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Residential Energy Time-of-Use (RE-TOU) Trial Evaluation Report 1

Findings from June 2017 to September 2018

Prepared for:

Xcel Energy – Colorado

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Residential Energy Time-of-Use (RE-TOU) Trial
Evaluation Report 1

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DISCLAIMER

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EXECUTIVE SUMMARY

Xcel Energy and the other Parties to the 2016 Settlement in Proceeding No. 16AL-0048E (Settlement) agreed to test two new voluntary residential time varying rate schedules in Colorado:

1. Residential Energy Time-Of-Use Service Schedule ("RE-TOU" or "TOU")
2. Residential Demand – Time Differentiated Rates Service Schedule ("RD-TDR" or "TDR")

The intent of the Settlement is to provide an opportunity for: (1) adequate educational materials to be prepared; (2) testing the impact of the trial's RE-TOU rate differentials and pricing time periods; and (3) testing the trial's Schedule RE-TOU rate with existing and new Demand Side Management or energy efficiency tools. The Settlement Agreement approved the two rates – the TOU "trial" and the TDR "pilot" – for customers who volunteer to enroll and receive a "bridge meter" that allows for measurement and billing of customers' monthly electric usage on a 15-minute basis. Voluntary participants have the right to withdraw (or "opt out") from the rate through the end of their sixth billing cycle. Per the Settlement Agreement (Settlement), Xcel Energy is expected to file an Advice Letter on December 2, 2019, which will include results from the RE-TOU trial. As specified in the Settlement, the Advice Letter is intended to inform whether the RE-TOU rate requires modification prior to implementing the final time-varied rate for all residential customers, whether the rate is working well as originally implemented, or whether it should be discontinued.

Non-solar participants on the RE-TOU rate reduced summer on-peak consumption by nearly 8%; annual bill savings for a typical customer with average consumption were negligible.

Key Takeaways. This Evaluation Report addresses Navigant's evaluation of the energy, system coincident peak demand, bill impacts, and customer experience from participation in the RE-TOU trial, from the earliest recruitment in March 2017 through September 2018.[1] The evaluation identified significant reductions in both summer and winter peak-period consumption across most customer segments (reductions of 7.6% and 3.8%, respectively, across all non-solar participants), with electric vehicle owners and customers with solar photovoltaic production most able to reduce on-peak usage and reduce electric bills. On an annual basis, all non-solar participants reduced their consumption by 0.2%.

Rate Structure. Table 1 presents the rate structure for RE-TOU, including the pricing periods, applicable prices during each period, and fixed charges. The prices under this plan are based on three periods and are referred to as off-peak, shoulder, and on-peak. The prices vary between summer and winter seasons,[2] but the hours for each period remain the same all year.

[1] Navigant will prepare Evaluation Report 2 to cover participation from October 2018 through September 2019. Navigant will prepare a final evaluation report in 2020 that covers participation from June 2017 through December 2019.

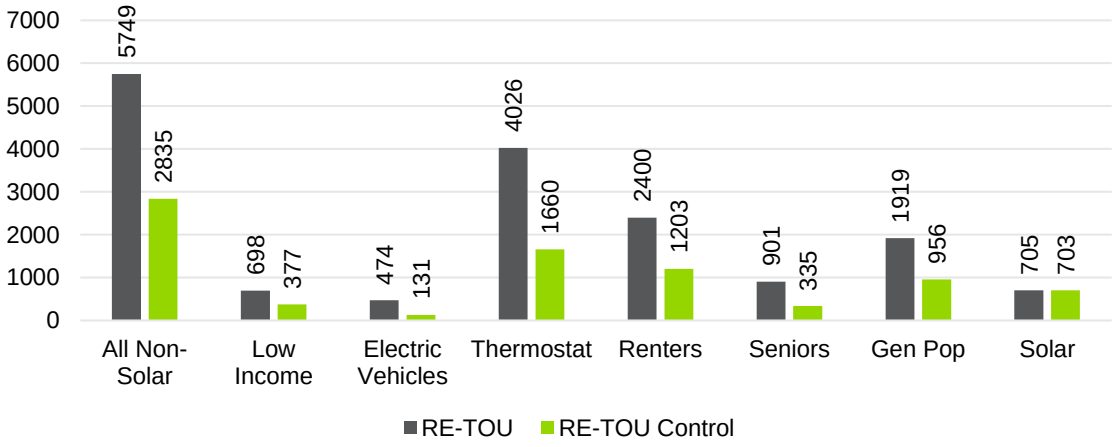
[2] Costs are rounded and included appropriate adjustments. The summer season includes June, July, August, and September. The winter season includes January, February, March, April, May, October, November, and December.

Table 1. RE-TOU Rate Structure[3]

RE-TOU	Off-Peak	Shoulder	On-Peak	Service and Facility Charge
Hours	9pm - 9am	9am-2pm, 6pm-9pm on Weekdays, 9am-9pm Weekends	2pm-6pm on Weekdays	
Summer	$0.08/kWh	$0.13/kWh	$0.18/kWh	$5.41
Winter	$0.08/kWh	$0.10/kWh	$0.14/kWh	$5.41

Enrollment Summary. Recruitment for the RE-TOU pilot began in March 2017 and continued through 2018, with most campaigns wrapping up in October of 2018. Xcel Energy implemented a variety of marketing tactics to increase awareness and enrollments in the trial rate, resulting in nearly 10,000 enrolled participants at the time this report was written—including the one-third who were randomly assigned to be in a control group. Figure 1 shows the number of participants and control group customers by customer segment.

Figure 1. RE-TOU Enrollment



Impact Findings

The evaluation estimated changes in the energy consumption of customers on the RE-TOU rate through a series of regression models, the findings from which were subsequently combined with the TOU rate structure to estimate bill impacts. Navigant's evaluation team performed the impact analysis across all customer segments and estimated the impacts both in aggregate (for all non-solar customers) as well as broken out by customer segment (including the solar customer segment).

Table 2 provides a summary of the impact analysis findings for **non-solar customers**, who in aggregate produced significant reductions in consumption during the on-peak and system coincident peak hours (7.6% reductions in summer months and 3.8% in winter months). Reductions in annual energy consumption were virtually non-existent at 0.2%. For the average non-solar participant, these impacts in combination with the RE-TOU rate structure yield a small increase in summer bills and a small decrease in winter bills, which net out to a 1.1% increase in the average annual cost of electricity.

[3] Rates include riders - that are periodically updated – and are rounded to the nearest cent.

Table 2. Impact Analysis Key Findings for Non-Solar Customers[4]

Season	Average System Coincident Peak Hour Impact		Average Hourly On-Peak Consumption Impact		Average Monthly Consumption Impact		Average Monthly Bill Impact	
Summer Months	-0.11 kWh	-7.3%	-0.09 kWh	-7.6%	-12.6 kWh	-1.8%	$3.67	4.4%
Winter Months	-0.04 kWh	-3.8%	-0.03 kWh	-3.8%	4.1 kWh	0.8%	-$1.08	-1.8%
October 2017 to September 2018	n/a				-1.4 kWh ***-17.2 kWh annually***	**-0.2%**	-$0.50 ***-$6.00 annually***	**1.1%**

The financial motivations and characteristics[5] of **customers with solar**—and the resulting changes in consumption from the RE-TOU rate—are different than customers without solar; consequently, the analysis of their impacts have been separated from non-solar customers and are as shown in Table 3.

Table 3. Impact Analysis Key Findings for Solar Customers

Season	Average System Coincident Peak Hour Impact		Average Hourly On-Peak Consumption Impact		Average Monthly Consumption Impact		Average Monthly Bill Impact	
Summer Months	-0.40 kWh	-20.5%	-0.37 kWh	-19.3%	-67.9 kWh	-1.8%	-$17.27	-57.7%
Winter Months	-0.09 kWh	-6.0%	-0.17 kWh	-16.3%	-4.30 kWh	-1.7%	-$7.52	-24.2%
October 2017 to September 2018	n/a				-25.51 kWh ***-306.12 kWh annually***	**-0.2%**	-$10.77 ***-$129.28 annually***	**-35.1%**

On-peak Impacts. Reductions in energy consumption from the on-peak period of the RE-TOU rate hold the greatest potential value to participants and customers alike, and the relatively high on-peak rate provides the greatest financial incentive for participants to reduce their usage. Key observations from the peak period impact analysis are as follows (see Figure 2 and Figure 3):

- Excluding low income participants, **each customer segment has a statistically significant reduction** in their average on-peak consumption during the summer.
- **Reductions in average on-peak consumption are less in the winter than in the summer**. This is likely due to participants reducing on-peak air conditioning loads during the summer and having less overall electricity use to manage in the winter.

[4] These average calculations are based on point estimates of the energy impacts by TOU rate period. The off-peak period point estimate is not statistically different from zero.

[5] Customers with solar generally live in larger homes (66% in homes greater than 2,000 square feet) with large electric loads that can be shifted (23% own electric vehicles and 87% have smart thermostats connected to central air conditioning). This provides a greater opportunity to shift consumption than the average non-solar customer that live in relatively smaller homes (27% in homes greater than 2,000 square feet) and have smaller loads that can be shifted (5% own electric vehicles and 59% have smart thermostats connected to central air conditioning).

- **Electric vehicle and solar participants have substantially larger on-peak reductions** than other segments. This is likely a result of electric vehicle ownership among both segments and changes in vehicle charging schedules.

Figure 2. Summer On-Peak Consumption Impact

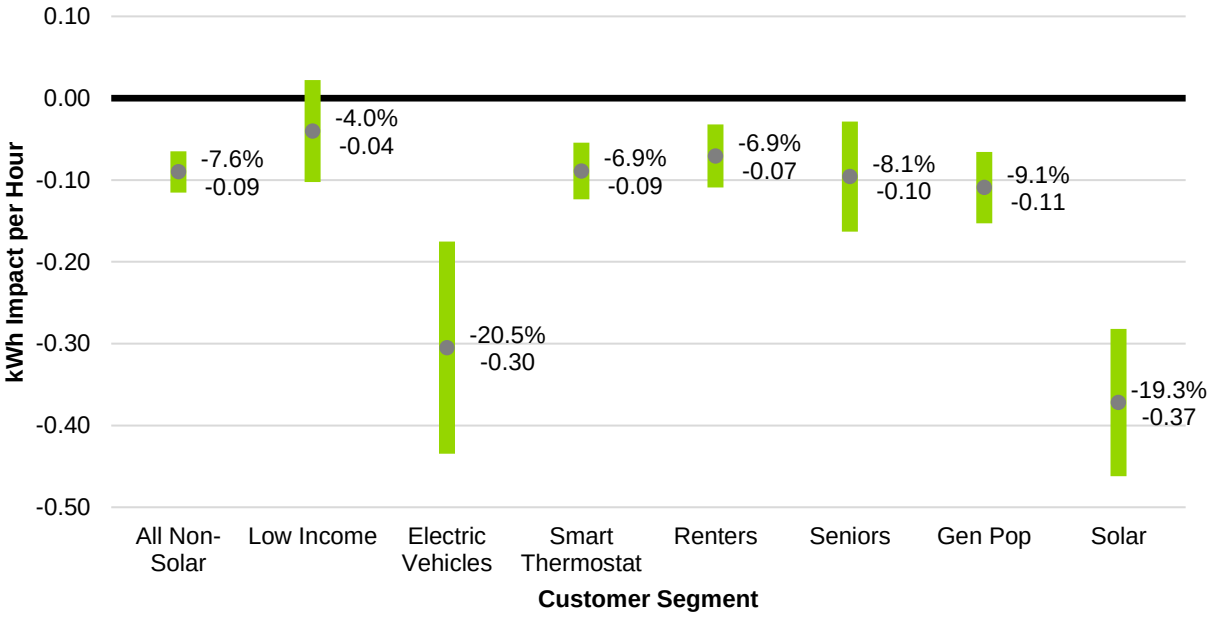
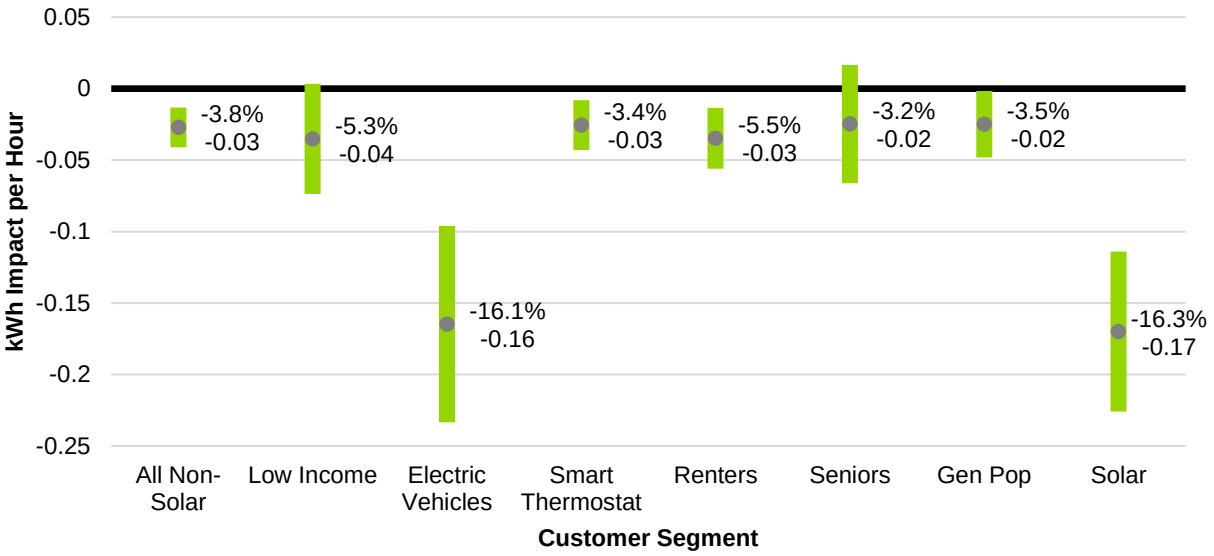


Figure 3. Winter On-Peak Consumption Impact

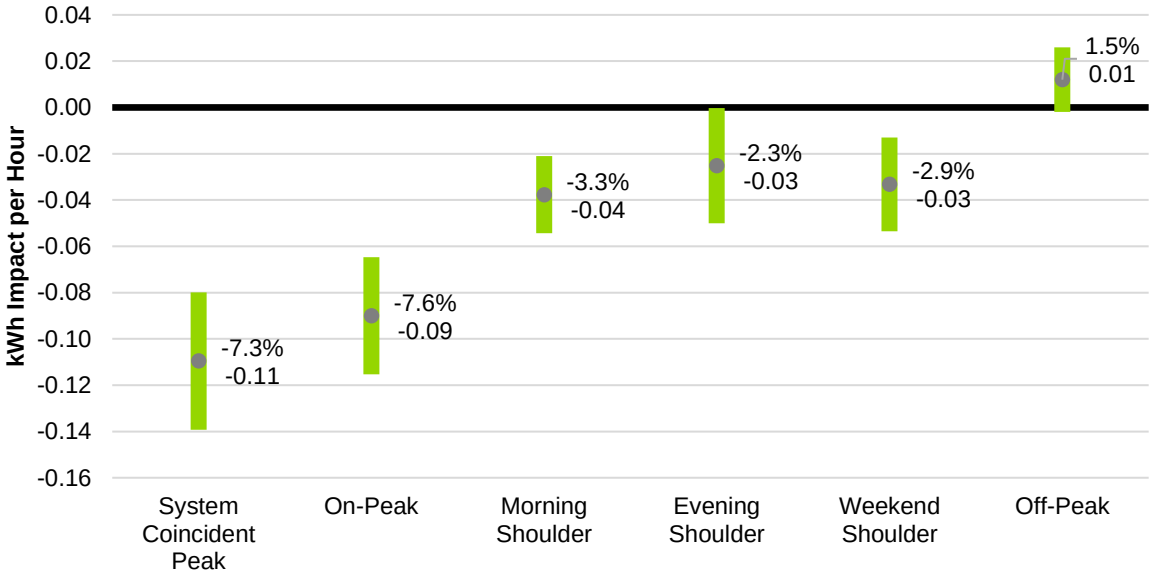


Reductions in the summer system coincident peak consumption (7.3%) are similar to those found for the summer on-peak period of the RE-TOU rate.

Energy Consumption Impacts. Many participants on RE-TOU responded to the rate structure by changing their usage in each of the pricing periods. For the shoulder period impact analysis, the period was divided into three parts (morning shoulder, evening shoulder, and weekend shoulder) to identify how customers' responses to the shoulder period varied based on the part of day or type of day in the shoulder period.

During the summer, non-solar customers are reduced consumption during the on-peak and shoulder periods (by 7.6% and 3%, respectively) but increased consumption during the off-peak period (Figure 4). This behavior is consistent with the RE-TOU rate structure as it provides participants with a financial incentive to shift consumption from the higher-priced on-peak period to the shoulder period and to the lowest-priced off-peak period. Winter impacts are similar but with less indication of significant reductions during shoulder periods. Impacts for solar customers are similar to those of non-solar customers.

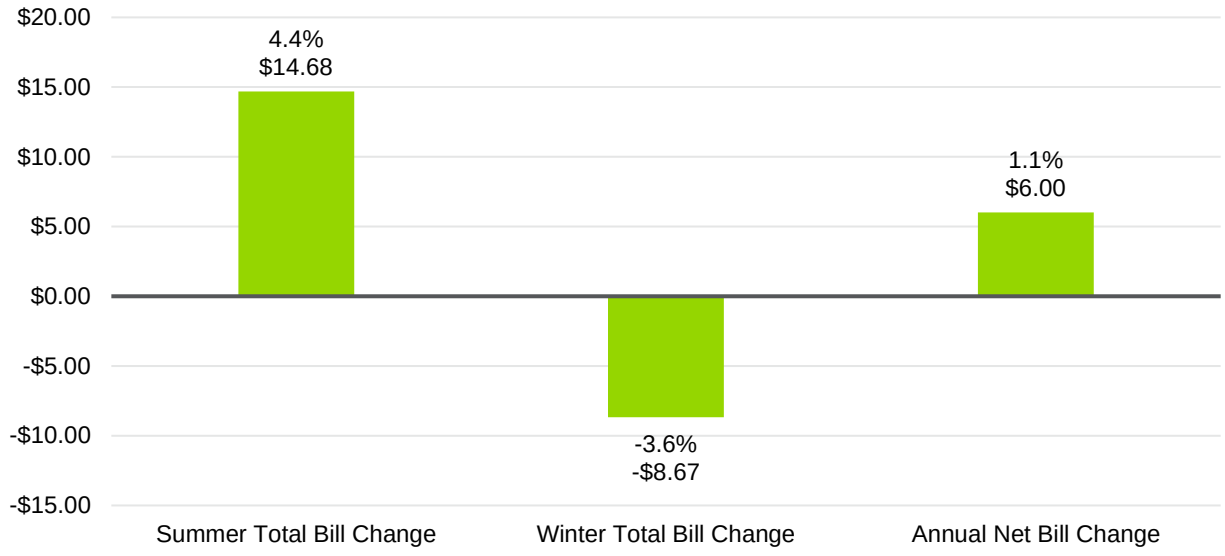
Figure 4. Summer RE-TOU Energy Consumption Impacts - All Non-Solar



Bill impacts. Estimates of the impacts on consumption in each rate period were combined with the applicable prices to estimate the impact on the average participant's bill relative to what it would have been on the default residential (R) rate, accounting for both the change in rate structure[6] and the estimated change in consumption. As shown in Figure 5, the cumulative annual bill for the average non-solar RE-TOU participant increases by 1.1% or $6.00. Bill increases during the summer are partially offset by winter bill decreases and the outcome is close to being revenue neutral for the average customer's usage (681 kWh average summer monthly usage and 555 kWh average winter monthly usage).

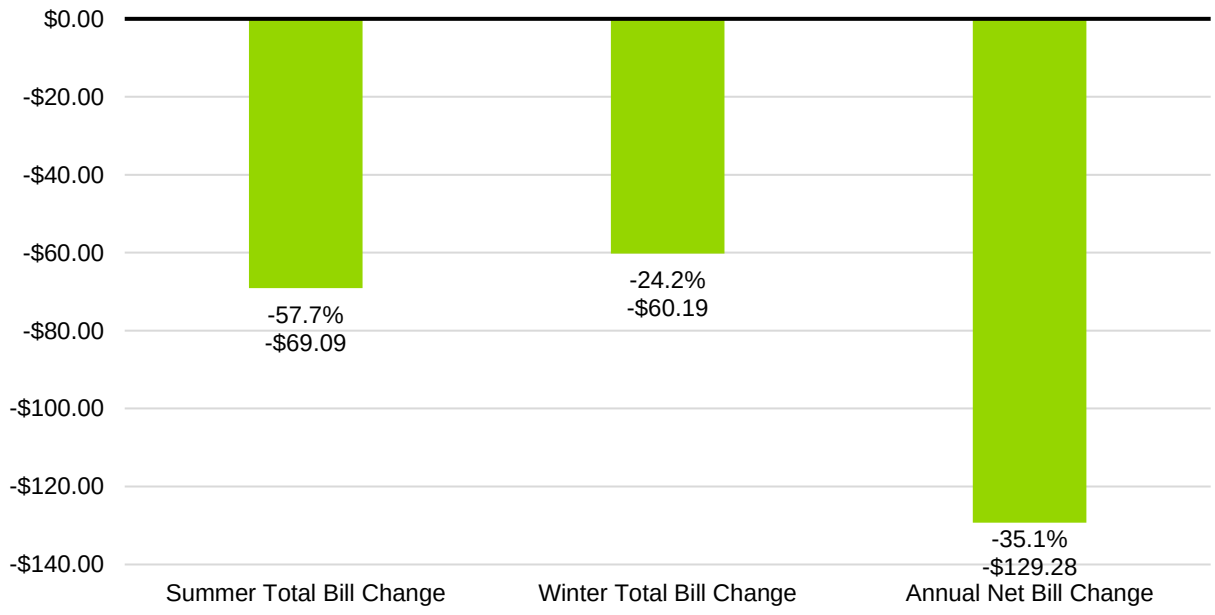
[6] See Section 3.3 for further details on the rate structure.

Figure 5. RE-TOU Bill Impacts by Season and Annual – Non-Solar



In contrast to the modest bill impact for non-solar customers, Figure 6 shows a much larger summer bill reduction and an annual bill reduction of $129.28, or nearly 35% for the average RE-TOU participant with solar[7].

Figure 6. RE-TOU Bill Impacts by Season and Annual – Solar



[7] The bill impacts include the value of solar production at the time of generation.

Customer Research Findings

Evaluation of customer participation in the RE-TOU trial rate consisted of two elements:

- **Participant surveys**, which are themselves broken into three online survey efforts conducted post-enrollment, after the first cooling season, and upon a customer dropping out of the trial rate
- **A statistical regression analysis of participants who withdraw from the TOU rate** and switch back to the R rate.

The customer research findings suggest that customers who enroll are motivated to make behavioral changes to reduce their bills, but that many are not sure which behaviors have the largest impact and are not able to discern whether their actions are making a difference in their bills. Specific findings of the customer research efforts include the following:

- **Motivation to enroll.** *When considering enrollment, customers typically enroll in the TOU rate either to save money, have more control over their energy bill, or to conserve energy.*
- **Characteristics of participants.** Customers who enrolled in the TOU rate may best be described as *motivated to save, actively engaged, and somewhat uncertain about their achievements to date*. RE-TOU participants are highly motivated by potential bill savings and actively engaged in consulting informational resources and changing their energy use patterns; however, they are a bit uncertain about the impact that their actions are having on their energy consumption and bills.
- **Behavior change.** *Despite knowledge limitations, the TOU rate has been highly successful at motivating most customers to change their behaviors, with 93% of customers reporting having taken action to shift when they use electricity.* Customers are less likely to purchase new technologies than shift their usage patterns, with only 32% of customers indicating they had purchased one or more technologies since enrolling.
- **Attrition.** Most participants have chosen to remain on the TOU rate once they have enrolled, with 78% of all participants remaining on the rate between March 2017 and September 2018, excluding customers who moved during the trial period.[8]
- **Drivers of participant dropouts.** *The two primary influences on the likelihood of a participant to drop out of the TOU rate are 1) changes in monthly bills (relative to what it would have been on the R rate) and 2) length of time on the RE-TOU rate prior to dropping out*. For every dollar increase in a customer's bill relative to the R rate, they are roughly 4% *more likely* to drop out; countering this influence, every month of participation in the TOU rate makes a customer approximately 35% *less likely* to drop out.

[8] Customers deciding to move during the trial period is the most common reason participants left the TOU rate (25% of all participants, 61% of total drop-outs). Including customers who move, 59% of all participants remained on the rate between March 2017 and September 2018.

1. INTRODUCTION

Xcel Energy and the other Parties to the 2016 Settlement in Proceeding No. 16AL-0048E (Settlement) agreed to test two new voluntary residential time varying rate schedules in Colorado:

1. Residential Energy Time-Of-Use Service Schedule ("RE-TOU" or "TOU")
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The intent of the Settlement is to provide an opportunity for: (1) adequate educational materials to be prepared; (2) testing the impact of the trial's RE-TOU rate differentials and pricing time periods; and, (3) testing the trial's Schedule RE-TOU rate with existing and new Demand Side Management or energy efficiency tools.

The Settlement Agreement approved the two rates – the TOU "trial" and the TDR "pilot" – for customers who volunteer to enroll and receive a "bridge meter" that allows for measurement and billing of customers' monthly electric usage on a 15-minute basis. Voluntary participants have the right to withdraw (or "opt out") from the rate through the end of their sixth billing cycle. Low-income customers are included in the trial but are subject to a "hold harmless" provision where participants pay the lower of their monthly bills determined under the Schedule Residential rate ("R rate") or the applicable trial rate.

Per the Settlement Agreement, Xcel Energy is expected to file an Advice Letter on December 2, 2019, which will include results from the RE-TOU trial. As specified in the Settlement, the Advice Letter is intended to inform whether the RE-TOU rate requires modification prior to implementing the final time-varied rate for all residential customers, whether the rate is working well as originally implemented, or whether it should be discontinued.

This Evaluation Report addresses Navigant's evaluation of the energy and bill impacts and of customer experience from participation only in the RE-TOU trial rate,[9] from the earliest recruitment in March 2017 through September 2018. Navigant will prepare a second evaluation report covering October 2018 through September 2019, and a Final Evaluation Report covering all study participants through December 2019.

1.1 Goals of the Study

Consistent with the Study and Evaluation Plan (the "Evaluation Plan") filed by Xcel Energy on November 15, 2016, the overarching goals of this evaluation include the following:

- Quantify the relative impacts of the RE-TOU rate on customers' bills as compared to the current Residential rate (R rate);
- Assess how various customer groups within the residential class change their consumption behavior in response to the proposed rates. In particular, to understand how their energy use and peak consumption change, particularly during summer peak periods;
- Attempt to understand with statistical significance how these rates affect targeted population segments; specifically, low income, seniors (65 years of age or older), renters in multifamily

[9] In accordance with the RE-TOU and RD-TDR Measurement & Verification Scope of Work, Navigant's evaluation comprises two separate studies and reports; the evaluation does not compare the two tested rates.

buildings, and those with end-use technologies such as solar, electric vehicles, and smart thermostats;

- Determine participating customer demographics, major household appliances, energy use patterns and other behavioral changes, and technologies adopted to help reduce or shift energy use/bill costs and how these characteristics potentially impact the efficacy of the trial and pilot rates

This report describes the results of Navigant's evaluation through September 2018. The report summarizes impact results for participants' energy consumption, bill impacts, and includes customer research survey findings across the course of participation as described in Table 1-1.

Table 1-1. Evaluation Research Objectives

Research Area	Study Objectives
Impact Analysis	• Energy Consumption impacts, including overall on-peak consumption impacts and system coincident peak consumption impacts • Bill impacts, including aggregate seasonal bill impacts
Customer Research	• Motivation to enroll • Characteristics of participants • Customer understanding of the TOU rate and monthly energy bills • Energy use patterns and behavior change • Drivers of participant dropouts

1.2 Rate Structure

Table 1-2 presents the rate structure for RE-TOU, including the pricing periods, applicable prices during each period, and fixed charges. The prices under this rate are based on three periods and are referred to as off-peak, shoulder, and on-peak. The prices vary between summer and winter seasons,[10] but the hours for each period remain the same all year. This contrasts with the rate structure for R where summer is an inclining block structure (first 500 kWh of consumption is $0.10/kWh and $0.14/kWh for consumption over 500 kWh) and a flat rate during the winter ($0.10/kWh).

Table 1-2. RE-TOU Rate Structure

RE-TOU	Off-Peak	Shoulder	On-Peak	Service and Facility Charge
Hours	9 p.m.–9 a.m.	9 a.m.-2 p.m., 6 p.m.-9 p.m. on weekdays, 9 a.m.-9 p.m. on weekends	2 p.m.-6 p.m. on weekdays	
Summer	$0.08/kWh	$0.13/kWh	$0.18/kWh	$5.41
Winter	$0.08/kWh	$0.10/kWh	$0.14/kWh	$5.41

[10] Costs are rounded and included appropriate adjustments. The summer season includes June, July, August, and September. The winter season includes January, February, March, April, May, October, November, and December.

1.3 Enrollment Summary

Recruitment for the RE-TOU trial began in March 2017 and continued through the summer of 2018. Xcel Energy implemented a variety of marketing tactics to increase awareness and enrollments in the trial, including but not limited to: direct mail, email, digital advertising, bill inserts, new mover outreach, and social media. Xcel Energy tested numerous tactics and compared outcomes against industry and utility benchmarks to identify effective strategies for increasing enrollment. Over 10,000 customers had enrolled as of summer 2018, had participated in the trial for any amount of time, and were included in the evaluation of the trial—including the one-third of enrollees who were randomly assigned to be in a control group. Figure 1-1 shows the number of participants and control group customers by customer segment. Due to rolling enrollment and attrition, the number of participants varied throughout the evaluation period. Figure 1-1 shows the number of participants who moved or opted out as well as the number of control group customers who moved.

Figure 1-1. RE-TOU Enrollment

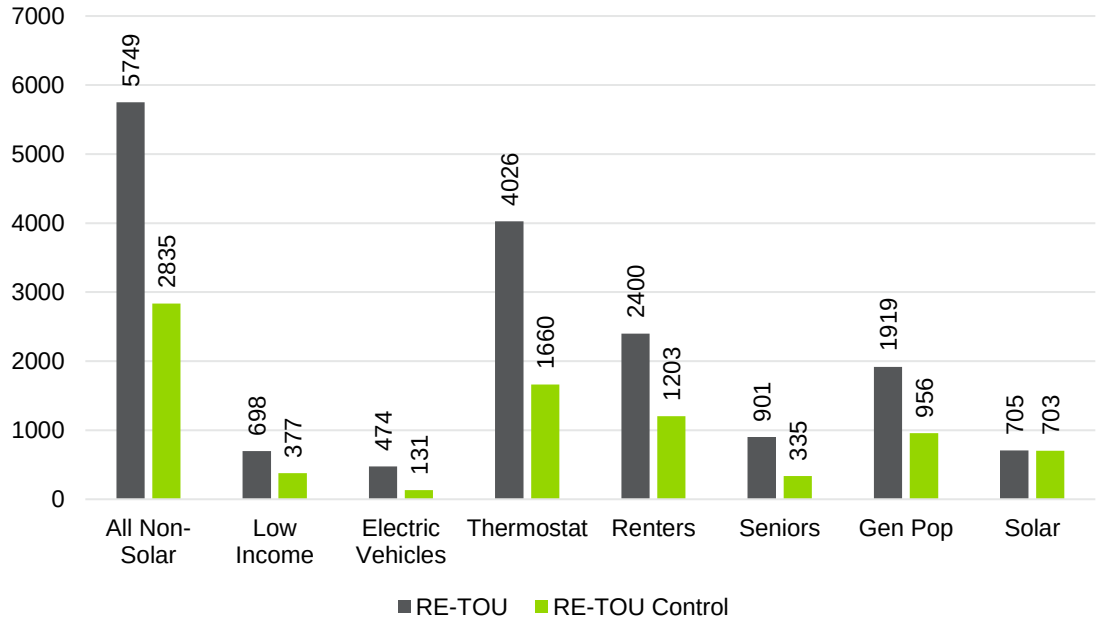
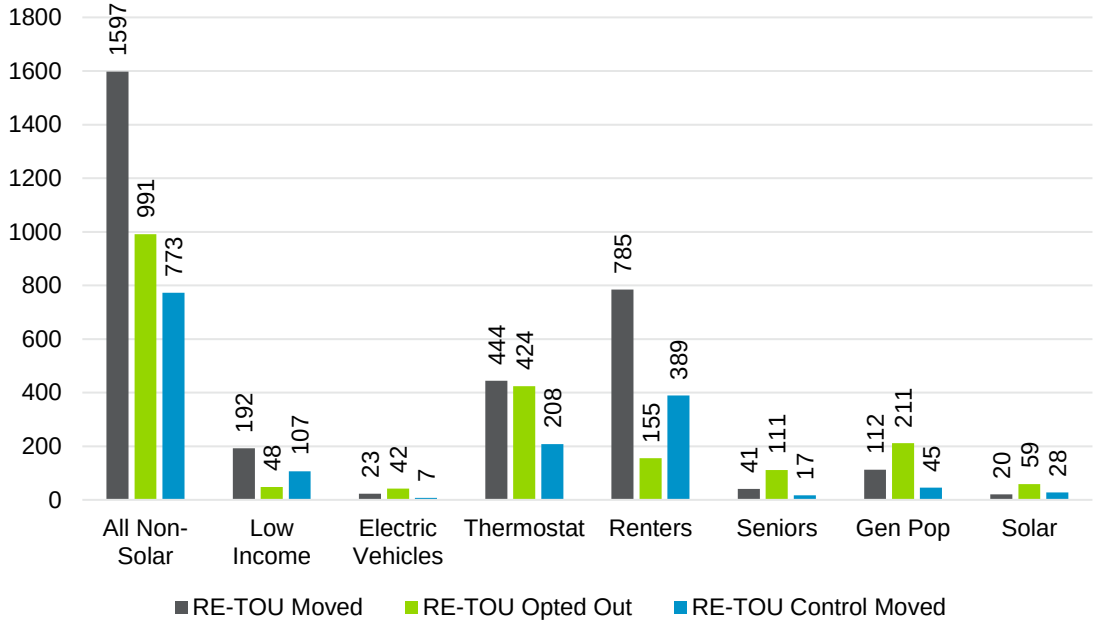


Figure 1-2. RE-TOU Attrition



1.4 Intake Survey Data

Xcel Energy collected essential customer information during the enrollment process from all customers volunteering for the TOU trial using an intake survey.[11] The survey included customer contact information, household characteristics, appliance and technology saturation, behavioral characteristics, and demographics. This information was used to identify the applicable customer segment for each customer enrolled and provide customer characteristics for use in the impact analysis. A copy of the Customer Intake Survey is included in Appendix F.

The remainder of this evaluation report reviews the methods and findings, organized as follows:

Section 2: **Methodology** addressing the experiment design, impact analysis, and customer research;

Section 3: **Impact analysis** findings

Section 4: **Customer research** findings

[11] This did not include the control group customers with solar since the controls were matched from non-participants that did not go through the enrollment process.

2. METHODOLOGY

The methods employed for this RE-TOU rate trial evaluation trace back to the measurement and verification plan upon which the study is based. The plan encompasses sample design, identification of test versus control groups, and the data sources used to inform them. The methods related to the actual evaluation activities pertain to impact analysis and customer research. Each of these major elements is described below, organized as follows:

- Experimental Design and Sample Management
- Impact Analysis Methods
- Customer Research Methods

2.1 Experimental Design and Sample Management

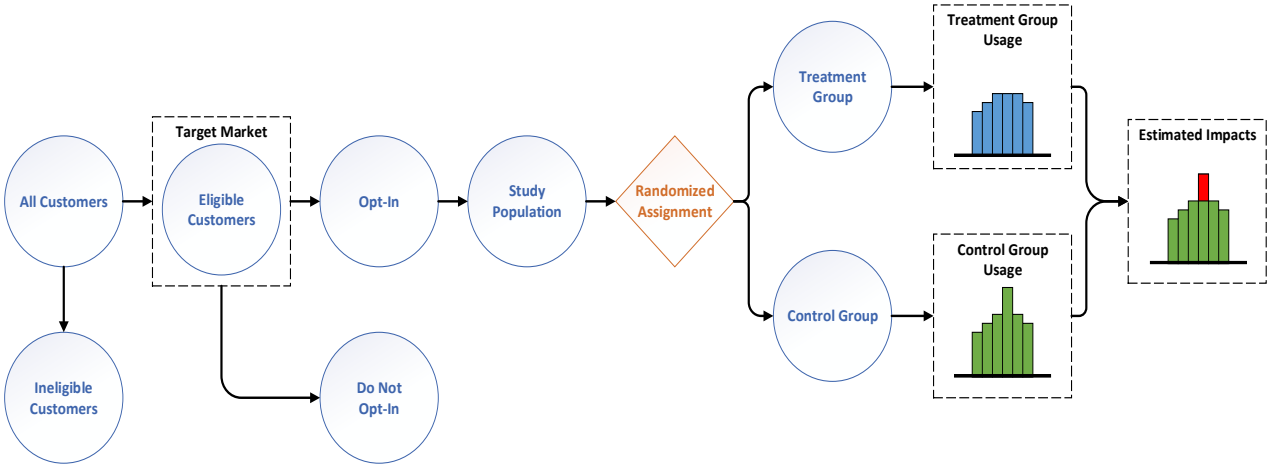
This section identifies the experimental design upon which the RE-TOU trial is based and it describes various elements of the evaluation approach and data, including:

- Sample Design
- Randomized Control Trial (RCT) Validation
- Matched Solar Control Group
- Legacy Solar Installation Production Data

It is well understood in program evaluation literature that RCTs are the gold standard for estimating treatment effects.[12] For customers without solar, an opt-in RCT was implemented for the RE-TOU trial—illustrated in Figure 2-1. This approach began with the identification of a target market of eligible customers. In this case, residential customers on the default R rate were the target market. Then those customers were recruited to opt-in to the rate of their choosing study and become part of the study population. After a customer had enrolled in the study, two-thirds were randomly assigned to be in the treatment group (on the RE-TOU rate) and one-third was randomly assigned to the control group (remaining on the R rate). Customers receiving their time-varying (RE-TOU) rate, as well as those that were chosen to be on the control group, received a new bridge meter so that consumption data could be captured.

[12] Donald B. Rubin, "The Design Versus the Analysis of Observational Studies for Causal Effects: Parallels with the Design of Randomized Trials," Statistics in Medicine 26(1): 20-37 (2007).

Figure 2-1. Opt-In RCT Experimental Design



Source: Adapted from US DOE Uniform Methods Project.

Ideally, the outcome of an RCT is a balanced sample where there are no observable or unobservable differences between the treatment and control groups during the pre-enrollment period or invariable characteristics.[13] However, from a practical standpoint, there are inevitably impediments to drawing perfect random samples as they would require a perfectly defined population and a perfect sampling frame. In the RE-TOU trial, imbalances occurred due to customers with unique characteristics (e.g., extremely high consumption) being randomly assigned to the treatment or control group without a similar customer in the opposing group. These imbalances were identified during a verification of the RCT and addressed through the removal of outliers or the inclusion of variables in regression analysis to control for differences in observable characteristics.

Solar customers were not subject to the random assignments of the RCT and all interested customers would be placed on the RE-TOU rate. Solar participants were matched to non-participating solar customers based on PV system size and pre-enrollment energy usage. This approach created a matched control group for which the distribution of the independent variables (or covariates) used in regression analysis for solar customers is almost identical to that of the treatment group in the pre-enrollment timeframe. This approach is an “as if” RCT because the two groups look as if they were formed by random assignment.

2.1.1 Sample Design

To understand how the rate impacts specific population segments, customers were actively recruited and identified as being part of the following segments[14]:

- Low Income
- Solar
- Electric Vehicles
- Smart Thermostats

[13] An RCT also has the benefit of minimizing self-selection bias as customers are randomly assigned to either the treatment or control group.

[14] All segments were self-reported except for Low Income (income qualified) and Solar.

- Renters
- Senior Citizens (65 years of age or older)
- All Others[15]

In the Evaluation Plan, the assignment of segments was based on a hierarchy[16] where customers were exclusively assigned to the highest priority[17] applicable segment. This approach reduced the number of customers that were assigned to segments lower in the hierarchy. For the impact analysis, Navigant allocated customers to all relevant segments that they represent based on information collected from the enrollment survey. This increased the number of customers included in the impact analysis for the segments lower in the hierarchy (e.g., Renters, Seniors). This potentially improves the external validity of impact estimates due to the inclusion of a range of overlapping characteristics that may more closely reflect the overall population with the specified characteristic.

2.1.2 RCT Validation

As previously mentioned, there are always impediments to drawing perfect, completely random samples. Validating the randomization of RCT assignments was an important step to ensure the validity of subsequent analysis. To accomplish the RCT validation, Navigant compared the energy usage and observable characteristics of the treatment and control groups during the period prior to the start of the trial. This analysis identified minor imbalances due to high usage and low usage outliers that were subsequently excluded from the impact analysis. Pre-enrollment consumption data was not available for participants that enrolled in the study when starting electric service, so the RCT validation analysis identified outliers in the post-enrollment consumption data as an alternative approach to identifying imbalances in the level of monthly consumption between treatment and control groups.

2.1.3 Matched Solar Control Group

As described above, Navigant developed a matched control group for participants with rooftop solar based on PV system size and pre-enrollment energy usage. The purpose of the matched control group was to provide insight on what the counterfactual consumption would have been for the participants had they not enrolled in the trial against which energy and peak consumption savings can be measured.

Figure 2-2 illustrates the solar customer matching process. The goal of the matching process was to select a solar non-participant with a very similar consumption pattern prior to enrollment. The matching was carried out in two stages using consumption data for two different time frames to ensure accuracy as well as consistency over time:

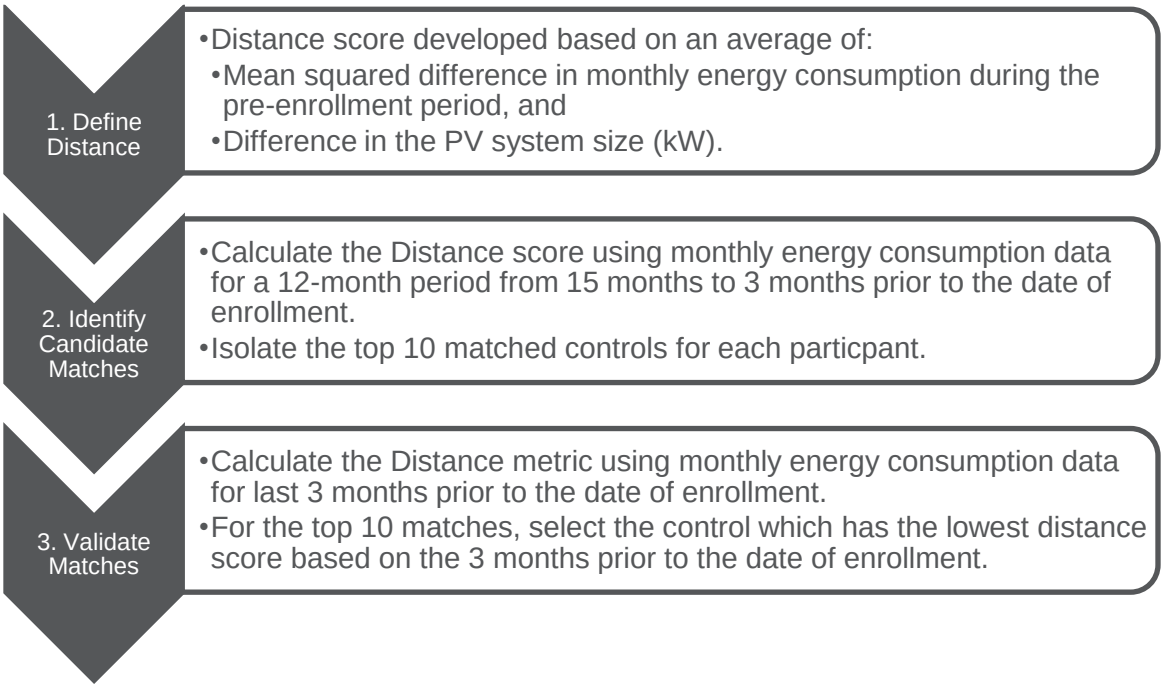
1. 1-year period beginning 15 months prior to enrollment up to 3 months prior to enrollment to determine which control group customers track each participants usage, and
2. 3-month period beginning 3 months prior to enrollment up to the date of enrollment to see which of the top 10 matches are most consistent over time.

[15] The All Others segment included customers that did not fall into the other segments and represented the absence of those characteristics.

[16] The hierarchy is as follows: (i) Solar, (ii) Low Income, (iii) Electric Vehicles, (iv) Smart Thermostats, (v) Renters, (vi) Seniors, (vii) General Population.

[17] For non-solar customers, the sample plan hierarchy was in the following order from highest to lowest: Low Income, Electric Vehicles, Smart Thermostats, Renters, Senior Citizens, and All Others.

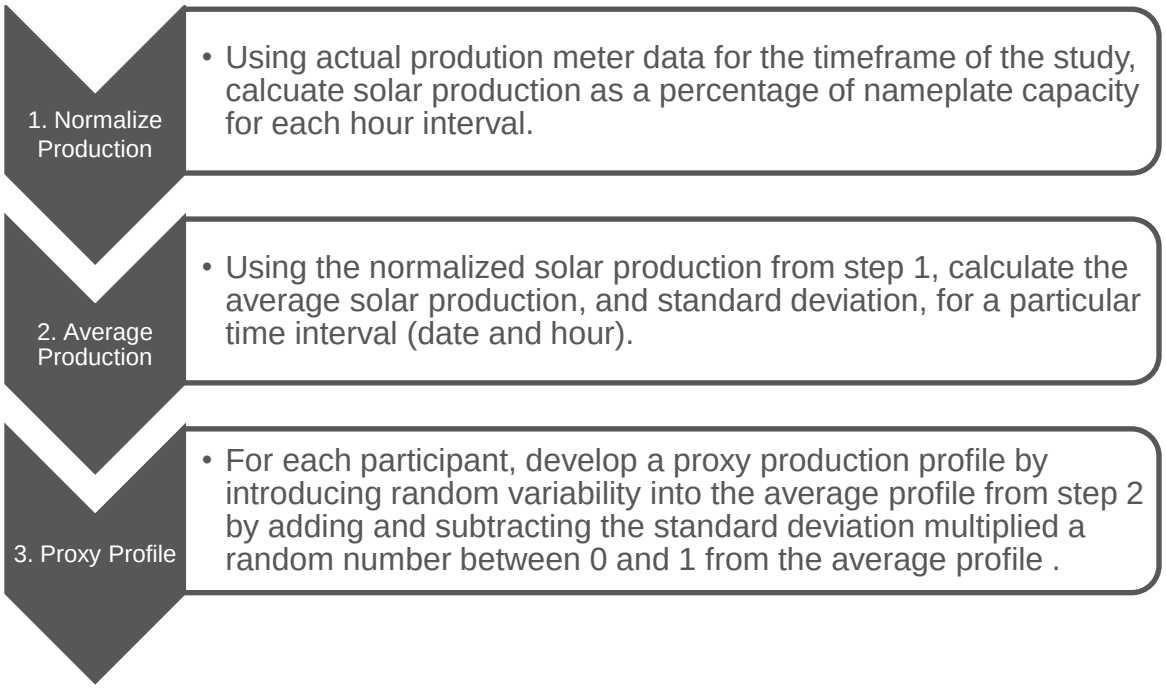
Figure 2-2. Solar Customer Matching Process



Source: Navigant

A deeper examination into the solar customers revealed that some customers were missing production meter data, which is required to determine the customer's total gross consumption. Further discussions with the Xcel Energy project team revealed that these were legacy solar customers who had installed solar panels prior to January 1, 2015 and were not required to have a production meter. To keep these customers in the analysis, Navigant developed proxy production profiles using available production meter data from the remaining customers. Figure 2-3 illustrates the process Navigant deployed to develop the proxy solar production profile.

Figure 2-3. Proxy Solar Production Profile Process



Source: Navigant

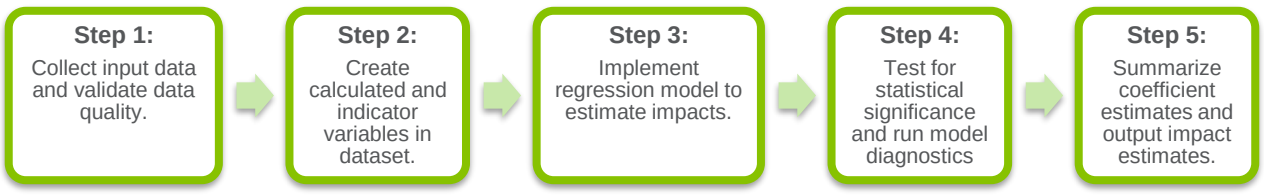
2.2 Impact Analysis Methods

To understand the changes in consumption of customers on the RE-TOU rate, a series of regression models were used to identify impacts and provide insights into changes in customer usage behavior. Those changes in usage behavior were combined with the TOU rate structure to estimate bill impacts. Two separate models were run to assess impacts on the following:

- kWh, consumption impacts (on-peak, shoulder, and off-peak periods)
- kWh, system coincident peak hour consumption impacts

Navigant followed the impact analysis process shown in Figure 2-4.

