BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Kansas City Power & Light Company's Request for Authority to Implement A General Rate Increase for Electric Service	)))	Case No. ER-2018-0145
In the Matter of KCP&L Greater Missouri Operations Company's Request for Authorization to Implement A General Rate Increase for Electric Service	))))	Case No. ER-2018-0146

NOTICE

COME NOW, Evergy Metro, Inc. d/b/a Evergy Missouri Metro ("Evergy Missouri Metro") and Evergy Missouri West, Inc. d/b/a Every Missouri West ("Evergy Missouri West") (collectively, the "Company")[1] and respectfully state as follows to the Missouri Public Service Commission ("Commission"):

1. Pursuant to the Commission's *Order Approving Stipulations and Agreements* issued on October 31, 2018, Evergy is required to, "[C]omplete an EM&V Report by December 31, 2021."[2]

2. Attached hereto, please find:

- *Evergy Missouri Residential Time-of-Use Rate Evaluation* prepared by Guidehouse Inc., dated December 23, 2021; and
- *Evergy TOU Study - Final Analysis - Supporting Data 2021-12-22* (Excel file).

WHEREFORE, the Company respectfully requests the Commission take notice of the attached.

[1] Effective October 7, 2019, Evergy Missouri Metro adopted the service territory and tariffs of Kansas City Power & Light Company ("KCP&L") and Evergy Missouri West adopted the service territory and tariffs of KCP&L Greater Missouri Operations Company ("GMO").
[2] *Non-Unanimous Stipulation and Agreement Concerning Rate Design Issues*, Section II(k), p 7., dated September 25, 2018, Docket Nos. EO-2018-0145/0146.

Respectfully submitted,

/s/ Roger W. Steiner

Roger W. Steiner, #39586
Evergy, Inc.
1200 Main Street, 16th Floor
Kansas City, MO 64105
Phone: (816) 556-2314
Fax: (816) 556-2787
roger.steiner@evergy.com

ATTORNEYS FOR EVERGY MISSOURI METRO AND EVERGY MISSOURI WEST

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile or electronically mailed to all counsel of record this 29th day of December 2021.

Roger W. Steiner

Roger W. Steiner

Evergy Missouri Residential Time-of-Use Rate Evaluation

Final Impacts for Missouri Metro and West Jurisdictions

Prepared for:

Evergy

Submitted by:

Guidehouse Inc.
1375 Walnut Street, Suite 100
Boulder, CO 80302

Reference No.: 208441
December 23, 2021

guidehouse.com

This deliverable was prepared by Guidehouse Inc. for the sole use and benefit of, and pursuant to a client relationship exclusively with Evergy ("Client"). The work presented in this deliverable represents Guidehouse's professional judgement based on the information available at the time this report was prepared. The information in this deliverable may not be relied upon by anyone other than Client. Accordingly, Guidehouse disclaims any contractual or other responsibility to others based on their access to or use of the deliverable.

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Executive Summary

In 2019, Guidehouse Inc. (Guidehouse), formerly Navigant Consulting, Inc., was retained by Evergy Inc. (Evergy) to support Evergy's efforts to study residential time-of-use (TOU) rates in two jurisdictions in Missouri—Missouri Metro (formerly the Missouri jurisdiction of Kansas City Power & Light [KCP&L]) and Missouri West (formerly KCP&L Greater Missouri Operations)—and provide independent evaluation services to verify the ex post (historical) impacts of the TOU rates.

All residential customers in Evergy's service territory in Missouri are on a tiered rate structure. This means they are charged a different set of prices based on whether their aggregate monthly consumption crosses various energy consumption thresholds. In contrast, TOU rates place a premium, in terms of the price charged to customers, on certain hours of the day. The goal of this structure is to align prices with cost causation and encourage customers to reduce their consumption in those hours and shift it to other hours in the day that have a lower price point (e.g., shifting consumption from the on-peak to the super off-peak period).

Each jurisdiction has its own set of TOU rates, as Table 1 shows. While the price per kilowatt-hour (kWh) value for the TOU periods are different across the two jurisdictions, the price differentials across the TOU periods are almost identical. The on-peak to super off-peak price differential is the most notable with the on-peak price being approximately six times higher than the off-peak in both seasons. The on-peak to off-peak price differential is also notable with the on-peak price being three and two and a half times higher in the summer and winter seasons, respectively.

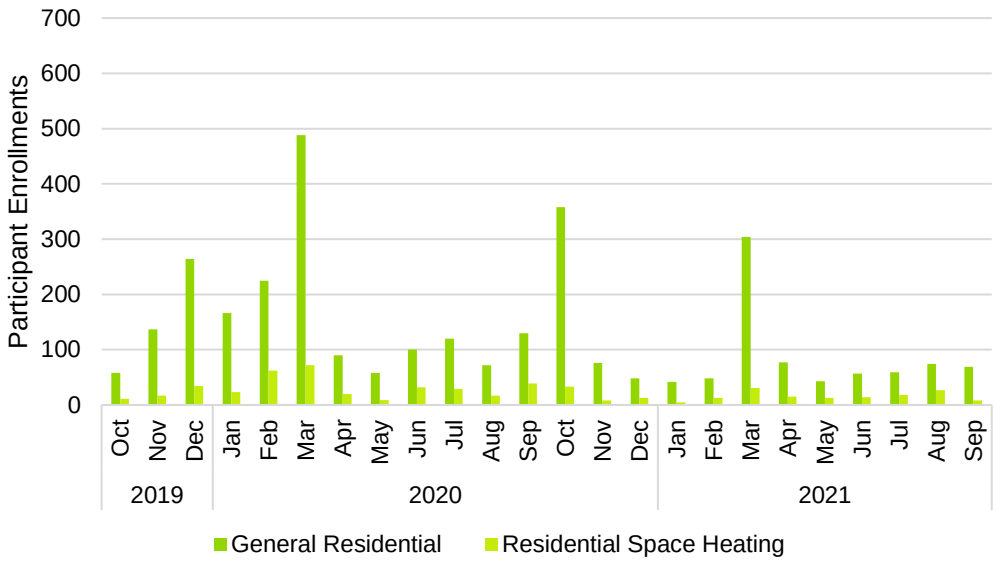
Table 1. TOU Rate Structure

Season	TOU Period	Metro Price ($/kWh)	West Price ($/kWh)	Time Period
Summer	On-Peak	0.32498	0.26577	4 p.m.-8 p.m. weekdays, excl. holidays
	Off-Peak	0.10833	0.08859	All other hours
	Super Off-Peak	0.05416	0.04429	12 a.m.-6 a.m. every day
Winter	On-Peak	0.26575	0.21629	4 p.m.-8 p.m. weekdays, excl. holidays
	Off-Peak	0.10422	0.08727	All other hours
	Super Off-Peak	0.04495	0.03667	12 a.m.-6 a.m. every day

Source: Evergy residential rate tariffs

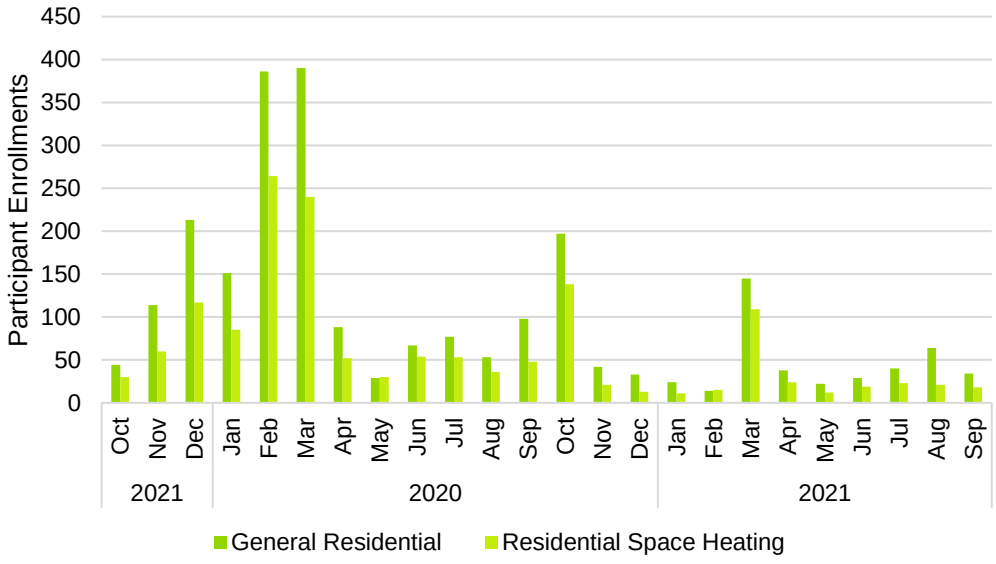
The final analysis includes all participants enrolled between October 1, 2019 and September 30, 20212020. The total (gross—before accounting for attrition) enrollments for the analysis are 3,951 customers and 4,095 customers for the Missouri Metro and West jurisdictions, respectively. Figure 1 and Figure 2 show the monthly participant enrollment for the Missouri Metro and Missouri West jurisdictions, respectively, with the general trend being similar across the two jurisdictions. The majority of the enrollment occurred prior to April 2020, when Evergy launched the first significant phase of its marketing plan.

Figure 1. Monthly Enrollment – Missouri Metro



Source: Guidehouse analysis

Figure 2. Monthly Enrollment – Missouri West



Source: Guidehouse analysis

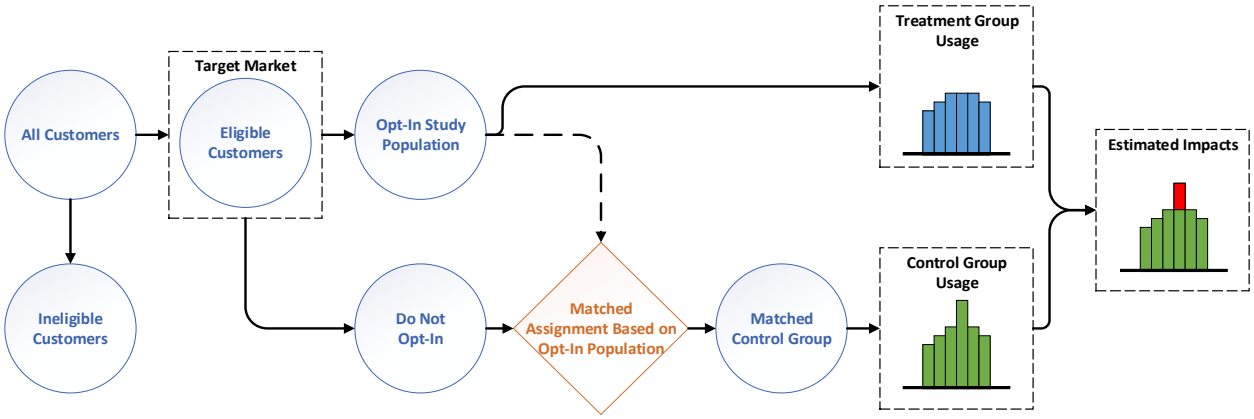
Methodology

Residential customers on the general residential rate or the residential space heating rate are eligible to opt in to the TOU rate. Customers were offered a choice to voluntarily opt in to the TOU rate or to remain on their current tiered rate.

Guidehouse used a quasi-experimental design with matched controls (as Figure 3 shows) to develop a control group to include in the analysis. This approach leverages historical interval

metering data for participants to match them with a comparable nonparticipant that will serve as their control for the study period. The selection of matched controls is a crucial element of the approach used by Guidehouse to estimate impacts. Impacts are estimated using a lagged dependent variable (LDV) regression approach—a special case of a difference-in-differences approach—and the use of matched (rather than, for example, randomly selected) control customers helps to improve the precision of the estimated impacts. The selection of the matched controls is discussed in Section 2.1.1.

Figure 3. Opt-In Quasi-Experimental Design with Matched Controls



Source: Guidehouse analysis

Impact Results

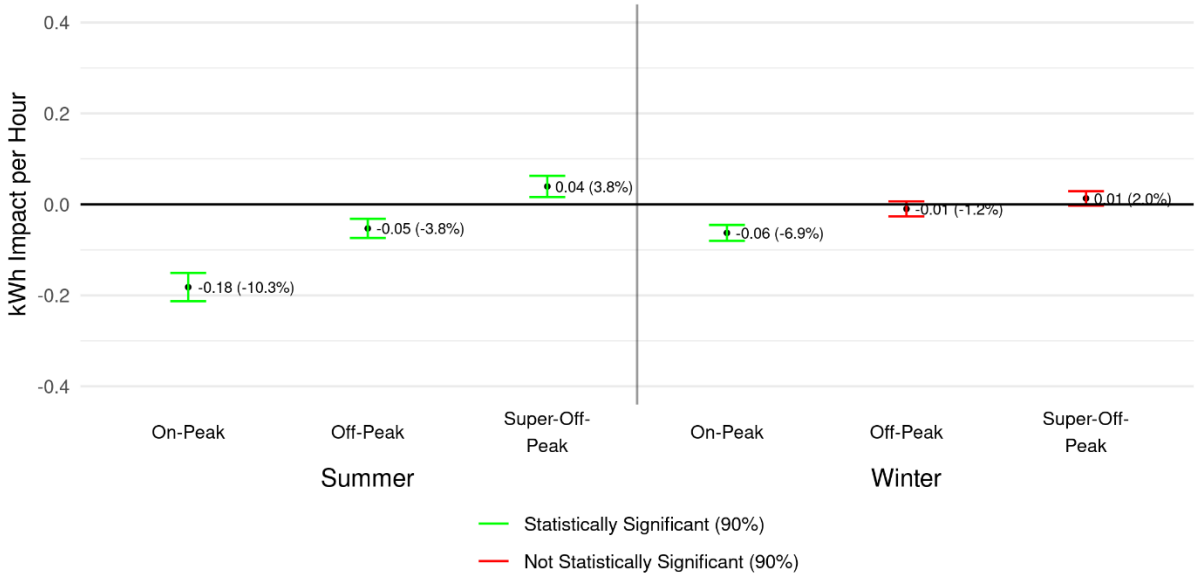
TOU Rate Impacts

Figure 4 and Figure 5 present the TOU rate impacts for the Missouri Metro and Missouri West jurisdictions, respectively. The impacts in the summer and winter seasons are similar across the two jurisdictions with all of the on-peak impacts being statistically significant at the 90% confidence level; this indicates that participants in both jurisdictions did respond to the TOU prices by reducing their demand during the highest price period.

The most notable savings in either season and jurisdiction occur during the on-peak periods as the price differential is the highest during these hours, both in comparison to the other TOU periods and to the tiered rates (see Table 5 and Table 6 in Section 1.2 for additional detail). Furthermore, the on-peak period is 4 hours a day during weekdays from 4 p.m. to 8p.m., making it easier to shift consumption than if the on-peak period was longer.

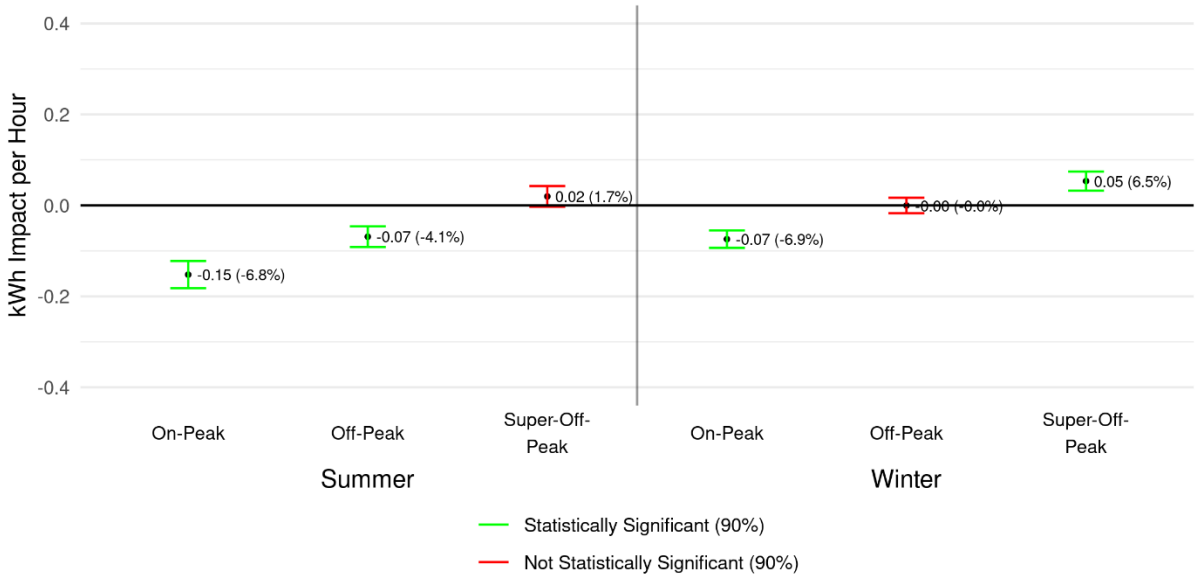
Summer on-peak impacts are consistently higher than winter on-peak impacts. This is consistent with expectations in a summer peaking jurisdiction where only a minority of customers use electricity for space heating. Air conditioning in such circumstances typically makes up participants' single biggest discretionary load—and one that can be controlled with relatively little inconvenience via smart or programmable thermostats.

Figure 4. TOU Rate Impacts – Missouri Metro



Source: Guidehouse analysis

Figure 5. TOU Rate Impacts – Missouri West



Source: Guidehouse analysis

Participants have also responded to the TOU rates in the summer off-peak period, reducing demand. Given that the off-peak TOU price is lower than the standard tier rate in the summer months, this reduction is inconsistent with the incentive offered but may be a result of participants adopting more general conservation behaviors in response to the TOU rate. The combined annual and seasonal effects of TOU response on energy consumption (the conservation effect) is quantified in Section 3.1 of the main body of the report (see, for example, Figure 27).

Bill Impacts

The bill impacts analysis compares the average participant's actual bill in the pre-TOU period to what it would have been in the same period under the TOU rate, accounting for rate structure changes (i.e., tiered vs. TOU rates) and the associated behavioral changes.

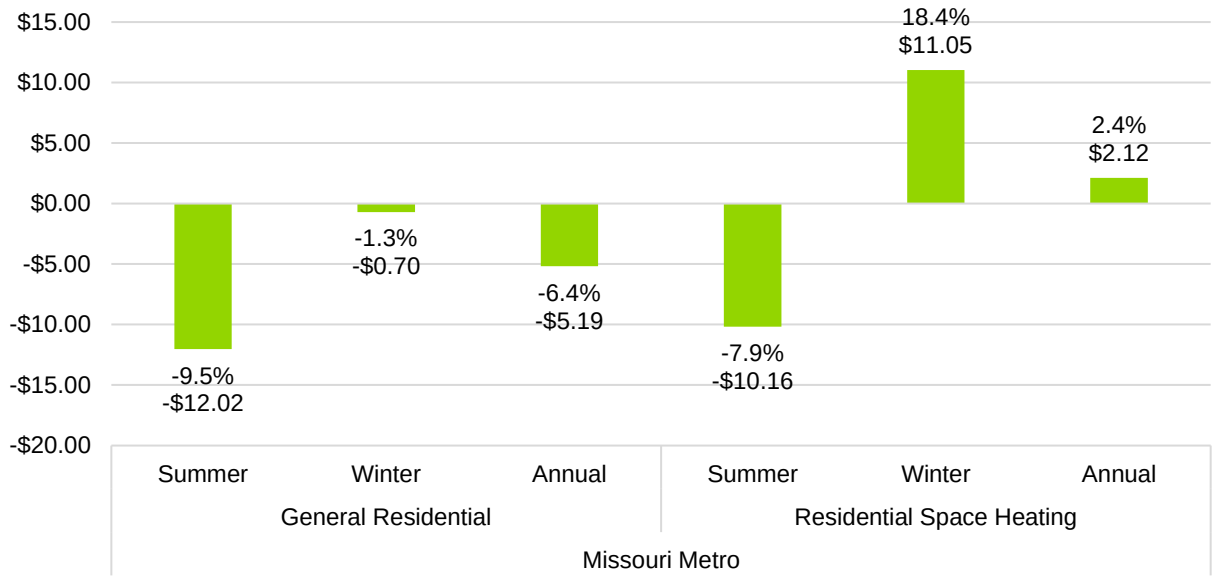
The impact estimates of the TOU rates for each jurisdiction (presented previously) were applied to participant pre-TOU consumption values to estimate the average effect of the rate, accounting for the estimated change in behavior motivated by the TOU rate. This series of average participant consumption values in conjunction with the applicable tier prices was used to determine what the average participant's electricity bill would have been under the two rates in the same period. This approach allows for the separation of rate structure and behavioral impacts.

