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April 28, 2015

VIA eFILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: **Dynamic Pricing: PECO Smart Time Pricing Pilot, Final Report**
Docket No.: P-2012-2297304

Dear Secretary Chiavetta:

Enclosed for filing in the above-referenced matter is the *Dynamic Pricing: PECO Smart Time Pricing Pilot Final Report* and associated **Certificate of Service**.

Sincerely,
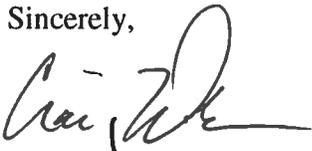
W. Craig Williams
Assistant General Counsel

Enclosures

cc: Certificate of Service

PETITION OF PECO ENERGY	:	
COMPANY FOR EXPEDITED	:	DOCKET NO. P-2012-2297304
APPROVAL OF ITS DYNAMIC	:	
PRICING PLAN VENDOR SELECTION	:	
AND DYNAMIC PRICING PLAN		
SUPPLEMENT		

CERTIFICATE OF SERVICE

I hereby certify and affirm that I have this day served a copy of the ***Dynamic Pricing:***

PECO Smart Time Pricing Pilot, Final Report on the following persons in the manner specified

in accordance with the requirements of 52 Pa. Code § 1.54:

VIA E-FILING

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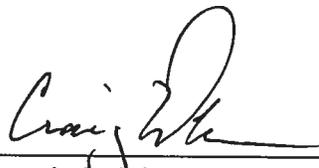
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Date: April 28, 2015

Counsel for PECO Energy Company

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☉ Nexant

Dynamic Pricing

PECO Smart Time Pricing Pilot Final Report

April 27, 2015

Submitted by Nexant

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Michael Sullivan, Senior Vice President
Josh Schellenberg, Managing Consultant
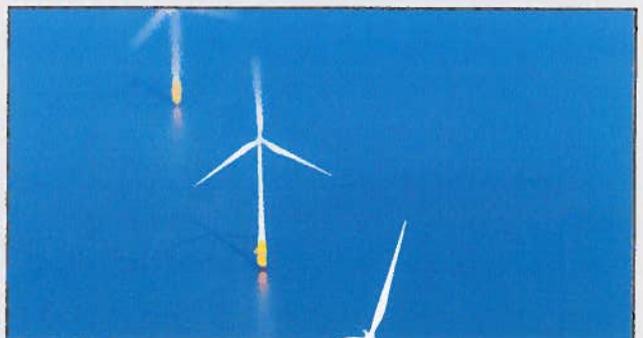Alana Lemarchand, Consultant

Table of Contents

1 Executive Summary

In October 2013, PECO launched a time-of-use (TOU) pricing pilot called PECO Smart Time Pricing. The offer combined a TOU rate with a bill protection feature plus a no-fee cancelation provision. The TOU rate offered a reduced rate for electricity usage for most hours of the year and a higher rate during non-holiday, weekday afternoons from 2 PM to 6 PM. NRG Retail Solutions was selected by PECO through a competitive process to perform customer care, program implementation tasks, and become the electric generation supplier (EGS) for customers who enrolled in the program. The offer was made to nearly 121,000 residential customers and more than 3,500 small & medium business (SMB) customers. In total, 4,779 residential customers enrolled during a 5-month period, which produced a 3.9% enrollment rate by the end of February 2014. As for the SMB segment, 23 customers accepted the offer. Due to the small number of SMB participants, this report primarily focuses on residential PECO Smart Time Pricing customers.

The primary objectives of the pilot were to:
- Gauge customer interest in a TOU rate offered through a competitive supplier;
- Assess the reasons why customers chose to enroll or not enroll in PECO Smart Time Pricing; and
- Evaluate the impact of TOU prices on electricity consumption.

Nexant was retained as the measurement and evaluation (M&E) contractor that conducted the research associated with these pilot objectives. The first two objectives were addressed in the PECO Smart Time Pricing Pilot Enrollment Report that was prepared by Nexant and submitted on June 30, 2014. The final objective is addressed in this PECO Smart Time Pricing Final Report. In addition, based on the end-of-pilot surveys and focus groups summarized in Section 5, this report includes information on customer satisfaction with and impressions of PECO Smart Time Pricing.

1.1 Residential Load Impact Results

Figure 1-1 summarizes the average percent reduction in monthly peak load for the residential customers enrolled in PECO Smart Time Pricing. PECO Smart Time Pricing delivered a 6% average load reduction during non-holiday, weekday afternoons from 2 PM to 6 PM in June, July and August 2014. With around 4,300 participants during those months, this reduction corresponded with an aggregate impact of 367 kW to 459 kW (or around 0.1 kW per participant). During September and spring months (March through May), load reductions were about 3% to 4%. In fall and winter months in 2014, load impacts were lower and were not statistically significant, due in part to the lower enrollment associated with the pilot enrollment ramp up and ramp down during these time periods.

Figure 1-1: Percent Reduction in 2014 Monthly Peak Load (2-6 PM) as a Result of Residential PECO Smart Time Pricing
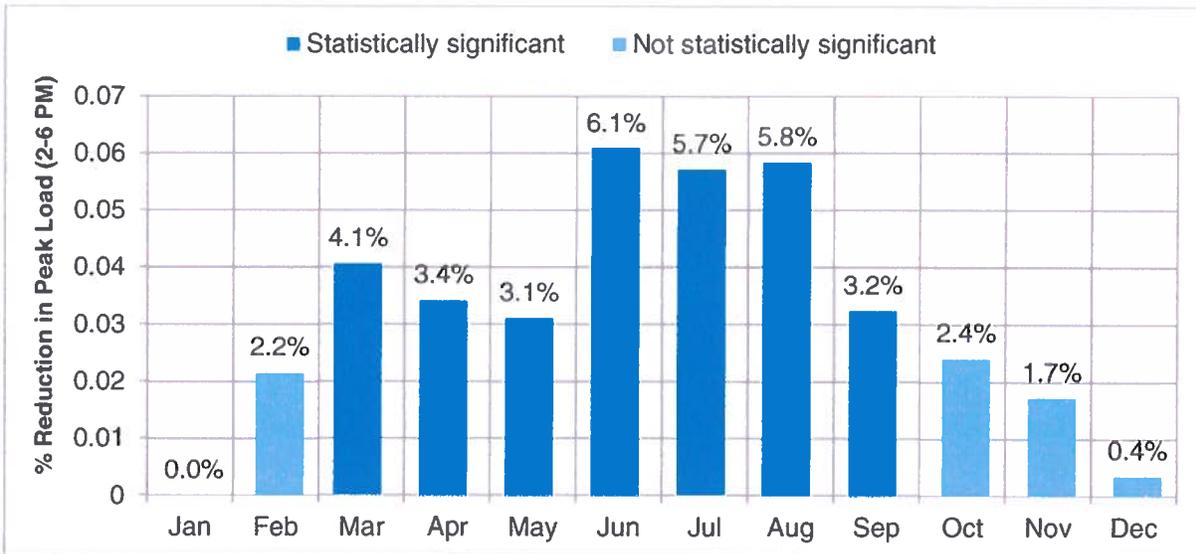
1.2 SMB Load Impact Results

For SMB customers, the results suggest that PECO Smart Time Pricing may have provided peak load reductions in most months, but given the small number of customers enrolled these results are not statistically significant. Because results for SMB customers were neither definitive nor meaningful they have not been included in this report.

1.3 Residential End-of-pilot Surveys and Focus Groups

Nexant conducted two end-of-pilot surveys in October 2014. The first was a participant survey among a randomly selected group of 2,500 customers out of a population of nearly 4,800 enrolled residential customers. The participant survey was designed to understand customer satisfaction with the pilot and self-reported behavior changes. The second survey, conducted among all 333 active PECO customers who disenrolled during the course of the pilot, was designed to understand customers' reasons for disenrolling from the program.

Nexant received 1,543 responses from participants, resulting in a 62% response rate for that survey. Ninety-five responses were received for the disenrollment survey, resulting in an overall response rate of 28%.

Among residential participant survey respondents, the key findings were:

- 98% were satisfied with PECO Smart Time Pricing or found it to be an equal or better value than their previous rate plan;
- 83% found PECO Smart Time Pricing to be convenient;
- 75% reported saving money on their bill; and

- 73% reported taking some level of action to shift electric usage away from peak hours (most commonly use of large appliances), while only 3% reported not shifting usage.

Among disenrollment survey respondents, the following were key findings:

- 86% were satisfied with PECO Smart Time Pricing

- The most common reasons for disenrolling were: 1) did not save enough money, and 2) Found a better deal elsewhere

- 21% (20 customers) indicated via open-ended responses that they did not intended to disenroll, with several stating that they only became aware of their disenrollment by receiving the invitation to participate in the disenrollment survey. Most respondents describing these unintentional disenrollments indicated that they would have preferred to keep PECO Smart Time Pricing.[1]

PECO also conducted focus groups to assess customers who were in one of three categories: 1) seniors (age 65+), 2) income less than $34,000/year, and 3) households who had reported to have one member who was qualified under the Americans with Disabilities Act ("ADA"). The focus group questions were designed to understand customer perception and satisfaction regarding their experience with PECO STP. The key findings from members of all focus groups were:

- Participants were enthusiastic about PECO STP
- The ability to save money was among the top reasons for satisfaction with the program
- The bill protection guarantee was very encouraging and helped put customers at ease
- Customers expressed the desire to see more communication regarding their savings and progress during PECO STP[2]

The executive summary of the focus group report is available in the appendix of this report. The full report is available upon request.

1.4 Residential Impacts by Self-reported Load Shifting Actions

Next, the residential load impact results, cost analysis, and the survey responses were combined to assess the extent to which impacts vary by self-reported actions to shift electrical usage away from peak hours and potentially produce cost savings for the customer. Figure 1-2 and Figure 1-3 summarize these findings. Figure 1-2 shows the average July 2014 peak load and cost impacts (in blue and green, respectively) for participants reporting taking varying levels of action to shift their usage away from peak hours. For comparison, the table also includes the average impacts for all residential PECO Smart Time Pricing customers and the impacts from customers who reported taking no action to shift usage. Impacts for most of these groups are statistically significant, except for three groups with small sample sizes (indicated by lighter shades of blue and green: customers only reporting shifting use of small appliances, customers

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[1] 20 of the 333 customers who were invited to participate in the disenrollment survey contacted either Nexant or PECO to ask why they were no longer enrolled in PECO Smart Time Pricing. Of these customers, 18 customers had switched to a competitive supplier, 1 customer was removed because of a meter mix-up, and 1 customer never returned attempts to contact them.

[2] See Appendix C for a description of the PECO Smart Time Pricing Communication Plan.

reporting shifting only the HVAC/thermostat settings, and those reported taking no action to shift usage).

The average peak load reduction per customer was 7% (0.14 kW) for customers who only shifted use of large appliances (e.g., washer and dryer, oven, stove). Average per customer impacts were twice as high, or 14% (0.28 kW), for customers who reported shifting both large appliance and HVAC use (e.g., by adjusting thermostat settings). This shows that load reductions were largest for customers who shifted use of both large appliances and HVAC-related loads.

Figure 1-2 also shows the portion of cost impacts or bill savings that was due to load reduction for each of the groups described above. Total bill savings were the average dollar savings relative to the default rate for each customer. The percentage of these savings due to load reduction follows the percentage of load reduction.

This also shows that the self-reported actions of survey respondents were reasonably accurate in reflecting differences in how customers actually responded to PECO Smart Time Pricing.

Figure 1-2: Average July 2014 Peak (2-6 PM) Impacts by Self-reported Actions to Shift Peak Loads

Figure 1-3 shows...

Figure 1-3 portrays average monthly bill savings for the duration of the program as a percentage of what customer bills would have been for each self-reported action group. These total average monthly bill savings (labeled to the right of the bars) are split into two components, the portion attributable to the rate structure as compared to the PECO default rate (in blue) and the portion attributable to load reduction behavior (green). While the total average bill savings were close to 5% for all groups, the portion attributable to load shifting is largest for the group reporting the most load shifting behavior (HVAC and large appliances),and lowest for the group that did not report load shifting behavior.

Figure 1-3: Average Total Savings and Percentage Attributable to Load Shifting Actions by Self-reported Actions to Shift Peak Loads
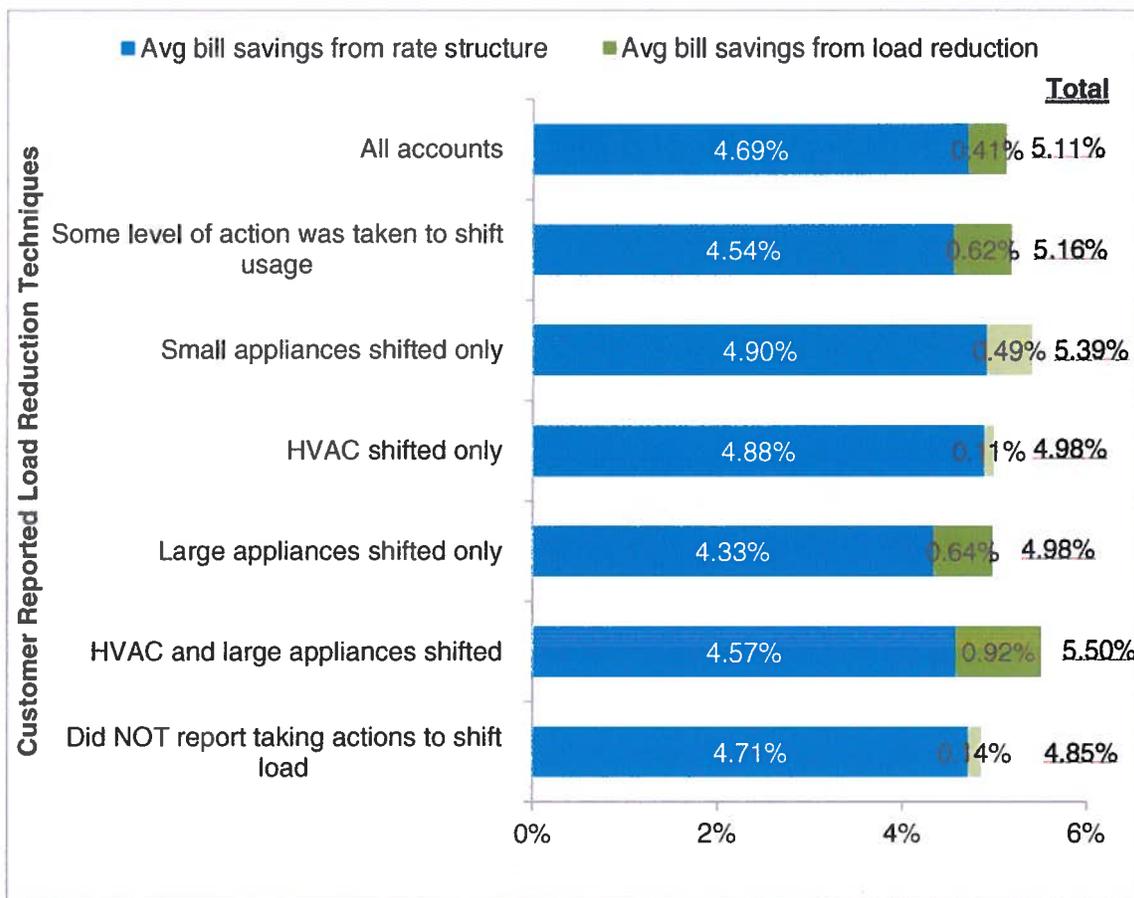
1.5 Residential Impacts by Select Demographic Groups

Nexant then performed a similar analysis using the combined residential load impact results, cost analysis, and the survey responses to determine the impacts from the three demographic groups that were eligible to participate in the Focus Group studies. Figure 1-4 shows the average July 2014 peak load and cost impacts (in blue and green, respectively) for seniors (age

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65+), income less than $34k/year, and households who had reported to have one member who was qualified under the Americans with Disabilities Act ("ADA"). For comparison, the table also includes the average impacts for all residential PECO Smart Time Pricing customers. All results reported here are statistically significant.

The average peak load reduction per customer in July 2014 was 7.1% for seniors, 7.3% for low income, and 11.6% for households who have an ADA eligible member.

Figure 1-4 also shows the portion of cost impacts or bill savings attributable to load reduction for each of the groups described above. Total bill savings were the average dollar savings relative to the default rate for each customer. The percentage of these savings due to load reduction follows the percentage of load reduction.

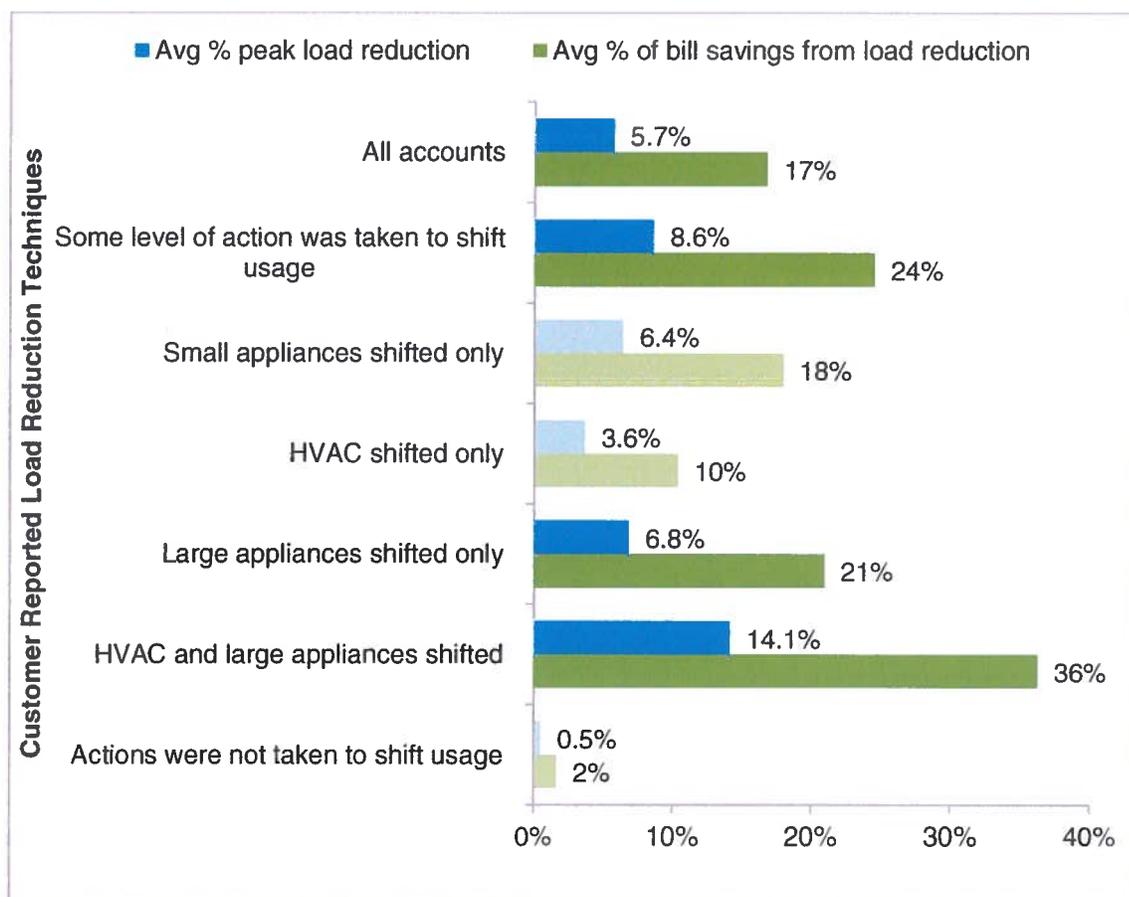**Figure 1-4: Average July 2014 Peak (2-6 PM) Impacts by Select Demographic Groups**
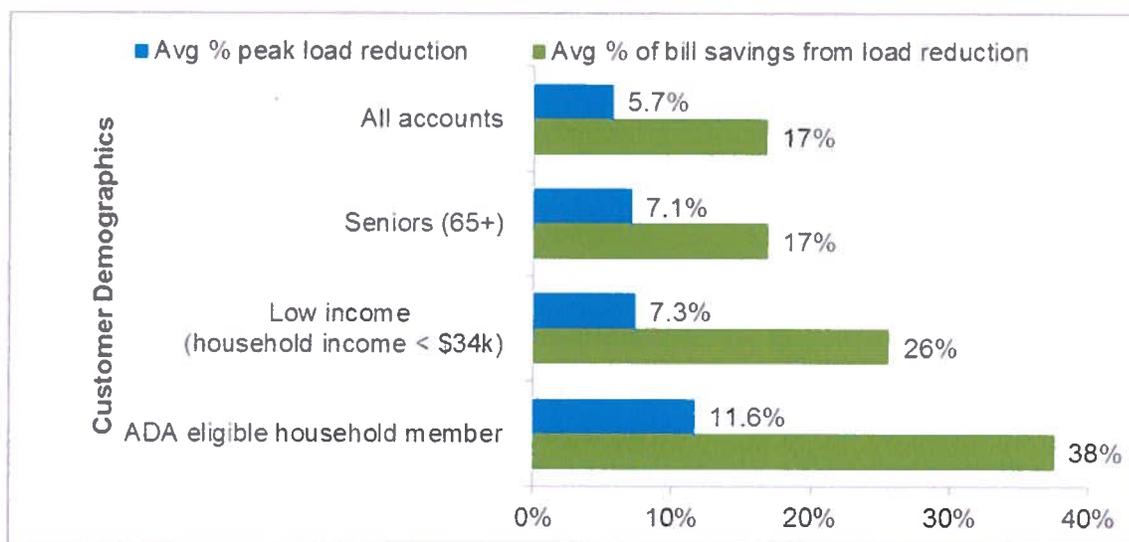
Figure 1-5 portrays average monthly bill savings for the duration of the program as a percentage of what customer bills would have been for each demographic group. These total average monthly bill savings (labeled to the right of the bars) are split into two components, the portion attributable to the rate structure as compared to the PECO default rate (in blue) and the portion attributable to load reduction behavior (green). While total average bill savings were close to 5% for all groups, the portion attributable to load shifting is largest for households with an ADA eligible member, which was also the group with the greatest percent load reduction in July 2014 (see Figure 1-4).

