2-4. Amount Building Operators Learned from the Optimize Outside Air Campaign (n=4)



Next, we asked building operators how frequently they previously had been conducting the actions targeted by the campaign to understand whether the actions taken through the campaign were in improvement over baseline O&M practices. As shown in Figure 2-5, the results are again mixed in terms of how much the campaign activities marked a departure from business-as-usual. Two building operators reported that they had been inspecting outdoor air damper operations more than four times a year, while one said they had been doing this less than one time per year. One respondent said they had been reviewing outdoor air damper settings for times the building is not fully occupied more than four times per year, one had been doing this less than one time per year, and the third respondent had never done this.

Figure 2-5. Frequency of Conducting Campaign Activities Before Optimize Outside Air Campaign (n=3)



Campaign Barriers

To better understand barriers to program participation, we asked building operators about the challenges they faced to implementing the actions targeted by the *Optimize Outside Air* campaign. Respondents were provided a list of potential barriers and were asked to indicate if each was a minor challenge, major challenge, or not a challenge.[10]

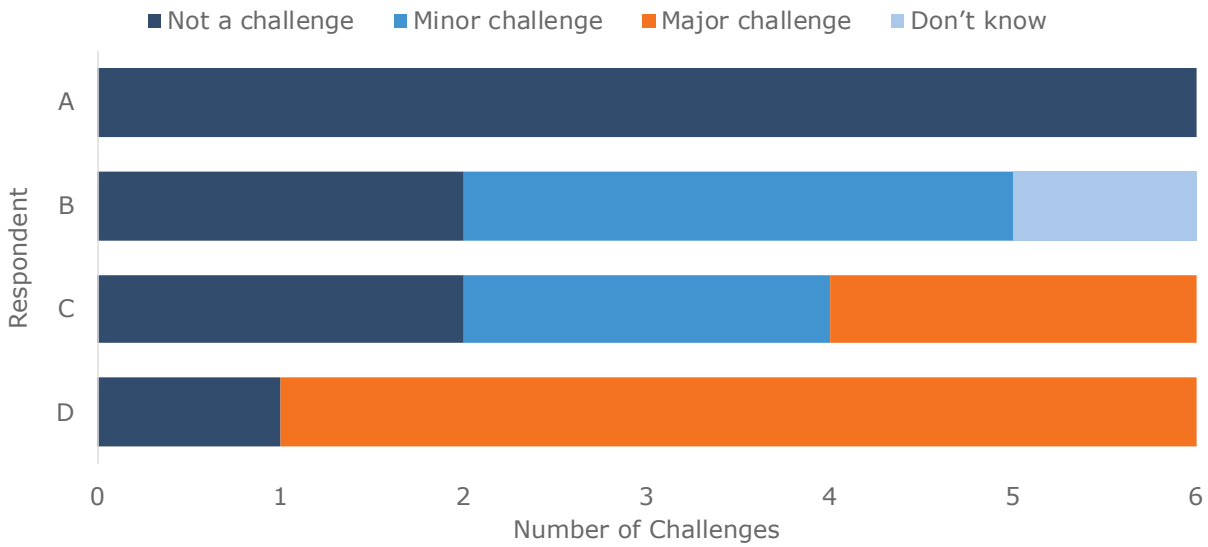
As shown in Figure 2-6, barriers to implementing campaign activities were mixed. The most commonly mentioned challenges were that (1) building operators already implemented the suggested actions or (2) the actions do not apply to the respondent's building (both characterized as major challenge by two respondents). Time was a minor or major challenge for three of the respondents. Two respondents each reported concerns about the suggested actions or believing the actions were not worth the effort were a minor or major challenge. Finally, understanding how to implement the campaign actions was less of a challenge: one building operator rated this a minor challenge, while the remaining three said this was not a challenge.

[10] Respondents were also invited to provide additional challenges they faced; no respondents listed other barriers for the Optimize Outside Air campaign.

Figure 2-6. Barriers to Completing Optimize Outside Air Campaign by Challenge (n=4)

To better understand barriers, we looked at responses across the four respondents. As shown Figure 2-7, one respondent (A) said that none of the barriers were challenges, while one (B) said all the barriers were either minor challenges or not challenges. One respondent (C) said five of the six barriers were major challenges. The fourth respondent (D) gave an even mix of responses, with two barriers each being major challenges, minor challenges, and not challenges. This suggests that challenges vary more across participants than across barrier: the program is challenging for some building operators, while others face few challenges.