Figure 6 and Figure 7 present the monthly bill impacts on an average TOU participant bill for each season and on an annual basis for the Missouri Metro and Missouri West jurisdictions, respectively. Given that participants can be on one of two tiered rates prior to enrolling, bill impacts are separated based on the tiered rates for each jurisdiction. The composition of these bill savings is discussed in Section 3.2.2.

The average TOU participant saves approximately 8%-10% on their bills during the summer season. During the winter months, the average general residential participant sees a slight decrease on their bills while the average residential space heating participant sees an increase. On an annual basis, impacts range from a 2.4% increase (Missouri Metro, residential space heating customers) to a 6.4% decrease (general residential customers). There are twice as many winter months as summer months; this means average monthly winter bill impacts have a commensurately larger impact on the overall annual average change in bill impacts.

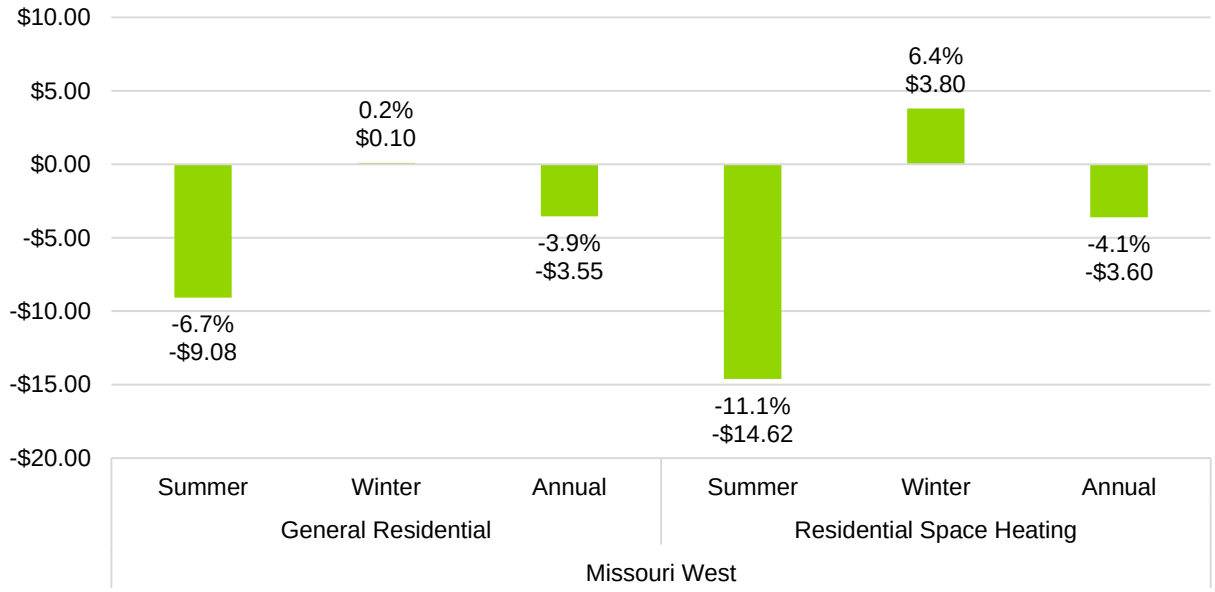
Overall, average monthly bill impacts over the course of a year are quite small, with an average monthly bill reduction for general residential customers in Missouri Metro barely exceeding $5 per month, or approximately 6%, and an average monthly bill reduction for general residential customers in Missouri West being an average approximately $3.55 or almost 4%.

Figure 6. Total Monthly Bill Impacts of TOU Rates – Missouri Metro



Source: Guidehouse analysis

Figure 7. Total Monthly Bill Impacts of TOU Rates – Missouri West



Source: Guidehouse analysis

Key Impact Findings

Guidehouse studied the TOU rates in the Missouri Metro and Missouri West jurisdictions using an opt-in quasi-experimental design with matched controls. Each jurisdiction has unique TOU rates. Residential customers who were on the general residential or the residential space heating rate were eligible to opt in to the TOU rate.

The key evaluation findings are as follows:

- The final results indicate that participants in both jurisdictions did respond to the TOU prices by changing their consumption patterns in both seasons, and the patterns are similar across the two jurisdictions.
- The summer kWh impacts are greater than the winter, likely due to the significantly higher discretionary load from air conditioning available in the summer season that can be controlled in response to TOU rates.
- Participants reduced their average demand during the summer peak coincident periods. These reductions were statistically significant in both Missouri Metro and Missouri West, though estimated impacts in Missouri Metro were more than twice the magnitude of the estimated impacts in Missouri West.
- Consistent with the energy and demand impacts, average bill savings are highest in the summer (compared to the winter). Summer bill savings is the primary driver for annual bill savings. Participants who were on the space heating tiered rate, particularly those in the Missouri Metro jurisdiction, on average experienced increased bills in the winter. In the case of Missouri Metro residential space heating customers, this increase is sufficient to offset the bill savings achieved in the summer months. The most significant driver of this effect is the rate structure: the winter off-peak rate for Missouri Metro customers is $0.104 per kWh, or approximately $0.07 per kWh higher than the highest winter tiered rate for this group of customers.

Evergy's Stipulation Agreement specifies that Evergy must demonstrate that customer enrollment in the TOU rate is not driven entirely by customers whose load profiles enable them to realize windfall gains by simply transferring to the TOU rate without effecting any additional changes in behavior. Such a situation would be easily identifiable in the results of Guidehouse's evaluation: if customers only enrolled in the program in anticipation of windfall gains without any intention to undertake behavioral changes, the evaluation would report material bill impacts without any commensurate TOU period energy impacts. In fact, as shown in this report, participants in nearly all segments in both jurisdictions demonstrated behavioral response to the TOU pricing in line with the incentives it provides, specifically: average reductions in consumption during the highest price on-peak periods. Enrolled participants have exhibited behavioral response to the TOU rates in line with the incentives embedded in that rate.

Customer Journey Map

The Guidehouse/Illume team (Guidehouse team) summarized key findings from customer research activities conducted by Evergy and developed a customer journey map. The customer journey map depicts the customer experience throughout the TOU rate pilot along six phases of the customer journey with the TOU rate. These six customer journey phases were identified before the launch of the rate plan as the likely journey through which customers would experience the rate plan. The initial customer journey map depicted these phases and potential areas of customer satisfaction and opportunities for improvement before the start of the rate plan. This expected customer journey was based on customer feedback (focus groups, interviews, surveys) collected during the rate plan development phase. During a July 2021 interview with the program manager, the Guidehouse team confirmed these phases still accurately represent the implemented rate plan. The six phases include the following:

1. Awareness
2. Education and Consideration
3. Enrollment
4. Onboarding
5. Rate Performance
6. Advocacy

Drawing on the customer surveys and in-depth interviews fielded during the TOU rate period, the Guidehouse team explored each phase of the customer journey, noting areas of customer satisfaction, areas for improvement, and overall customer sentiment about each phase, to develop the updated journey map. Key changes from the interim to final customer journey map based on customer research conducted during the rate plan period included: updated customer sentiment indicators at the top of the journey map, updated participant quotes, and updated Opportunities (where applicable). In addition, the team added an icon for Rate Education Support within Step 1 Awareness and added notation in Step 3 Enrollment to indicate that the vast majority of enrollments occurred through the Self-Service channel. The updated experienced journey map summarizes all this information into a single-page visual presented in Figure 8.

Through the development of the customer journey map, the Guidehouse team identified the following findings related to customer experience on the rate plan:

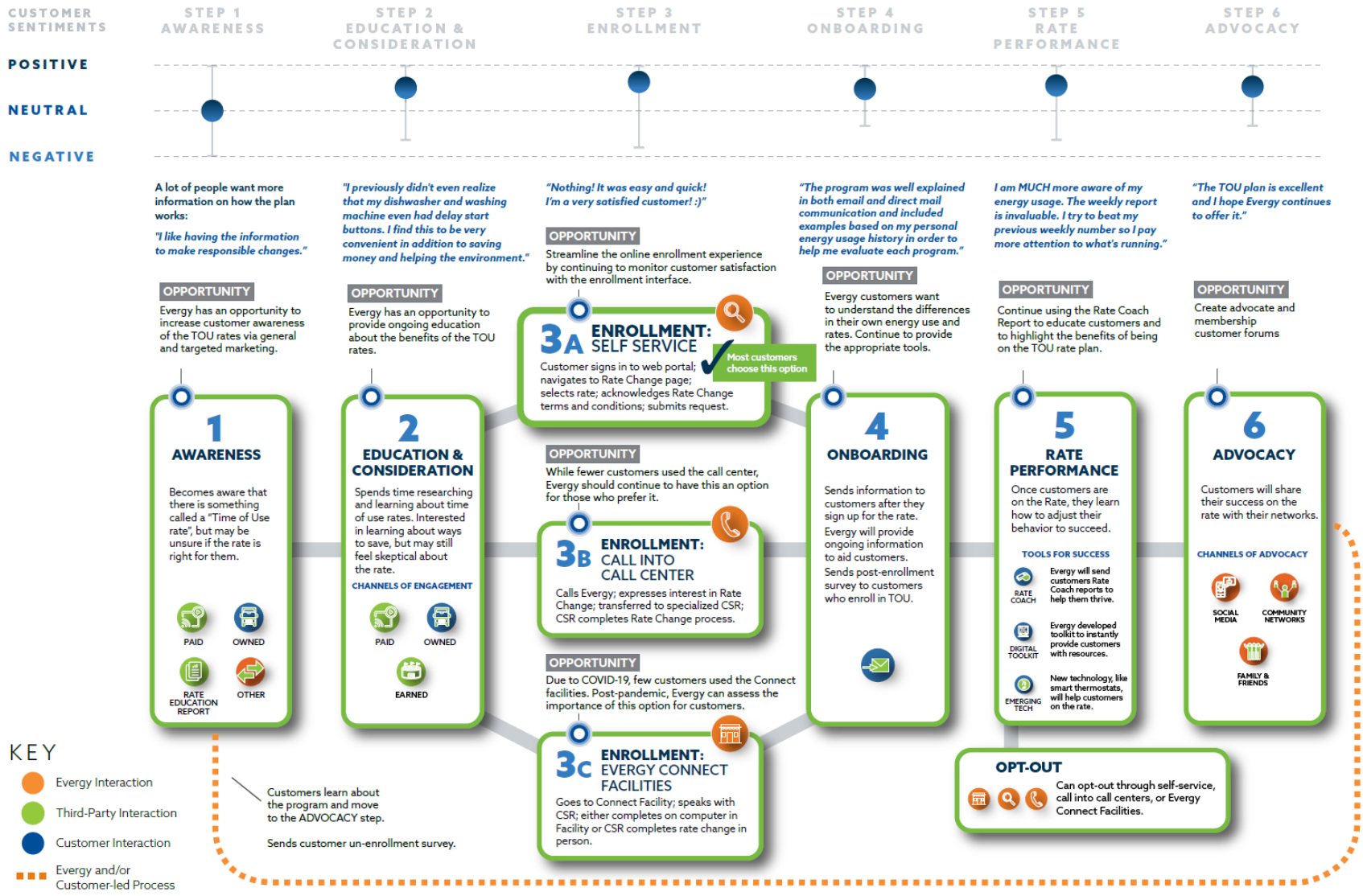
- Bill savings was a key motivator for participants to enroll in and stay on the TOU rate. For example, 94% cited saving money on bill as a reason for enrolling, 40% of those who unenrolled identify not saving money on their bill as a reason to unenroll, and 95% named cost of bill as a priority related to their energy use.
- The vast majority (92%) of customers enrolled in the TOU rate using the online enrollment option and most (84%) rated the process as quick and easy.
- Many participants were satisfied with Evergy's comparison and tracking tools and were engaged with their energy use. Customers reported high use of and satisfaction with monitoring tools (e.g., 70% rated the Rate Coach Report a 7 to 10 on a 10-point scale) and indicated that they were making changes to household activities to be successful on the rate (e.g., 85% of respondents reported shifting washer or drying usage).
- Participants were highly satisfied with the TOU rate plan. Over 80% rated their satisfaction a 7 to 10 on a 10-point scale, and 79% provided a 7 to 10 rating to describe how the plan met their expectations. Over 70% of participants would recommend the rate plan to family or friends.

Based on these findings, the Guidehouse team recommends that Evergy consider the following opportunities:

- To encourage enrollment in TOU rates, continue messaging about bill savings and offer customers information and tools to show how rates will affect their bills.
- Continue to encourage online enrollment while offering a call-in option for those who have additional questions.

- Continue to offer comparison and tracking tools, while assessing customers' reactions to the tools to ensure they are useful to a range of customers. Later adopters may need different or simpler/fewer tools to help manage energy use.
- Use word of mouth and testimonials from enthusiastic and satisfied customers to increase enrollment in the rate plan. Consider offering refer-a-friend rewards, create simple ways for participants to forward information to other via email or social media, and create forums for customers to share their strategies so nonparticipants can see how customers like them manage their energy use and lower their bills.

Figure 8. Customer Journey Map



Source: Guidehouse team

1. Introduction

In 2019, Guidehouse Inc. (Guidehouse), formerly Navigant Consulting, Inc., was retained by Evergy Inc. (Evergy) to support Evergy's efforts to study residential time-of-use (TOU) rates in two jurisdictions in—Missouri Metro and Missouri West. Guidehouse's services include independent evaluation services to verify the ex post (historical) impacts of the TOU rates.

All residential customers in Evergy's service territory in Missouri are on a tiered rate structure. This means they are charged a different set of prices based on whether their aggregate monthly consumption crosses various usage thresholds. The hour of day in which a residential customer consumes energy does not have any bearing on their monthly electricity bill.

TOU rates place a premium, in terms of the price charged to customers, on certain hours of the day. The goal of this structure is to align prices with the cost to provide energy and thus encourage customers to reduce their consumption in the higher price hours and shift it to other hours in the day that have a lower price point (e.g., shifting consumption from the on-peak to the super off-peak period). This helps to reduce energy supply costs and improve grid stability by spreading the load across more hours of the day as opposed to having extremely high loads for a few hours, which could compromise system integrity.

The remainder of this section is divided into the following subsections:

- **Study Overview:** Provides an overview of the TOU rate study and the various customer segments that will be analyzed.
- **TOU Rate Design:** Describes the TOU prices being tested and how they compare to the regular tiered rate structures.
- **Enrollment Summary:** Summarizes the number of customers who have enrolled or unenrolled in the study so far.
- **Evaluation Goals and Objectives:** Describes the goals and objectives of the evaluation from a rate impact standpoint.

1.1 Study Overview

The TOU study was implemented in two Evergy jurisdictions in Missouri:

- Missouri Metro, formerly the Missouri jurisdiction of Kansas City Power & Light (KCP&L)
- Missouri West, formerly KCP&L Greater Missouri Operations

Starting October 1, 2019, residential customers who are on the general residential rate or the residential space heating rate are eligible to enroll in the three-period, opt-in TOU rate. Each jurisdiction has its own set of TOU prices, which is discussed further in Section 1.2.

The analysis focuses on the jurisdictions as a whole and provides additional insights with respect to various customer segments (i.e., subgroups of the participant population with specific characteristics). The segment definitions are the same for both jurisdictions, and Guidehouse used participant survey data in conjunction with third-party data to classify customers into the segments (see Table 2).

Table 2. Customer Segments

Customer Segment	Description
Low Income	Low Income Home Energy Assistance Program (LIHEAP) participants or those that self-report LIHEAP eligibility in survey responses
Electric Vehicles	Self-reported electric vehicle (EV) owners in survey responses or in EV program data
Smart Thermostat	Participants in the Missouri Energy Efficiency Investment Act (MEEIA) Cycle 2 and MEEIA Cycle 3 thermostat program or self-reported smart thermostat owners in survey responses
eco+ Smart Thermostat	Participants in the MEEIA 3 thermostat program with the eco+ precooling programming enabled
Seniors	Self-reported senior or at least one occupant over 62 in survey responses or identified as over 62 in third-party Axiom data[1]
Renters	Self-reported renter or identified as a renter in third-party Axiom data
General Population	Customers not classified within any other segment

Source: Guidehouse analysis

The customer segments are based on various factors that influence a customer's perspective on energy. Individual customers usually represent a combination of characteristics—for example, a customer may have an EV and a smart thermostat. This means the segments are not mutually exclusive, and TOU participants can provide insights into the impacts of all the segments they represent.

1.2 TOU Rate Design

Beginning October 1, 2019, the two jurisdictions offered TOU rates with slightly different definitions of the seasons (see Table 3). Table 4 describes the TOU rate for each jurisdiction. While the price per kilowatt-hour (kWh) value for the TOU periods are different across the two jurisdictions, the price differentials across the TOU periods are almost identical, as Table 5 shows.

Table 3. Season Definition

Season	Missouri Metro Definition	Missouri West Definition
Summer	May 16-September 15	June-September
Winter	September 16-May 15	October-May

Source: Evergy

Table 4. TOU Rate Structure

Season	TOU Period	Missouri Metro Price ($/kWh)	Missouri West Price ($/kWh)	Time Period
Summer	On-Peak	0.32498	0.26577	4 p.m.-8 p.m. weekdays, excl. holidays
	Off-Peak	0.10833	0.08859	All other hours

[1] Evergy provided the Axiom data Guidehouse used.

Season	TOU Period	Missouri Metro Price ($/kWh)	Missouri West Price ($/kWh)	Time Period
	Super Off-Peak	0.05416	0.04429	12 a.m.-6 a.m. every day
Winter	On-Peak	0.26575	0.21629	4 p.m.-8 p.m. weekdays, excl. holidays
	Off-Peak	0.10422	0.08727	All other hours
	Super Off-Peak	0.04495	0.03667	12 a.m.-6 a.m. every day

Source: Evergy residential rate tariffs

Table 5. Price Differentials Across TOU Periods

Differential	Season	Missouri Metro	Missouri West
On-Peak/ Super Off-Peak	Summer	6.00	6.00
	Winter	5.91	5.90
On-Peak/Off-Peak	Summer	3.00	3.00
	Winter	2.55	2.48

Source: Guidehouse analysis

As Table 5 shows, the on-peak to super off-peak price differential is the most notable with the on-peak price being approximately six times higher in both seasons. The on-peak to off-peak price differential is also notable with the on-peak price being three and two and a half times higher in the summer and winter seasons, respectively.

For comparison, Table 6 shows the tier pricing structure that residential customers were on prior to enrolling in the TOU rate. For both seasons, the on-peak price is more than double the average of the tiered prices. The off-peak price is approximately 20% lower, and the super off-peak price is approximately half the average of the tiered prices.

