Evaluation as a Critical Continuous Improvement Element to Meet Long-Term Energy Efficiency Targets in the Commercial & Industrial Sector

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ABSTRACT

A large US utility developed a 5-year plan for its energy efficiency (EE) and demand response (DR) programmes around the philosophy that making participation an easy, convenient, and smart choice for customers is the most certain path to cost-effectively meeting energy savings and peak load reduction targets. To accomplish this customer-centric vision, this utility is employing an implementation approach aimed at providing customers with the right offer, in the right way, at the right time via innovative marketing and lead generation tactics, a comprehensive suite of customer solutions, integration and cooperation across a network of contractors, and a commitment to continuous improvement.

This implementation model demands a dynamic evaluation approach emphasising the customer experience. This paper reviews the evaluation methods used throughout the start of the utility's 5-year plan for commercial and industrial (C&I) programmes and highlights the role of continuous improvement in the evaluation. Instead of evaluating after the end of each programme year, the authors used right time evaluation methods to ensure that the utility receives insight and recommendations at the most impactful points. The authors discuss the challenges and benefits of this approach from a compliance and project management perspective and present thoughts on how right time evaluation could be used across the evaluation industry.

Introduction

In the US, regulated utilities play a key role in delivering energy efficiency (EE) and demand response (DR) programmes. This is typically due to state regulation or legislation. In Pennsylvania, PECO Energy (PECO) developed a 5-year plan for its EE and DR programmes around the philosophy that making participation an easy, convenient, and smart choice for customers is the most certain path to cost-effectively meeting energy savings and peak load reduction targets. To accomplish this customer-centric vision, this utility is employing an implementation approach aimed at providing customers with the right offer, in the right way, at the right time via innovative marketing and lead generation tactics, a comprehensive suite of customer solutions, integration and cooperation across a network of contractors, and a commitment to continuous improvement.

This implementation model demands a dynamic evaluation approach emphasising the customer experience; this aligns with PECO's interest in keeping customers engaged in an increasingly competitive environment. Traditional approaches tend to be static and delayed, focusing on customer satisfaction

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rather than experience. This paper reviews the evaluation methods used throughout the start of the utility's 5-year plan and how the evaluators took traditional process evaluation metrics (such as operational effectiveness and customer satisfaction) and added an in-depth focus on the customer experience throughout the portfolio's touchpoints using tactics such as customer journey mapping, a diagram that illustrates the steps customer(s) go through to engage with a company (Richardson 2010). The evaluators used the utility's data analytics platform and live-updating dashboards to explore participation and survey response patterns across customer segments.

What is PECO?

Based in Philadelphia, Pennsylvania, PECO is an electric and natural gas utility subsidiary of Exelon Corporation, the nation's largest competitive energy provider. PECO is the largest electric and natural gas utility in Pennsylvania, serving approximately 1.6 million electric customers and more than 511,000 natural gas customers in southeastern Pennsylvania. Figure 1 shows the utility's service territory location.
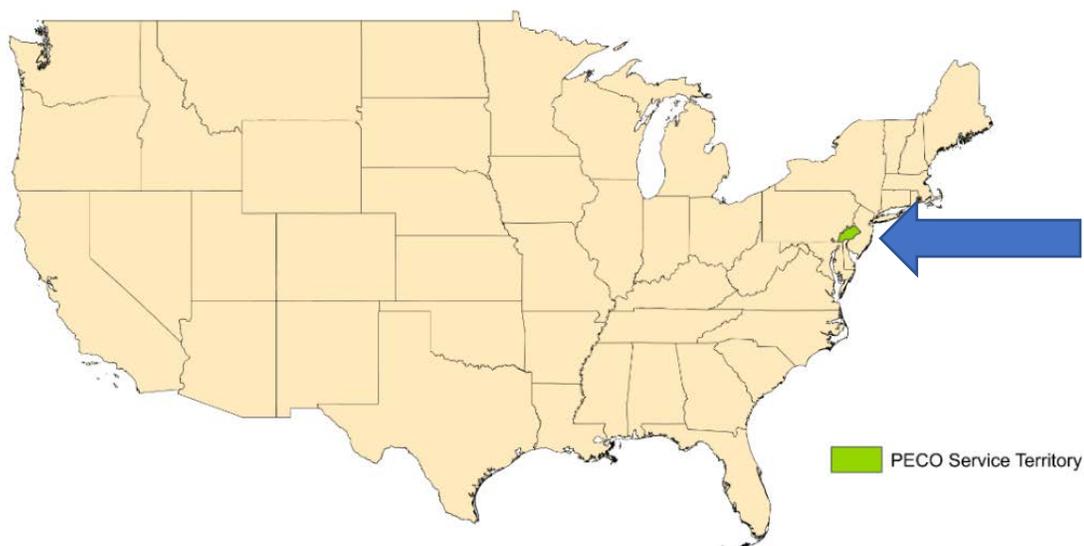
Figure 1. Location of PECO service territory