Figure 2-7. Barriers to Completing Optimize Outside Air Campaign by Respondent (n=4)



BAS PITSTOP SURVEY RESULTS

The second building operator pulse survey was fielded at the conclusion of the *BAS Pitstop* campaign. While this campaign officially ran from September 4 through October 19, campaign participation extended past this window for many participants. Based on conversations with the Engagement Manager, we decided not to survey three participants who were still working through the campaign when we wanted to field the survey.[11] Of the 18 building operators who were invited to complete the survey, we received:

- 4 completed surveys by operators who logged campaign actions in the portal[12]
- 0 completed surveys by operators who did not log campaign actions in portal

Because of the small number of completed surveys, results should be interpreted as a qualitative indicator of the experience of survey respondents, rather than a generalizable reflection on all participants' experiences.

RESPONDENT CHARACTERISTICS

Three of the four respondents also responded to the first campaign pulse survey and were not asked the introductory questions about their background and policies.

[11] The survey was again fielded in batches, with the early campaign participants getting the email invitation on October 31, 2918, and the remainder going out December 3, 2018.
[12] Three of the respondents had also responded to the first pulse survey, while one was a new respondent.

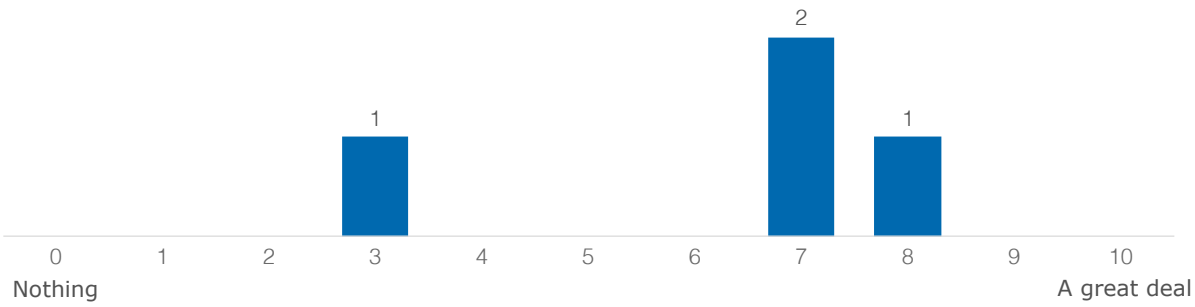
The one new respondent had been in their position between one and three years and had protocols or standard practices for the O&M of energy-using equipment prior to their participation in the BEP Program.

We also asked respondents to indicate which actions they took as part of the *BAS Pitstop* campaign. Three of the respondents reported reviewing their variable air volume (VAV) system minimum flow setpoints, while two reported reviewing air-side economizer controls and two reported reviewing air handling unit supply air temperature setpoints. This does not fully match data from the program portal. One respondent provided survey responses that completely matched the activity logged in the program portal. However, the responses from the survey and portal were inconsistent for the other three respondents. Because of the small sample size and brief nature of the survey, we were not able to identify the reason for this discrepancy.

Campaign Influence

To understand the influence of the *BAS Pitstop* campaign, we first asked respondents to rate how much they learned about optimizing their building's control sequences from the campaign on a 10-point scale where 0 meant "Nothing" and 10 meant "A great deal." As shown in Figure 2-4, three of the four respondents reported learning a lot (ratings of 7 or 8), while one did not (rating of 3).