Table 6. Residential Tiered Rates

Season	Tier Structure	Metro General Residential ($/kWh)	Metro Residential Space Heating ($/kWh)	West General Residential ($/kWh)	West Residential Space Heating ($/kWh)
Summer	First 600 kWh	0.13511	0.13806	0.10938	0.11927
	Next 400 kWh	0.13511	0.13806	0.10938	0.11927
	Over 1,000 kWh	0.14916	0.13806	0.11927	0.11927
Winter	First 600 kWh	0.12013	0.09703	0.09888	0.09888
	Next 400 kWh	0.07396	0.09703	0.07800	0.06035
	Over 1,000 kWh	0.06561	0.06300	0.07800	0.05005

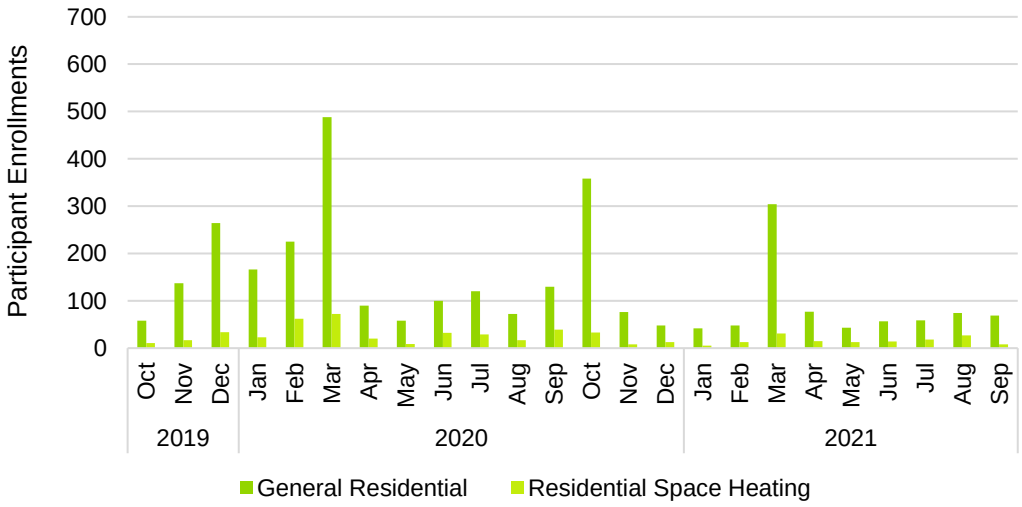
Source: Evergy residential rate tariffs

1.3 Enrollment Summary

The analysis includes all participants enrolled between October 1, 2019 and September 30, 2021. The total gross enrollments for the analysis are 3,951 customers and 4,095 customers for the Missouri Metro and West jurisdictions, respectively. Evergy exceeded the stipulated enrollment goal of 1,750 customers per jurisdiction by the end of 2020.

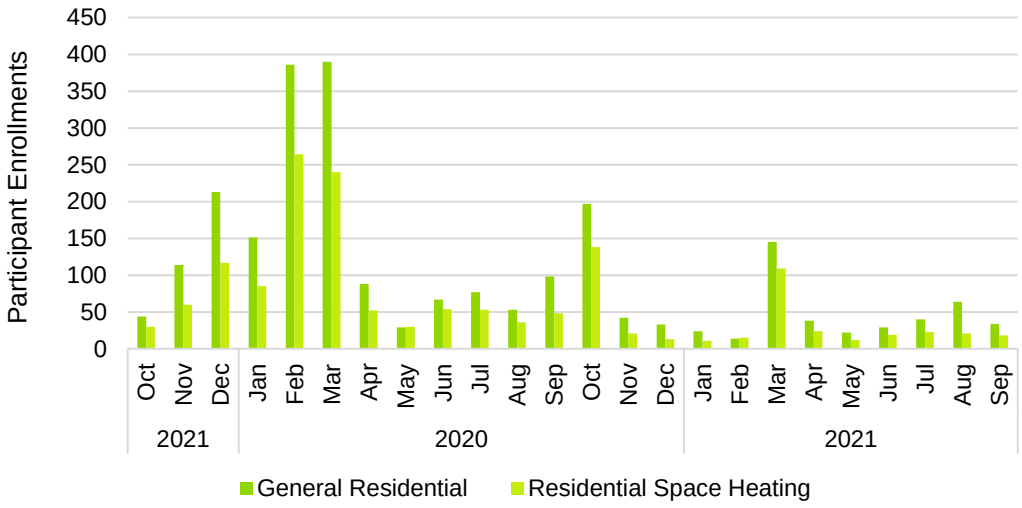
Figure 9 and Figure 10 show the monthly participant enrollment for the Missouri Metro and Missouri West jurisdictions, respectively, with the general trend being similar across the two jurisdictions. The majority of the enrollment occurred prior to April 2020, when Evergy launched the first significant phase of its marketing plan.

Figure 9. Monthly Enrollment – Missouri Metro



Source: Guidehouse analysis

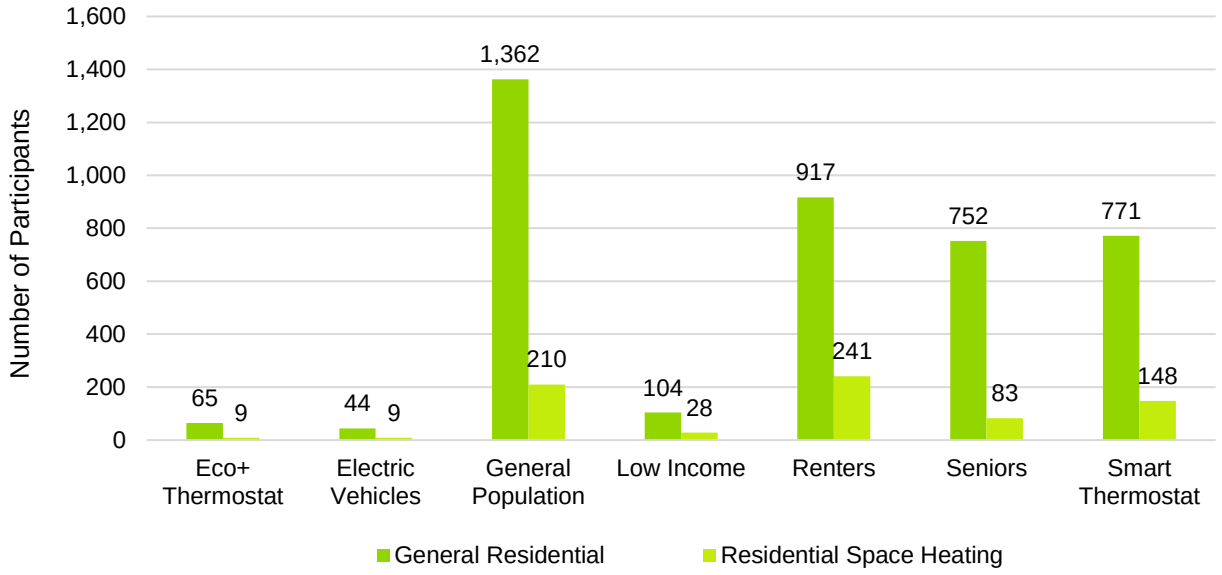
Figure 10. Monthly Enrollment – Missouri West



Source: Guidehouse analysis

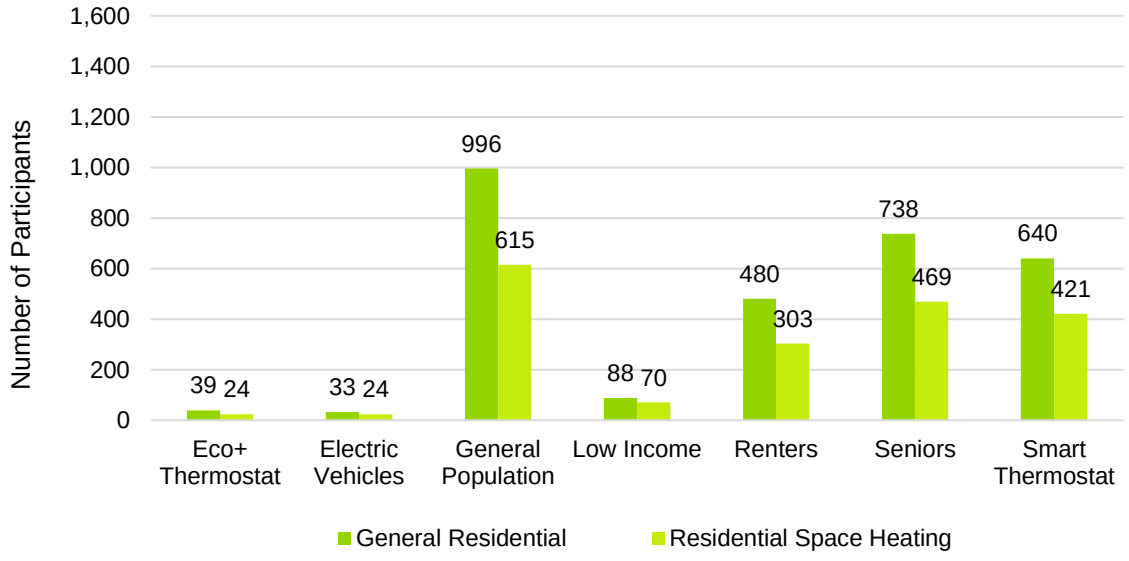
Figure 11 and Figure 12 show enrollment by customer segment for the Missouri Metro and Missouri West jurisdictions, respectively. As mentioned previously, segment membership is not exclusive. Most participants fall into the general population segment with renters, seniors, and smart thermostats having adequate representation. The EVs, eco+ thermostat, and low income segments have relatively few participants, which affects the confidence bands around the impact estimates; as such, the results need to be interpreted with caution.

Figure 11. Enrollment by Segment – Missouri Metro



Source: Guidehouse analysis

Figure 12. Enrollment by Segment – Missouri West

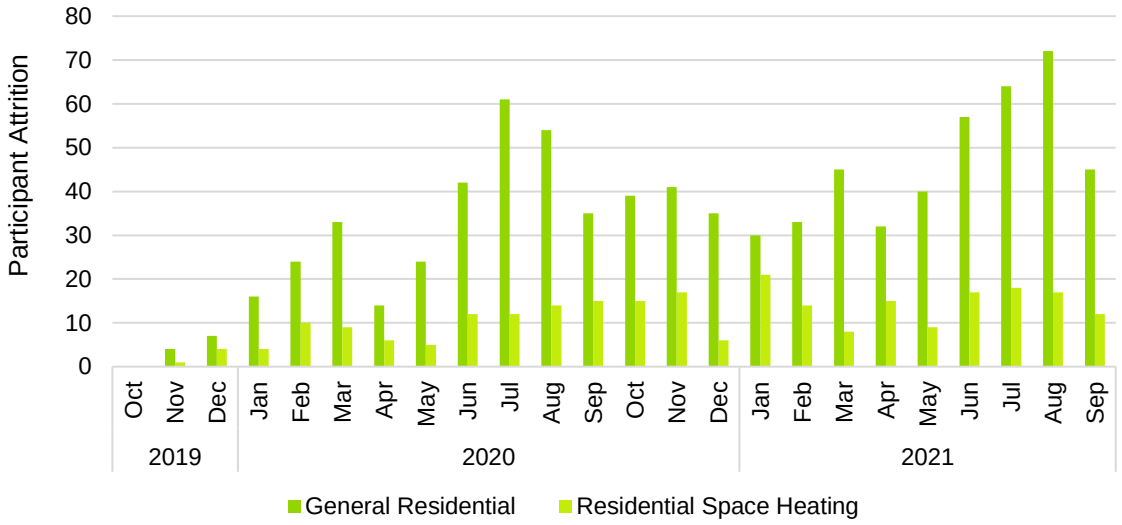


Source: Guidehouse analysis

Figure 13 and Figure 14 show monthly participant attrition for the Missouri Metro and Missouri West jurisdictions, respectively, with the trend across both jurisdictions being similar. The total

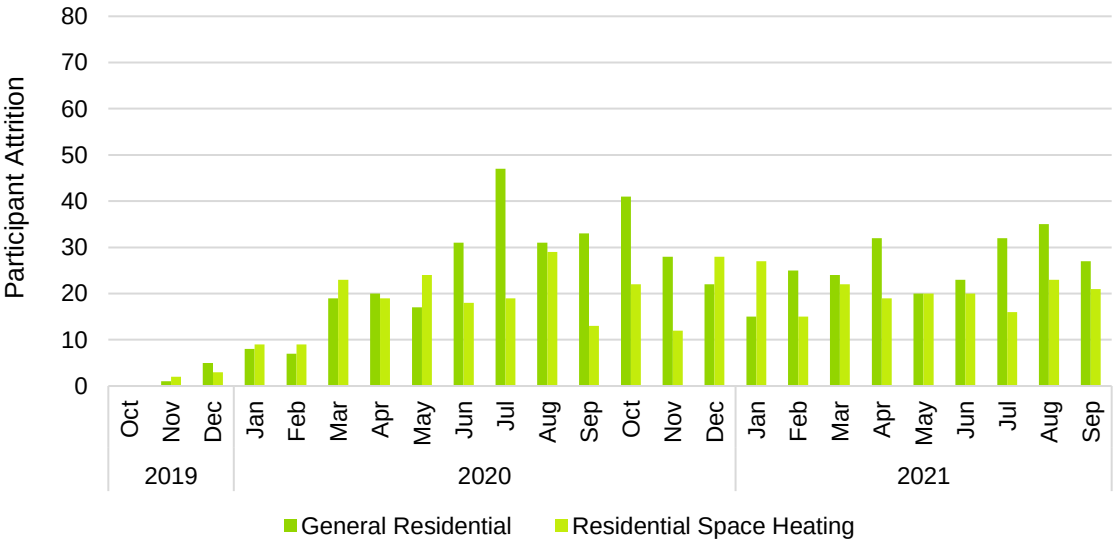
attrition is 1,173 and 1,006 customers for the Missouri Metro and Missouri West jurisdictions, respectively, across the two years included in the period of analysis. This level of attrition is not unusual for TOU rates. A recent meta-analysis of ten price pilots in Ontario, Canada, found that single-year attrition fluctuated between 5% and 20% for opt-in price pilots.[2] Figure 15 and Figure 16 break down the reasons that caused attrition, with the trends across the Missouri Metro and Missouri West jurisdictions being similar. Approximately half of the attrition is due to participants moving out of Evergy's service territory.

Figure 13. Participant Attrition – Missouri Metro



Source: Guidehouse analysis

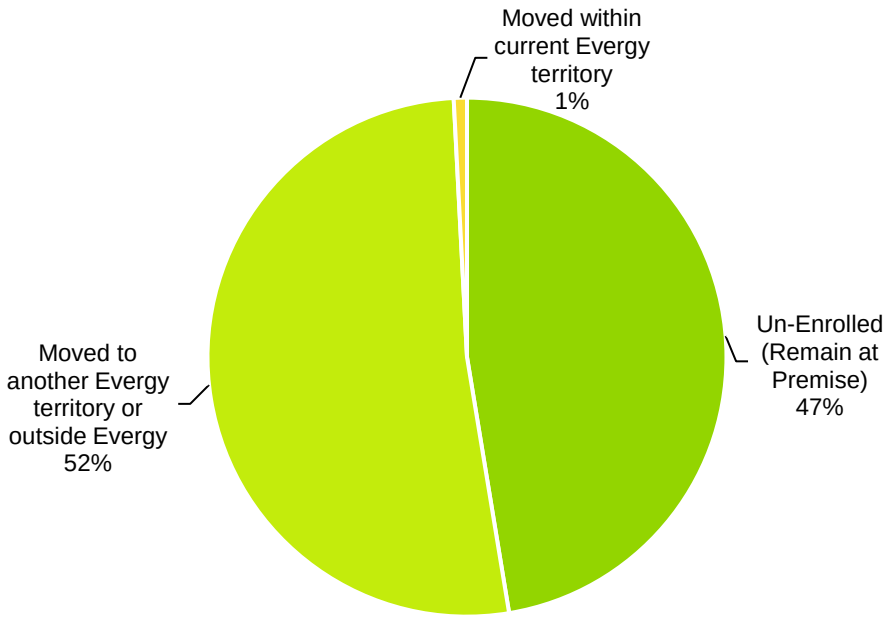
Figure 14. Participant Attrition – Missouri West



Source: Guidehouse analysis

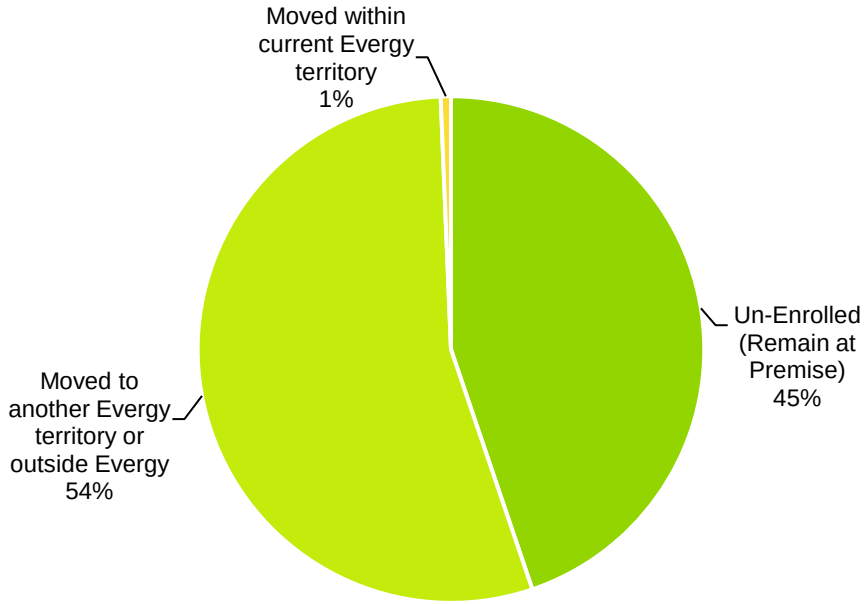
[2] See Table ES-1 of Guidehouse prepared for Ontario Energy Board, *Regulated Price Plan Meta-Analysis – Final Report*, December 2020, **https://www.oeb.ca/sites/default/files/report-RPP-Pilot-Meta-Analysis-20211110.pdf**.

Figure 15. Attrition Reason – Missouri Metro



Source: Guidehouse analysis

Figure 16. Attrition Reason – Missouri West



Source: Guidehouse analysis

1.4 Evaluation Goals and Objectives

Per the evaluation plan, Guidehouse estimated the ex post energy and demand impacts (i.e., the estimated impacts of historical pricing treatments) for the TOU rates across the Missouri

Metro and Missouri West jurisdictions. The study period for this report comprises the 2-year period from October 1, 2019 to September 30, 2021.

Key objectives:

- Quantify the behavioral impacts of the TOU rate in terms of energy and peak demand, defined as the system coincident peak in each month.
- Assess how impacts vary across the customer segments in each jurisdiction.
- Quantify the relative impacts of the TOU rate on customer bills and the utility's revenue recovery.

The approach used to estimate the energy and demand impacts are discussed in Section 2 and the associated findings are presented in Section 3.

2. Methodology

This section provides a high-level description of the approach used to estimate the impacts presented both in the interim and now this, the final, evaluation report. The remainder of this section is divided into the following subsections:

- **Quasi-Experimental Design:** Describes the experimental design used to quantify the behavioral impacts of the TOU rates.
- **Estimating TOU Rate Impacts:** Describes the econometric approach used to estimate the energy and demand impacts of the TOU rates.

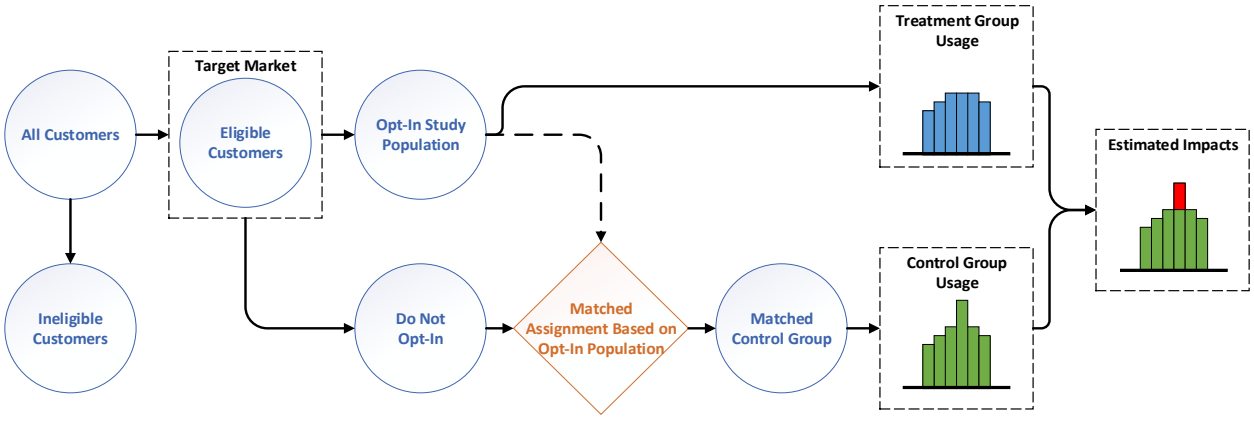
2.1 Quasi-Experimental Design

Residential customers on the general residential rate or the residential space heating rate are eligible to enroll in the TOU rate. Customers were offered a choice to voluntarily opt in to the TOU rate or to remain on their current tiered rate. This enrollment approach is different from a default study, also known as an opt-out study, where customers are automatically placed on a new rate and must actively choose to unenroll or opt out.