Figure 1-5: Average Total Savings and Percentage Attributable to Load Shifting Actions Achieved by Select Demographic Groups

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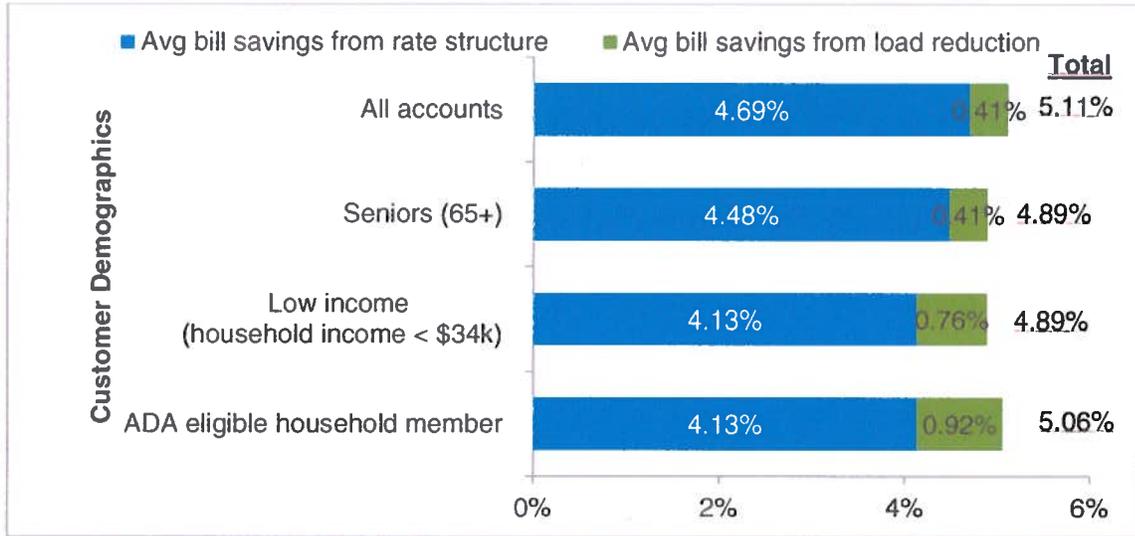
2   Introduction

In October 2013, PECO launched a time-of-use (TOU) pricing pilot called PECO Smart Time Pricing. The offer combined a TOU rate with a bill protection feature plus a no-fee cancelation provision, all of which was supported by customer education and a call center staffed by trained NRG Retail Solutions agents. The TOU rate structure offered a reduced rate for electricity usage for most hours of the year and a higher rate during non-holiday, weekday afternoons from 2 PM to 6 PM. The bill protection feature provided assurance to customers who stayed on the program for a year that they would pay no more than what they would have paid on the PECO default rate. The offer was made to nearly 121,000 residential customers and more than 3,500 small & medium business (SMB) customers. NRG Retail Solutions was selected by PECO through a competitive process to perform program customer care (call center), program implementation tasks, and become the electric generation supplier (EGS) for customers who enrolled in the program. As the EGS, NRG Retail Solutions performed the normal EGS functions including bill calculation although all participants in PECO Smart Time Pricing were provided a single bill option where the EGS charges were placed on the normal PECO monthly bill.

The primary objectives of the pilot were to:

- Gauge customer interest in a TOU rate offered through a competitive supplier;
- Assess the reasons why customers chose to enroll or not enroll in PECO Smart Time Pricing; and
- Evaluate the impact of TOU prices on electricity consumption.

Nexant was retained as the measurement and evaluation (M&E) contractor to conduct the research associated with these pilot objectives. The first two objectives were addressed in the PECO Smart Time Pricing Pilot Enrollment Report that was prepared by Nexant and submitted on June 30, 2014. The final objective is addressed in this PECO Smart Time Pricing Final Report. In addition, based on the end-of-pilot surveys and focus groups summarized in Section 5, this report includes information on customer satisfaction with and impressions of PECO Smart Time Pricing.

2.1   Eligibility for PECO Smart Time Pricing

Throughout the development of PECO's Smart Time Pricing program, PECO engaged various stakeholder groups (including statutory advocates, the supplier community and PUC staff), via webinars and in-person meetings to cooperatively develop meaningful program parameters, including the establishment of the eligibility criteria for participation in the pilot. The findings of this report are limited to customers meeting those criteria, which were summarized in Section 2.2 of the PECO Smart Time Pricing Enrollment Report.

2.2   Residential Enrollment in PECO Smart Time Pricing

PECO solicited 120,998 residential customers to enroll in PECO Smart Time Pricing, starting in October 2013. In total, 4,779 customers enrolled over a 5-month period, which produced a 3.9% enrollment rate by the end of February 2014. The pilot ended for each customer as they reached their one-year enrollment anniversary. Of the 4,779 customers who enrolled in PECO

Smart Time Pricing, around 10% disenrolled before reaching one year on the pilot. Considering that pilot enrollment ramped up over a 5-month period, the phase out of the pilot also lasted 5 months (one year later), from October 2014 through February 2015. The pilot ended for most customers by the end of 2014, so this report focuses on the 2014 time period, which is when load impacts were estimated and when the end-of-pilot surveys were conducted (in October 2014).

2.3 SMB Enrollment in PECO Smart Time Pricing

PECO solicited 3,583 SMB customers to enroll in PECO Smart Time Pricing. In total, 23 customers accepted the offer, which produced a 0.64% acceptance rate. This experience showed that, among SMB customers that have never switched electricity suppliers, there was a lack of interest in PECO Smart Time Pricing. Due to the small number of SMB participants, this report primarily focuses on residential PECO Smart Time Pricing customers.

2.4 Summary of Survey Findings from Enrollment Report

Three prior surveys related to PECO Smart Time Pricing were summarized in the Enrollment Report. NRG Retail conducted a welcome survey among all residential customers who enrolled. Nexant conducted a residential decliner survey among a random sample of 5,500 customers who were solicited for PECO Smart Time Pricing, but who did not enroll in the program (referred to as "decliners"). Finally, Nexant also conducted a small-scale SMB phone survey, for which 22 customers completed the survey.

For the NRG Retail Welcome Survey for residential enrollees, the key findings were:
- More than two-thirds of respondents were satisfied with the pilot;
- Less than 10% of respondents were dissatisfied;
- The main reason respondents chose to participate in the program was to save money by taking advantage of a better rate during off-peak hours;
- PECO sponsorship of the program was an important reason in choosing to participate; and
- Over 75% of survey respondents were 55 years of age or older.

For the residential decliner survey, around half of respondents recalled receiving the offer to enroll in PECO Smart Time Pricing. Among customers who recalled receiving the offer, the key findings about why customers declined the offer were the following:
- Not wanting to switch away from their current service supplier;
- Not sure they would be better off on the new pricing plan;
- Simply not interested; and
- Thought they may experience higher costs on the program.

Finally, of the few customers who completed the small-scale SMB phone survey and recalled the offer, four out of five stated that they were just not interested, were not sure that they would be better off and that they thought it was too much hassle to sign up.

2.5 Overview of the Offer

As described in the Enrollment Report, the PECO Smart Time Pricing offer included three features – the TOU rate, bill protection and the option to leave the pilot at any time without a cancellation fee. The summary of these three features is also included in this report to ensure that readers of this report are aware of exactly what the pilot included.

2.5.1 The TOU Rate

PECO Smart Time Pricing applies to the generation portion of the rate that customers pay for electricity. The delivery portion of the rate stays the same. Figure 2-1 compares the generation rate under PECO Smart Time Pricing and under the default PECO rate ("PECO Price to Compare") in effect at the time of the solicitation. PECO Smart Time Pricing had a peak generation rate of $0.1595 per kWh on weekdays from 2 PM to 6 PM, excluding holidays, and an off-peak generation rate of $0.0685 per kWh during the remaining hours of the year. The PECO Smart Time Pricing TOU rate remained the same for the entire pilot. PECO's default rate for generation changed quarterly and was $0.0935 per kWh at the time the solicitations began (that rate was in effect from September 1, 2013 through November 30, 2013). Basically, under PECO Smart Time Pricing, customers paid roughly 7 cents more per kWh during around 11% of the hours of the year and saved just over 2 cents per kWh during the remaining 89% of the hours.[3]

Figure 2-1: Comparison on Generation Rates ($/kWh) on Non-holiday Weekdays

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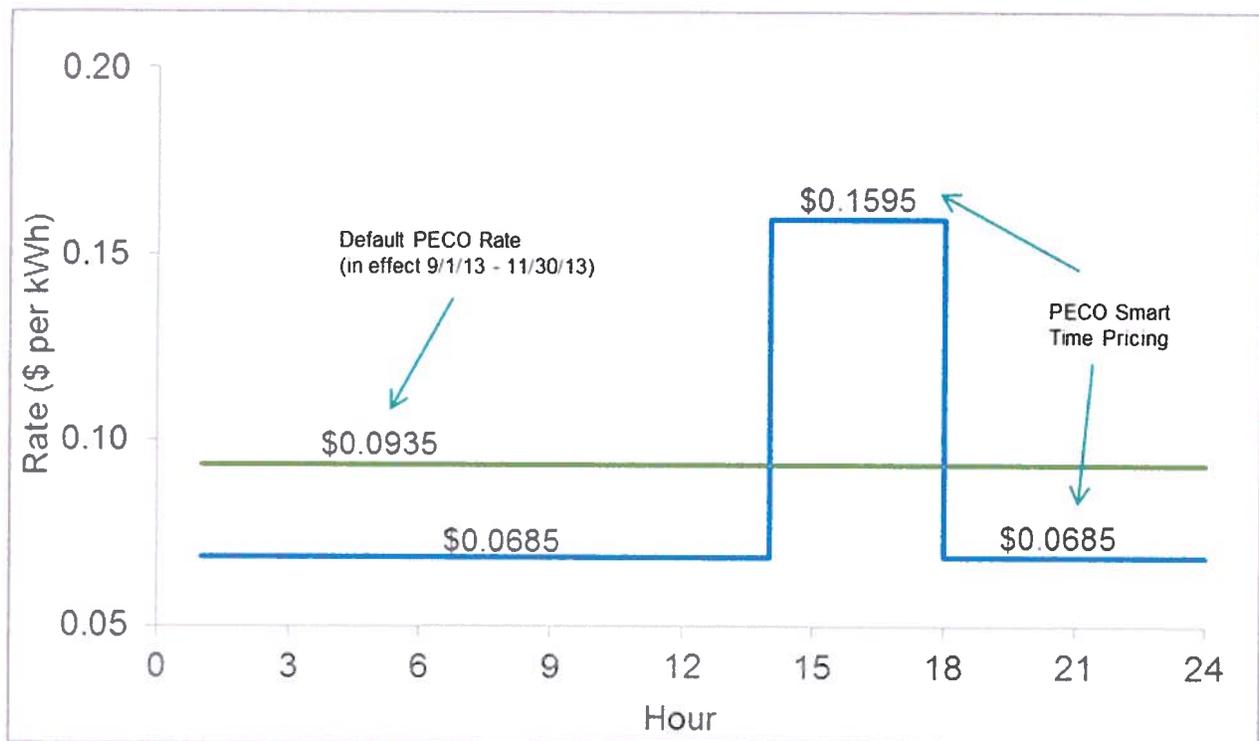
[3] While the TOU pricing remained the same throughout the pilot, the on-peak premium and off-peak discount varied quarterly with changes to PECO's default rate.

2.5.2 Bill Protection

PECO offered a bill protection feature that provided enrolled customers who remained with the program for 12 months the assurance that their total cost would not be greater than what they would have paid on PECO's default rate. If a customer's actual bill on PECO Smart Time Pricing was higher than it would have been with PECO's default rate, the customer received a check for the difference. The bill protection reconciliation was performed on the customer's aggregate twelve months of bills. Customers who left the pilot before completing the 12-month term were not eligible for bill protection.

At the end of the program, there were a total of thirteen customers who received bill-protection reimbursement from PECO. The individual amounts of bill-protection reimbursement ranged from $1.01 to $19.23, totaling $100.64 for all thirteen customers.

2.5.3 Leave Anytime, No Cancellation Fee

Enrolled customers had the option of leaving the pilot at any time without a penalty or fee.

2.6 Report Organization

The remainder of this report proceeds as follows:

- **Section 3** summarizes the methodology for estimating the impact of PECO Smart Time Pricing on hourly and peak-period electricity consumption;
- **Section 4** provides the results of the PECO Smart Time Pricing load impact and cost saving analysis for residential participants;
- **Section 5** details the results of the end-of-pilot surveys and focus groups. and
- **Section 6** provides some observations

 Nexant

3 Load Impact Evaluation Methodology

The primary impact of interest for PECO Smart Time Pricing was the reduction of load during the peak hours. To measure this load impact, it was necessary to develop an estimate of the reference load. The reference load was an estimate of what load would have been in the absence of the price incentives. For this evaluation, the focus was on what the load would have been without PECO Smart Time Pricing during the pilot period November 2013 through December 2014.

This evaluation used a difference-in-difference methodology with a matched control group to estimate impacts for residential participants. At a high level, the steps for this process were as follows:

1. Selected a matched control group whose pre-treatment loads closely align with participant loads;

2. Calculated average control load during the treatment period to establish a counterfactual reference load;

3. Subtracted out any differences that existed between control and participant loads in the pre-treatment period;

4. Compared average participant loads to control loads during peak hours (2-6 PM on non-holiday weekdays), which produced average kW and percent impacts; and

5. Calculated aggregate impacts by multiplying average kW impacts by the number of participants enrolled during the treatment period.

The remainder of this section provides additional detail regarding the matching and difference-in-difference methodology used in the evaluation, including underlying assumptions made. The next three subsections summarize aspects of the residential impact evaluation methodology as follows:

- Section 3.1 describes the matched control group methodology;

- Section 3.2 describes the difference-in-differences approach; and

- Section 3.3 explains the estimation of aggregate impacts.

3.1 Matched Control Group Methodology – Residential

The primary source of reference loads, and hence impact estimates, was a matched control group. This matched control group was selected from the pool of 35,700 customers who were not solicited for enrollment in PECO Smart Time Pricing, but met all of the pilot eligibility criteria.[4] By assembling a matched control group from a similar population that was not exposed to PECO Smart Time Pricing, it was possible to compare average control group loads to average participant loads and estimate impacts. The methods used to assemble this group were designed to ensure that the control group load during the treatment period was an

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[4] As discussed in the PECO Smart Time Pricing Pilot Enrollment Report, the pilot eligibility criteria led to only 25% of PECO residential customers being eligible. Therefore, it was important to draw the matched control group from a population that also met the eligibility criteria.

accurate estimate of what load would have been among PECO Smart Time Pricing customers had they not been exposed to the rate. The fundamental idea behind the matching process was to find customers who were not subject to the rate, but who met the eligibility criteria and had similar usage patterns to participants before enrollment.

A common alternative to a matched control group was a within-subjects analysis based only on the pretreatment and post-treatment loads of participants. This is usually carried out by constructing a regression model that predicts reference loads based on predictive variables such as weather and past usage. However, the matched control group method used for this analysis was superior to a within-subjects analysis because there was a large population of non-PECO Smart Time Pricing customers to use as a pool for matching and because it eliminated the problem of regression model misspecification.[5] Any reference load model based on a participant's own loads before being exposed to the price signal requires the modeler to make assumptions about the relationships between load, time and temperature. If this assumed function does not reflect the true relationships between load, time and temperature, then the model can produce incorrect results. In contrast, the matched control group automatically deals with this problem by assuming that the customers who behaved similarly to PECO Smart Time Pricing participants prior to enrollment would also behave similarly after the participants enrolled. This eliminates the need to specify load as a function of weather, and therefore, reduces the uncertainty of a matched control group. PECO Smart Time Pricing conditions presented a case to use a matched control group as the basis for its analysis.

The PECO Smart Time Pricing population changed over time, due to rolling enrollments and disenrollments. Because of this, impacts were estimated separately for each month the program was offered. To do this, it was necessary to identify a participant group and a control group for each month. The participant group for each month was defined as the subset of participants who were fully enrolled for that month in the treatment period. Different matched control groups were selected for each month for each participant from among non-participants by comparing pretreatment loads for participants and non-participants. Selecting a different matched control group for each month, as opposed to selecting a match with the lowest average difference in load across months, results in a closer match within each month because the factors which result in similar load shapes for two customers in one month may be very different in another month. Therefore, selecting the closest match for each month resulted in a closer match and more accurate reference load.

For most months, pretreatment loads were from the same month one year prior to the treatment month, except for November and December 2014 because PECO Smart Time Pricing was already offered one year prior. For these two months, data from two years prior was used for the pretreatment matching month. This meant that for a non-participant to be a control group candidate, customer had to have interval data for both the treatment month and the pretreatment month. Participants used for impact analysis also had to have this interval data

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[5] For a comparison of results using various research methods, including RCT/RED designs, statistical matching and within-subjects regression analysis, see the interim report for Sacramento Municipal Utility District's Smart Pricing Options pilot: https://www.smartgrid.gov/sites/default/files/MASTER_SMUD%20CBS%20Interim%20Evaluation_Final_SUBMITTED%20T0%20TAG%2020131023.pdf.

and must have been fully enrolled for the post-treatment month and not be enrolled in or exposed to PECO Smart Time Pricing in the pretreatment month.

To assess the accuracy of the control group match, Table 3-1 summarizes the following for each post-treatment month:

- Pretreatment month that was used;

- Number of participants fully enrolled in PECO Smart Time Pricing for that post-treatment month (e.g. enrolled on the first and last non-holiday weekday);

- Subset of enrolled customers who also had interval data for the pre-treatment month;

- Number of non-participants who were control group candidates because they had interval data for the pre-treatment and post-treatment months; and

- Subset of control group candidates who were selected as part of the matched control group.

It is important to note that PECO's smart meter rollout for these customers was in process during the winter of 2012 and the spring of 2013. Because interval data was only available for customers who had a smart meter installed, there were a limited number of participants or control group candidates who could be used for this analysis during certain months. In addition, because of rolling enrollments and disenrollments, the number of participants available for impact analysis was quite low in the fourth quarters of 2013 and 2014.

Table 3-1: Participants and Matched Control Group Used for Monthly Impact Analysis

| Post-treatment Month	Pre-treatment Month	Participants Enrolled	Participants with Pre-treatment Data	Participant Sample as % of Total Enrolled	Control Group Candidates	Control Group	Control Group as % of Control Candidates
Nov 2013	Nov 2012	113	34	30%	10,687	33	0%
Dec 2013	Dec 2012	973	403	41%	10,641	367	3%
Jan 2014	Jan 2013	2,977	1,436	48%	10,608	1,098	10%
Feb 2014	Feb 2013	4,155	2,312	56%	10,576	1,646	16%
Mar 2014	Mar 2013	4,424	2,795	63%	10,530	1,999	19%
Apr 2014	Apr 2013	4,445	3,324	75%	10,491	2,391	23%
May 2014	May 2013	4,399	3,852	88%	10,434	2,718	26%
Jun 2014	Jun 2013	4,353	4,297	99%	10,378	3,068	30%
Jul 2014	Jul 2013	4,322	4,281	99%	10,307	3,111	30%
Aug 2014	Aug 2013	4,282	4,262	100%	10,226	3,046	30%
Sep 2014	Sep 2013	4,163	4,161	100%	10,179	2,965	29%
Oct 2014	Oct 2013	3,457	1,121	32%	10,134	817	8%
Nov 2014	Nov 2012	1,390	391	28%	10,084	357	4%
Dec 2014	Dec 2012	812	321	40%	10,042	299	3%

After identifying the subset of customers who could be used for matching, the match itself was performed as follows. To select a match for an individual participant, that customer's monthly average weekday load shape was compared to the monthly average weekday load shape for

each control group candidate. The candidate with the lowest absolute difference[6] was selected as the match for that participant for that month.[7] In effect, each participant was matched to the control candidate with the most similar pretreatment load shape on non-holiday weekdays. A match was found for each PECO Smart Time Pricing participant, but the same control customer could be matched to multiple PECO Smart Time Pricing participants, meaning that a control customer would be represented more than once in the control group.

3.2 Difference-in-differences Approach – Residential

Figure 3-1 shows the average pretreatment loads for the participant and matched control group in summer 2013, just before PECO Smart Time Pricing was rolled out. Note how closely the loads align; in effect, this is evidence that the control group was well matched to the participants. A well matched control group allowed for detection of relatively small impacts.

Figure 3-1: Average Weekday Loads Before PECO Smart Time Pricing, July-Sept. 2013


Enrolled N = 4,122
Control N=3,034
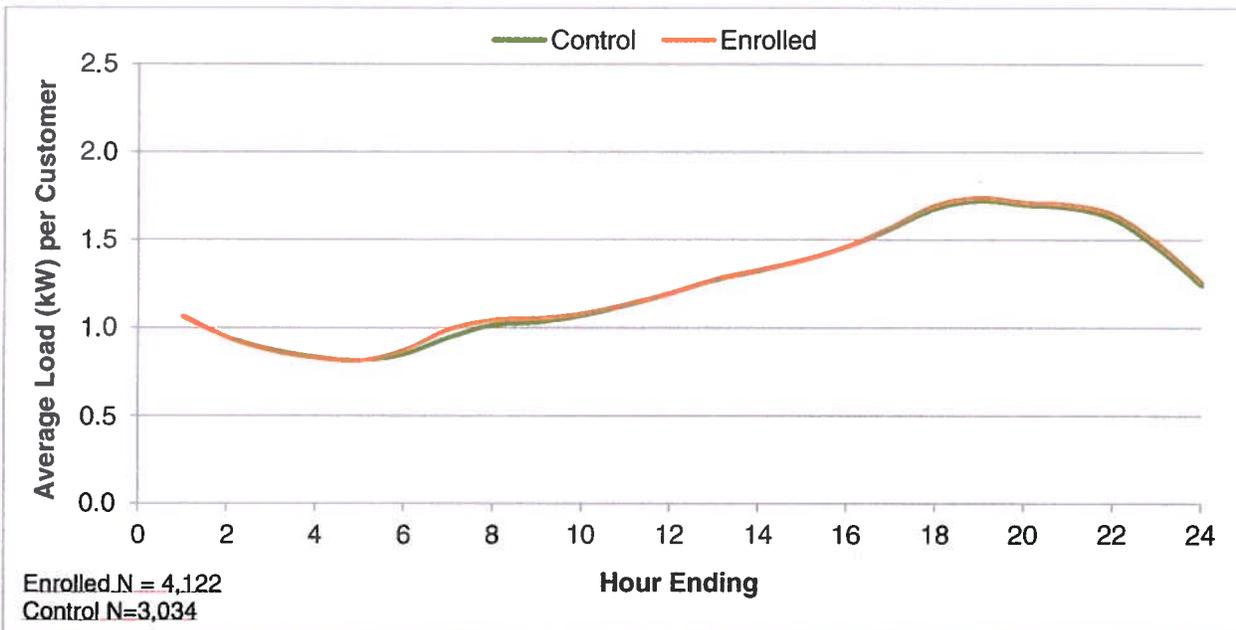
Once the matched control group was selected, the counterfactual load was derived by simply taking the average load across the control group during the post-treatment period. This reference load was compared to average participant load in the same period. Figure 3-2 shows these two loads for summer 2014. The counterfactual, or control, load is in green. Note that participant loads were reduced between the hours of 2 and 6 PM when the PECO Smart Time Pricing peak period was in effect.

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[6] Sum of absolute differences for each hour.

[7] In a few cases, more than one candidate had the same absolute difference in which case the candidate with the lowest variance in hourly differences was selected.