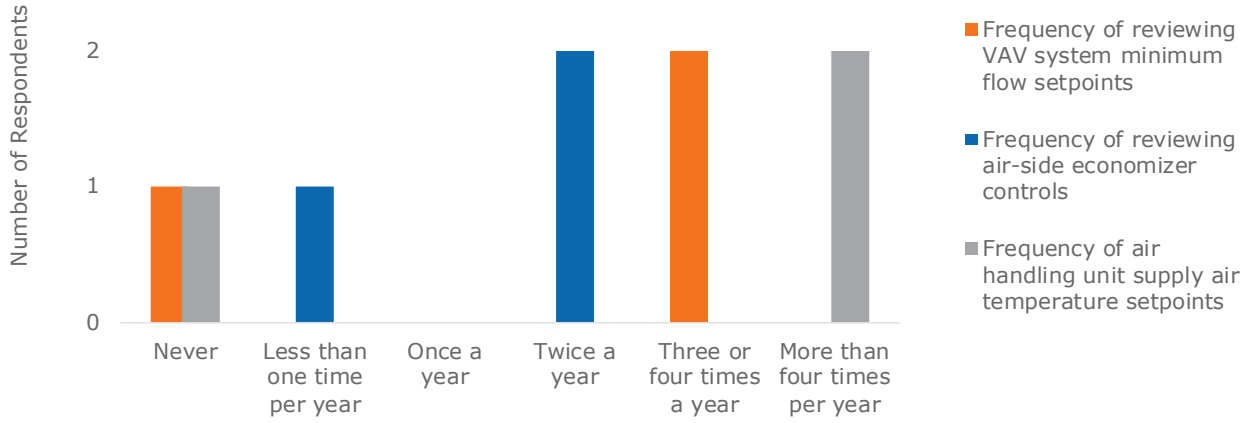
Figure 2-8. Amount Building Operators Learned from the BAS Pitstop Campaign (n=4)



Next, we asked building operators how frequently they previously had been conducting the actions targeted by the campaign to understand whether the actions taken through the campaign were an improvement over baseline O&M practices. As shown in Figure 2-9, the results are again mixed in terms of how much the campaign activities marked a departure from business-as-usual. Two building operators reported that they had been regularly conducting campaign-targeted actions (twice a year, three or four times a year, or more than four times a year for the three actions). However, the third respondent had been doing one of the actions less than once a year and had never completed the other two targeted actions — this was the same respondent who answered never or less than once per

year to all three actions. This again shows how the influence of the program varied across participants.

Figure 2-9. Frequency of Conducting Campaign Activities Before BAS Pitstop Campaign (n=3)



Campaign Barriers

To better understand barriers to program participation, we asked building operators about the challenges they faced to implementing the actions targeted by the campaign. Respondents were provided a list of potential barriers and asked to indicate if each was a minor challenge, major challenge, or not a challenge.[13]

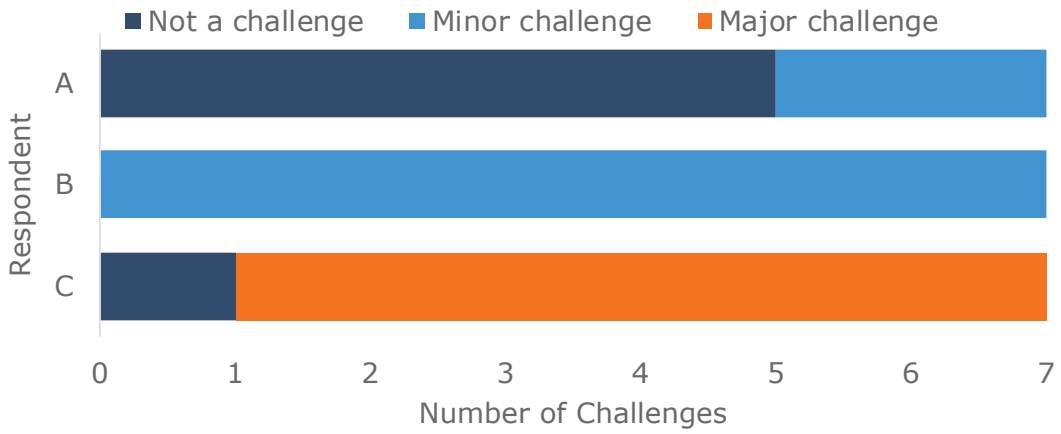
As shown in Figure 2-10, barriers to implementing campaign activities were mixed. The most commonly mentioned challenges were that (1) building operators already implement the suggested actions or (2) participants had concerns about taking suggestion actions. However, every barrier was a major or minor barrier to all three respondents (the fourth respondent did not answer these questions).

[13] Respondents were also invited to provide additional challenges they faced; no respondents listed other barriers for the BAS Pitstop campaign.