While this approach respects customer choice, any opt-in study can result in self-selection bias, meaning it may attract those customers already more engaged in their electricity consumption patterns and think they can benefit from the TOU rate (i.e., they can shift consumption to the lower priced off-peak or super off-peak periods or reduce consumption, thereby saving money on their electricity bill).

This approach, coupled with the relatively small sample sizes compared to the overall residential population, may have implications for extrapolating the impacts to the broader population, but it does not invalidate or compromise the study. This is because the behavioral changes observed in customers who opt into a rate may not necessarily mirror those for the entire residential population.

Figure 17. Opt-In Quasi-Experimental Design with Matched Controls



Source: Guidehouse analysis

Even a randomized control trial (RCT), which effectively recruits customers and then denies a portion of customers the new rate to create the control group, is subject to this challenge.[3] There

[3] RCTs eliminate self-selection bias conditional on expressing interest to participate.

were concerns that denying customers the opportunity to enroll in the TOU rate would negatively affect customer perceptions.

Guidehouse used an opt-in quasi-experimental design with matched controls, as Figure 17 shows. This approach leverages historical interval metering data for participants to match them with a comparable nonparticipant that will serve as their control for the study period. In essence, the team used observable characteristics to create an *as-if or quasi RCT*. The selection of the matched controls is discussed in the following subsections.

2.1.1 Matching Analysis

The process of finding matched controls can be thought of as a preprocessing step for estimating the TOU rate impacts. This is because the act of selecting matched controls is aimed at reducing the variation in the data as the entire residential population is no longer included and the participant and control groups are balanced based on observable characteristics, namely pre-period consumption, which can yield narrower confidence bands and more precise estimates.

Matching cannot be expected to yield a perfect matched control for every participant, meaning that consumption patterns will not be exactly the same. There are bound to be some minor differences in consumption patterns even during the matching period, but the key is that the patterns are similar.

The goal is to reduce the variation in the pre-period (i.e., the period prior to enrolling in the TOU rate) as much as possible given the pool of nonparticipants, such that the regression has to do less work to control for these differences, which would aid in yielding narrower confidence bands and more precise estimates. Any remaining differences will be controlled for by the regression model.

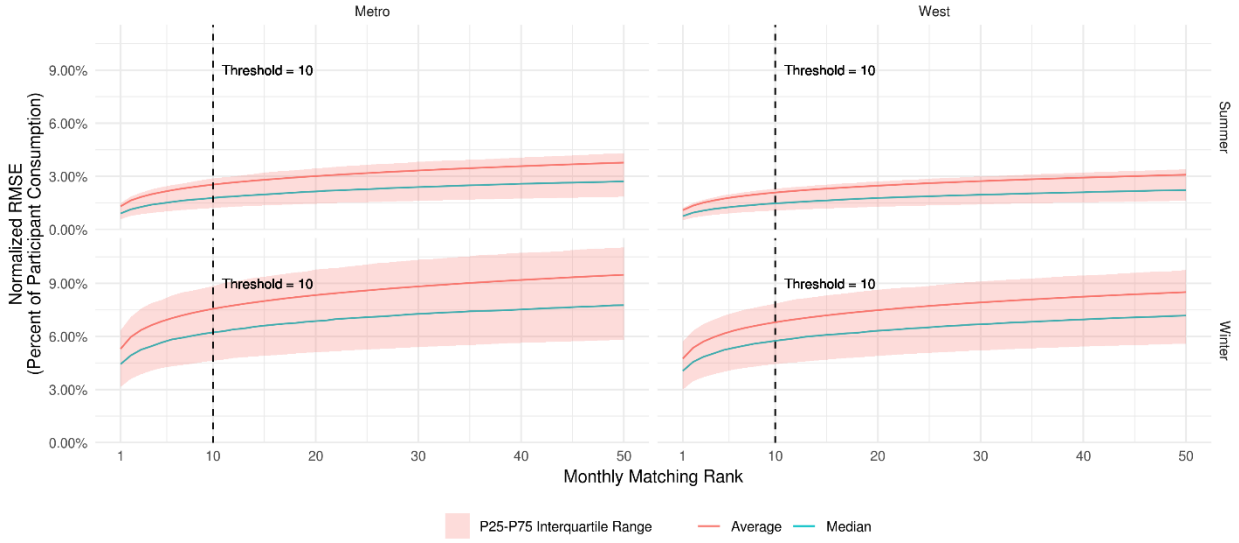
The process of finding a matched control for each participant was conducted in two phases.

Phase 1: Monthly Matching

This phase can be thought of as a preprocessing step for the hourly matching. The goal of this phase is to narrow down the potential pool of controls for each participant for each season (as the summer and winter load profiles can vary) such that their monthly load profiles are similar.

Matching based on Euclidean (i.e., straight line) distance was conducted within each jurisdiction to select a subset of the top monthly matches for each participant for the summer and winter seasons. The 12-month period that immediately preceded the participant's enrollment month was used as the matching period. Figure 18 shows that the monthly distances (root mean squared error, RMSE) plateau quickly as one moves down the ranks, allowing for the flexibility to have a reasonable threshold at which to narrow down the pool of controls for each participant for further refinement.

Figure 18. Monthly Matches RMSE Distribution by Rank



Source: Guidehouse analysis

There is no scientific algorithm to be applied in selecting the threshold for the top monthly matches; rather, a determination is made based on a professional review of the distribution in Figure 18 to ensure a sufficient pool for the hourly matching.

The winter season has greater variance across the entire pool of nonparticipants, which is most likely due to variations in space heating. The distributions are similar for both jurisdictions in both seasons, so a threshold of the top 10 monthly matches was selected for both jurisdictions and seasons.

In summary, this first phase generates 10 matches for each participant for each season within their own jurisdiction with similar monthly load profiles that can be passed to Phase 2 for further refinement at the hourly level.

Phase 2: Hourly Matching

Given that the impacts are estimated using an hourly regression model, it is important to ensure that the hourly load profiles are as close as possible. The top 10 monthly matches for each participant (in each season) from Phase 1 were used as inputs to select the matched control with the most similar hourly profile for each participant in each season. The matching period used was same as Phase 1.

For hourly matching, the TOU buckets were defined as shown in Table 7. The weekend off-peak and super off-peak periods were separated from the weekdays because the weekend load profiles are usually different from weekdays. The weights assigned to each period correspond to the number of hours they span in the week (i.e., they are the natural weights). Given that the TOU periods are same for both seasons, the same set of buckets and weights apply.

Table 7. Weights by TOU Period and Bucket

Day Type	TOU Period	Hours/ Week	Total Hours/ Week	Bucket	Period Weight
Weekday	On-Peak	20	168	1-On-Peak	12%
	Off-Peak	70	168	2-Off-Peak	42%
	Super Off-Peak	30	168	3-Super Off-Peak	18%
Weekend	Off-Peak	36	168	4-Off-Peak	21%
	Super Off-Peak	12	168	5-Super Off-Peak	7%

Source: Guidehouse analysis

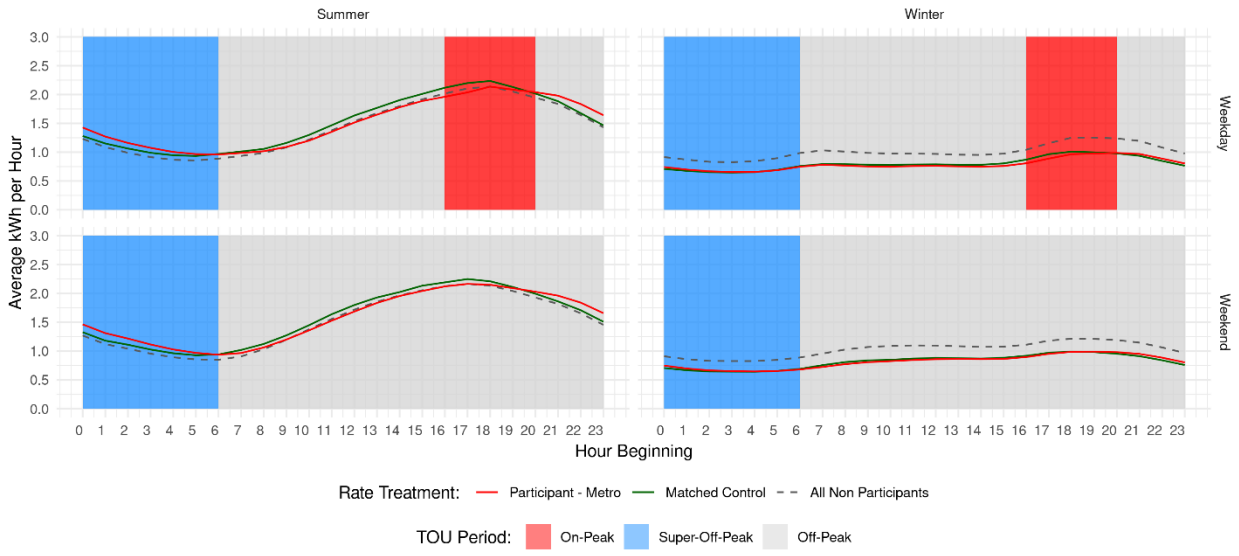
Conducting the hourly matching with a full 24-hour load profile for the weekday versus the weekend results in too many dimensions for each month to match on, which can introduce a lot of noise and reduce the ability to produce a reliable match. However, using the TOU buckets provides a reasonable number of dimensions to match on and provides a good set of matches. Effectively, for each month of each season there are five dimensions to match on for each participant: three for weekdays and two for weekends.

2.1.2 Review of Matched Controls

The approach described previously yielded a good set of matched controls for both jurisdictions in that the participant and matched control consumption profiles are similar, as the following figures show. The figures also demonstrate how the matched controls compare to the entire pool of all nonparticipants from which the controls are selected.

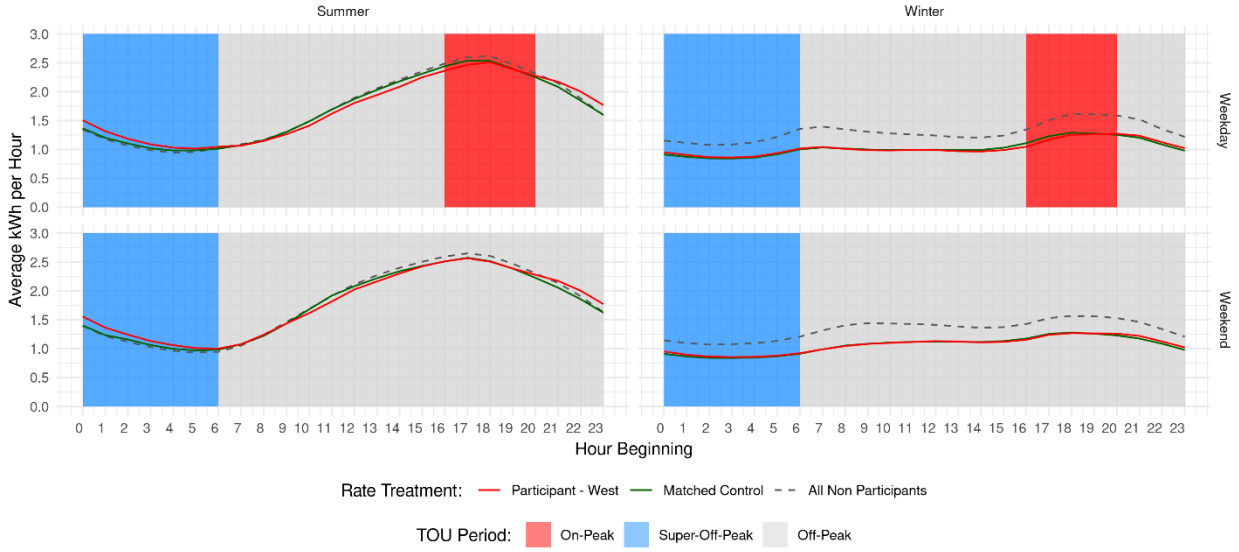
In general, the summer consumption is higher than the winter consumption, which demonstrates the benefit of finding a separate matched control for the two seasons. The entire pool of all nonparticipants has a notably higher load profile, especially in the winter. Therefore, the preprocessing step of finding a matched control was successful.

Figure 19. Matched Control Hourly Load Profiles – Missouri Metro



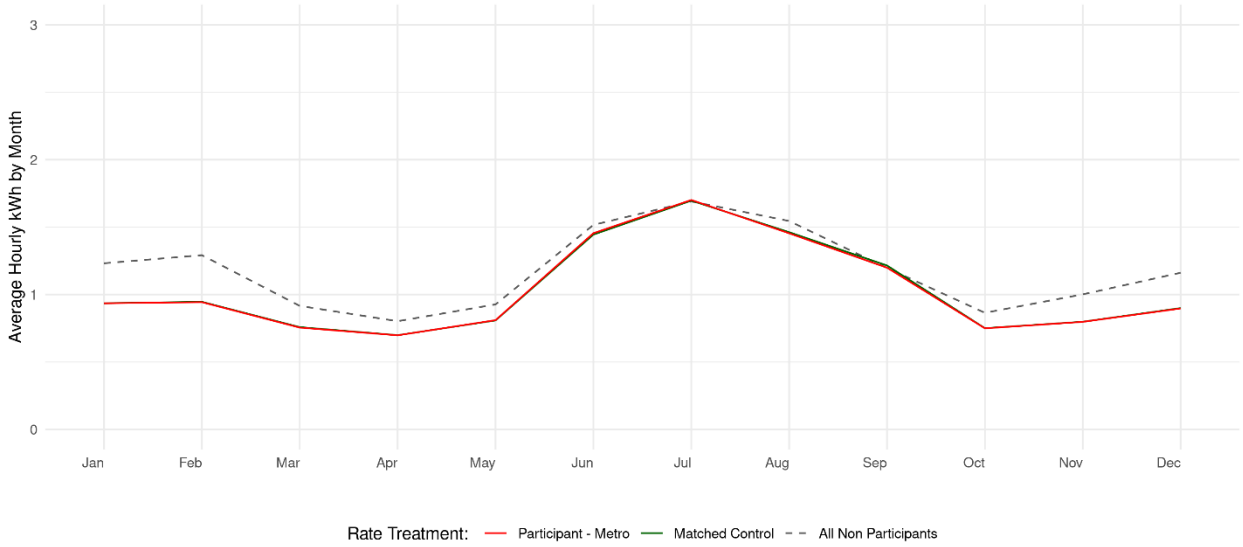
Source: Guidehouse analysis

Figure 20. Matched Control Hourly Load Profiles – Missouri West



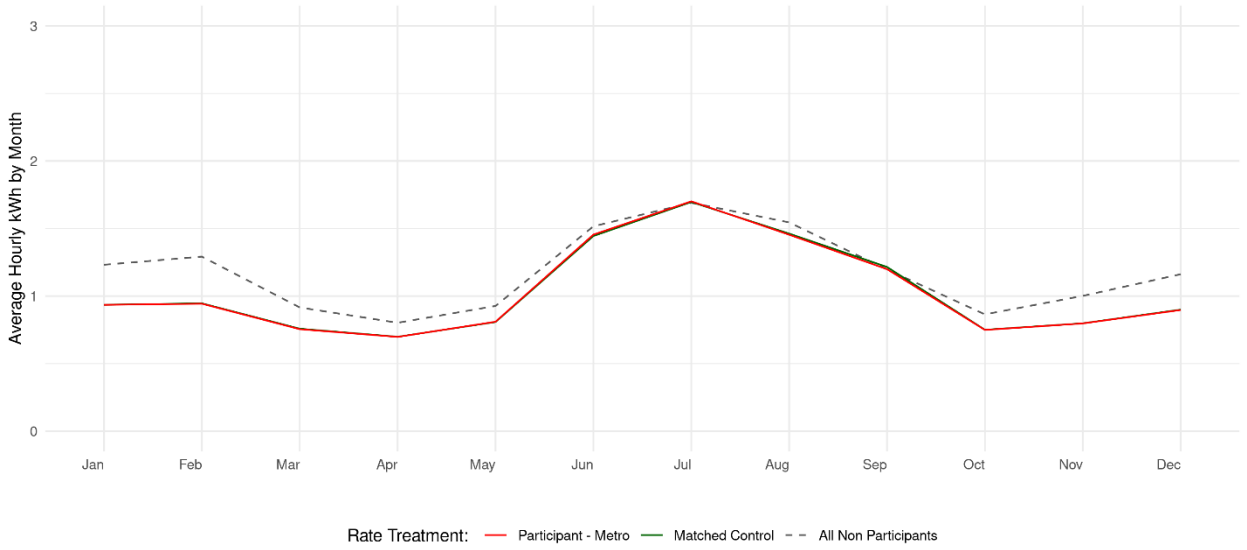
Source: Guidehouse analysis

Figure 21. Matched Control Monthly Load Profiles – Missouri Metro



Source: Guidehouse analysis

Figure 22. Matched Control Monthly Load Profiles – Missouri West



Source: Guidehouse analysis

2.2 Estimating TOU Rate Impacts

This section describes the econometric approach to estimating the energy impacts by TOU period as well as the monthly system coincident peak demand impacts.

2.2.1 Energy Impacts Methodology

This section details the econometric approach Guidehouse adopted to estimate energy impacts by TOU period. A post-program lagged dependent variable (LDV) model was applied to a panel dataset. The model effectively compares the change in hourly consumption from the pre-period to the treatment period (i.e., the period after enrolling in the TOU rate) for the participants to the same change in hourly consumption observed for the matched controls. Additional variation due to the effects of weather are captured by the heating degree hour and cooling degree hour (HDH, CDH) variables and the WeekNum variable which functions as a time-wise fixed effect. A separate regression was run for each jurisdiction and season (see Equation 1).

Equation 1. Energy Impacts Post-Program Regression Model

$$kWh_{i,t} = \sum_{n} \alpha_n \cdot Participant_{i,t} \cdot TOU\_period_{n,i,t} + \sum_{n} \beta_n \cdot TOU\_period_{n,i,t} +$$
$$\sum_{w} \chi_w \cdot WeekNum_{w,i,t} \cdot kWh\_Lag_{i,t} +$$
$$\sum_{w}\sum_{d} \delta_{w,d} \cdot WeekNum_{w,i,t} \cdot DayOfWeek_{d,i,t} + \sum_{w}\sum_{h} \phi_w \cdot WeekNum_{w,i,t} \cdot Hour_{h,i,t} +$$
$$\sum_{w} \gamma_w \cdot WeekNum_{w,i,t} \cdot HDH65_{i,t} + \sum_{w} \eta_w \cdot WeekNum_{w,i,t} \cdot HDH65buildup_{i,t} +$$
$$\sum_{w} \iota_w \cdot WeekNum_{w,i,t} \cdot CDH65_{i,t} + \sum_{w} \varphi_w \cdot WeekNum_{w,i,t} \cdot CDH65\_buildup_{w,i,t} + \varepsilon_{i,t}$$

Source: Guidehouse analysis

Table 8 describes the model variables. The dependent variable is the hourly consumption in the post-period analysis timeframe. The participant indicator variable is interacted (i.e., multiplied) with the TOU period to capture the changes in energy consumption in each TOU period.

The purpose of the other variables is to account for other factors that influence energy consumption behavior to obtain a clean estimate of the impact of the TOU rates on a customer's energy consumption patterns. The LDV controls for the pre-period consumption by week of the year, providing greater flexibility to control for changes in consumption over time.