Figure 2-4. Impact Analysis Process



This process began (Step 1) with the collection and validation of all data necessary for the regression analysis to ensure that that the output of the analysis is not affected by missing data, erroneous values, or

outliers.[18] After consolidating and validating all available information, indicator variables were defined and appended to the dataset (Step 2). The indicator variables were used to identify assigned rates, pricing periods, enrollment status, customer segments, and temporal factors. After the necessary variables were appended to the dataset, a series of regression models were run (Step 3) and tested for statistical significance/robustness (Step 4). Finally, the coefficient estimates were summarized (Step 5) to provide impact estimates and output for further analysis and reporting.

The remainder of this section describes the regression models used to estimate the average peak consumption and energy impacts.

2.2.1 Peak Impacts Methodology

This section presents the regression models used for the non-solar and solar customers, respectively. The fundamental approach used for both groups is the same in principle; however, there are subtle differences in the exact variables used to achieve the outcome. This is driven by the fact that a matched control group was used for the solar customers and since they did not partake in the recruit and deny RCT structure, they did not fill out an enrollment survey. Hence, the various household characteristics that were obtained from the intake surveys were not available for solar control group customers.

2.2.1.1 Non-Solar

An individual customer's peak consumption need not necessarily be coincident with that of system peak hour. Hence, a separate model was estimated using only the system coincident peak hours. By separately modeling the system peak hours, the model will provide insights into how the evaluated rates impact consumption during the conditions that result in system peak demands (daily and annual peak hours).

Equation 2-1. Non-Solar Peak Consumption Impact Regression Equation

$$kWh_{i,t} = \beta_1 * Participant_{i,t} + \beta_2 * Monthly\ kWh_{i,t} + \beta_3 * Work\ from\ Home_{i,t} + \beta_4 * Home\ Type_{i,t} + \beta_5 * OwnRent_{i,t} + \beta_6 * \sum Month_{i,t} + \varepsilon_{i,t}$$

The dependent variable is the individual customer's consumption during the system coincident peak hour. The participant indicator variable is intended to capture the differences in consumption patterns for the participants during the system coincident peak hours compared to the control group. The other variables are meant to control for the individual customer's specific characteristics.

[18] Outliers were identified through a statistical analysis of each variable. Observations that are found to be outside the reasonable range of values for the population that is to be represented were flagged as outliers and removed from the regression analysis.

Table 2-1. Non-Solar System Coincident Peak Consumption Model Regression Variables

Variable	Definition
$kWh_{i,t}$	kWh consumption of customer *i* during system coincident peak hour in month *t*
$Participant_{i,t}$	Indicator variable that takes on a value of one when customer *i* is a participant on the designated rate
$Monthly\ kWh_{i,t}$	Total monthly consumption for customer *i* during month *t*
$Work\ from\ Home_{i,t}$	Indicator variable that takes on a value of one when customer *i* is working from home
$Home\ Type_{i,t}$	A series of indicator variables that take on a value of one when customer *i* has that particular home type
$OwnRent_{i,t}$	A series of indicator variables that take on a value of one when customer *i* either owns or rents their current residence
$Month_{i,t}$	A series of indicator variables that take on a value of one when customer *I*'s consumption is for month *t*
$\varepsilon_{i,t}$	Error for participant *i* in month *t*

2.2.1.2 Solar

The fundamental methodology for solar customers is the same as for non-solar customers. The main difference is that the other household characteristics (work from home, home type, and own rent) are replaced by the nameplate capacity.

Equation 2-2. Solar Customer Peak Consumption Impact Regression Equation

$$kWh_{i,t} = \beta_1 * Participant_{i,t} + \beta_2 * Monthly\ kWh_{i,t} + \beta_3 * Solar\ Nameplate\ Capacity_{i,t} + \beta_4 * \sum Month_{i,t} + \varepsilon_{i,t}$$

The dependent variable is the individual consumption during the system coincident peak hour. The participant indicator variable is intended to capture the differences in consumption patterns for the participants during the system coincident peak hours compared to the control group. The nameplate variable is meant to control for the individual specific characteristics of the solar PV system.

Table 2-2. Solar System Coincident Peak Consumption Model Regression Variables

Variable	Definition
$kWh_{i,t}$	Total gross kWh consumption of customer *i* during system coincident peak hour in month *t*
$Participant_{i,t}$	Indicator variable that takes on a value of one when customer *i* is a participant on the designated rate
$Monthly\ kWh_{i,t}$	Total gross monthly consumption for customer *i* during month *t*
$Solar\ Nameplate\ Capacity_{i,t}$	Solar PV nameplate capacity for customer *i*
$Month_{i,t}$	A series of indicator variables that take on a value of one when customer *I*'s consumption is for month *t*
$\varepsilon_{i,t}$	Error for participant *i* in month *t*

2.2.2 Energy Consumption Impacts Methodology

Like the on-peak impacts, the fundamental approach used for the energy consumption impacts of solar and non-solar customers is the same in principle; however, there are differences in the exact variables used to achieve the outcome and this is due a matched control group being used for the solar control customers. Since they did not partake in the recruit and deny RCT structure, they did not fill out an enrollment survey and the various household characteristics that were used for the non-solar regressions were not available for solar control group customers.

2.2.2.1 Non-Solar

The primary objective is twofold, to estimate:

1. The overall conservation of energy, and
2. Shifts in energy consumption from peak periods to off-peak or shoulder periods.

Equation 2-3. Non-Solar Energy Impact Regression Equation

$$kWh_{i,t} = \beta_0 \cdot \sum_{j=1}^{24} Hr_j + \beta_1 \cdot Weekday + \beta_2 \cdot Participant \cdot OnPeak + \beta_3 \cdot Participant \cdot ShoulderMorn + \beta_4 \cdot Participant \cdot ShoulderEve + \beta_5 \cdot Participant \cdot ShoulderWeekend + \beta_6 \cdot Participant \cdot OffPeak + \beta_7 \cdot OnPeak + \beta_8 \cdot ShoulderMorn + \beta_9 \cdot ShoulderEve + \beta_{10} \cdot ShoulderWeekend + \beta_{11} \cdot CDH65 + \beta_{12} \cdot Education + \beta_{13} \cdot WorkFromHome + \beta_{14} \cdot HomeType + \beta_{15} \cdot Sqft + \beta_{16} \cdot RentOwn + \beta_{17} \cdot OccupantsUnder10 + \beta_{18} \cdot Occupants11to18 + \beta_{19} \cdot Occupants19to30 + \beta_{20} \cdot Occupants31to61 + \beta_{21} \cdot OccupantsOver62 + \varepsilon$$

The dependent variable is the hourly consumption for each datetime (day and hour combination) period in the analysis timeframe. The participant indicator variable interacted (multiplied) with the TOU period indicator variables are intended to capture the shifts in energy consumption patterns for the participants during each of the respective TOU time periods compared to the control group. The other variables are meant to account for the impacts of weather on consumption and control for the individual specific characteristics.

Table 2-3. Non-Solar Energy Model Regression Variables

Variable	Definition
$kWh_{i,t}$	kWh consumption of customer *i* during time period (day and hour combination) *t*
$Participant_{i,t}$	Indicator variable that takes on a value of one when customer *i* is a participant on the designated rate
$Time\ of\ Use\ Periods_{i,t}$	Indicator variable that takes on a value of one when the time period is within the respective TOU period—peak, shoulder morning / evening, off-peak
$HDH\ or\ CDH65_{i,t}$	The cooling or heating degree hours using a threshold of 65^0F
$Work\ from\ Home_{i,t}$	Indicator variable that takes on a value of one when customer *i* is working from home
$Home\ Type_{i,t}$	A series of indicator variables that take on a value of one when customer *i* has that particular home type
$OwnRent_{i,t}$	A series of indicator variables that take on a value of one when customer *i* either owns or rents their current residence
$Number\ of\ Occupants_{i,t}$	A series of variables that count the number of occupants in various age brackets in customer *i*'s home
$\varepsilon_{i,t}$	Error for customer *i* in month *t*

2.2.2.2 Solar

The twofold objective and fundamental methodology for solar customers is the same as for non-solar customers. The main difference is that the other household characteristics (work from home, home type, and own rent) are replaced by the nameplate capacity.

Equation 2-4. Solar Energy Impact Regression Equation

$$kWh_{i,t} = \beta_0 \cdot \sum_{j=1}^{24} Hr_j + \beta_1 \cdot Weekday + \beta_2 \cdot Participant \cdot OnPeak + \beta_3 \cdot Participant \cdot ShoulderMorn + \beta_4 \cdot Participant \cdot ShoulderEve$$
$$+\beta_5 \cdot Participant \cdot ShoulderWeekend + \beta_6 \cdot Participant \cdot OffPeak + \beta_7 \cdot OnPeak + \beta_8 \cdot ShoulderMorn$$
$$+\beta_9 \cdot ShoulderEve + \beta_{10} \cdot ShoulderWeekend + \beta_{11} \cdot CDH\,65 + \beta_{12} \cdot SolarNameplate + \varepsilon$$

The dependent variable is the hourly consumption for each datetime (day and hour combination) period in the analysis timeframe. The participant indicator variable interacted (multiplied) with the TOU period indicator variables are intended to capture the shifts in energy consumption patterns for the participants during each of the respective TOU time periods compared to the control group. The nameplate variable is meant to control for the individual specific characteristics of the solar PV system.

Table 2-4. Solar Energy Model Regression Variables

Variable	Definition
$kWh_{i,t}$	Total gross kWh consumption of customer *i* during time period (day and hour combination) *t*
$Participant_{i,t}$	Indicator variable that takes on a value of one when customer *i* is a participant on the designated rate
$Time\ of\ Use\ Periods_{i,t}$	Indicator variable that takes on a value of one when the time period is within the respective TOU period—peak, shoulder morning/evening, off-peak
$HDH\ or\ CDH65_{i,t}$	The cooling or heating degree hours using a threshold of 65^0F
$Solar\ Nameplate\ Capacity_{i,t}$	Solar PV nameplate capacity for customer *i*
$\varepsilon_{i,t}$	Error for customer *i* in month *t*

2.3 Customer Research Methods

Evaluation of customer participation in the RE-TOU trial is consisted of two elements:

- **Participant surveys**, which are themselves broken into three online survey efforts conducted post-enrollment, after the first cooling season, and upon a customer dropping out of the trial
- **A statistical regression analysis of participants who withdraw from the TOU rate** and switch back to the R rate.

2.3.1 Participant Survey Research

Participant survey research consisted primarily of three survey efforts. These surveys were conducted online shortly after enrollment, after the first cooling season, and, if applicable, upon a customer withdrawing from the rate. The varying objectives of each survey effort are identified in Table 2-5.

Table 2-5. Participant Research Surveys Conducted to Date

Wave #	Survey	Objectives
1	Post-Enrollment Survey	• Marketing effectiveness • Participant understanding • Enrollment experience
2	Post First Cooling Season Survey	• Understanding of bill • Behavior changes • Motivations and perceived success in achieving goals • Support for hypothetical changes to the TOU rate
N/A	Dropout Survey	• Reasons for dropping out • Behavior changes • Recommendations

Wave 1 refers to post-enrollment surveys fielded every few months as new customers enrolled. Wave 2 surveys were fielded in two rounds shortly following a customer's first cooling season, in fall of either 2017 or 2018 depending on the time of enrollment. A Wave 3 survey will be fielded in 2019 toward the conclusion of the trial. Dropout survey respondents are participants who enrolled in the new rate and subsequently opted out. (Section 4.3.2)

Each of the three surveys conducted to date are described in more detail below.[19]

2.3.1.1 Wave 1 – Post-Enrollment Survey

Navigant conducted seven rounds of the post-enrollment survey[20] with residential TOU participants shortly after enrollment in the TOU trial (i.e., Wave 1 survey). The purpose of the Wave 1 survey was to:

1. Gather key data about TOU participants near the time of enrollment including reasons for enrolling, perceptions, expectations, and baseline behavior
2. Assess the effectiveness of marketing and messaging of the TOU rate
3. Measure customer understanding of the rate components, and
4. Assess customer experience with the enrollment process.

Navigant issued the Wave 1 survey in seven rounds, from July 2017 through June 2018, to gather information about customer understanding and enrollment experience prior to significant exposure to the new rate. Survey eligibility was limited to those TOU rate participants who had enrolled during the 5-week period prior to the survey, and all eligible participants were invited to take the survey. In all, 2,492

[19] Navigant offered incentives to increase participation in the customer surveys. Navigant offered a 'reciprocity incentive' for rounds 1-3 of the Wave 1 survey. The reciprocity incentive involved offering a $5 gift card as a gift, with no requirement for completion of the survey. For the remaining rounds of Wave 1 survey and for all rounds of the Wave 2 and Dropout survey, Navigant implemented a 'sweepstakes incentive' where completion of the survey entered customers into a drawing where a pre-defined number of respondents were randomly selected to be awarded a monetary prize in the form of a gift card.

[20] Appendix A provides the full survey.

participants were invited to take the Wave 1 survey, and Navigant obtained 1,196 survey completes for an overall response rate of 48% (Table 2-6).

Table 2-6. Wave 1 Post-Enrollment Survey Participation

Round	Timing	Survey Completes	Response Rate
1	July 2017	88	50%
2	Aug 2017	81	41%
3	Sept 2017	107	40%
4	Nov 2017	264	46%
5	Apr 2018	235	57%
6	May 2018	93	44%
7	June 2018	328	51%
Total		**1,196**	**48%**

2.3.1.2 Wave 2 – Post-First Cooling-Season Survey

The Wave 2 survey is an online survey designed to gather information about customer perceptions and experiences following participants' first summer of enrollment in the TOU rate. The primary topics explored by this survey include:

- How well participants understand their bill
- Changes in energy use behaviors since signing up for the TOU rate
- Customer success in achieving enrollment goals
- Customer perceptions and support for hypothetical changes to the TOU rate

As shown in Table 2-7 survey data were collected by means of two separate rounds of the Wave 2 survey. The first round was fielded in December 2017. Participants were deemed eligible to participate in the first round if they had enrolled in the TOU rate before August 1, 2017. All eligible TOU participants (1,337) were invited to participate in the survey. The survey gathered data from a total of 535 participants at a response rate of 40%. The second round of the survey was fielded in October 2018 and included participants who enrolled between September 1, 2017 and August 1, 2018. All eligible TOU participants for 5 of the 7 segments (solar, EV, seniors, smart thermostat and low income) were invited to participate. A sample of participants in two customer segments (renters and general population) were invited to participate. A random sample of 460 participants were selected from each of these two groups, representing 56% of eligible participants in the renter segment and 42% of the eligible participants in the general population group. Of the 2,305 customers who were invited to participate, 717 customers participated in the second round of the survey at a response rate of 30%. The overall response rate for both rounds of the Wave 2 survey was 34%.

Table 2-7. Wave 2 Post-First Cooling-Season Survey Participation

Round	Timing	Survey Completes	Response Rate
Round 1	Dec 2017	535	40%
Round 2	Oct 2018	717	30%
Total		**1,252**	**34%**

2.3.1.3 Dropout Survey

The dropout survey is an online survey designed to gather insights and recommendations from customers who dropped out of the TOU pricing plan.

The primary topics explored by this survey include:

- Reasons for leaving the plan
- The level of customer engagement and behavior change while on the plan
- The degree to which customers made use of informational resources before leaving the plan
- Customer recommendations for changing the plan

As shown in Table 2-8, survey data were collected by means of three separate rounds of the dropout survey. The dropout survey was fielded periodically with the goal of gathering insights in a timely manner following the customers' decision to leave the TOU rate. The first survey was fielded in January 2018 and included participants who had dropped out between April and December 2017. A second round was fielded in July/August of 2018 targeted at customers who dropped out from January through June 2018, and the final round was fielded in October 2018 for customers who dropped out from July through October 2018. A total of 383 customers participated in the dropout survey for an overall response rate of 28%.

Table 2-8. Dropout Survey Participation

Rounds	Timing	Survey Completes	Response Rate
Round 1	January 2018	147	33%
Round 2	July/August 2018	133	24%
Round 3	October 2018	103	28%
Total		**383**	**28%**

2.3.2 Logistic Regression Modeling of Participant Dropouts

The dropout survey described above is complemented by a statistical analysis (Section 4.3.1) that characterizes the relationship between various independent factors and participants' decision to leave the rate, such as the length of time on the rate and changes in their bill relative to what it would have been on the R rate. Logistic regression is a quantitative analysis technique to explain the relationship between a

dependent binary variable and one or more independent variables. Since a customer's decision to withdraw from the RE-TOU rate is a binary outcome (withdraw/drop out versus remain), logistic regression is an appropriate technique to understand the factors influencing that decision.

The first step in the analysis was to collect and combine data relating to the timing of dropout decisions, energy consumption data, household characteristics, appliance and technology saturation, and demographics for all participants regardless of whether they withdrew from the rate at any point. This data was compiled into a time-series of monthly observations for all participants in the trial that included a binary variable indicating whether the participant dropped out in that month. Data after a customer dropped out and after the participant had been enrolled for more than 6 months was excluded[21].

In preparation for the analysis, the following variables were prepared for use in a logistic regression model:

- Number of months since enrollment
- Monthly bill on R and RE-TOU (based on actual usage)
- Monthly difference between bill amounts on R and RE-TOU
- Cumulative difference between billed amounts on R and RE-TOU since enrollment
- Demographics (Age, Education, Income)
- Household Characteristics (Number of occupants, Home Size)
- Appliance and Technology Saturation (Smart Thermostats, EV Ownership)

Each variable was tested in a step-wise manner in a logistic regression model to determine if there was a relationship with the decision to withdraw from the RE-TOU trial. Only the number of months since enrollment and the difference in the monthly billed amount on RE-TOU versus R demonstrated a statistically significant relationship with a customer's decision to withdraw. Equation 2-5 illustrates the final model specification that was chosen for the logistic regression analysis and Table 2-9 provides an explanation of each variable in the model. The dependent variable is a binary flag for the month when a customer dropped out of the trial. The dependent variable is always 0 for customers that never dropped out. The independent variables are the number of months since enrollment and the difference in the billed amount on RE-TOU and R for the month.

Equation 2-5. Logistic Regression Equation

$$OptOutStatus_{i,t} = \beta_0 + \beta_1 * MonthsSinceEnrollment_{i,t} + \beta_2 * BillDiff_{i,t} + \varepsilon_{i,t}$$

[21] Customers were restricted from to opting-out between 7 and 12 months after enrollment.

Table 2-9. Opt-Out Logistic Regression Model Variables

Variable	Definition
$\boldsymbol{OptOutStatus_{i,t}}$	Enrollment status of customer *i* during month *t. 0 if enrolled and 1 if opted out in that month*
$\boldsymbol{MonthsSinceEnrollment_{i,t}}$	Number of months since enrollment for customer *i* during month *t*
$\boldsymbol{BillDiff_{i,t}}$	Difference in billed amount on RE-TOU versus R for customer *i* during month *t*
$\boldsymbol{\varepsilon_{i,t}}$	Error for participant *i* in month *t*

3. IMPACT ANALYSIS

The evaluation estimated changes in the energy consumption of customers on the RE-TOU rate through a series of regression models (see Section 2.2 for details), the findings from which were subsequently combined with the TOU rate structure to estimate bill impacts. The evaluation team performed the impact analysis across all customers segments and estimated the impacts both in aggregate (for all non-solar customers) as well as broken out by customer segment (including the solar customer segment).

Table 3-1 provides a summary of the impact analysis findings for **non-solar customers**, who in aggregate produced significant reductions in consumption during the on-peak and system coincident peak hours (7.6% reductions in summer months and 3.8% in winter months). Reductions in annual energy consumption were virtually non-existent at 0.2%. For the average non-solar participant, these impacts in combination with the RE-TOU rate structure yield a small increase in summer bills and a small decrease in winter bills, which net out to a 1.1% increase in the average annual cost of electricity.

Table 3-1. Impact Analysis Key Findings for Non-Solar Customers

Season	Average System Coincident Peak Hour Impact		Average Hourly On-Peak Consumption Impact		Average Monthly Consumption Impact		Average Monthly Bill Impact	
Summer Months	-0.11 kWh	-7.3%	-0.09 kWh	-7.6%	-12.6 kWh	-1.8%	$3.67	4.4%
Winter Months	-0.04 kWh	-3.8%	-0.03 kWh	-3.8%	4.1 kWh	0.8%	-$1.08	-1.8%
October 2017 to September 2018	n/a				-1.4 kWh *-17.2 kWh annually*	-0.2%	-$0.50 *-$6.00 annually*	1.1%

The financial motivations and characteristics[22] of **customers with solar**—and the resulting changes in consumption from the RE-TOU rate—are different than customers without solar; consequently, the analysis of their impacts have been separated from non-solar customers. Changes in the value of solar production on RE-TOU and the desire to maximize the return on their investment in solar provide these customers with additional incentives that accompany the RE-TOU rate. Including solar customers in impact analysis with the non-solar customers would provide a misleading estimate of the aggregate impacts across all customer segment. Key impact analysis findings for customers with solar are shown below in Table 3-2.

[22] Customers with solar generally live in larger homes (66% in homes greater than 2,000 square feet) with large electric loads that can be shifted (23% own electric vehicles and 87% have smart thermostats connected to central air conditioning). This provides a greater opportunity to shift consumption than the average non-solar customer that live in relatively smaller homes (27% in homes greater than 2,000 square feet) and have smaller loads that can be shifted (5% own electric vehicles and 59% have smart thermostats connected to central air conditioning).

Table 3-2. Impact Analysis Key Findings for Solar Customers

Season	Average System Coincident Peak Hour Impact		Average Hourly On-Peak Consumption Impact		Average Monthly Consumption Impact		Average Monthly Bill Impact	
Summer Months	-0.40 kWh	-20.5%	-0.37 kWh	-19.3%	-67.9 kWh	-1.8%	-$17.27	-57.7%
Winter Months	-0.09 kWh	-6.0%	-0.17 kWh	-16.3%	-4.30 kWh	-1.7%	-$7.52	-24.2%
October 2017 to September 2018	n/a				-25.51 kWh *-306.12 kWh annually*	-0.2%	-$10.77 *-$129.28 annually*	-35.1%

In the impact charts presented in this report, the point estimates are represented by the grey dot and the 80% confidence intervals are represented by the green bars.

3.1 Peak Impacts

For RE-TOU participants, the average change in consumption was estimated for the on-peak period and separately for the system coincident peak hours. The system coincident peak hours are the single hour with the highest demand for Xcel Energy's system during each month. These impact estimates address the times when the price or system demand is the highest.

3.1.1 Seasonal On-Peak Impacts

The on-peak period of the RE-TOU rate provides the greatest financial incentive for participants to reduce their consumption of energy. Figure 3-1 and Figure 3-2 provide the average summer and winter consumption impacts for each customer segment during on-peak hours, with non-solar customers achieving nearly an 7.6% reduction in on-peak consumption. Details on the impact analysis methodology and regression model specifications can be found in Section 2.2. The following are key observations:

- Excluding low income, **each segment has a statistically significant reduction** in their average on-peak consumption during the summer
- **Reductions in average on-peak consumption are less in the winter than in the summer**. This is likely due to participants reducing on-peak air conditioning loads during the summer and having less load to manage in the winter.
- **Electric vehicle and solar participants have substantially larger on-peak reductions** than other segments. This is likely a result of electric vehicle ownership among both segments and changes in vehicle charging schedules.

Figure 3-1. Summer On-Peak Consumption Impact

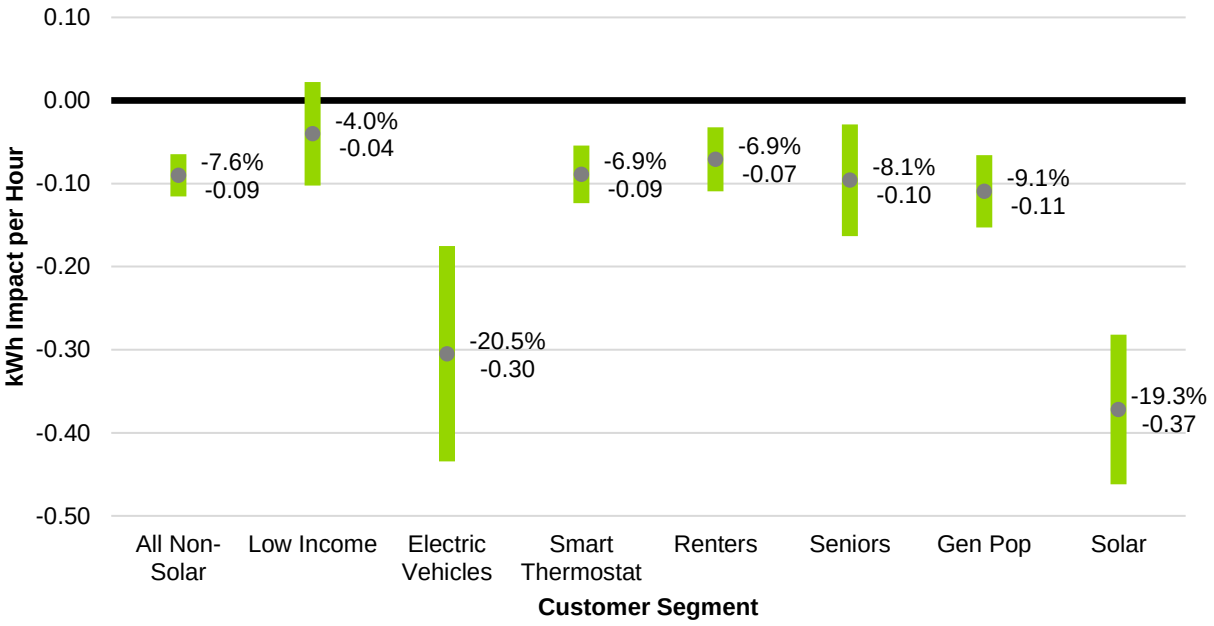
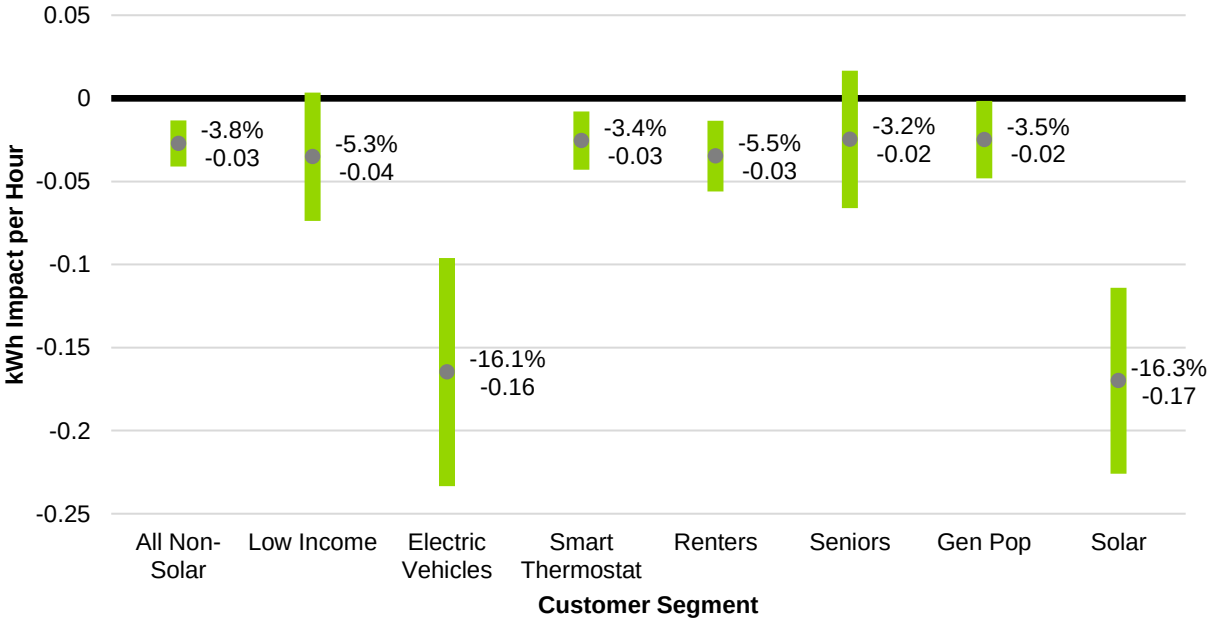


Figure 3-2. Winter On-Peak Consumption Impact



3.1.2 Seasonal System Coincident Peak Consumption Impacts

System coincident peak consumption impacts are the average reduction in consumption that happened during the system's peak hour each month. In most months, the system coincident peak hour was during the on-peak period. Figure 3-3 and Figure 3-4 provide the average summer and winter on-peak impacts for each customer segment. Details on the impact analysis methodology and regression model specifications can be found in Section 2.2. The following are key observations:

- Reductions in the summer system coincident peak consumption (7.3%) are similar to those found for the summer on-peak period of the RE-TOU rate (7.6% from above).
- Reductions in the summer system coincident peak consumption are more compared to the winter likely due to participants reducing on-peak air conditioning loads during the summer and having less load to manage in the winter.
- All segments, except for low income, have a statistically significant reduction in their system coincident peak consumption in both seasons.
- Electric vehicle and solar participants have substantially larger system coincident peak reductions than other segments. This is most likley due to electric vehicle ownership among both segments and shifts in charging patterns to off-peak periods when the system peak is unlikely to occur.

Figure 3-3. Summer RE-TOU System Coincident Peak Impact

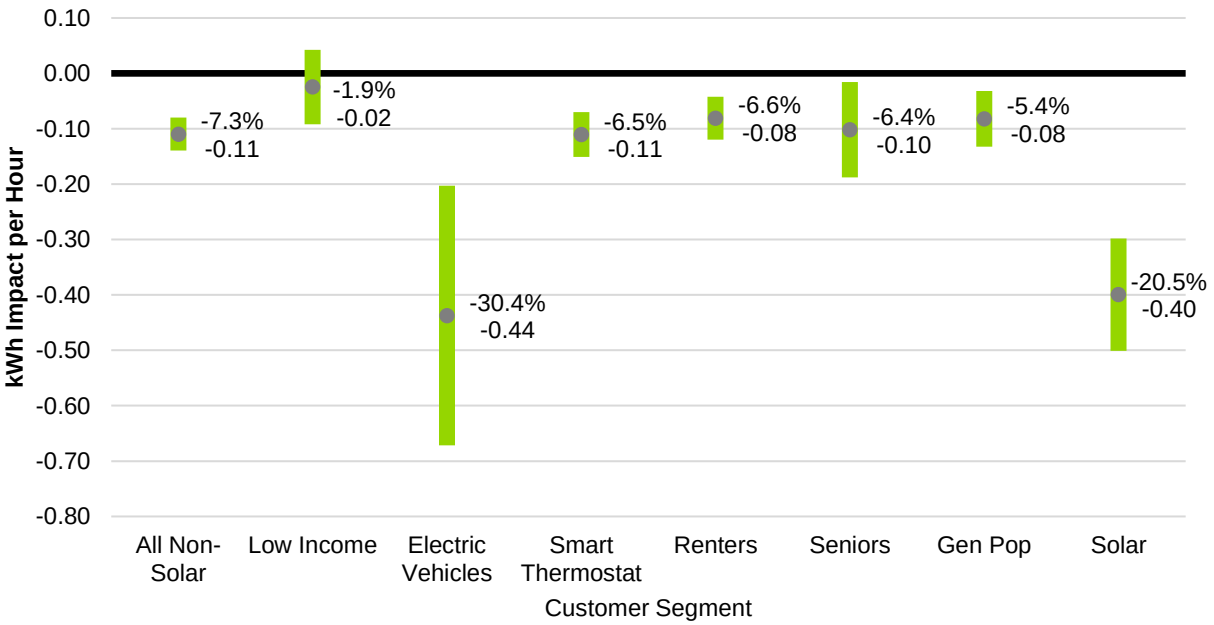
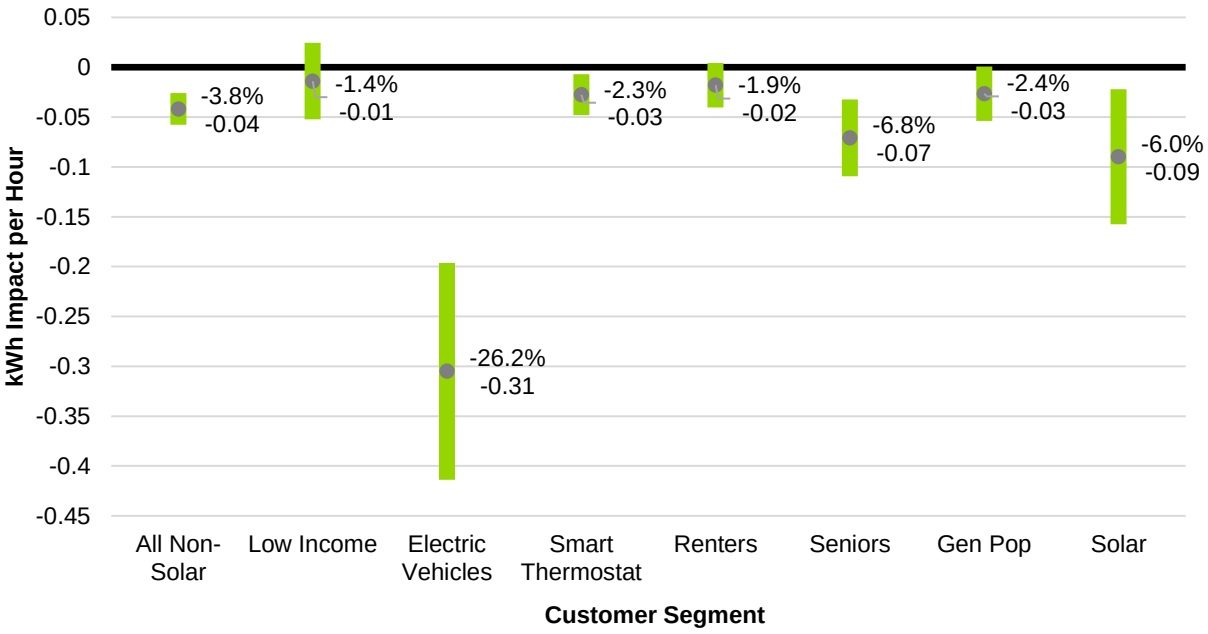


Figure 3-4. Winter RE-TOU System Coincident Peak Impact



3.2 Energy Consumption Impacts

Many participants on RE-TOU responded to the rate structure by changing their usage in each of the pricing periods. These changes in usage vary in statistical significance, but both solar and non-solar participants are, in aggregate, responding to the price signals.

For the shoulder period impact analysis, the period was divided into three parts (morning shoulder, evening shoulder, and weekend shoulder) to identify how customers' responses to the shoulder period varied based on the part of day or type of day in the shoulder period. The morning shoulder consists of the shoulder period hours that occurred prior to the on-peak period on weekdays (9 a.m.-2 p.m.), the evening shoulder consists of the shoulder period hours that occurred after the on-peak period on weekdays (6-9 p.m.), and the weekend shoulder consists of the shoulder period hours on weekends (9 a.m.-9 p.m.).

Figure 3-5 and Figure 3-6 provide the average summer and winter energy consumption impacts by rate period for **non-solar participants.** Details on the energy consumption impact analysis methodology and regression model specifications can be found in Section 2.2. The following are key observations:

- During the summer, non-solar customers are reducing consumption during the on-peak and shoulder periods (by 7.3% and 3.8%, respectively) but estimates indicate an increase in consumption during the off-peak period however it is not statistically different from zero. This behavior is consistent with the RE-TOU rate structure as it provides participants with a financial incentive to shift consumption from the on-peak and shoulder periods to the off-peak period.
- During the winter, non-solar customers are reducing consumption during the on-peak period and increasing consumption during the off-peak period. The impacts during the shoulder period are

not statistically different than zero, so any changes in consumption during the shoulder are likely to be minimal.

Figure 3-5. Summer RE-TOU Energy Consumption Impacts - All Non-Solar

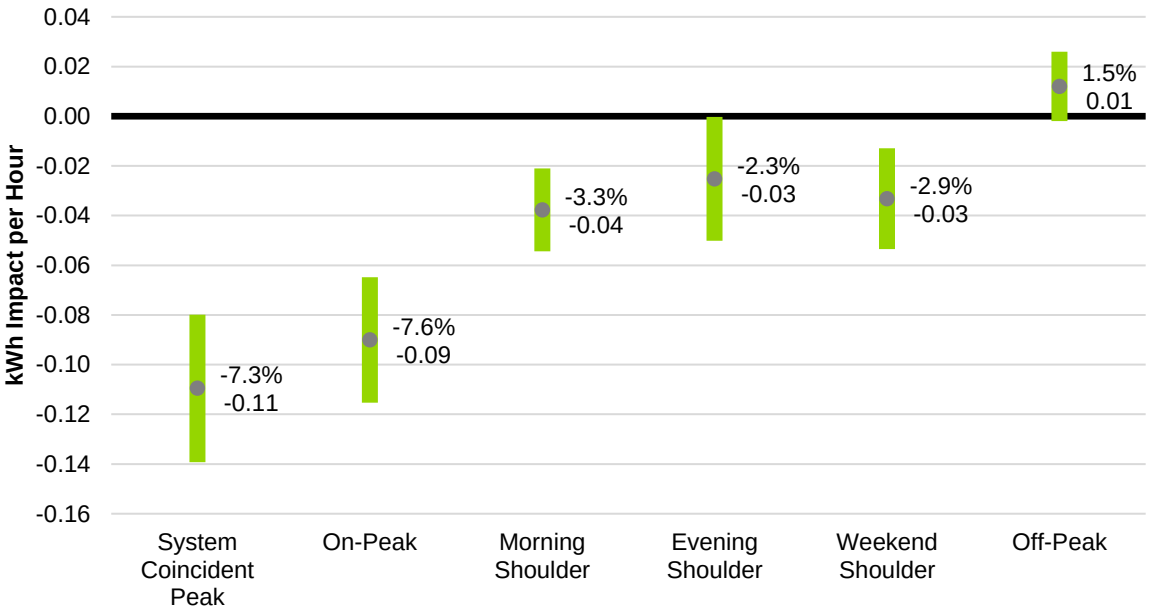


Figure 3-6. Winter RE-TOU Energy Consumption Impacts - All Non-Solar

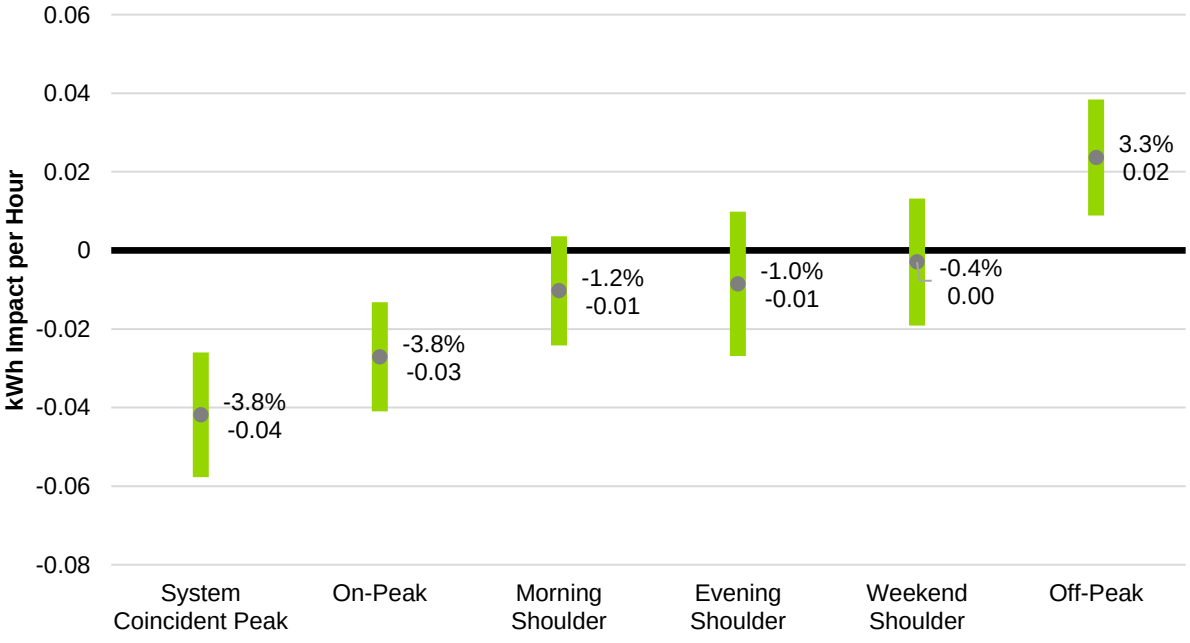


Figure 3-7 and Figure 3-8 provide the average summer and winter energy consumption impacts by rate period for solar participants. Details on the energy consumption impact analysis methodology and regression model specifications can be found in Section 2.2. The following are key observations:

- During the summer, solar customers are reducing consumption during the on-peak and shoulder periods. Changes in consumption during the off-peak period are not statistically different than zero, so it appears that there is more conservation of energy than shifting consumption between rate periods.
- During the winter, solar customers are reducing consumption during the on-peak period and increasing consumption during the off-peak period. The impacts during the shoulder period are only statistically different than zero during the morning part of the shoulder period.

Figure 3-7. Summer RE-TOU Energy Consumption Impacts - Solar

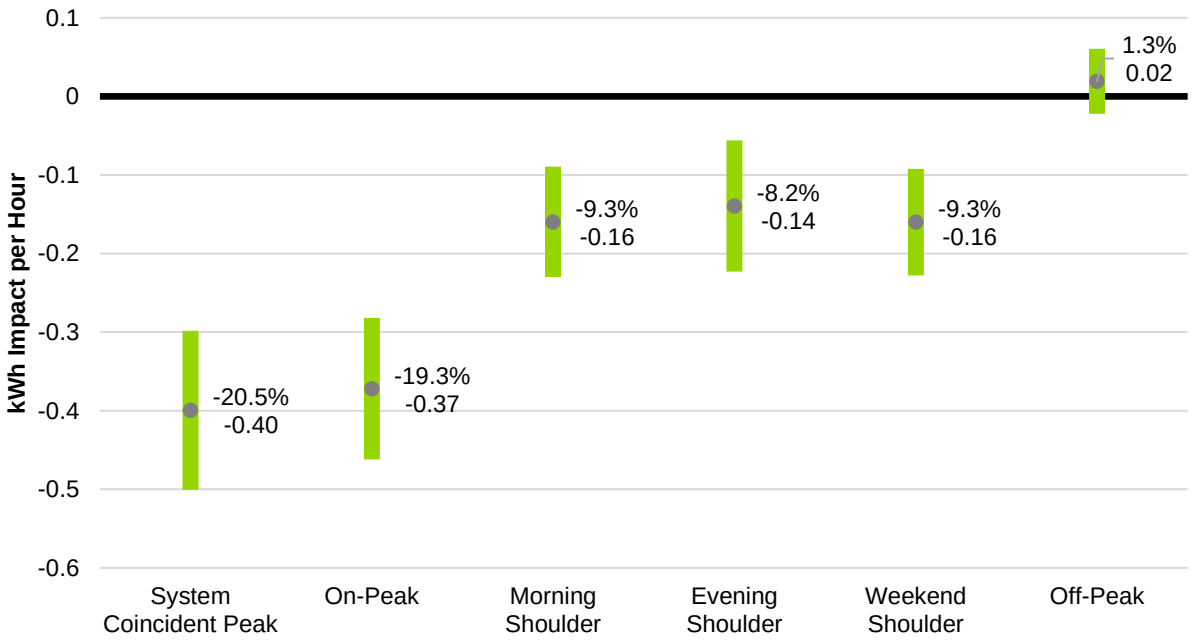


Figure 3-8. Winter RE-TOU Energy Consumption Impacts - Solar

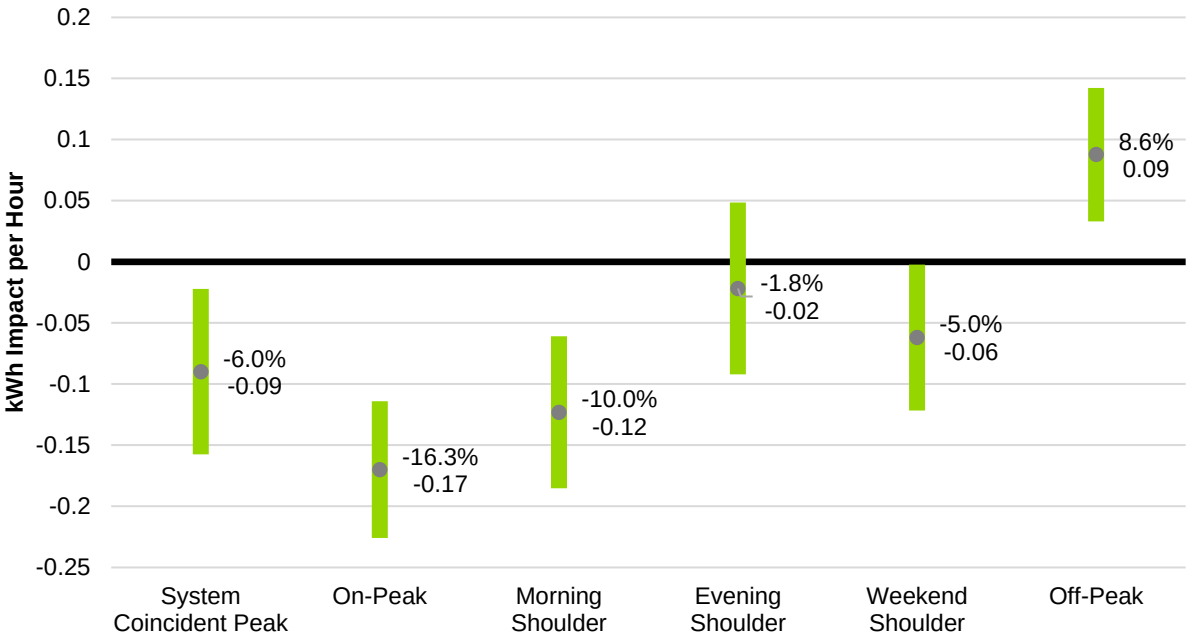


Table 3-3 and Table 3-4 provide the average impact on total monthly energy consumption during the Summer and Winter. The monthly consumption has been normalized to represent a month with 30 days (22 weekdays and 8 weekend days). The impact on monthly consumption has been calculated by multiplying the average hourly impact for each rate period by the number of hours in the normalized month for each rate period. The following are key observations:

- Each segment is reducing their monthly consumption during the summer
- Monthly consumption impacts are less during the winter and some segments are increasing their consumption
- The electric vehicle segment has the highest monthly consumption year-round

Table 3-3. Summer RE-TOU Monthly Consumption Impacts

Segment	Average Normalized Monthly Consumption Pre-Enrollment	Average Normalized Monthly Consumption Post-Enrollment	Average Normalized Monthly Consumption Impact (kWh)	Average Normalized Monthly Consumption Impact (%)
All Non-Solar	694.3 kWh	681.7 kWh	-12.6 kWh	-1.8%
Low Income	620.2 kWh	580.1 kWh	-40.1 kWh	-6.5%
Electric Vehicles	1,044.4 kWh	956.9 kWh	-87.5 kWh	-8.4%
Smart Thermostat	739.8 kWh	731.1 kWh	-9 kWh	-1.2%
Renters	632.8 kWh	612.2 kWh	-20.6 kWh	-3.3%
Seniors	622.7 kWh	619.8 kWh	-2.9 kWh	-0.5%
Gen Pop	701.4 kWh	681.7 kWh	-19.7 kWh	-2.8%
Solar	248.2 kWh	180.3 kWh	-67.9 kWh	-27.4%

Table 3-4. Winter RE-TOU Monthly Consumption Impacts

Segment	Average Normalized Monthly Consumption Pre-Enrollment	Average Normalized Monthly Consumption Post-Enrollment	Average Normalized Monthly Consumption Impact (kWh)	Average Normalized Monthly Consumption Impact (%)
All Non-Solar	550.7 kWh	554.9 kWh	4.1 kWh	0.8%
Low Income	507.8 kWh	483.7 kWh	-24.1 kWh	-4.7%
Electric Vehicles	872.4 kWh	870.9 kWh	-1.5 kWh	-0.2%
Smart Thermostat	578.2 kWh	581.7 kWh	3 kWh	0.6%
Renters	480.6 kWh	465.8 kWh	-14.8 kWh	-3.1%
Seniors	554.6 kWh	561.5 kWh	6.9 kWh	1.2%
Gen Pop	548.9 kWh	554.9 kWh	6.0 kWh	1.1%
Solar	259.7 kWh	255.4 kWh	-4.3 kWh	-1.7%

3.2.1 Energy Consumption Impacts – By Segment

The following charts include the Summer energy consumption impacts by rate period for each customer segment. Generally, customer segment level impact estimates have wider confidence intervals than the broader non-solar analysis that is inclusive of these segments. This is partially due to the sample sizes of each segment. See Figure 1 for the number of participants and control group customers within each segment for this analysis.