What is Act 129?

Pennsylvania Act 129 of 2008, signed on October 15, 2008 (General Assembly of Pennsylvania, 2008), mandated energy savings and demand reduction goals for the largest electric distribution companies (EDCs) in Pennsylvania for Phase I (2008 through 2013). EDCs are subject to penalties of at least $1 million and up to $20 million for failure to meet mandatory targets. However, there are no incentives for meeting or exceeding targets. Phase II of Act 129 began in 2013 and concluded in 2016. In late 2015, each EDC filed a new energy efficiency and conservation (EE&C) plan with the Pennsylvania Public Utilities Commission (PA PUC) detailing the proposed design of its portfolio for Phase III. These plans were updated based on stakeholder input and subsequently approved by the PUC in 2016. Implementation of Phase III of the Act 129 programmes began on June 1, 2016.

Act 129 requires that independent evaluators evaluate the programmes. Each EDC hired an evaluation firm, and the PUC hired a firm to audit the EDCs' firms.

Overview of the Utility Implementation Plan

PECO has a 5-year target of 1,962,659 MWh, spending of $427 million, and a DR target of 161 MW (PECO 2016). The portfolio consists of eight programmes, five of which are commercial and industrial (C&I) focused, as shown in Table 1. Each programme consists of at least one solution, which reflects the pathway to reach the customers.

Table 1. PECO C&I programmes

Programme	Energy savings (MWh)	Demand savings (MW)	Budget (millions)
Small C&I EE	403,256	70	$44.770
Large C&I EE	480,098	116	$54.770
Combined Heat and Power	363,565	55	$24.990
Small C&I DR	0	1	$0.990
Large C&I DR	0	125	$27.110
Total C&I	1,246,919	367	$152.30

Source: PECO 2016

Agile Process Evaluation Approach

Like many utilities, PECO's commercial customers tend to install inexpensive and simple energy efficient measures such as LED lighting to reduce energy use rather than more complex and expensive measures such as appliances, insulation, and HVAC systems. As customers' lighting efficiency grows, opportunities for PECO to further increase energy savings from lighting diminishes and the utility becomes more reliant on other measures to further reduce energy use. With this in mind, we hypothesise that achieving energy savings via customer-centric programmes as opposed to measure-centric programmes is the most important way for utilities to cost-effectively meet long-term energy savings and peak load reduction targets. If utility programmes are designed effectively and operate efficiently for the customer, programme participation becomes an easy, convenient, and smart choice for customers. This helps utilities achieve their energy reduction targets. Such a customer-centric engagement model requires a continuous improvement, agile process evaluation approach that emphasises the customer experience rather than a periodic evaluation approach focused on measures.

Our approach uses the waterfall methodology first introduced in a paper by Winston Royce (1970). Royce's methodology highlighted the logical nature of the sequential process much like the incremental cascades of a waterfall (Powell-Morse 2016). We use a waterfall approach to define the types of evaluation we will conduct for each year of PECO's Phase III evaluation. The results from the previous years' work defines the work that will be conducted in the next evaluation year. In addition, we use the Agile method (Beck et al. 2001) to deliver results to PECO on a regular basis across each year of the phase. Agile is rooted in adaptive planning, early delivery, and continuous improvement. By receiving results early and often, PECO can respond quickly and make necessary programme changes that enhance the customer experience.