Figure 3-2: Average Weekday Loads during PECO Smart Time Pricing, July-Sept. 2014

Enrolled N = 4,122
Control N=3,034
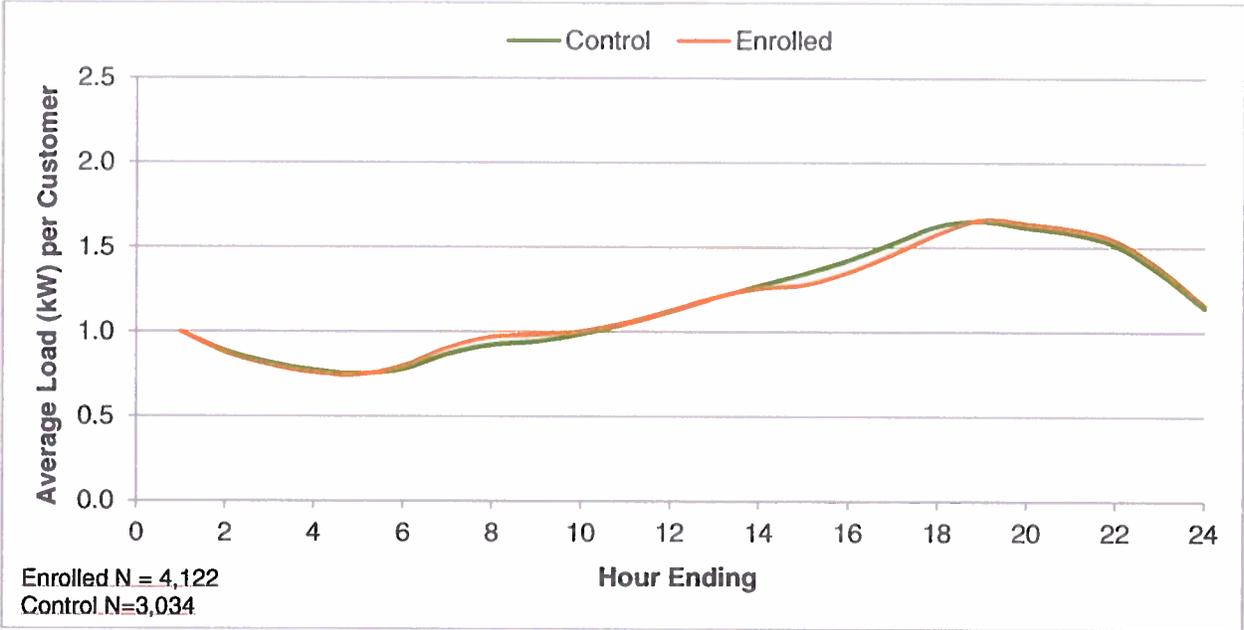
Equation 3-1 shows the difference-in-differences equation that was then used to estimate the hourly impacts of PECO Smart Time Pricing during the post-treatment period. In simple terms, this was done by comparing hourly loads for the matched control group to hourly loads for the PECO Smart Time Pricing participants, after subtracting out any underlying differences between control and participant loads as observed in the pretreatment period.

Equation 3-1: Difference-in-differences Calculation

$$kW\_impact = \left(kW_{p,post} - kW_{c,post}\right) - \left(kW_{p,pre} - kW_{c,pre}\right)$$

Table 3-2: Variables and Subscripts for Difference-in-differences Equation

Element	Description
kW_impact	Change in load during each hours
kW	Average load during the each weekday hour
p	Participant
c	Matched control customer
pre	Pre-treatment period (same month in year or two prior to PECO Smart Time Pricing)
post	Post-treatment period (during which PECO Smart Time Pricing was in effect)

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3.3 Estimation of Aggregate Load Impact Results – Residential

While individual customer impacts to their savings were important, the main metric of interest was the aggregate load reduction during peak hours. As mentioned in the previous section, some participants were excluded from certain months in the impact analysis due to a lack of pretreatment interval data. This limitation occurred when a customer did not have an AMI Meter throughout the pre- and post-treatment time periods or when a customer was not an active PECO customer throughout the entire time period. Nexant analyzed the participants with and without data limitations and found that, for the most part, the two groups had similar load shapes. Therefore, aggregate load impacts for each month were estimated by multiplying the number of participants fully enrolled for that month (regardless of data availability) by the average load impact as estimated from the customers for which there weren't any data limitations.

In the few cases where the loads of participants with and without data limitations were not similar, this difference was mostly due to there being a very small number of excluded participants, such as in June and July of 2014 when only 1% of enrolled participants were lacking pretreatment data (see Table 3-1). Since only a small subset was excluded, it was reasonable to assume that impact results could be generalized to the whole group. The other noticeable difference was that loads for the included group were generally slightly lower. This meant that load impacts for the excluded group were likely to have been slightly larger, thus leading to a somewhat conservative aggregate impact estimate. For these two reasons it was deemed reasonable to arrive at aggregate load impacts by applying average load impacts derived from the subset with pretreatment data to the full group of participants enrolled in a given month.

3.4 Estimation of Bill Savings

While the impact analysis primarily focused on peak load reductions, a secondary analysis was also conducted on customer bill savings. The goal of this analysis was to understand the impact the PECO Smart Time rate had on customer bills and to what extent this bill impact could be attributed to behavioral peak load shifting. The inputs to this analysis were the monthly cost impacts calculated by PECO (and communicated periodically to customers throughout the program) and the total monthly usage for the same billing period each month. The total monthly usage was used to calculate what the bill would have been under the PECO default rate and included the tariff distribution and customer charges. From there dollar savings as a percent of what the bill would have been without PECO Smart Time Pricing was simply the cost savings divided by the estimated total bill. Average monthly savings over the duration of the PECO Smart Time Pricing program were weighted by the number of participants in each month.

4 Residential Load Impact Results

This section summarizes the load impact estimates for PECO Smart Time Pricing residential customers following their full year of participation in the pilot. First, hourly estimates are provided for July 2014, the month with the highest average usage. Next, average monthly load impact estimates are provided from November 2013 through December 2014, which nearly covers the entire PECO Smart Time Pricing pilot time period.[8] Monthly load impact estimates are then compared for accounts with and without electric heat. In the next step the load impact estimates are combined with the participant survey responses (summarized in Section 5) to show how load impacts vary by self-reported actions to shift usage away from peak hours. Finally, the customer cost impacts due to load shifting are evaluated to show the overall savings plus the savings attributable to customer behavior changes.

Throughout this section, results are qualified as being statistically significant or not statistically significant, using the p-value and the 95% confidence interval. The p-value is the likelihood that a given estimated impact of PECO Smart Time Pricing is not different from zero. For example, a p-value of 5% means that there is a 5% chance that the impact of PECO Smart Time Pricing is not different from zero (put differently, there is a 95% chance that the impact is different than zero). A p-value of 5% or below is considered statistically significant because it corresponds to a high likelihood that the estimated impact is different from zero. The 95% confidence interval consists of a lower and upper bound within which actual results are likely to lie (with 95% likelihood). On impact charts throughout this section, hourly impacts are plotted along with the lower and upper bounds of the 95% confidence interval, a standard measure of statistical significance. If zero falls within the interval, the impact is considered to be not statistically significant. In the tables in the section, impact estimates that are not statistically significant are designated by a gray background in the table row in order to clearly show when a given result is not statistically different from zero.

4.1 Hourly Load Impacts for July 2014

Figure 4-1 shows the hourly load impact estimates for the average residential PECO Smart Time Pricing participant during the month of July 2014 – the month with the highest average usage during the 14 months analyzed. Above the figure, it shows average peak impacts, and below the figure, there is a table with hourly impacts.

For weekdays in July 2014, the average hourly reference load per participant was 1.86 kW. The average reduction during the peak period from 2 PM to 6 PM was 0.11 kW, which corresponds to a 5.7% reduction of whole-house load during that period. This impact was consistent throughout the 4-hour peak period resulting in an aggregate peak load reduction of 459 kW. This represents the highest peak load reduction achieved throughout the PECO Smart Time Pricing pilot, due to the high usage in July 2014 and enrollment being near its peak.
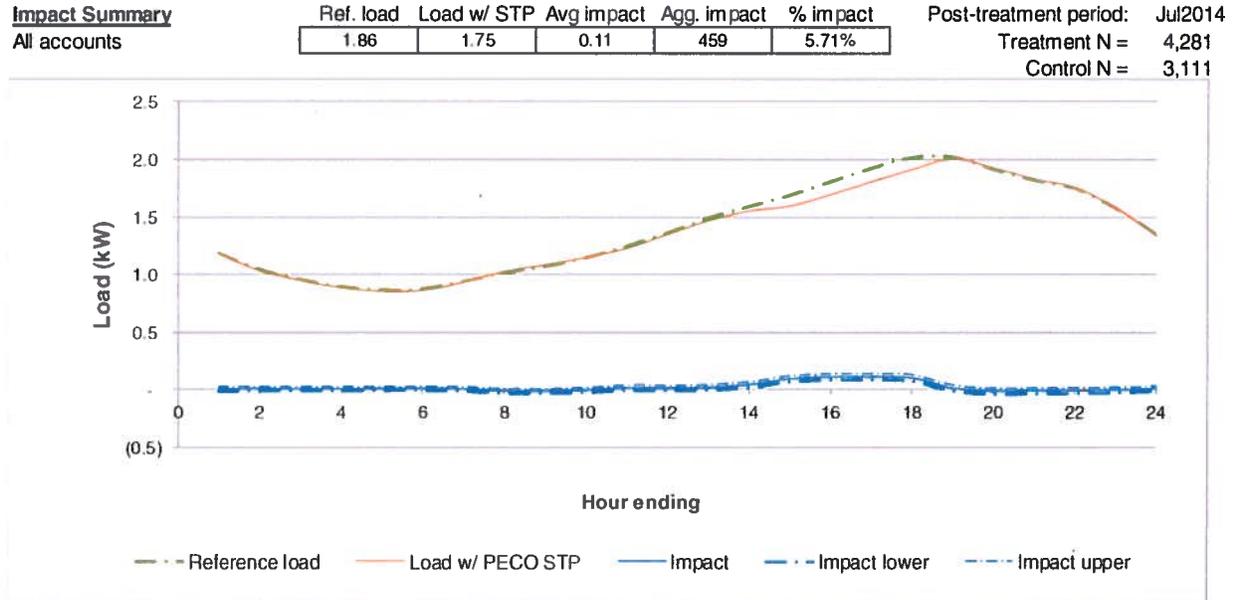
As for off-peak hours during weekdays in July, load did not significantly increase before or after the peak period, which suggests that peak loads were largely reduced as opposed to simply

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[8] A relatively small number of customers were still rolling off the rate in the beginning of 2015.

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shifted to off-peak hours. This was also the case in other summer months, including June, August and September 2014.

Figure 4-1: Residential PECO Smart Time Pricing Average Hourly Impacts for July 2014

Impact Summary	Ref. load	Load w/ STP	Avg impact	Agg. impact	% impact	Post-treatment period:	Jul2014
All accounts	1.86	1.75	0.11	459	5.71%	Treatment N =	4,281
						Control N =	3,111

Hour	Reference load (kW)	Load w/ PECO STP (kW)	Average impact (kW)	Aggregate impact (kW)	Percent Reduction (%)	Standard error (kW)	P-value (confidence)	Lower bound: 95% confidence	Upper bound: 95% confidence
12 AM - 1 AM	1.18	1.18	0.01	27	0.53%	0.01	54.6%	-0.01	0.03
1 AM - 2 AM	1.05	1.04	0.01	47	1.05%	0.01	25.1%	-0.01	0.03
2 AM - 3 AM	0.96	0.95	0.01	38	0.93%	0.01	32.2%	-0.01	0.03
3 AM - 4 AM	0.90	0.89	0.01	39	1.01%	0.01	29.6%	-0.01	0.03
4 AM - 5 AM	0.87	0.86	0.01	48	1.29%	0.01	18.3%	-0.01	0.03
5 AM - 6 AM	0.88	0.86	0.01	55	1.46%	0.01	14.8%	0.00	0.03
6 AM - 7 AM	0.94	0.93	0.01	31	0.77%	0.01	44.9%	-0.01	0.03
7 AM - 8 AM	1.01	1.03	-0.01	-45	-1.04%	0.01	30.5%	-0.03	0.01
8 AM - 9 AM	1.07	1.08	-0.01	-52	-1.13%	0.01	25.3%	-0.03	0.01
9 AM - 10 AM	1.15	1.15	0.00	-12	-0.25%	0.01	79.6%	-0.02	0.02
10 AM - 11 AM	1.25	1.23	0.02	77	1.43%	0.01	12.4%	0.00	0.04
11 AM - 12 PM	1.36	1.35	0.01	59	1.00%	0.01	26.3%	-0.01	0.04
12 PM - 1 PM	1.49	1.47	0.02	93	1.45%	0.01	8.6%	0.00	0.05
1 PM - 2 PM	1.59	1.55	0.04	190	2.76%	0.01	0.1%	0.02	0.07
2 PM - 3 PM	1.69	1.60	0.10	412	5.64%	0.01	0.0%	0.07	0.12
3 PM - 4 PM	1.81	1.69	0.11	486	6.23%	0.01	0.0%	0.09	0.14
4 PM - 5 PM	1.92	1.81	0.11	489	5.89%	0.01	0.0%	0.09	0.14
5 PM - 6 PM	2.02	1.91	0.10	447	5.13%	0.01	0.0%	0.08	0.13
6 PM - 7 PM	2.02	2.00	0.02	68	0.78%	0.01	24.4%	-0.01	0.04
7 PM - 8 PM	1.91	1.92	-0.01	-49	-0.60%	0.01	39.6%	-0.04	0.01
8 PM - 9 PM	1.82	1.83	-0.01	-41	-0.53%	0.01	46.5%	-0.04	0.02
9 PM - 10 PM	1.75	1.76	-0.01	-25	-0.33%	0.01	65.3%	-0.03	0.02
10 PM - 11 PM	1.58	1.58	0.00	-11	-0.16%	0.01	83.9%	-0.03	0.02
11 PM - 12 AM	1.35	1.34	0.01	53	0.91%	0.01	28.7%	-0.01	0.04

4.2 Monthly Load Impact Summary

Table 4-1 shows the average load reduction during peak hours for residential customers enrolled in PECO Smart Time Pricing for each month included in the analysis, from November 2013 through December 2014. For each month, the analysis only included accounts that were enrolled for the entire month.[9] As shown in Table 4-1, load reductions for PECO Smart Time Pricing customers were statistically significant in the spring and summer months. On average, PECO Smart Time Pricing participants had peak loads that were about 6% lower than those of the control group during summer peak period hours (June through August 2014), resulting in an average load impact of 0.09 kW to 0.11 kW and an aggregate load reduction of 367 kW to 459 kW. During September and spring months (March through May), load reductions were about 3% to 4%. Aggregate impacts fluctuated throughout these periods due to rising and falling PECO Smart Time Pricing enrollment.

In fall and winter months, load impacts were largely not statistically significant, which was due to lower enrollment and usage (weekday afternoon load is lower in the fall and winter). The one exception is November 2013, which had a statistically significant impact of over 13% of peak load reduction. However, this result may have been an anomaly due to the small sample size: only 34 participants were included in the November 2013 analysis. Alternatively, this result could be that the first group of customers to be enrolled were early adopters and perhaps were initially more enthusiastic about managing their load to save money than the average enrollee.

Table 4-1: Monthly Average Peak (2-6 PM) Impacts, Residential PECO Smart Time Pricing

Month	Reference Load kW	Load w/ PECO STP kW	Average Impact kW	Aggregate Impact kW	Percent Reduction (%)	Standard Error (Impact)	P-value (Impact)	Lower Bound: 95% Conf.	Upper Bound: 95% Conf.
Nov 2013	1.02	0.88	0.14	15	13.35%	0.06	1.9%	0.02	0.25
Dec 2013	1.25	1.19	0.06	55	4.49%	0.03	7.9%	-0.01	0.12
Jan 2014	1.40	1.40	0.00	-5	-0.11%	0.02	94.5%	-0.05	0.04
Feb 2014	1.19	1.16	0.03	106	2.15%	0.02	11.8%	-0.01	0.06
Mar 2014	1.01	0.97	0.04	181	4.06%	0.01	0.1%	0.02	0.06
Apr 2014	0.79	0.77	0.03	120	3.41%	0.01	0.0%	0.01	0.04
May 2014	0.82	0.79	0.03	111	3.10%	0.01	0.3%	0.01	0.04
Jun 2014	1.44	1.36	0.09	382	6.07%	0.01	0.0%	0.07	0.11
Jul 2014	1.86	1.75	0.11	459	5.71%	0.01	0.0%	0.08	0.13
Aug 2014	1.47	1.38	0.09	367	5.83%	0.01	0.0%	0.06	0.11
Sep 2014	1.10	1.06	0.04	148	3.24%	0.01	0.0%	0.02	0.05
Oct 2014	0.76	0.74	0.02	63	2.40%	0.01	19.4%	-0.01	0.05
Nov 2014	1.02	1.01	0.02	24	1.72%	0.03	54.6%	-0.04	0.08
Dec 2014	1.23	1.23	0.00	4	0.35%	0.04	90.8%	-0.07	0.08

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[9] For example, June 2014 impacts are only for accounts enrolled on the first and last weekday in June 2014

4.3 Impacts by Electric vs. Non-electric Heating

Customers who used electricity as their primary source of heat[10] had higher electric loads during colder months, especially in morning and evening hours. Therefore, these customers had the potential to provide relatively large load reductions during winter months. To assess this, Table 4-2 provides a comparison of monthly percent impacts for customers with and without electric heat. When comparing impacts for these two groups, it is important to note that there were only 600 customers with electric heat compare to 3,697 non-electric heating customers (comparison of peak PECO Smart Time Pricing enrollment numbers in June 2014. Due to the small sample size, most of the monthly load impact estimates were not statistically significant for electric heat customers. Interestingly, the only load impact estimates that were statistically significant were during the summer and early fall. These summer and early fall percent impact estimates were also higher for the most part for electric heat customers. One potential explanation for this observation could be that a higher percentage of the electric heat customers who enrolled had heat pumps than the percentage of non-electrically heated customers who had central air conditioners. As such, contrary to what may have been expected, electric customers were actually shown to provide larger percent load reductions in non-winter months. Also note the 7.8 percent swing between the non-electrically heated and electrically heated homes in January 2014 which was the month of the polar vortex.

Table 4-2: Comparison of Monthly Percent Impacts (2-6 PM) for Customers With and Without Electric Heat

Month	Percent Reduction (%)	
	Electric Heat	Non-electric Heat
Nov 2013	10.02%	14.41%
Dec 2013	-2.90%	7.18%
Jan 2014	-5.12%	2.68%
Feb 2014	-2.21%	4.27%
Mar 2014	2.72%	4.62%
Apr 2014	2.16%	3.78%
May 2014	3.65%	2.97%
Jun 2014	8.20%	5.65%
Jul 2014	4.31%	5.96%
Aug 2014	9.92%	5.00%
Sep 2014	7.39%	2.34%
Oct 2014	9.10%	0.75%
Nov 2014	-0.60%	2.63%
Dec 2014	-3.64%	2.01%

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[10] These customers were identified using the PECO rate code.

4.4 Impacts by Self-reported Load Shifting Actions

This section analyzes impacts for the subset of residential customers who completed the participant survey and focuses on identifying the extent to which load impacts varied by self-reported actions to shift usage away from peak hours. These self-reported actions were detailed by survey respondents in an open-ended question asking them to describe actions taken to shift peak load (Question 13 in the participant survey instrument, provided in Appendix B).

Table 4-3 shows the average peak load impacts in July 2014 for participants reporting taking various actions or inactions to shift their usage away from peak hours. For comparison, the table also includes the average impacts for all residential PECO Smart Time Pricing customers and impacts for customers reporting taking no action to shift usage away from the peak hours. Impacts for most of these groups were statistically significant, except for three groups with small sample sizes (customers only reporting shifting use of small appliances, customers reporting shifting only the HVAC/thermostat settings, and those who reported taking no action to shift usage). The average peak load reduction was 7% (0.14 kW) for customers who only shifted use of large appliances (e.g., washer and dryer, oven, stove). Impacts were twice as high, or 14% (0.28 kW), for customers who reported shifting both large appliance and HVAC use (e.g., by adjusting thermostat settings). This shows that load reductions were largest for customers who shifted use of both large appliances and HVAC-related loads – possibly an indication that this group of customers was more diligent in their behavior to shift load away from the peak price time of day. This observation is reinforced by evaluating the comparison between the sum of the individual large appliance reduction and the HVAC only reduction and the reduction experienced by customers reported to be doing both (10.47% vs. 14.13%).

Finally, the results demonstrate that the self-reported actions of survey respondents seemed reasonably accurate in reflecting differences in how customers actually responded to PECO Smart Time Pricing.

Table 4-4 shows the set of statistics as Table 4-3 for select demographic groups as compared to all accounts. For all three demographic groups percent load reduction was substantially higher than for the average across all accounts and all of these impacts were statistically significant. Seniors (65+) were the largest group and had reference loads very similar to the average customer but produced peak load impacts (7.05%) that were over one percentage point higher than for average customers (5.71%). Households with incomes below $34k/year were a smaller group and had a below average reference load (1.34 kW compared to 1.86 kW) indicating lower overall peak electricity usage. However, the impacts for this group (7.32%) were also higher than average. Households with an ADA eligible member represented a very small minority (sample size of 66 participants analyzed for July 2014). However, this group produced peak load impacts (11.61%) over twice those of average customers (5.71%). This indicates that all three of these groups were no less able to shift their peak load than were average customers.

Table 4-3: Average July 2014 Peak (2-6 PM) Impacts by Self-reported Actions to Shift Peak Loads (Statistical Data)

Month	Accounts Analyzed (N)	Reference Load kW	Load w/ PECO STP kW	Average Impact kW	Percent Reduction (%)	Standard Error (Impact)	P-value (Impact)	Lower Bound: 95% Conf.	Upper Bound: 95% Conf.
All accounts	4,281	1.86	1.75	0.11	5.71%	0.01	0.0%	0.08	0.13
Actions were taken to shift load	1,143[11]	1.99	1.82	0.17	8.57%	0.03	0.0%	0.12	0.22
Small appliances only[12]	19	1.17	1.10	0.08	6.40%	0.15	63.4%	-0.25	0.40
HVAC only[13]	80	1.97	1.90	0.07	3.64%	0.10	49.3%	-0.14	0.28
Large appliances only[14]	468	2.05	1.91	0.14	6.83%	0.04	0.0%	0.07	0.21
HVAC and large appliances	328	1.98	1.70	0.28	14.13%	0.05	0.0%	0.17	0.39
Actions were NOT taken to shift load	380	1.78	1.77	0.01	0.51%	0.04	81.4%	-0.07	0.09

Table 4-4: Average July 2014 Peak (2-6 PM) Impacts by Select Demographic Groups (Statistical Data)

Month	Accounts Analyzed (N)	Reference Load kW	Load w/ PECO STP kW	Average Impact kW	Percent Reduction (%)	Standard Error (Impact)	P-value (Impact)	Lower Bound: 95% Conf.	Upper Bound: 95% Conf.
All accounts	4,281	1.86	1.75	0.11	5.71%	0.01	0.0%	0.08	0.13
Seniors (65+)	689	1.83	1.70	0.13	7.05%	0.03	0.0%	0.07	0.18
Low income (household income < $34k)	159	1.34	1.24	0.10	7.32%	0.05	4.2%	0.00	0.19
ADA eligible household member	66	2.15	1.90	0.25	11.61%	0.09	0.6%	0.07	0.43

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[11] This represents the 73% of respondents who took some level of action to shift energy usage from peak hours.

[12] These items include appliances such as kitchen appliances, entertainment (television, sound systems) and lighting.

[13] These appliances cover central heating and air conditioning.

[14] These items include heavier appliances such as washing machines, dryers, and dishwashers.

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4.5 Impacts and Average Monthly Dollar Savings

Throughout the PECO Smart Time Pricing pilot the generation costs for the TOU rate compared to the PECO default rate were calculated and communicated to customers.[15] Nearly all customers saved money on PECO Smart Time Pricing, with monthly savings amounts exceeding $5 for over 2350 customers. Nonetheless, customers from all savings levels showed evidence of load reductions in response to PECO Smart Time Pricing. Table 4-5 shows the average of these savings for each month during the pilot.[16] It also shows the PECO default rate ("Price to Compare") that was used to calculate bill savings in each month.