Figure 3-9. Summer RE-TOU Energy Consumption Impacts – Low Income

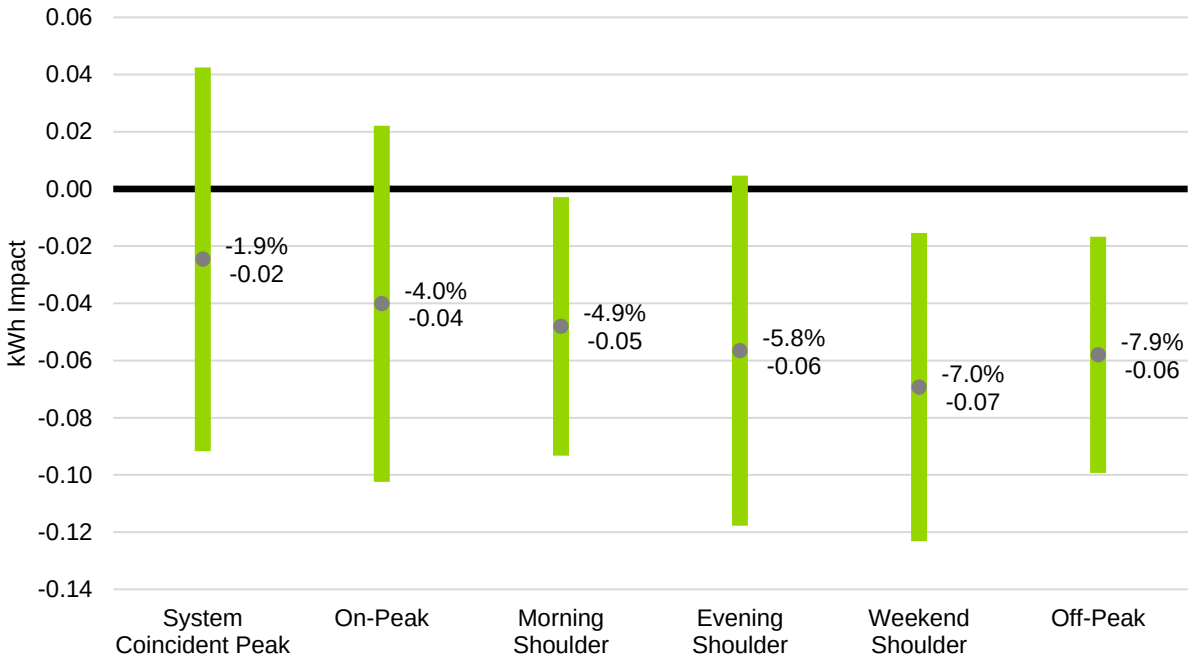


Figure 3-10. Summer Weekday Load Shape – Low Income

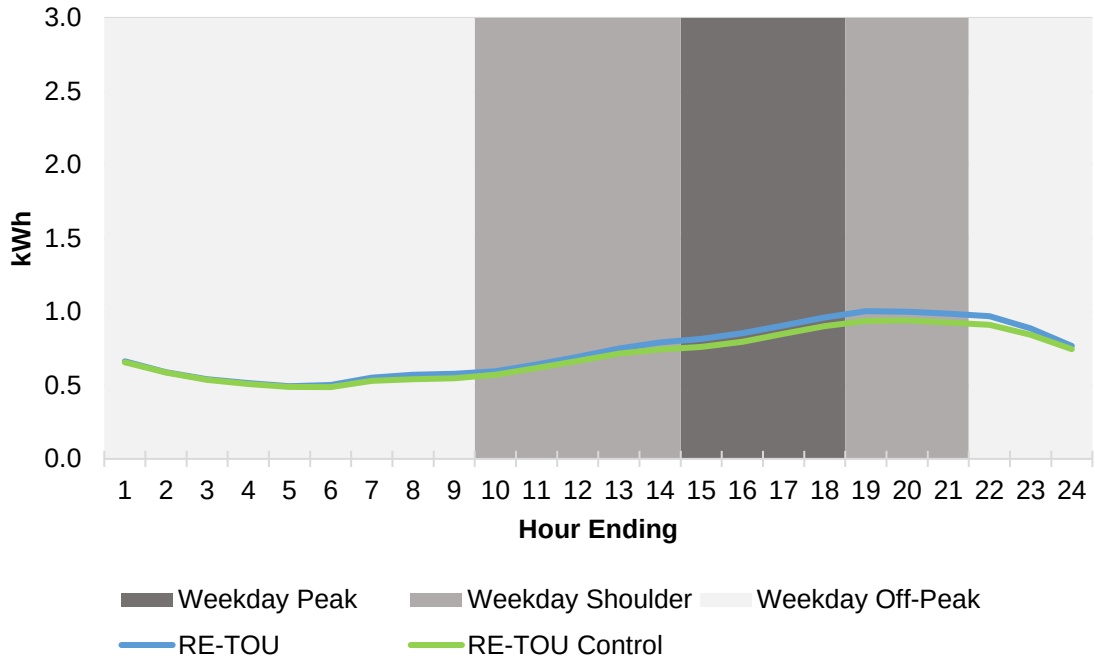


Figure 3-11. Summer RE-TOU Energy Consumption Impacts – Electric Vehicles

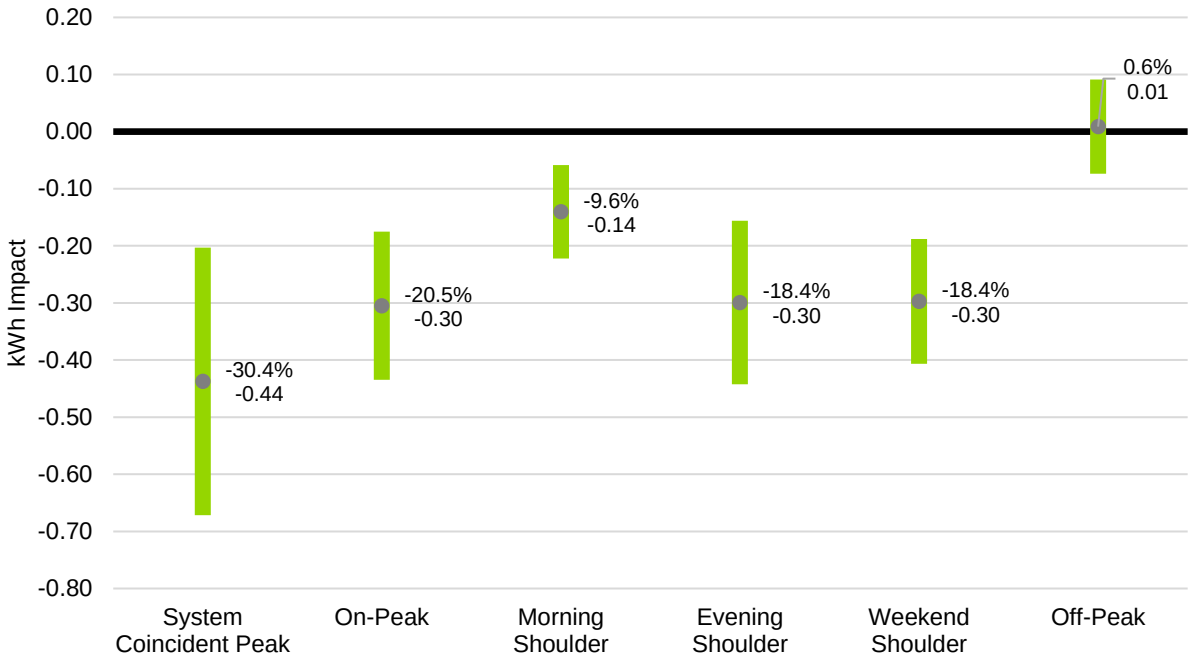


Figure 3-12. Summer Weekday Load Shape – Electric Vehicles

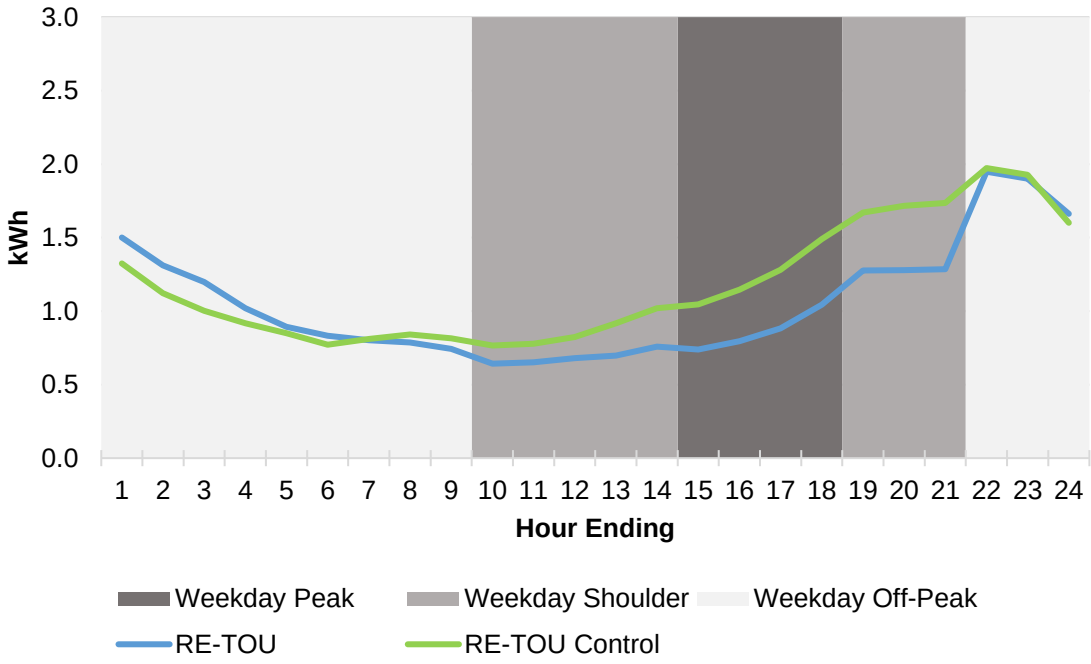


Figure 3-13. Summer RE-TOU Energy Consumption Impacts – Smart Thermostats

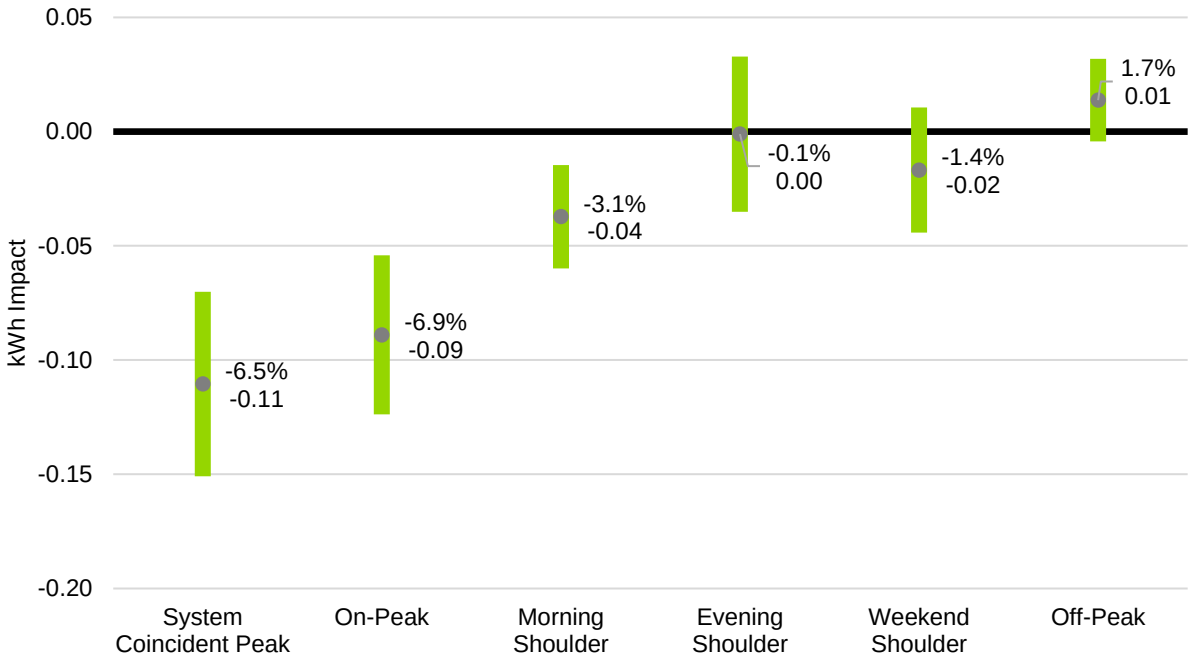


Figure 3-14. Summer Weekday Load Shape – Smart Thermostats

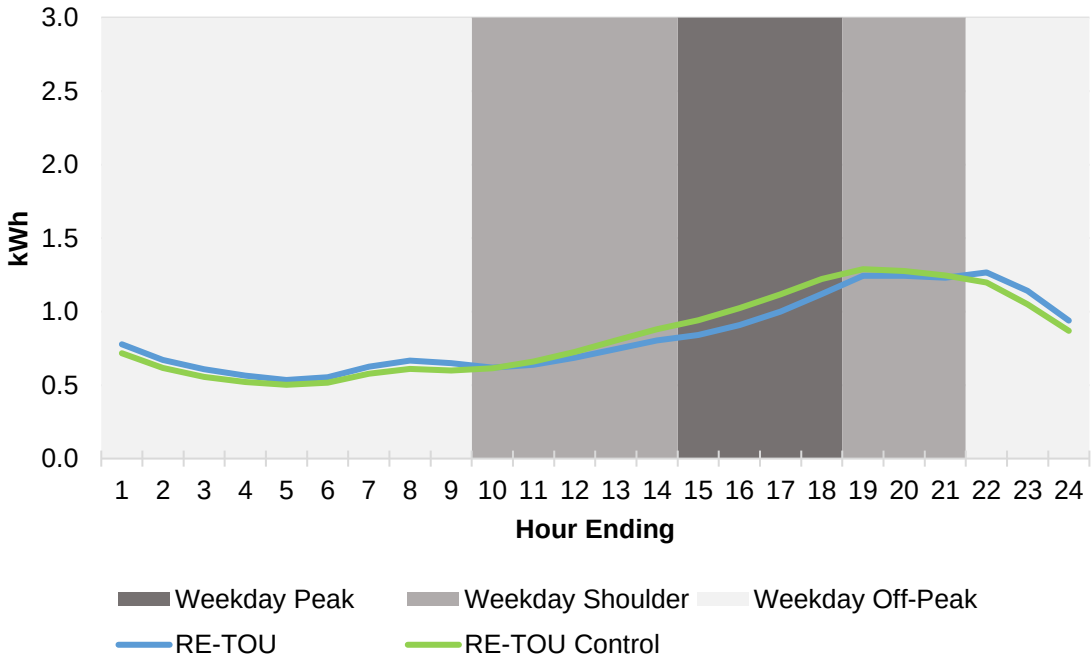


Figure 3-15. Summer RE-TOU Energy Consumption Impacts – Renters

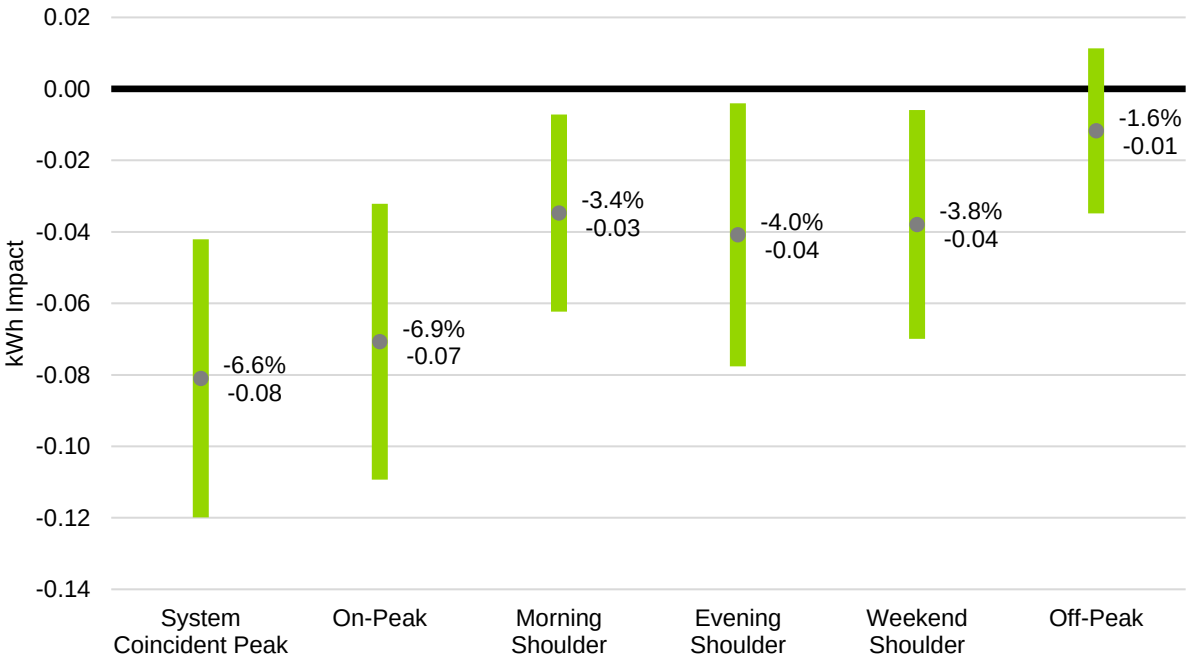


Figure 3-16. Summer Weekday Load Shape – Renters

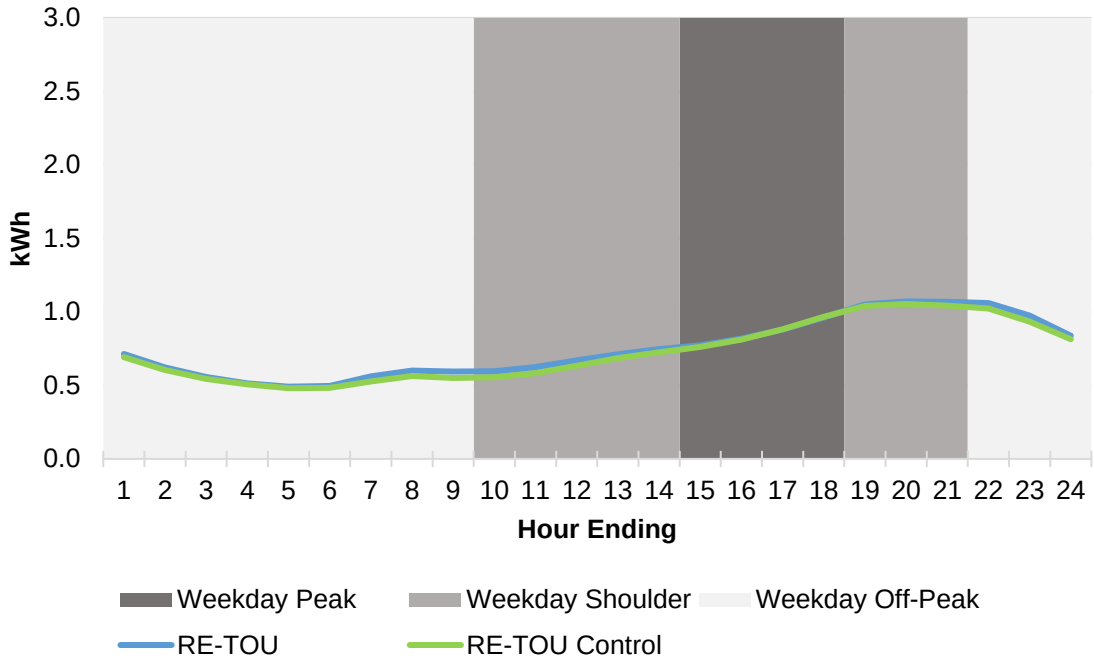


Figure 3-17. Summer RE-TOU Energy Consumption Impacts – Seniors

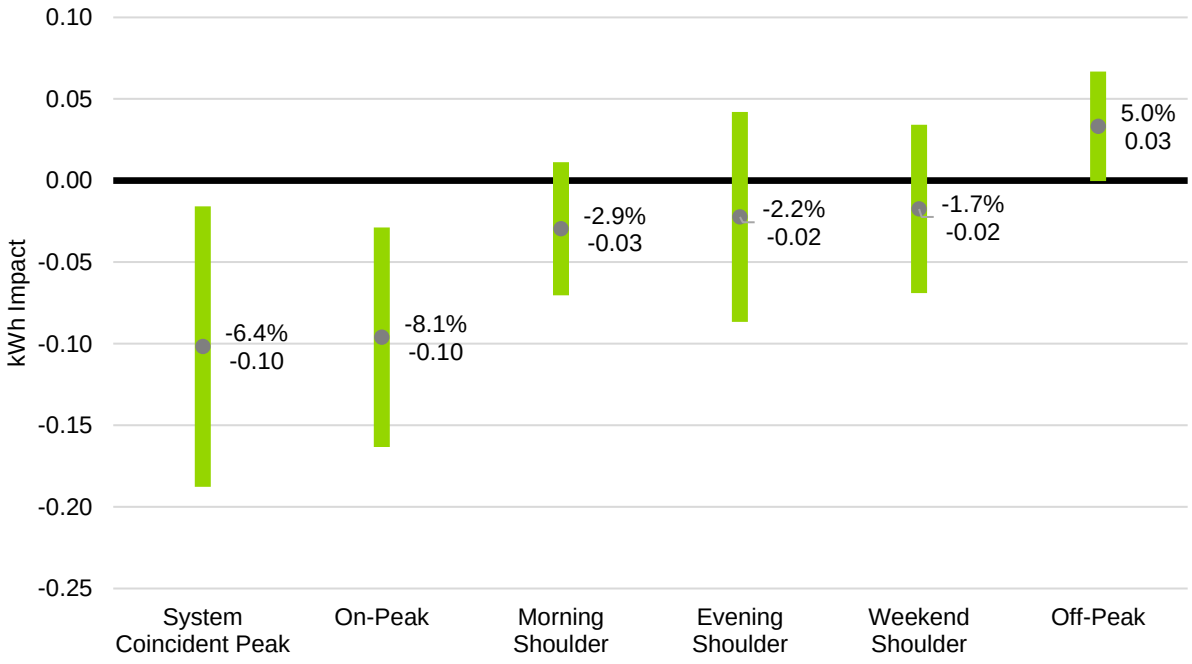


Figure 3-18. Summer Weekday Load Shape – Seniors

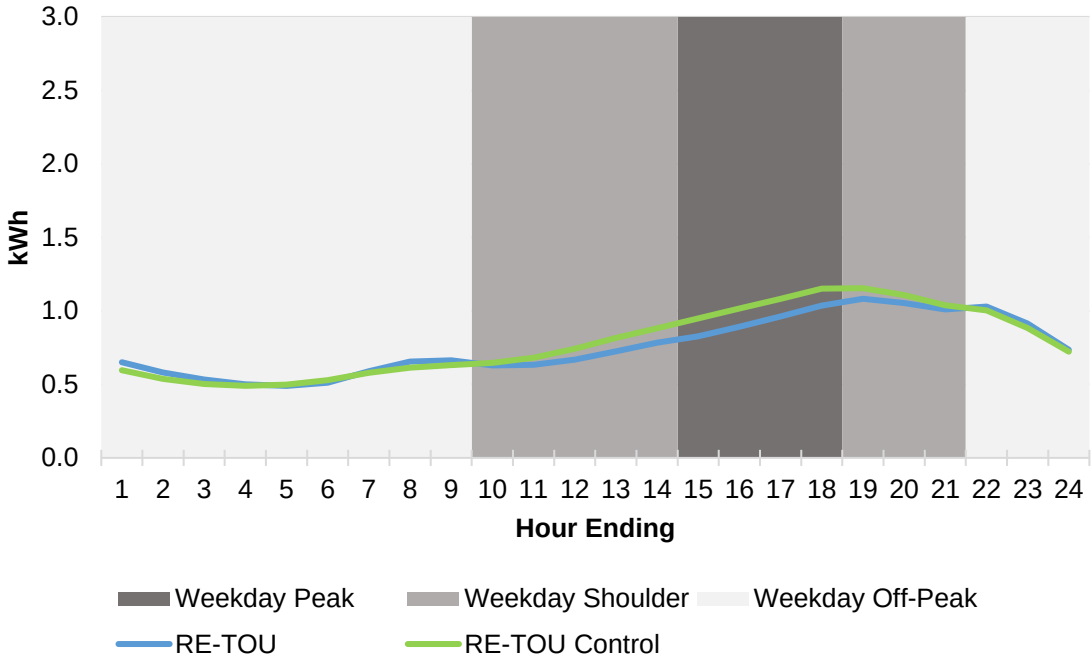


Figure 3-19. Summer RE-TOU Energy Consumption Impacts – General Population

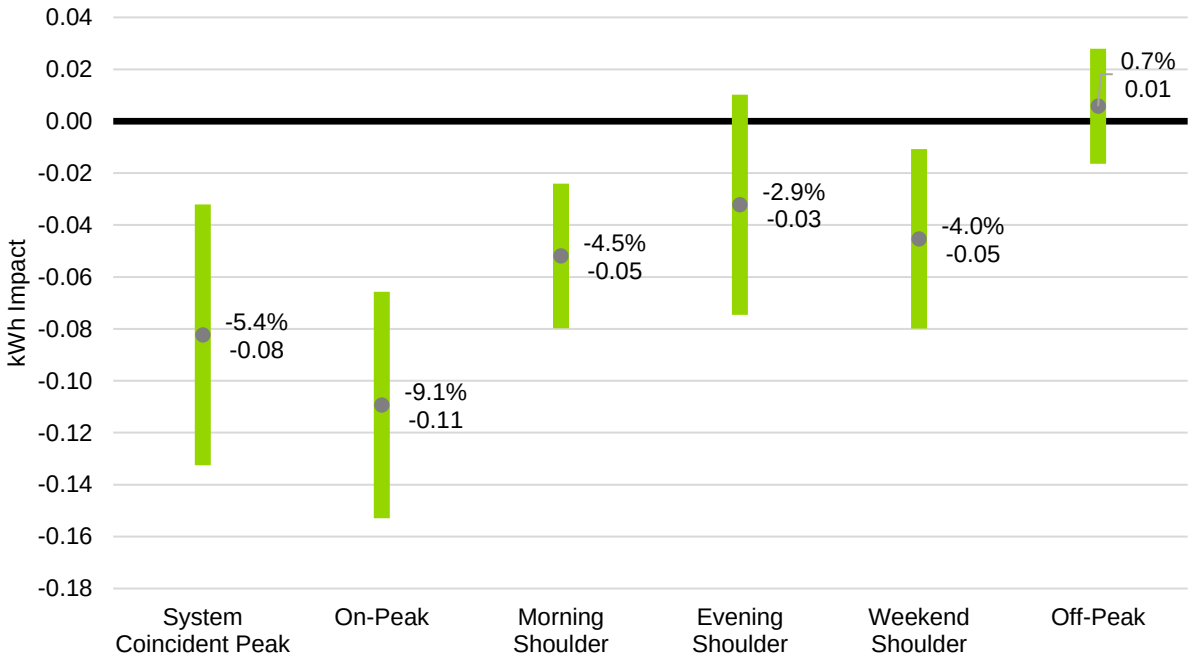
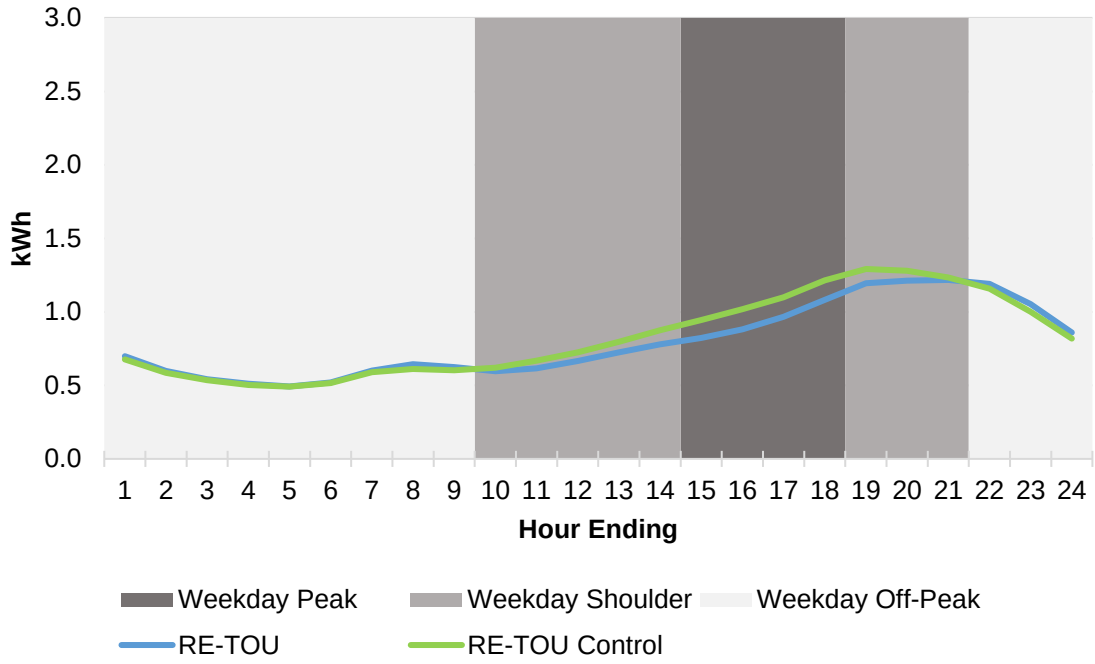


Figure 3-20. Summer Weekday Load Shape – General Population



3.3 Bill Impacts

Estimates of the impacts on consumption in each rate period were combined with the applicable prices to estimate the impact on the average participant's bill relative to what it would have been on the R rate, accounting for both the change in rate structure and the estimated change in consumption behavior. Consumption impacts and prices vary between the summer and winter seasons, so the average monthly impact was calculated for each season independently. Monthly bill impacts for each season were combined and annualized to estimate the cumulative annual impact on the average customer's bill and the Company's revenue collections.

As shown in Table 3-5 and Table 3-6, participants on RE-TOU transitioned from an inclining block rate during the summer (Tier I and Tier II) and a flat rate in the winter to a time varying rate year-round with seasonal differences. A key aspect of this transition is how a customer's level of consumption is related to the RE-TOU bill impact during the summer. It is difficult for customers with less than 500 kWh of monthly consumption to save on RE-TOU during the summer since only the off-peak period has a price lower than the first 500 kWh of consumption on R ($0.08 versus $0.10 per kWh). A customer's ability to reduce their bill during the summer on RE-TOU increases when they have more consumption that would have been more than 500 kWh on R and billed at the higher block's rate on R. This is an important distinction as the average bill impacts were calculated for the summer but vary based on a customer's level of consumption. This phenomenon does not persist in the winter due to a constant price for all consumption on R.

Table 3-5. RE-TOU Rate Structure

RE-TOU	Off-Peak	Shoulder	On-Peak	Service and Facility Charge
Hours	9 p.m. – 9 a.m.	9 a.m.-2 p.m., 6 p.m.-9 p.m. on Weekdays, 9 a.m.-9 p.m. Weekends	2 p.m.-6 p.m. on Weekdays	
Summer	$0.08/kWh	$0.13/kWh	$0.18/kWh	$5.41
Winter	$0.08/kWh	$0.10/kWh	$0.14/kWh	$5.41

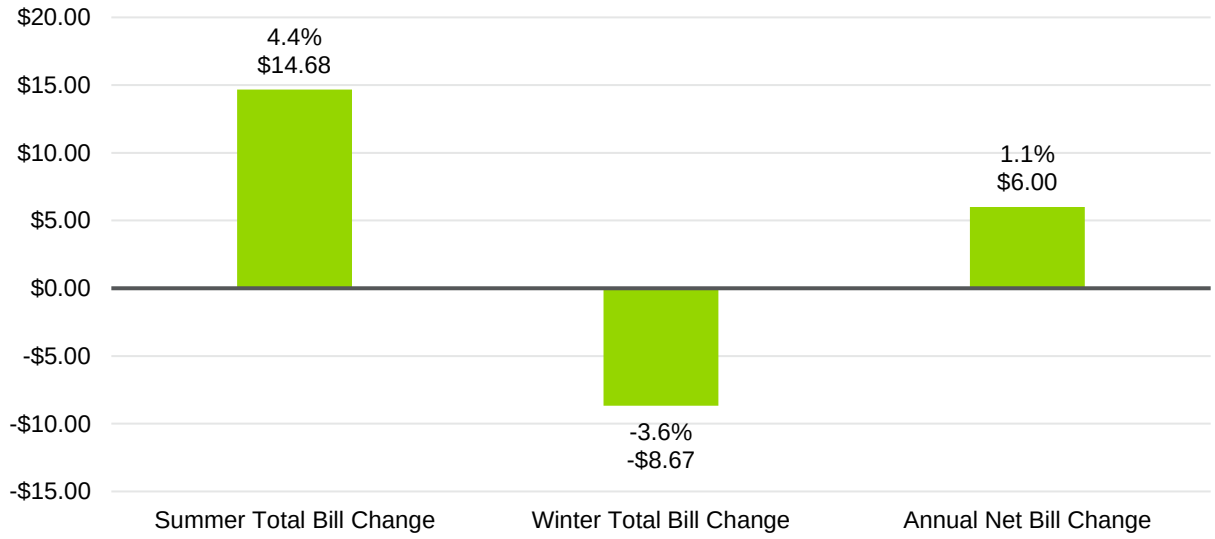
Table 3-6. R Rate Structure

R	First 500 kWh of Consumption (Tier I)	Consumption Over 500 kWh (Tier II)	Service and Facility Charge
Summer	$0.10/kWh	$0.14/kWh	$5.41
Winter	$0.10/kWh	$0.10/kWh	$5.41

3.3.1 Aggregate Seasonal Bill Impacts

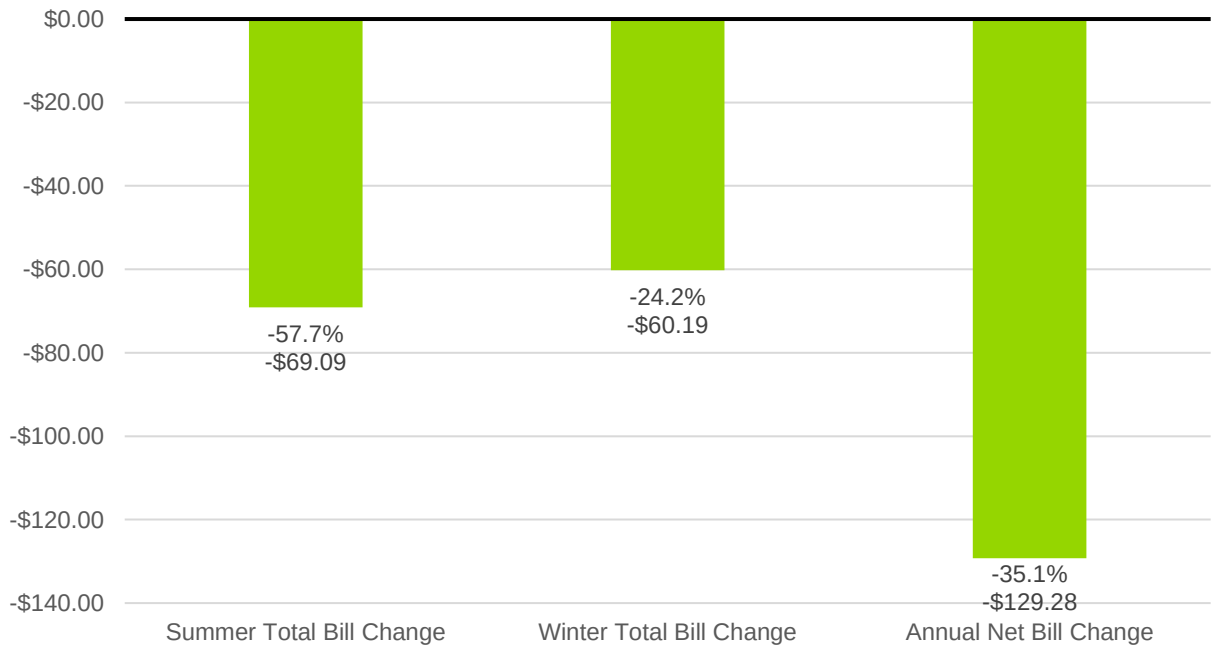
As shown in Figure 3-21, the cumulative annual bill for the average non-solar RE-TOU participant increases by 1.1% or $6.00. Bill increases during the summer are partially offset by winter bill decreases and the outcome is close to being revenue neutral for the average customer's usage (681 kWh average summer monthly usage and 555 kWh average winter monthly usage).

Figure 3-21. RE-TOU Bill Impacts by Season and Annual – Non-Solar



In contrast to the modest bill impact for non-solar customers, Figure 3-22 shows a much larger summer bill reduction and an annual bill reduction of $129.28, or nearly 35% for the average RE-TOU participant with solar. This is partially a result of an increase in the value of energy produced by solar during the shoulder and on-peak periods relative to R. The average customer has 180 kWh of net monthly usage with 727 kWh of monthly solar production during the Summer and 255 kWh of net monthly usage with 537 kWh of monthly solar production during the Winter.

Figure 3-22. RE-TOU Bill Impacts by Season and Annual – Solar



3.3.2 Composition of Bill Impact

There are two main factors that determine the impact of RE-TOU on a customer's bill:

- **Rate structure change.** Customers with higher usage are more likely to benefit from the transition from the inclining block rate of the R rate to the RE-TOU rate structure. This is due to higher usage customers previously having more usage billed on the higher tier of the R rate than lower usage customers, meaning they would have paid a higher average price per kWh on R. By moving to the RE-TOU rate, these high usage customers are more likely to see bill reductions even in the absence of any changes in usage patterns.
- **Change in usage patterns/behavior.** Changes in the time of day that a customer uses energy will have an impact on the bill, depending on the magnitude of the changes across the various rate periods. By decreasing usage during the on-peak and shoulder periods or shifting usage to the off-peak period, RE-TOU participants contributed to reducing their bill. Similarly, any reduction in total usage—even with the same relative usage patterns over time—will reduce the customer's bill.

The net of the structural bill impact and the impact from behavior changes constitutes the monthly bill impact for a RE-TOU participant.

Figure 3-23 and Figure 3-24 show the breakdown of how the rate structure change and behavior impacts contribute to the average monthly bill impact during the summer and winter for non-solar customers. The summer bill impact is mostly driven by the rate structure change increasing the average customer's bill while changes in usage behavior offsets a portion of the bill increase. Conversely, the winter bill impact is mostly driven by the rate structure change decreasing the average customer's bill with changes in usage behavior slightly offsetting some of the decrease due to an increase in off-peak consumption.

Figure 3-23. RE-TOU Summer Monthly Bill Impact – All Non-Solar

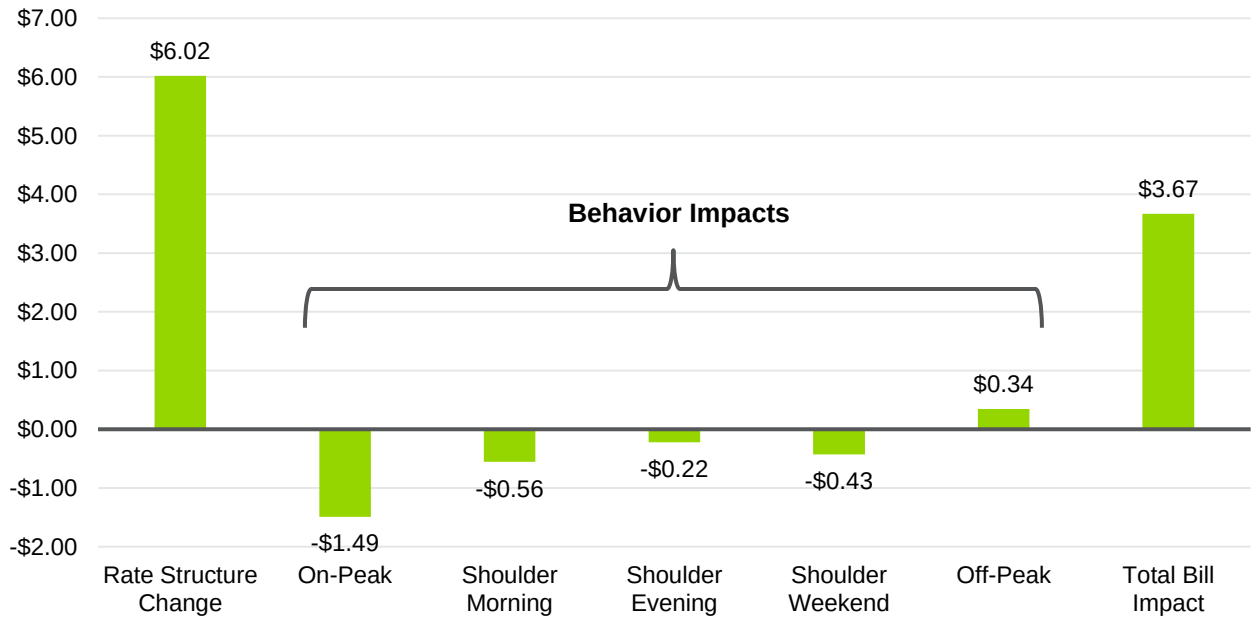


Figure 3-24. RE-TOU Winter Monthly Bill Impact - All Non-Solar

Figure 3-25 and Figure 3-26 show the breakdown of how the rate structure change and behavior impacts contribute to the average monthly bill impact during the summer and winter for solar customers. The bill impacts in both seasons are driven by the rate structure change decreasing the average customer's bill along with changes in usage behavior providing further bill decreases. Solar production during the shoulder and on-peak periods is monetized at a higher value on RE-TOU than on R. The increased value of solar production outweighs the bill increases that would occur for a non-solar customer with similar net usage.

Figure 3-25. RE-TOU Summer Monthly Bill Impact - Solar

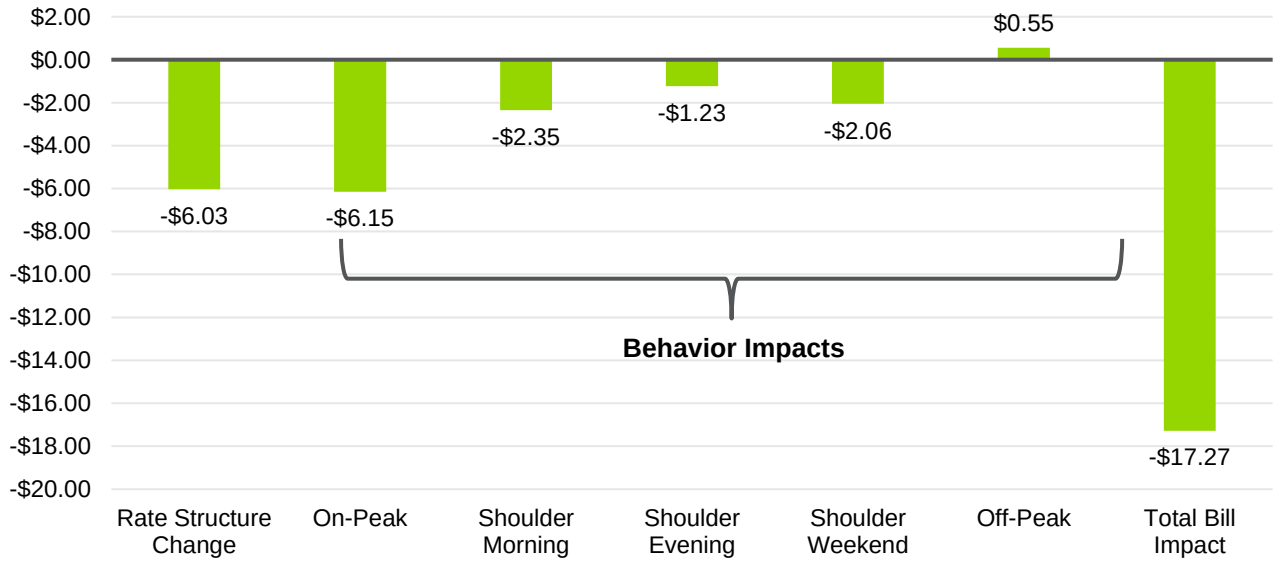
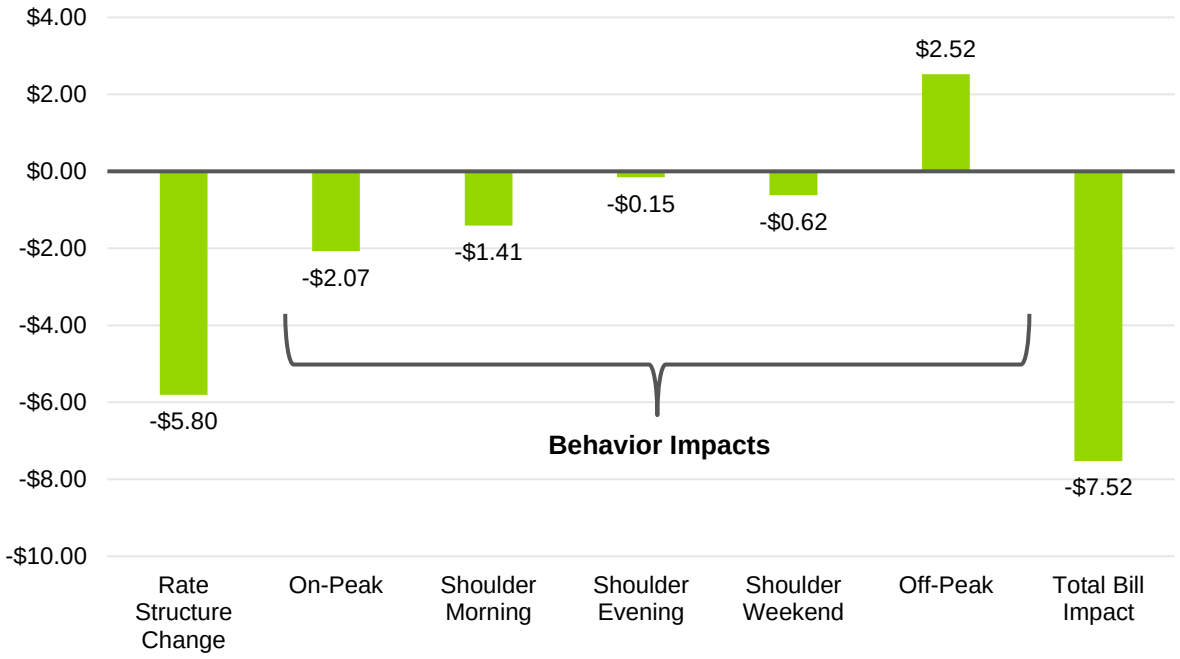


Figure 3-26. RE-TOU Winter Monthly Bill Impact - Solar



4. CUSTOMER RESEARCH

This section describes the results of the customer research, which consisted primarily of three online participant survey efforts, supplemented by a statistical analysis of customers who withdraw from the rate and switch back to the R rate. The three surveys were conducted during unique periods of customers' participation in the trial (Table 4-1).

Table 4-1. Participant Research Surveys

Survey Timing/Trigger	Objectives/Focus
Post-enrollment (Section 4.1)	Focusing on participant demographics, marketing and understanding of the rate, and the enrollment experience
After the first cooling season (Section 4.2)	Addressing understanding of the new bill, behavior changes, perceived success in achieving goals, and suggested changes to the TOU rate
Upon withdrawing from the RE-TOU rate (Section 4.3.2)	Similar to the post-cooling-season survey, but also addressing reasons for dropping out and recommendations for a future alternative to the standard rate

Synopsis of customer research takeaways. The customer research findings suggest that customers who enroll tend to be motivated to make changes to their energy behaviors to reduce their bills, but that many are not sure which actions matter most or how to most effectively change those behaviors, and customers are not able to discern whether their actions are making a difference in their bills.

Specific findings of the customer research efforts include the following:

- **Motivation to enroll.** *When considering enrollment, customers typically enroll in the TOU rate either to save money, have more control over their energy bill, or to conserve energy.* Prior to making their decision to enroll, most customers spend time learning about the plan, and most access information on Xcel Energy's website. Despite customer efforts to learn more, the majority of customers have only a basic understanding of the rate and effective strategies for achieving their goal of bill savings.
- **Characteristics of participants.** Customers who enrolled in the TOU rate may best be described as *motivated to save, actively engaged, and somewhat uncertain about their achievements to date*. As described in more detail below, RE-TOU participants are highly motivated by potential bill savings and actively engaged in consulting informational resources and changing their energy use patterns; however, they are a bit uncertain about the impact that their actions are having on their energy consumption and bills.
- **Behavior change.** *Despite knowledge limitations, the TOU rate has been highly successful at motivating most customers to change their behaviors, with 93% of customers reporting having taken action to shift when they use electricity.* For example, most participants report changing when they do laundry and when they run the dishwasher, and some have changed their use of air conditioning as well. In general, however, customers tend to be less likely to make changes in some of the most important behaviors, such as air conditioning use. Customers also report difficulties in changing when they engage in cooking behaviors. Finally, customers are less likely to purchase new technologies than shift their usage patterns, with only 32% of customers indicating they had purchased one or more technologies since enrolling.

- **Participant uncertainty over bill savings.** *The complexities of the TOU rate combined with customers' limited understanding of effective behavior change strategies make it difficult for customers to assess whether they have been successful in reducing their electricity bill, leaving many customers in a state of uncertainty.* In short, most customers are unsure whether they are saving money or conserving energy on the new plan. One emergent insight is that while most people are staying on the TOU rate, their continued engagement is generally not the result of high levels of enthusiasm or savings on their bill. In contrast, customers who dropped out of the rate tend to firmly believe they are not saving money. They are also less likely to take advantage of information resources or change behaviors that are likely to make a notable impact on their bill.
- **Attrition.** Most participants have chosen to remain on the TOU rate once they have enrolled, with 78% of all participants remaining on the rate between March 2017 and September 2018, excluding customers who moved during the trial period.[23]
- **Drivers of participant dropouts.** *The two primary influences on the likelihood of a participant to drop out of the TOU rate are 1) changes in monthly bills (relative to what it would have been on the R rate) and 2) length of time on the RE-TOU rate prior to dropping out*. For every dollar increase in a customer's bill relative to the R rate, they are roughly 4% *more likely* to drop out; countering this influence, every month of participation in the TOU rate makes a customer approximately 35% *less likely* to drop out.

4.1 Awareness and Enrollment Experience

Navigant conducted seven rounds of the web-based post-enrollment (i.e., Wave 1) surveys[24] with residential TOU participants shortly after enrollment in the TOU trial. The purpose of the Wave 1 survey included the following:

- Gathering key data about TOU participants near the time of enrollment including reasons for enrolling, perceptions, expectations, and baseline behavior
- Assessing the effectiveness of marketing and messaging of the TOU rate
- Measuring customer understanding of the rate components, and
- Assessing customer experience with the enrollment process.