The first year we evaluated PECO's Phase III programme implementation (June 1, 2016 to May 30, 2017), PECO's C&I programmes performed below its customer participation and energy savings targets. We used Agile process evaluation to determine the causes of the low participation and worked with PECO to redesign programme incentives and its marketing and outreach campaign. Our work included developing a customer journey map, conducting a market scan of C&I programmes across the US, interviewing programme participants and contractors to determine barriers to installing more complex

measures, and assessing and redesigning the financial incentives offered to programme participants. This paper discusses each of these approaches in depth.

Journey Map

Journey mapping is a great exercise to tell the story of customers' experience from initial contact with the programme through engagement and participation. It puts the customer at the centre and encourages all people involved in the programme to consider customer feelings and needs throughout their participation. We developed a journey map, shown in Figure 2, for PECO's C&I programme to help us identify points in the customer experience that could be improved.
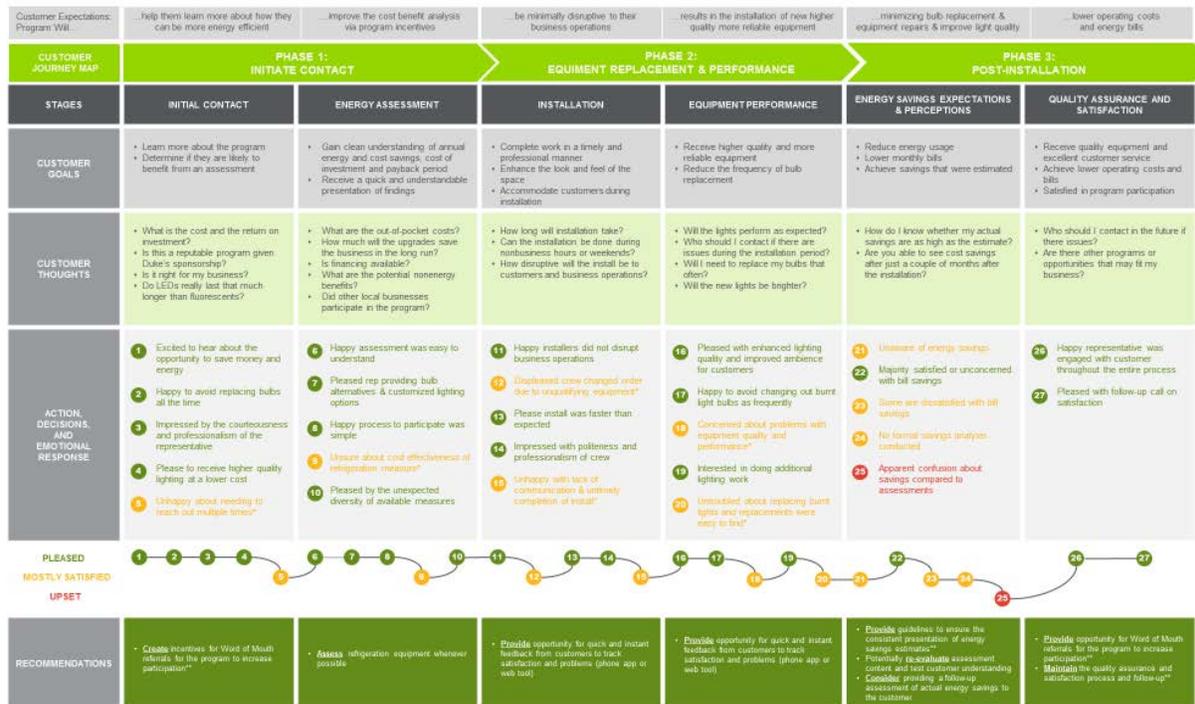

Figure 2. Example of a customer journey map. *Source:* Navigant

To create the journey map, we interviewed PECO programme staff and implementation contractors and surveyed customers. PECO programme staff and implementers provided insight about how the programme is intended to interact with customers, while customers provided statistical and anecdotal evidence from their actual experience regarding how they interact with the programme.