Table 4-5: Average Monthly Bill Savings

Month	Accounts analyzed (N)	PECO Price to Compare ($)	Avg monthly savings ($)
Nov 2013	34	$0.0935	$11.24
Dec 2013	403	$0.0977	$15.52
Jan 2014	1436	$0.0977	$19.36
Feb 2014	2312	$0.0977	$17.37
Mar 2014	2795	$0.0877	$7.96
Apr 2014	3324	$0.0877	$6.51
May 2014	3852	$0.0877	$5.36
Jun 2014	4297	$0.0866	$4.03
Jul 2014	4281	$0.0866	$3.48
Aug 2014	4262	$0.0866	$3.39
Sep 2014	4161	$0.0825	$1.40
Oct 2014	1121	$0.0825	$1.97
Nov 2014	390	$0.0825	$2.56
Dec 2014	320	$0.0890	$11.24

Figure 4-2 shows the percent of customer savings attributable only to the behavioral shift in peak load alongside the percent peak load reductions for each month in 2014. Both bill savings and load reductions appeared to be positively correlated with warm weather as both were

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[15] See Appendix C for an explanation of the PECO Smart Time Pricing Communication Plan.

[16] Savings were typically highest in the first few months of participation, skewing average savings towards participants who were only enrolled for a few months. Savings stabilize after about 8 months of participation so the 415 participants with fewer than 8 months of enrollment were removed to address this skewing.

highest in the warmer summer months. The percentage of savings due to load reduction was highest in June, comprising 20% of total savings, and lowest in January and December of 2014 when there were no significant peak load reductions. It is notable that the percent of savings due to load shifting was highest in the summer months when the average percent load reduction was also at its highest.

Figure 4-2: Percent Reduction in 2014 Monthly Peak Usage (2-6 PM) and Percent of Bill Savings from Load Reduction as a Result of Residential PECO Smart Time Pricing
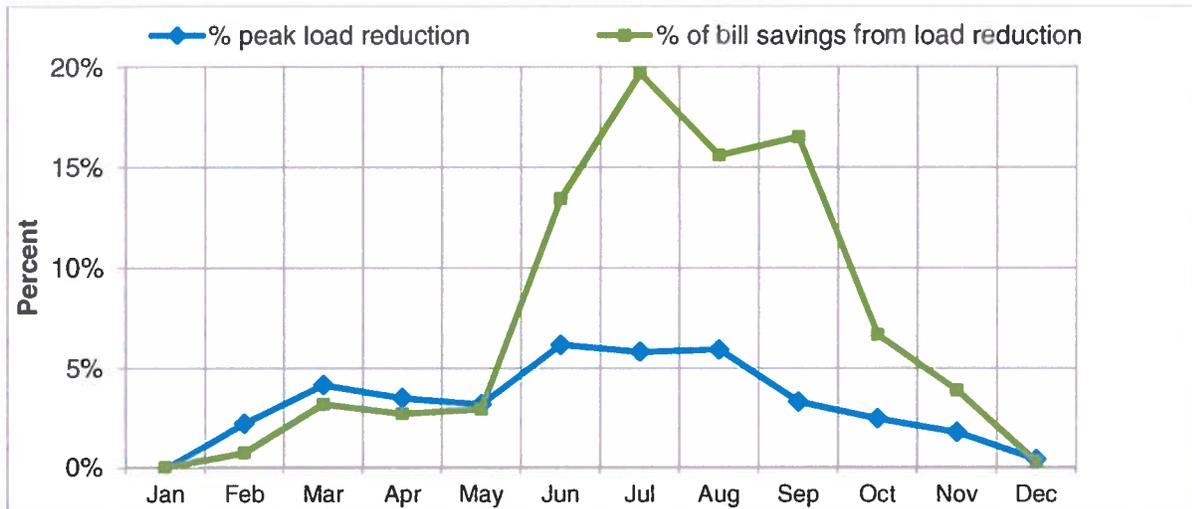
The calculation of savings attributable to load reduction (illustrated in Figure 4-2) took into account the load shift along with the PECO price to compare and average bill savings for each month.[17] Figure 4-3 shows total average dollar savings for each month alongside PECO's price to compare. This figure illustrates that average monthly savings were highest in winter months when PECO price to compare was also highest.

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[17] This estimate is calculated by multiplying the average load reduction for each group by the number of peak hours in each month from November 2013 to December 2014 (4 hours per day times the number of non-holiday weekdays) and the difference between the PECO Smart Time Pricing rate and the PECO default rate for the same period. Only peak hours were considered because load shifting was not statistically significant during off-peak hours. The average across months was weighted by the enrollment in each month.

Figure 4-3: Percent Reduction in 2014 Monthly Peak Usage (2-6 PM) and Percent of Bill Savings from Load Reduction as a Result of Residential PECO Smart Time Pricing
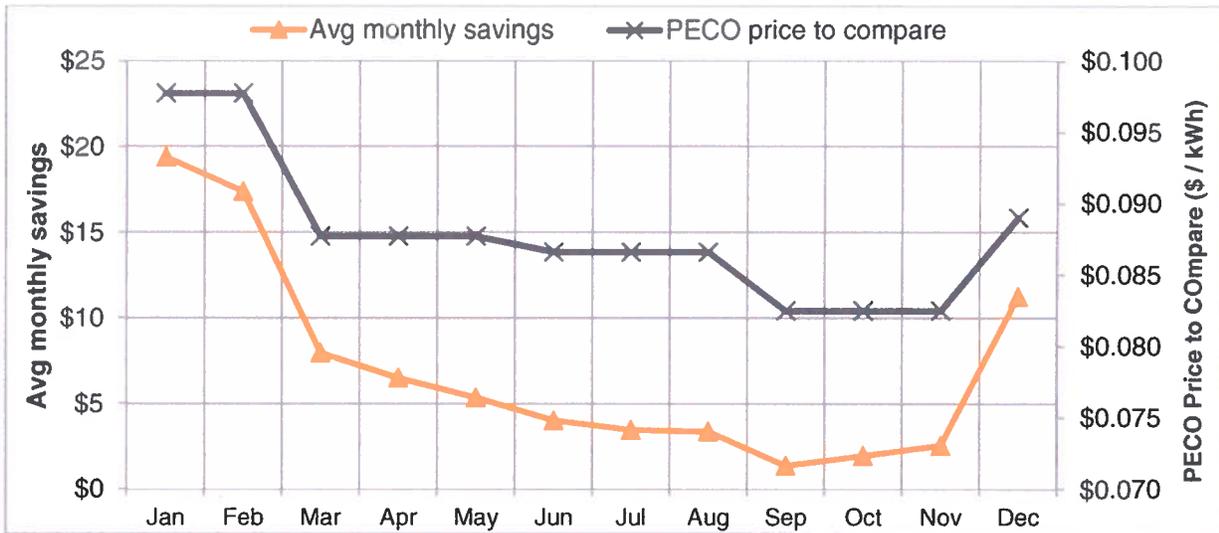
Comparing Figure 4-2 with Figure 4-3, it is notable that the percent of savings due to the load reduction was accentuated between June and November 2014, when the PECO default rate was at its lowest. The percent of savings from load reduction was highest when the total dollar savings were lowest, suggesting that the high dollar savings in the winter months were primarily driven by the difference in rates while the summer savings were more driven by load reductions.

Table 4-6 shows the average of bill savings for the month of July 2014 for the load shifting action categories discussed in section 4.4, Impacts by Self-reported Load Shifting. The table also shows an estimate of the portion of savings attributable only to the behavioral shift in peak load.[18] The behavioral load shift accounted for about 17% of the $4.06 average July 2014 bill savings across all participants. This percentage was higher for participants who reported taking actions to shift load (24% of savings were from load shift) and highest for participants who reported shifting both HVAC-related and large appliance use, the most substantial load shifting actions (36% of savings were from load shift).

Table 4-6: Average July 2014 Peak (2-6 PM) Bill Savings by Self-reported Actions to Shift Peak Loads

Segment	Accounts analyzed (N)	Average bill savings ($)	Average savings from load shift ($)	Portion of savings from load shift (%)
All accounts	4,281	$4.06	$0.68	16.8%
Some level of action was taken to shift usage	1,143	$4.46	$1.09	24.5%

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[18] This estimate is calculated by multiplying the average load reduction for each group by the number of peak hours in July (4 hours per day times 22 non-holiday weekdays) and the difference between the PECO Smart Time Pricing rate and the PECO default rate for the same period. Only peak hours were considered because load shifting was not statistically significant during off-peak hours.

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Segment	Accounts analyzed (N)	Average bill savings ($)	Average savings from load shift ($)	Portion of savings from load shift (%)
Small appliances shifted only	19	$2.68	$0.48	17.9%
HVAC shifted only	80	$4.44	$0.46	10.4%
Large appliances shifted only	468	$4.30	$0.90	20.9%
HVAC and large appliances shifted	328	$4.95	$1.80	36.3%
Did NOT report taking actions to shift load	380	$3.48	$0.06	1.7%

Bill savings for the month of July 2014 were also analyzed for selected demographic groups. Table 4-7 shows the average of bill savings for the month of July 2014 for three specific groups as compared to all customers. The table also shows an estimate of the portion of savings attributable only to the behavioral shift in peak load. The behavioral load shift accounted for about 17% of the $4.06 average July 2014 bill savings across all participants. This percentage was about the same for seniors (65+), it was substantially higher for households with incomes below $34k/year (26% of savings were from load shift), and highest for households with an ADA eligible household member (36% of savings were from load shift). Of note households with an ADA eligible member were more likely to report HVAC and large appliances load shifting behavior than the average customer.

Table 4-7: Average July 2014 Peak (2-6 PM) Bill Savings for Select Demographic Groups

Segment	Accounts analyzed (N)	Average bill savings ($)	Average savings from load shift ($)	Portion of savings from load shift (%)
All accounts	4,281	$4.06	$0.68	16.8%
Seniors (65+)	689	$4.90	$0.83	16.9%
Low income (household income < $34k)	159	$2.46	$0.63	25.6%
ADA eligible household member	66	$4.27	$1.60	37.5%

Finally, bill savings were analyzed as a percentage of what the customer bill would have been without PECO Smart Time Pricing under the PECO default rate.[19] For this analysis average total monthly savings were calculated for the duration of the program (November 2013 to December 2014). As above, the portion of these savings that could be attributed to load shifting behavior was also identified.

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[19] Estimated used the average monthly usage and the PECO default rate for each month, see section 3.4 for more details

Table 4-8 shows average monthly bill savings in dollars and as a percentage of what the bill would have been for the load shifting action categories discussed above. It also shows the average monthly usage, average monthly dollar savings, and the portion of monthly savings that were due to load shifting behavior. As with the analysis specific to July 2014, average monthly savings were highest for groups reporting the most load shifting actions ($7.95 or 5.50% of the total bill for those shifting HVAC and large appliance usage) and lowest for customers not reporting taking actions to shift loads ($6.07 or 4.85% of the total bill).

Table 4-8: Average Total Bill Monthly Savings by Self-reported Actions to Shift Peak Loads

Segment (for all months)	Average monthly usage (kWh)	Average monthly bill savings ($)	Average total savings (%)	Portion of total savings from load shift
All accounts	911	$6.95	5.11%	8.1%
Some level of action was taken to shift usage	962	$7.42	5.16%	12.1%
Small appliances shifted only	725	$5.87	5.39%	9.2%
HVAC shifted only	920	$6.84	4.98%	2.1%
Large appliances shifted only	1001	$7.43	4.97%	12.8%
HVAC and large appliances shifted	967	$7.95	5.50%	16.8%
Did NOT report taking actions to shift load	838	$6.07	4.85%	2.9%

Table 4-9 shows average monthly bill savings in dollars and as a percentage of what the bill would have been for selected demographic groups. It also shows the average monthly usage, average monthly dollar savings, and the portion of monthly savings that were due to load shifting behavior. Average monthly savings were similar for all of these groups (about 5% of the total bill). However, the portion of these bill savings due to load shifting behavior was about twice as high for low income households (15.6%) and households with an eligible ADA member (18.3%), as compared to the average for all customers (8.1%). As stated above households with an ADA eligible member were more likely to report HVAC and large appliances load shifting behavior than the average customer.

Table 4-9: Average Total Bill Monthly Savings for Select Demographic Groups

Segment (for all months)	Average monthly usage (kWh)	Average monthly bill savings ($)	Average total savings (%)	Portion of total savings from load shift
All accounts	911	$6.95	5.11%	8.1%
Seniors (65+)	842	$6.15	4.89%	8.4%
Low income (household income < $34k)	670	$4.91	4.89%	15.6%
ADA eligible household member	952	$7.19	5.06%	18.3%

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4.6 Comparison of Impacts to Other Price Studies

Section 4 has laid out the load impacts observed for PECO Smart Time Pricing. To put these load impacts in context, they can be compared to load reductions found in other pilots and programs. Figure 4-4 shows results from other studies. The smooth lines in the figure represent regression equations, referred to as the Arc of Price Responsiveness, that relate peak load reduction to the ratio of peak to off-peak prices.[20] The black line shows the econometrically modeled relationship between peak load reduction and the ratio of peak to off-peak prices for TOU rates where no enabling technology was provided by the utility (such as programmable thermostats or automatic load control switches) and the blue line shows the relationship for programs that involve enabling technology. The orange diamond shows where PECO Smart Time pricing would fall on the Arc of Price Responsiveness.[21] This implies that the load reductions achieved by PECO Smart Time Pricing were very much in line with those observed historically for TOU rates.

Figure 4-4: Average PECO STP Summer Load Reductions on the Arc of Price Responsiveness for TOU Rates

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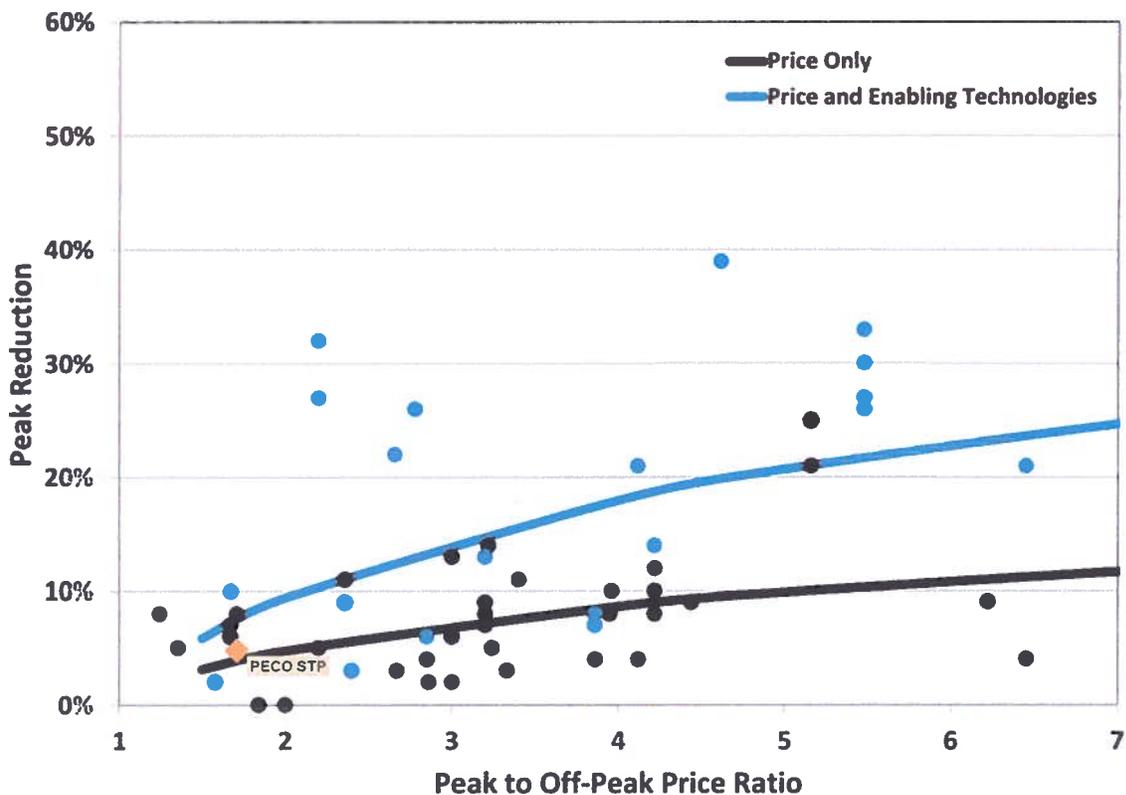
[20] "Arcturus: International Evidence on Dynamic Pricing", Faruqui and Sergici 2013. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2288116

[21] For an average peak load reduction of 5% from July to September and a peak to off-peak price ratio of 1.7

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5   Residential End-of-pilot Surveys and Focus Groups

This section summarizes the methodology, survey instrument design, response rate, and results of the residential participant and disenrollment surveys, which were conducted by Nexant toward the end of the pilot. This section also draws comparisons to focus groups commissioned by PECO from Mary Treisbach, an independent consultant.

5.1   Survey Methodology

In total, 120,998 residential customers were solicited to enroll in PECO Smart Time Pricing. At the end of the pilot enrollment period (March 31, 2014), nearly 4,800 residential customers had enrolled in PECO Smart Time Pricing. Of these participants, 481 customers ended up disenrolling during the course of the pilot. In September 2014, 333 disenrolled customers were still active PECO accounts, so they could be surveyed about their experience with PECO Smart Time Pricing and about their reasons for disenrolling. All 333 disenrolled customers that were still active PECO accounts as of September 2014 were included in the disenrollment survey. As for the participant survey, a randomly selected group of 2,500 enrolled customers were invited to participate. The primary objective of these two end-of-pilot surveys was to understand satisfaction with the pilot, self-reported behavior changes, and reasons for disenrolling (for disenrolled customers). To ensure comparability, the satisfaction and demographics sections of the two surveys were similar for participants and disenrolled customers. Participants also had an additional section of questions focused on their perceptions of any changes in billing or behavior in response to the program.

Table 5-1 summarizes the implementation timeline for the two end-of-pilot surveys. The surveys began on October 8 with an initial recruitment letter that included a $2 bill, which was an unconditional incentive that was sent to all 2,500 participants and all 333 disenrolled customers before they decided to complete the survey or not.[22] This initial recruitment letter was followed 5 days later by an initial email, which was sent to the 36% of participants and 20% of disenrolled customers with an available email address. The final three communications were sent to customers who had not completed the survey at that time. Data collection ended on November 21.

Table 5-1: Implementation Timeline for Residential End-of-pilot Surveys

Date	Communication Sent
October 8, 2014	Initial recruitment letter with $2 bill (unconditional incentive)
October 13, 2014	Initial recruitment email
October 16, 2014	Paper version of survey instrument
October 21, 2014	Email reminder
October 30, 2014	Postcard reminder

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[22] This type of incentive has proven to be a highly cost-effective method for producing high response rates, as discussed in detail in: Dillman, Don A., Jolene D. Smyth and Leah Melani Christian. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method.* Wiley: 3rd edition (October 12, 2008).

5.2 Survey Instrument Design

The participant and disenrollment survey instruments included the following sections:

- Familiarity and satisfaction with PECO Smart Time Pricing;
- *Participant survey only* – Impressions of PECO Smart Time Pricing (perceived value, comfort of home, control over bill, convenience, actions taken to reduce peak use, and bill savings achieved);
- *Disenrolled survey only* – Reasons for withdrawing from PECO Smart Time Pricing; and
- Demographic questions.

5.3 Focus Groups Background

In addition to the two end-of-pilot surveys, PECO commissioned four focus groups toward the end of the pilot to study residential customer feedback on PECO Smart Time Pricing. While the focus groups were conducted by a different researcher and not specifically coordinated with the end-of-pilot surveys conducted by Nexant, some demographics in the Nexant surveys were used for recruiting focus group participants from specific demographic profiles. Four groups of 10 participants each were recruited among the following customer groups:

- Seniors (aged 65 or above);
- Households with income less than $34,000/year;
- Households that indicated they have an ADA eligible resident; and a control group of PECO Smart Time Pricing customers who did not fall under the three categories listed above.

Several topics explored in the focus groups overlapped with the Nexant end-of-pilot surveys, including satisfaction with PECO Smart Time Pricing, perceptions of control over electricity costs, and actions taken to shift electricity use away from peak hours. For overlapping topics, the key findings from the focus groups research were largely similar to the findings from the end-of-pilot surveys. The remainder of this section focuses on findings from the end-of-pilot surveys, but relevant comparisons to focus group findings are also made throughout. Complimentary focus group findings are highlighted separately to preserve a clear distinction between focus group and survey findings. The executive summary of the focus group findings can be found in Appendix A.

5.4 Survey Response Rates

Table 5-2 summarizes the response rates for the two end-of-pilot surveys. Nexant received 1,543 responses from participants, resulting in a 62% response rate for that survey. Ninety-five responses were received for the disenrollment survey, resulting in an overall response rate of 28%. Though the response rate for the disenrollment survey was lower, a response rate of 28% is higher than is typically seen in the industry for this type of target respondent.

Table 5-2: Response Rate Summary for Residential End-of-pilot Surveys

Survey	Invitations sent	Responses received	Response rate
Participant	2,500	1,543	62%
Disenrolled	333	95	28%

5.5 Participant and Disenrolled Customer Satisfaction

Each of the surveys asked respondents to rate their satisfaction with PECO Smart Time Pricing. This was the only non-demographic question that was asked to both participant and disenrollment survey respondents. In general, both participants and disenrolled customers were highly satisfied with PECO Smart Time Pricing. As shown in Figure 5-1, 98% of participant survey respondents and 86% of disenrollment survey respondents were somewhat or very satisfied with PECO Smart Time Pricing. A majority of both groups responded that they were very satisfied.

Figure 5-1: "Overall, how satisfied are/were you with PECO Smart Time Pricing?"

Participant N=1,543; Disenrolled N=95
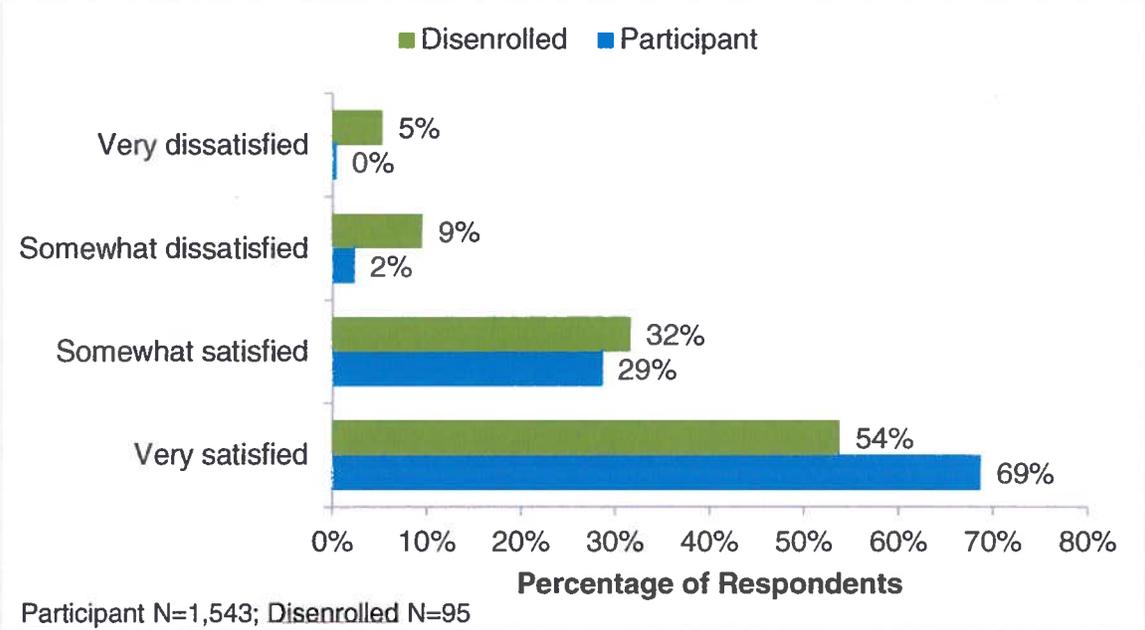
Complementary Findings from Focus Groups

Each focus group participant was asked to rate their satisfaction with PECO Smart Time Pricing on a scale from 0, not at all satisfied, to 10, extremely satisfied. The seniors group had an average rating of 8.8, the ADA eligible group had an average rating of 9.2, the low income group had an average rating of 9.7, and the control group had an average rating of 8.9.