Navigant issued the Wave 1 survey in seven rounds over the course of roughly one year to gather information about customer understanding and enrollment experience prior to significant exposure to the new rate. Navigant obtained 1,196 survey completes for an overall response rate of 48% (Table 4-2).

[23] Customers deciding to move during the trial period is the most common reason participants left the TOU rate (25% of all participants, 61% of total drop-outs). Including customers who move, 59% of all participants remained on the rate between March 2017 and September 2018.

[24] Appendix A provides the full survey.

Table 4-2. Wave 1 Post-Enrollment Survey Participation

Timing	Survey Completes	Response Rate
July 2017 to June 2018	**1,196**	**48%**

Key takeaways from the Wave 1 survey include the following:

- **Exposure to the rate and motivations to enroll.** Well over half of respondents (64%) were most likely to learn about the TOU rate through an email or letter from Xcel Energy or via the Company's website. Customers were most motivated to enroll by their interest in saving money on their electricity bill although two other factors were also highly influential: having more control over their bill and conserving energy[25]. Despite their decision to enroll, customers harbored a variety of concerns. The most prominent concerns expressed by customers was their concern that their electricity bill may increase (43%), concerns over their ability to manage their electricity use (30%), and concerns about not fully understanding how the bill is calculated (27%).
- **Understanding of the rate.** Survey findings also indicate that most customers recognize their limited level of knowledge about the new rate, with 65% indicating that they have a basic or less-than-basic knowledge of the rate. Of respondents, 34% indicate they either have a fairly complete understanding or are highly knowledgeable about the rate. Customers self-assessment of their knowledge seems to be comparable to several objective knowledge measures. Survey measures of objective knowledge indicate that more than 80% of participants understand the core elements of the TOU plan; however, most participants are not aware that electricity rates vary by season and that their electricity is more expensive in the summer months. Similarly, while participants recognize the importance of limiting peak usage, they are less likely to recognize the importance of limiting shoulder usage.
- **Informational resources on the TOU rate.** Website resources played an important role in informing customer decisions, while emails from Xcel Energy were a helpful means of sharing important information. Most customers visited the Xcel Energy website before enrolling (77%), while another 9% of respondents visited the website after enrolling (of respondents, 15% did not visit the website either immediately before or after enrollment). For those customers who did visit the website to learn more, the Xcel Energy rate pages and the Rate Advisor Tool were identified as the most popular website resources used to learn more about the plan. Overall, customers indicated that online information and emails from Xcel Energy were the most useful sources of information about the new plan.

The remainder of this discussion addresses the following topics:

1. Awareness and motivations
2. Understanding of the rate
3. Feedback on the efficacy of customer resources for the TOU rate

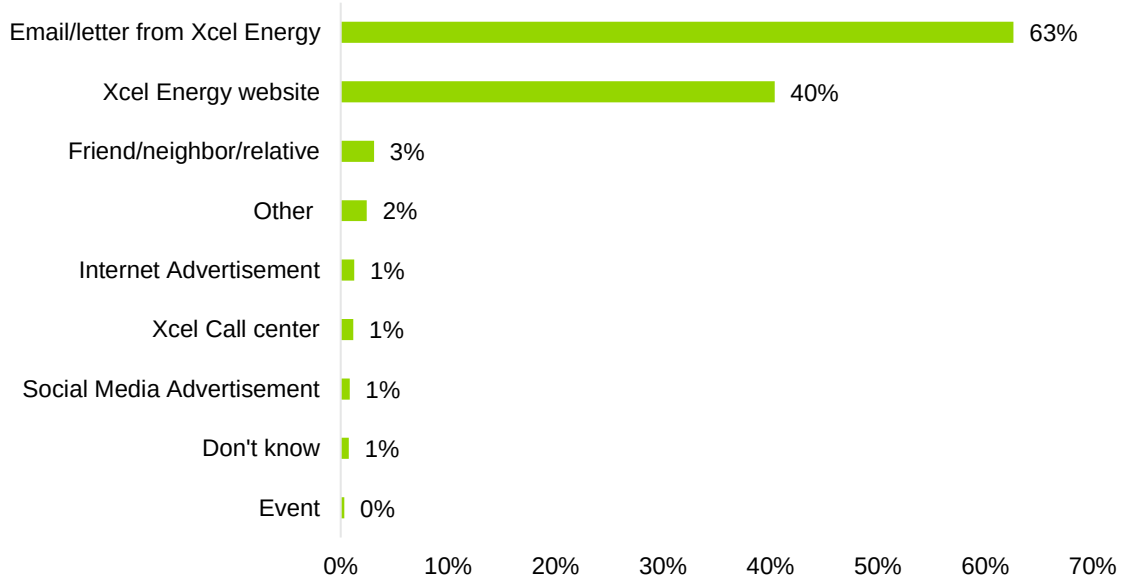
[25] The TOU rate was not marketed to customers as an energy conservation plan. For example, Xcel Energy's website explains: "With the Time of Use Pricing plan, saving on energy isn't about using less electricity, it's about using electricity at the right times." https://www.xcelenergy.com/billing_and_payment/understanding_your_bill/residential_rate_plans/time_of_use_pricing/time_of_use_pricing_how_it_works

4.1.1 Awareness and Motivations

To assess TOU participants awareness and motivations for signing up for the TOU rate, Navigant asked how customers heard about the plan, what motivated them to sign up, and what concerns they had about participating in the TOU rate. This section presents the results of those questions.

When asking how TOU participants heard about the TOU rate, the survey results shown in Figure 4-1 reveal that most people learned about the rate through an email or letter from Xcel Energy (64% of respondents). Xcel Energy's website is the second most common source of information about the TOU rate, with 40% of participants indicating that the website was a source of awareness of the rate.

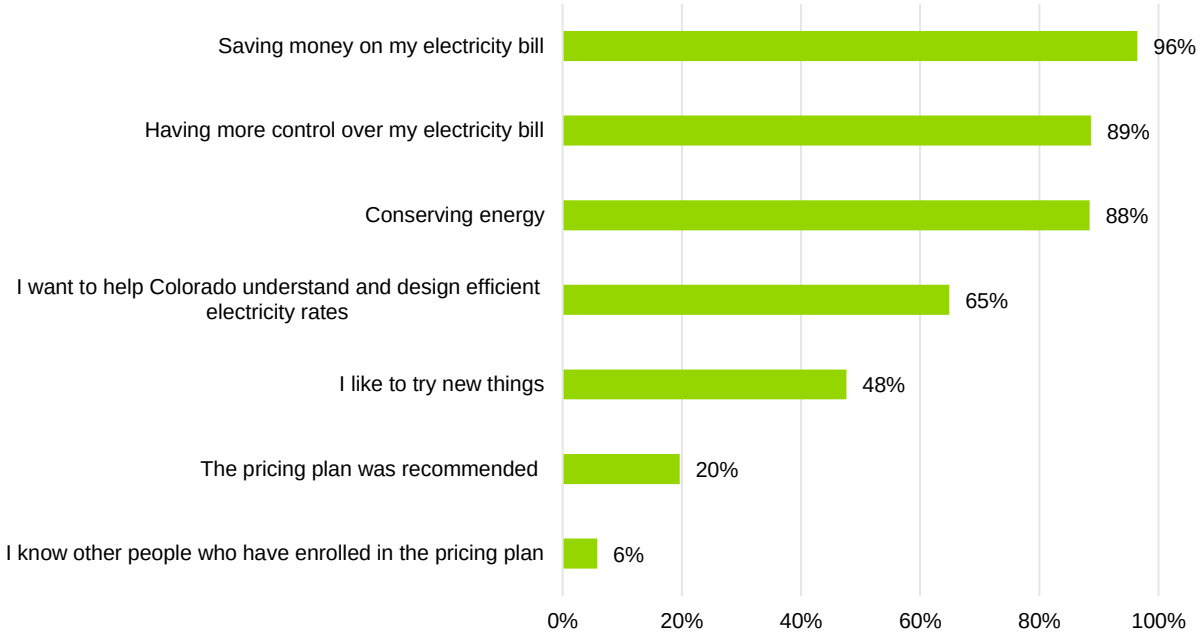
Figure 4-1. Xcel Energy Time of Use Awareness (N = 1,196)



D1 How did you hear about the Xcel Energy Time-of-Use and/or Peak Demand pricing plan?
Source: Navigant analysis of online survey data

Figure 4-2 presents participant motivations for signing up for the plan. The results show that the vast majority of customers are motivated by savings money on their electricity bill (96% of respondents). Other motivators include having more control over their energy bill (89% of respondents) and conserving energy (88% of respondents).

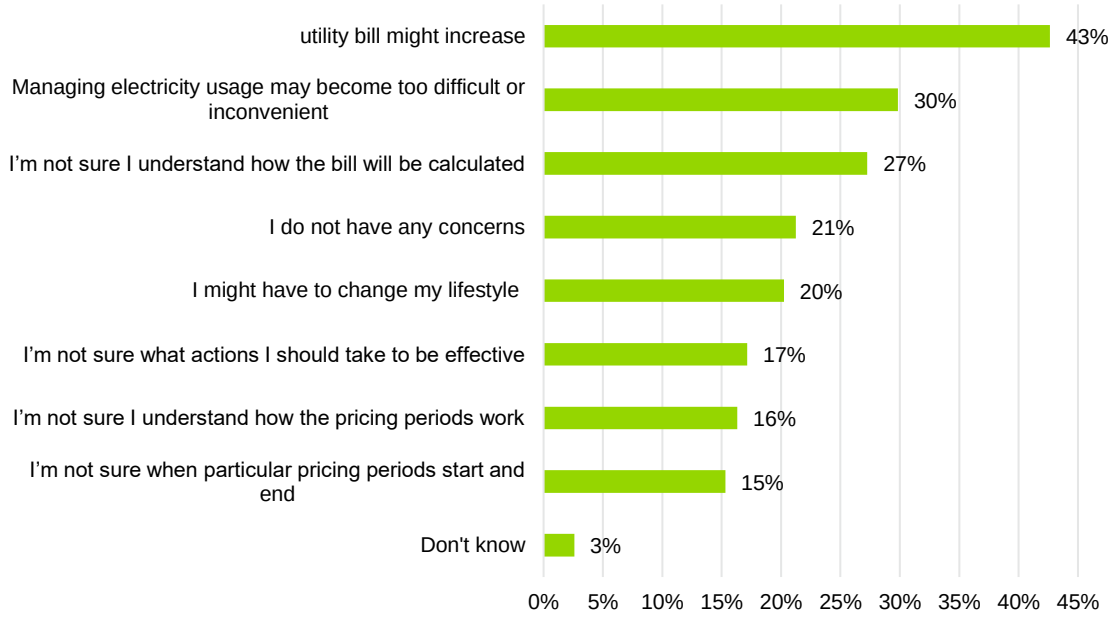
Figure 4-2. Motivators for Participation (N = 1,196)



A2 Please indicate the importance of the following factors in motivating your participation in the Time of Use pricing plan
Source: Navigant analysis of online survey data

Navigant asked customers what concerns, if any, they had about participating in this new rate. Figure 4-3 shows the results for this question and shows that near the time of enrollment, most customers are concerned that their electricity bill may increase (43% of respondents). Customers are also concerned that managing electricity use may become difficult or inconvenient (30%) and that they may not fully understand how the bill is calculate (27%).

Figure 4-3. Participant Concerns about TOU Rate (N = 1,196)



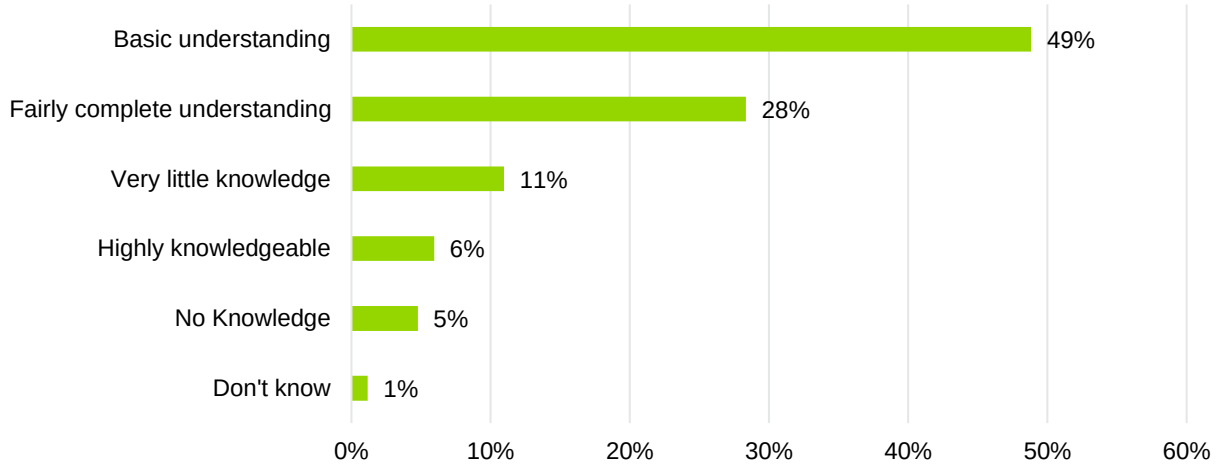
A8 What concerns, if any, do you have about participating in this new rate plan?
Source: Navigant analysis of online survey data

4.1.2 Understanding of the Rate

To assess participant understanding of the rate, Navigant asked participants to rate their own level of knowledge about the TOU rate. Navigant then presented various statements about the TOU rate and asked participants to agree or disagree with the statements.

Figure 4-4 shows the results of the question assessing self-reported knowledge, indicating that most customers feel they have a basic or less-than-basic knowledge of the TOU rate. Just over a quarter report that they have a fairly complete understanding of the rate (28%) and only 6% feel they are highly knowledgeable about the TOU rate.

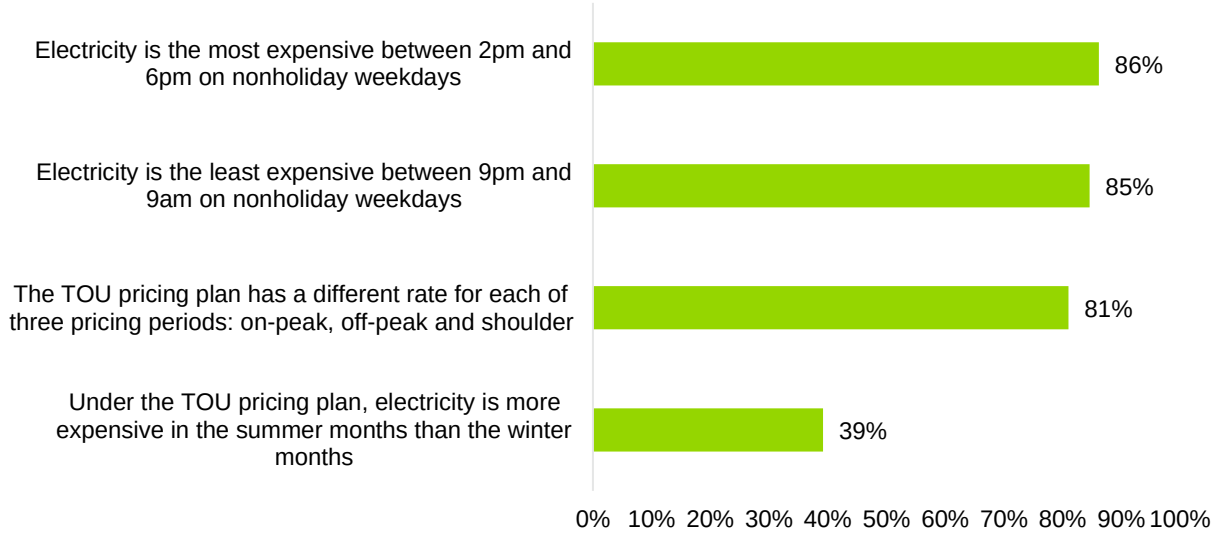
Figure 4-4. Knowledge of the TOU Rate (N = 1,196)



C1 How would you characterize your level of knowledge about how the Time of Use pricing plan works?
Source: Navigant analysis of online survey data

Navigant asked participants whether they agree or disagree with several statements about the TOU rate and the results for each question are shown in Figure 4-5. Navigant determined that more than 80% of participants understand the core elements of the plan. However, most participants are not aware that electricity is more expensive in the summer months than in the winter.

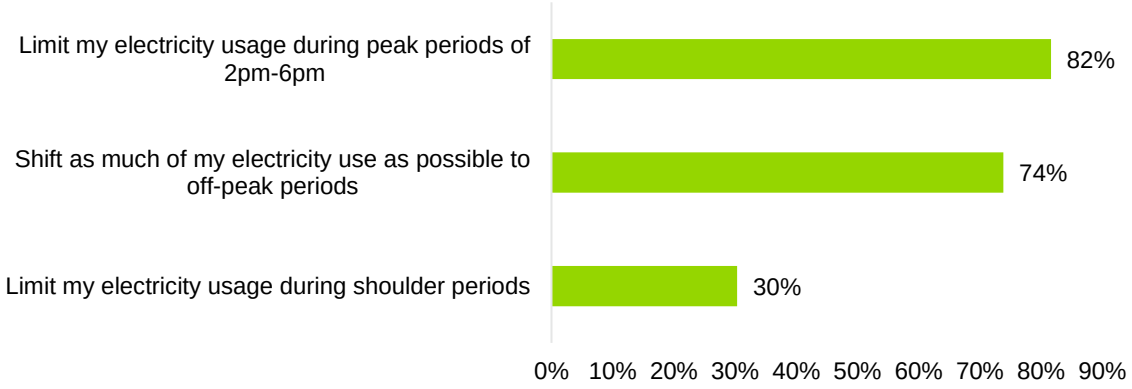
Figure 4-5. Respondent Knowledge on Time of Use (N = 1,196)



C2 Please indicate whether you agree or disagree with the following statements about the Time of Use pricing plan.
Source: Navigant analysis of online survey data

When asked to identify effective strategies for reducing electricity use under the TOU rate, results in Figure 4-6 show that participants recognize the importance of limiting peak usage but are less likely to recognize the importance of limiting shoulder usage.

Figure 4-6. Effective Strategies for Reducing Electricity Use

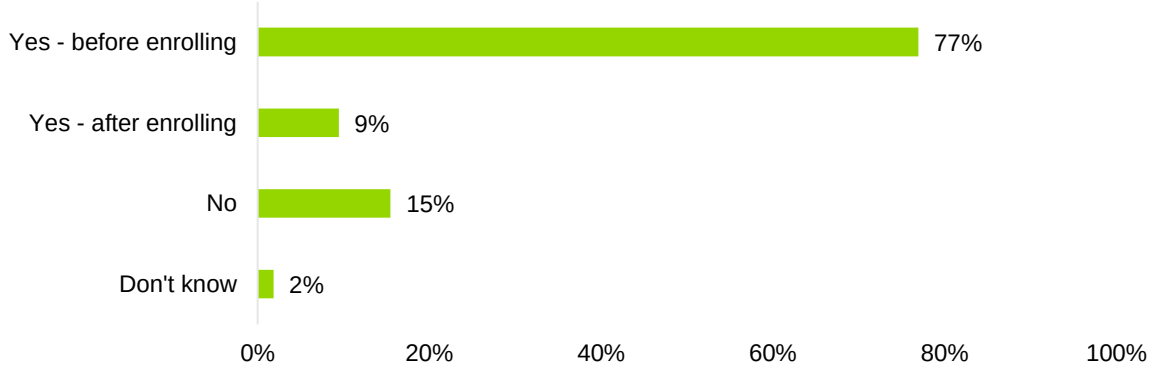


C3 Please indicate which of the following represent effective strategies for reducing your electricity bill under the Time of Use pricing plan.
Source: Navigant analysis of online survey data

4.1.3 Feedback on Efficacy of Customer Resources for the TOU Rate

To assess feedback on efficacy of TOU rate resources, Navigant asked survey participants if they visited the Xcel Energy website to learn about rate options, what tools they used to decide to enroll, and the level of level of helpfulness for the resources that they used. Figure 4-7 shows the results for participant use of the website, which shows that three-quarters of participants visit the Xcel Energy website before enrolling. Nine percent visit the website after enrolling and 15% do not visit the website at all.

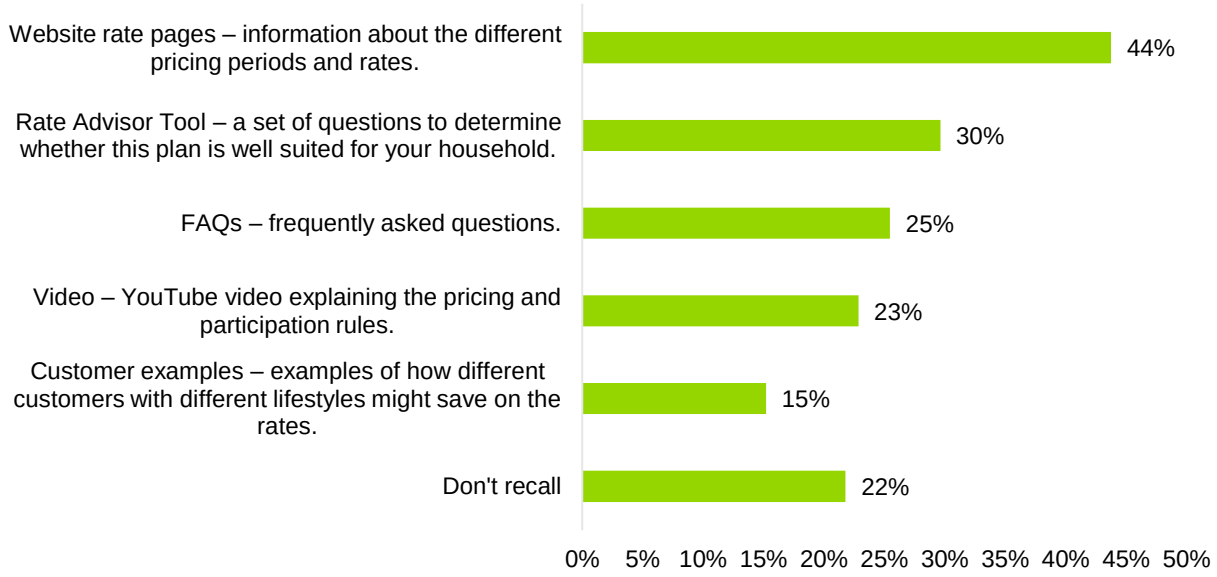
Figure 4-7. Xcel Energy Website Visits to Learn About the Residential Pricing Options (N = 1,196)



D3 Did you visit the Xcel Energy website to learn more about the new residential pricing options?
Source: Navigant analysis of online survey data

Navigant asked participants if they use online resources to inform their decision to enroll, as shown in Figure 4-8. The website rate pages and the Rate Advisor Tool were the most popular resources used by participants to learn more about the plan, with 44% and 33% of respondents reporting usage, respectively. Frequently asked questions and videos were each used by roughly one-quarter of participants who visited the website.

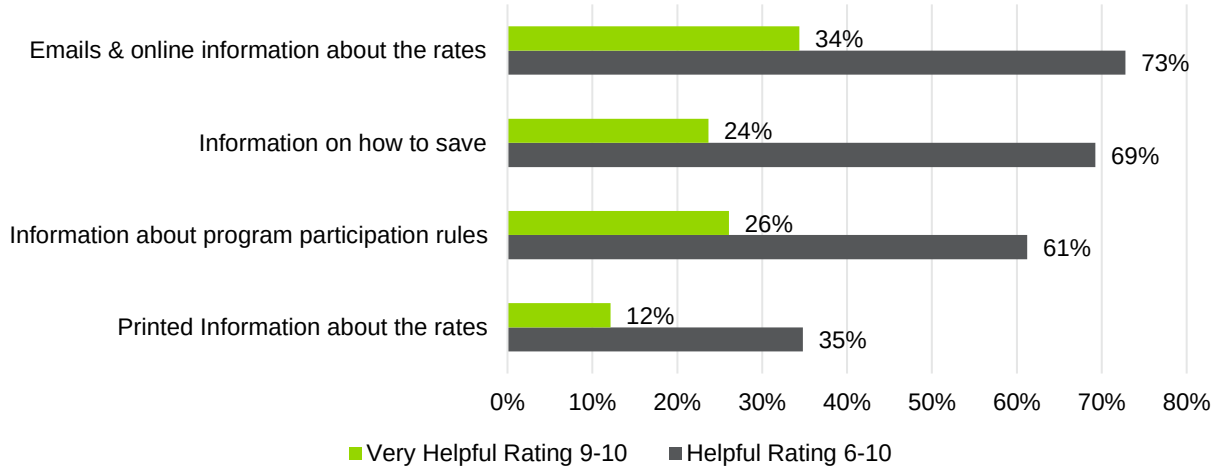
Figure 4-8. Online Resources Used to Learn about the TOU Rate (N = 1,196)



D4 Did you use any of the following online resources to inform your decision to enroll?
Source: Navigant analysis of online survey data

Survey respondents rated the helpfulness of informational resources on a scale of 0-10 where 0 is very unhelpful and 10 is very helpful. Figure 4-9 shows that emails and online information were perceived as the most useful followed by information on how to save, since a higher percentage of respondents rated these resources as helpful (rating of 6-10 on a 10-point scale) or very helpful (rating of 9-10 on a 10-point scale).

Figure 4-9. Helpfulness of Informational Resources



D7 For each of the following questions, please drag the slider bar left or right to indicate your response. On a scale of 0 to 10 where 10 is "very helpful" and 0 is "very unhelpful," please indicate how helpful the following information resources were in your decision to participate in the new pricing plan.

Source: Navigant analysis of online survey data

4.2 Participation Experience

The Wave 2 survey was an online survey designed to gather information about customer perceptions and experiences following participants' first summer of enrollment in the TOU rate. The primary topics explored by this survey include:

- How well participants understand their bill
- Changes in energy use behaviors since signing up for the TOU rate
- Customer motivations for enrolling and success in achieving enrollment goals
- Customer perceptions and support for hypothetical changes to the TOU rate

Survey data were collected by means of two separate rounds of the Wave 2 survey, in December 2017 and October 2018. A total of 1,252 customers participated in the survey, reflecting a response rate of 34% of invited participants (Table 4-3).

Table 4-3. Wave 2 Survey Participation

Timing	Survey Completes	Response Rate
Dec 2017 and Oct 2018	**1,252**	**34%**

A synopsis of reported participant experiences from the Wave 2 survey is as follows:

- **Moderate shifting in usage.** Following their first summer on the new TOU rate, *many participants had responded to the TOU price signals by shifting their use of some of their appliances and air conditioning to shoulder and off-peak periods*.

- **Uncertainty over energy/bill savings.** Customers' motivation for participating in the TOU rate is largely grounded in the common goals of reducing electricity consumption and lowering their electricity bill. Although customers reported having taken action, they also experienced some *uncertainty as to whether their actions were resulting in the energy and bill savings* they had enrolled to achieve.
- **Customer-suggested changes to the rate.** Perhaps as a result of this uncertainty, customers expressed interest in several hypothetical changes to the pricing plan. Their responses suggest a potential concern about the cost of electricity during shoulder periods.

In general, *customer strategies tended to be much more focused on changing when and how they used appliances and air conditioning than on buying new technologies*. Customers were most likely to shift laundry-related behaviors and their use of their dishwasher. A smaller proportion of customers reported changes in air conditioning use, and customers with electric ranges and ovens indicated challenges in avoiding the use of these appliances during peak periods. Wave 2 survey findings are discussed in more detail below.

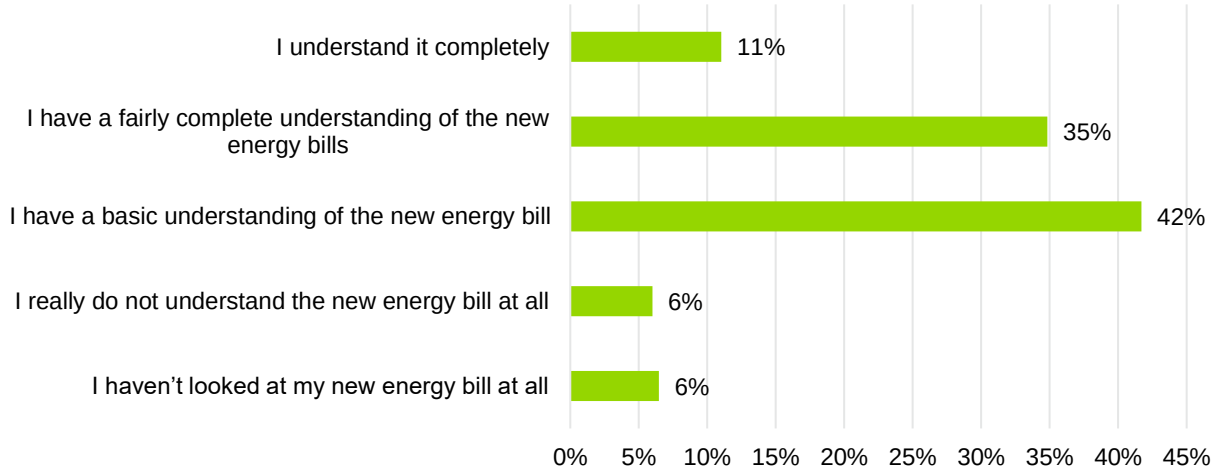
The remainder of this discussion addresses the following topics:

1. Understanding of electricity bills
2. Behavior changes
3. Perceptions of success
4. Support for hypothetical rate design changes

4.2.1 Understanding of Electricity Bills

As shown in Figure 4-10, most customers (88%) have at least a basic understanding of their new energy bill. Within this group, many customers (46%) indicate that they have either a fairly complete understanding of their electricity bill or that they understand the bill completely. Only 12% do not understand the bill at all or have not taken the time to look at their new bill. These findings indicate that customers have a moderate to high level of understanding of their new electricity bill and that their ability to understand the bill is unlikely to be an important influence on customer performance under the TOU rate.

Figure 4-10. Customer Understanding of TOU Energy Bill (n=1,252)



Q4 How well do you understand your new energy bills?
Source: Navigant analysis of online survey data

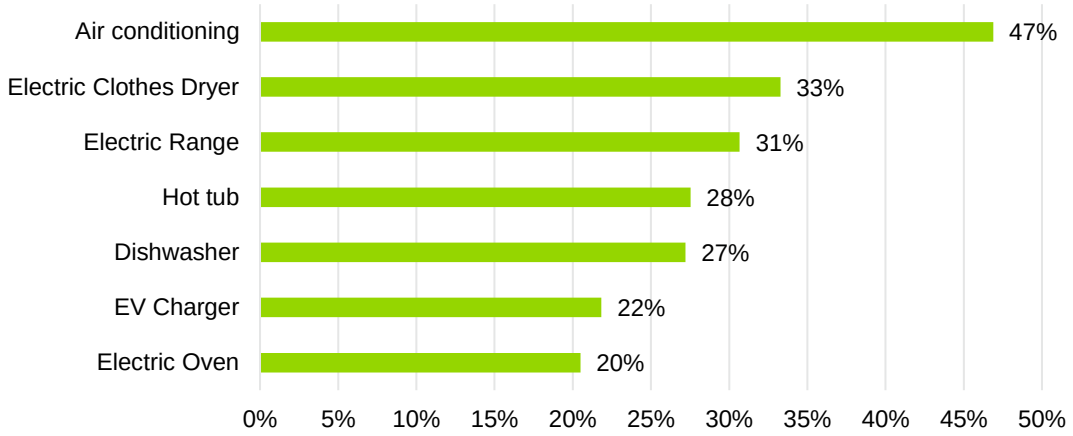
4.2.2 Behavior Change

Survey research indicates that many customers have made important changes to their energy use behaviors by shifting their use of appliances and air conditioning from peak periods to shoulder and off-peak periods, while a smaller proportion of customers have purchased new technologies since joining the TOU rate. Figure 4-11 shows customers' appliance use prior to enrolling in the TOU rate. The data indicates that nearly half of customers with air conditioning were using air conditioning during peak hours prior to enrolling while roughly one-third of customers with electric clothes dryers and ranges were using those during peak hours.

Figure 4-12 illustrates the notable changes in customers' appliance use after enrolling in the TOU rate. The percent of customers with air conditioning who typically used air conditioning during peak hours declined from 47% to 22%. Other notable declines were also seen in customers' use of electric clothes dryers, ovens, ranges, dishwashers, and electric vehicle chargers.

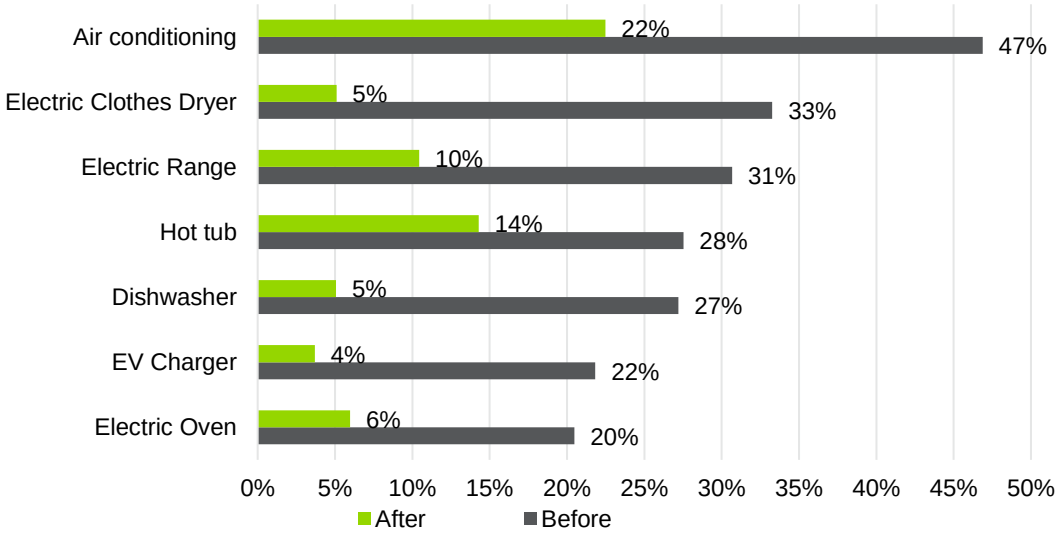
Due to the large energy demand associated with air conditioning use, several survey questions looked more closely at shifts in customers' air conditioning behaviors and the strategies that they have embraced to reduce the effects of air conditioning on their bill. As illustrated in Figure 4-11, Figure 4-12, and Figure 4-13, customers have made notable changes in a subset of air conditioning-related behaviors. For example, as shown in Figure 4-13, the biggest changes were associated with two behaviors: 1) moving away from "set it and forget it" practices in which customers set thermostat temperatures below 78°F at all times, and 2) customers' more frequent decision to forgo the use of air conditioning (except when it is really hot outside).

Figure 4-11. Appliance Use During Peak: Appliances for Which Customers Report Frequent Use Prior to Enrollment



Q10 Before signing up for the new pricing plan, how frequently did you run the following appliances during the hours of 2pm to 6pm during the summer months (June – Sept)?
Source: Navigant analysis of online survey data

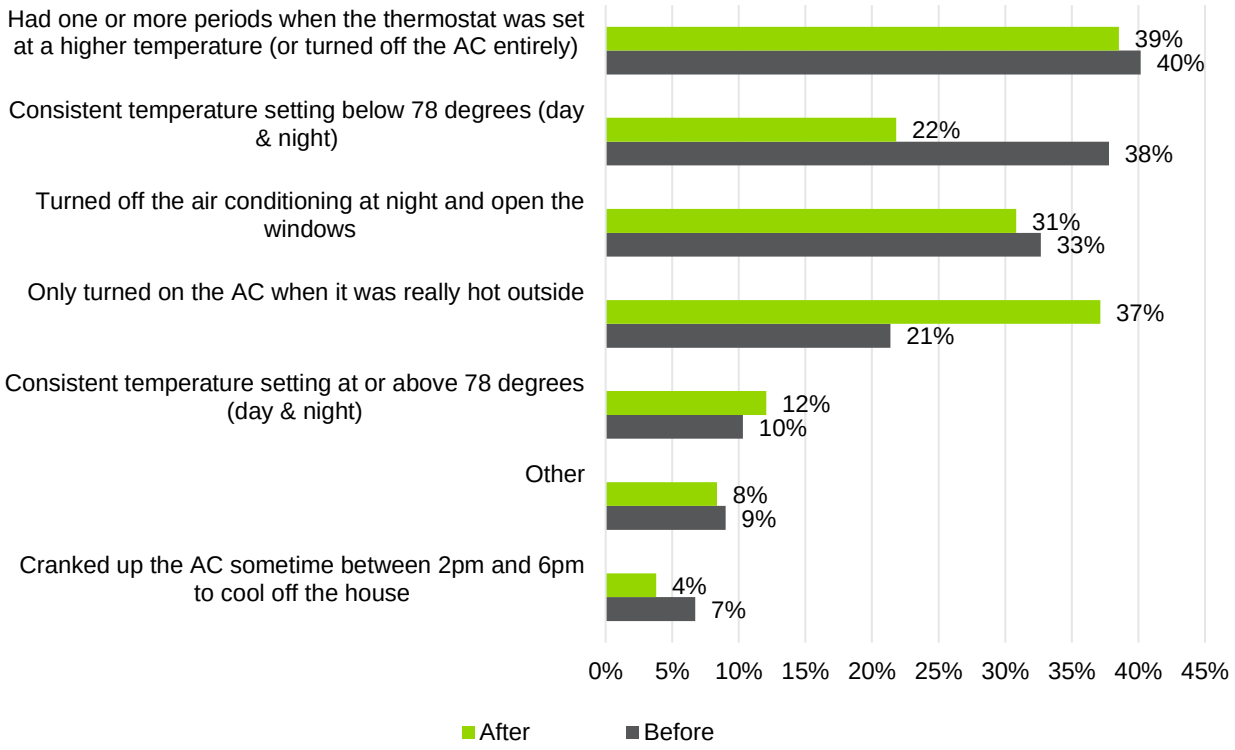
Figure 4-12. Appliance Use Practices Before and After Enrollment



*Percentages are of those households who own the specified technology.

Q10 Before signing up for the new pricing plan, how frequently did you run the following appliances during the hours of 2pm to 6pm during the summer months (June – Sept)?
Q12 After enrolling in the new pricing plan, how frequently have you run the following appliances during the hours of 2pm to 6pm during the summer months (June – Sept)?
Source: Navigant analysis of online survey data

Figure 4-13. Air Conditioning Use Practices (TOU) Before and After Enrollment (n=921)

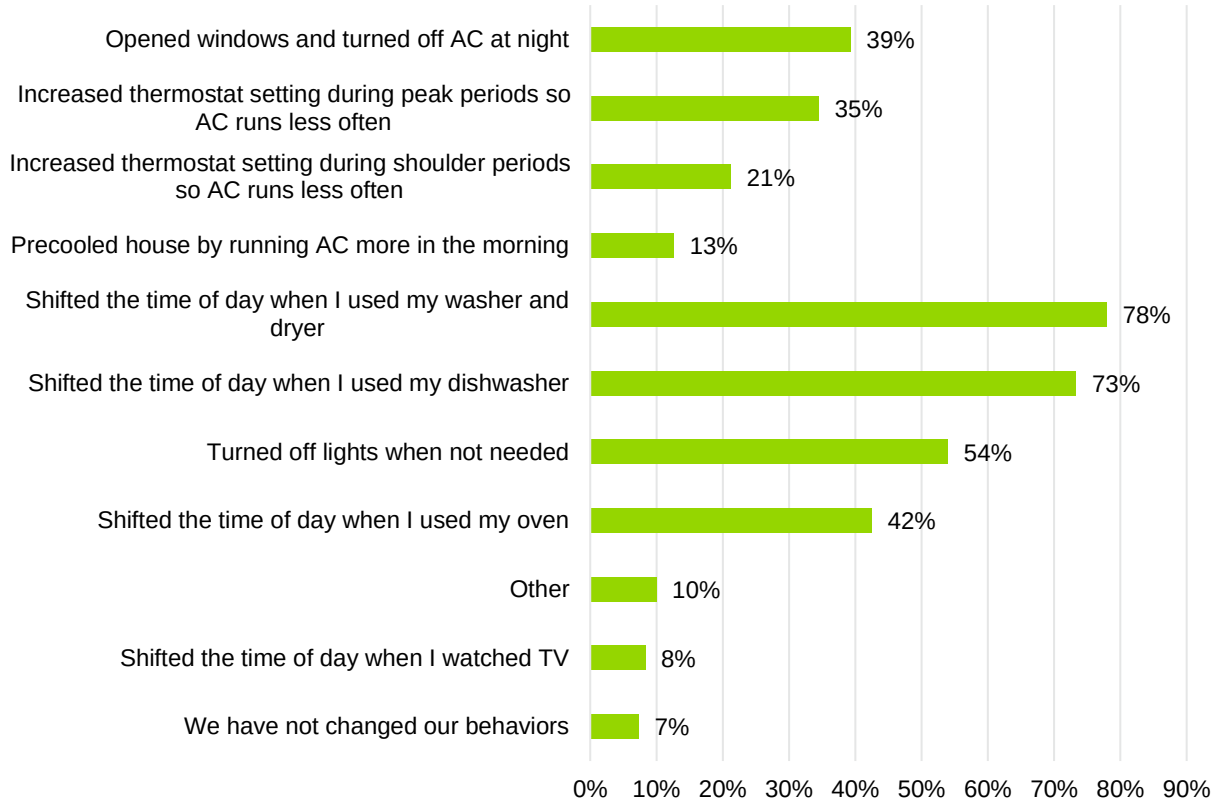


*Percent of households with air conditioning.

Q11 Before signing up for the new pricing plan, how would you describe the typical air conditioning settings in your home during the summer months (June – Sept)?
Q13 After enrolling in the new pricing plan, how would you describe the typical air conditioning settings in your home during the summer months (June – Sept)?
Source: Navigant analysis of online survey data

Figure 4-14 shows that a very small percentage (7%) of customers have taken no action to shift their behaviors and that customers are more likely to shift their use of electric appliances than they are to shift their air conditioning use practices. Of those customers who are making changes to their air conditioning use most are increasing their thermostat setting during peak and turning the air conditioning off at night. Of those who are shifting appliance use most are shifting when they do laundry and run the dishwasher but appear to be having a harder time shifting their use of their oven.

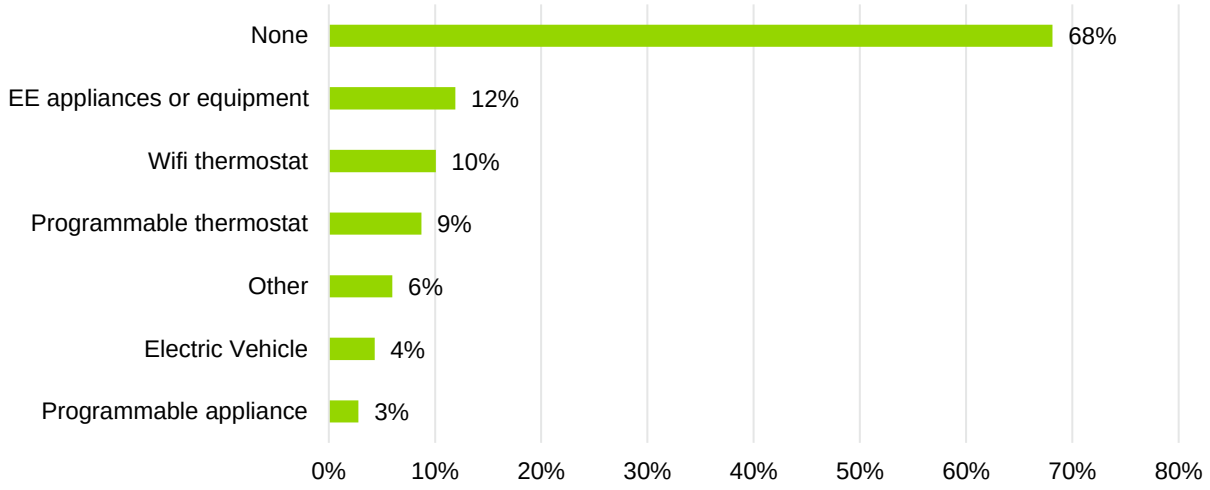
Figure 4-14. Post-Enrollment Customer Actions - Actions Taken after Signing up for the TOU Rate (n=1,252)



Q14 Please indicate which of the following actions you or others in your household started doing (during the months June – Sept) after you signed up for the new pricing plan.
Source: Navigant analysis of online survey data

Unlike the notable shifts in behavior noted above, customers have been less likely to purchase new technologies since enrolling in the TOU plan. As shown in Figure 4-15, of the 32% of customers who have purchased a new technology, most have purchased either a new Wi-Fi thermostat (10%) or new programmable thermostat (9%). Other technology purchases include new energy efficient appliances, electric vehicles, and Wi-Fi appliances.

Figure 4-15. Post-Enrollment Purchases Made after Signing up for the TOU Rate (n=1,252)



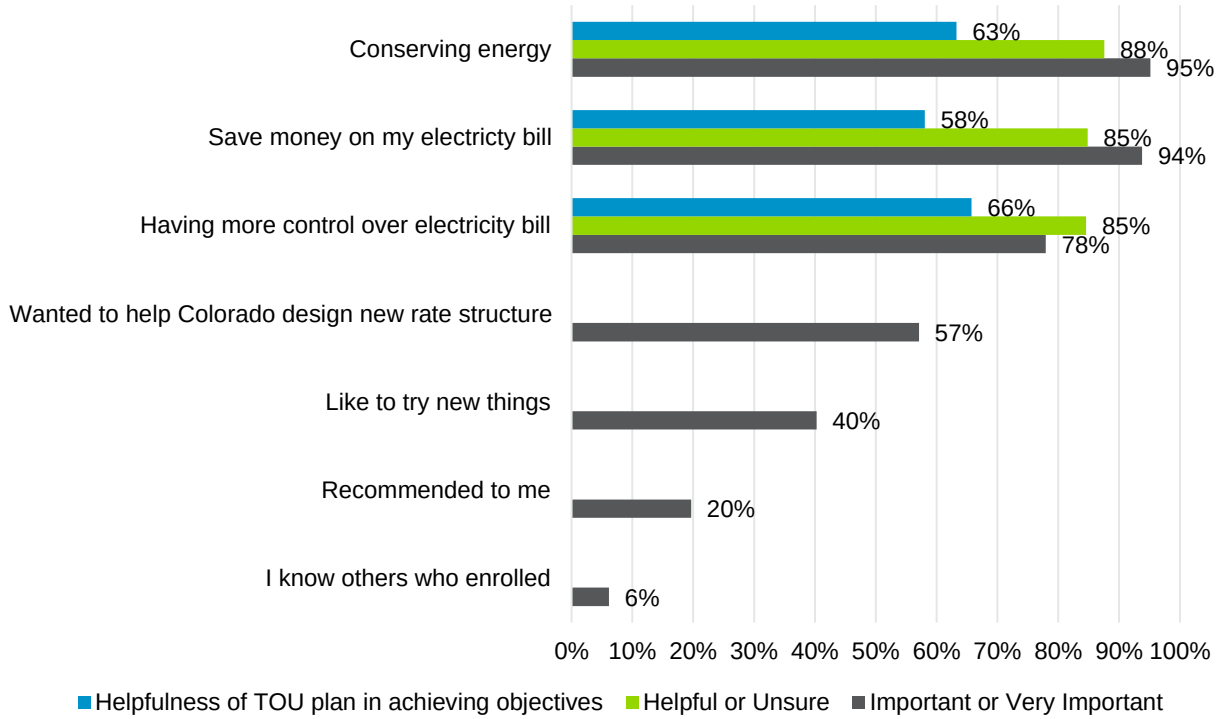
Q17 Please indicate which of the following items that you or others in your household have purchased after signing up for the new pricing plan.
Source: Navigant analysis of online survey data

4.2.3 Perceptions of Success

Customers are motivated to enroll in the TOU rate for a variety of reasons. As illustrated in Figure 4-16, however, there are three primary motivations that drive customer enrollment: conserving energy (95%), saving money (94%), and having more control over their energy bill (78%). It is also notable that more than half of customers (57%) indicated that they were also motivated by the opportunity to help Colorado design a new rate structure.

After their first summer of enrollment, about two-thirds of customers believed that the TOU rate had helped them achieve their goals of conservation and control and more than half of customer (58%) indicated that the rate had helped them save on their energy bill.