Market Scan

We reviewed recent industry-based C&I programme research and trends and conducted internal conversations with colleagues who consult with utilities across the US on their C&I programmes (shown in Figure 3). We used this market scan to provide context and highlighted how national trends may be influencing performance in PECO's C&I programmes. We looked for evidence of similar participation issues in other territories, identified the driving factors behind those participation issues, and confirmed the actions utilities took to mitigate the effects of the participation shift. While conducting this analysis,

it was important for us to consider regulatory requirements, implementation constraints, education/marketing barriers, and market context.
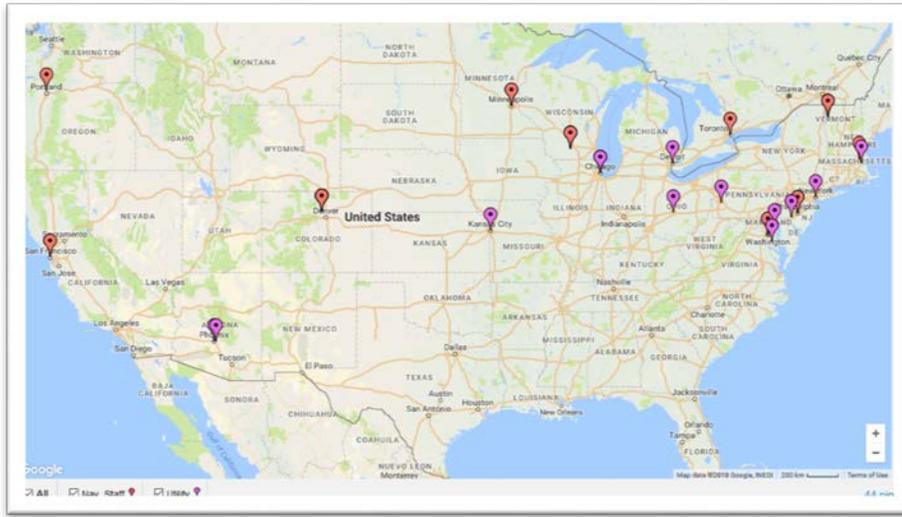

Figure 3. Utilities represented in market scan

We identified several factors driving the downward shifts in participation and savings in C&I programmes across the country, as shown in Figure 4. While many are known issues in the C&I sector, trade ally and customer education present opportunities to reverse downward trends.

Lighting measures
Easy measures have been adopted/implemented
Hard measures have cost-effectiveness barriers

Measure saturation
Some measures are near full saturation
Push new/newish measures and technologies/use cases

Capital constraints
Businesses are capital-constrained and need help to purchase
Trade allies need help showing value of programme beyond kWh

Trade ally education
Some utilities have offered focused non-lighting trainings
Increased expertise in new measures can build credibility and sales

Demand focus/regulatory changes
Some utilities are more focused on demand savings/load shifting

Figure 4. Factors driving shifts in participation and energy savings

We found that utilities have taken several actions to mitigate the effect of declining participation and savings in their own C&I programmes. Several have added non-lighting midstream and load shifting programmes to their portfolios. Others have focused efforts on offering replacement measures and new

construction offerings over retrocommissioning. The most immediate opportunities for improvement, however, include offering support and education to trade allies and increasing the intensity of customer-focused awareness and education campaigns. These efforts include holding in-person kick-off trainings for new partner contractors to provide an overview of programme details, organising measure-focused training sessions to review programme changes and sales techniques, and keeping contractors up to date on programme changes via appropriate communication channels. We discuss findings related to customer-facing awareness and education in the next section.

The Agile approach employed during this market scan included evaluating the current state of utility C&I programmes across the US to suggest areas for improvement to PECO. We conducted regular meetings with PECO to report early findings and discuss recommendations regarding incentive adjustments. We then provided recommendations on how to implement incentive changes across stakeholder groups, including guidance on educational training and potential marketing strategies.

Customer Voice Interviews

We conducted nine short interviews with C&I customers and contractors to infuse the customer voice and experience into programme improvement efforts and to understand the drivers behind the decline in participation. Customers and contractors participated in PECO's programmes to varying degrees. Interviews focused on understanding the factors contributing to an observed lack of continued programme participation by customers and examined if recent programme changes had negatively affected contractor project uptake. Our research questions included:

- Why are C&I customers not participating in the programme?
- Is the incremental cost of participation a significant barrier to participation?
- To what extent do PECO's application requirements impact decision-making?
- Do contractors need support or training to help them sell the programme and its measures?