5.6 Participant Perceptions and Actions

The remainder of the participant survey (excluding demographics) focused on the impressions respondents had about PECO Smart Time Pricing: perceived value, comfort of home, control over bill, convenience, actions taken to reduce peak use, and bill savings achieved. Many of these questions were asked in two parts, first as a multiple choice question, then with an optional follow-up question asking respondents to explain their selection. Throughout this section of the report, representative respondent comments are included in grey call-out boxes as appropriate with certain figures.

Figure 5-2 shows how participants responded when asked how familiar they were with PECO Smart Time pricing. The high familiarity rate (98%) indicates that nearly all participants were aware of their enrollment in PECO Smart Time Pricing and understood that, under the rate, pricing was more expensive during peak hours than off-peak hours.

Figure 5-2: "Under PECO Smart Time Pricing, you receive a discounted price on your electricity during most of the hours in the year except for non-holiday weekday afternoons between 2 PM and 6 PM. Does that sound familiar?"

No
0.5%

Yes
98%

Not Sure
1.5%

N=1,543

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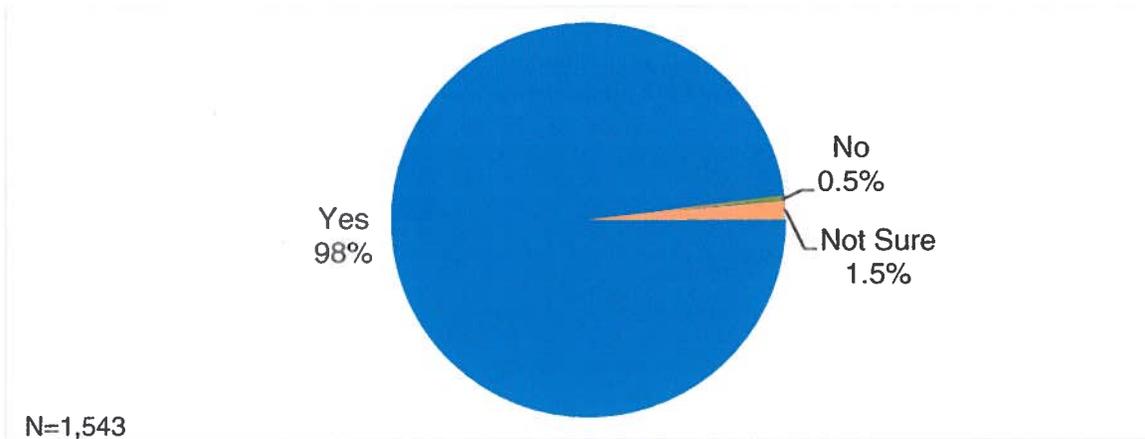
The next three questions asked participants to compare aspects of their previous rate plan to PECO Smart Time Pricing.[23] Figure 5-3 shows the extent to which participants considered PECO Smart Time Pricing to be a change in value over their previous rate plan (the PECO default rate). A very large majority (88%) considered PECO Smart Time Pricing to be a much better or somewhat better value. However, this may be at least partially due to lower overall NRG Retail pricing as compared to the PECO default rate. Under PECO Smart Time Pricing, customers pay roughly 7 cents more per kWh during around 11% of the hours of the year and save just over 2 cents per kWh during the remaining 89% of the hours.

Figure 5-3: "Compared to your previous rate plan, how would you rate the value of PECO Smart Time Pricing?"
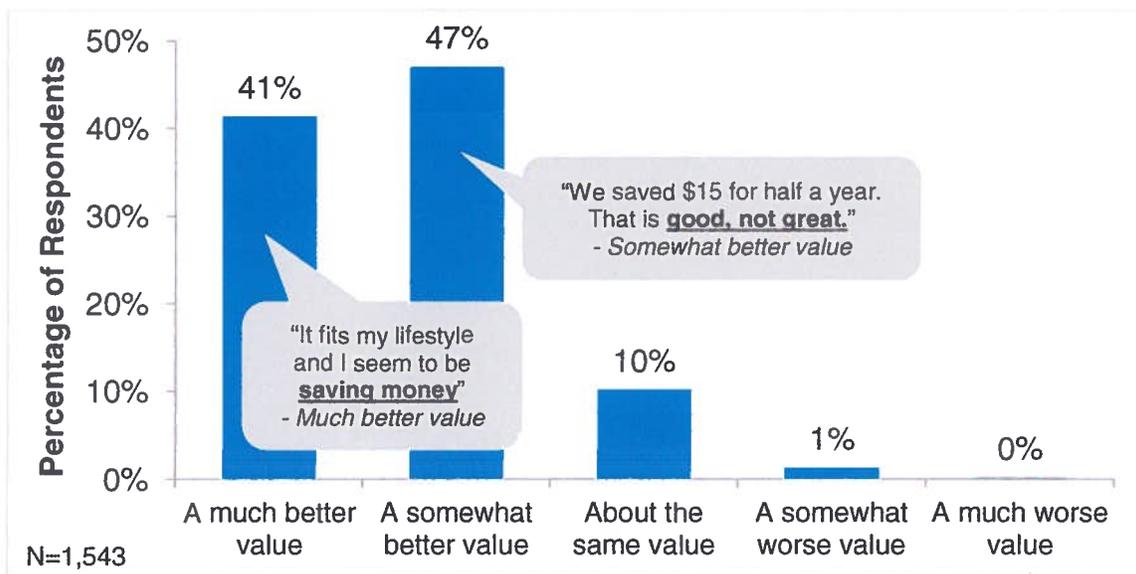
Complementary Findings from Focus Groups

This perception of value was echoed in focus groups conducted with participants. Participants in all groups mentioned bill savings as one of the aspects they liked best about PECO Smart Time Pricing.

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[23] All customers who were solicited for PECO Smart Time Pricing were taking default service from PECO at the time of solicitation. Therefore the comparison to the previous rate plan is a comparison to the PECO default plan in nearly all instances.

Figure 5-4 shows how participants perceived the comfort of their home during peak hours with PECO Smart Time Pricing, as compared to their previous rate. About 72% of respondents found that their home was about as comfortable. In a follow-up, open-ended question, many of these participants reported not being home during peak hours or simply not perceiving a decline in comfort. In addition, fewer than 10% of respondents perceived a decline in comfort, while 20% perceived an increase in comfort.

Figure 5-4: "Compared to your previous rate plan, how would you rate the comfort of your home on weekday afternoons from 2 PM to 6 PM on PECO Smart Time Pricing? Would you say your home is…"

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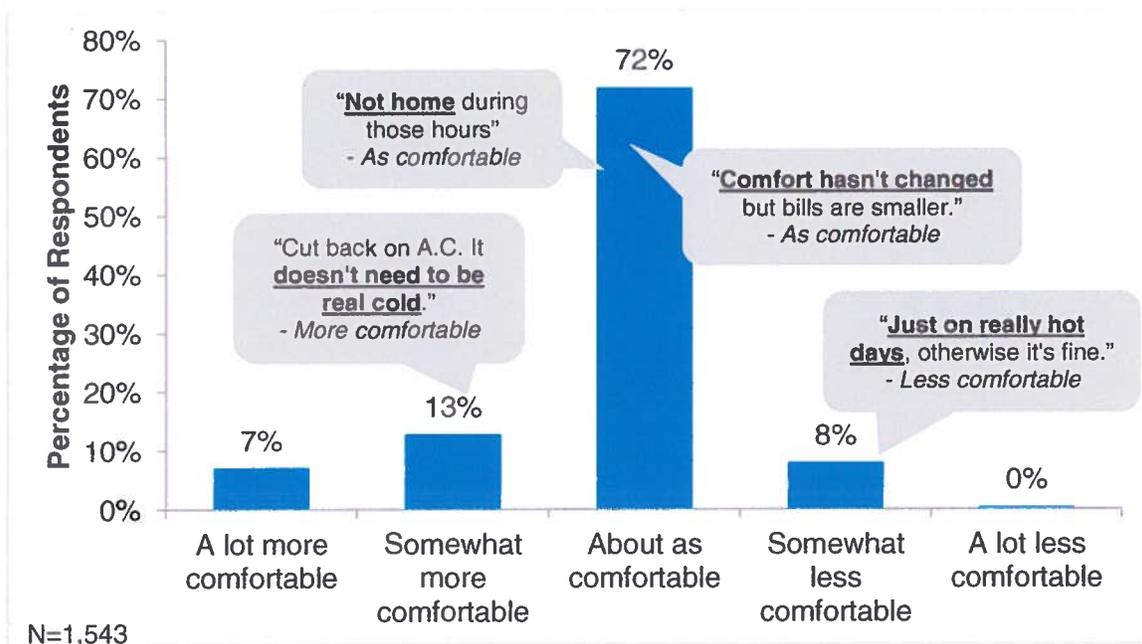
Figure 5-5 reflects respondents' views about the control they had over household electricity costs with PECO Smart Time Pricing as compared to their previous rate. Seventy percent of participants found that they had more control over their household's electricity cost with PECO Smart Time Pricing. Several customers reported liking the discount and increased awareness of usage in general under the new rate.

Figure 5-5: "As a result of participating in PECO Smart Time Pricing, do you feel you have more control over your household's electricity cost?"

No
8%

Not Sure
22%

"**I control the usage** and am given discounts for doing so."
- *Feel more in control*

"We utilize our electricity better. We are **more aware of pricing**."
- *Feel more in control*

Yes
70%

N=1,543

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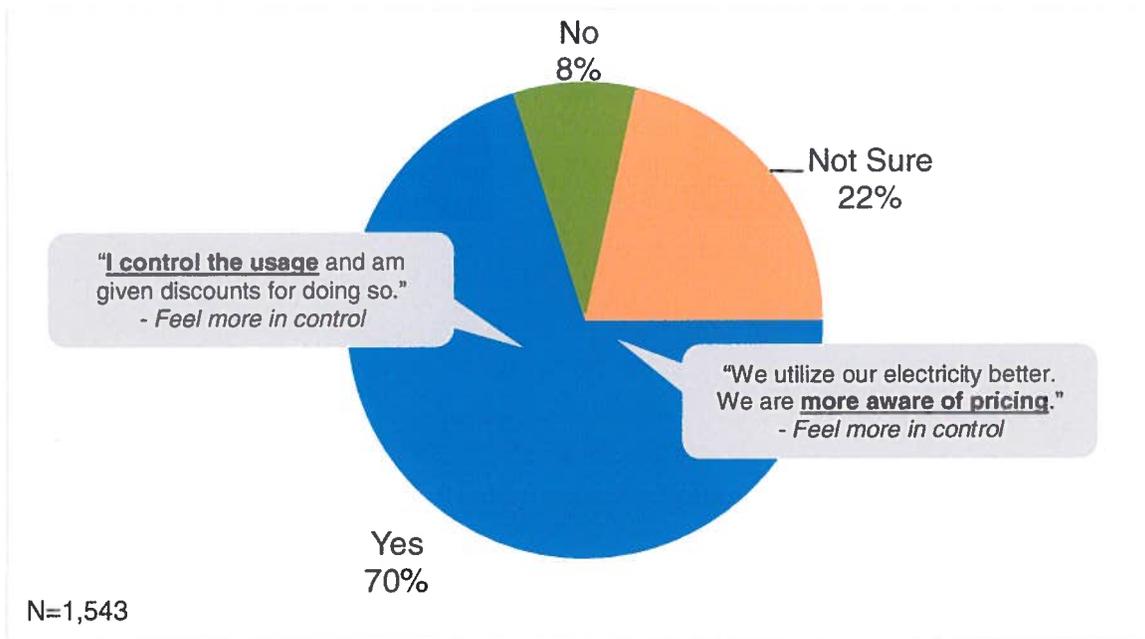
Figure 5-6 reflects how participants perceived the convenience of PECO Smart Time Pricing. Over 80% of participants found PECO Smart Time Pricing to be convenient. Commonly cited reasons for this perceived convenience were that:

1. The peak hours aligned with hours when the home was unoccupied;
2. Tasks requiring electricity were easy to shift; and
3. The peak schedule was easy to remember.

Conversely, the few participants (3%) who did not consider PECO Smart Time Pricing convenient commonly stated that it would be more convenient if their household was unoccupied during peak hours.

Figure 5-6: "Is PECO Smart Time Pricing convenient for your household?"

N=1,543
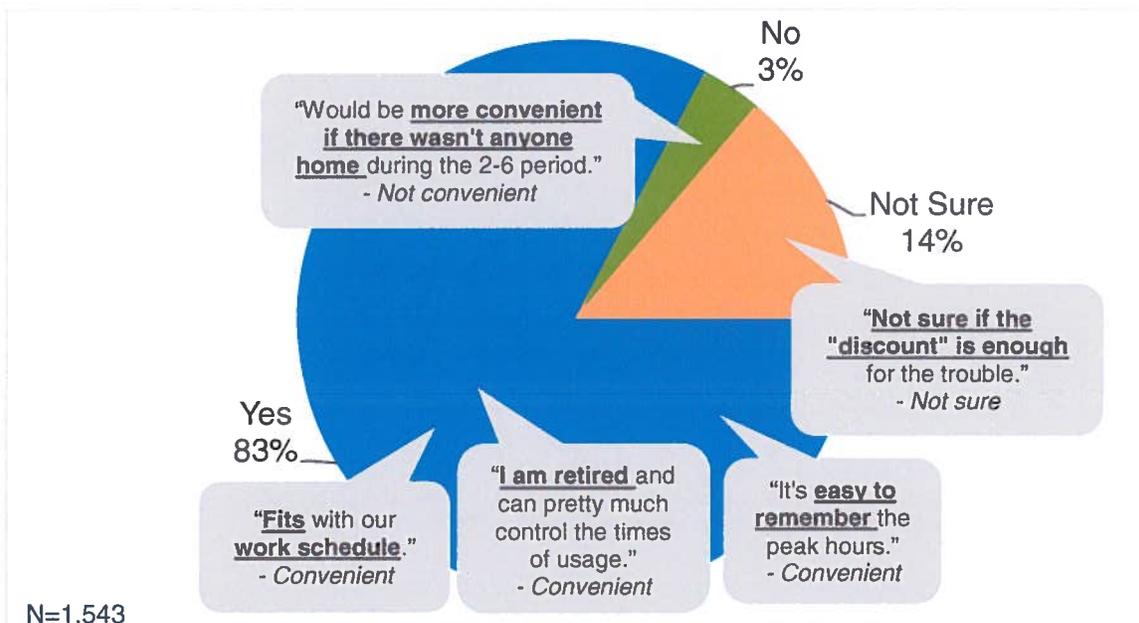
Complementary Findings from Focus Groups

In the focus groups, participants emphasized that the rate could be appropriate for customers with any household profile (single, working away from home during the day, retired, family with children, low income, etc.). However, when pressed, focus group participants also stated that the rate would be more convenient for households that are largely unoccupied during peak hours.

Regarding whether tasks requiring electricity were easy to shift, focus group participants described a small but manageable inconvenience of shifting activities to non-peak hours as the aspect they liked least about PECO Smart Time Pricing.

Finally, while survey respondents noted that peak hours were easy to remember, participants in focus groups further elaborated on how they remembered peak time hours. Several stated that they made charts showing the peak hours schedule or left signs on large appliances (especially clothes washers, dryers, and dishwashers). Some also suggested that visual aids, such as a refrigerator magnet, should be provided at sign up to help household members

remember peak hours. This shows that while PECO Smart Time Pricing may have been perceived as convenient, participants often still needed some visual reminders in the home about the rate.

Figure 5-7 shows the proportion of respondents who took actions to shift electricity usage away from peak hours. Almost three in four (73%) participants reported taking some level of action to shift electric usage away from peak hours, while only 3% reported not shifting usage. In light of the previous question showing that most participants considered PECO Smart Time Pricing to be convenient, this suggests that most participants found the rate convenient despite taking actions to shift usage. Commonly cited actions included shifting laundry, cooking or cleaning chores, which implies that most participants were not substantially inconvenienced by shifting these tasks.

Figure 5-7: "Have you or anyone else in your household done anything to reduce the amount of electricity you use on weekday afternoons for example, delaying the use of dish or clothes washers or changing your thermostat setting?"
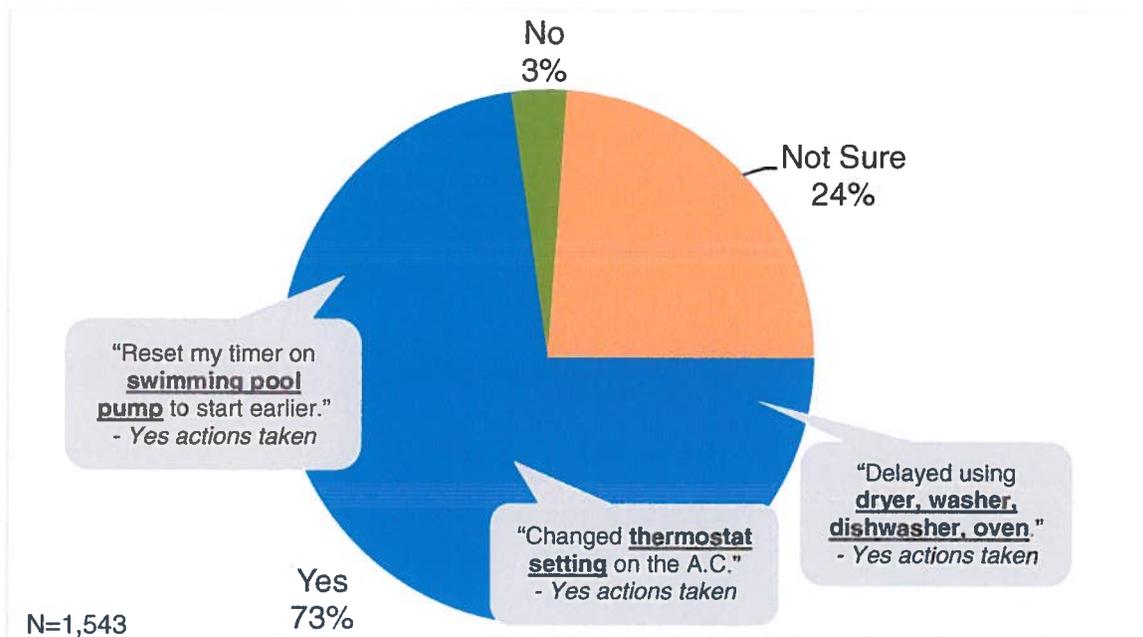
Complementary Findings from Focus Groups

Focus group participants also cited electricity use shifting, though some stated that the most difficult activity to shift was cooking, due to early evening household dinner times. The perceived convenience of PECO Smart Time Pricing may also have resulted because many of the actions taken were facilitated by device automation. Commonly cited automated actions among survey respondents and focus group participants included changing thermostat settings and resetting timers on pool pumps and filters.

Figure 5-8 shows an analysis of respondent-entered descriptions of actions taken to reduce peak usage, for the 59% of respondents who reported taking action and also provided a specific description. Though responses were typed in by respondents, common themes were identified and could be summarized into the following three action categories:

- Shifting use of large appliances (dishwasher, clothes washer, dryer, oven, pool filter, etc.);
- Shifting use of space heating or cooling (HVAC);
- Shifting use of small appliances (lighting, vacuuming, etc.).

A vast majority of participants who took action (89%) reported shifting their use of large appliances such as dishwashers or clothes washers/dryers. Over two-thirds of this 89% also reported shifting or changing use of space heating and cooling, mostly by adjusting their thermostat. Very few participants who took action, just 2%, reported only taking small actions such as turning out the lights.

Figure 5-8: "Tell us in a couple of sentences what you have done [to reduce the amount of electricity you use on weekday afternoons]."

N=910

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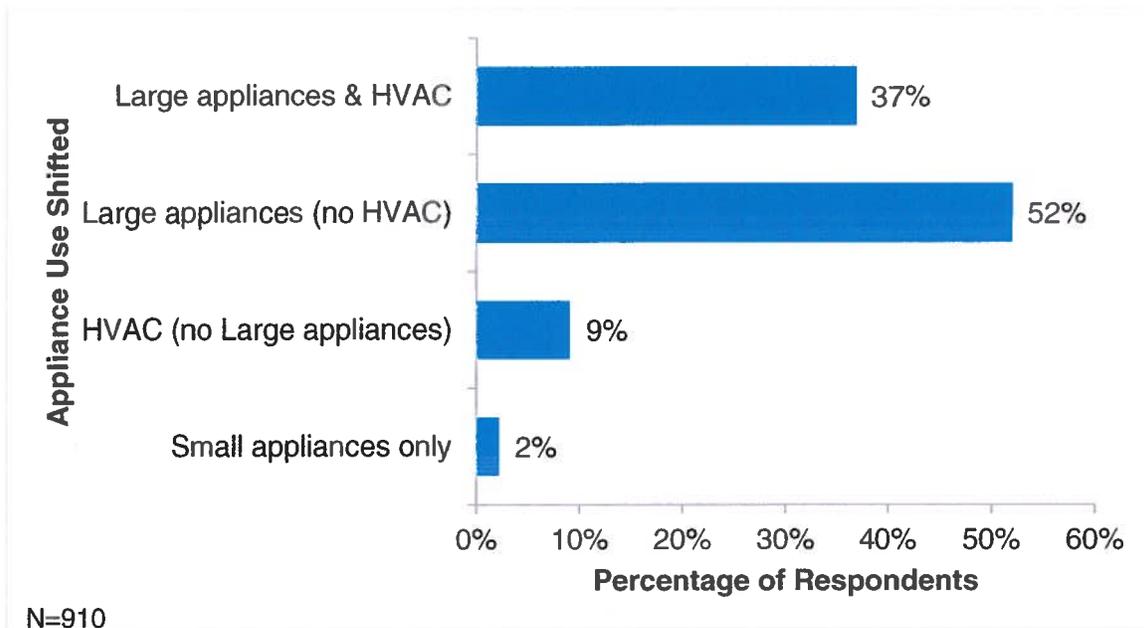
Figure 5-9 shows the proportion of participants that felt they saved money with PECO Smart Time Pricing. About 75% of participants reported saving money on their bill. By contrast, 19% reported not saving money. Few participants, only 6%, responded that they were not sure if they saved money, which indicates that respondents generally had a clear perception of whether or not they saved money. Nonetheless, in write-in comments several respondents mentioned that savings were not communicated clearly enough.

Figure 5-9: "Do you believe you saved any money as a result of selecting PECO Smart Time Pricing?"