Figure 4-16. Customer Motivations and Perceptions of Success - Motivations for Enrolling and Perceived Helpfulness of TOU Rate at Achieving Goals (n=1,252)

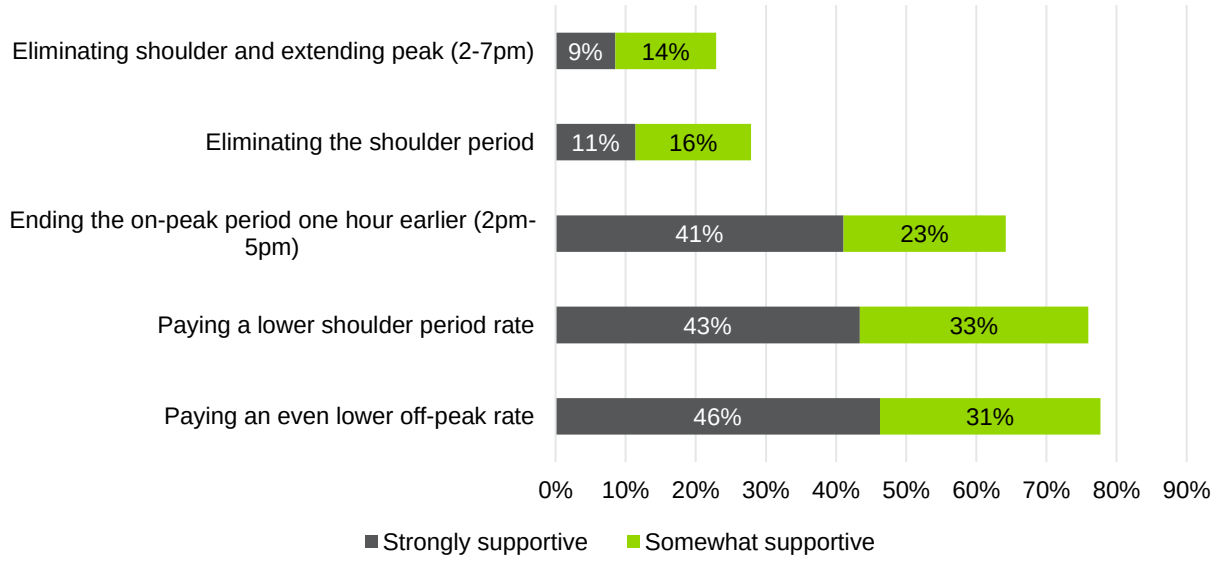


Q18 Please indicate the importance of the following factors in motivating your participation in the Time of Use pricing plan.
Q18b-Q18d Has your participation in the Time of Use pricing plan helped you conserve energy/save money on your electricity bill/achieve more control over your electricity bill?
Source: Navigant analysis of online survey data

4.2.4 Support for Hypothetical Rate Design Changes

Customers expressed support for three of the five hypothetical changes to the rate that they were asked to consider. As shown in Figure 4-17, customers were most supportive of those changes that proposed paying an even lower off-peak rate (77%) or paying a lower shoulder rate (76%) in exchange for paying a higher peak rate. A majority of customers (64%) also supported shortening the on-peak period in exchange for paying a higher peak rate. Customers were largely not supportive of eliminating the shoulder or extending the peak period. This finding may suggest customer concern with the cost of electricity during shoulder periods and reducing consumption during the final hour of the peak period.

Figure 4-17. Customer Support for Hypothetical Changes to Rate - Customer Support for Hypothetical Changes in TOU Rate (n=1,252)



Q22 In thinking about your experience on the Time of Use pricing plan, please indicate how supportive you are likely to be of each of the following hypothetical changes to the pricing plan.
Source: Navigant analysis of online survey data

4.3 Participant Dropouts: Drivers and Customer Feedback

The evaluation of customer retention and dropouts consists of two distinct elements:

- **A statistical regression analysis characterizing** the correlation between various independent factors and participants' decision to opt **off the TOU rate** and back to the R rate.
- **A participant dropout survey** designed to gather insights and recommendations from customers who dropped out of the TOU rate.

As of October 2018, when the evaluation team conducted the opt-out analysis, nearly 1,500 TOU participants had opted out of the trial (excluding approximately 700 who left the rate because they moved residences). The main takeaway from the statistical analysis is that **for every dollar increase in a customer's bill relative to the R rate, they are roughly 4% *more likely* to drop out; and for every month of participation in the TOU rate, they are about 35% *less likely* to drop out.** The apparent influence of bill increases on dropout rates is supported by the survey data, which identifies the top three reasons for leaving the TOU rate (aside from moving residences) are perceived bill increases, saving less than expected, and uncertainty over whether bills were going down (see Figure 4-18 on page 60).

4.3.1 Statistical Analysis of Customer Dropouts

The customer retention analysis is a statistical analysis that characterizes the relationship between various independent factors and participants' decision to leave the rate, such as the length of time on the rate and changes in their bill relative to what it would have been on the R rate. The analysis incorporated data relating to the timing of withdrawal decisions, energy consumption data, household characteristics,

appliance and technology saturation, and demographics. A variable relating to each of these was then tested in a logistic regression model to determine if there was a relationship with the decision to withdraw from the RE-TOU rate trial.

The analysis found that the two primary influences on the likelihood of a participant to drop out of the TOU rate are:

- Changes in monthly bills relative to what it would have been on the R rate, and
- Length of time on the RE-TOU rate.

Impact of bill increases on opt-out rates. For every dollar increase in a customer's bill relative to the R rate, they are roughly 4% *more likely* to drop out; countering this influence, every month of participation in the TOU rate makes a customer about 35% *less likely* to drop out. (See Table 4-4 for the regression coefficients.) The apparent influence of a bill increase is fairly straightforward: the likelihood of a given participant dropping out of the trial rate goes up by 4% if their average bill while on the RE-TOU rate as just a dollar higher than it otherwise would have been; and a five-dollar average bill increase would make a customer 20% more likely to drop out.

Impact of longevity in the TOU rate on opt-out rates. The longer a participant is in the trial the less likely they are to drop out. On average, about 9% of customers who enrolled in the pilot had opted out at the time of this analysis in October 2018. Among these customers who opted out, 46% did so within a month of enrolling; but only about 17% opted out in the second month, and 10% in the third month. Across the six months of each customer's participation considered for the analysis, the model estimates that the likelihood of opting out decreases by about 35% for each month a customer is in the rate.

Aside from bill changes and time on the RE-TOU rate, none of the other possible influences that the evaluation team test for, such as various demographic and household characteristics, could explain dropout trends in a statistically significant manner.

These findings suggest that despite widespread uncertainty over changes in their bill from the R rate, customers do have a sense of whether they are saving money on the RE-TOU rate. Furthermore, those who are not saving are increasingly more likely to opt-out according to the magnitude of the bill increase.

Table 4-4. Dropout Analysis Model Output

Parameter	Parameter Estimate	Standard Error	Z-Value	Statistical Significance
Intercept[26]	0.990	0.11	9.25	99% Confidence Interval
Months Since Enrollment	-0.349	0.03	-10.51	99% Confidence Interval
Bill Difference Relative to R ($)	0.043	0.01	5.26	99% Confidence Interval

Note: None of the other tested parameters were significant at an 80% confidence/precision

[26] The intercept term is the starting point for estimating the likelihood of a customer dropping out. The other variables are multiplied by the applicable number of months since enrollment or bill difference and added to the intercept parameter estimate.

4.3.2 Participant Dropout Surveys

The dropout survey is an online survey designed to gather insights and recommendations from customers who dropped out of the TOU rate. The primary topics explored by this survey include:

- Reasons for leaving TOU rate
- The level of customer engagement and behavior change while on the rate
- The degree to which customers made use of informational resources before leaving the rate
- Customer recommendations for changing the rate

Survey data were collected by means of three separate rounds of the opt-out survey over the course of 2018 in order to gather insights in a timely manner following the customers' decision to leave the TOU rate. A total of 383 TOU customers participated in the dropout survey for a response rate of 28%.

Table 4-5. Dropout Survey Participation

Timing	Survey Completes	Response Rate
January, July/August, and October 2018	**383**	**28%**

A synopsis of the dropout survey findings is as follows:

- **Bill concerns topped the list of reasons why most customers left the TOU rate.** Although nearly one-third of customers left the rate because they moved residence, concerns over changes (including both actual and potential changes) in customers' bills constituted the predominant motivator for the remainder of customers.
- Despite their dissatisfaction and concerns, **nearly all customers who left the rate indicated that they had taken some actions to change their energy use practices**. Notably, however, the actions taken by customers who left the rate were less likely to include changes in the use of air conditioning when compared to customers who remained enrolled. Similarly, a comparison with Wave 1 survey data indicates that customers who dropped out were less likely to make use of educational materials provided by Xcel Energy.
- **Customer recommendations for improving the rate** focused on providing a better price structure and explanation of the rate, improving customer service and providing more information, and changing the rate structure.

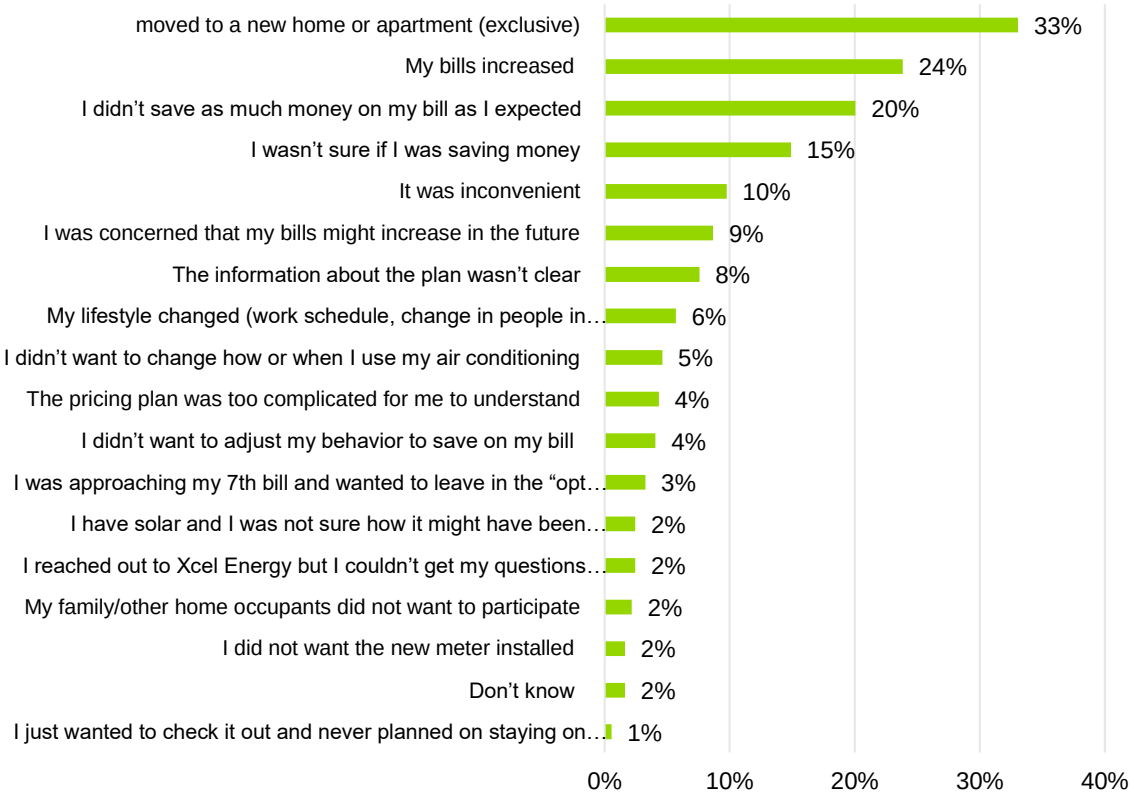
These and related findings are discussed in more detail below according to the following topics:

1. Reasons for leaving the rate
2. Actions taken while on the rate
3. Use of Xcel Energy information and support resources

4.3.2.1 Reasons for Leaving the TOU Rate

Customers reported leaving the TOU rate for a variety of reasons, however, concerns over changes in their monthly electricity bill was among the most notable reasons expressed. As shown in Figure 4-18, customers were most likely to leave the rate because they moved residence. For customers who did not move, however, motivations to leave the plan were more closely linked to concerns about increases in their bills (24%), unmet expectations in the amount of bill savings (20%), and uncertainty they were saving on their bill (15%). Of customers, 14% indicated that the plan was either inconvenient or they did not want to adjust their behavior to save on their bill.

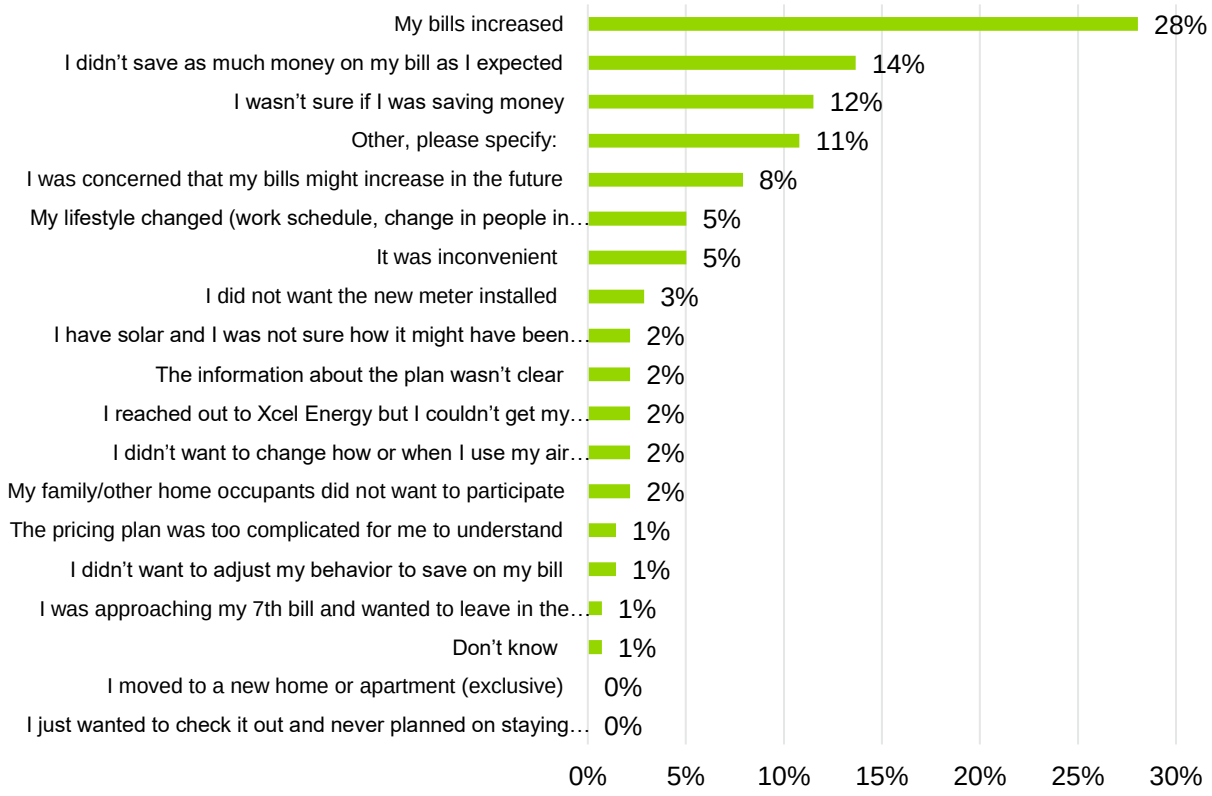
Figure 4-18. Reason for Leaving the TOU Rate (N=369)



Q1 It is helpful to understand why customers drop out of a pilot program. Often more than one factor is involved. Can you identify the reasons why you dropped out of the Time of Use pricing plan?
Source: Navigant analysis of online survey data

For customers who provided multiple reasons for leaving, financial concerns were identified as the principal reason influencing their decision. Of those citing multiple reasons, the largest proportion of customers (28%) pointed to bill increases as the main reason they left. The second and third most prominent influences were less-than-anticipated savings, and customer uncertainty about whether they were saving money on the TOU rate.

Figure 4-19. Most Important of Multiple Reasons for Leaving the TOU Rate (N=139)

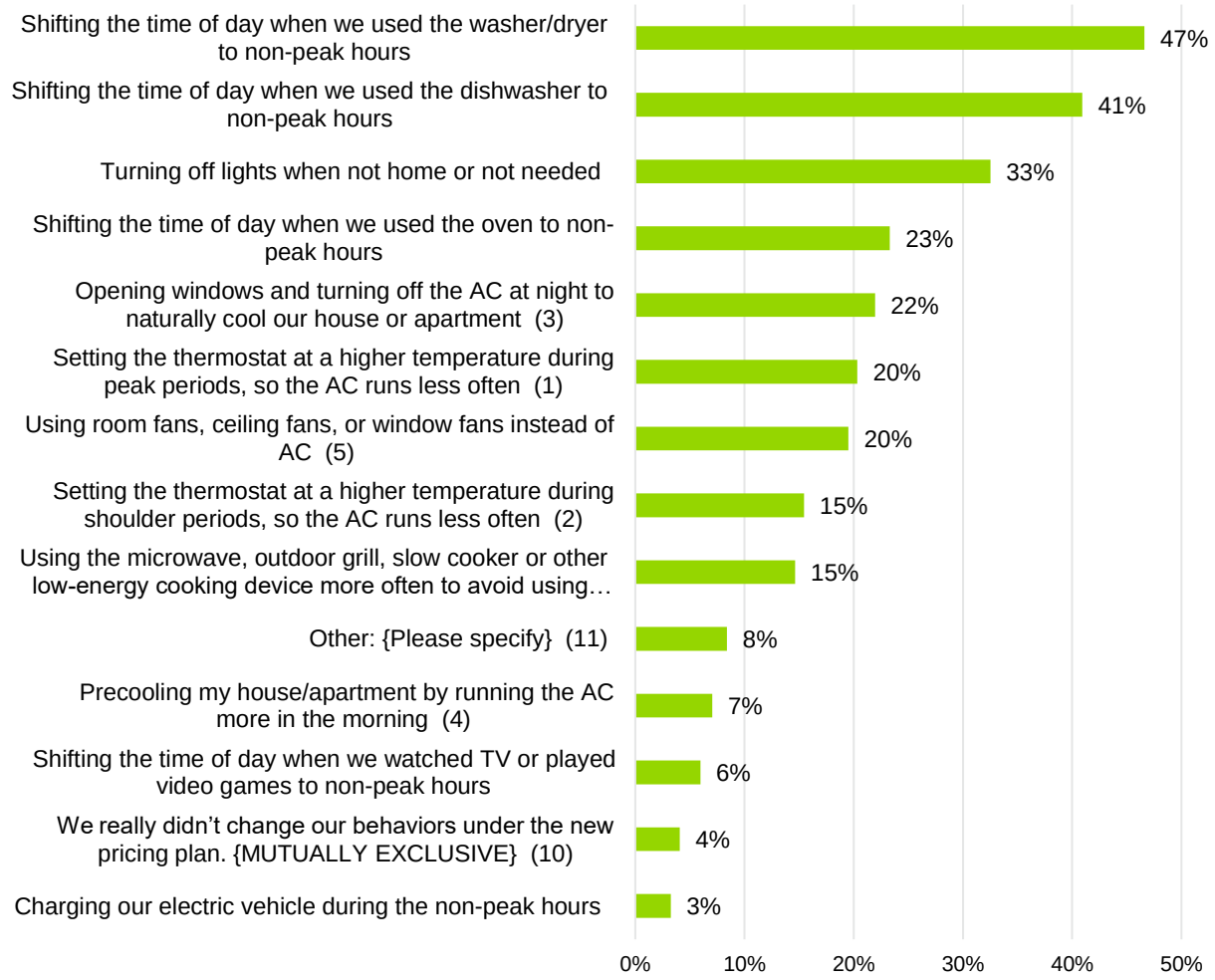


Q2 Which one of the factors above was most important in influencing your decision to drop out?
Source: Navigant analysis of online survey data

4.3.2.2 Actions Taken While on the TOU Rate

Most of the customers who dropped out of the TOU rate indicated that they changed one or more behaviors while on the rate. As shown in Figure 4-20, only 4% of customers indicated that they had not taken any actions to shift their behaviors. Notably, however, customers who dropped out of the rate were less likely to make changes to their air conditioning practices than those who did not drop out of the rate. These findings suggest that customers who dropped out of the TOU rate were less likely to change those behaviors that are likely to have the largest impact on bill savings.

Figure 4-20. Actions Taken While on the TOU Rate (N=369)

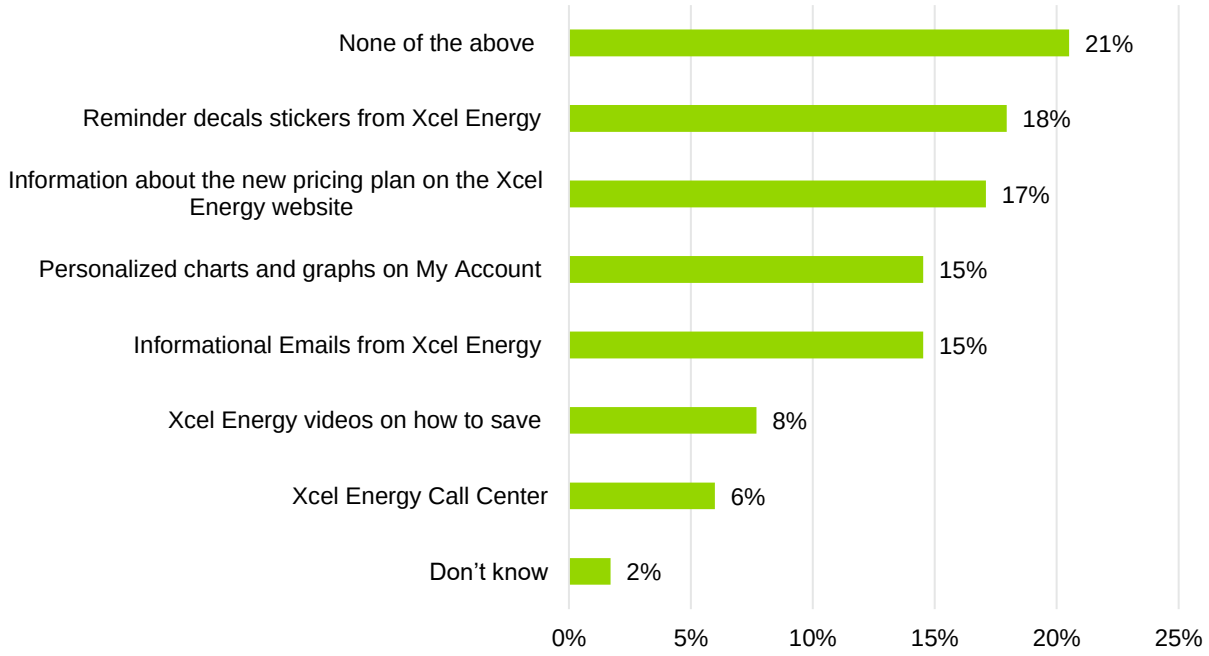


Q4 Please indicate which of the following actions you or others in your household started doing after you signed up for the new pricing plan.
Source: Navigant analysis of online survey data

4.3.2.3 Use of Xcel Energy Resources

A comparison of data from the dropout survey and the Wave 1 survey suggests that customers who dropped out of the TOU rate may have also been less likely to make use of Xcel Energy resources. As shown in Figure 4-21, 21% of customers who dropped out of the TOU rate indicated that they had not used any of the listed information sources. Of those who did access resources, the TOU stickers and Xcel Energy website were the most oft sited resources, used by 18% and 17% of customers, respectively. Wave 2 survey results indicate that 80% of respondents had used the TOU stickers and 47% had found them helpful. Similarly, 86% of Wave 1 Survey participants indicated that they had visited the Xcel Energy website either before or after enrolling to learn more about the program (see Figure 4-21). These findings suggest that customer retention may be associated with a certain level of customer engagement and that the use of an expanded set of engagement strategies may be helpful at increasing retention rates.

Figure 4-21. Xcel Energy Resources Used to Improve TOU Performance (N=234)



NQ1 Which of the following information resources did you use to improve your performance on the Time of Use pricing plan?
Source: Navigant analysis of online survey data

4.3.2.4 Customer Recommendations for Improvement

Near the end of the survey, Navigant included an open-ended question asking customers for their recommendations on additional changes to the rate. The vast majority of survey respondents (81%) offered recommendations for improving the rate or helping customers be more successful on the rate. The most common recommendations included:

- Providing a better price structure and explanation of the rate (36%)
- Improving customer service and providing more information (19%)
- Changing the rate charged or changing peak/off-peak hours (11%)
- Explaining to low energy households that they will not benefit from the rate or providing a means of evaluating which types of households are likely to benefit (10%)

Appendix A. ENERGY CONSUMPTION IMPACTS – BY SEGMENT

A.1 Low Income Consumption Impacts

Figure A-1. Summer RE-TOU Energy Consumption Impacts – Low Income

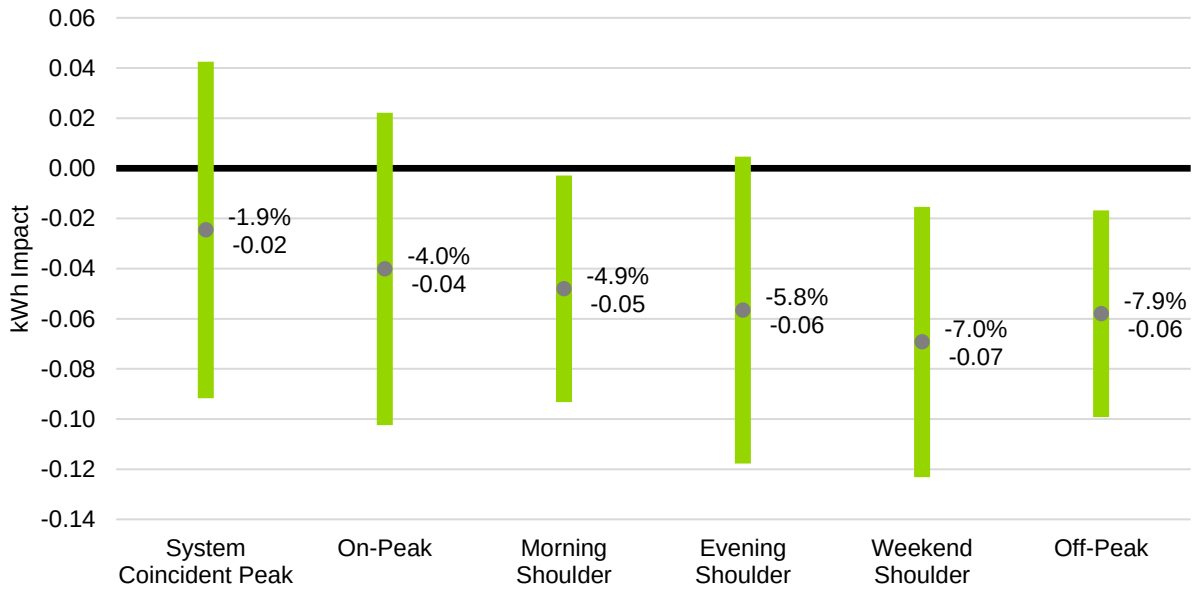
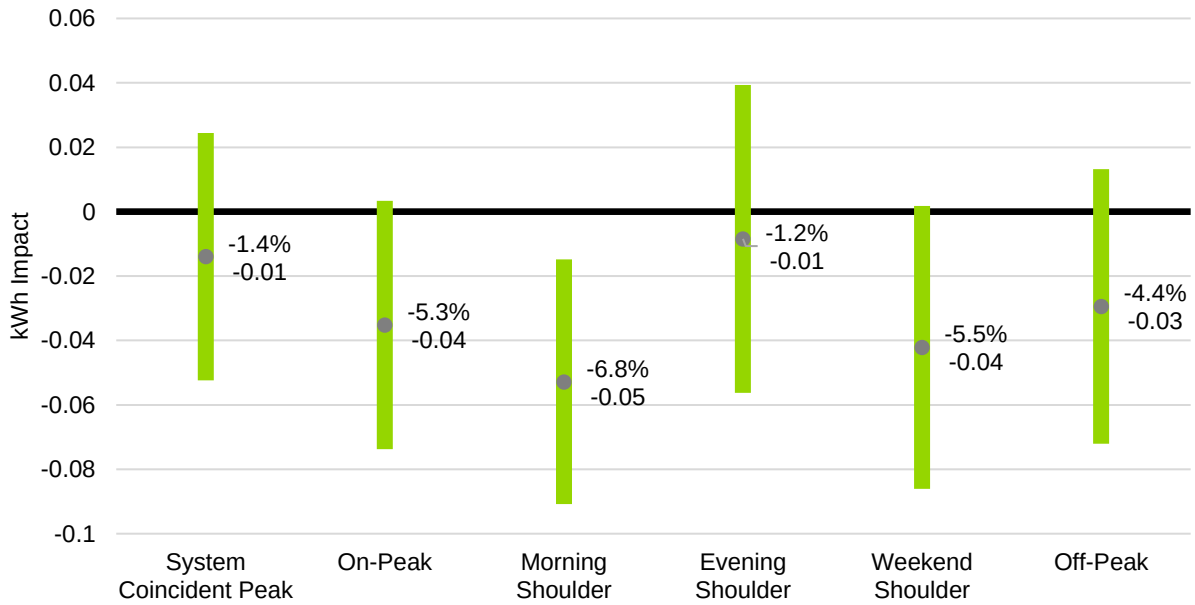


Figure A-2. Winter RE-TOU Energy Consumption Impacts – Low Income



A.2 Electric Vehicles Consumption Impacts

Figure A-3. Summer RE-TOU Energy Consumption Impacts – Electric Vehicles

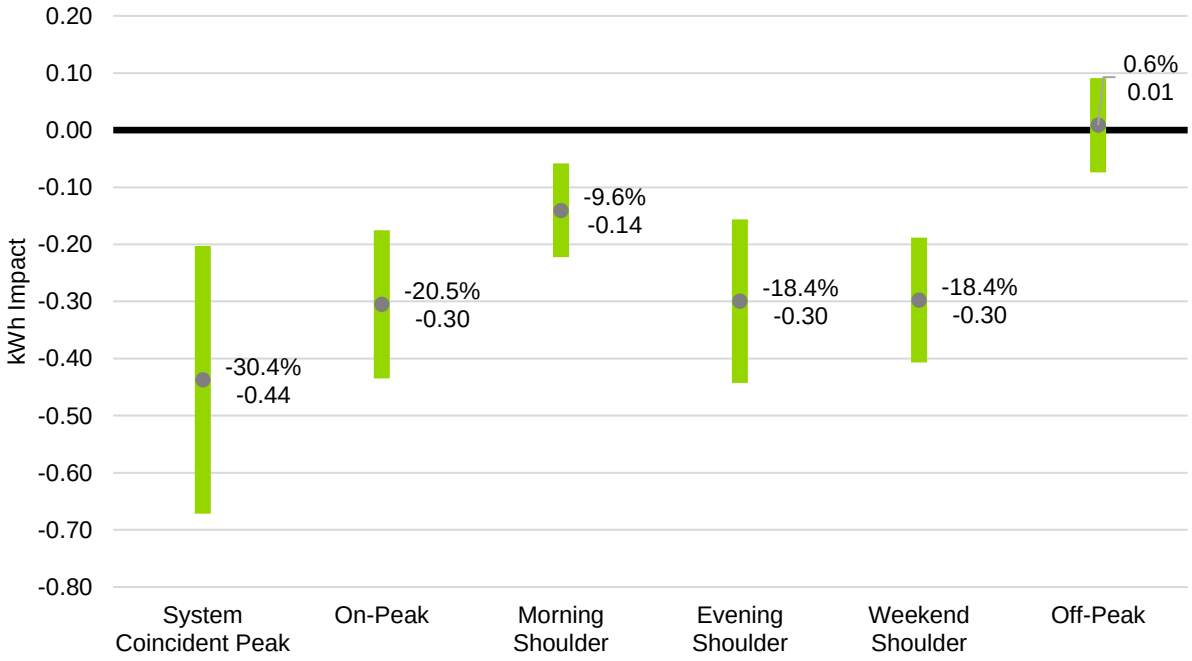
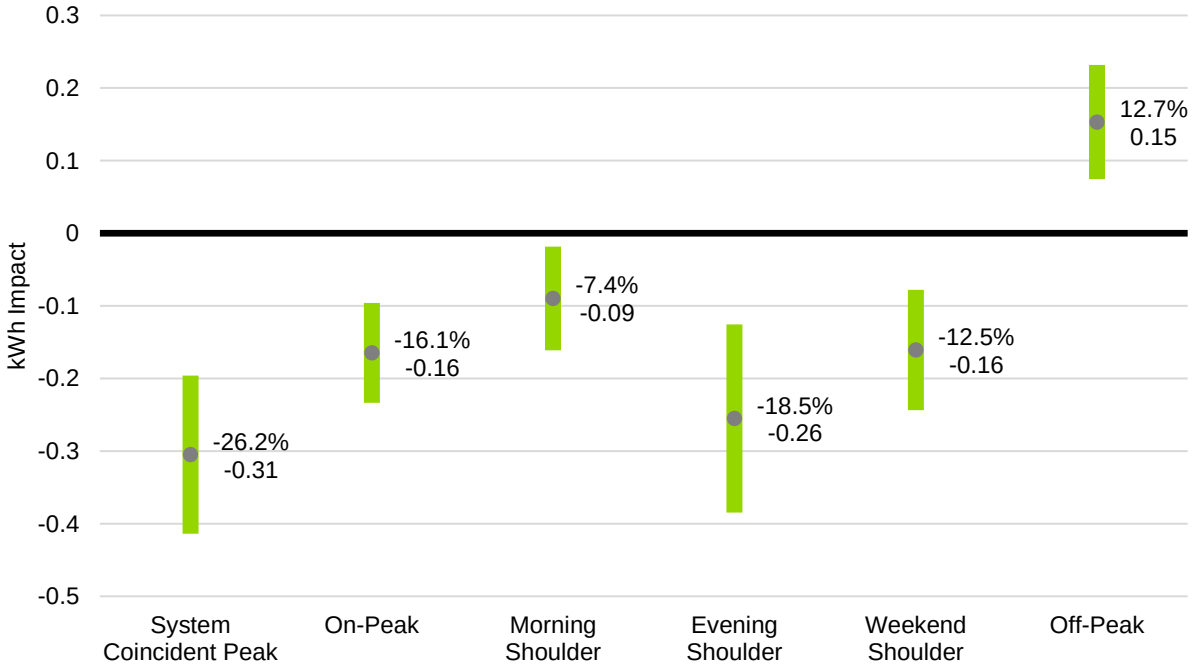


Figure A-4. Winter RE-TOU Energy Consumption Impacts – Electric Vehicles



A.3 Smart Thermostat Consumption Impacts

Figure A-5. Summer RE-TOU Energy Consumption Impacts – Smart Thermostats

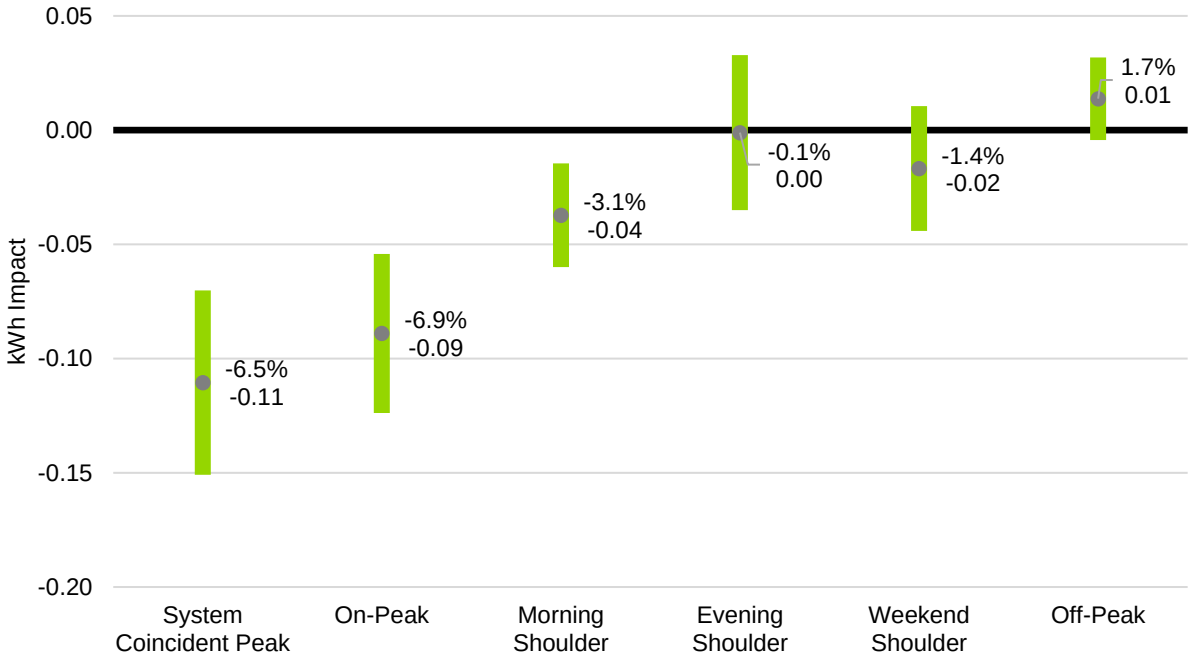
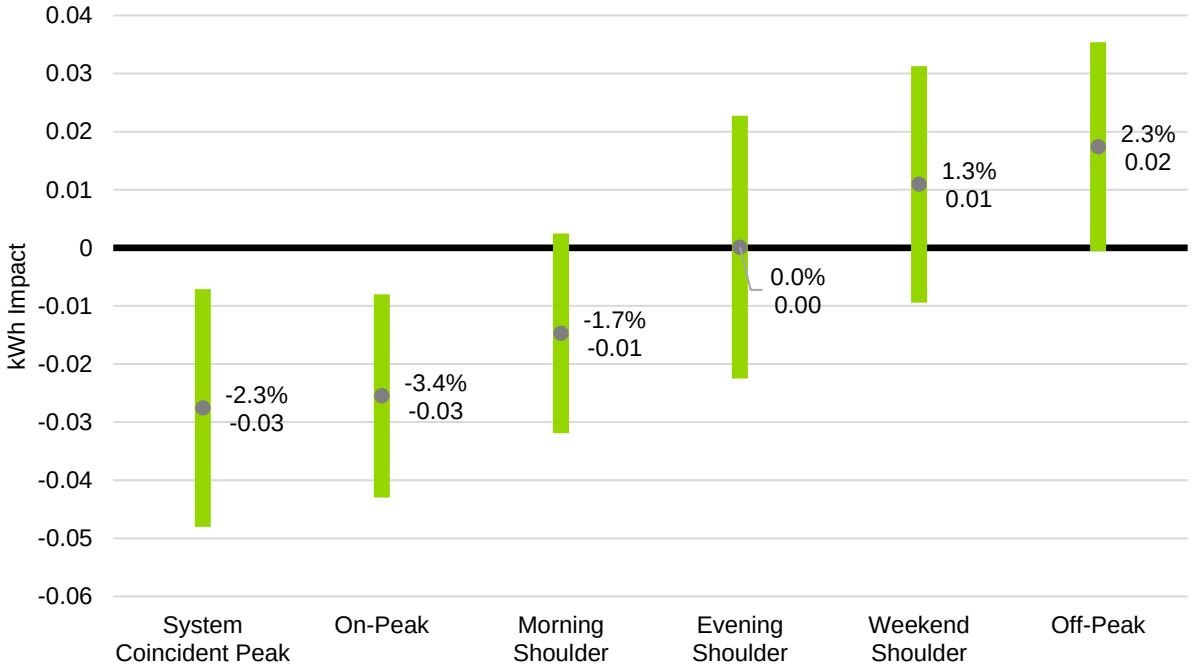


Figure A-6. Winter RE-TOU Energy Consumption Impacts – Smart Thermostats



A.4 Renters Consumption Impacts

Figure A-7. Summer RE-TOU Energy Consumption Impacts – Renters

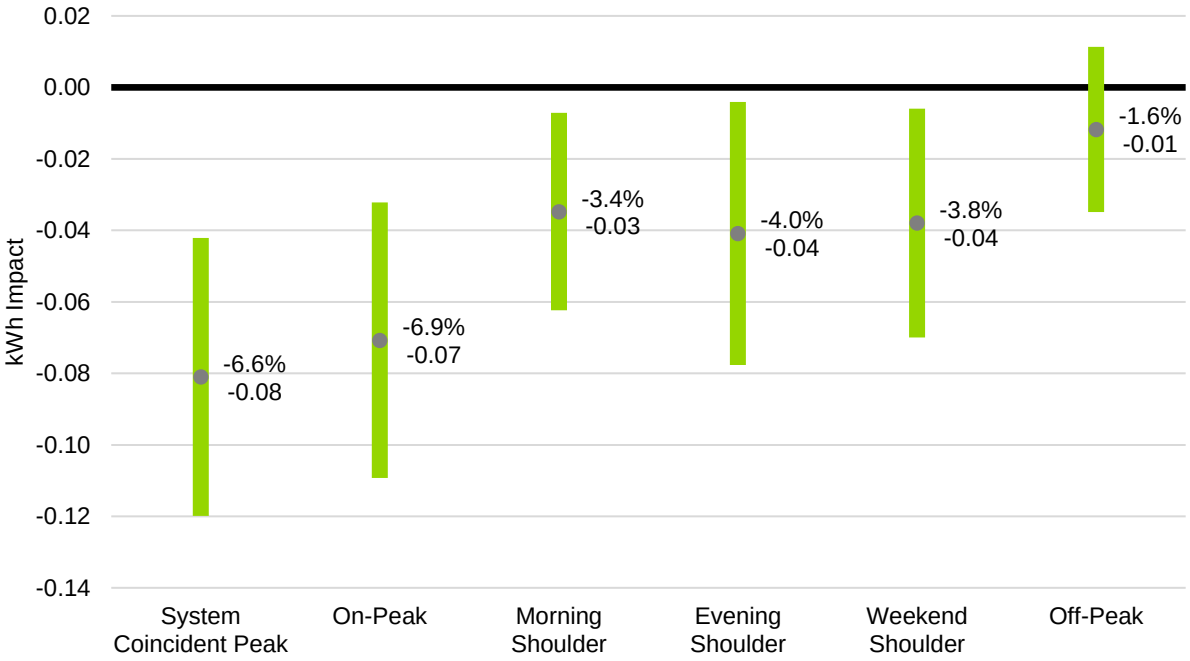
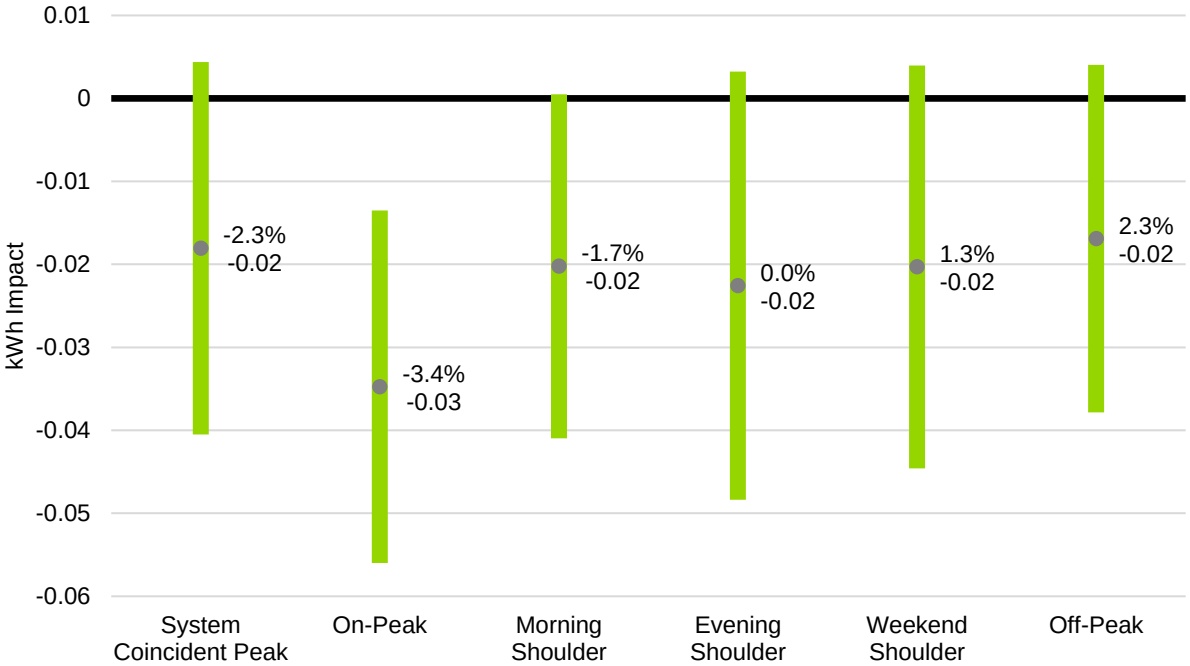


Figure A-8. Winter RE-TOU Energy Consumption Impacts – Renters



A.5 Seniors Consumption Impacts

Figure A-9. Summer RE-TOU Energy Consumption Impacts – Seniors

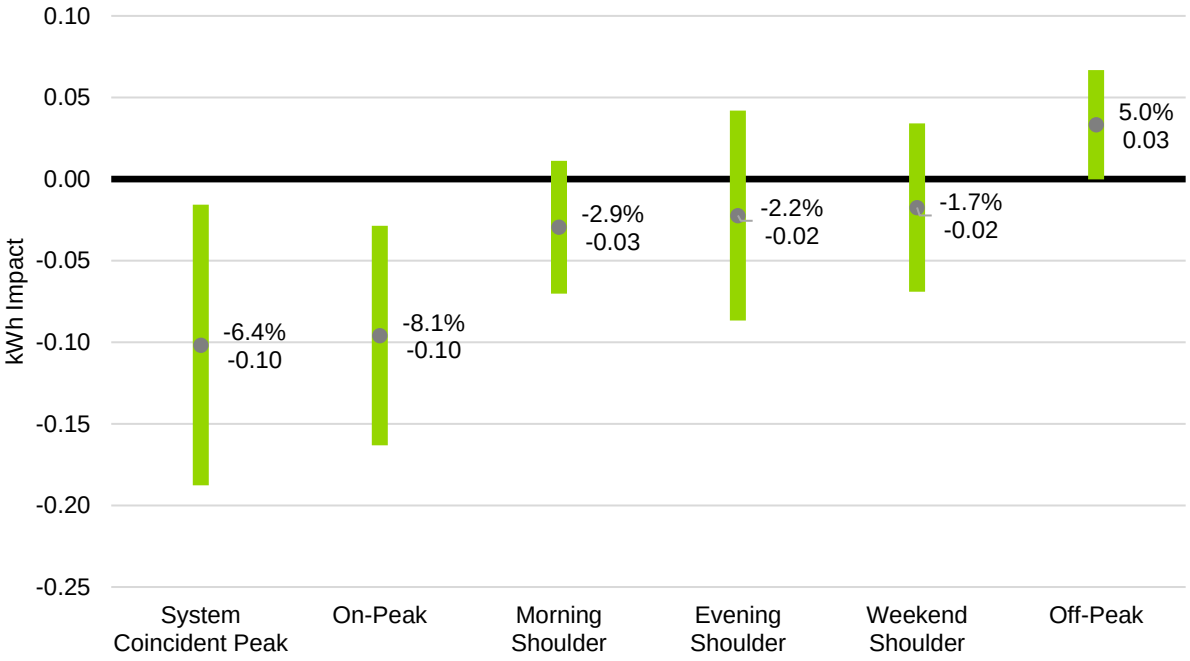
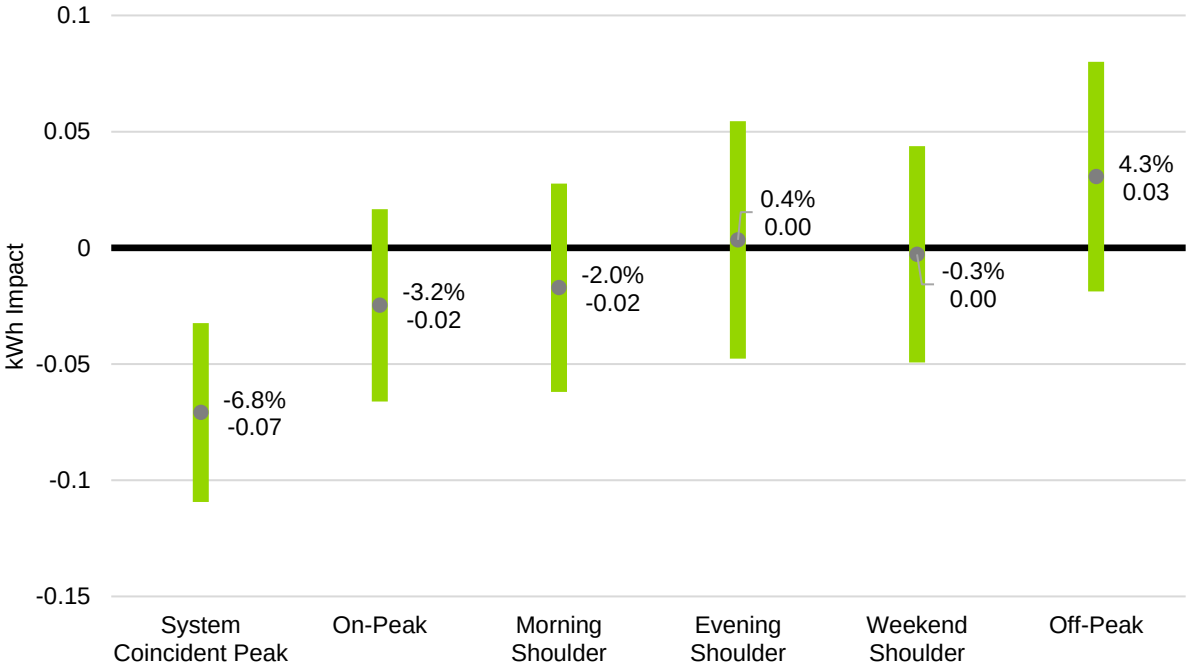