Table 8. Energy Impact Regression Model Variables

Variable	Description
i	Index to identify a particular customer
t	Index to identify the datetime stamp for the hourly observation
n	Index to identify the TOU period (on-peak, off-peak, super off-peak)
w	Index to identify the week of the year
d	Index to identify the day of the week
h	Index to identify the hour of the day
$Participant_{i,t}$	Indicator variable that takes the value of 1 when the customer is a participant, 0 otherwise
$TOU\_Period_{n,i,t}$	Indicator variable that takes the value of 1 when the TOU period = n, 0 otherwise
$WeekNum_{w,i,t}$	Indicator variable that takes the value of 1 when the week of the year = w, 0 otherwise
$kWh\_Lag_{i,t}$	Average energy consumption in the same week and hour by weekday or weekend in the pre-period (same timeframe used for matching)[4]
$DayOfWeek_{d,i,t}$	Indicator variable that takes the value of 1 when the day of the week = d, 0 otherwise
$Hour_{h,i,t}$	Indicator variable that takes the value of 1 when the hour of the day = h, 0 otherwise
$HDH65_{i,t}$	Heating degree hours measured at 65°F
$CDH65_{i,t}$	Cooling degree hours measured at 65°F
$HDH65\_buildup_{w,i,t}$	Sum of the heating degree hours over the past 72 hours measured at 65°F
$CDH65\_buildup_{w,i,t}$	Sum of the cooling degree hours over the past 72 hours measured at 65°F

Source: Guidehouse analysis

[4] Guidehouse believes that a weekly average is a reasonable timeframe to account for the prior year's energy consumption levels. This addresses the issue with variability that may arise in any particular hour in the previous year that may not be indicative of typical consumption patterns.

2.2.2 Peak Demand Impacts Methodology

This section details the econometric approach Guidehouse adopted to estimate the monthly system coincident peak demand impacts. Like the energy impacts, a post-program LDV model was applied to a panel dataset. The model effectively compares the monthly system coincident peak demand consumption in the post-period for the participants and matched controls to estimate savings. Any remaining differences in usage prior to enrollment are controlled for via the LDV. A separate regression was run for each jurisdiction and season (see Equation 2).

Equation 2. Peak Demand Impacts Post-Program Regression Model

$$kW_{i,t} = \alpha \cdot Participant_{i,t} + \sum_{m} \beta_m \cdot Month_{m,i,t} \cdot kW\_Lag_{m,i,t} + \sum_{m} \beta_m \cdot Month_{m,i,t} \cdot Monthly\_kWh_{i,t} + \sum_{m} \gamma_w \cdot Month_{m,i,t} \cdot HDH65_{i,t} + \sum_{w} \iota_w \cdot Month_{m,i,t} \cdot CDH65_{i,t} + \varepsilon_{i,t}$$

Source: Guidehouse analysis

Table 9 describes the model variables. The dependent variable is the system coincident peak demand consumption for the month in the post-period analysis timeframe. The participant indicator variable captures the changes in peak consumption that are driven by the TOU rate.

Like the energy impacts, the purpose of the other variables is to account for other factors that influence energy consumption behavior to obtain a clean estimate of the impact of the TOU rates on a customer's peak demand, and the LDV controls for the pre-period peak demand by month of the year.

Table 9. Peak Demand Impact Regression Model Variables

Variable	Description
i	Index to identify a particular customer
t	Index to identify the month for the peak demand observation
m	Index to identify the month of the year
$Participant_{i,t}$	Indicator variable that takes the value of 1 when the customer is a participant, 0 otherwise
$Month_{m,i,t}$	Indicator variable that takes the value of 1 when the month of the year = m, 0 otherwise
$kW\_Lag_{i,t}$	Peak demand in the same month of the pre-period (same timeframe used for matching)
$HDH65_{i,t}$	Heating degree hours measured at 65°F
$CDH65_{i,t}$	Cooling degree hours measured at 65°F

Source: Guidehouse analysis

2.3 Journey Map and Customer Research

The Guidehouse/Illume team (Guidehouse team) summarized key findings from customer research activities conducted by Evergy and developed a final customer journey map depicting the customer experience on the TOU rate. The customer research activities summarized in this

section include interviews and surveys with TOU participants and an interview with the program manager. Table 10 summarizes the timing, data collection method, and number of completes for each of the research activities that the Guidehouse team references for this report.

Table 10. Research Activities

Data Collection Activity	Date Range	n	Data Collection Method
Program Manager interview	July 27, 2021	1	In-depth phone interview conducted by the Guidehouse team
Enrollment survey	10/21/2019-10/4/2020 Within 2 weeks of enrollment	1,628	Online survey fielded by True North/Evergy
Cancellation survey	12/20/2019-7/31/2021 Within 2 weeks of opting out	298	Online survey fielded by True North/Evergy
Behavior survey	7/16/2020-7/31/2021 6 months after enrollment	1,348	Online survey fielded by True North/Evergy
TOU rate plan interviews*	4/20/2020-4/23/2020	14	Phone interviews conducted by True North

Note: The Guidehouse team analyzed raw data from the enrollment, cancellation, and behavior surveys. For the TOU rate plan interviews, the team referenced the *Evergy TOU Rate Plan: Qualitative Customer Reactions* report delivered by True North in April 2020.

*Due to the small sample size for in-depth interviews, the Guidehouse team primarily relied on the survey data to inform the journey map and customer research summary.

This report organizes and presents the customer research findings along six phases of the customer journey. The Guidehouse team identified these phases before the launch of the rate plan as the likely journey through which customers would experience the rate plan. The team created an initial customer journey map depicting these phases and potential areas of customer satisfaction and opportunities for improvement. This expected customer journey was based on customer feedback (focus groups, interviews, surveys) collected during the rate plan development phase. During a July 2021 interview with the program manager, the Guidehouse team confirmed that these phases still accurately represent the implemented rate plan:

1. Awareness
2. Education and Consideration
3. Enrollment
4. Onboarding
5. Rate Performance
6. Advocacy

Drawing on the customer surveys and in-depth interviews fielded during the TOU rate period, the Guidehouse team explored each phase of the customer journey, noting areas of customer satisfaction, areas for improvement, and overall customer sentiment about each phase. Key changes from the interim to final customer journey map based on customer research conducted during the rate plan period included: updated customer sentiment indicators at the top of the journey map, updated participant quotes, and updated Opportunities (where applicable). In

addition, the team added an icon for Rate Education Support within Step 1 Awareness and added notation in Step 3 Enrollment to indicate that the vast majority of enrollments occurred through the Self-Service channel.

The updated experienced journey map that summarizes all this information into a single-page visual is presented in Figure 48.

Table 11 shows the different phases of the customer journey and the questions from each survey that were reviewed to update the journey map.

Table 11. Source of Customer Journey Map Input – Survey Questions

Journey Map Phase	Enrollment Survey	Cancellation Survey	Behavior Survey
Awareness	Q8		
Education and Consideration	Q5, Q7, Q9, Q11, Q12		Q2
Enrollment	Q3, Q4		Q11
Onboarding			Q12a, Q12b, Q12c, Q13, Q14
Rate Performance		Q2, Q3, Q4, Q5/Q6, Q7, Q8, Q9	Q1, Q3, Q4, q5, Q6, Q8, Q17, Q18
Advocacy			Q9, Q19, Q20, Q21, Q24

Source: Guidehouse team analysis

3. Results

This section presents the results of the TOU rates on customer behavior, namely the impacts on energy and peak demand and the associated bill impacts.

The remainder of this section is divided into the following subsections:

- **TOU Rate Impacts:** Presents the energy and monthly system coincident peak demand impacts of the TOU rate.
- **Bill Impacts:** Presents the impacts the TOU rates and the associated behavioral changes that customers have made has had on their electricity bills.

3.1 TOU Rate Impacts

This section presents the estimated energy and demand impacts of the TOU pilot in the following subsections:

1. Overall TOU Period Impacts by Region
2. TOU Period Impacts by Customer Segment
3. Coincident Peak Demand Impacts, Overall and by Segment
4. Persistence Impacts by Region

3.1.1 Overall TOU Period Impacts by Region

Figure 23 and Figure 25 present the estimated TOU impacts by season and TOU period split across the two jurisdictions considered in this study: Missouri Metro and Missouri West. Each plot of estimated results is followed by a set of plots showing the average seasonal load profiles of participants and control customers in the pilot period (Figure 24 and Figure 26). Material participant response during the on-peak period is evident in these plots.

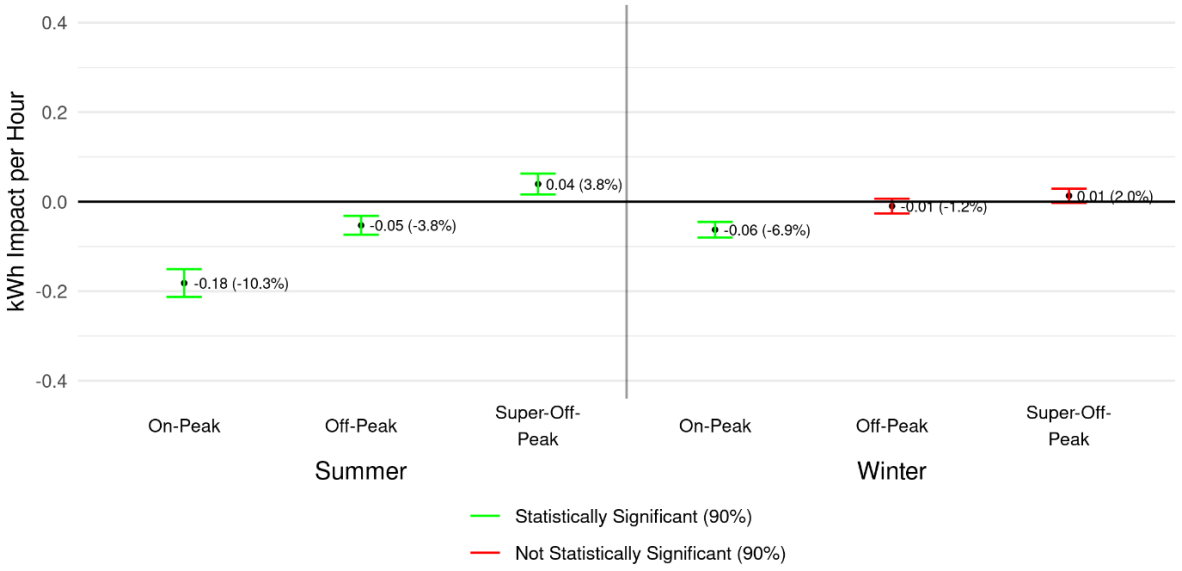
These plots (and those like it that follow) show the estimated impact by TOU period and season and the associated 90% confidence interval (the whiskers). Impacts that are statistically significant at the 90% confidence level are accompanied by green whiskers. Those results that are not statistically significant are accompanied by red whiskers. The estimated impacts are presented as average hourly energy (kWh) impacts, equivalent to an average demand (kW) impact. Impacts are also presented as a percentage of participants' average pre-TOU loads in the same period.

The results indicate that participants in both jurisdictions did respond to the TOU prices by changing their consumption patterns. Prior to enrolling in the TOU rate, participants were subject to a tiered rate structure. This means that the hour in which they consumed electricity did not affect their bill, only the total amount they consumed in a month.

As expected, the most notable savings in either season and jurisdiction occur during the on-peak periods as the price differential is largest during these hours compared to the other TOU periods and to the tiered rate, as mentioned in Section 1.2 (see Table 5 and Table 6). This is also evident from the post-period load shapes (shown in Figure 24 and Figure 26) as the gap

between the participants' and the matched controls' average demand is the largest during the on-peak period.

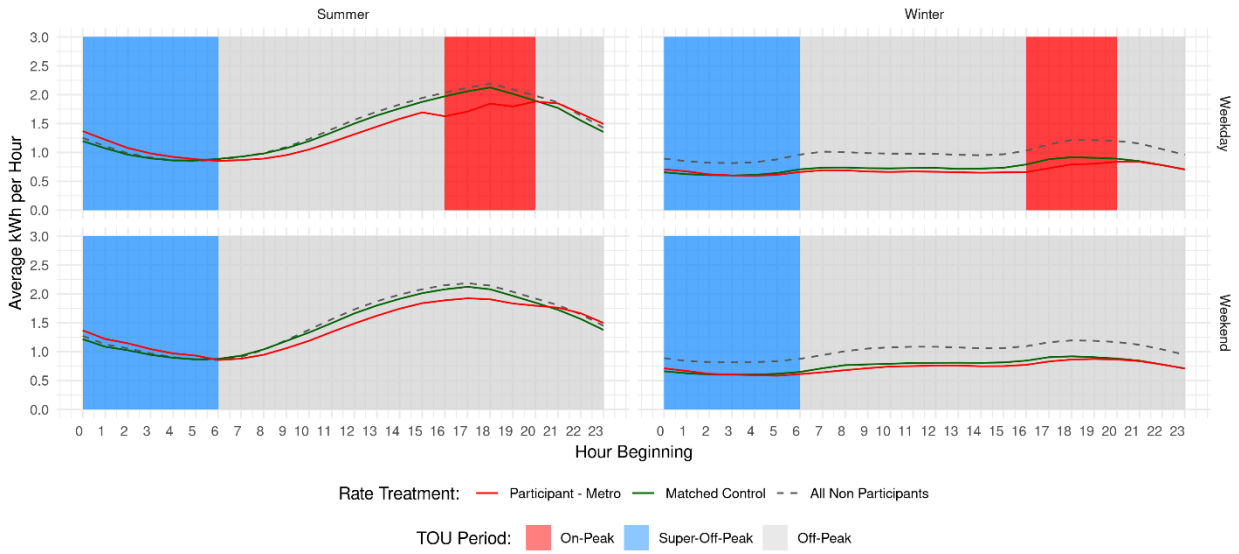
Figure 23. TOU Rate kWh Impacts – Missouri Metro



Source: Guidehouse analysis

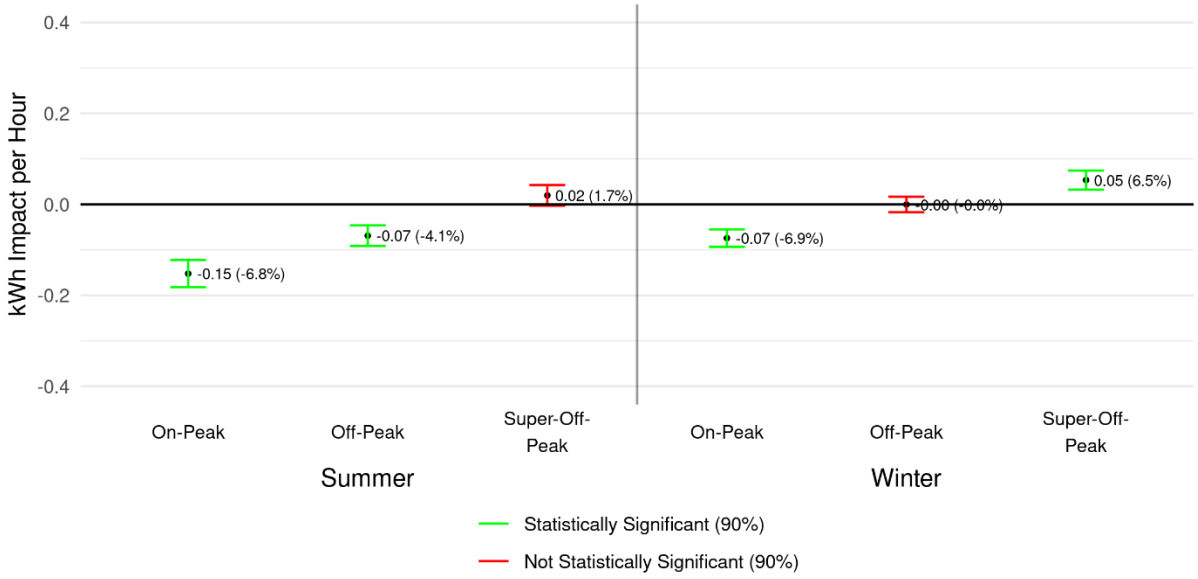
The pattern of impacts is one more indicative of conservation than of a load shifting response, with participants, on average, achieving energy reductions in both the on-peak and the (summer) off-peak periods. The pattern of participant response to the TOU rates is evident in Figure 24, and Figure 26, which shows average participant (red) and control customer (green) load profiles during the survey period. The summer on-peak reductions show up in these plots as a distinct reduction in load during the red highlighted period.

Figure 24. Post-Period Load Shapes – Missouri Metro



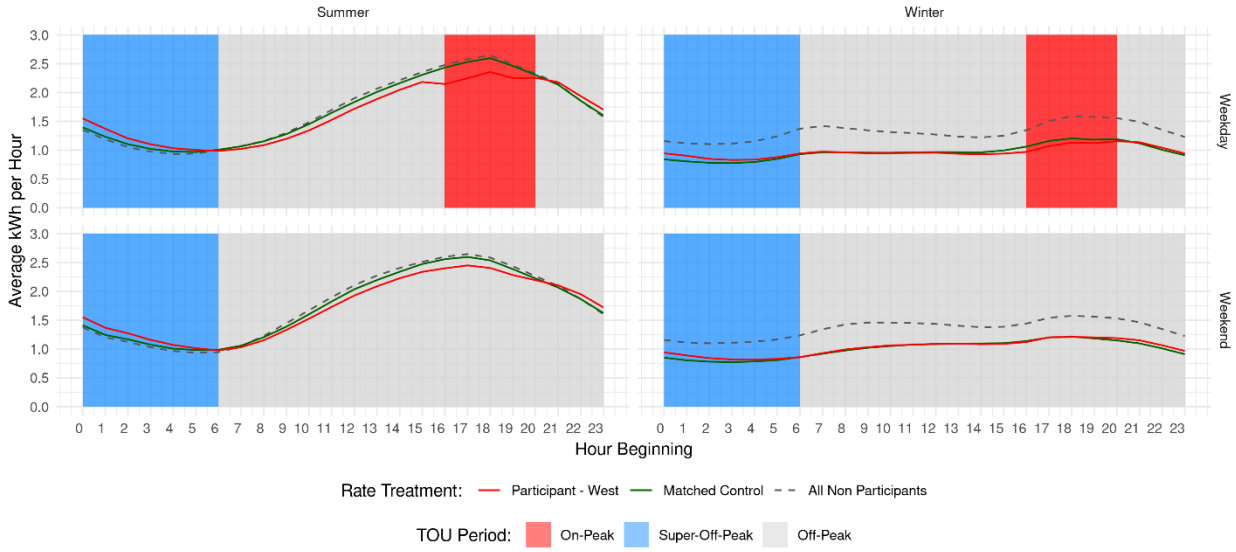
Source: Guidehouse analysis

Figure 25. TOU Rate Impacts – Missouri West



Source: Guidehouse analysis

Figure 26. Post-Period Load Shapes – Missouri West



Source: Guidehouse analysis

The estimated summer impacts are considerably higher than the estimated winter results. This finding is consistent with other TOU evaluations in temperate jurisdictions[5] with high penetrations of non-electric space heating: participants have a great deal more discretionary load (air conditioning) in summer months and greater capacity to respond to the TOU pricing incentives.