N=1,543
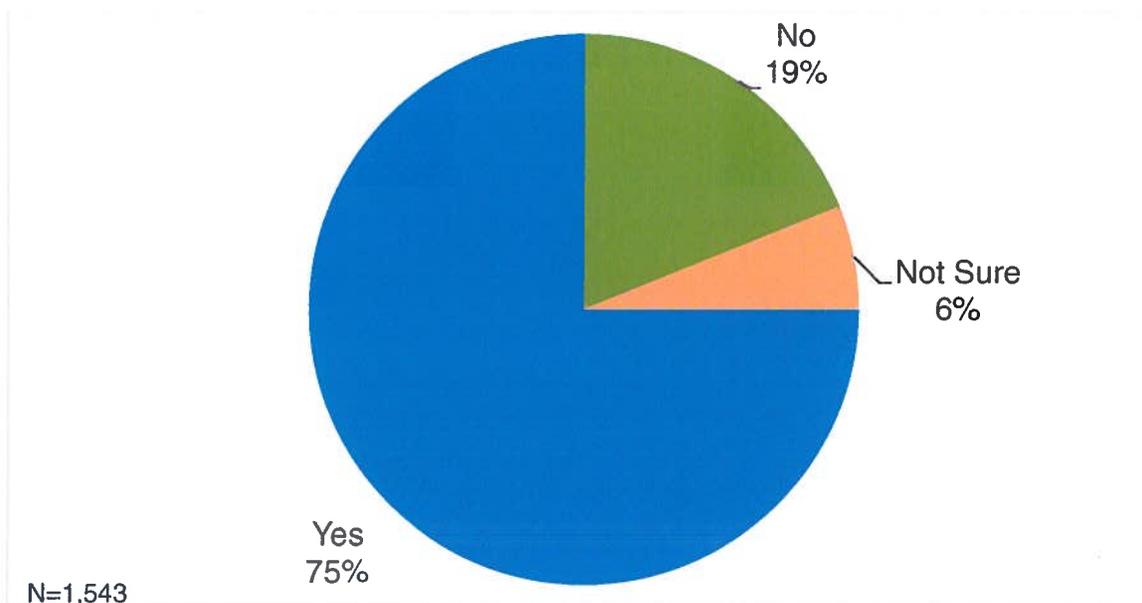
Complementary Findings from Focus Groups

Many focus group participants reported only remembering receiving a bill analysis at the end of the year, noting that this did not help them track savings or adjust behaviors during the year. In both the participant survey and the focus groups, several participants suggested that savings be clearly communicated on a monthly basis, both by comparing usage and cost for the previous year as well as by showing what that month's bill would have been under the PECO default rate.[24]

Participants who reported saving money were further asked to specify how much money was saved per month, on average. Respondents were asked to type in number amounts to indicate their perceived savings. Figure 5-10 groups these responses into $10 increments and shows that respondents most commonly reported saving between $10 and $19 per month. The second most common savings range was between $20 and $29. The median amount respondents reported saving was $15 per month. Satisfaction with the level of savings varied. When reported savings were high, such as above $10 per month, participants tended to be more satisfied with their savings. In addition, as discussed in Section 4, PECO tracked dollar

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[24] See Appendix x for a complete description of the Smart Time Pricing communication plan.

savings relative to the default rate for each customer and periodically communicated these savings amounts to customers throughout the PECO Smart Time Pricing pilot as described in Appendix C. For the customers who responded to the survey, Nexant compared self-reported savings to actual savings and found that 86% percent of participants thought they saved more on PECO STP than they actually did. Among this 86%, most customers actually saved between $5 and $19 per month less than they thought they did. On a related note, when survey respondents mentioned savings in unrelated open-ended comments, savings tended to be referred to in annual terms (as opposed to in monthly terms).

Figure 5-10: "How much money do you think you have saved on a monthly basis?"

N=821
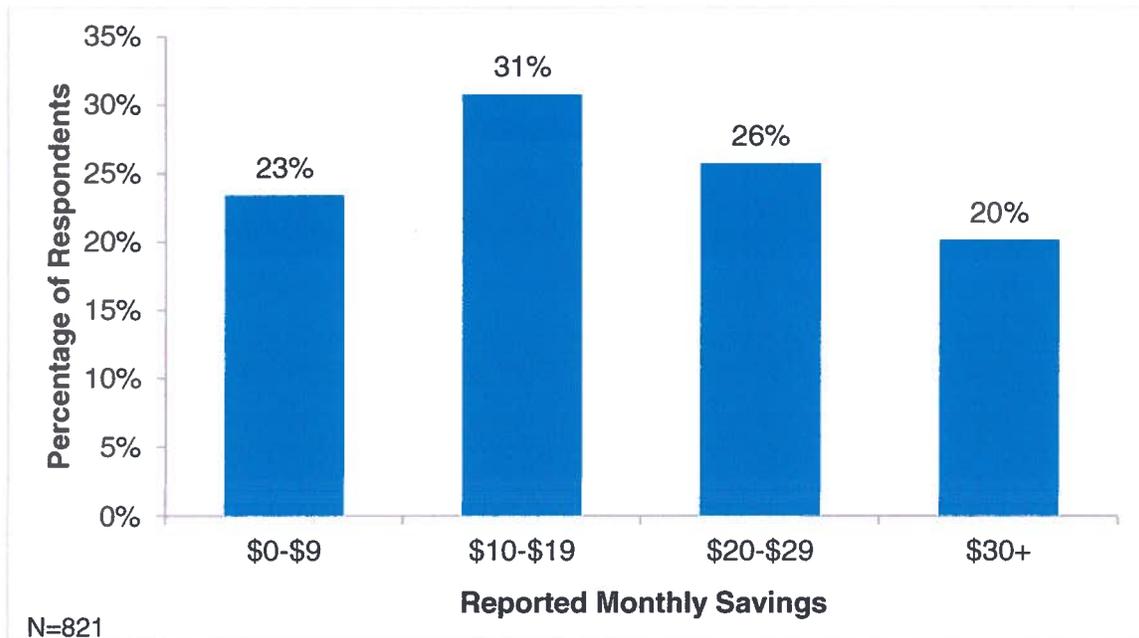
Complementary Findings from Focus Groups

Generally, both survey respondents and focus group participants who reported saving less than a few dollars per month felt the savings were disappointing, though some stated they still would have kept PECO Smart Time Pricing. Focus group participants also tended to characterize their savings on annual basis, as opposed to monthly savings. It is not clear to what extent this was influenced by the PECO end-of-pilot communication showing estimated savings for the entire year.

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The final program-related question asked participants to rate several aspects of PECO Smart Time pricing from "Excellent" to "Poor." Figure 5-11 summarizes participant responses to this question, indicating that PECO Smart Time Pricing was largely perceived as fair, easy to understand, and an opportunity to save money. Participants gave the highest rating to "Ease of understanding," with 76% rating it as "Very Good" or "Excellent." By contrast, "Comfort in my home" was rated the lowest, with about 60% giving a rating of "Very Good" to "Excellent." The small amount of variation between the highest and lowest ratings shows that all aspects of PECO Smart Time Pricing were rated relatively high. No aspects of PECO Smart Time Pricing were commonly rated as "Fair" (less than 8%) or "Poor" (less than 2%).

Figure 5-11: "Please rate the following aspects of PECO Smart Time Pricing from excellent to poor."

N=1,247 to 1,290
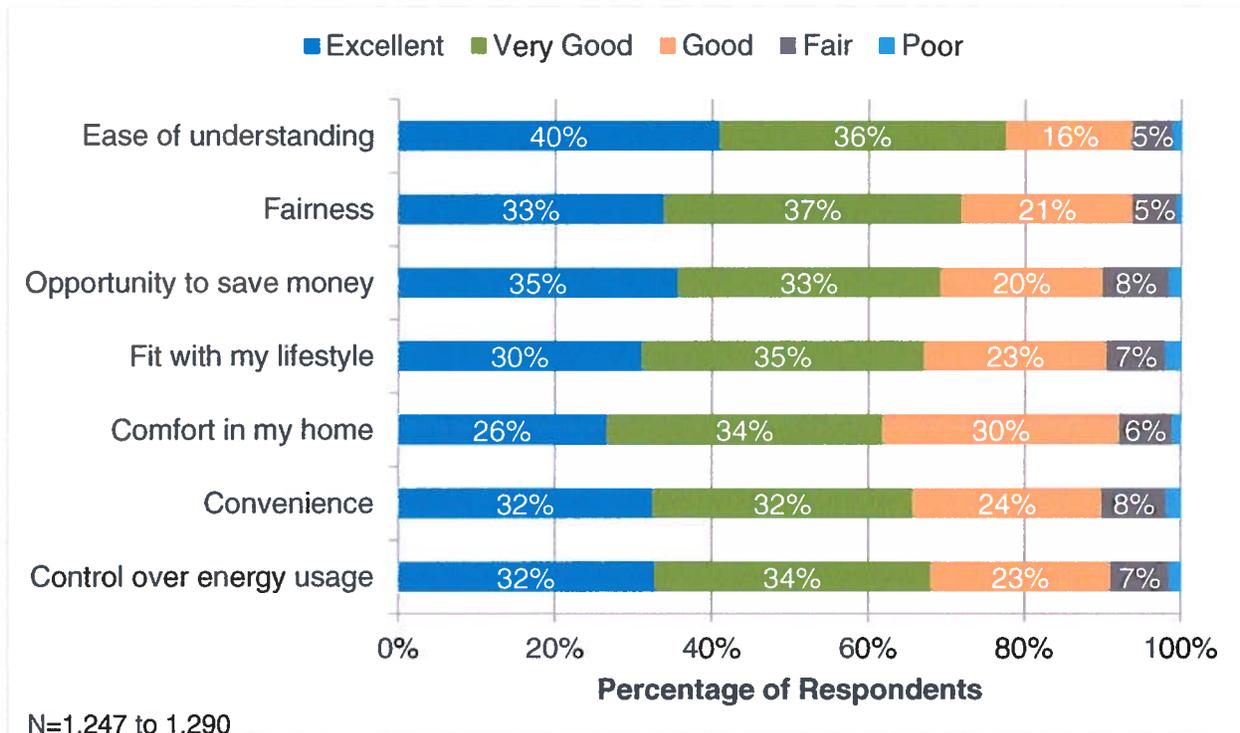
Complementary Findings from Focus Groups

Focus group participants were asked in an open-ended question what they liked best about PECO Smart Time Pricing, a different though related question. In order of frequency, bill savings, control and convenience were mentioned the most often. These responses do not exactly reflect the survey responses in which, for example, convenience and control were rated least highly and ease of understanding and fairness were rated above opportunity to save money. However, these discrepancies are not particularly consequential because of the difference in how the questions were formulated and because there was a relatively small amount of variation between ratings in the survey question, with all aspects receiving high ratings.

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5.7 Reasons for Disenrolling

Disenrolled customers were asked to share their views on why they withdrew from PECO Smart Time Pricing after initially enrolling. Figure 5-12 reflects disenrolled customer responses to this question. The reasons chosen most commonly as very or somewhat important for withdrawing were: 1) did not save enough money; and 2) found a better deal elsewhere. Both of these reasons pertain to savings, suggesting that money was more of a motivator for withdrawal than inconvenience or discomfort. However, analysis of average monthly bill savings (discussed more in depth in section 4.5) showed that savings were actually slightly higher for disenrolled customers than they were for participants. Since savings were typically higher in the first months of the program, and disenrolled customers stayed in the program for fewer months (4 months on average), average savings in the first fourth months of enrollment were compared for participants and disenrolled customers. This ensured that savings were compared for a comparable period. Average monthly savings for disenrolled customers who responded to the survey were $13.84 per month after four months of enrollment, while average monthly savings for participants who responded to the survey were $12.63 per month for the same period of time - about 9% lower than the savings experienced by the disenrolled customers. This comparison reinforces previously noted observations that customer perceptions of savings are not necessarily indicative of actual savings where participants responding to the survey reported their monthly savings to be much higher than they actually were. In contrast, customers who disenrolled reported that savings were not high enough for them to keep PECO Smart Time Pricing, even though their average monthly savings were slightly higher than they were for participants. This may imply that disenrolled customers were more likely to pay attention to their savings and to perceive these savings as not worthwhile, despite experiencing above average savings.[25]

Unexpectedly, 21% of disenrollment survey respondents indicated via open-ended responses that they had not intended to disenroll, with several stating that they only became aware of their disenrolling by receiving the invitation to participate in the disenrollment survey. Most respondents describing these unintentional disenrollments expressed that they would have preferred to keep PECO Smart Time Pricing.[26]

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[25] In January of 2014 the PECO territory experienced a time of extreme weather referred to as the Polar Vortex. It is possible that some customers associated a higher bill following this time with the PECO Smart Time Pricing program TOU rate when in reality it was associated with higher usage due to the unusual weather. It should be noted here that customers on PECO Smart Time Pricing did not experience any pricing fluctuation during the Polar Vortex since the on-peak and off-peak prices were locked for the duration of the pilot.

[26] 20 of the 333 customers who were invited to participate in the disenrollment survey contacted either Nexant or PECO to ask why they were no longer enrolled in PECO Smart Time Pricing. Of these customers, 18 customers had switched to a competitive supplier, 1 customer was removed because of a meter mix-up, and 1 customer never returned attempts to contact them.

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Figure 5-12: "Below are some reasons for withdrawing from PECO Smart Time Pricing. For each reason, please indicate whether it was a consideration in your decision to withdraw from the plan and how important it was."


Legend: ■ Not a reason ■ Not Very Important ■ Somewhat Important ■ Very Important

Reason	Not a reason	Somewhat Important	Very Important
You did not save enough money	53%	11%	35%
PECO Smart Time Pricing did not give you enough control over your energy costs	58%	21%	16%
You don't like worrying about when you use electricity	54%	13%	28%
The temperature of your home was uncomfortable on afternoons and evenings	67%	8%	18%
You found a better deal from another electricity supplier	55%	13%	31%
It was inconvenient to change the time of day when you used appliances and air conditioning	61%	14%	19%
You believed that your energy costs were higher with PECO Smart Time Pricing	58%	7% / 11%	24%

N=95   Percentage of respondents

5.8 Demographic Comparison

The participant survey and the disenrollment survey included the same demographic questions so that comparisons could be made between the two groups. This section also includes responses to similar demographic questions from the decliner survey, which included customers who did not accept the offer to enroll in PECO Smart Time Pricing. The decliner survey was conducted from January 22 through March 14, 2014 and was summarized in the PECO Smart Time Pricing Pilot Enrollment Report. The decliner survey response rate of 24% was similar to that of the disenrollment survey (28%). Considering that the participant survey response rate (62%) was substantially higher, it is somewhat unclear whether the observed demographic differences between the three surveys resulted from actual differences between the three groups or from variation in the response rates. Nonetheless, the comparisons in this section are at least suggestive of what demographic differences may exist between the three population groups.

Figure 5-13 shows the percent of households with at least one resident in selected age groups. Around 22% of participant survey respondents reside in households that include at least one minor, compared with 28% of decliner households. At the same time, around 72% of participant survey respondents reside in households that include at least one member 55 years old or above, compared with 65% of decliner households. Both of these differences are statistically significant with 99% confidence.[27] This suggests that decliners in the subset of 25% of residential customers who met the pilot eligibility criteria were generally younger than participants. Like participants, disenrolled customers were also more likely than decliners to have at least one older household resident.

Figure 5-13: "For each of the following age groups, how many people, including you, live in this home for more than half of the year?" (Graph Shows Percent of Households with At Least One Resident in Each Age Group)

Participant N=1,483; Disenrolled N=94, Decliner N=1,338

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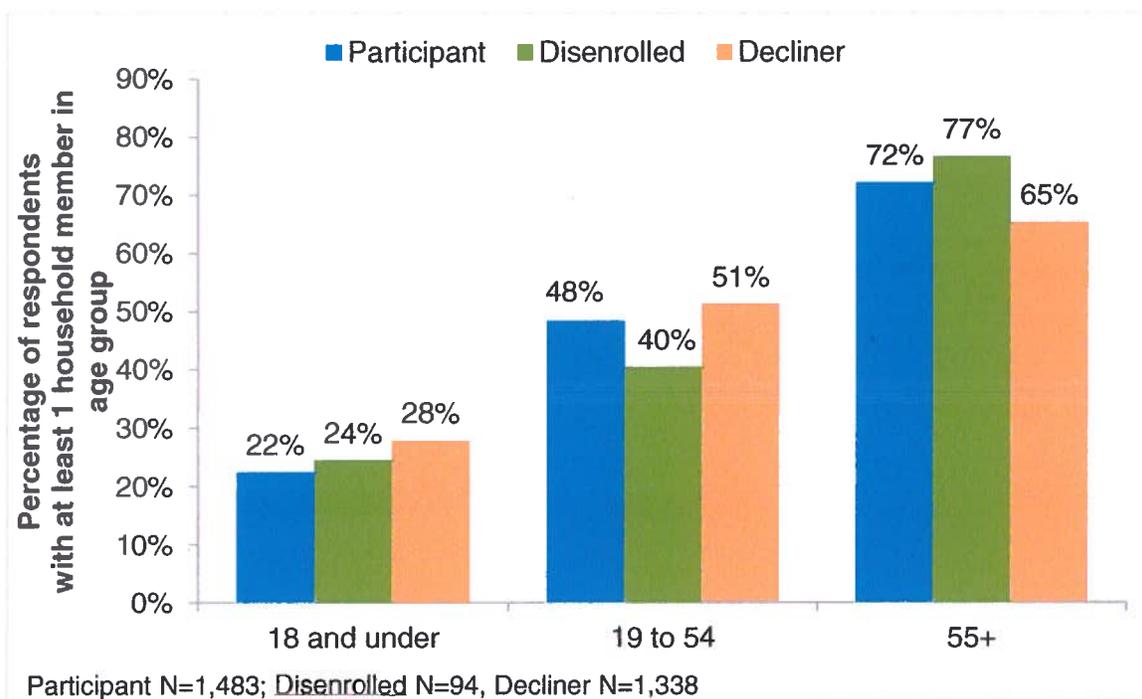
27 99% confidence means that we can be 99% sure that these observed differences are not due to random chance.

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Figure 5-14 shows the highest level of education completed by anyone in the household for disenrolled customers and decliners. For participants, the figure shows the highest level of education completed by the respondent, due to a slight difference in the wording of the question. However, it is reasonable to assume that the participant completing the survey is likely to have close to the highest level of education in the household and that the questions are still somewhat comparable. Disenrolled and decliner respondents had no significant difference in level of education relative to each other and participants had at least the same level of education as these two other groups.

Figure 5-14: Participants – "What is the highest grade of schooling you completed?"; Disenrolled & Decliners – "What is the highest grade of schooling anyone in your household has completed?"

Participant N=1,461; Disenrolled N=92, Decliner N=1,289

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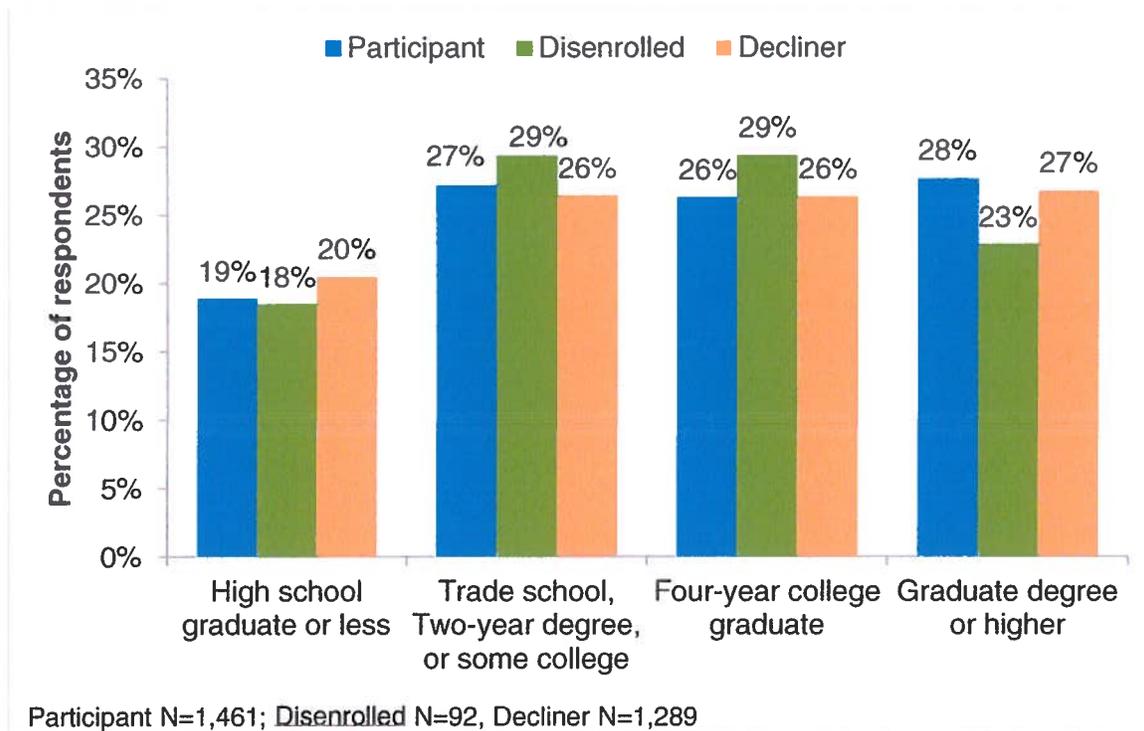
Figure 5-15 shows the distribution of reported household incomes for participants, disenrolled customers, and decliners. In general, a smaller proportion of participants had incomes below $75,000. Forty-nine percent of participants had incomes below this level compared to 61% of disenrolled customers and 57% of decliners. This difference is statistically significant with 95% confidence.

Figure 5-15: "Which of the following best describes your total household income from all sources in 2013, before taxes? (Check one)"

Participant N=1,144; Disenrolled N=76; Decliner N=1,129

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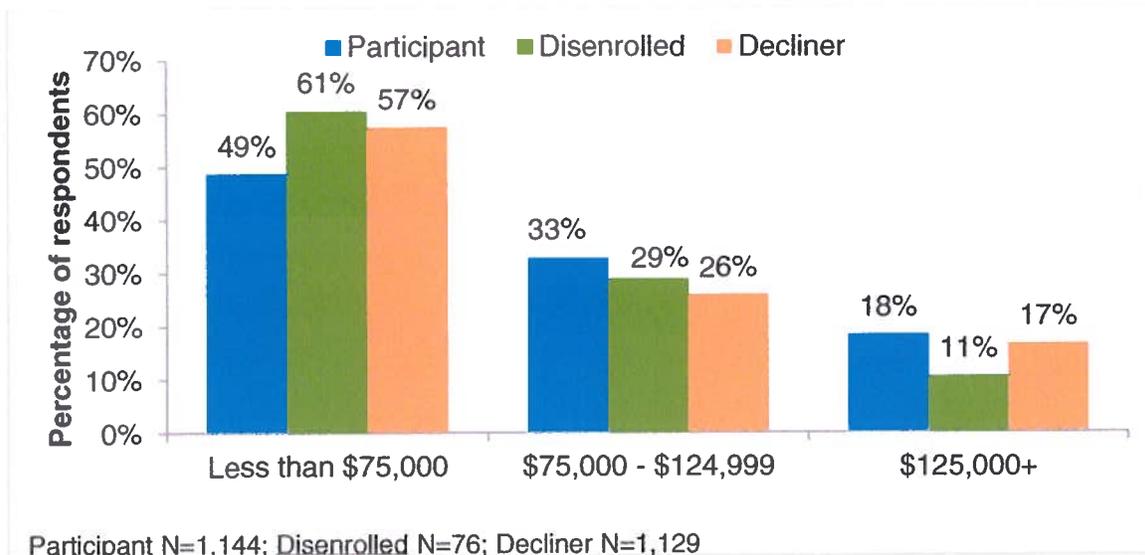
The next two demographic questions asked respondents to indicate how many adults work outside the home on most days and how many adults work from home on most days. Figure 5-16 compares participants, disenrolled customers, and decliners based on how many adults work outside the home on most days. Figure 5-17 compares participants, disenrolled customers, and decliners based on how many adults work exclusively at home on most days. None of the differences between respondent categories are statistically significant for either of these demographic questions.