Figure A-10. Winter RE-TOU Energy Consumption Impacts – Seniors



A.6 General Population Consumption Impacts

Figure A-11. Summer RE-TOU Energy Consumption Impacts – General Population

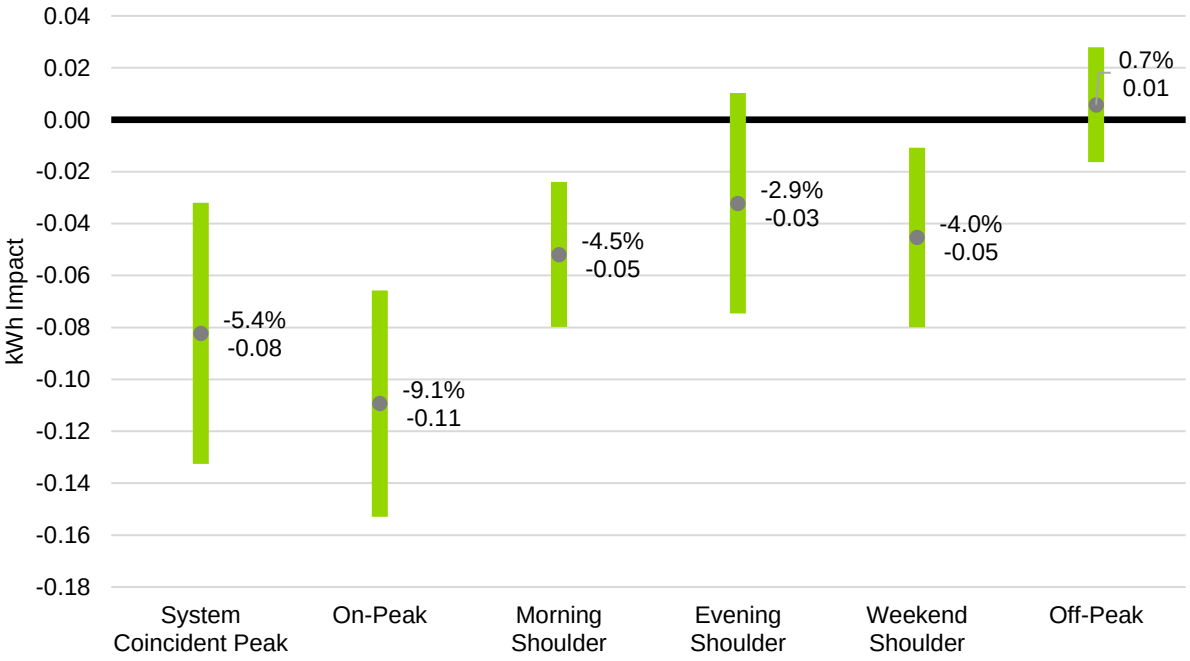
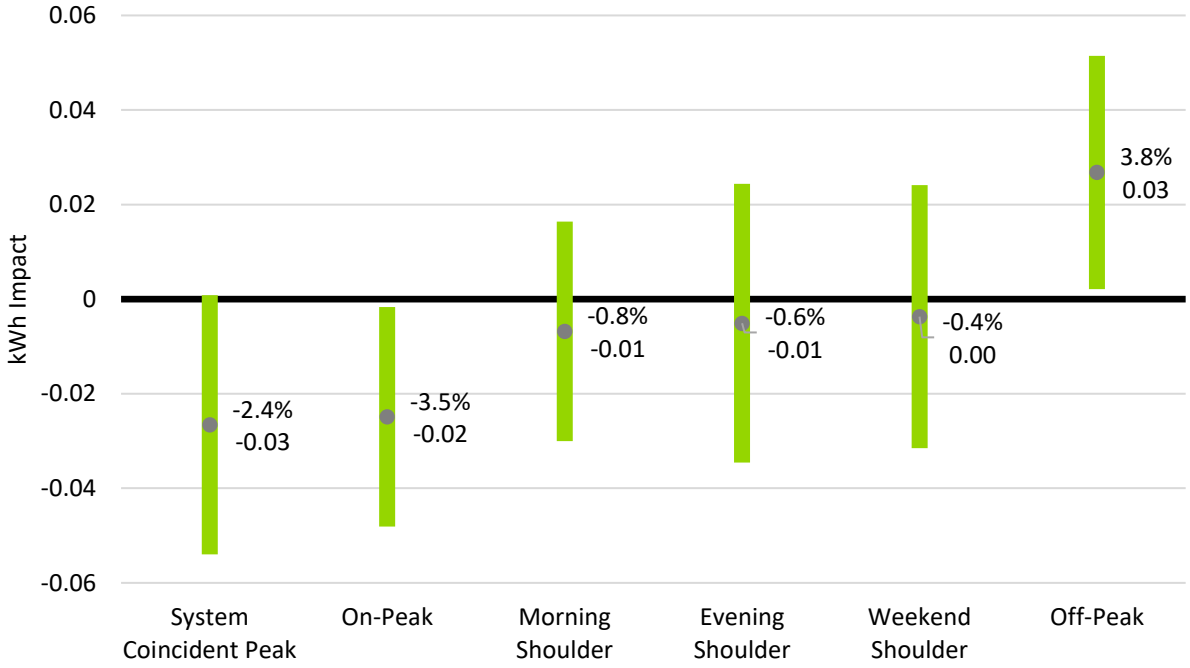


Figure A-12. Winter RE-TOU Energy Consumption Impacts – General Population



Appendix B. **LOAD SHAPES BY SEGMENT**

B.1 Low Income

Figure B-1. Low Income - Summer - Weekdays

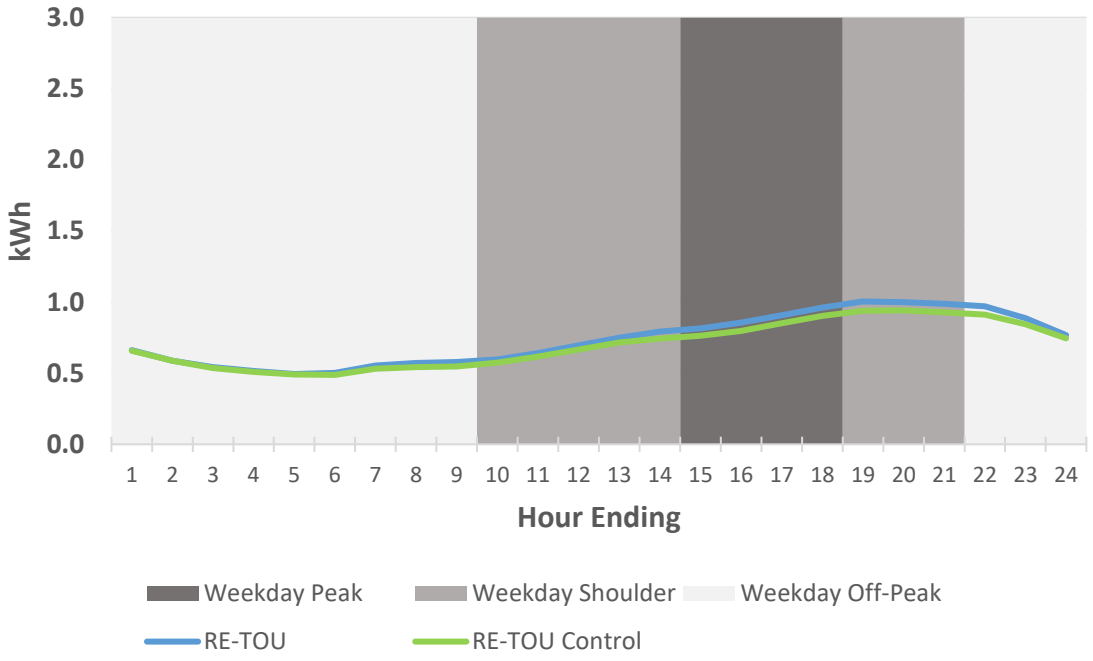


Figure B-2. Low Income - Summer - Weekends

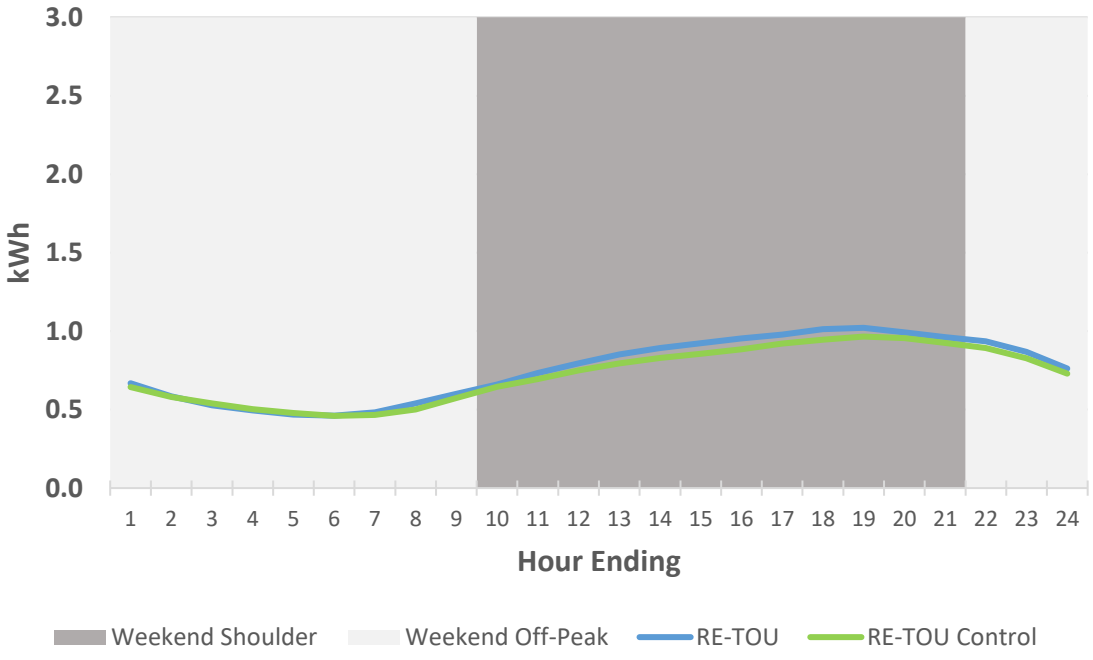


Figure B-3. Low Income - Winter - Weekdays

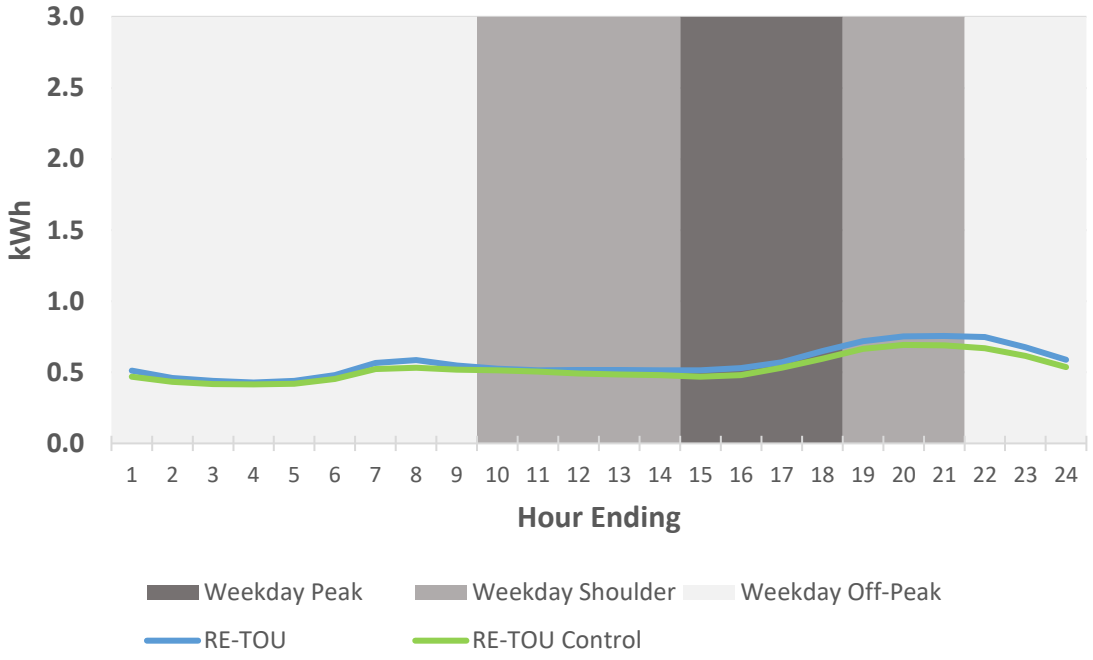
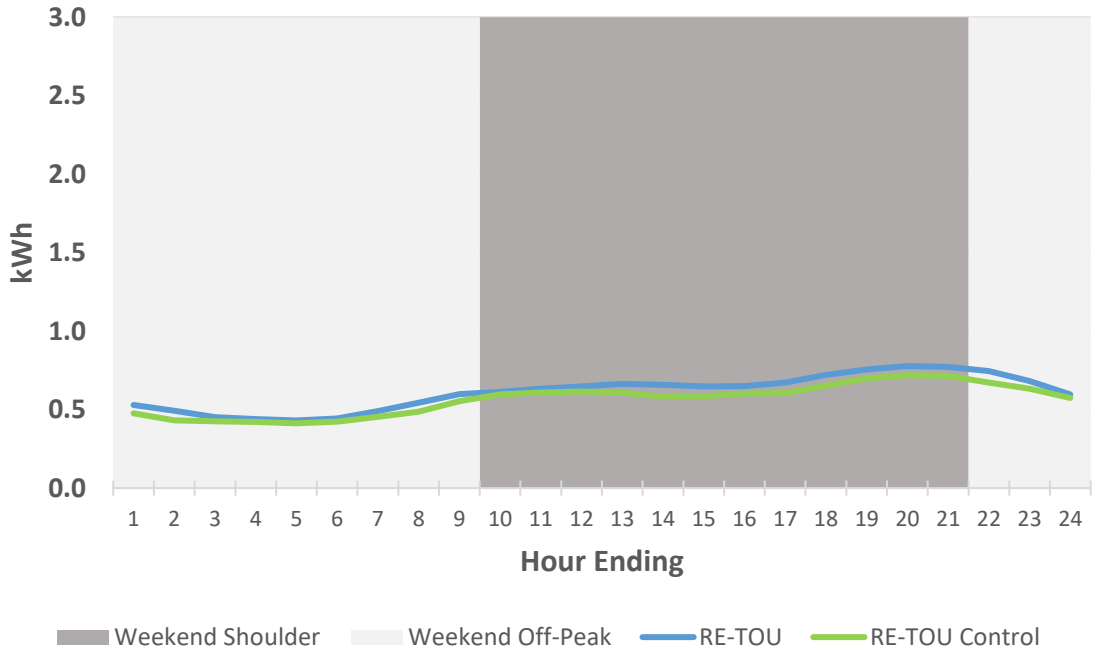


Figure B-4. Low Income - Winter - Weekends



B.2 Electric Vehicles

Figure B-5. Electric Vehicles - Summer - Weekdays

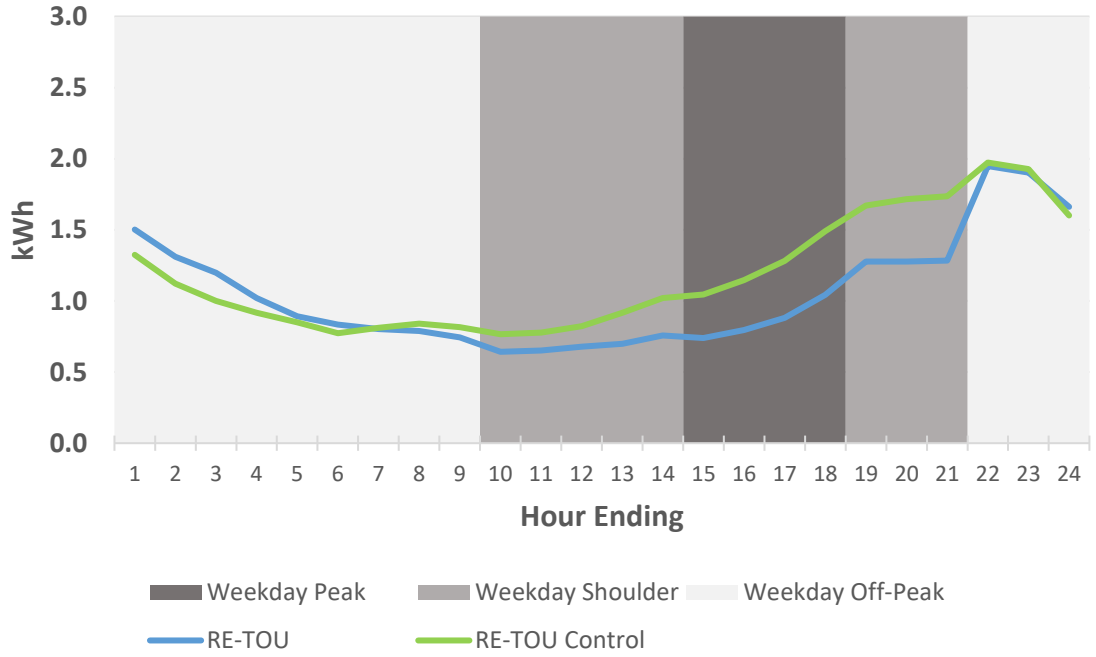


Figure B-6. Electric Vehicles - Summer - Weekends

Figure B-7. Electric Vehicles - Winter - Weekdays

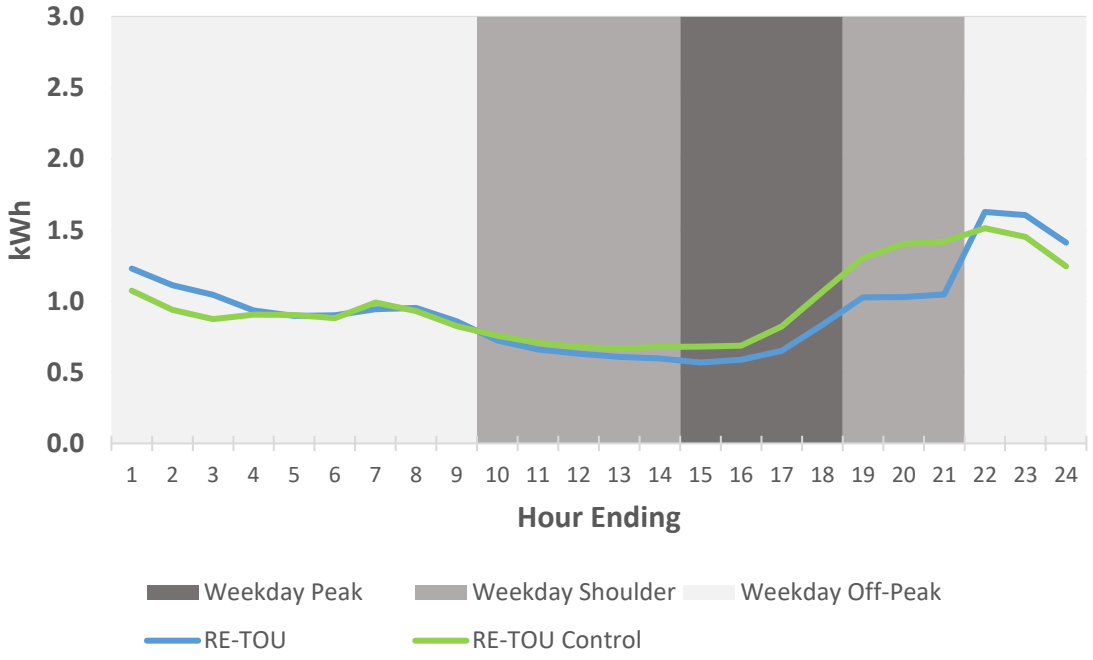
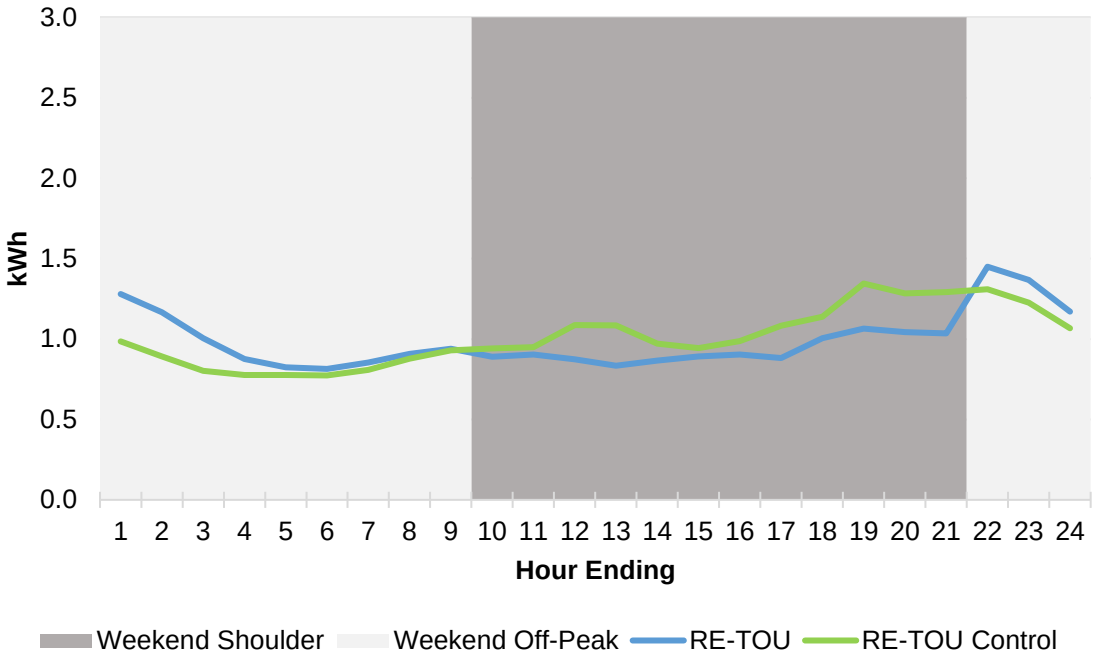


Figure B-8. Electric Vehicles - Winter - Weekends



B.3 Smart Thermostats

Figure B-9. Smart Thermostats - Summer - Weekdays

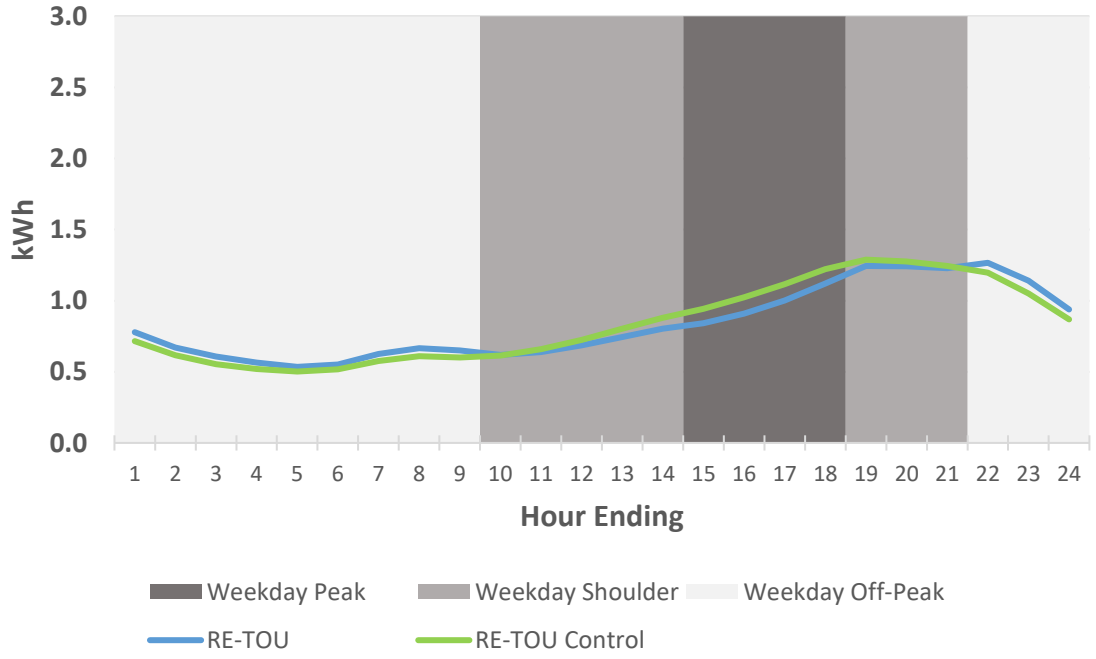


Figure B-10. Smart Thermostats - Summer - Weekends

Figure B-11. Smart Thermostats - Winter - Weekdays

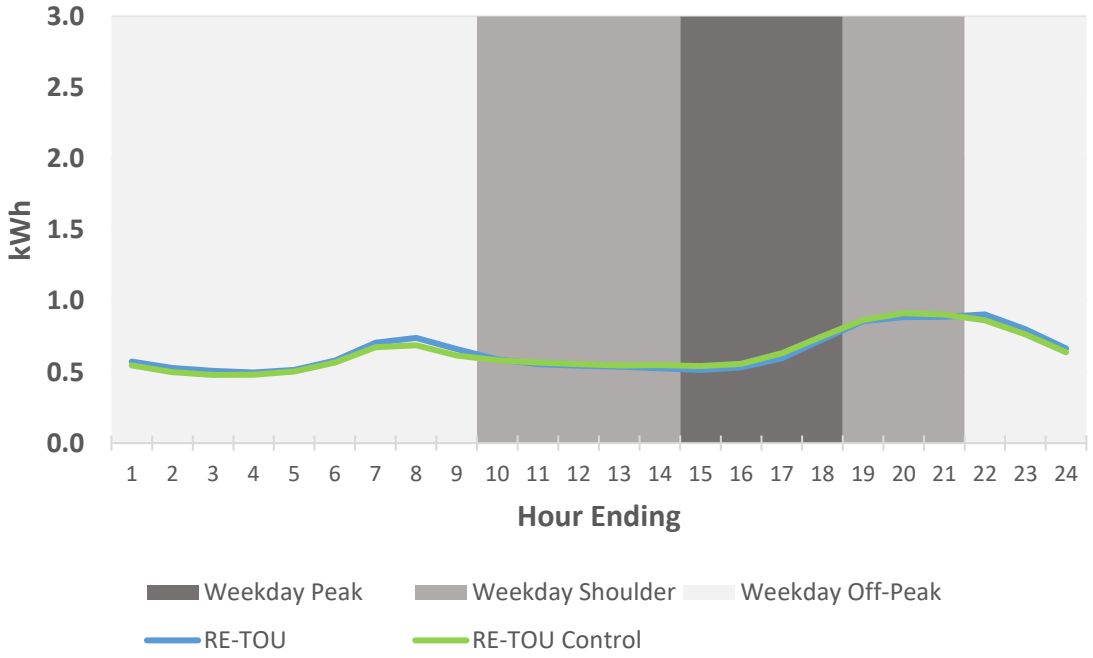
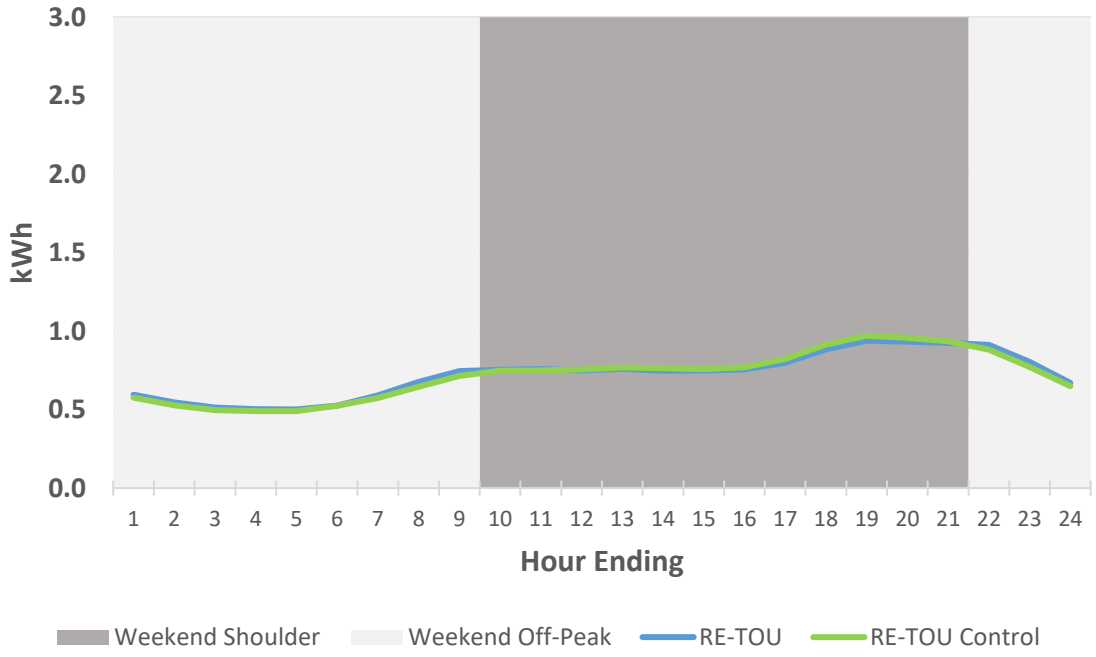


Figure B-12. Smart Thermostats - Winter - Weekends



B.4 Renters

Figure B-13. Renters - Summer - Weekdays

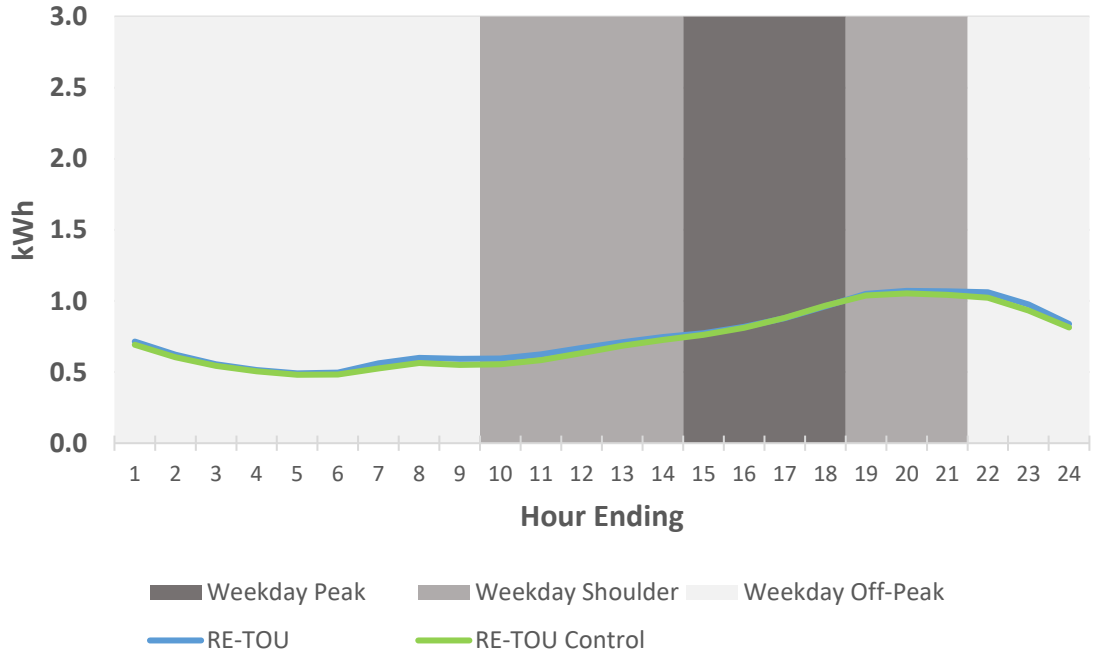


Figure B-14. Renters - Summer - Weekends

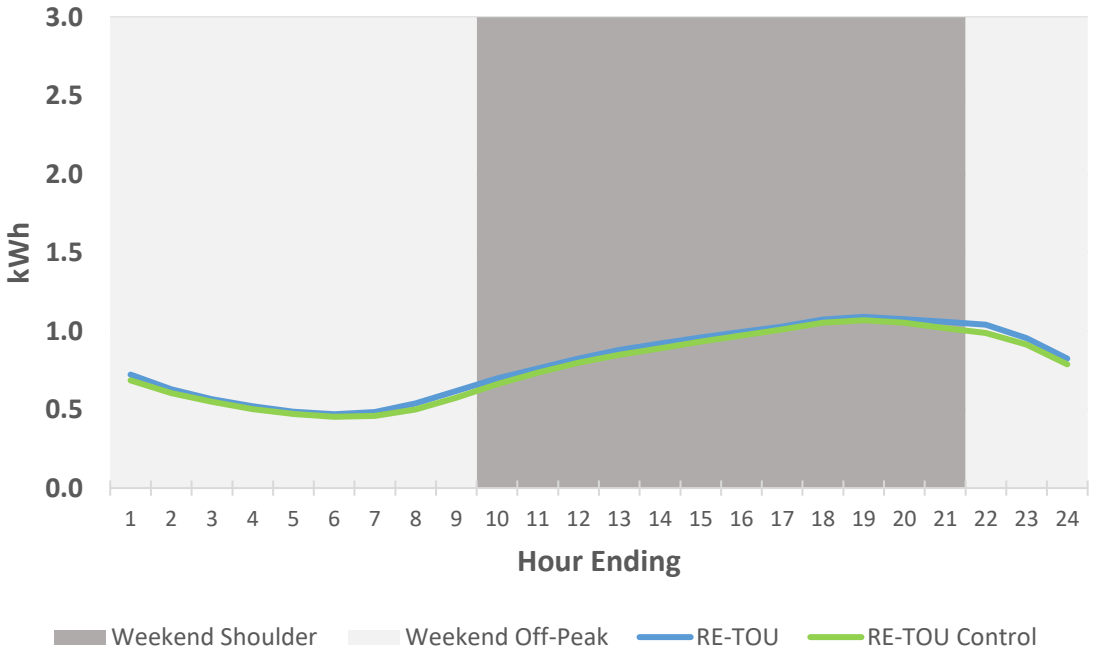


Figure B-15. Renters - Winter - Weekdays

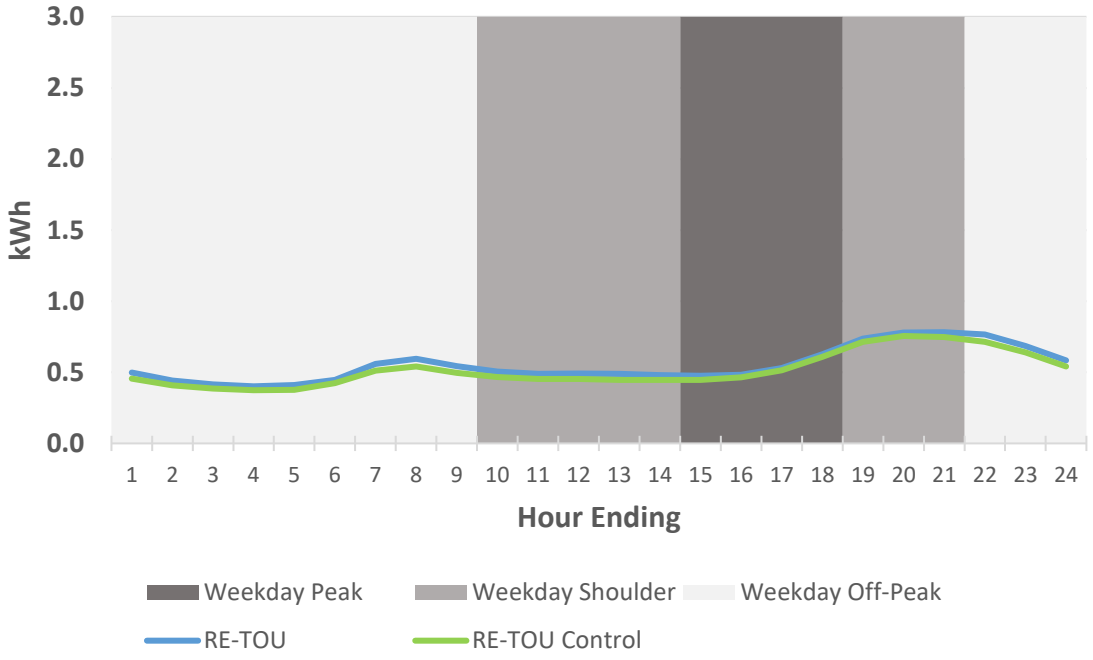
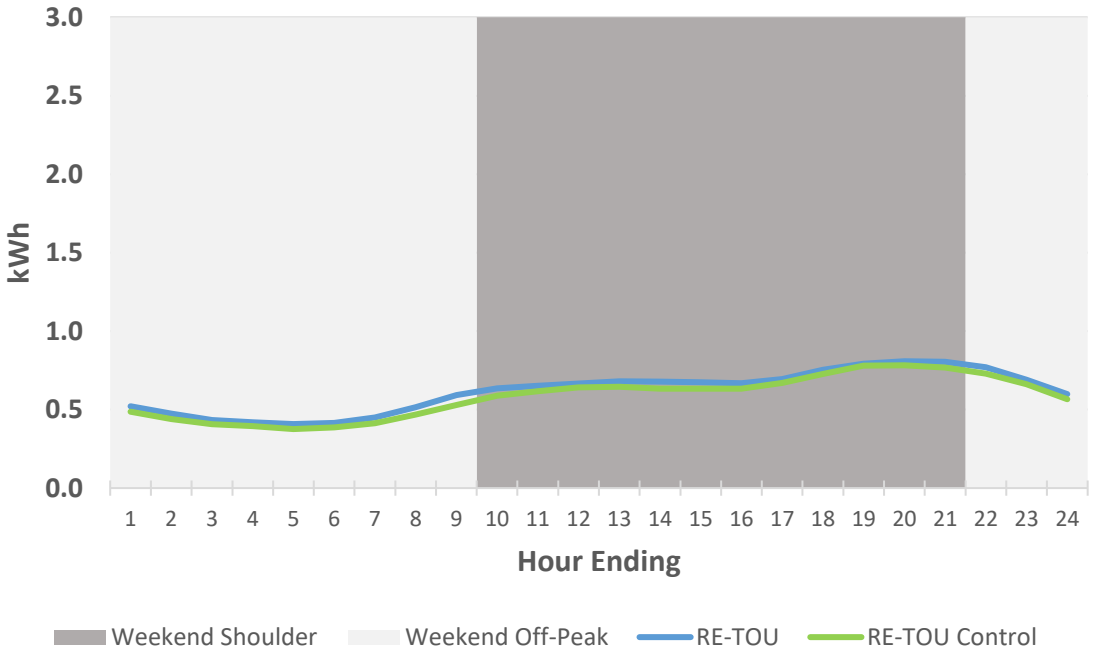


Figure B-16. Renters - Winter - Weekends



B.5 Seniors

Figure B-17. Seniors - Summer - Weekdays

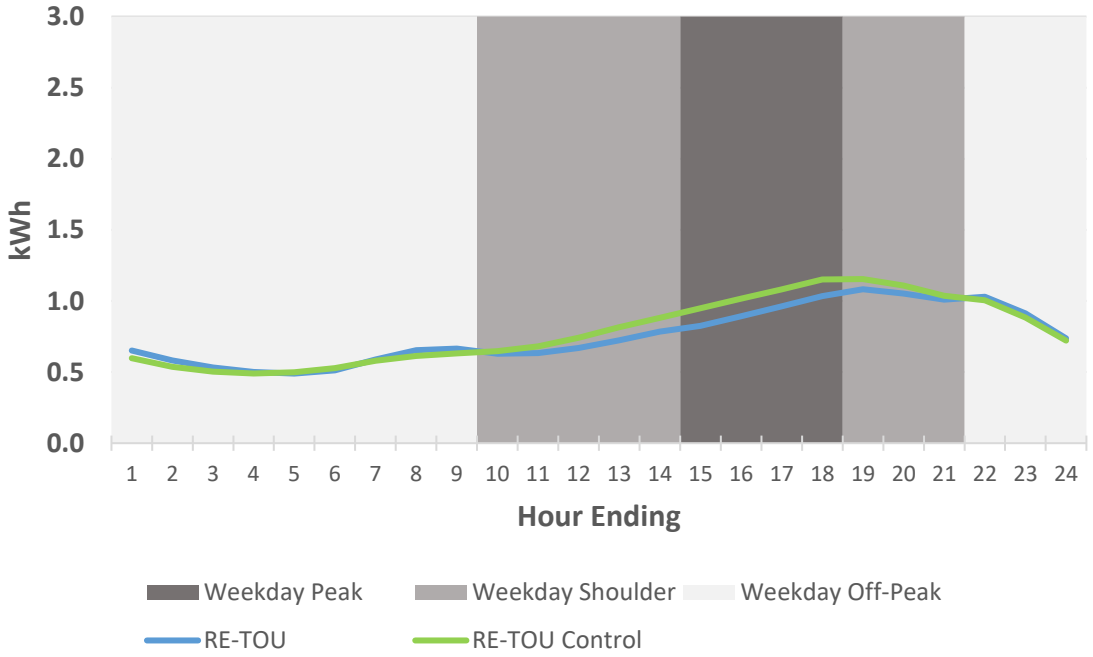


Figure B-18. Seniors - Summer - Weekends

Figure B-19. Seniors - Winter - Weekdays

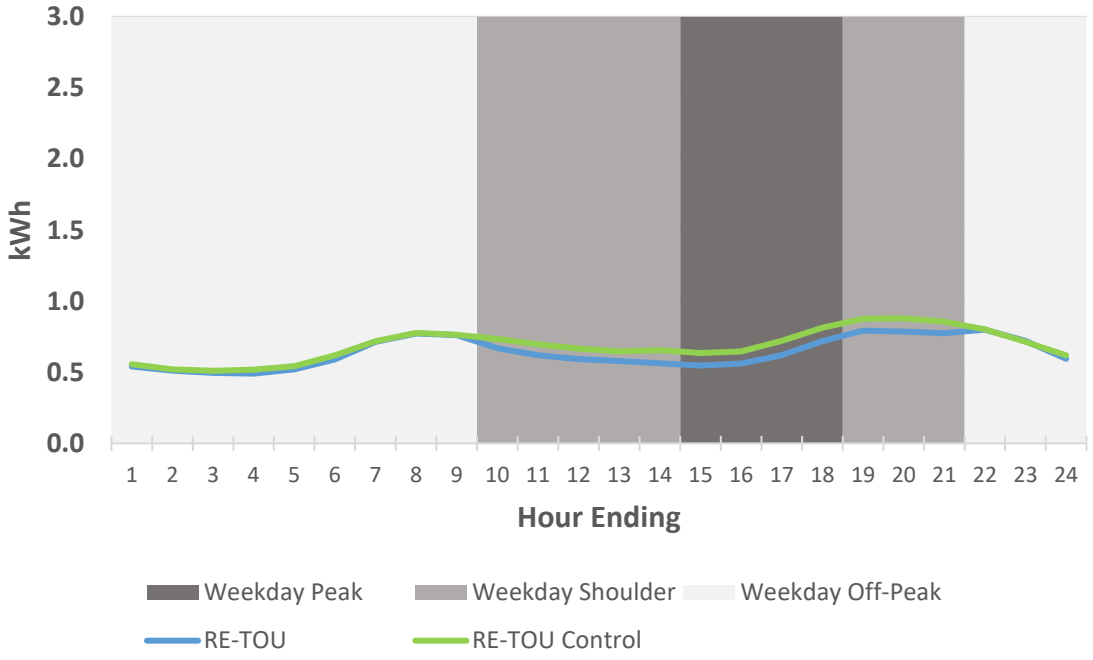
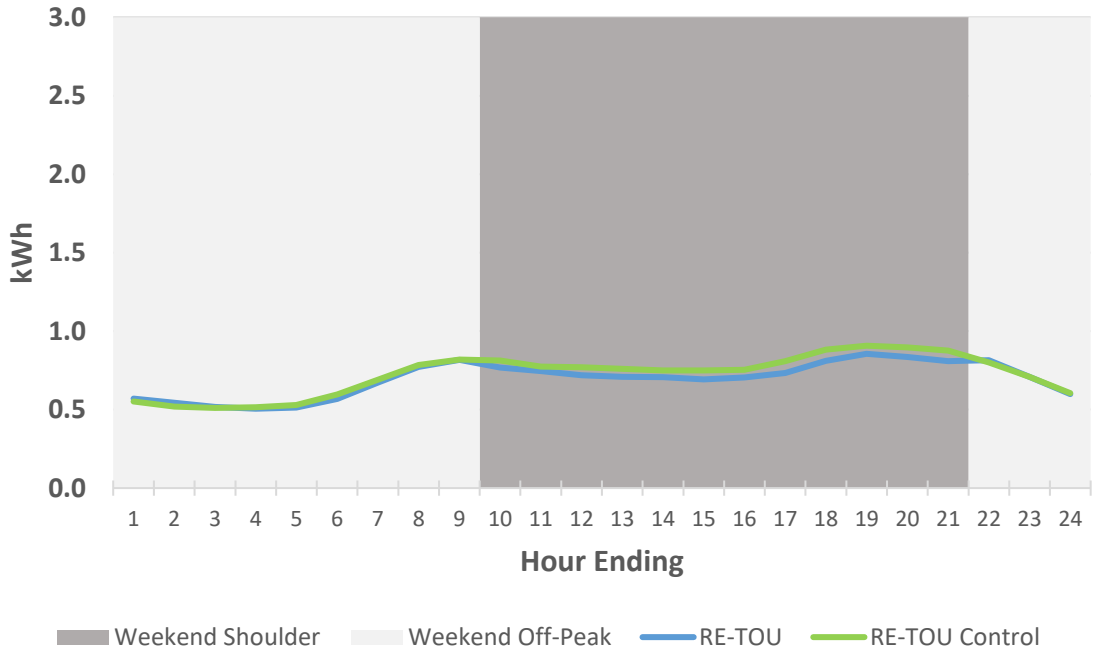


Figure B-20. Seniors - Winter - Weekends



B.6 General Population

Figure B-21. General Population - Summer - Weekdays

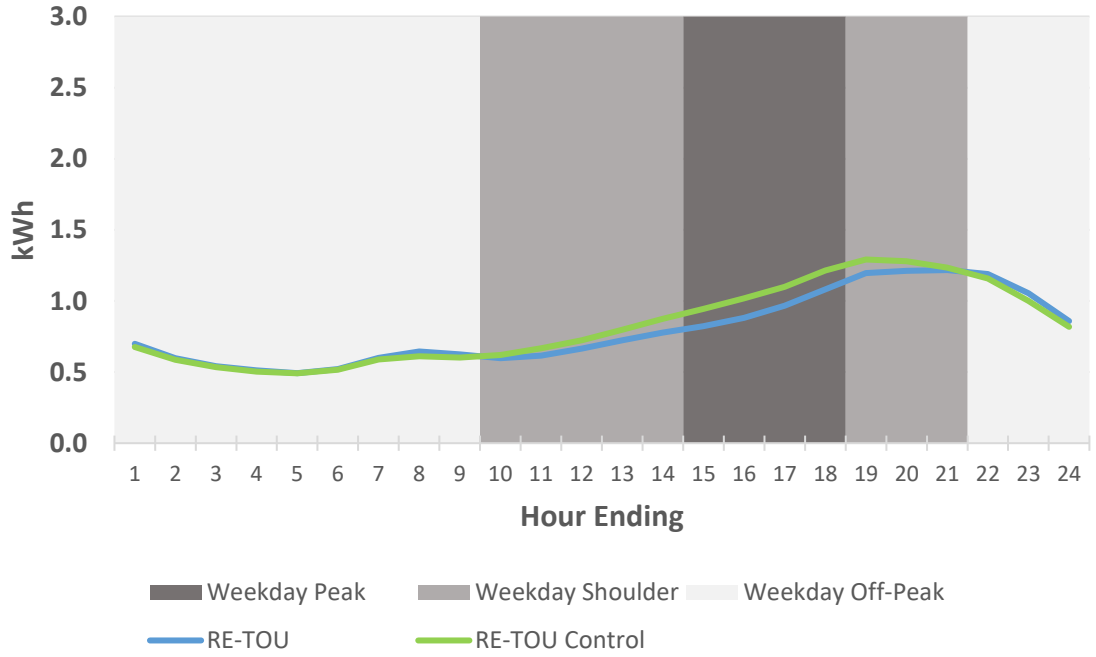


Figure B-22. General Population - Summer - Weekends

Figure B-23. General Population - Winter - Weekdays

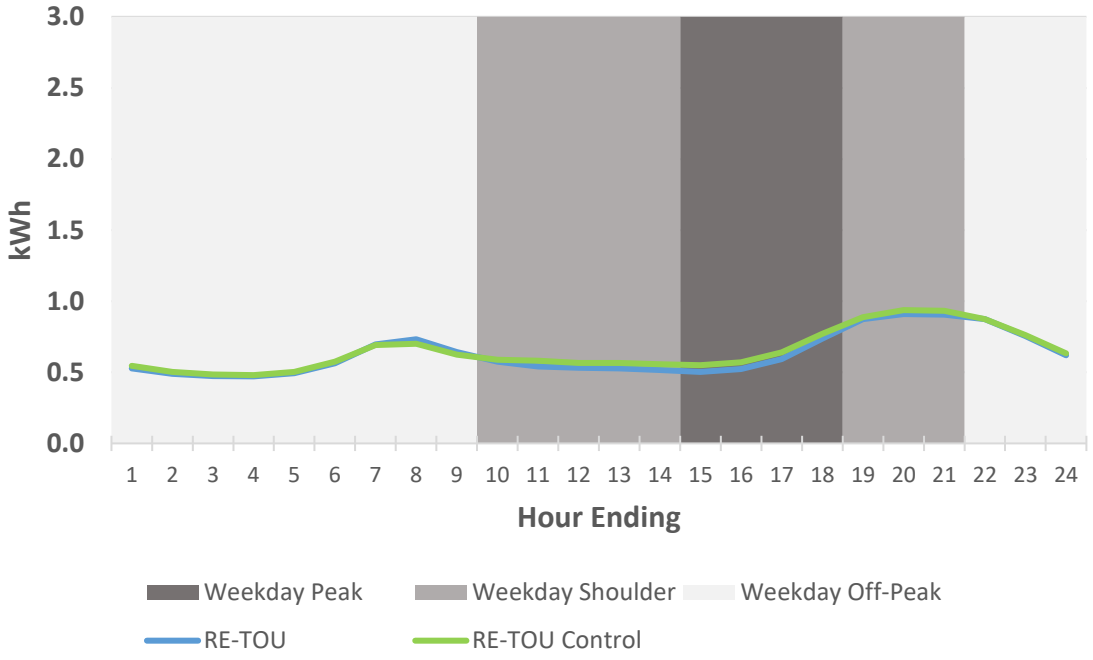
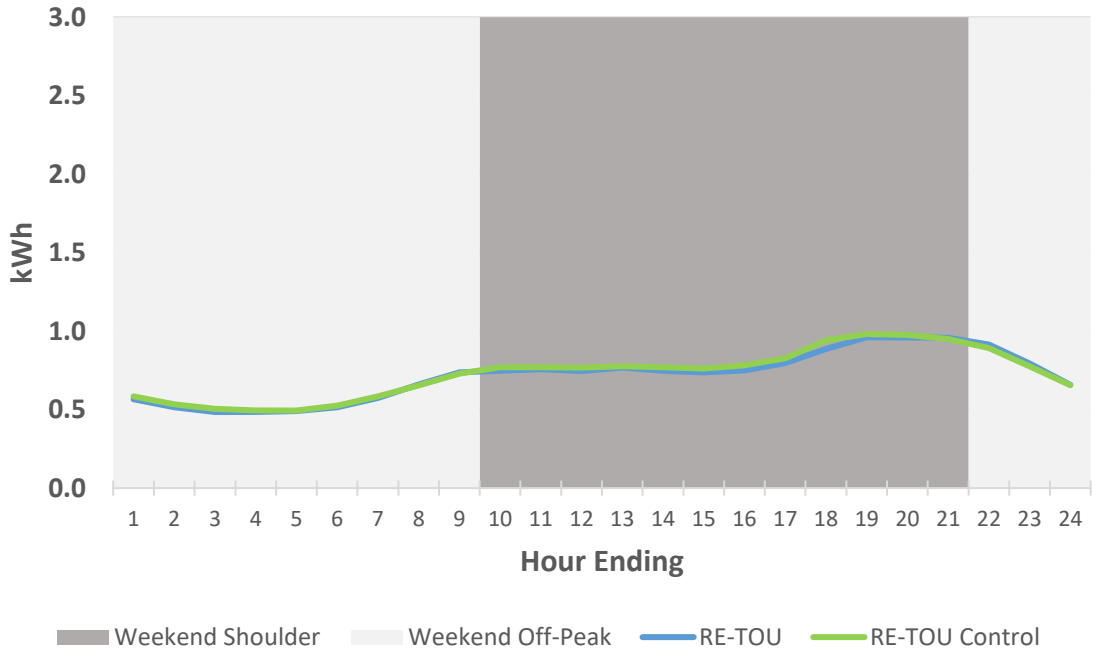