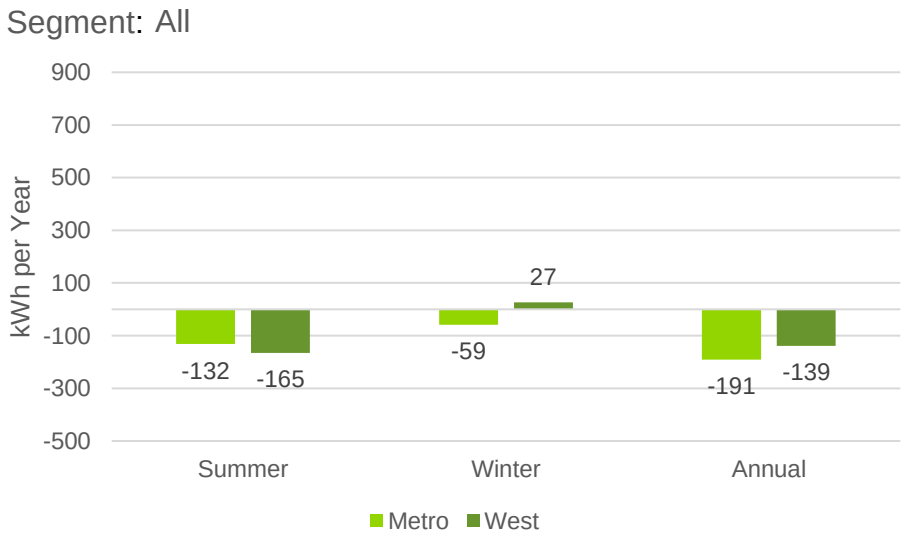
[5] See, for example: Guidehouse, *Regulated Price Plan Meta-Analysis*, prepared for the Ontario Energy Board, December 2020, **https://www.oeb.ca/sites/default/files/report-RPP-Pilot-Meta-Analysis-20211110.pdf.**

The consumption during the summer months, especially during the on-peak period, is much higher than the winter. This was observed in the pre-period during the matching process (as mentioned in Section 2.1.2—see Figure 19 through Figure 22) and can also be seen in post-period load shapes shown in Figure 24 and Figure 26.

TOU pricing designs, although explicitly designed to incentivize shifts in consumption from more costly on-peak to less costly off-peak and super off-peak periods, often do result in participants reducing their overall energy consumption. Despite an average net increase in consumption for Missouri West customers in the winter months, overall participants realized modest annual consumption reductions in both jurisdictions, as Figure 27 shows. The annual conservation effects presented below are calculated by multiplying the average hourly impact by TOU period to the number of hours of the year that fall in each TOU period summing the resulting values. These are therefore the average expected conservation impacts for a single season, or year.

As in the TOU period plots, reductions in consumption (savings) are captured as negative values: on average, participants in both jurisdictions realized modest overall annual energy savings of between 139 kWh per year (slightly more than 1% of participant 2019 consumption), for Missouri West) and 191 kWh per year (slightly more than 2% of participant 2019 consumption), for Missouri Metro.

Figure 27. Overall Conservation Impacts by Region



Source: Guidehouse analysis

3.1.2 TOU Period Impacts by Customer Segment

This section summarizes the impacts by customer segment. Additional detail regarding impacts in non-on-peak periods is provided in Appendix A. Some individual segments, such as the low income and EV segments, have much smaller enrollment (see Figure 11 and Figure 12 in Section 1.3) than others, and thus care should be taken in extrapolating the estimated results.

Figure 28 and Figure 29 show the estimated impacts by segment during the summer on-peak period in the Missouri Metro and Missouri West jurisdictions, respectively. Estimated impacts are presented as average kWh per hour (equivalent to average kW) and as a percentage of

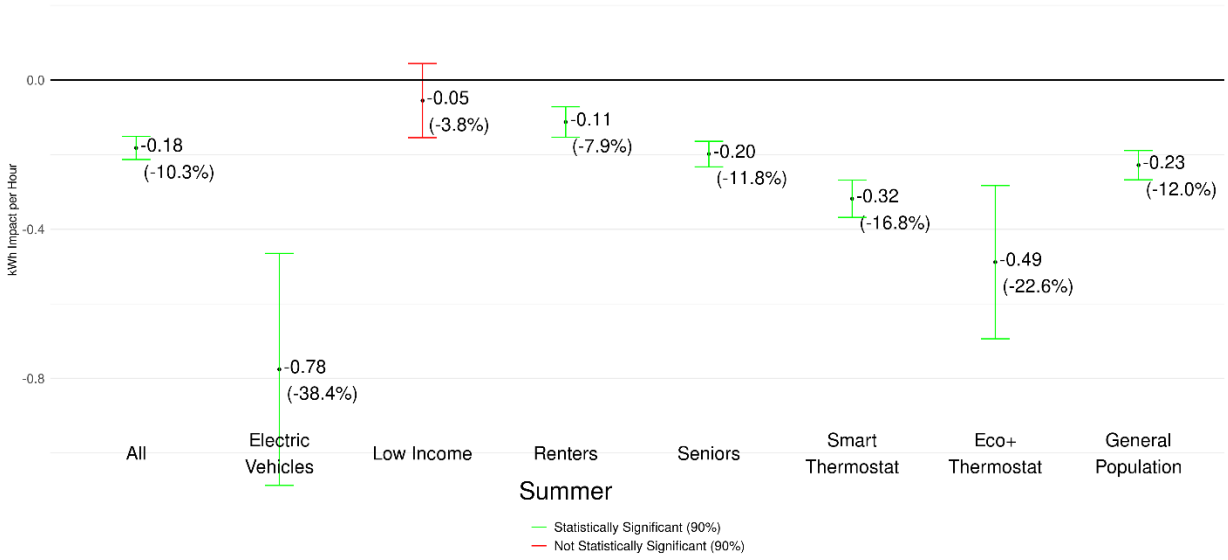
average participant demand in the pre-pilot period. The whiskers surrounding each point estimate represent the 90% confidence interval.

Low income participants in the Missouri Metro jurisdiction and renters in the Missouri West jurisdiction have the lowest estimated on-peak impacts in the summer. Neither of these impacts (0.05 kW and 0.04 kW, respectively) is statistically significant at the 90% confidence level. A statistically non-significant result may generally be interpreted in one of two ways: either there was no impact (and the apparent impact is just statistical noise) or there is an impact, but the estimated magnitude is extremely uncertain. Given that the low income segment sample is the second smallest in this study and that the estimated summer on-peak impacts are statistically significant for all other segments, the latter interpretation (i.e., that there are reductions, but they are highly uncertain) seems to be the most reasonable one in that case. Guidehouse would apply the same interpretation (that impacts are real, but highly uncertain) for renters in the Missouri West jurisdiction: the estimated impacts here are only just barely statistically non-significant, and an examination of the study-period load profiles (see Section A.3 of Appendix A) reveals a clearly visible response. In the case of the renters, that response simply appears to be highly variable across customers.

In both jurisdictions, renters show a more muted response than all other segments (except for low income in Missouri Metro), which is consistent with the expectation that such participants generally live in smaller premises and have fewer discretionary loads available to respond to the TOU rate.

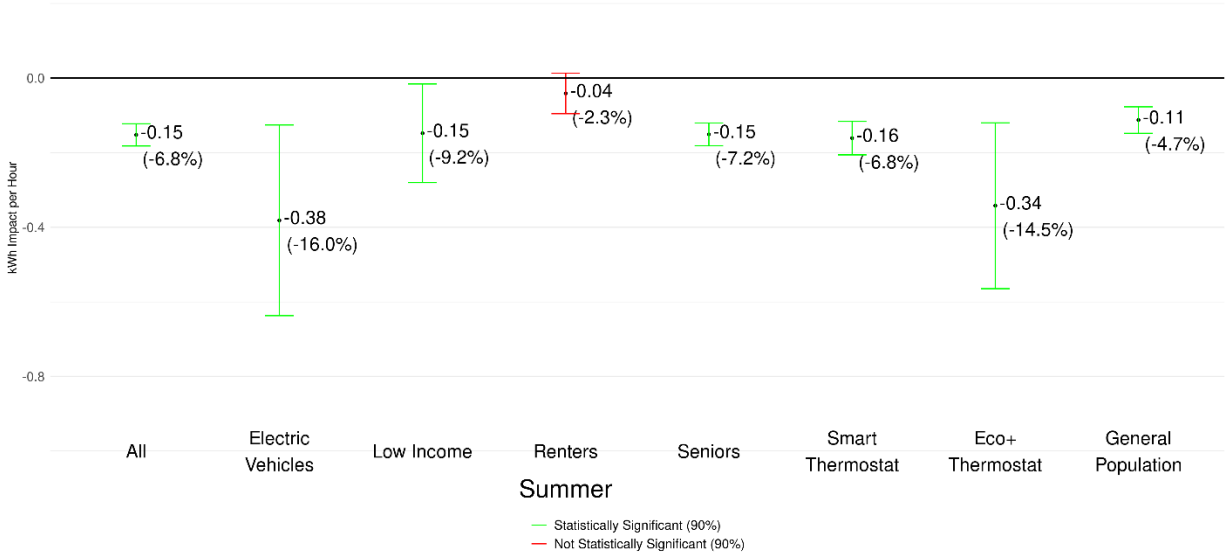
By far the largest on-peak reductions are contributed by EV customers, which is consistent with the expectation that such customers would shift EV charging demands entirely away from the on-peak period. Care should be taken in extrapolating this result given the small sample size for this group (the smallest of all the segments).

Figure 28. On-Peak Impacts by Segment – Missouri Metro, Summer



Source: Guidehouse analysis

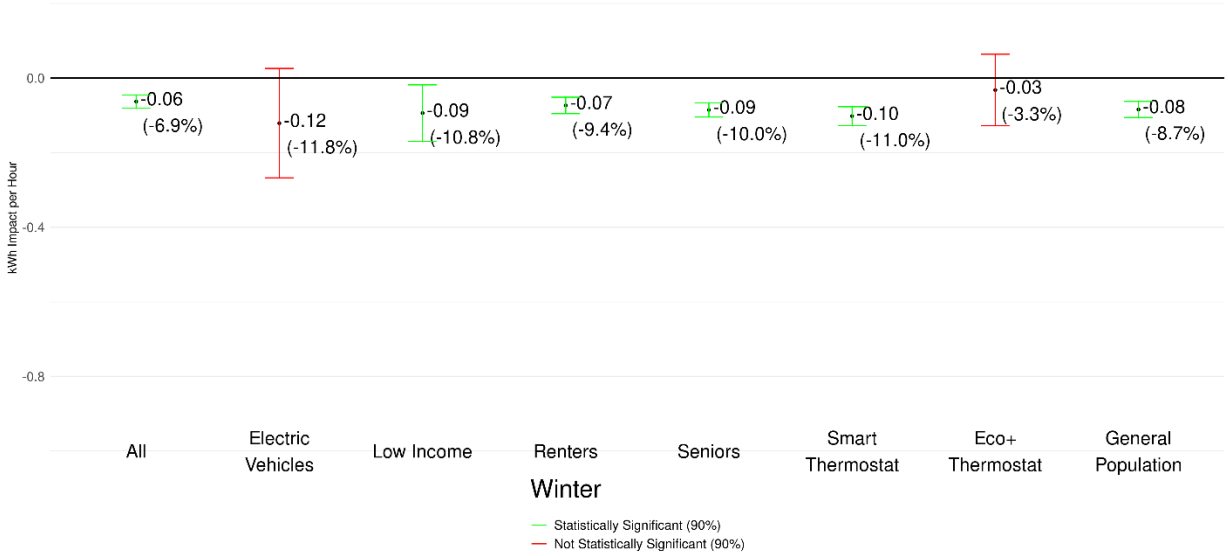
Figure 29. On-Peak Impacts by Segment – Missouri West, Summer



Source: Guidehouse analysis

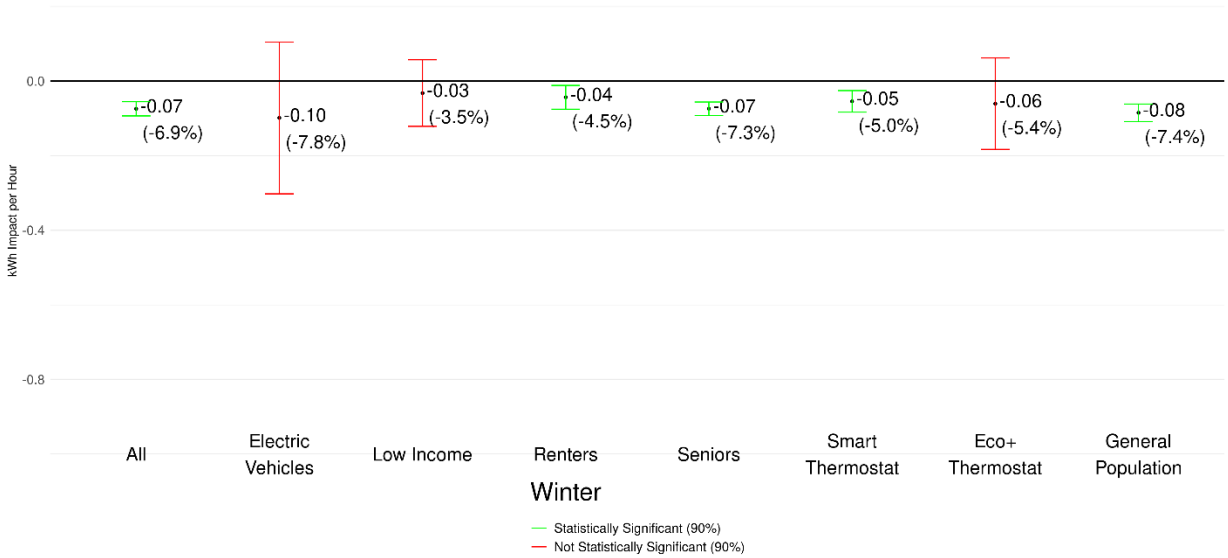
Figure 30 and Figure 31 show the estimated impacts by segment during the winter on-peak period in the Missouri Metro and Missouri West jurisdictions, respectively. As with the overall (average across segment) results shown in Section 3.1.1, winter impacts are (in absolute terms) much lower than summer impacts. In both jurisdictions, EV and eco+ customer impacts are not statistically significant; in Missouri West, low income segment on-peak impacts are not statistically significant. These three segments (EVs, eco+, and low income) are the smallest segments, a major contributor to the uncertainty of these estimates. Though winter EV on-peak impacts are not statistically significant in either jurisdiction, an inspection of EV customers' winter load profiles in the two jurisdictions (see Figure 32) reveals a clear reduction in demand during the on-peak period; this suggests it is primarily the small sample size rather than a lack of response that is driving the uncertainty of the estimate.

Figure 30. On-Peak Impacts by Segment – Missouri Metro, Winter



Source: Guidehouse analysis

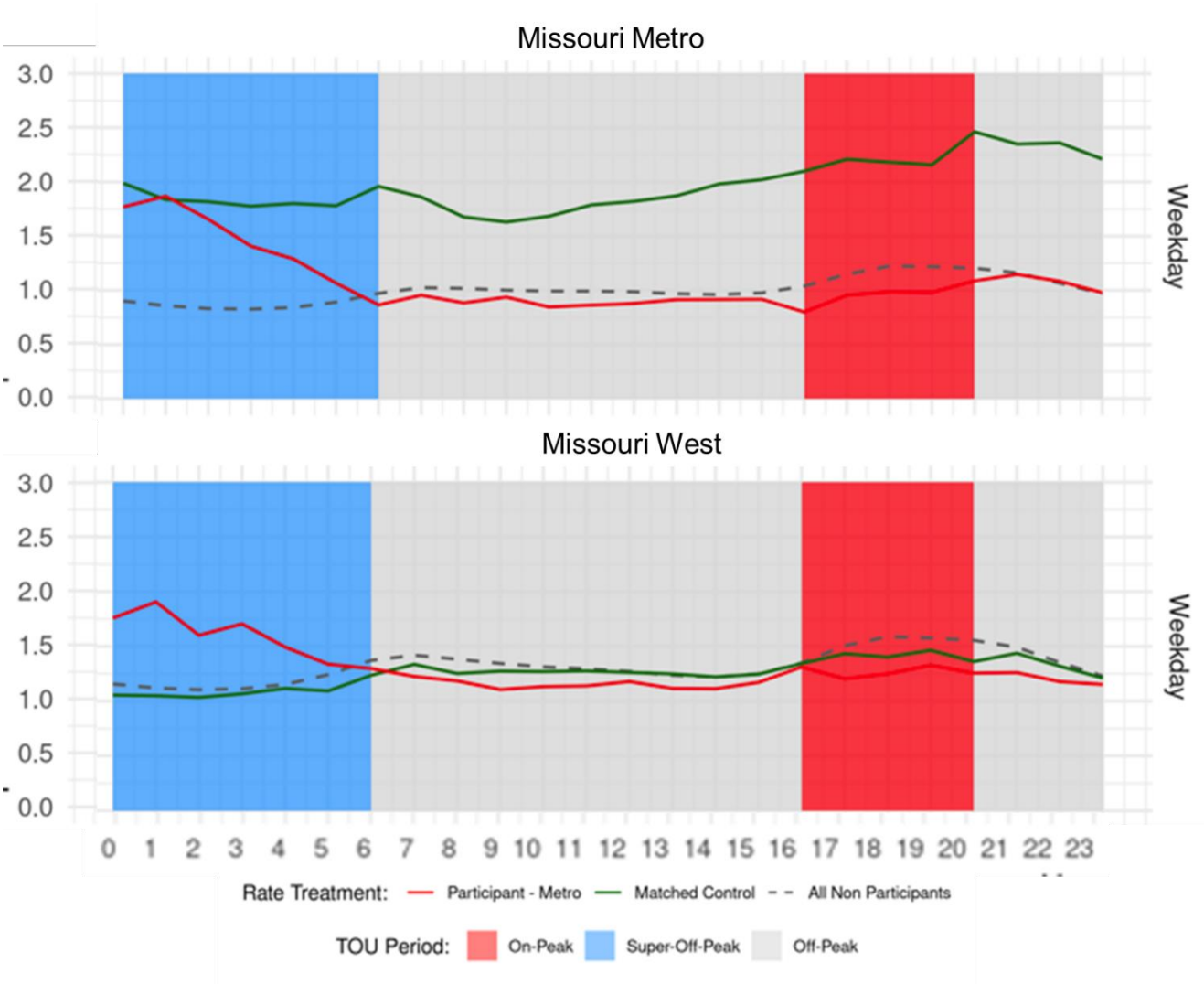
Figure 31. On-Peak Impacts by Segment – Missouri West, Winter



Source: Guidehouse analysis

Figure 32 provides the average winter pilot period load profiles of EV participants and control customers. As noted previously, there is clear evidence of a reduction in average demand during the on-peak period despite the statistically non-significant estimated impacts. Also noteworthy in these plots are the large loads of EV participants during the overnight super off-peak period. Estimated impacts for all TOU periods for each segment are found in Appendix A.

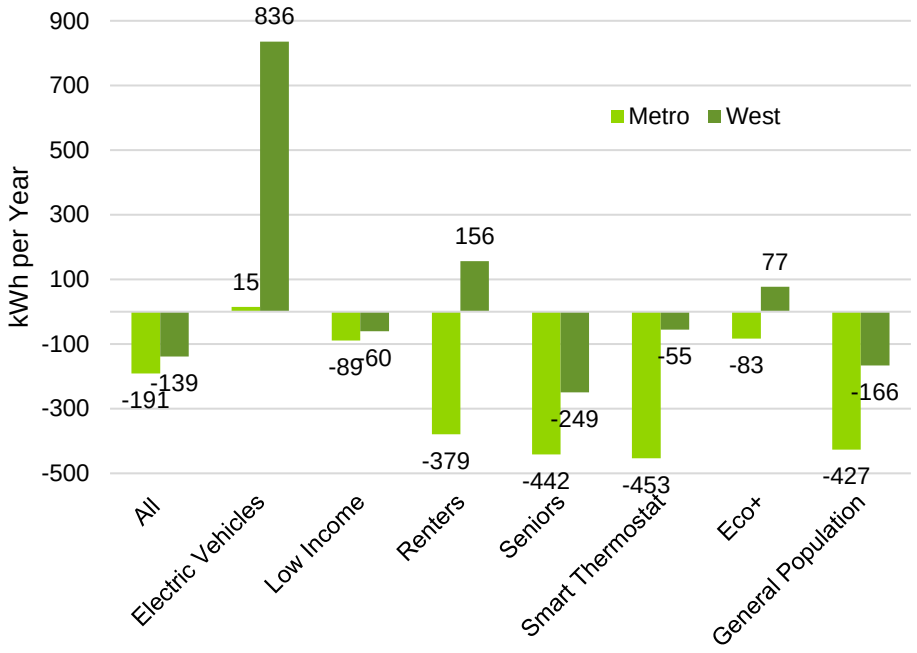
Figure 32. Winter EV Pilot Period Pilot Period Load Profiles



Source: Guidehouse analysis

Figure 33 provides the estimated average annual conservation impact by segment—that is, the overall net energy impact after accounting for the offsetting effects in the various TOU periods. As noted previously, caution should be exercised when interpreting the estimated outcomes for segments with very small sample sizes. In particular, the very small number of EV customers, and the highly variable loads of such customers must be considered carefully when reviewing their estimated impacts.