Figure 2-10. Barriers to Completing BAS Pitstop Campaign, by Challenge (n=3)

To better understand barriers, we looked at responses across the three respondents. In addition to the barriers from the first survey, we added one related to building operators having control over the equipment, based on feedback that tenants controlled more of the equipment than expected. As shown in Figure 2-11, one respondent (B) said all seven barriers were minor challenges, while a second said all barriers were either minor challenges or not challenges (A). However, the third respondent (C) rated six of the barriers as major challenges and the seventh as a minor challenge. This suggests that challenges vary more across participants than across barrier: the program is harder for some building operators than others. Interestingly, the operator reporting the most barriers also said they had already been completing campaign-targeted activities regularly.

Figure 2-11. Barriers to Completing BAS Pitstop Campaign, by Respondent (n=3)



LIMITATIONS

It is important to note that the results of this section only provide a qualitative snapshot of select building operators' experiences with the program. First, the samples sizes for both survey waves are too small to generalize to the population. Second, because of the technical delays with the early campaigns, it did not make sense to include all building operators in the sample when the surveys were fielded. Finally, the survey was never intended to provide a full assessment of the program. Rather, the survey was intended to provide Con Edison with timely feedback on campaign effectiveness and capture information on campaign influence while the activities were fresh on operators' minds. The evaluation team intended to combine survey results from all the planned campaigns with in-depth interviews and a billing analysis to better understand program influence and effectiveness.

3. CONCLUSIONS

Through the early experiences with the BEP Pilot, Con Edison and the evaluation team learned about the potential for — and challenges with — engaging building operators in targeted buildings to pursue operations and maintenance improvements to their building.[14] The building operators targeted through the BEP Pilot were expected to be a difficult group to engage, as was evident in Con Edison's experience. Through our analysis of program implementation and limited evaluation activities, we developed the following lessons learned:

- **It can be difficult to maintain building operators' engagement over time.** While 19 of 23 building operators participated in the first building operator campaign, participation decreased with each subsequent campaign. The operators who only did the early campaigns reported already doing campaign activities or having the campaign not be applicable to their equipment, suggesting that it can be hard to maintain engagement if the program does not feel valuable or relevant to participants. For example, four operators participated solely in the first campaign. All four reported already taking all of the actions targeted by the campaign.
- **Many building operators are (or think they are) already implementing efficient O&M practices**. Across all participating building operators, one of the top reasons that operators did not make program-targeted improvements was that they were already implementing the practice. For example, 9 of 15 operators participating in the *Scheduling for Success* campaign had already been utilizing a temperature setback for Zone Temperature Setpoints.
- **Tenant control of building equipment was an unexpected barrier**. Building operators reported that tenants controlled HVAC systems, outside air damper, and lighting. For example, 4 of the 16 operators participating in the *BAS Pitstop* campaign said that tenant-control of HVAC systems prevented them from making changes. This was partially due to a shift in program recruitment: while the campaigns were designed for Class A buildings with central control of building equipment, the program ended up including more Class B buildings with distributed control to meet participation goals. Engaging individual tenants, rather than building operators, would be more difficult given how many more stakeholders that would involve. This will be a challenge for any program trying to target the types of buildings included in the BEP Pilot.
- **The influence and impact of the program varied widely from building to building.** While the sample size was too small to generalize, we saw mixed results in our surveys with building operators in terms of how much they learned from program campaigns and how often they had been implementing targeted actions before the campaign. For example, when

[14] Targeted buildings were Class A-/B+ buildings with building automation systems who are not already pursuing energy efficiency or sustainability goals

asked how much they learned through the *Optimize Outside Air* campaign, two building operators rated their learning as a 3 on a scale from 1 to 10, while one rated learning as an 8 and another as a 9. In addition, our program data analysis showed considerable differences between the most and least engaged participants. On the one hand, four buildings never participated in a campaign and four more dropped out after the first campaign without making any O&M changes. On the other hand, four buildings participated in all five campaigns and made changes to their O&M through each campaign.

In conclusion, our early experience with the BEP Pilot suggests that the program is helping educate and motivate some participating building operators to improve the energy efficiency of their building operations and maintenance. However, a larger number of participants were less likely to save energy, either because they were (1) not participating in campaigns, (2) already implementing targeted O&M practices, or (3) lacked control over the equipment systems targeted by the program.