Figure B-24. General Population - Winter - Weekends



B.7 Solar

Figure B-25. Solar - Summer - Weekdays - Gross Consumption

Figure B-26. Solar - Summer - Weekdays

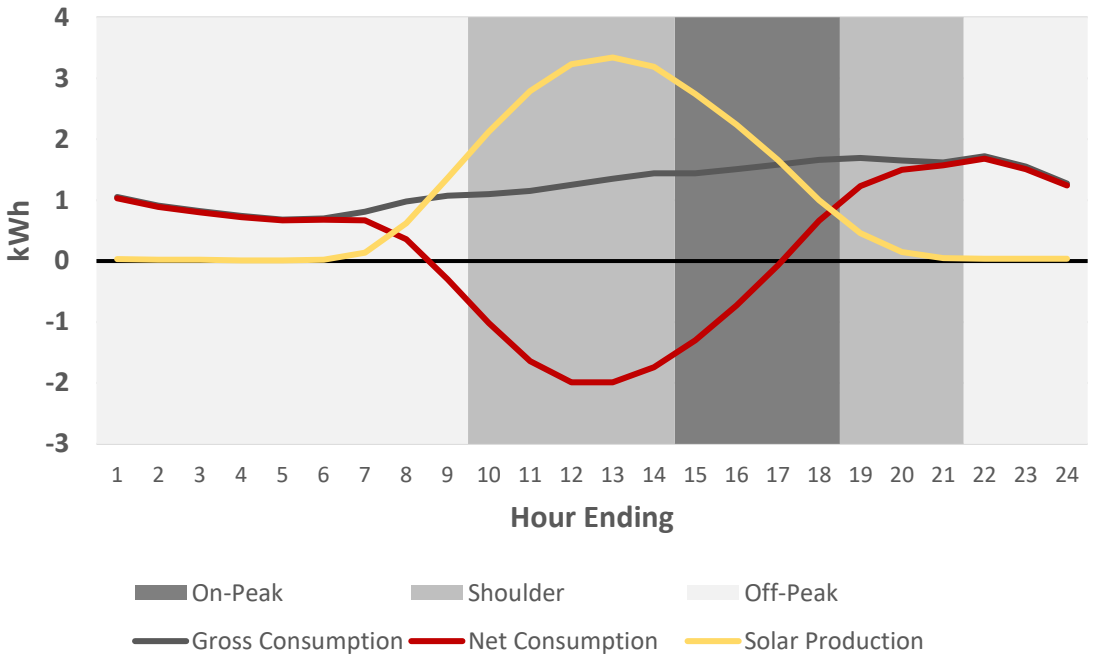


Figure B-27. Solar Control - Summer - Weekdays

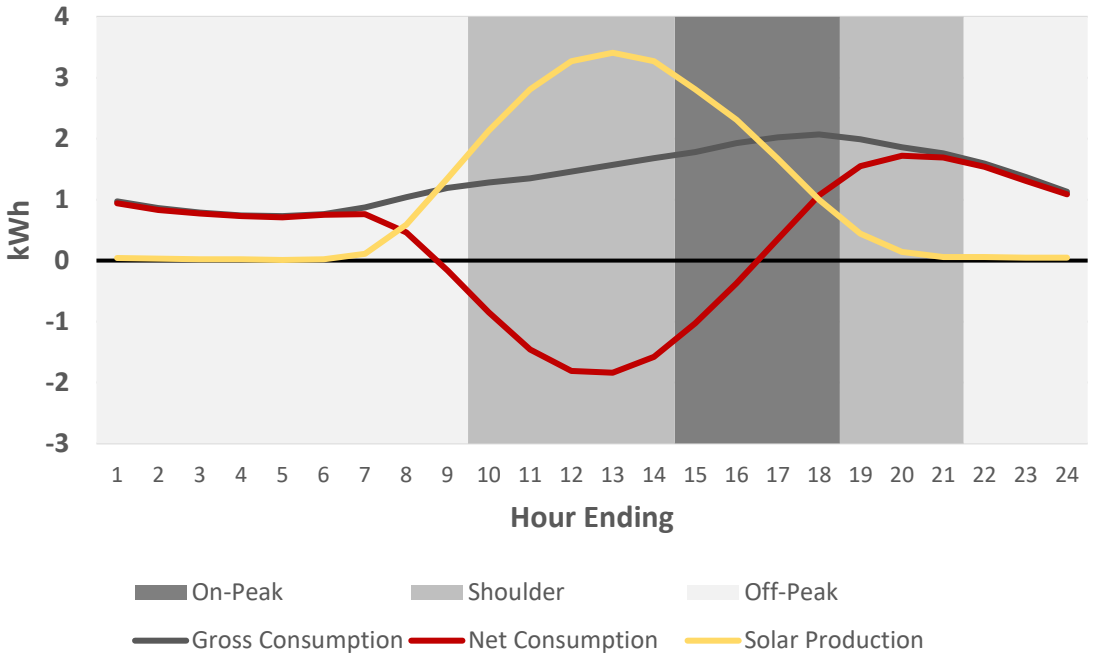


Figure B-28.Solar - Summer - Weekends - Gross Consumption

Figure B-29. Solar - Summer - Weekends

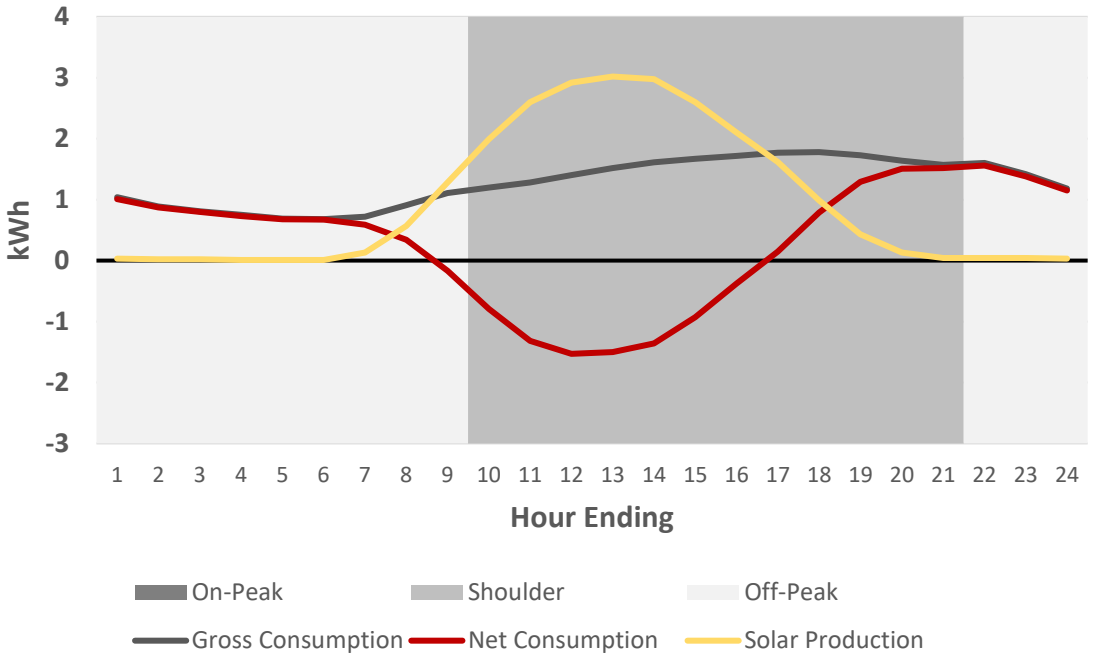


Figure B-30. Solar Control - Summer - Weekends

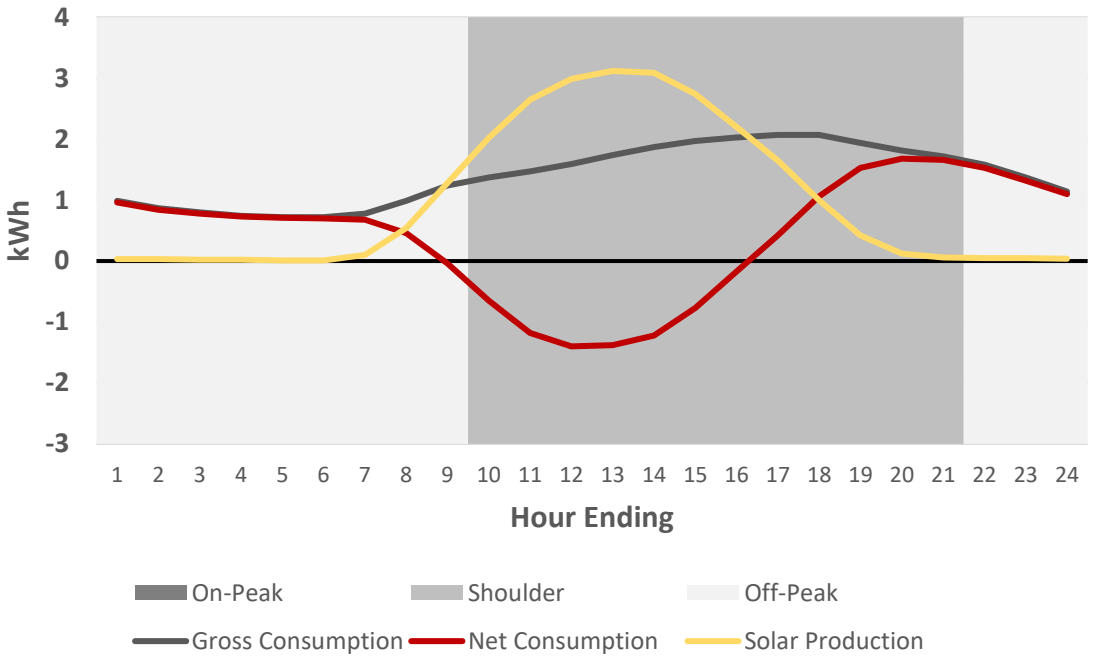


Figure B-31. Solar - Winter - Weekdays - Gross Consumption

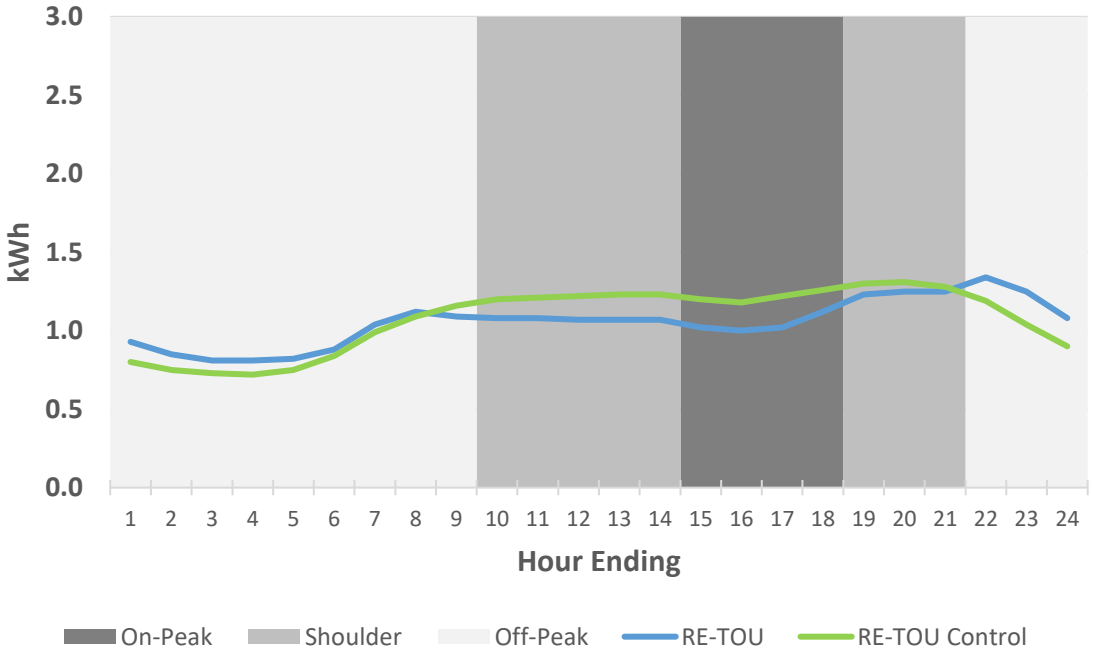


Figure B-32. Solar - Winter - Weekdays

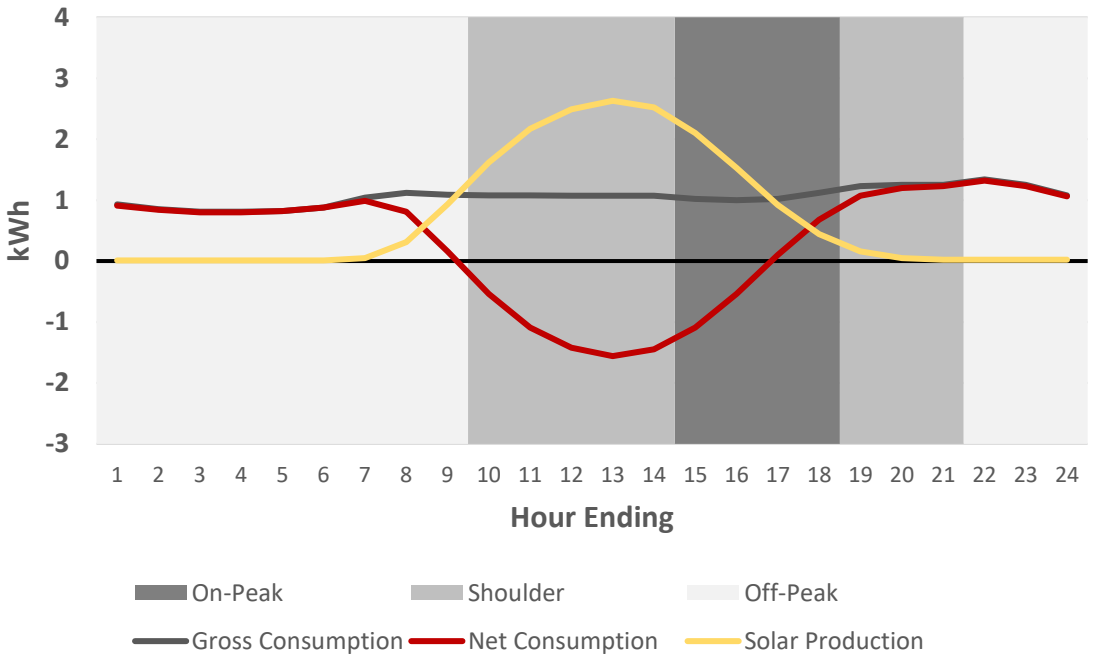


Figure B-33. Solar Control - Winter - Weekdays

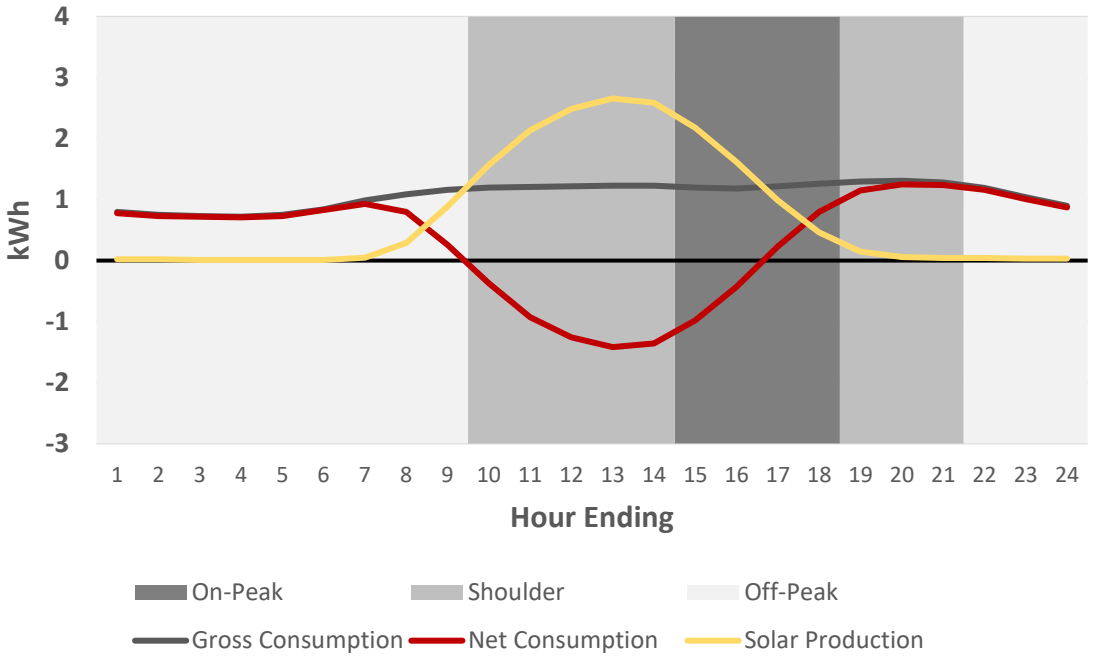


Figure B-34. Solar - Winter - Weekends - Gross Consumption

Figure B-35. Solar - Winter - Weekends

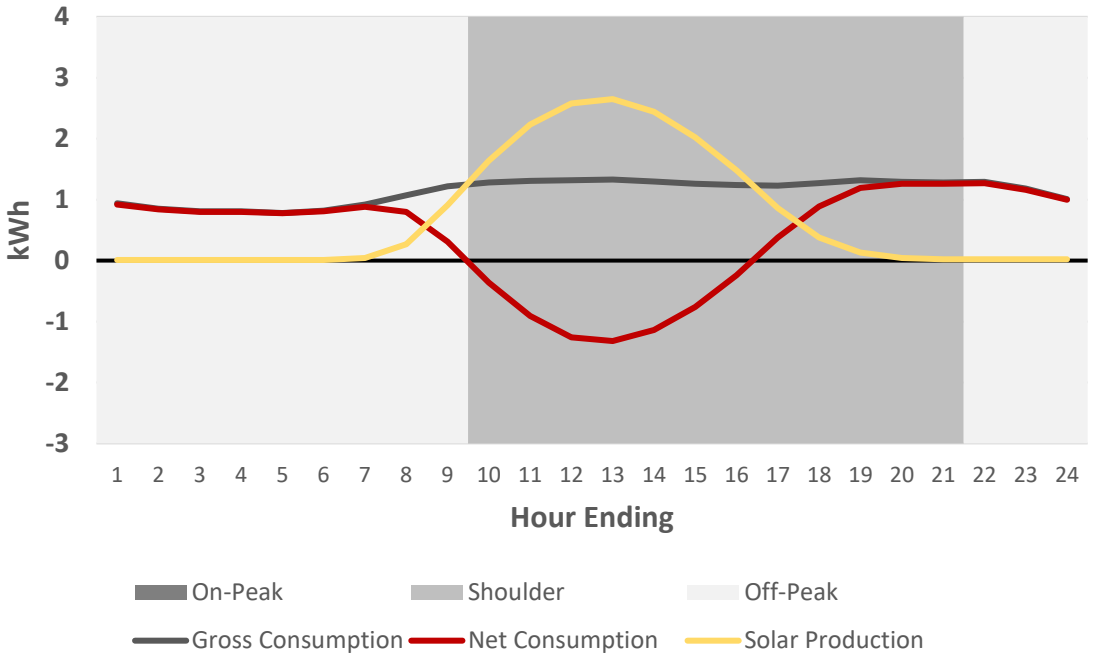
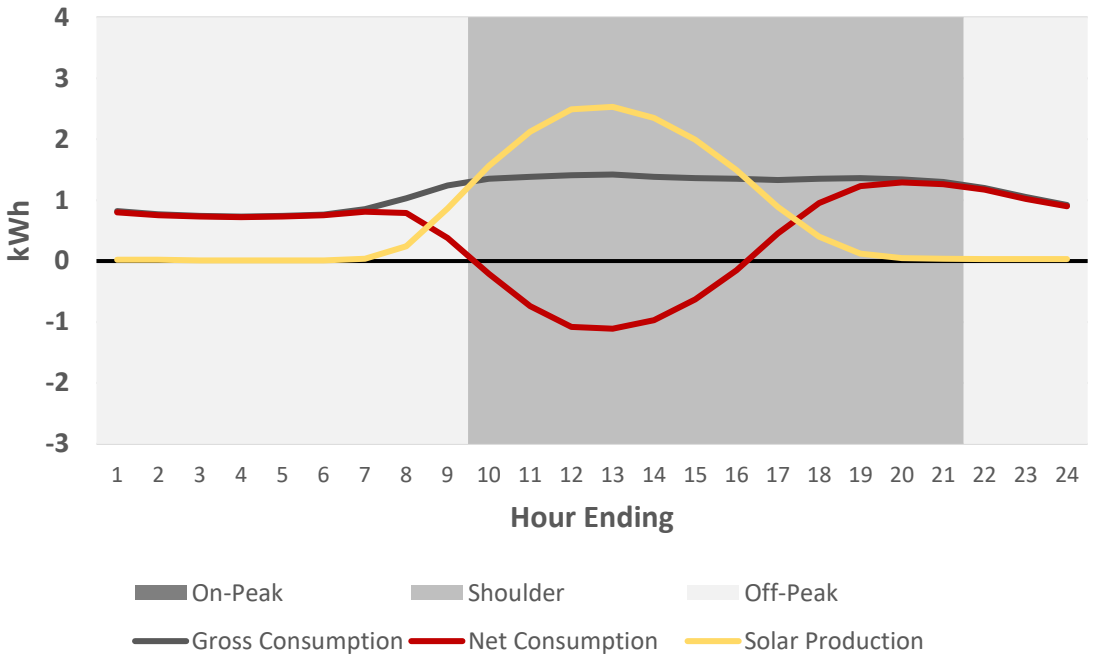


Figure B-36. Solar Control - Winter - Weekends



Appendix C. **WAVE 1 POST-ENROLLMENT SURVEY**

Start of Block: Customer Motivations, Expectations and Perceptions/Beliefs

Intro We would like to begin by asking you a few questions about your thoughts and expectations concerning the new TOU pricing plan that you recently enrolled in.

A1 Which of the following aspects of your participation, if any, are you excited about? Please select all that apply:

- ☐ Helping design Colorado's future rate structure (1)
- ☐ Taking advantage of opportunities to shift electricity usage from higher-priced periods to lower-priced periods (2)
- ☐ Reducing my/our overall electricity usage (3)
- ☐ The opportunity to save on my bill (4)
- ☐ Other (PLEASE SPECIFY) (00) _____
- ☐ Don't know (98)

NAVIGANT

Residential Energy Time-of-Use (RE-TOU) Trial Evaluation Report 1

A2 Please indicate the importance of the following factors in motivating your participation in the TOU pricing plan:

	Very important (1)	Important (2)	Somewhat important (3)	Not very important (4)	Not at all important (5)	Don't know (98)
Having more control over my electricity bill (1)	○	○	○	○	○	○
Conserving energy (2)	○	○	○	○	○	○
I like to try new things (3)	○	○	○	○	○	○
The pricing plan was recommended to me (or someone in my household) (4)	○	○	○	○	○	○
I know other people who have enrolled in the pricing plan (5)	○	○	○	○	○	○
I want to help Colorado understand and design efficient electricity rates for the future (6)	○	○	○	○	○	○
Saving money on my electricity bill (7)	○	○	○	○	○	○

A2a Are there other important factors that motivate your participation in the TOU plan?

_____

_____

_____

_____

_____

End of Block: Customer Motivations, Expectations and Perceptions/Beliefs

Start of Block: Solar Subgroup

A2b Did you install your solar in the past 12 months?

- Yes (1)
- No (2)
- Don't know (98)

A3 Was your pricing plan choice influenced by the fact that you have solar panels?

- No (2)
- Yes, please specify how your choice of pricing plans was influenced: (1)
  _____
- Don't know (98)
- I do not have solar panels (4)

Skip To: End of Block If A3 = I do not have solar panels

A4 Did your solar provider inform you of Xcel Energy's new electricity pricing plan?

- No (2)
- Yes, please elaborate: (1) _____
- Don't know (98)

A5 Did your solar provider recommend any of Xcel's new pricing plans to you?

- Yes, the Time of Use rate (1)
- Yes, the Peak Demand rate (2)
- Yes, both of the new rates (3)
- No (4)
- Don't know (98)

A6 Did your solar provider communicate any additional information to you?

- Yes, please specify: (1) _____
- No (2)
- Don't know (98)

Display This Question:

If A2b = Yes

A7 Did the new electricity pricing plan affect your choice of design of solar installation?

- ○ Yes, please specify: (1) _____
- ○ No (2)
- ○ Don't know (98)

End of Block: Solar Subgroup

Start of Block: Cont. Customer Motivations, Expectations and Perceptions

A8 What concerns, if any, do you have about participating in this new rate plan? Please select all that apply:

- ☐ Managing my/our electricity usage may become too difficult or inconvenient (1)
- ☐ I'm not sure what actions I should take to be effective (2)
- ☐ I might have to change my lifestyle in some way (3)
- ☐ I'm not sure I understand how the pricing periods work (4)
- ☐ I'm not sure when particular pricing periods start and end (5)
- ☐ I'm not sure I understand how the bill will be calculated (6)
- ☐ My/our utility bill might increase (7)
- ☐ I do not have any concerns about participating in this pricing plan (9)
- ☐ Don't know (98)

Display This Question:

If A8 != I do not have any concerns about participating in this pricing plan

Or A8 != Don't know

A8a Do you have any further concerns about participating in this new pricing plan?

_____

A9 Thinking about your household's typical electricity usage patterns, how important do you think it will be to shift the timing of your electricity use in order for you to save money under the new pricing plan?

- Very important (1)
- Important (2)
- Somewhat important (3)
- Not very important (4)
- Not important at all (5)
- Don't know (98)

A10 How effective do you think your household will be in changing when or how you use electricity under the new pricing plan?

- Very effective (1)
- Effective (2)
- Somewhat effective (3)
- Not very effective (4)
- Not effective at all (5)
- Don't know (98)

Display This Question:

If A2 = Saving money on my electricity bill [Very important]

Or A2 = Saving money on my electricity bill [Important]

Or A2 = Saving money on my electricity bill [Somewhat important]

A11 How effective do you think your household will be in lowering your electricity bill?

- Very effective (1)
- Effective (2)
- Somewhat effective (3)
- Not very effective (4)
- Not effective at all (5)
- Don't know (98)

A12 Please indicate whether you agree or disagree with the following statement:

The price of electricity should be higher during times when it is more expensive to provide it.

- Strongly agree (1)
- Agree (2)
- Neither Agree nor Disagree (3)
- Disagree (4)
- Strongly disagree (5)
- Don't know (98)

End of Block: Cont. Customer Motivations, Expectations and Perceptions

Start of Block: Baseline Behaviors and Technologies

Intro The following questions ask you to share information about your home, your electricity bill, and how you use electricity.

B1 Which of the following statements best describes your typical response to your electricity bill?

- I typically spend at least several minutes looking at my monthly bill to gain an understanding of the costs, and other information that is provided. (1)
- I glance at the various costs and other information on the bill before paying. (2)
- I look at the total bill amount, and if it is within reason, I just pay it. (3)
- I don’t look at it at all, I just pay for it or it gets paid automatically. (4)
- Don’t Know (98)

B2 Have you ever used (or attempted to use) My Account service on the Xcel website to review your electricity bill?

- ○ Yes (1)
- ○ No (2)
- ○ Don't Know (3)

B3 Prior to signing up for the new pricing plan, how frequently did you use the following appliances during the hours of 2pm to 6pm during the summer months (June – Sept)?

	Very Frequently (1)	Frequently (2)	Sometimes (3)	Rarely (4)	Never (5)	Not Applicable (6)
Air conditioning (1)	○	○	○	○	○	○
Electric oven (2)	○	○	○	○	○	○
Electric range (3)	○	○	○	○	○	○
Dishwasher (4)	○	○	○	○	○	○
Electric clothes dryer (5)	○	○	○	○	○	○
Electric vehicle charger (6)	○	○	○	○	○	○
Hot tub (7)	○	○	○	○	○	○

Display This Question:

If CENTRAL_AC > 0

Or WINDOW_AC > 0

B4 Prior to enrolling in the new pricing plan, how would you describe the typical air conditioning settings in your home? Please select all that apply:

As a household, we typically…

- ☐ Maintain a consistent temperature setting at or above 78 degrees throughout the day and night (1)
- ☐ Maintain a consistent temperature setting below 78 degrees throughout the day and night (2)
- ☐ Have at least one period during the day when the temperature is set at a higher temperature (or we turn off the AC entirely) (3)
- ☐ Turn off the air conditioning at night and open the windows (4)
- ☐ Crank up the AC sometime between 2pm and 6pm to cool off the house or apartment (5)
- ☐ Only turn on the AC when it is really hot outside (6)
- ☐ Other, please specify: (97) _____
- ☐ I don't have AC (7)

Skip To: End of Block If B4 = I don't have AC

Display This Question:

If CENTRAL_AC > 0

Or WINDOW_AC > 0

B5 Do you **pay for** air conditioning in this residence?

- Yes (1)
- No, it is part of my rent/condo fee (2)
- No, I do not have air conditioning (3)
- Don't Know (98)

B6 Which of the following types of thermostats do you use to control your home's main cooling system?

- **No thermostat** - simple on/off control (1)
- **Standard thermostat(s)** - Allows you to set the temperature and turn the air conditioner on or off manually; you cannot program on/off times (2)
- **Programmable thermostat(s)** - Digital display units that allow you to program thermostat settings according to the household schedule (3)
- **Smart thermostat** - A wifi-enabled thermostat also known as a communicating thermostat that you can control from your smart phone or computer (4)

Display This Question:

If B6 = Smart thermostat - A wifi-enabled thermostat also known as a communicating thermostat that you can control from your smart phone or computer

Or B6 = Programmable thermostat(s) - Digital display units that allow you to program thermostat settings according to the household schedule

X→

B7 Are you using the default setting on your thermostat or have you changed the default settings?

- Using default settings (1)
- Changed the default settings (2)
- Don't know (98)

End of Block: Baseline Behaviors and Technologies

Start of Block: Electric Vehicles

B8 On average, how many days per week do you charge your electric vehicle at home?

- Number of days per week: (1) _____
- I do not have an electric vehicle (2)
- Don't Know (98)

Skip To: End of Block If B8(Number of days per week:) Is Empty

B9 On an average day, how many hours is your electric vehicle charging at home?

- Hours charged per day: (1) _____
- As long as it takes, I don't track it (2)
- Don't Know (3)

B10 When do you typically charge your electric vehicle at your home? Please select up to two options:

- ☐ Early in the morning (between 5AM and 9AM) (1)
- ☐ In the morning (between 9AM and noon) (2)
- ☐ In the early afternoon (between noon and 2PM) (3)
- ☐ Later in the afternoon (between 2PM and 6PM) (4)
- ☐ Early evening (between 6PM and 9PM) (5)
- ☐ Overnight (between 9PM and 5AM) (6)
- ☐ The time of day that I charge my vehicle varies (7)
- ☐ Don't Know (98)

End of Block: Electric Vehicles

Start of Block: Understanding of Rate Design, Terminology and Prescribed Behaviors

Intro The next set of questions asks about your familiarity with your new pricing plan.

C1 How would you characterize your level of knowledge about how the TOU pricing plan works?

- ○ No knowledge (1)
- ○ Very little knowledge (2)
- ○ Basic understanding (3)
- ○ Fairly complete understanding (4)
- ○ Highly knowledgeable (5)
- ○ Don't Know (98)

Display This Question:

If RATE_PLAN = RE-TOU

C2 Please indicate whether you agree or disagree with the following statements about the Time of Use pricing plan.

	Agree (1)	Disagree (2)	Don't know (98)
The TOU pricing plan has a different rate for each of three pricing periods: on-peak, off-peak and shoulder (1)	☐	☐	☐
Under the TOU pricing plan, electricity is more expensive in the summer months than the winter months. (2)	☐	☐	☐
Electricity is the **most** expensive between 2pm and 6pm on nonholiday weekdays (3)	☐	☐	☐
Electricity is the **least** expensive between 9pm and 9am on nonholiday weekdays (4)	☐	☐	☐

Display This Question:

If RATE_PLAN = RE-TOU

C3 Please indicate which of the following represent effective strategies for reducing your electricity bill under the Time of Use pricing plan. Please select all that apply:

- ☐ Limit my electricity usage during peak periods of 2pm-6pm (1)
- ☐ Limit my electricity usage during shoulder periods (2)
- ☐ Shift as much of my electricity use as possible to off-peak periods (3)

Display This Question:

If RATE_PLAN = RD-TDR[27]

X→

[27] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

C4
Please indicate whether you agree or disagree with the following statements about the Peak Demand pricing plan. Please select all that apply:

	Agree (1)	Disagree (2)	Don't know (98)
I can reduce my bill by limiting and staggering my electricity use during peak times throughout the month (1)	○	○	○
High electricity use for an hour during any on-peak period can substantially increase my electricity bill for the month (4)	○	○	○
Peak periods occur between 2pm and 6pm on nonholiday weekdays (2)	○	○	○
Electricity is more expensive during summer months than during winter months (3)	○	○	○

Display This Question:

If RATE_PLAN = RD-TDR[28]

[28] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

C5 Please indicate which of the following factors are used to calculate the cost of your electricity under the Peak Demand pricing plan. Please select all that apply:

	Used (1)	Not Used (2)
The total amount of energy I consume during the month (1)	○	○
A distribution demand charge based on the one hour of the month when my energy demand is at its highest (2)	○	○
A peak demand charge based on the one hour of the month when my energy demand *during peak hours* is at its highest (3)	○	○

Display This Question:

If RATE_PLAN = RD-TDR[29]

C6 Which of the following statements represent a recommended strategy for reducing your electricity bill under the Peak Demand pricing plan? Please select all that apply:

- ☐ Always stagger my use of major appliances during peak periods (1)
- ☐ Stagger my use of major appliances during off-peak periods as much as possible (2)
- ☐ Shift my use of electricity from peak to off-peak periods. (3)
- ☐ Don't Know (98)

[29] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

C7 Please indicate your interest in receiving additional help from Xcel Energy on any of the following topics… Please select all that apply:

- ☐ How the pricing plan works (1)
- ☐ How my bill is calculated (2)
- ☐ How to reduce my electricity bills (3)
- ☐ Tools (such as reminders) to help me be more successful (4)
- ☐ Other, please specify: (00) _____
- ☐ I am not interested in receiving any additional help at this time (6)
- ☐ Don't know (98)

C8 What type of educational materials do you prefer? Please select all that apply:

- ☐ Video (1)
- ☐ Emails (2)
- ☐ Information on the Xcel website (3)
- ☐ Other, please specify: (4) _____

End of Block: Understanding of Rate Design, Terminology and Prescribed Behaviors

Start of Block: Marketing, Messaging and Materials

Intro Please tell us how you learned about the new pricing plan and which sources of information you found most helpful.

D1 How did you hear about the Xcel Time-of-Use and/or Peak Demand pricing plan? Please select all that apply:

- ☐ Email/letter from Xcel Energy (1)
- ☐ Xcel Energy's website (2)
- ☐ Friend/neighbor/relative (3)
- ☐ Internet Advertisement (4)
- ☐ Social Media Advertisement (5)
- ☐ Xcel Energy Call Center (6)
- ☐ Event (7)
- ☐ Other, please specify: (00) _____
- ☐ Don't Know (98)

Skip To: D3 If Selected Choices = 1

Carry Forward Selected Choices from "D1"

D2 Which of the following sources of information was MOST EFFECTIVE at getting you interested in the new pricing plan?

- ○ Email/letter from Xcel Energy (1)
- ○ Xcel Energy's website (2)
- ○ Friend/neighbor/relative (3)
- ○ Internet Advertisement (4)
- ○ Social Media Advertisement (5)
- ○ Xcel Energy Call Center (6)
- ○ Event (7)
- ○ Other, please specify: (8) _____
- ○ Don't Know (9)

X→

D3 Did you visit the Xcel Energy website to learn more about the new residential pricing options? Please select all that apply:

- ☐ Yes – prior to enrolling in a new pricing plan (1)
- ☐ Yes – after enrolling in a new pricing plan (2)
- ☐ No (3)
- ☐ Don't know (98)

Skip To: D7 If D3 = No

Skip To: D7 If D3 = Don't know

D4 Did you use any of the following online resources to inform your decision to enroll? Please select all that apply:

- ☐ Video – YouTube video explaining the pricing and participation rules. (1)
- ☐ Customer examples – examples of how different customers with different lifestyles might save on the rates. (2)
- ☐ Rate Advisor Tool – a set of questions to determine whether this plan is well suited for your household. (3)
- ☐ Website rate pages – information about the different pricing periods and rates. (4)
- ☐ FAQs – frequently asked questions. (5)
- ☐ Don't recall (98)

Skip To: D6 If Selected Choices = 1

Carry Forward Selected Choices from "D4"

D5 Which of the following online resources did you find most helpful? Please select all that apply:

- [ ] Video – YouTube video explaining the pricing and participation rules. (1)
- [ ] Customer examples – examples of how different customers with different lifestyles might save on the rates. (2)
- [ ] Rate Advisor Tool – a set of questions to determine whether this plan is well suited for your household. (3)
- [ ] Website rate pages – information about the different pricing periods and rates. (4)
- [ ] FAQs – frequently asked questions. (5)
- [ ] Don't recall (6)

D6 Was the information on the website presented in an easy to understand manner?

- ○ Yes (1)
- ○ No (2)
- ○ Don't Know (98)

D7 For each of the following questions, please drag the slider bar left or right to indicate your response. On a scale of 0 to 10 where 10 is "very helpful" and 0 is "very unhelpful", please indicate how helpful the following information resources were in your decision to participate in the new pricing plan:

Not Applicable

0 1 2 3 4 5 6 7 8 9 10

Emails or online information that I consulted about the rates ()	
Printed information that I received and consulted about the rates ()	
Information about how I can save ()	
Information about program participation rules (opt out period, meter installation, need for a control group) ()	

Display This Question:

If D3 = Yes – prior to enrolling in a new pricing plan

Or D3 = Yes – after enrolling in a new pricing plan

D8 Did the website answer all your questions about the pricing plan options?

- ○ Yes (1)
- ○ No, please specify: (2) _____
- ○ Not applicable (3)
- ○ Don't know (98)

Display This Question:

If If D8 Did the website answer all your questions No, please specify: Is Not Empty

Or D8 = No, please specify:

D9 Were you able to find other sources of information that answered your questions?

- ○ Yes (1)
- ○ No (2)

End of Block: Marketing, Messaging and Materials

Start of Block: Customer (Enrollment) Experience and Customer Satisfaction

Intro Please tell us about your enrollment experience.

E1 Did you sign up for the TOU pricing plan online or by phone?

- Online (1)
- By phone (2)
- Don't know (98)

Display This Question:

If E1 = Online

E2 How easy was it to find the application form on the website?

- Very easy (13)
- Somewhat easy (14)
- Somewhat difficult (15)
- Very difficult (16)
- Don't know (5)

E3 Would you say that the enrollment process....

- ○ Took about as long as you would expect (1)
- ○ Took less time than you anticipated (2)
- ○ Took more time than you anticipated (3)
- ○ Don't know (98)

E4 For the following question, please drag the slider bar left or right to indicate your response.
On a scale of 0 to 10, where 10 is “very satisfied” and 0 is “very dissatisfied”, how satisfied were you with your overall enrollment experience?

	0 1 2 3 4 5 6 7 8 9 10
Overall Satisfaction ()	

E5 Please share any suggestions you have to improve the enrollment process.

_____

End of Block: Customer (Enrollment) Experience and Customer Satisfaction

Start of Block: Household Demographics, Miscellaneous and Conclusion

Intro Here are a few final questions that will conclude the survey.

F1 How long have you lived in the state of Colorado?

- 0 -5 years (1)
- 5 - 10 years (2)
- 10 - 15 years (3)
- 15 - 20 years (4)
- 20 plus years (5)
- Don't Know (98)

F2 What is the **primary** language spoken in your home?

- English (1)
- Spanish (2)
- Other, please specify: (00) _____

F3 Is there anything else you would like to share with us at this time?

_____

_____

_____

_____

_____

End of Block: Household Demographics, Miscellaneous and Conclusion

Appendix D. **WAVE 2 POST-COOLING SEASON SURVEY**

XCEL Energy TOU & PDP Wave 2 - October 2018

Start of Block: Xcel Energy Recommendation

Intro Thank you for your participation in Xcel Energy Pricing Plan Survey. We appreciate your thoughtful responses to each of the following survey questions. To start the survey click on the “Next” button below.

Q1 On a scale from 0 to 10, where 0 means “Not at all likely” and 10 means “Extremely likely”, how likely are you to recommend Xcel Energy to a friend, relative or colleague for their residential electric service? (Drag the slider bar left or right to indicate your answer.)

0 1 2 3 4 5 6 7 8 9 10

()

Q2 Please explain why you rated your likeliness to recommend Xcel Energy as a ${Q1/ChoiceNumericEntryValue/1}.

_____

_____

_____

_____

_____

End of Block: Xcel Energy Recommendation

Start of Block: Customer Understanding of the Pricing Plan

Q3 Which of the following statements best describes your typical response to your electricity bill since joining the new Xcel Energy pricing plan?

- I typically spend at least several minutes looking at my monthly bill to gain an understanding of the costs, and other information that is provided. (1)
- I glance at the various costs and other information on the bill before paying. (2)
- I look at the total bill amount, and if it is within reason, I just pay it. (3)
- I don't look at it at all, I just pay for it or it gets paid automatically. (4)
- Don't Know (98)

Q4 How well do you understand your new energy bills?

- I haven't looked at my new energy bill at all (1)
- I really do not understand the new energy bill at all (2)
- I have a basic understanding of the new energy bill (3)
- I have a fairly complete understanding of the new energy bills (4)
- I understand it completely (5)

End of Block: Customer Understanding of the Pricing Plan

Start of Block: Hot Spot Q5a and Q5b

Display This Question:

If CUSTOMERPLAN = TOU

And Q4 = I really do not understand the new energy bill at all

Or If

CUSTOMERPLAN = TOU

And Q4 = I have a basic understanding of the new energy bill

Or If

CUSTOMERPLAN = TOU

And Q4 = I have a fairly complete understanding of the new energy bills

Q5 Your new energy bill provides detailed information about how your bill is calculated. *Please click on the image below to indicate the parts of the bill that you find confusing or that you do not understand.*

	Off (1)	On (2)
Meter Reading Information (16)		
Service & Facility (17)		
RETOU On-Peak (18)		
RETOU Shoulder (19)		
RETOU Off-Peak (20)		
ECA Off-Peak (21)		
ECA On-Peak (22)		
Trans Cost Adj (23)		
Demand Side Mgmt (24)		
PurchaseCapCost Adj (25)		
CACJA (26)		
Renew. Energy Std Adj (27)		
GRSA (28)		
Franchise Fee (29)		

SERVICE ADDRESS	ACCOUNT NUMBER		DUE DATE
John Doe 15 Main Street Denver, CO 80111	55-55555-9		08/16/2017
	STATEMENT NUMBER	STATEMENT DATE	AMOUNT DUE
	555555	07/27/2017	$90.49

SERVICE ADDRESS: 15 Main Street, Denver CO 80111
NEXT READ DATE: 08/25/17

ELECTRICITY SERVICE DETAILS

PREMISES NUMBER: 333333
INVOICE NUMBER: 123456789

METER READING INFORMATION		
METER 8888888	Read Dates: 06/23/17 - 07/25/17 (32 Days)	
DESCRIPTION	CURRENT READING	USAGE
Total Energy	690 Actual	690 kWh
On Peak Energy	57 Actual	57 kWh
Shoulder Peak Energy	361 Actual	361 kWh
Off Peak Energy	272 Actual	272 kWh
ECA On-Peak	417 Actual	417 kWh
ECA Off-Peak	272 Actual	272 kWh

ELECTRICITY CHARGES — RATE: RETOU Res Energy TOU

DESCRIPTION	USAGE	UNITS	RATE	CHARGE	
Service & Facility				$5.39	
RETOU On-Peak	57	kWh	$0.138140	$7.87	
RETOU Shoulder	361	kWh	$0.084200	$30.40	
RETOU Off-Peak	272	kWh	$0.044400	$12.08	
ECA Off-Peak	59.50	kWh	$0.021650	$1.29	
ECA Off-Peak	212.50	kWh	$0.018790	$3.99	
ECA On-Peak	91.22	kWh	$0.034860	$3.18	
ECA On-Peak	325.78	kWh	$0.030260	$9.86	
Trans Cost Adj	690	kWh	$0.001090	$0.75	
Demand Side Mgmt	150.94	kWh	$0.001320	$0.20	
Demand Side Mgmt	539.06	kWh	$0.001510	$0.82	
PurchCapCostAdj	690	kWh	$0.004650	$3.21	
CACJA	690	kWh	$0.005030	$3.48	
Renew. Energy Std Adj				$1.67	
GRSA				- $0.52	CR
Subtotal				**$83.67**	
Franchise Fee			3.00%	$2.51	
Sales Tax				$4.31	
Total				**$90.49**	

End of Block: Hot Spot Q5a and Q5b

Start of Block: Hot Spot Q5b

Display This Question:

If CUSTOMERPLAN = TDR[30]

And Q4 = I really do not understand the new energy bill at all

Or CUSTOMERPLAN = TDR[31]

And Q4 = I have a basic understanding of the new energy bill

Or CUSTOMERPLAN = TDR[32]

And Q4 = I have a fairly complete understanding of the new energy bills

[30] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

[31] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

[32] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q5b Your new energy bill provides detailed information about how your bill is calculated. *Please click on the image below to indicate the parts of the bill that you find confusing or that you do not understand.*

	Off (1)	On (2)
Meter Reading Information (17)		
Service & Facility (18)		
RDTDR Residential Dmd (19)		
ECA On-Peak (20)		
ECA Off-Peak (21)		
Distribution Demand (22)		
Gen & Tran Demand (23)		
Trans Cost Adj (24)		
Demand Side Mgmt (25)		
Purch Cap Cost (26)		
CACJA (27)		
Renew, Energy Std Adj (28)		
GRSA (29)		
Franchise Fee (30)		

SERVICE ADDRESS	ACCOUNT NUMBER		DUE DATE
15 Main Street Denver, CO 80111	53-55555-5		09/13/2017
	STATEMENT NUMBER	STATEMENT DATE	AMOUNT DUE
	123456789	08/23/2017	$61.53

SERVICE ADDRESS: 15 Main Street Denver, CO 80111
NEXT READ DATE: 09/21/17

ELECTRICITY SERVICE DETAILS

PREMISES NUMBER: 300000000
INVOICE NUMBER: 123456789

METER READING INFORMATION		
METER 82321206	Read Dates: 07/20/17 - 08/18/17 (29 Days)	
DESCRIPTION	CURRENT READING	USAGE
Total Energy	95 Actual	95 kWh
ECA On-Peak	65 Actual	65 kWh
ECA Off-Peak	30 Actual	30 kWh
Generation&Transmission Demand	Actual	2.668 kW
Distribution Demand	Actual	2.771 kW

ELECTRICITY CHARGES — RATE: RDTDR Residential Dmd

DESCRIPTION	USAGE	UNITS	RATE	CHARGE
Service & Facility				$5.39
RDTDR Residential Dmd	95	kWh	$0.004610	$0.44
ECA On-Peak	65	kWh	$0.030260	$1.97
ECA Off-Peak	30	kWh	$0.018790	$0.56
Distribution Demand	3	kW	$3.650000	$10.95
Gen & Transm Demand	3	kW	$9.730000	$29.19
Trans Cost Adj	3	kW	$0.230000	$0.69
Demand Side Mgmt	3	kW	$0.320000	$0.96
Purch Cap Cost	3	kW	$1.010000	$3.03
CACJA	3	kW	$1.090000	$3.27
Renew. Energy Std Adj				$1.13
GRSA				- $0.13 CR
Subtotal				**$57.45**
Franchise Fee			3.00%	$1.71
Sales Tax				$2.37
Total				**$61.53**

End of Block: Hot Spot Q5b

Start of Block: Customer Understanding of the Pricing Plan Q6 - Q9

Q6 Have you used My Account service on the Xcel website to review your electricity bill, since joining the plan?