Figure 33. Conservation Impact by Segment



Source: Guidehouse analysis

On average, most participants in Missouri Metro achieved meaningful energy savings because of their participation in the study, although overall savings tended to be lower in the Missouri West jurisdiction. EV participants appear to deliver meaningful net increases in overall energy consumption, particularly in Missouri West. This finding is consistent with that of a recent evaluation of an overnight TOU rate targeted to EV customers in Ontario,[6] which estimated participation in the overnight TOU pilot increased overall average participant demand by 0.12 kW, or more than 1,000 kWh per year. Guidehouse, in its meta-analysis of the suite of TOU pilots deployed by Ontario's regulator (the Ontario Energy Board) hypothesized[7] that this net increase could be due to participants shifting some daytime public or workplace EV charging to home charging overnight to take advantage of the low super off-peak price.[8]

3.1.3 Coincident Peak Demand Impacts, Overall and by Segment

In addition to TOU period impacts, Guidehouse estimated the average impact of the TOU rate at the time of monthly system peak demand, the coincident peak demand impacts. Although a TOU rate is not in itself a tool for targeting coincident peak demand impacts (because periods of peak demand may—and in the winter frequently do—fall outside of the on-peak hours), it may

[6] See Table 60 of Alectra Utilities with its partner BEWorks, *Regulated Price Plan Pilot – Final Report*, August 2020, **https://www.oeb.ca/sites/default/files/Alectra-RPP-roadmap-12-Month-Report-20200831.pdf.**

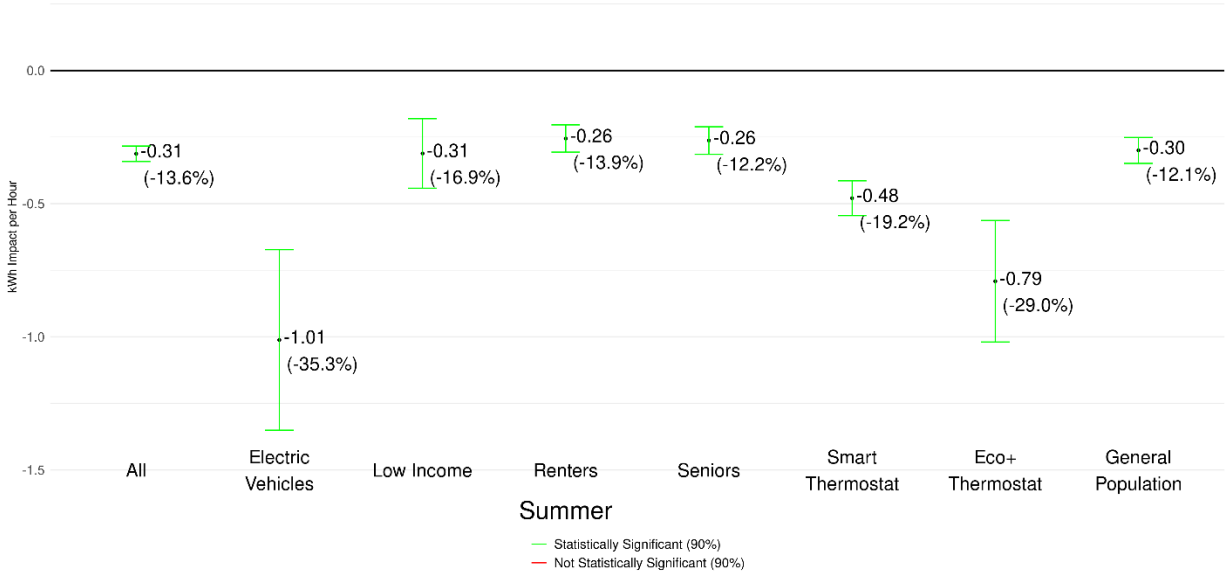
[7] Guidehouse, *Regulated Price Plan Pilot Meta-Analysis*, prepared for the Ontario Energy Board, December 2020, **https://www.oeb.ca/sites/default/files/report-RPP-Pilot-Meta-Analysis-20211110.pdf.**

[8] An alternative or additional contributing, factor could be some correlation between the acquisition of an EV and enrollment on the TOU rate—if a material number of participants enrolling in this rate are doing so shortly after acquiring an EV, the increase in consumption that is a result of EV acquisition could be attributed by the regression model to a TOU response. While Guidehouse acknowledges this could be a contributing factor, the overall average estimated increase in consumption is much smaller than would be expected as a result of an EV acquisition. The incremental 887 kWh per year estimated for Missouri West would be equivalent to approximately 3,500 vehicle miles traveled for most EVs, far less than the average American driving distance in a year.

deliver coincident peak demand impacts when the periods of peak demand fall in TOU periods in which participants are incented to reduce consumption (i.e., the on-peak period).

Figure 34 and Figure 35 show the average coincident peak demand impacts during the summer months for participants in Missouri Metro and Missouri West jurisdictions (respectively). As may be seen from these plots, the average summer coincident peak demand impact for all participants in Missouri West is materially lower than the average on-peak impact for all participants in the same jurisdiction, whereas the summer coincident peak demand impact is higher than the average on-peak demand impact for Missouri Metro. Although not conclusive, this does suggest that participants in Missouri Metro may rely more on air conditioning as a response strategy to TOU since, in that case, impacts would be strongly correlated with increases in temperature, and summer system peaks are typically observed on the hottest days of the year.

Figure 34. System Coincident Peak Demand Impacts by Segment – Missouri Metro, Summer



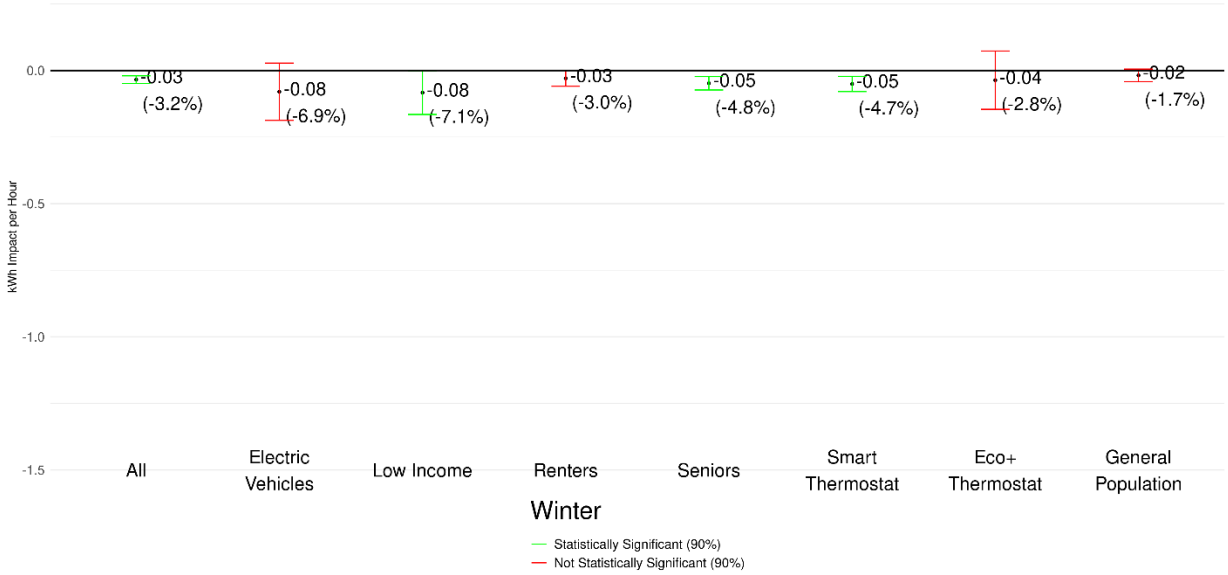
Source: Guidehouse analysis

Figure 35. System Coincident Peak Demand Impacts by Segment – Missouri West, Summer

Source: Guidehouse analysis

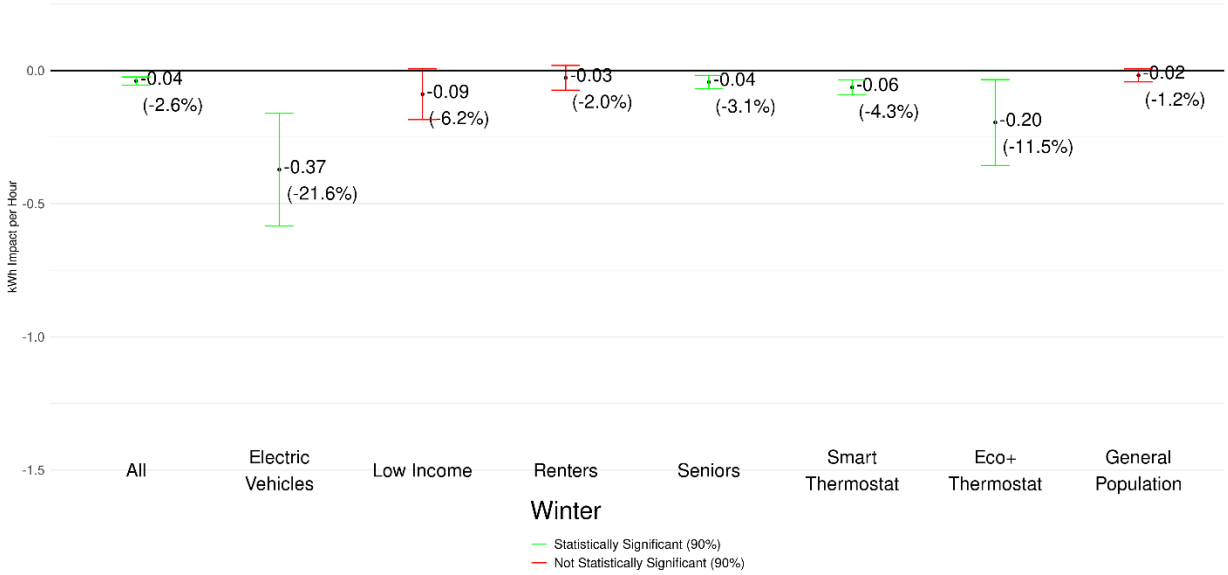
Figure 36 and Figure 37 show the estimated coincident peak demand impacts in the winter months. As noted previously, participant response during system peak times will be driven by the timing of those peaks—when system peaks occur during the on-peak period, estimated coincident peak demand impacts tend to be higher than when system peaks occur in other lower priced periods. In October through May, beginning October 1, 2019 through September 30, 2021, only around half of the Missouri West and less than half of the Missouri Metro winter peaks actually fell during the on-peak period. In contrast, nearly all the Missouri West system peak demands in June through September fell in the on-peak period and two-thirds of the Missouri Metro system peak demands in June through September fell in the on-peak period.

Figure 36. System Coincident Peak Demand Impacts by Segment – Missouri Metro, Winter



Source: Guidehouse analysis

Figure 37. System Coincident Peak Demand Impacts by Segment – Missouri West, Winter



Source: Guidehouse analysis

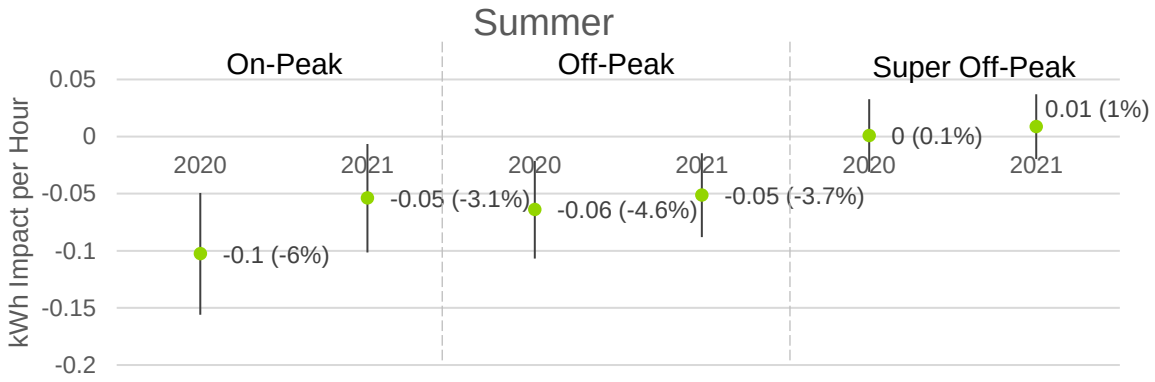
3.1.4 Persistence Impacts by Region

The purpose of the persistence analysis is to understand to what degree the behavioral response to TOU rates has changed over the analysis period. Because there is ongoing program enrollment and attrition, a simple comparison of impacts in 1 year with another would be inappropriate; the underlying customer sample has changed over that time, and a simple

comparison of the impacts in the two periods could be confounded by the different customer types joining the program. To control for this factor, Guidehouse selected a sub-sample of participants that enrolled relatively early in the program and, as of the end of September 2021, had not yet exited the program. Impacts were estimated for this group of customers in an early period (2020) and a later period (2021), and the results compared.

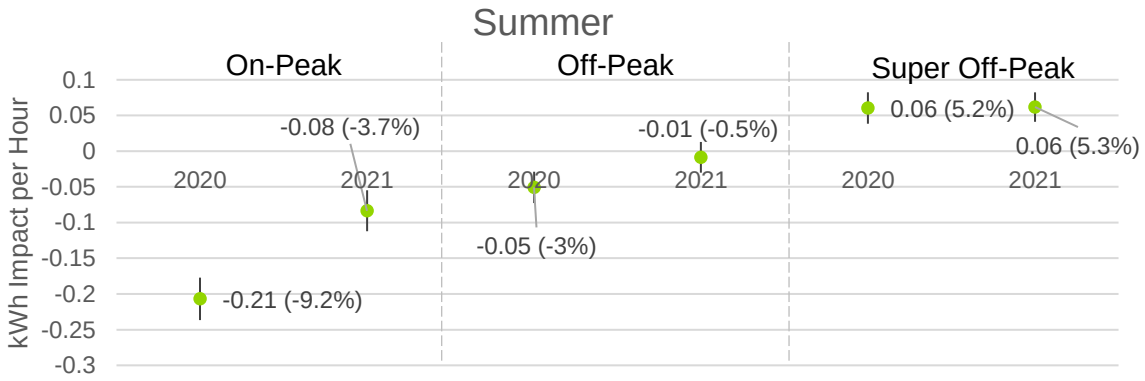
Figure 38 and Figure 39 show the estimated summer impacts by TOU period and year for the cohort of participants included in this analysis in the Missouri Metro and Missouri West jurisdictions, respectively. These estimated values demonstrate that this group of participants contributed lower reductions in the summer of 2021 than the summer of 2020. The cause of the reduced impacts is unknown, but the magnitude of the change suggests it is behavioral (and not, for example, the result of a hotter summer in 2020). With only 2 years of historical data on which to draw, it is impossible to identify whether this change in impacts is simply a one-time adjustment (e.g., as participants become more familiar with the magnitude of the bill impacts they can expect as they change their behavior) or whether it marks a trend of TOU impacts falling over time.

Figure 38. TOU Period Impact Persistence – Missouri Metro, Summer



Source: Guidehouse analysis

Figure 39. TOU Period Impact Persistence – Missouri West, Summer



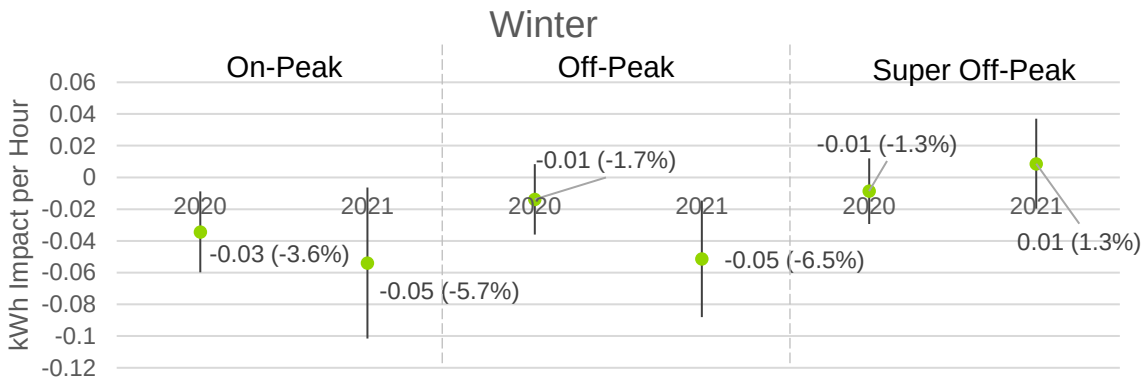
Source: Guidehouse analysis

Figure 40 and Figure 41 show the estimated summer impacts by TOU period and year for the cohort of participants included in this analysis in the Missouri Metro and Missouri West

jurisdictions, respectively. As in the summer months, these outputs indicate a clear erosion of estimated on-peak impacts over time.

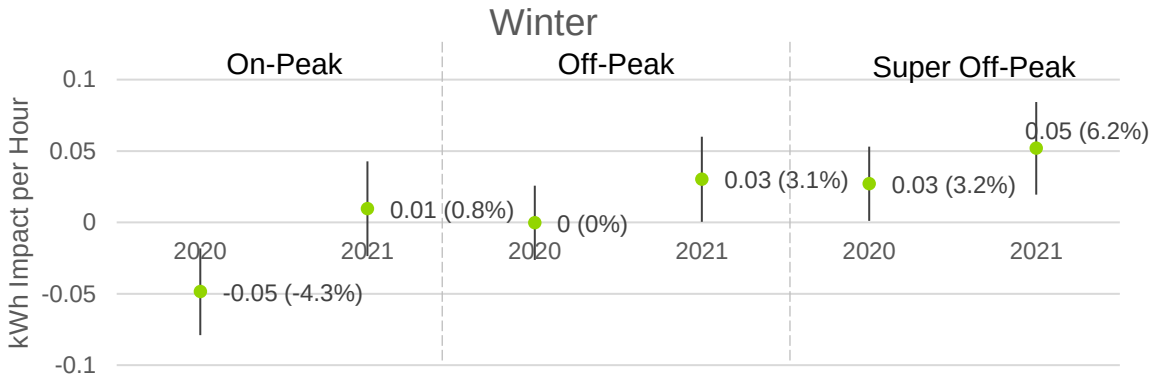
As with the summer, the cause of this reduction is unknown but may be related to a growing participant awareness of the value of certain TOU response actions over time. For example, for Missouri Metro in the summer, the average 2020 on-peak impact was a 0.1 kW reduction (see Figure 38). Given that the average winter season will include approximately 680 on-peak hours, this would deliver an overall reduction in on-peak energy of only approximately 68 kWh, which, at $0.266 cents per kWh would mean approximately a total winter bill reduction (spread across multiple bills) of a little less than $20. Such savings would likely be imperceptible to most customers, particularly if they are also offset by bill increases due to increased usage during the overnight super off-peak and could result in a reduced level of effort by participants to respond to the TOU prices.

Figure 40. TOU Period Impact Persistence – Missouri Metro, Winter



Source: Guidehouse analysis

Figure 41. TOU Period Impact Persistence – Missouri West, Winter



Source: Guidehouse analysis

3.2 Bill Impacts

This section presents the impacts of the TOU rate on an average participant's electricity bill. This compares the average participant's actual bill in the pre-TOU period to what it would have been in the same period under the TOU rate, accounting for the rate structure changes (i.e., tiered vs. TOU rates) and the associated behavioral changes.

The impact estimates of the TOU rates for each jurisdiction (presented in Section 3.1) were applied to participant pre-TOU consumption values to estimate the average effect of the rate, accounting for the estimated change in behavior motivated by the TOU rate. This series of average participant consumption values in conjunction with the applicable tier prices was used to determine what the average participant's electricity bill would have been under the two rates during the same period. This approach allows for the separation of rate structure and behavioral impacts.