Figure 5-16: "How many adults in your household work outside the home on most days?"

Participant N=1,360; Disenrolled N=86; Decliner N=1,213
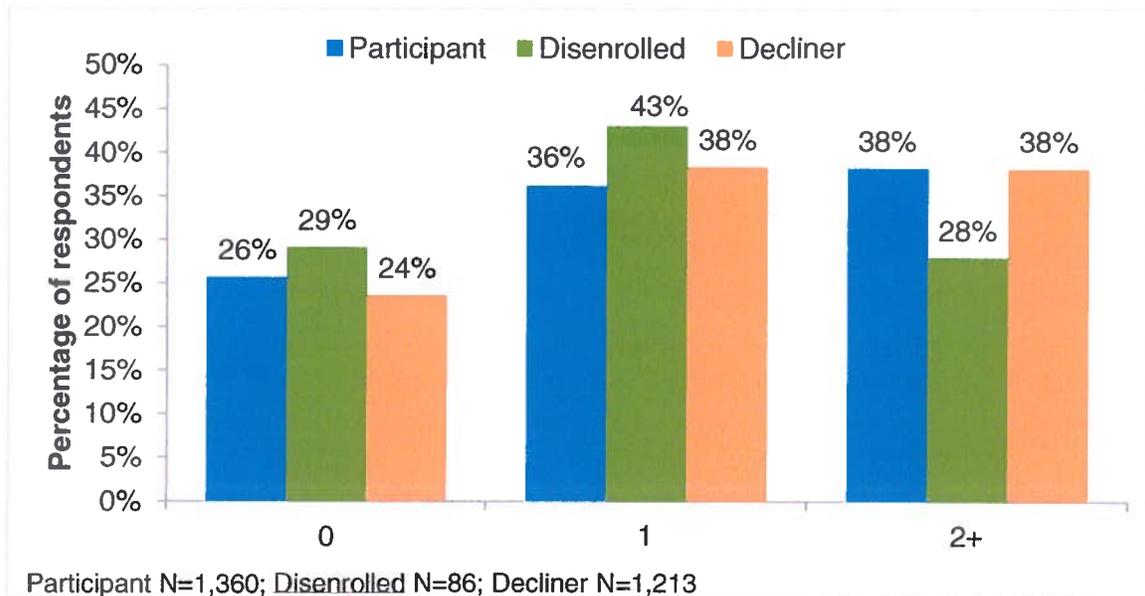
Figure 5-17: "How many adults in your household work exclusively at home on most days?"

Participant N=1,203; Disenrolled N=79; Decliner N=1,138
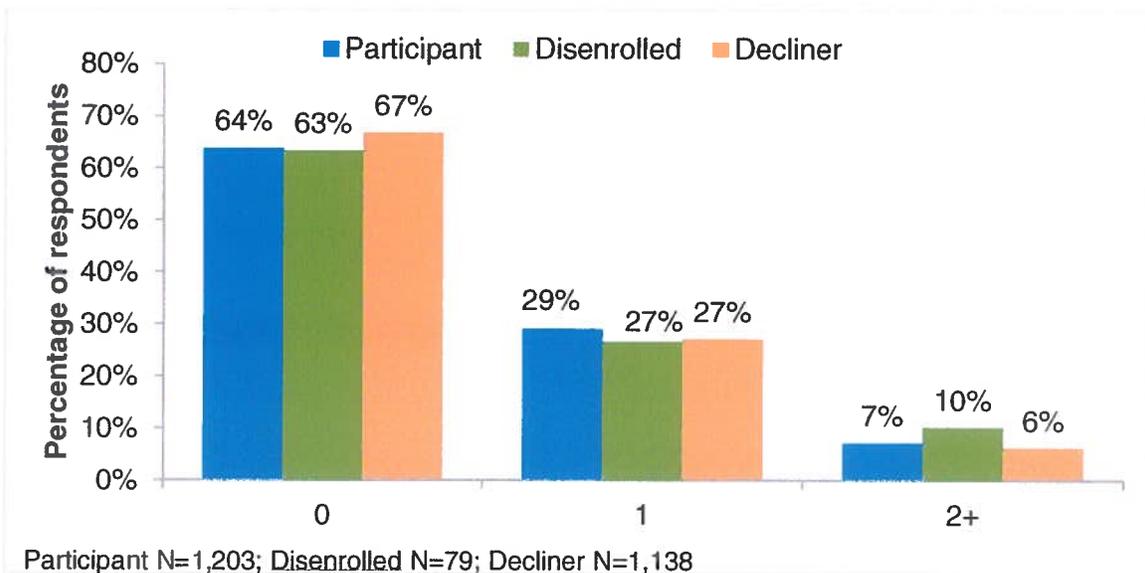
The final demographic question inquired whether any household members were eligible for accommodations under the Americans with Disabilities Act (ADA) (i.e., sight impairment, mobility impairment, etc.). This question was asked to participant and decliner survey respondents, but not to disenrollment survey respondents.

Figure 5-18 shows that both participants and decliners were unlikely to have a member of the household who was disabled. However, 8% of decliner respondents, compared to 5% of participant respondents, reported having an ADA-eligible household member. While this difference is statistically significant, the incidence rates of households with ADA-eligible members were so low for both participants and decliners that the difference is not meaningful.

Figure 5-18: "Are any members of your household eligible for accommodations under the Americans with Disabilities Act?"

Participant N=1,458; Decliner N=1,310
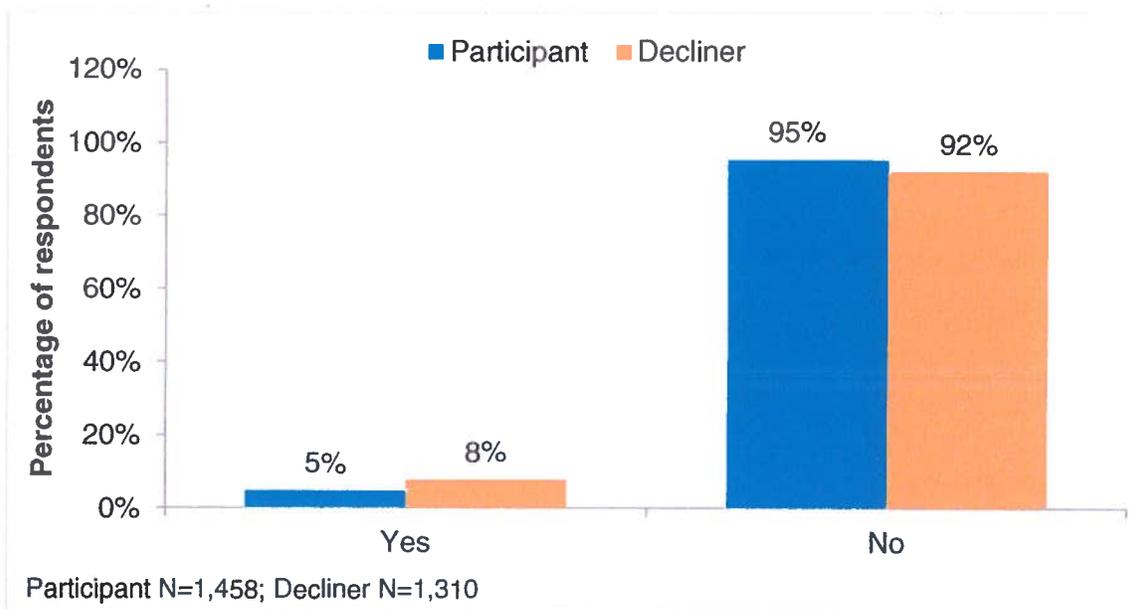
Complementary Findings from Focus Groups

ADA participants were specifically targeted for focus group participation and reported similar levels of satisfaction and behavior modifications as other groups. In fact, focus group participants with ADA-eligible household members gave a slightly higher average satisfaction rating (9.2) for PECO Smart Time Pricing than did the control group (8.9), though this difference is not statistically significant due to the small focus group sample size (10 per group). Participants with ADA-eligible household members also reported considering similar factors when initially deciding to sign up for PECO Smart Time Pricing.

6 Observations

- The collaborative process used to develop the program and then periodically update the stakeholders was an asset as the program proceeded to conclusion.

- Some customers who had not previously shopped for a competitive energy supplier decided to enroll (and thereby switch to a supplier) under the umbrella of PECO Smart Time Pricing.

- There seems to be a group of residential customers who are interested in saving money where a time-varying rate is not an inconvenience but rather a tool to help them control their energy costs.

- Non-shopping SMB customers were not interested in PECO Smart Time Pricing.

- Focus group feedback reported that customers felt like they didn't receive enough updates on their progress regarding savings with PECO Smart Time Pricing. Any EGS undertaking a similar TOU program might benefit from a proactive approach to providing this information. See Appendix C for more information on PECO's customer communication plan.

Appendix A   Focus Group Findings: Executive Summary

In addition to the two end-of-pilot surveys, PECO commissioned four focus groups toward the end of the pilot to study residential customer feedback on PECO Smart Time Pricing. The executive summary of the focus groups findings is provided in this appendix.

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PECO Smart Time Pricing Focus Groups

December 2, 2014

Detailed Report of Findings

Background

PECO commissioned four focus groups to study customer feedback for the PECO Smart Time Pricing (PSTP) program. There were three specific targeted customer groups: seniors (aged 65+), income less than $34,000/year and households who reported to have one member who was qualified under the Americans with Disabilities Act and one control group of "typical" PSTP customers.

Executive Summary

1. Participants in all groups were extremely enthusiastic about PSTP.

2. For most, the initial source of information about PSTP was via a separate letter inviting them to join the program. When asked unaided, most gave as reasons to consider PSTP the opportunity to save money on the electric bill and the fact that PECO seemed to "endorse" NRG as the supplier for the program.

3. Most signed up via mail, and few cited any difficulties with enrollment.

4. When asked to rate eight factors in the PSTP decision-making process, the characteristic that received the highest ratings varied slightly by group. Top rated were:
   - Better rate during off peak hours/save money
   - Sponsored by PECO
   - Certainty of 12-months fixed price
   - Bill protection guarantee
   - More control over energy bill.
   In most cases, the opportunity to save money was the most important factor.

5. In an exercise where they were asked to describe the program to a person who had never heard of PSTP, most participants focused on savings, convenience and a description of peak and off-peak usage. Overall they were highly favorable about the program.

6. Most thought the program could be "for anyone" who wants to save; when pressed, they admitted that households with no one at home during the 2PM-6PM time period would be a good fit for PSTP. Some thought the program would be especially appealing to customers on fixed incomes.

7. When asked what they liked best about the program, customers in all groups mentioned:
   - Savings/smaller bills;
   - Sense of control over electricity usage; and
   - Convenient/simple to participate.
   Some mentioned that being on the program made them more aware of electricity usage and challenged them to think of additional ways to save.

8. When asked what they liked least about PSTP, participants mentioned:
   - The fact that the program is coming to an end;
   - Small inconvenience involved in shifting some household activities out of the peak timeframe;
   - Lack of ongoing reporting about their performance/savings with PSTP; and
   - High differential in cost between peak and off-peak.
   - In a few cases, some mentioned that savings were not as high as expected.

9. Few seemed to be aware of the actual amount of monthly savings they garnered through PSTP, though most had a sense that some money was saved. In all groups, participants asked for more ongoing communication about the program, and especially about how much they were saving along the way.

10. Overall satisfaction with the program was high across all groups. Interest in recommending the program was also extremely high. High levels of satisfaction with PECO edged out satisfaction with NRG, though this may have had more to do with overall familiarity and loyalty to PECO than anything else.

11. Participants in all groups were disappointed that the program was coming to a close and wanted an opportunity to continue PSTP. Many talked about "going back to PECO" rather than staying with NRG as a supplier, though not all had acted on this at the time of the focus groups. For some, end of program communication could be improved.

Appendix B   Residential End-of-pilot Survey Instruments

B.1 PECO Smart Time Pricing Participant Survey

PECO Smart Time Pricing Participant Survey

Thank you for agreeing to complete this short survey about your experience with PECO Smart Time Pricing. The survey should take just a few minutes and we would appreciate it if you complete all of the questions. Your responses will be reported along with hundreds of other people and your identity will not be reported to PECO along with your answers.

Q1. Our records indicate that you are enrolled in PECO Smart Time Pricing. Under PECO Smart Time Pricing, you receive a discounted price on your electricity during most of the hours in the year except for non-holiday weekday afternoons between 2 PM and 6 PM. Does that sound familiar?

☐ Yes ☐ No ☐ Not Sure

Q2. Overall how satisfied are you with PECO Smart Time Pricing? (Check one)
- ☐ Very satisfied – Go to Q4
- ☐ Somewhat satisfied – Go to Q4
- ☐ Somewhat dissatisfied
- ☐ Very dissatisfied

Q3. Tell us in a couple of sentences why you feel that way.

_____

_____

_____

Q4. Previously you were charged a single price per kilowatt hour of electricity no matter when you used it. Under PECO Smart Time Pricing you receive a discount on most hours during the year but are charged a higher price on non-holiday weekday afternoons between 2 PM and 6 PM. Compared to your previous rate plan, how would you rate the value of PECO Smart Time Pricing?
- ☐ A much better value
- ☐ A somewhat better value
- ☐ About the same value
- ☐ A somewhat worse value
- ☐ A much worse value

Q5. Tell us in a couple of sentences why you feel that way.

_____

_____

_____

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Q6. Compared to your previous rate plan, how would you rate the comfort of your home on weekday afternoons from 2 PM to 6 PM on PECO Smart Time Pricing? Would you say your home is...

- ☐ A lot more comfortable
- ☐ Somewhat more comfortable
- ☐ About as comfortable
- ☐ Somewhat less comfortable
- ☐ A lot less comfortable

Q7. Tell us in a couple of sentences why you feel that way.

_____

_____

_____

Q8. As a result of participating in PECO Smart Time Pricing, do you feel you have more control over your household's electricity cost?

☐ Yes   ☐ No – Go to Q10   ☐ Not Sure – Go to Q10

Q9. Tell us in a couple of sentences why you feel that way.

_____

_____

Q10. Is PECO Smart Time Pricing convenient for your household?

- ☐ Yes
- ☐ No
- ☐ Not Sure

Q11. Tell us in a couple of sentences why you feel that way.

_____

_____

_____

Q12. Have you or anyone else in your household done anything to reduce the amount of electricity you use on weekday afternoons for example, delaying the use of dish or clothes washers or changing your thermostat setting?

☐ Yes ☐ No – Go to Q14 ☐ Not Sure – Go to Q14
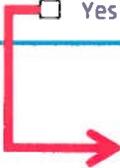
Q13. Tell us in a couple of sentences what you have done.

_____

_____

_____

Q14. Do you believe you saved any money as a result of selecting PECO Smart Time Pricing?

☐ Yes ☐ No – Go to Q16 ☐ Not Sure – Go to Q16

Q15. How much money do you think you have saved on a monthly basis?

$_____ per month

Q16. Please rate the following aspects of PECO Smart Time Pricing from excellent to poor.

	Excellent	Very Good	Good	Fair	Poor	No Opinion
Ease of understanding	☐	☐	☐	☐	☐	☐
Fairness	☐	☐	☐	☐	☐	☐
Opportunity to save money	☐	☐	☐	☐	☐	☐
Fit with my lifestyle	☐	☐	☐	☐	☐	☐
Comfort in my home	☐	☐	☐	☐	☐	☐
Convenience	☐	☐	☐	☐	☐	☐
Control over energy usage	☐	☐	☐	☐	☐	☐

Now we have a few questions about you and that will help us understand how different people view PECO Smart Time Pricing. Your individual answers will not be reported to PECO or anyone else and will only be used to create statistical summaries.

Q17. For each of the following age groups, how many people, including you, live in this home for more than half of the year?

Age Group	Number of People		Age Group	Number of People
5 and under	_____		55 – 64	_____
6 – 18	_____		65 – 74	_____
19 – 34	_____		75+	_____
35 – 54	_____			

Q18. What is your age? _____

Q19. How many adults in your household work outside the home on most days? _____ Adults

Q20. How many adults in your household work exclusively at home on most days? _____ Adults

Q21. What is the highest grade of schooling you completed? (Check one)

☐ Elementary or middle school   ☐ Some college, no degree

☐ Some high school, no diploma   ☐ Two-year college graduate

☐ High school graduate   ☐ Four-year college graduate

☐ Trade or technical school   ☐ Graduate degree or higher

Q22. Which of the following best describes your total household income from all sources in 2013, before taxes? (Check one)

☐ Less than $23,000   ☐ $57,000 - $74,999   ☐ $175,000 - $199,999

☐ $23,000 - $33,999   ☐ $75,000 - $89,999   ☐ $200,000 - $224,999

☐ $34,000 - $38,999   ☐ $90,000 - $124,999   ☐ $225,000 - $249,999

☐ $39,000 - $46,999   ☐ $125,000 - $149,999   ☐ $250,000 plus

☐ $47,000 - $56,999   ☐ $150,000 - $174,999

Q23. Are any members of your household eligible for accommodations under the Americans with Disabilities Act? (Examples include sight impairment, mobility impairment, etc.)

☐ Yes   ☐ No

Q24. We will be inviting a small number of people to meet with us to discuss their experience with PECO Smart Time Pricing. These small, informal discussion groups will help us gain additional insights into how you felt about your experience. In return for discussing PECO Smart Time Pricing with others like yourself for 90 minutes we will pay you $150. If you are interested please provide your telephone number and/or email address. We will then contact you if you are selected.

Telephone: _____

Email: _____

Q25. Thanks for answering our questions. If there are any comments you have on PECO Smart Time Pricing please record them in the space provided below.

_____

_____

Thank you! Please return your completed survey using the enclosed envelope.

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B.2 PECO Smart Time Pricing Disenrollment Survey

Thank you for agreeing to complete this short survey about your experience with PECO Smart Time Pricing. The survey should take just a few minutes to finish and we would appreciate it if you complete all of the questions asked. Your responses will be reported along with hundreds of other people and your identity will not be reported to PECO along with your answers.

Q1. Overall how satisfied were you with PECO Smart Time Pricing? (Check one)
- ☐ Very satisfied – Go to Q3
- ☐ Somewhat satisfied – Go to Q3
- ☐ Somewhat dissatisfied
- ☐ Very dissatisfied

Q2. Tell us why you feel that way.

_____

_____

Q3. Please tell us why you chose to leave PECO Smart Time Pricing.

_____

_____

_____

Q4. Below are some reasons for withdrawing from PECO Smart Time Pricing. For each reason, please indicate whether it was a consideration in your decision to withdraw from the plan and how important it was.

Reason for Leaving	Not a reason	Not Very Important	Somewhat Important	Very Important
You did not save enough money	☐	☐	☐	☐
PECO Smart Time Pricing did not give you enough control over your energy costs	☐	☐	☐	☐
You don't like worrying about when you use electricity	☐	☐	☐	☐
The temperature of your home was uncomfortable on afternoons and evenings	☐	☐	☐	☐
You found a better deal from another electricity supplier	☐	☐	☐	☐
It was inconvenient to change the time of day when you used appliances and air conditioning	☐	☐	☐	☐
You believed that your energy costs were higher with PECO Smart Time Pricing	☐	☐	☐	☐
Other – please specify (if any):	☐	☐	☐	☐

Q5. For each of the following age groups, how many people, including you, live in this home for more than half of the year?

Age Group	Number of People	Age Group	Number of People
5 and under	_____	55 – 64	_____
6 – 18	_____	65 – 74	_____
19 – 34	_____	75+	_____
35 – 54	_____		

Q6. How many adults in your household work outside the home on most days? Number of people _____

Q7. How many adults in your household work exclusively at home on most days? Number of people _____

Q8. What is the highest grade of schooling anyone in your household has completed? (Check one)

- ☐ Elementary or middle school
- ☐ Some high school, no diploma
- ☐ High school graduate
- ☐ Trade or technical school

- ☐ Some college, no degree
- ☐ Two-year college graduate
- ☐ Four-year college graduate
- ☐ Graduate degree or higher

Q9. Which of the following best describes your total household income from all sources in 2013, before taxes? (Check one)

- ☐ Less than $23,000
- ☐ $23,000 - $33,999
- ☐ $34,000 - $38,999
- ☐ $39,000 - $46,999
- ☐ $47,000 - $56,999

- ☐ $57,000 - $74,999
- ☐ $75,000 - $89,999
- ☐ $90,000 - $124,999
- ☐ $125,000 - $149,999
- ☐ $150,000 - $174,999

- ☐ $175,000 - $199,999
- ☐ $200,000 - $224,999
- ☐ $225,000 - $249,999
- ☐ $250,000 plus

Q10. Thanks for answering our questions. If there are any comments you have on PECO Smart Time Pricing please record them in the space provided below.

_____

_____

_____

Thank you! Please return your completed survey using the enclosed envelope.

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Appendix C   PECO Smart Time Pricing Customer Communication Plan

C.1 Introduction

The following outlines the communication plan that the PECO Smart Time Pricing team designed and rolled out with the program.

This section details the communication plan for a customer during their post enrollment period – for information on pre-enrollment, please refer to the PECO Smart Time Pricing Interim Report submitted to the PUC on June 24th, 2014

C.2 Objective

The stated[28] objective of the communication plan for customers enrolled in PECO Smart Time Pricing was to educate customers on how the TOU rate works and how they can take advantage of load shifting to maximize cost savings. PECO used the web, bill messaging, and progress letters as the primary means of providing this information. The details of these avenues of communication follow.

C.3 Web

PECO STP customers who enrolled are able to view additional information through their account webpage pertinent to PECO STP. The My Account features allowed the ability to track savings, energy usage, bill comparison, and other information that customers would find helpful.

Figure C-1 displays what a customer enrolled in PECO STP would see when they clicked on 'view my bill' from their PECO My Account page. The main feature of this page is the PECO Smart Time Pricing Bill Comparison. The first column in the Bill Comparison Tool shows what the customer is paying on the PECO Smart Time Pricing rate. The second column displays the PECO Default Rate, or what a customer not enrolled in PECO Smart Time Pricing would be paying for the same energy usage. The third column details the difference of the first two columns, displaying an aggregate savings for the customer on the bottom. The bill comparison feature would be refreshed each customer's billing cycle.

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[28] See section 3.3 Customer Education of the Supplement to PECO Energy Company's Initial Dynamic Pricing and Customer Acceptance Plan, February 22, 2013, Docket No. P-2012-2297304

Figure C-1: PECO STP Customer Landing Page and Bill Comparison Tool

PECO Smart Time Pricing customers could also view detailed usage history by clicking on the 'view usage' tab on the upper- right hand side of the screen.