Table 2 outlines who we interviewed and the research objective for each programme year and interviewee.

Table 2. Interviewee characteristics

Phase	II	III	III
Programme Year	Programme year 7	Programme year 8	Programme year 8
Interviewee	Participants	Participants	Contractors
Business Type	Industrial production plant	Pharmaceutical facility	Local small business
	Paper mill	Hospitality properties	National firm: new construction and retrofits
	Steel mill	Medical treatment facilities	Midwest small business
Objective	Examined why customers have not participated in PY8 programmes looking for opportunities to ease barriers to access	Assessed whether incremental costs of participation are a significant barrier to participation in PY8 and explored how impacts project decision-making	Examined how programme design changes have impacted project uptake and assessed opportunities for training needs to help contractors sell the programme and measures

Source: Navigant 2018

Interviewee responses indicated the following key themes:

- Programme confusion, gaps in communication, and lack of outreach in programme operations
- Low return on investment, lack of outreach, and contractor union policies that disqualify projects from Act 129 programmes are current obstacles in submitting more projects
- Mixed reviews by both customers and contractors on application requirements

Incentive Redesign

Using Agile principles, we completed a rapid response modelling exercise to redesign PECO's financial incentives to entice customers to participate in the C&I programmes. We evaluated Phase II incentives against Phase III incentives, identified measures for incentive changes, designed new incentive measures in collaboration with PECO and the programme implementation contractor, and provided application and implementation recommendations to communicate the new incentives to customers.

First, we needed to understand the economics of adoption for Phase III measures versus the measures incentivised in Phase II. The comparative assessment of the economic value proposition to customers in both phases included reviewing incentive levels, the simple payback period, and participant cost test ratios, among other concepts. Because market conditions independent of PECO intervention should have been similar between Phase II and Phase III, the difference in performance between the two phases allowed us to identify underperforming measures in Phase III. We found that while there was still significant value for customers in the Phase III incentives, the nominal incentive values decreased across the board from Phase II levels. Likely, this reduced the perceived value of the incentives among customers and trade allies and slowed participation. For some measures—for example, indoor recessed LEDs—this slowdown was substantial.

After identifying the nominal incentive levels as a potential key driver of diminished programme performance, through collaboration with PECO and the programme implementation contractor, we identified key candidate measures for incentive changes and then set new incentive levels for those target

measures via a sensitivity analysis. Increased participation resulting from these new incentive levels was modelled to yield savings close to Phase III goals.

Conclusions

We used dynamic evaluation approaches that emphasised customer experience rather than customer satisfaction and delivered results to PECO when recommendations were ready. These approaches allowed us to pinpoint areas for programme improvement and suggest ways in which PECO could modify the programme to enhance the customer experience. They also ensured we delivered the results of our research to PECO when we had them rather than wait until the end of the year, allowing PECO to make programme changes early and often to enhance the customer experience.

Via our market scan, we found that utilities have taken several actions to mitigate the effect of declining participation and savings in their own C&I programmes but that the most immediate opportunities for improvement included offering support and education to trade allies and increasing the intensity of customer-focused awareness and education campaigns. Our in-depth interviews with past participants and trade allies indicated programme confusion, gaps in communication, issues with the application process, and perceived low return on investment.

We recommended several programme enhancements to encourage customer participation in PECO's programmes based on insights from our rapid response research. These included immediate, short-term, and long-term actions PECO will take to influence C&I customers to participate in its programmes at increasing rates. Table 3 outlines these recommendations.

Table 3. Summary of recommendations

Priority	Recommendations
Immediate	• Adjust incentives as outlined • Communicate updated incentives to trade allies via training and webinars • Simplify application requirements by streamlining the form and eliminating extraneous technical documentation requirements • Update all relevant programme materials and supporting information in the market
Short-term	• Market updated incentives via direct-to-customer outreach focused on non-lighting measures, including use of all relevant marketing channels
Long-term	• Manage customer relationships via proactive communication and collaboration with trade allies and account managers • Understand customers' long-term needs and implement strategies for follow up and handholding as needed

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