- ○ Yes, often (1)
- ○ Yes, a few times (2)
- ○ No, not at all (3)
- ○ Don't know (98)

Display This Question:

If Q4 = I really do not understand the new energy bill at all

Or Q4 = I have a basic understanding of the new energy bill

Or Q4 = I have a fairly complete understanding of the new energy bills

Q7 What additional information could Xcel provide to help you better understand your bill?

_____

_____

_____

_____

_____

Display This Question:

If CUSTOMERPLAN = TOU

Q8 Under the new pricing plan, the way you are charged for energy has changed. Based on your current knowledge of the plan, please indicate the accuracy of each of the following descriptions of how the new pricing plan works

	Accurate (1)	Inaccurate (2)	Don't Know (3)
Under the new pricing plan, the amount I pay per kWh is determined by the time of day I'm using electricity and whether it is a weekday, weekend or a holiday. (1)	☐	☐	☐
Under the new pricing plan, there are three different prices for electricity on any given weekday (unless it is a holiday). (4)	☐	☐	☐

Display This Question:

If CUSTOMERPLAN = TDR[33]

[33] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q9 Under the new pricing plan, the way you are charged for energy has changed. Based on your current knowledge of the plan, please indicate the accuracy of each of the following descriptions of how the new pricing plan works.

	Accurate (1)	Inaccurate (2)	Don't Know (3)
Under the new pricing plan, the amount I pay is determined by the time of day I'm using electricity. (1)	☐	☐	☐
Under the new pricing plan, the amount I pay is determined by the amount of electricity that I use during a single hour during the month. (4)	☐	☐	☐

End of Block: Customer Understanding of the Pricing Plan Q6 - Q9

Start of Block: Changes in Behaviors and Technologies

Display This Question:

If CENTRAL_AC = 1

Q10_1 During this past summer, what temperature did you typically set your thermostat to when running your air conditioner...

	Temperature Setting (1)	We never/rarely ran the AC during these hours (1)

Daytime - Weekdays during peak hours (2-6 pm) (1)		☐
Daytime - Weekdays during non-peak hours (2)		☐
Daytime - Weekends (4)		☐
At Night (5)		☐
When no one is home (3)		☐

Intro Now we would like to ask you a couple of questions about how you were using electricity **before** you signed up for the new pricing plan.

Q10 **Before** signing up for the new pricing plan, how frequently did you run the following appliances during the hours of 2pm to 6pm during the summer months (June – Sept)?

	Very frequently (1)	Frequently (2)	Sometimes (3)	Rarely (4)	Never (5)	Do not have this appliance or technology (99)
Air conditioning (1)	○	○	○	○	○	○
Electric oven (2)	○	○	○	○	○	○
Electric range (3)	○	○	○	○	○	○
Dishwasher (4)	○	○	○	○	○	○
Electric clothes dryer (5)	○	○	○	○	○	○
Electric vehicle charger (6)	○	○	○	○	○	○
Hot tub (7)	○	○	○	○	○	○

Display This Question:

If CENTRAL_AC = 1

Or WINDOW_AC = 1

Q11 Before signing up for the new pricing plan, how would you describe the typical air conditioning settings in your home during the summer months (June – Sept)? *Please select all that apply:*

As a household, we typically…

- ☐ Maintained a consistent temperature setting at or above 78 degrees throughout the day and night (1)
- ☐ Maintained a consistent temperature setting below 78 degrees throughout the day and night (2)
- ☐ Had at least one period during the day when the thermostat was set at a higher temperature (or we turn off the AC entirely) (3)
- ☐ Turned off the air conditioning at night and open the windows (4)
- ☐ Cranked up the AC sometime between 2pm and 6pm to cool off the house or apartment (5)
- ☐ Only turned on the AC when it was really hot outside (6)
- ☐ Other, please specify: (97) _____

Transition Now we would like to ask you a few questions about how you (and others in your household) have been using electricity **after** signing up for the new pricing plan.

Q12 **After** enrolling in the new pricing plan, how frequently have you run the following appliances during the hours of 2pm to 6pm during the summer months (June – Sept)?

	Very frequently (1)	Frequently (2)	Sometimes (3)	Rarely (4)	Never (5)	Do not have this appliance or technology (99)
Air conditioning (1)	○	○	○	○	○	○
Electric oven (2)	○	○	○	○	○	○
Electric range (3)	○	○	○	○	○	○
Dishwasher (4)	○	○	○	○	○	○
Electric clothes dryer (5)	○	○	○	○	○	○
Electric vehicle charger (6)	○	○	○	○	○	○
Hot tub (7)	○	○	○	○	○	○

Display This Question:

If CENTRAL_AC = 1

Or WINDOW_AC = 1

Q13 **After** enrolling in the new pricing plan, how would you describe the typical air conditioning settings in your home during the summer months (June-Sept)? *Please select all that apply:*

As a household, we typically...

- ☐ Maintained a consistent temperature setting at or above 78 degrees throughout the day and night (1)
- ☐ Maintained a consistent temperature setting below 78 degrees throughout the day and night (2)
- ☐ Had at least one period during the day when the thermostat is set at a higher temperature (or we turn off the AC entirely) (3)
- ☐ Turned off the air conditioning at night and open the windows (4)
- ☐ Cranked up the AC sometime between 2pm and 6pm to cool off the house or apartment (5)
- ☐ Only turned on the AC when it is really hot outside (6)
- ☐ Other, please specify: (97)

Display This Question:

If CUSTOMERPLAN = TOU

X→

Q14 Please indicate which of the following actions you or others in your household started doing (during the months June-Sept) **after** you signed up for the new pricing plan. *Please select all that apply:*

- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)
- ☐ Setting the thermostat at a higher temperature during shoulder periods, so the AC runs less often (2)
- ☐ Opening windows and turning off the AC at night to naturally cool my house or apartment (3)
- ☐ Precooling my house/apartment by running my AC more in the morning (4)
- ☐ Shifting the time of day when I use my washer/dryer (5)
- ☐ Shifting the time of day when I use my oven (6)
- ☐ Shifting the time of day when I use my dishwasher (7)
- ☐ Shifting the time of day when I watch TV or play video games (8)
- ☐ Turning off lights when not home or not needed (9)
- ☐ We have not changed our behaviors (10)
- ☐ Other, please specify: (97) _____

Display This Question:

If CUSTOMERPLAN = TOU

And Q14 != We have not changed our behaviors

Carry Forward Selected Choices from "Q14"

Q14a Which of these actions did you find most difficult to implement on a regular basis? *(Select up to three)*

- ☐ None of these (12)
- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (13)
- ☐ Setting the thermostat at a higher temperature during shoulder periods, so the AC runs less often (14)
- ☐ Opening windows and turning off the AC at night to naturally cool my house or apartment (15)
- ☐ Precooling my house/apartment by running my AC more in the morning (16)
- ☐ Shifting the time of day when I use my washer/dryer (17)
- ☐ Shifting the time of day when I use my oven (18)
- ☐ Shifting the time of day when I use my dishwasher (19)
- ☐ Shifting the time of day when I watch TV or play video games (20)
- ☐ Turning off lights when not home or not needed (21)
- ☐ We have not changed our behaviors (22)
- ☐ Other, please specify: (23) _____

Display This Question:

If CUSTOMERPLAN = TDR[34]

[34] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q15 Please indicate which of the following actions you or others in your household started doing during the summer months (June-Sept) **after** you signed up for the new pricing plan. *Please select all that apply:*

- ☐ Setting the thermostat at a higher temperature during Peak periods, so the AC runs less often (1)
- ☐ Opening windows and turning off the AC at night to naturally cool my house or apartment (2)
- ☐ Precooling my house/apartment by running my AC in the morning and then set my thermostat at a higher temperature in the afternoon (3)
- ☐ Staggering my use of major appliances during Peak periods (4)
- ☐ Staggering my use of major appliances during Off-Peak periods (5)
- ☐ Shifting the time of day when I use my washer/dryer (6)
- ☐ Shifting the time of day when I use my oven (7)
- ☐ Shifting the time of day when I use my dishwasher (8)
- ☐ Shifting the time of day when I watch TV or play video games (9)
- ☐ Turning off lights when not home or not needed (10)
- ☐ We have not changed our behaviors at all (11)
- ☐ Other, please specify: (97) _____

Display This Question:

If CUSTOMERPLAN = TDR

And Q15 != We have not changed our behaviors at all

Carry Forward Selected Choices from "Q15"

Q15a Which actions did you find most difficult to implement on a regular basis? *(Select up to three)*

- ○ None of there (1)
- ○ Setting the thermostat at a higher temperature during Peak periods, so the AC runs less often (13)
- ○ Opening windows and turning off the AC at night to naturally cool my house or apartment (14)
- ○ Precooling my house/apartment by running my AC in the morning and then set my thermostat at a higher temperature in the afternoon (15)
- ○ Staggering my use of major appliances during Peak periods (16)
- ○ Staggering my use of major appliances during Off-Peak periods (17)
- ○ Shifting the time of day when I use my washer/dryer (18)
- ○ Shifting the time of day when I use my oven (19)
- ○ Shifting the time of day when I use my dishwasher (20)
- ○ Shifting the time of day when I watch TV or play video games (21)
- ○ Turning off lights when not home or not needed (22)
- ○ We have not changed our behaviors at all (23)
- ○ Other, please specify: (24) _____

Display This Question:

If CUSTOMERPLAN = TDR[35]

[35] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q16 Which of the following best describes your efforts to avoid using several appliances at the same time (in other words, ***stagger*** your appliance use)?

	Frequently (1)	Sometimes (2)	Rarely (3)	Never (4)
I/we stagger our use of appliances **during peak hours** (1)	○	○	○	○
I/we stagger our use of appliances **during off-peak hours** (2)	○	○	○	○

Display This Question:

If CUSTOMERPLAN = TDR[36]

And Q16 != Never

Q16a How easy or difficult has it been for you to **stagger** your use of appliances and other electricity-consuming technologies? (Staggering means avoiding the simultaneous use of appliances so that your household's energy demand is more spread out)

- ○ Very easy (1)
- ○ Somewhat easy (2)
- ○ Somewhat difficult (3)
- ○ Very difficult (4)
- ○ I have not tried (5)
- ○ I don't know (98)

[36] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q17 Please indicate which of the following items that you or others in your household have purchased after signing up for the new pricing plan. *Please select all that apply:*

- ☐ A programmable thermostat (A thermostat with a digital display that allows you to program thermostat settings according to the household schedule.) (1)
- ☐ A smart thermostat (A wifi-enabled thermostat also known as a communicating thermostat that you can control from your smart phone or computer.) (2)
- ☐ One or more energy-efficient appliances or equipment (like a refrigerator, dryer, or A/C unit). Please specify: (3) _____
- ☐ A programmable appliance (An appliance with a digital display that allows you to program settings according to the household schedule.) (4)
- ☐ An electric vehicle (5)
- ☐ Other, please specify: (97) _____
- ☐ We have not purchased any of the above technologies (6)

Display This Question:

If Q17 = A smart thermostat (A wifi-enabled thermostat also known as a communicating thermostat that you can control from your smart phone or computer.)

Q17a To what degree did your participation in the new pricing plan influence your decision to purchase a smart thermostat?

- ○ Significantly (1)
- ○ Somewhat (2)
- ○ Did not influence (3)

Display This Question:

If Q17 = An electric vehicle

Q17b To what degree did your participation in the new pricing plan influence your decision to purchase an electric vehicle?

- ○ Significantly (1)
- ○ Somewhat (2)
- ○ Did not influence (3)

End of Block: Changes in Behaviors and Technologies

Start of Block: Customer Experience and Satisfaction

Q18 Please indicate the importance of the following factors in motivating your participation in the ${e://Field/CUSTOMERPLAN} pricing plan:

	Very important (1)	Important (2)	Somewhat important (3)	Not very important (4)	Not at all important (5)	Don't know (98)
Having more control over my electricity bill (1)	○	○	○	○	○	○
Conserving energy (2)	○	○	○	○	○	○
I like to try new things (3)	○	○	○	○	○	○
The pricing plan was recommended to me (or someone in my household) (4)	○	○	○	○	○	○
I know other people who have enrolled in the pricing plan (5)	○	○	○	○	○	○
I want to help Colorado understand and design efficient electricity rates for the future (6)	○	○	○	○	○	○
Saving money on my electricity bill (7)	○	○	○	○	○	○

Q18a Were there any other important factors that motivated your participation in the ${e://Field/CUSTOMERPLAN} pricing plan?

_____

_____

_____

_____

_____

Display This Question:

If Q18 = Having more control over my electricity bill [Very important]

Or Q18 = Having more control over my electricity bill [Important]

Or Q18 = Having more control over my electricity bill [Somewhat important]

Q18b Has your participation in the TOU pricing plan helped you achieve more control over your electricity bill?

- Yes, very helpful (1)
- Yes, somewhat helpful (2)
- Unsure (3)
- No, Not helpful (4)
- Other, please specify: (97) _____

Display This Question:

If Q18 = Conserving energy [Very important]

Or Q18 = Conserving energy [Important]

Or Q18 = Conserving energy [Somewhat important]

Q18c Has your participation in the ${e://Field/CUSTOMERPLAN} pricing plan helped you conserve energy?

- ○ Yes, very helpful (1)
- ○ Yes, somewhat helpful (2)
- ○ Unsure (3)
- ○ No, Not helpful (4)
- ○ Other, please specify: (97) _____

Display This Question:

If Q18 = Saving money on my electricity bill [Very important]

Or Q18 = Saving money on my electricity bill [Important]

Or Q18 = Saving money on my electricity bill [Somewhat important]

Q18d Has your participation on the ${e://Field/CUSTOMERPLAN} pricing plan helped you save money on your electricity bill?

- ○ Yes, very helpful (1)
- ○ Yes, somewhat helpful (2)
- ○ Unsure (3)
- ○ No, Not helpful (4)
- ○ Other, please specify: (97) _____

Q19 On a scale of 0 to 10, where 10 is “extremely likely” and 0 is “not at all likely”, how likely are you to recommend the new pricing plan to friends or family? (Drag the slider bar left or right to indicate your answer.)

0 1 2 3 4 5 6 7 8 9 10

()

X→

Q20 Have you had the opportunity to talk about your experiences on the new pricing plan with friends, family, and/or coworkers? *Please select all that apply:*

- ☐ Yes, friends (1)
- ☐ Yes, family (2)
- ☐ Yes, coworkers (3)
- ☐ No, I haven’t talked about my experience to friends, family or coworkers (4)
- ☐ I don’t know (98)

Display This Question:

If Q20 = Yes, friends

Or Q20 = Yes, family

Or Q20 = Yes, coworkers

X→

Q21 Was the information that you shared generally positive or negative?

- Mostly positive (1)
- Somewhat positive (2)
- Neutral (3)
- Somewhat negative (4)
- Mostly negative (5)
- Other, please specify: (3) _____

Display This Question:

If CUSTOMERPLAN = TOU

Q22 In thinking about your experience on the Time of Use pricing plan, please indicate how supportive you are likely to be of each of the following hypothetical changes to the pricing plan.

How supportive would you be of paying a higher rate during peak periods in exchange for...

	Strongly supportive (1)	Somewhat supportive (2)	Neutral (3)	Somewhat opposed (4)	Strongly opposed (5)
...paying an even lower off-peak rate (1)	○	○	○	○	○
…paying a lower shoulder period rate (2)	○	○	○	○	○
…ending the on-peak period one hour earlier (2pm-5pm) (3)	○	○	○	○	○
…eliminating the shoulder period (4)	○	○	○	○	○
…eliminating the shoulder period AND extending the peak period an additional hour (2pm-7pm) (5)	○	○	○	○	○

Display This Question:

If CUSTOMERPLAN = TDR[37]

[37] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q23 In thinking about your experience on the Peak Demand pricing plan, please indicate how supportive you are likely to be of each of the following hypothetical changes to the pricing plan.

How supportive would you be of paying a higher rate during peak periods in exchange for…

	Strongly supportive (1)	Somewhat supportive (2)	Neutral (3)	Somewhat opposed (4)	Strongly opposed (5)
…paying an even lower off-peak rate (1)	○	○	○	○	○
…ending the on-peak period one hour earlier (2pm-5pm) (2)	○	○	○	○	○
…shortening the on-peak period to only two hours (2pm-4pm) BUT paying an even higher on-peak rate (3)	○	○	○	○	○

End of Block: Customer Experience and Satisfaction

Start of Block: Marketing, Messaging and Materials

Display This Question:

If CUSTOMERPLAN = TOU

X→

Q26_TOU Do you remember receiving a sticker from Xcel Energy with information about your TOU pricing plan (see image below)?

- ○ Yes (1)
- ○ No (2)
- ○ I Don't Know (98)

Display This Question:

If CUSTOMERPLAN = TDR[38]

X→

Q26_TDR Do you remember receiving a sticker from Xcel Energy with information about your TOU pricing plan (see image below)?

- ○ Yes (1)
- ○ No (2)
- ○ I Don't Know (98)

Display This Question:

If Q26_TOU = Yes

Or Q26_TDR = Yes

X→

[38] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q26a What did you do with the sticker(s) you received?

- ○ Threw it out (1)
- ○ Stuck the sticker(s) to a major appliance such as thermostat, dish washer, and clothes washer/dryer. (2)
- ○ Put it somewhere else, please specify: (3) _____

Display This Question:

If Q26a = Stuck the sticker(s) to a major appliance such as thermostat, dish washer, and clothes washer/dryer.

Or Q26a = Put it somewhere else, please specify:

X→

Q26b Which appliance did you attach the sticker(s) to?

- ☐ Thermostat (1)
- ☐ Dishwasher (2)
- ☐ Clothes washer/dryer (3)
- ☐ Refrigerator (4)
- ☐ Other, please specify: (97) _____

Display This Question:

If Q26_TOU = Yes

And Q26a != Threw it out

Or If

Q26_TDR = Yes[39]

And Q26a != Threw it out

[39] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q26c On a scale of 0 to 10 where 10 is “very helpful" and 0 is “very unhelpful”, please use the slider bar below to indicate how helpful the information on the sticker(s) was for you. (Drag the slider bar left or right to indicate your answer.)

Q24 On a scale of 0 to 10 where 10 is “very helpful" and 0 is “very unhelpful”, please indicate how helpful the following information resources have been in your understanding of ***the new ${e://Field/CUSTOMERPLAN}* pricing plan**.

	0 (0)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)	Did Not Reference Materials (99)
An email from Xcel Energy (1)	○	○	○	○	○	○	○	○	○	○	○	○
Reminder stickers sent in the mail (2)	○	○	○	○	○	○	○	○	○	○	○	○
Personalized charts and graphs on My Account (3)	○	○	○	○	○	○	○	○	○	○	○	○
Xcel Energy Call Center (4)	○	○	○	○	○	○	○	○	○	○	○	○
Information about the rates on Xcel Energy’s website (5)	○	○	○	○	○	○	○	○	○	○	○	○

Q25 On a scale of 0 to 10 where 10 is “very helpful" and 0 is “very unhelpful”, please indicate how helpful the following information resources have been in your understanding of ***your bill***.

	0 (0)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 (10)	Did Not Reference Materials (99)
Information enclosed with your Xcel Energy bill (1)	○	○	○	○	○	○	○	○	○	○	○	○
An email from Xcel Energy (2)	○	○	○	○	○	○	○	○	○	○	○	○
Reminder stickers sent in the mail (3)	○	○	○	○	○	○	○	○	○	○	○	○
Personalized charts and graphs on My Account (4)	○	○	○	○	○	○	○	○	○	○	○	○
Xcel Energy Call Center (5)	○	○	○	○	○	○	○	○	○	○	○	○
Information about the rates on Xcel Energy’s website (6)	○	○	○	○	○	○	○	○	○	○	○	○

Display This Question:

If CUSTOMERPLAN = TOU

Q26TOU Video Do you recall seeing any of the “tips to save” videos on the Xcel website?

- Yes (1)
- No (2)
- I Don’t Know (98)

Display This Question:

If CUSTOMERPLAN = TDR[40]

Q26TDR Video Do you recall seeing any of the “tips to save” videos on the Xcel Energy website?

- Yes (1)
- No (2)
- I Don’t Know (98)

Display This Question:

If Q26TOU Video = Yes

Or If

Q26TDR Video = Yes

Q26 Video On a scale of 0 to 10 where 10 is “very helpful" and 0 is “very unhelpful”, please use the slider bar below to indicate how helpful the information from the video(s) was for you. (Drag the slider bar left or right to indicate your answer.)

Not Applicable

0 1 2 3 4 5 6 7 8 9 10

()

[40] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q27 Is there any other information that Xcel could provide to help you understand the new pricing plan or your bill?

- ○ Yes, please specify: (1) _____
- ○ No (2)

End of Block: Marketing, Messaging and Materials

Start of Block: Tstats

Q28 Please indicate whether you have a smart thermostat installed in your home at this time. (A smart thermostat is a wifi-enabled thermostat (also known as a communicating thermostat) that you can control from your smart phone or computer.)

- ○ Yes (1)
- ○ No (2)
- ○ Don't know (98)

Skip To: End of Block If Q28 != Yes

Display This Question:
If Q28 = Yes

Q29 Have you made any changes to the programming on your thermostat in response to the new pricing plan?

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (98)

Display This Question:

If Q29 = Yes

Q30 How easy or difficult was it to reprogram your thermostat?

- Very easy (1)
- Somewhat easy (2)
- Somewhat difficult (3)
- Very difficult (4)
- I don't know (98)

Q31 How helpful do you think having a smart thermostat has been in increasing your success on the new pricing plan?

- Very helpful (1)
- Somewhat helpful (2)
- Not at all helpful (3)
- I don't know (98)

End of Block: Tstats

Start of Block: Solar

Q32 How would you describe the way in which the new pricing plan works well with your solar generation?

_____

_____

_____

_____

_____

Q33 Are there some ways in which the new pricing plan doesn't work well with your solar generation?

- ○ No (2)
- ○ Yes, please explain: (1) _____
- ○ I don't know (98)

Q34 Has the new pricing plan led you to think about the placement of your solar panels?

- ○ No (2)
- ○ Yes, please explain: (1) _____
- ○ I don't know (98)

Q35 Would you say that the value of your solar generation has generally increased or decreased due to your participation in the new pricing plan?

- Increased a lot (1)
- Increased a little (2)
- Stayed the same (3)
- Decreased a little (4)
- Decreased a lot (5)
- I don't know (98)

End of Block: Solar

Start of Block: Electric Vehicles

Q36 How helpful or harmful has the new pricing plan been for reducing the cost of charging your electric vehicle?

- Extremely helpful (1)
- Somewhat helpful (2)
- Neutral (3)
- Somewhat harmful (4)
- Extremely harmful (5)
- Don't know (98)

Q37 Please indicate whether you (or others in your household) have made any of the following changes to your EV charging routines during the period **after** you signed up for the new pricing plan.

- ○ We have made changes to the time of day that we charge our electric vehicle (1)
- ○ We have made changes to the location where we charge our electric vehicle (2)
- ○ We have made some changes to both location and time of day (3)
- ○ We have not made changes to either time or location (4)
- ○ Don't know (98)

Q37a Please indicate the times of day and locations where you used to charge your electric vehicle **before** signing up for the new pricing plan.

Before signing up for the new pricing plan, I typically charged my EV during the following time periods and locations:

	At Home (1)	Away from Home (2)	Neither (3)
Early in the morning (between 5AM and 9AM) (1)	○	○	○
In the morning (between 9AM and noon) (2)	○	○	○
In the early afternoon (between noon and 2PM) (3)	○	○	○
Later in the afternoon (between 2PM and 6PM) (4)	○	○	○
Early evening (between 6PM and 9PM) (5)	○	○	○
Overnight (between 9PM and 5AM) (6)	○	○	○

Display This Question:

If Q37 = We have made changes to the time of day that we charge our electric vehicle

Or Q37 = We have made changes to the location where we charge our electric vehicle

Or Q37 = We have made some changes to both location and time of day

Q37b Please indicate the times of day and locations where you have been charging your electric vehicle in the time period since you've signed up for the new pricing plan.

Since signing up for the new pricing plan, I typically charged my EV during the following time periods and locations:

	At Home (1)	Away from Home (2)	Neither (3)
Early in the morning (between 5AM and 9AM) (1)	○	○	○
In the morning (between 9AM and noon) (2)	○	○	○
In the early afternoon (between noon and 2PM) (3)	○	○	○
Later in the afternoon (between 2PM and 6PM) (4)	○	○	○
Early evening (between 6PM and 9PM) (5)	○	○	○
Overnight (between 9PM and 5AM) (6)	○	○	○

Display This Question:

If CUSTOMERPLAN = TOU

Q38 Please indicate whether you have experienced any difficulty in making the following changes to your EV charging practices? *Please select all that apply:*

☐ Avoiding peak periods (2-6pm)? Please explain: (1)
_____

☐ Avoiding the morning shoulder (9am–2pm)? Please explain: (2)
_____

☐ Avoiding the afternoon shoulder (6pm- 9pm)? Please explain: (3)
_____

☐ I didn't charge my vehicle during peak periods before signing up for the new pricing plan. (4)

☐ I have not tried to shift when I charge my vehicle. (5)

☐ I have not experienced difficulty in making any of these changes (6)

Display This Question:

If CUSTOMERPLAN = TDR[41]

Q39 Please indicate whether you have experienced any difficulty in making the following changes to your EV charging practices? *Please select all that apply:*

☐ Avoiding peak periods (2-6pm)? Please explain: (1)
_____

☐ I didn't charge my vehicle during peak periods before signing up for the new pricing plan. (2)

☐ I have not tried to shift when I charge my vehicle. (3)

End of Block: Electric Vehicles

Start of Block: Expectations/Perceptions

[41] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q40 To what degree has your experience with the new TOU pricing plan been what you expected?

- ○ Exactly as I expected (1)
- ○ Mostly as I expected (2)
- ○ Somewhat different from what I expected (3)
- ○ Very different from what I expected (4)
- ○ Don't know (98)

Display This Question:

If Q40 = Mostly as I expected

Or Q40 = Somewhat different from what I expected

Or Q40 = Very different from what I expected

Q42 What about the new pricing plan was different from what you expected?

_____

_____

_____

_____

_____

Q43 Since enrolling in the new pricing plan, have your household's electricity bills been higher than expected, lower than expected, or about the same as you expected?

- Higher than I expected (1)
- About the same as I expected (2)
- Lower than I expected (3)
- Did not have any expectation (4)
- Don't know (98)

End of Block: Expectations/Perceptions

Start of Block: Demographics and Miscellaneous

Q44 How long have you lived in Colorado?

- Less than 2 years (1)
- 2-5 years (2)
- 5-10 years (3)
- 10-15 years (4)
- 15-20 years (5)
- 20 plus years (6)
- Don't know (98)

Display This Question:

If Q44 = Less than 2 years

Or Q44 = 2-5 years

Q44a What state did you live in prior to moving to Colorado?

▼Alabama (1) ... I do not reside in the United States (53)

Q45 Are there any additional thoughts, suggestions or questions that you would like to share?

_____

_____

_____

_____

_____

End of Block: Demographics and Miscellaneous

Appendix E. **DROPOUT SURVEY**

XCEL Energy TOU PDP Dropout 2018 October

Start of Block: Reasons for Leaving

Intro Thank you for taking the time to participate in this special Xcel Energy survey. We appreciate your feedback and look forward to learning more about your recent experience with the TOU pricing plan. Our goal is to learn from your feedback and improve the pricing plan program. Please answer the following questions as completely and candidly as possible. Once the survey period has closed, the survey findings will be tabulated and summarized to better understand how customers are experiencing the program and to identify opportunities for improvement.

Q1 It is helpful to understand why customers drop out of a pilot program. Often more than one factor is involved. Can you identify the reasons why you dropped out of the TOU pricing plan? Please select all that apply.

- [ ] I moved to a new home or apartment *(exclusive)* (1)
- [ ] The pricing plan was too complicated for me to understand (2)
- [ ] I have solar and I was not sure how it might have been affecting my bill (3)
- [ ] The information about the plan wasn't clear (4)
- [ ] I just wanted to check it out and never planned on staying on more than a few months (5)
- [ ] I reached out to Xcel Energy but I couldn't get my questions answered (6)
- [ ] I wasn't sure if I was saving money (7)
- [ ] My bills increased (8)
- [ ] I didn't save as much money on my bill as I expected (9)
- [ ] I didn't want to adjust my behavior to save on my bill (10)
- [ ] It was inconvenient (11)
- [ ] I was concerned that my bills might increase in the future (12)
- [ ] I didn't want to change how or when I use my air conditioning (13)
- [ ] I did not want the new meter installed (14)
- [ ] My family/other home occupants did not want to participate (15)
- [ ] My lifestyle changed (work schedule, change in people in the home, new appliances) (16)
- [ ] I was approaching my 7th bill and wanted to leave in the "opt out" period (17)

☐ Don't know (98)

☐ Other, please specify: (97) _____

Skip To: End of Survey If Q1 = I moved to a new home or apartment (exclusive)

Page Break

NAVIGANT

Residential Energy Time-of-Use (RE-TOU) Trial Evaluation Report 1

Display This Question:

If If Q1 Reasons for dropping out q://QID137/SelectedChoicesCount Is Greater Than or Equal to 3 bytes

Carry Forward Selected Choices from "Q1"

Q2 Which one of the factors above was most important in influencing your decision to drop out? Please select up to two.

- ☐ I moved to a new home or apartment *(exclusive)* (1)
- ☐ The pricing plan was too complicated for me to understand (2)
- ☐ I have solar and I was not sure how it might have been affecting my bill (3)
- ☐ The information about the plan wasn't clear (4)
- ☐ I just wanted to check it out and never planned on staying on more than a few months (5)
- ☐ I reached out to Xcel Energy but I couldn't get my questions answered (6)
- ☐ I wasn't sure if I was saving money (7)
- ☐ My bills increased (8)
- ☐ I didn't save as much money on my bill as I expected (9)
- ☐ I didn't want to adjust my behavior to save on my bill (10)
- ☐ It was inconvenient (11)
- ☐ I was concerned that my bills might increase in the future (12)
- ☐ I didn't want to change how or when I use my air conditioning (13)
- ☐ I did not want the new meter installed (14)
- ☐ My family/other home occupants did not want to participate (15)
- ☐ My lifestyle changed (work schedule, change in people in the home, new appliances) (16)

☐ I was approaching my 7th bill and wanted to leave in the “opt out” period (17)

☐ Don’t know (18)

☐ Other, please specify: (19) _____

End of Block: Reasons for Leaving

Start of Block: Behavior change

Q3 How much did you and other members of your household try changing your energy use behaviors to manage or lower the cost of your electricity bill?

- Significantly (1)
- Somewhat (2)
- Very little (3)
- Not at all (4)
- Don't know (98)

Display This Question:

If CUSTOMERPLAN = TOU

Q4 Please indicate which of the following actions you or others in your household started doing after you signed up for the new pricing plan.

During the summer, we started.....(please select all that apply)

- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)
- ☐ Setting the thermostat at a higher temperature during shoulder periods, so the AC runs less often (2)
- ☐ Opening windows and turning off the AC at night to naturally cool our house or apartment (3)
- ☐ Precooling my house/apartment by running the AC more in the morning (4)
- ☐ Using room fans, ceiling fans, or window fans instead of AC (5)

Display This Question:

If CUSTOMERPLAN = TOU

Q4_1 **Other actions that we started doing include…**(please select all that apply)

☐ Charging our electric vehicle during the non-peak hours (1)

☐ Shifting the time of day when we used the washer/dryer to non-peak hours (4)

☐ Shifting the time of day when we used the oven to non-peak hours (5)

☐ Using the microwave, outdoor grill, slow cooker or other low-energy cooking device more often to avoid using the oven (6)

☐ Shifting the time of day when we used the dishwasher to non-peak hours (7)

☐ Shifting the time of day when we watched TV or played video games to non-peak hours (8)

☐ Turning off lights when not home or not needed (9)

☐ We really didn't change our behaviors under the new pricing plan. {MUTUALLY EXCLUSIVE} (10)

☐ Other: {Please specify} (11) _____

Display This Question:

If CUSTOMERPLAN = TOU

Q4a After joining the new pricing plan, which of the following actions did you find too challenging to even attempt to begin implementing ? (Select all that apply.)

- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)
- ☐ Setting the thermostat at a higher temperature during shoulder periods, so the AC runs less often (2)
- ☐ Opening windows and turning off the AC at night to naturally cool our house or apartment (3)
- ☐ Precooling my our house/apartment by running the AC more in the morning (4)
- ☐ Using room fans, ceiling fans, or window fans instead of AC (5)
- ☐ Charging our electric vehicle during the non-peak hours (6)
- ☐ Shifting the time of day when we used the washer/dryer to non-peak hours (7)
- ☐ Shifting the time of day when we used the oven to non-peak hours (8)
- ☐ Using the microwave, outdoor grill, slow cooker or other low-energy cooking device more often to avoid using the oven or other rapid cooking (9)
- ☐ Shifting the time of day when we used the dishwasher to non-peak hours (10)
- ☐ Shifting the time of day when we watched TV or played video games to non-peak hours (11)
- ☐ Turning off lights when not home or not needed (12)
- ☐ Other, please specify: (97) _____
- ☐ None of the above (13)

Display This Question:

If CUSTOMERPLAN = TOU

Carry Forward Unselected Choices from "Q4a"

Q4b After joining the new pricing plan, which of the following actions did you try to implement but found that they were too difficult to implement successfully?

- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)
- ☐ Setting the thermostat at a higher temperature during shoulder periods, so the AC runs less often (2)
- ☐ Opening windows and turning off the AC at night to naturally cool our house or apartment (3)
- ☐ Precooling my our house/apartment by running the AC more in the morning (4)
- ☐ Using room fans, ceiling fans, or window fans instead of AC (5)
- ☐ Charging our electric vehicle during the non-peak hours (6)
- ☐ Shifting the time of day when we used the washer/dryer to non-peak hours (7)
- ☐ Shifting the time of day when we used the oven to non-peak hours (8)
- ☐ Using the microwave, outdoor grill, slow cooker or other low-energy cooking device more often to avoid using the oven or other rapid cooking (9)
- ☐ Shifting the time of day when we used the dishwasher to non-peak hours (10)
- ☐ Shifting the time of day when we watched TV or played video games to non-peak hours (11)
- ☐ Turning off lights when not home or not needed (12)
- ☐ Other, please specify: (13) _____
- ☐ None of the above (14)

Display This Question:

If CUSTOMERPLAN = TDR[42]

Q5 Please indicate which of the following actions you or others in your household started doing after you signed up for the new pricing plan.
Please select all that apply:

- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)
- ☐ Opening windows and turning off the AC at night to naturally cool the house or apartment (2)
- ☐ Precooling my house/apartment by running my AC in the morning and then setting the thermostat at a higher temperature in the afternoon (3)

Display This Question:

If CUSTOMERPLAN = TDR[43]

[42] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

[43] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q5_1 **Other actions that we started doing include.....**

☐ Staggering our use of major electrical appliances during peak periods, to avoid using multiple appliances at once (4)

☐ Staggering our use of major electrical appliances during off-peak periods, to avoid using multiple appliances at once (5)

☐ Shifting the time of day when we used the washer to non-peak hours (6)

☐ Shifting the time of day when we used the dryer to non-peak hours (7)

☐ Shifting the time of day when we used the oven to non-peak hours (8)

☐ Using the microwave, outdoor grill, slow cooker or other low-energy cooking device more often to avoid using the oven (9)

☐ Shifting the time of day when we used the dishwasher to non-peak hours (10)

☐ Shifting the time of day when we watched TV or played video games to non-peak hours (11)

☐ Turning off lights when not home or not needed (12)

☐ We really haven't have not changed our behaviors under the new pricing plan. (13)

☐ Other, please specify: (98) _____

Display This Question:

If CUSTOMERPLAN = TDR[44]

[44] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

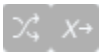
Q5a After joining the new pricing plan, which of the following actions did you find to be too challenging to even attempt to begin implementing?
Please select all that apply.

- ☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)
- ☐ Opening windows and turning off the AC at night to naturally cool the house or apartment (2)
- ☐ Precooling our house/apartment by running my the AC in the morning and then setting the thermostat at a higher temperature in the afternoon (3)
- ☐ Staggering our use of major electrical appliances during peak periods, to avoid using multiple appliances at once (4)
- ☐ Staggering our use of major electrical appliances during off-peak periods, to avoid using multiple appliances at once (5)
- ☐ Shifting the time of day when we used the washer to non-peak hours (6)
- ☐ Shifting the time of day when we used the dryer to non-peak hours (7)
- ☐ Shifting the time of day when we used the oven to non-peak hours (8)
- ☐ Using the microwave, outdoor grill, slow cooker or other low-energy cooking device more often to avoid using the oven (9)
- ☐ Shifting the time of day when we used the dishwasher to non-peak hours (10)
- ☐ Shifting the time of day when we watched TV or played video games to non-peak hours (11)
- ☐ Turning off lights when not home or not needed (12)
- ☐ Other, please specify: (13) _____
- ☐ None of the above (14)

Display This Question:

If CUSTOMERPLAN = TDR[45]

Carry Forward Unselected Choices from "Q5a"



[45] TOU customers were not shown any questions related to the TDR rate plan. This question was skipped in the survey for TOU customers.

Q5b After joining the new pricing plan, which of the following actions did you try to implement but found that they were too difficult to implement successfully?

☐ Setting the thermostat at a higher temperature during peak periods, so the AC runs less often (1)

☐ Opening windows and turning off the AC at night to naturally cool the house or apartment (2)

☐ Precooling our house/apartment by running my the AC in the morning and then setting the thermostat at a higher temperature in the afternoon (3)

☐ Staggering our use of major electrical appliances during peak periods, to avoid using multiple appliances at once (4)

☐ Staggering our use of major electrical appliances during off-peak periods, to avoid using multiple appliances at once (5)

☐ Shifting the time of day when we used the washer to non-peak hours (6)

☐ Shifting the time of day when we used the dryer to non-peak hours (7)

☐ Shifting the time of day when we used the oven to non-peak hours (8)

☐ Using the microwave, outdoor grill, slow cooker or other low-energy cooking device more often to avoid using the oven (9)

☐ Shifting the time of day when we used the dishwasher to non-peak hours (10)

☐ Shifting the time of day when we watched TV or played video games to non-peak hours (11)

☐ Turning off lights when not home or not needed (12)

☐ Other, please specify: (13) _____

☐ None of the above (14)

NQ1 Which of the following Xcel Energy website resources did you initially consult to learn more about how the TOU pricing plan works? (Select all that apply.)

- ☐ Informational Video – Xcel Energy video that explains the rates and participation rules (1)
- ☐ Customer examples – examples of how different customers with different lifestyles might save on the rates. (2)
- ☐ Rate Advisor Tool – a set of questions to determine whether the plan is well suited for your household. (3)
- ☐ Website rate pages – information about the different pricing periods and rates. (4)
- ☐ FAQs – frequently asked questions. (5)
- ☐ None of the above (6)
- ☐ Don't recall (98)

NQ2 Which of the following information resources did you use to improve your performance on the TOU pricing plan. (Select all that apply.)

- ☐ Informational Emails from Xcel Energy (1)
- ☐ Reminder decals stickers from Xcel Energy (2)
- ☐ Personalized charts and graphs on My Account (3)
- ☐ Xcel Energy Call Center (4)
- ☐ Information about the new pricing plan on the Xcel Energy website (5)
- ☐ Xcel Energy videos on how to save (6)
- ☐ None of the above (7)
- ☐ Don't know (98)

End of Block: Behavior change

Start of Block: Recommendations for Improvement

Q6 What could Xcel Energy have done or explained better that would have made this program more appealing to you?

_____

_____

_____

_____

_____

Q7 If that change had been made, would you have considered continuing your participation on the TOU pricing plan?

- ○ Yes definitely (1)
- ○ Perhaps (2)
- ○ No (3)
- ○ Don't know (98)

Q8 What additional changes to the TOU pricing plan would you recommend?

_____

_____

_____

_____

_____

End of Block: Recommendations for Improvement

Start of Block: Miscellaneous

Q9 Are there any additional thoughts or questions that you would like to share?

_____

_____

_____

_____

_____

End of Block: Miscellaneous

Appendix F. **CUSTOMER INTAKE SURVEY**

Colorado Time-of-Use and Peak Demand Pricing Plans
Application Form

INTRODUCTION

Thank you for agreeing to participate in Xcel Energy's new pricing plans! Your participation will be critical to helping Xcel Energy make decisions about how best to price electricity in a way that fair and equitable for all customers.

Once we've processed your application and determined that you're eligible for participation, you'll receive a confirmation email.

Note that your responses will not be sold for any reason and are strictly confidential to Xcel Energy and its partners. Please see our privacy notice for further information.

-The Xcel Energy Team

SCREENERS / NPS

Q1. **[SINGLE CHOICE QUESTION]**
By participating in our new rates, you agree to receive communication from Xcel Energy with important updates and notifications (such as the status of your application), suggestions on reducing your energy bill, and tips on managing your energy usage. In addition to these important communications, we'll also be sending you surveys periodically to see how things are going. While completing our surveys won't be required, your feedback will be important to us as we work through the testing and design phases of these new rates.

Got it. [FOR AFS ONLY] Email address: _____
No, I'd rather receive communication via paper mail about my participation. (This may limit the communications you receive since many notices are email only)

Q2. **[SINGLE CHOICE QUESTION]**
Are you the primary decision maker about your home's energy use?

Yes
No

Q3. **[SINGLE CHOICE QUESTION]**
On a scale from 0 to 10, where 0 means Not at all likely and 10 means Extremely likely, how likely are you to recommend Xcel Energy to a friend, relative or colleague for their residential electric service?

0 - Not at all likely

1
2
3
4
5
6
7
8
9
10 - Extremely likely

HOUSEHOLD CHARACTERISTICS

Q4. **[SINGLE CHOICE QUESTION]**
Which of the following best describes your home?
Single family home - fully detached
Mobile home
Duplex, triplex, four-plex
Townhome
Condominium or loft
Apartment

Q5. **[SINGLE CHOICE QUESTION]**
What is the approximate total square footage of your home?
0-500 square feet
501-1000 square feet
1001-1500 square feet
1501-2000 square feet
2001-2500 square feet
2501-3000 square feet
3001-3500 square feet
3501-4000 square feet
4001 or more square feet
Don't know

Q6. **[SINGLE CHOICE QUESTION]**
What is the approximate age of your home?
- 5 years or less
- 6-15 years
- 16 to 25 years
- 26 to 35 years
- More than 35 years old
- Don't know

Q7. **[SINGLE CHOICE QUESTION]**
Do you own or rent your home?
- Own
- Rent

Q8. **[ASK IF Q7=RENT, SINGLE CHOICE QUESTION]**
How do you pay your electricity bills?
- I pay my own electricity bill directly to Xcel Energy
- I pay my landlord or building owner/manager for electricity that I specifically use, and they pay Xcel Energy on my behalf
- I pay my landlord or building owner/manager for a portion of the building's electricity use or a set amount as part of my monthly rent
- Don't know

Q9. **[SINGLE CHOICE QUESTION]**
How long have you lived at your current residence?
- Less than a year
- 1 year up to 5 years
- 5 years up to 10 years
- 10 years up to 15 years
- 15 years up to 20 years
- 20 years up to 25 years
- 25 years up to 35 years
- 35 years or more

Q10. **[NUMERIC ENTRY]**
How many people of each age group (including yourself) live in your home?
- 10 and under_____
- 11 to 18 _____
- 19 to 30 _____
- 31 to 61_____
- 62 and older _____

Q11. **[SINGLE CHOICE QUESTION]**

Do you regularly work from home or operate a business from your home?

Yes
No

Q12. **[NUMERIC ENTRY]**
How many people are typically at home on weekdays between 2pm and 6pm?

_____

APPLIANCES & TECHNOLOGY

Q13. **[NUMERIC ENTRY]**
Please indicate which of the following appliances / equipment are present in your home and the quantity of each.

____Central air conditioning
____Evaporative or swamp cooler
____Window unit air conditioner
____Electric water heater
____Electric stove / range
____Laundry dryer (natural gas)
____Laundry dryer (electric)
____Dishwasher
____Refrigerator
____Freezer (separate from refrigerator)
____Heat pump (ground or air source)
____Solar thermal (solar hot water heating)
____Swimming pool with filtration system and/or pool pump
____Hot tub with filtration system and/or pump
____Whole home lighting control system
____Computer

Q14. **[SINGLE CHOICE QUESTION]**
What type of fuel is used for the space heating that is primarily used in your home?
- Electricity
- Natural gas
- Don't know

Q15. **[MULTI-CHOICE QUESTION]**
Which of the following do you have in or on your home? Select all that apply.
- Rooftop solar
- Plug-in electric vehicles (i.e., those that can be plugged-in and recharged from an outlet)
- Programmable thermostat (i.e., a thermostat that can be set to adjust your HVAC system according to a specific schedule)
- Smart thermostat (i.e., a programmable thermostat that is wifi enabled)
- Energy storage or battery system (i.e., Powerwall, etc.)
- Smart / Programmable dishwasher (ability to delay start)
- Smart / Programmable washing machine (ability to delay start)
- I don't have any of these technologies

Q16. **[ASK IF Q15=Electric Vehicles, NUMERIC ENTRY]**
How many plug-in electric vehicles does your household have?

_____

Q17. **[ASK IF Q15=Electric Vehicles, SINGLE-CHOICE QUESTION]**
What type of EV charger do you have?
- Level One (Plugs into common 120 V outlet)
- Level Two (Hard wired or plugs into 240 V circuit)

Q18. **[ASK IF Q15=Smart thermostats, SINGLE-CHOICE QUESTION]**
What kind of smart thermostat do you have?
- Nest
- Ecobee
- Honeywell
- Emerson
- Carrier
- Radio
- Lux
- Venstar
- Other

Q19. **[SINGLE-CHOICE QUESTION]**
Is there are need for ongoing medical equipment that requires electricity use at your home?

Yes
No

ENERGY EFFICIENCY BEHAVIORS

Q20. **[MULTI-CHOICE QUESTION]**
Please indicate if you typically do any of the following things to save energy. Select all that apply.

Turn off lights to reduce electric use
Wash clothes in cold water
Unplug electronic equipment/appliances when not in use
Adjust thermostats to save energy when no one is at home
Lower the thermostat setting during the heating season to save on energy or cost
Increase the thermostat setting during the cooling season to save on energy or cost
Turn off power strips when not in use
Take shorter showers
None of the above

Q21. **[SINGLE CHOICE QUESTION]**
If you were to make a change to your normal routine on this new pricing plan, such as shifting the time of day you use the dishwasher or washing machine, which would be the most compelling reason for you?

I could save on my bill
It would help the environment
It would make the grid more stable for everyone
My neighbors also made the change
I wouldn't change for any reason

DEMOGRAPHICS

Q22. **[SINGLE CHOICE QUESTION]**
I identify my gender as:

Female
Male
Prefer not to answer

Q23. **[SINGLE CHOICE QUESTION]**
What age group do you fall in?

- Under 25
- 25-34
- 35-44
- 45-54
- 55-61
- 62-74
- 75 or higher
- Prefer not to answer

Q24. **[SINGLE CHOICE QUESTION]**
What is the highest level of education you have completed?

- Less than high school graduate
- High school graduate
- Some college/Trade school
- College graduate
- Some graduate school
- Graduate degree
- Prefer not to answer

Q25. **[SINGLE CHOICE QUESTION]**
What was your total household income in 2016 before taxes and including Social Security and other payments, if applicable?

Up to $30,000
$30,000 to under $50,000
$50,000 to under $75,000
$75,000 to under $100,000
$100,000 to under $150,000
$150,000 to under $200,000
More than $200,000
Prefer not to answer]

Q26. **[SINGLE CHOICE QUESTION]**
You don't need to be home when we install your new meter. But do you have any issues that our installation technician needs to be aware of when accessing your meter, like a gate code or to watch for a dog?

Yes **[IN AFS, AGENTS SHOULD ENTER THIS INFORMATION DIRECTLY INTO THE SPECIAL METER ACCESS FIELD IN CRS, NOT THIS FORM]**
No

Q27. **[MY ACCOUNT VERSION ONLY IF Q26=YES, OPEN END QUESTION]**
Please provide your special meter access instructions.

_____

You've reached the end of the form. Thanks again for your interest in participating in this important study. We'll send you a confirmation email once your application has been approved within the next 48 hours.

Please note, that as part of this test, it will be necessary to select a random group of customers to be a part of a control group, so we can measure how effective the rates are at encouraging shifts in energy usage. If you are selected for the control group, you will remain on your current rate. While you no longer will be put on a different rate or need to change any of your energy consumption patterns, you will be just as crucial to the success of this test.