Figures C-2, C-3, and C-4 show example images of what a PECO STP customer could view. The line graph represents the customer's energy usage over a specified period of time. The customer could switch their view from months, days, and even hours to gain a better understanding of how to manage their energy usage habits. This was especially relevant to customers who were attempting to shift their energy usage away from the 2 to 6 PM peak hours and maximize savings. Customers could view all of their energy usage up to the day before through this method. Below are three examples of what a customer on PECO STP could view through viewing their usage.

Figure C-2: PECO STP ' View My Usage' – Month View

ↄ Nexant
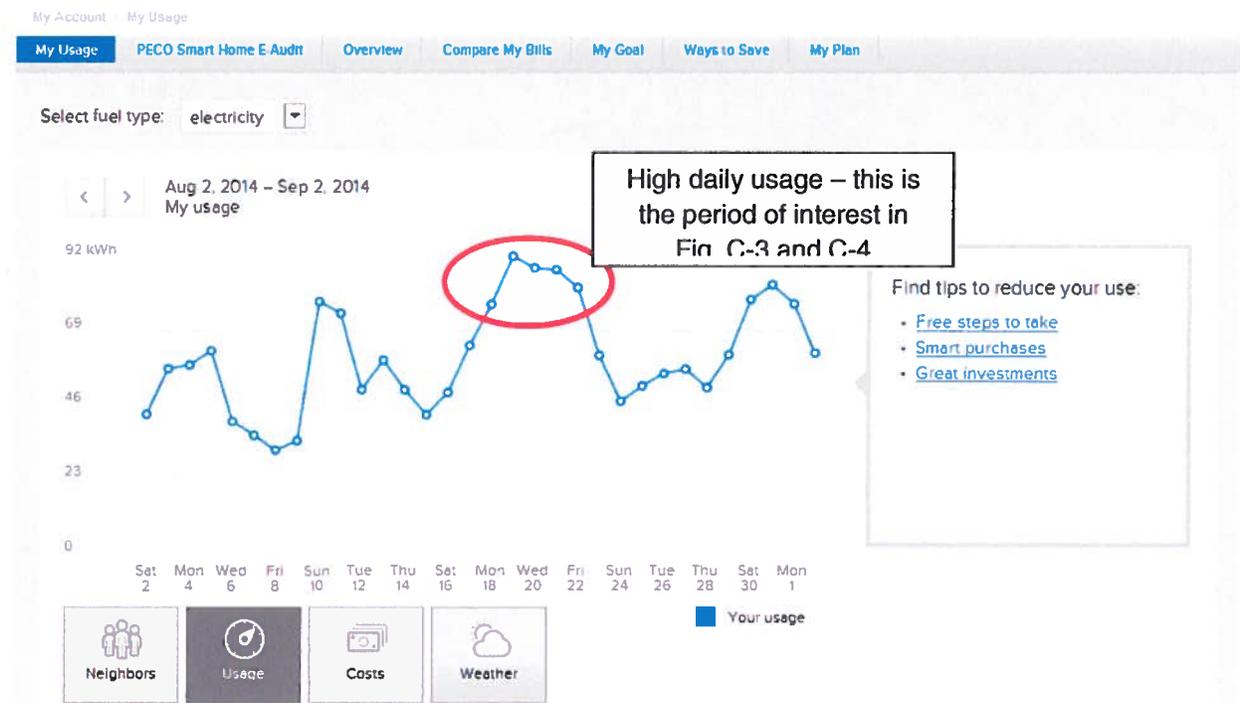
Figures C-3 and C-4 further show a comparison of what a customer would see during a day when the peak time usage was relatively low and flat vs. when it was higher and had a spiky pattern.

Figure C-3: PECO STP 'View My Usage' – Daily View
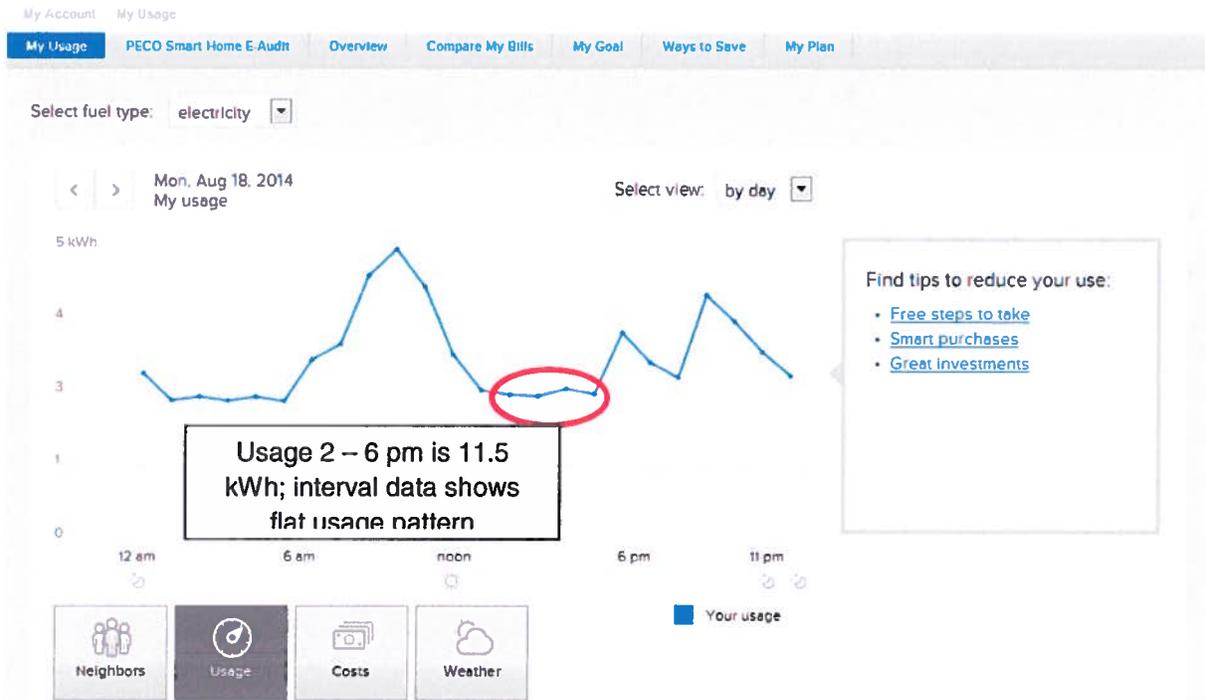
Figure C-4: PECO STP 'View My Usage' - Daily View
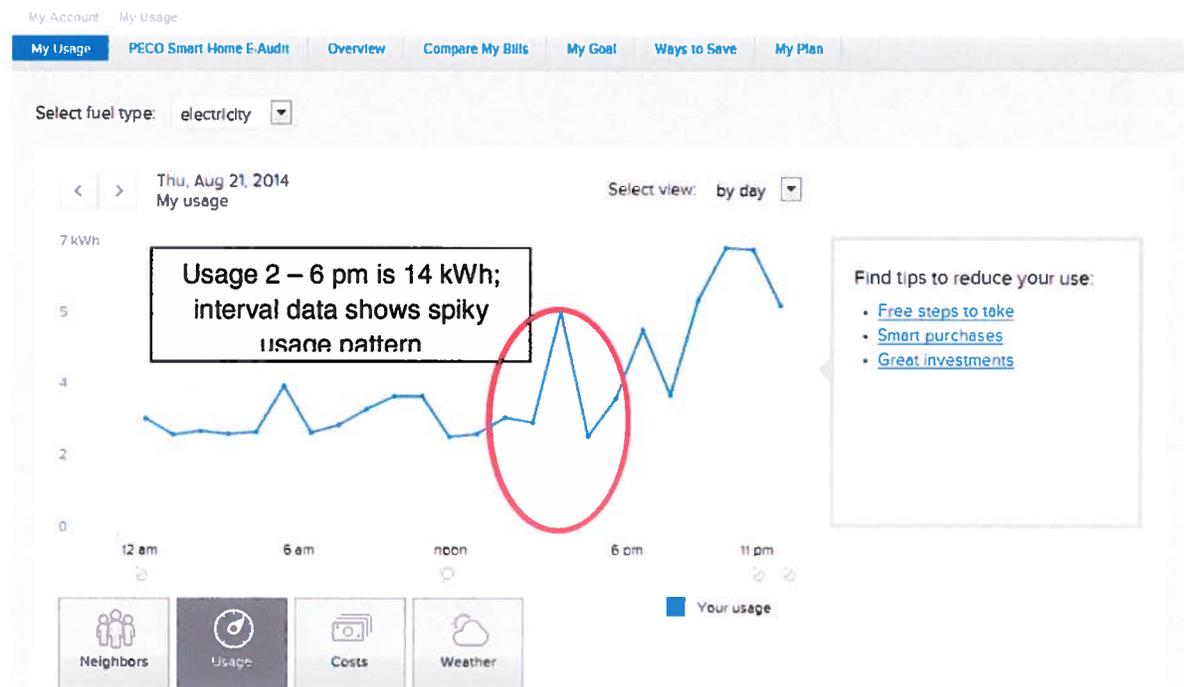
The final communication avenue using the web is the FAQ's. Figure C-5 illustrates how the FAQ's were presented on the PECO Smart Time Pricing website. In the pre-launch focus groups PECO included discussions about what questions that PECO STP customers may ask before and during the course of the program. These were then accessible from the PECO STP homepage shown above. The page also displays contact info to reach PECO or NRG if they have any questions that are not answered satisfactorily to the customer on the web page.

Figure C-5: PECO STP PECO STP FAQ's
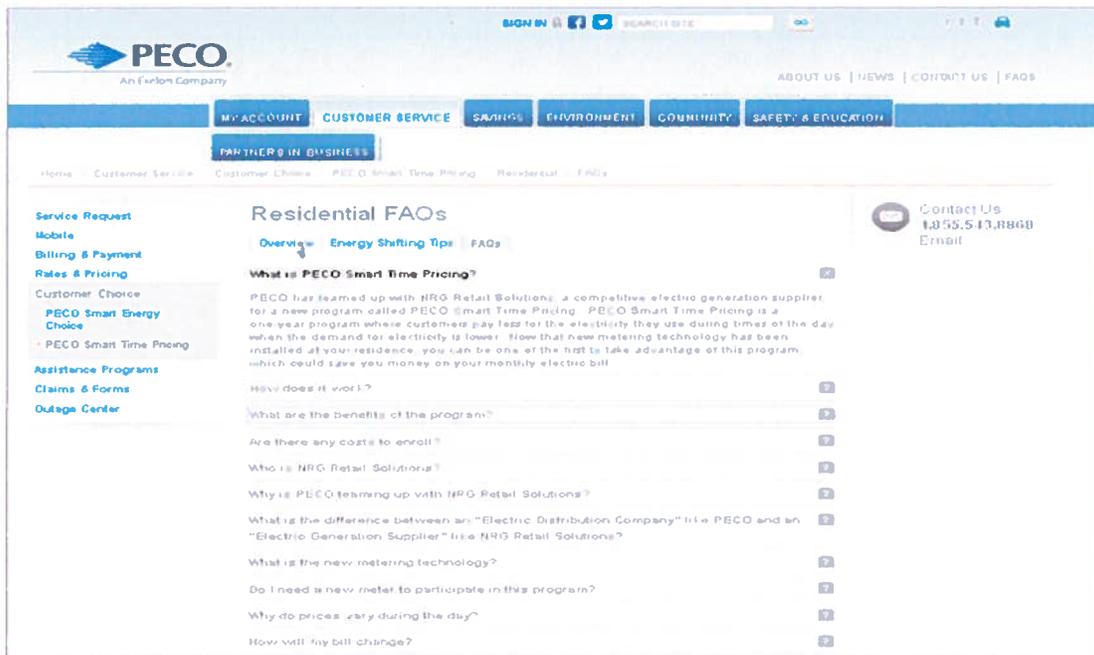
C.4 Bill

PECO customers receive a hard copy of their bills on a monthly basis. PECO customers enrolled in PECO STP could receive messages regarding the program in the message center box on their bill. The example below shows how customers were referred back to the online component of the PECO STP program for details.

The message highlighted below in Figure C-6 is an example of a bill with a custom message from PECO STP.

Figure C-6: Message Center Example of PECO STP Message on a PECO Bill

NRG's supplier charges detailing the breakdown of their on and off peak usage and associated charges were included on the bill. Highlighted below is an example of how this was displayed on a PECO bill.

Figure C-7: PECO Bill with PECO STP Charges Listed
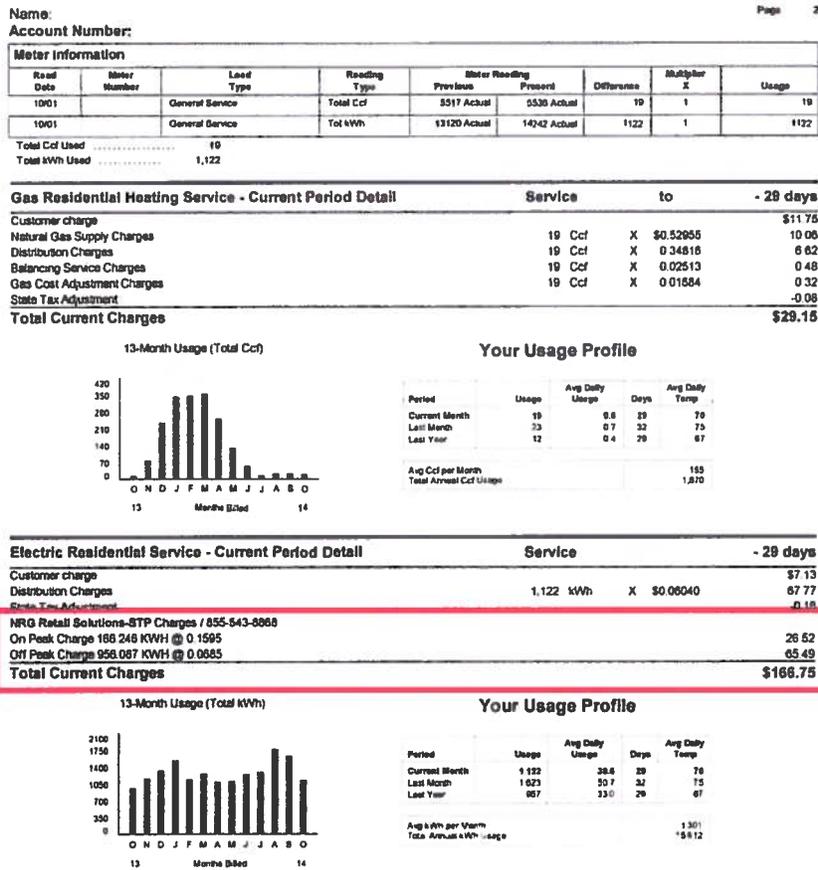
E-Bill

PECO Smart Time Pricing customers who received their bills through e-bills saw the exact same information as those who received paper bills.
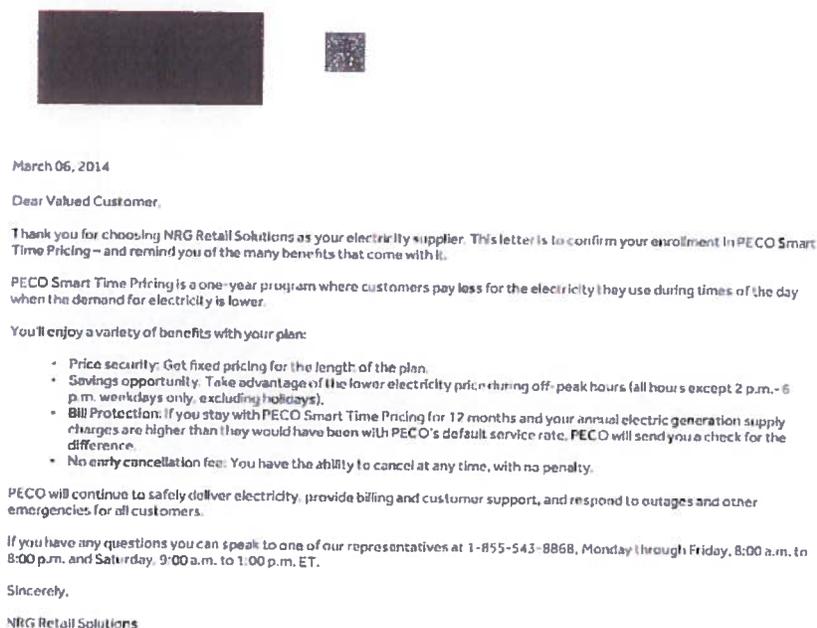
Nexant

C.5 Program Letters

PECO Smart Time Pricing customers received three written program related communications: a welcome package, a progress letter, and an end of program letter.

Welcome Package

Following enrollment customers received a welcome package letter and insert from NRG Retail Solutions. The letter and inserts were designed to introduce newly enrolled Smart Time Pricing customers to the program and inform customers about the benefits of enrollment. This communication came directly from NRG Retail Solutions because the customer had switched to NRG upon enrollment.

Figure C-8 is an example letter

Figure C-8 Welcome Letter

March 06, 2014

Dear Valued Customer,

Thank you for choosing NRG Retail Solutions as your electricity supplier. This letter is to confirm your enrollment in PECO Smart Time Pricing – and remind you of the many benefits that come with it.

PECO Smart Time Pricing is a one-year program where customers pay less for the electricity they use during times of the day when the demand for electricity is lower.

You'll enjoy a variety of benefits with your plan:

- Price security: Get fixed pricing for the length of the plan.
- Savings opportunity. Take advantage of the lower electricity price during off-peak hours (all hours except 2 p.m.-6 p.m. weekdays only, excluding holidays).
- Bill Protection: If you stay with PECO Smart Time Pricing for 12 months and your annual electric generation supply charges are higher than they would have been with PECO's default service rate, PECO will send you a check for the difference.
- No early cancellation fee: You have the ability to cancel at any time, with no penalty.

PECO will continue to safely deliver electricity, provide billing and customer support, and respond to outages and other emergencies for all customers.

If you have any questions you can speak to one of our representatives at 1-855-543-8868, Monday through Friday, 8:00 a.m. to 8:00 p.m. and Saturday, 9:00 a.m. to 1:00 p.m. ET.

Sincerely,

NRG Retail Solutions

Inserts were also provided with the welcome package. They mirror similar information included in the welcome letter, while expanding on NRG's participation and the mechanics of the Time of Use process. Below are examples of the inserts. Figure C-9 show the inserts that were included.

Figure C-9: Inserts in the Welcome Package

Who is **NRG Retail Solutions**, and how are they related to PECO Smart Time Pricing?

NRG Retail Solutions is part of the retail division of NRG, a Fortune 500 company and one of the nation's largest energy suppliers. NRG Retail Solutions is also the competitive electric generation supplier PECO has contracted with to provide PECO Smart Time Pricing. By participating in the program, you'll enjoy the best of both worlds. You'll get all the benefits of being an NRG Retail Solutions Customer, with PECO continuing to safely deliver electricity, provide billing and customer support, and respond to outages and other emergencies.
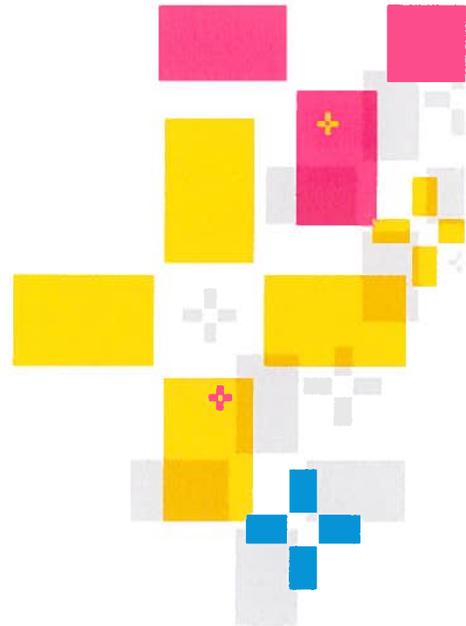
How does **PECO Smart Time Pricing** work?

This program gives you the opportunity to save money based on your electricity usage habits. It features a lower price for electricity during times of the day when the demand for electricity is lower (off-peak hours), and a higher price for electricity during times of the day when the demand for electricity is higher (peak hours). These lower-priced, non-peak hours are defined as any time other than 2 p.m. to 6 p.m. on non-holiday weekdays, which means they make up almost 90% of the year.

For more information, visit peco.com/smarttimepricing **or call** 1.855.543.8868.

nrg.

Progress Letter

In June of 2014, every customer enrolled in PECO Smart Time Pricing received a progress letter. The Progress Letter was designed to not only update customers on the current savings on the Smart Time Pricing Rate, but also to remind customers about the mechanics of the program and its' eventual end. The timing of the progress letter was designed to serve as a reminder as we entered the summer cooling season. The letter included:

- Customer Progress
- Program savings to date
- Breakdown of savings month to month
- Tools to maximize savings by shifting load
- Facts about the NRG and PECO Price to Compare
- A brief list of the benefits of the PECO Smart Time Pricing Program
- Call center information

Below is a sample of a progress letter that PECO Smart Time Pricing customers received.

Figure C-10: PECO STP Progress Letter Example

Nexant

End of Program Letter

The End of Program Letter was distributed to customers shortly after they disenrolled from the PECO Smart Time Pricing Program. The letter took one of two forms, either a saving letter informing them of how much they saved or a bill protection version that presented the data on how much more they spent on STP. The bill protection letter also included the bill protection check. Both versions included a reminder to contact NRG Retail Solutions with questions.

Figure C-11 is an example of the End of Program Savings Letter.

Figure C-11: PECO STP End of Program Saving Letter Example

Figure C-12 is an example of the End of Program Bill Protection Letter

Figure C-12: End of Program Bill Protection Letter Example

PECO.
An Exelon Company

2/27/15

Dear   .

Thank you for participating in PECO Smart Time Pricing. This one-year program has now ended. The chart below provides an overview of your monthly charges through NRG Retail Solutions, what you would have been charged if you remained with PECO, and any monthly savings you achieved through this program.

As part of PECO Smart Time Pricing, we offered you bill protection. If your annual electric generation supply charges were higher than they would have been with PECO's default service rate, your total program savings below will appear as a negative amount. Enclosed is your bill protection rebate check for the difference.

Date	NRG Retail Solutions Charges	PECO Price-To-Compare	Monthly Program Savings
02/10/14	$0.00	$0.00	$0.00
03/11/14	$0.00	$0.00	$0.00
04/09/14	$0.00	$0.00	$0.00
05/08/14	$0.00	$0.00	$0.00
06/09/14	$0.00	$0.00	$0.00
07/09/14	$0.02	$0.02	$0.00
08/08/14	$0.85	$0.91	$0.06
09/08/14	$0.82	$0.85	$0.03
10/07/14	$0.50	$0.53	$0.03
11/05/14	$6.38	$4.97	($1.41)
12/08/14	$0.18	$0.21	$0.03
01/06/15	$0.46	$0.36	($0.10)
Total Program Savings			**($1.36)**

If you have not already chosen to purchase the electricity you use from another competitive electric generation supplier, or returned your service to PECO, you were automatically enrolled in another time-of-use rate from NRG retail solutions. If you have any questions, please call 1-855-543-8868, Monday through Friday, 8 a.m. to 6 p.m., and Saturday, from 9 a.m. to 1 p.m.

Sincerely,
PECO Smart Time Pricing Team