Total monthly bill impacts are presented for each season and on an annual basis. Prior to enrolling in the TOU rate, customers were either on the general residential or residential space heating rate (see Table 12).

During the summer months, the main difference between the general and space heating tiered rate structures are that the general price increases by approximately $0.01 for the final step—over 1,000 kWh. The residential space heating rate is a flat rate during the summer.

Table 12. Residential Tiered Rate

Season	Tier Structure	Metro General Residential ($/kWh)	Metro Residential Space Heating ($/kWh)	West General Residential ($/kWh)	West Residential Space Heating ($/kWh)
Summer	First 600 kWh	0.13511	0.13806	0.10938	0.11927
	Next 400 kWh	0.13511	0.13806	0.10938	0.11927
	Over 1,000 kWh	0.14916	0.13806	0.11927	0.11927
Winter	First 600 kWh	0.12013	0.09703	0.09888	0.09888
	Next 400 kWh	0.07396	0.09703	0.07800	0.06035
	Over 1,000 kWh	0.06561	0.06300	0.07800	0.05005

Source: Evergy residential rate tariffs

In the winter months, rates decline as volume increases, with incremental consumption becoming less and less costly as participants move from tier to tier. Winter rates for space heating customers are substantially discounted in the lowest tier as compared to the standard general residential rate.

Under the TOU rate structure (see Table 13), the on-peak price is more than double any of the tiered rates in summer and winter. The off-peak rate is lower than the tiered rate in the summer but slightly higher than the second and third tier in the winter, especially for the space heating tiered rate. The super off-peak rate is lower than any tiered rate in any season.

A customer's aggregate consumption level also plays a role in overall bill impacts. Customers who have low levels of consumption typically have limited potential for further behavioral changes (shifting or reducing consumption) as compared to other customers who have higher levels of overall consumption.

Table 13. TOU Rate Structure

Season	TOU Period	Metro Price ($/kWh)	West Price ($/kWh)	Time Period
Summer	On-Peak	0.32498	0.26577	4 p.m.-8 p.m. weekdays, excl. holidays
	Off-Peak	0.10833	0.08859	All other hours
	Super Off-Peak	0.05416	0.04429	12 a.m.-6 a.m. every day
Winter	On-Peak	0.26575	0.21629	4 p.m.-8 p.m. weekdays, excl. holidays
	Off-Peak	0.10422	0.08727	All other hours
	Super Off-Peak	0.04495	0.03667	12 a.m.-6 a.m. every day

Source: Evergy residential rate tariffs

The following subsections present the total bill impacts at the monthly level and a more detailed analysis of what comprises the total monthly bill savings. The bill impact calculations only consider the volumetric price of electricity and do not factor in fixed charges or rate riders.

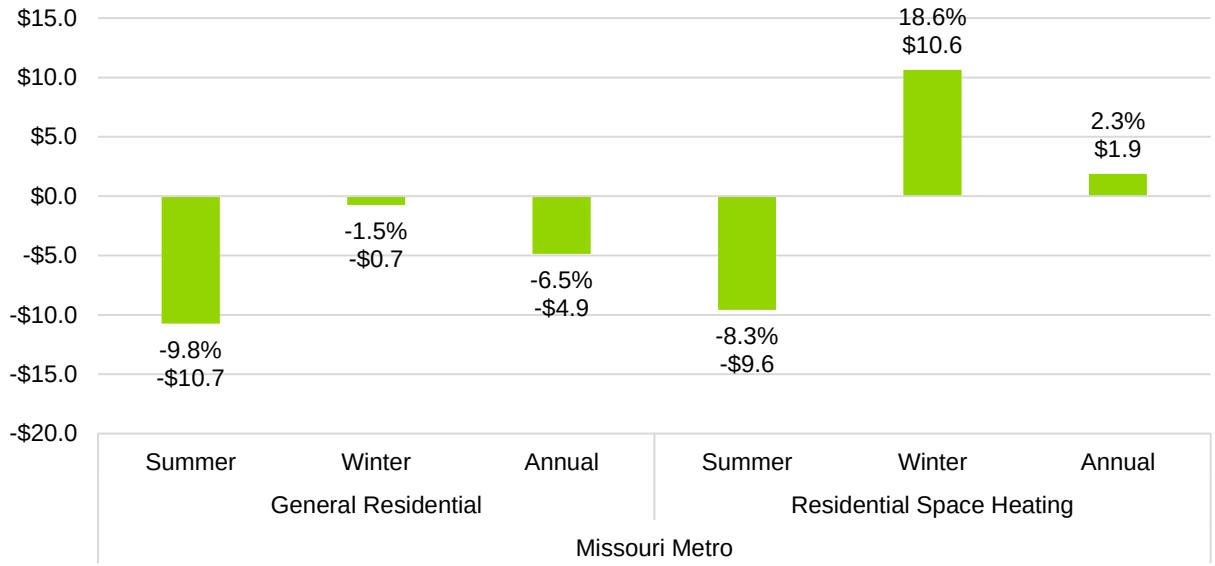
3.2.1 Total Monthly Bill Impacts

Figure 42 and Figure 43 present the monthly bill impacts on an average participant bill for each season and on an annual basis for the Missouri Metro and Missouri West jurisdictions, respectively. Given that participants can be on one of two tiered rates prior to enrolling, bill impacts are separated based on the tiered rates for each jurisdiction. The composition of these bill savings is discussed in Section 3.2.2.

The average participant saves approximately 7%-10% on their bills during the summer season. During the winter months, the average general residential participant sees a slight decrease on their bills, while the average residential space heating participant sees an increase. On an annual basis, impacts range from a 2.3% increase (Missouri Metro, residential space heating customers) to a 6.5% decrease (general residential customers). In reviewing the following plots and seasonal bill reductions and increases, note there are twice as many winter months as summer months; this means the average monthly winter bill impacts have a commensurately larger impact on the overall annual average change in bill impacts.

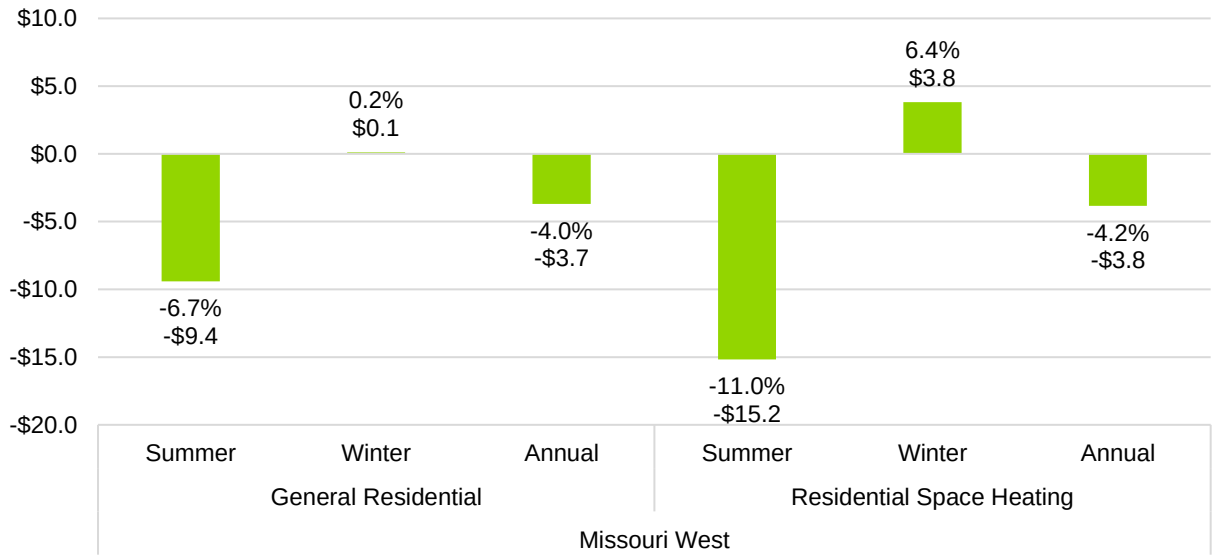
Overall, average monthly bill impacts over the course of a year are quite small, with an average monthly bill reduction for general residential customers in Missouri Metro barely exceeding $5 per month, or approximately 6%, and an average monthly bill reduction for general residential customers in Missouri West being an average approximately $3.55 or almost 4%.

Figure 42. Total Monthly Bill Impacts of TOU Rates – Missouri Metro



Source: Guidehouse analysis

Figure 43. Total Monthly Bill Impacts of TOU Rates – Missouri West



Source: Guidehouse analysis

3.2.2 Composition of Bill Impacts

Two key factors determine the impact of TOU rates on a customer's bill:

1. Rate Structure Impact

This refers to changes in the rate structure (i.e., moving from a tiered rate that is based off total monthly consumption to a TOU rate that charges customers based on the hour of the day in which they consumed electricity). The rate structure impact is a comparison of the average pre-

pilot customer bill under the tiered rate to what it would have been in the same period under the TOU rates had the customer not changed their behavior in response to the TOU rate.

2. Behavioral Impact

This refers to the behavioral changes that the TOU rates induce—for example, shifting consumption from the high priced on-peak period to the lower priced super off-peak period. The magnitude of changes in terms of kWh (see Section 3.1) in each season determine the impact on a customer's bill.

The total bill impacts presented previously factors in the rate structure and behavioral impacts. Figure 44 through Figure 47 break down the rate structure and behavioral bill impacts for the Missouri Metro and Missouri West jurisdictions for the general residential and residential space heating tier rates for the average participant.

During the summer, approximately half of the total bill savings are achieved due to the change in the rate structure in both jurisdictions for the general residential and residential space heating rates. This is because the off-peak and super off-peak rates in the summer are lower than the tiered rates so even without any behavioral changes, customers save money during those periods. Although the on-peak rates in summer are much higher than the tiered rates, these apply only to a relatively small number of hours.

During the winter months, the rate structure impact for the average participant on the general residential rate is small in both jurisdictions. However, for the average participant on the residential space heating rate, the structural impact accounts for the majority of the bill increase.

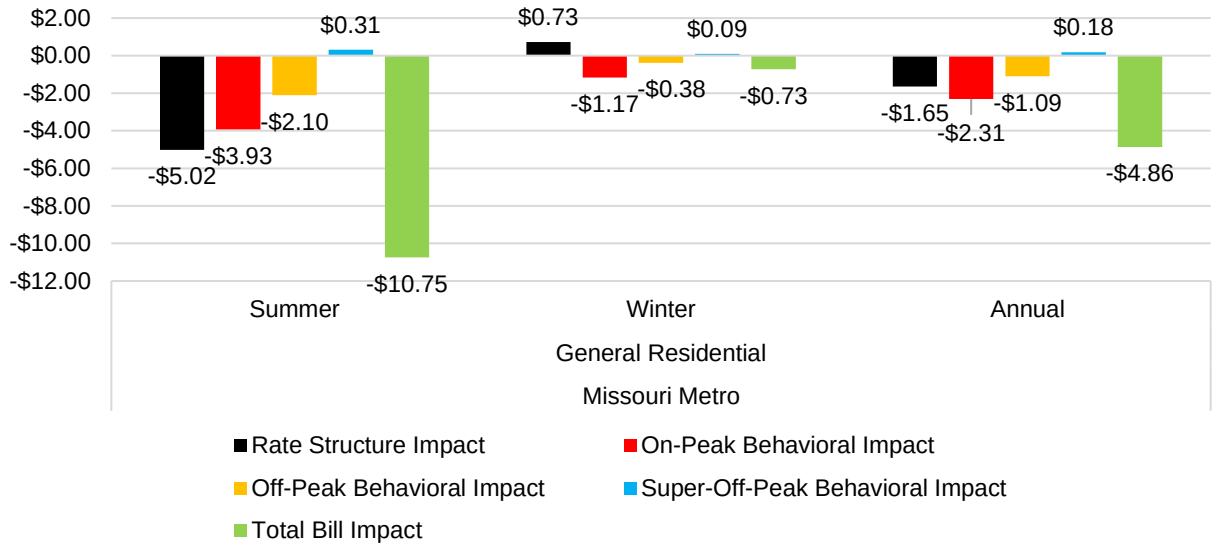
The winter residential space heating rates are lower than the TOU on-peak and off-peak rates, so the two periods together account for the majority of hours in a day or week. The higher the winter loads on the space heating rate, the higher the structural impact.

Generally, the impacts of the rate structure are quite low on an annual basis as would be expected of a rate designed for revenue neutrality under the assumption of no behavior change. The notable exception to this is the bill impact due to the change in rate structure for the residential space heating customers in Missouri Metro, where there appears to be a substantial rate structural winter bill impact; this impact is driven by the winter TOU off-peak rate for these customers being higher than even the highest cost tier rate.

The remainder of the bill impacts are due to behavioral impacts. On-peak behavioral changes account for the majority of these bill impacts. Some savings are achieved during the off-peak period, but these tend to be quite small because the estimated average demand reductions are lower in that period, as are the rates.

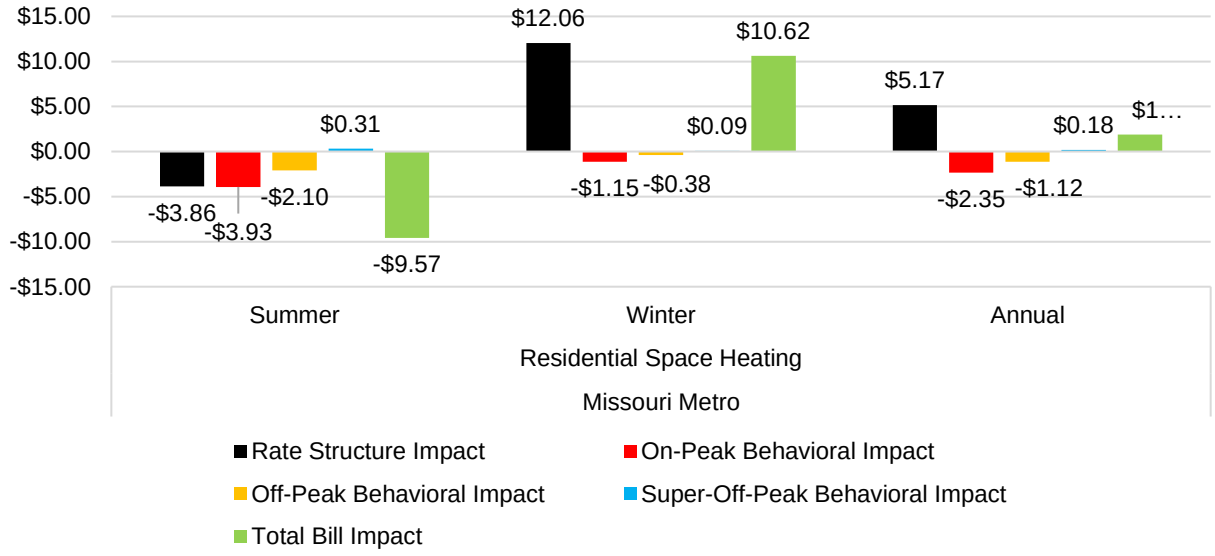
In summary, the summer bills experience a notable reduction as the structural impacts and behavioral impacts result in savings. The average TOU participant previously on the general residential rate sees modest bill savings during the winter, driven mainly by behavioral changes. However, the average TOU participant previously on the residential space heating rate sees an increase on their winter bills that is driven primarily by structural changes that are high enough to offset any savings from the behavioral changes.

Figure 44. Composition of Bill Impacts – Missouri Metro, General Residential



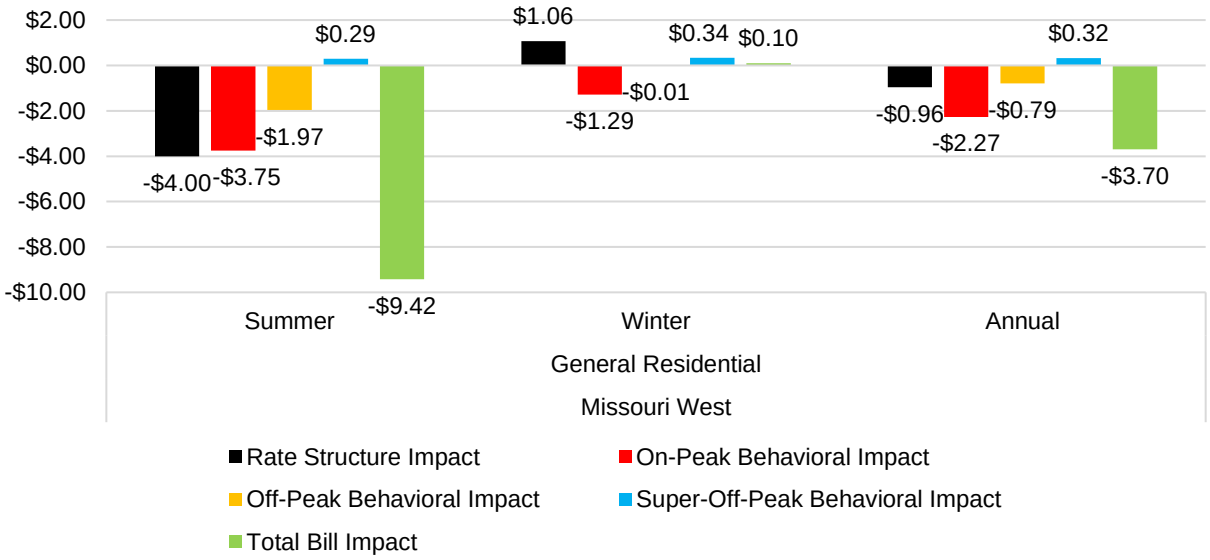
Source: Guidehouse analysis

Figure 45. Composition of Bill Impacts – Missouri Metro, Residential Space Heating



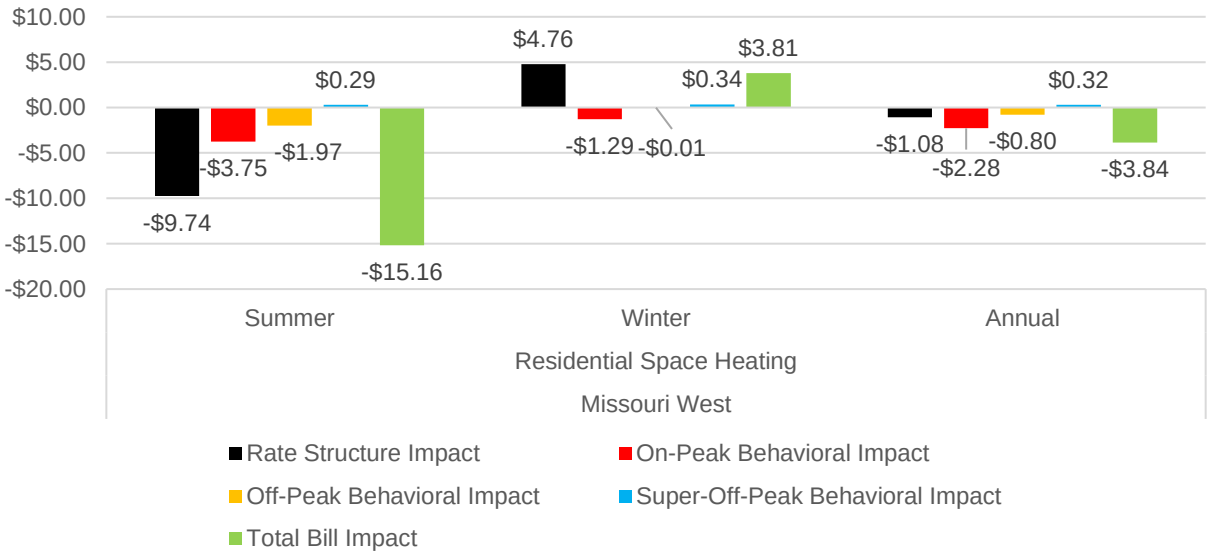
Source: Guidehouse analysis

Figure 46. Composition of Bill Impacts – Missouri West, General Residential



Source: Guidehouse analysis

Figure 47. Composition of Bill Impacts – Missouri West, Residential Space Heating



Source: Guidehouse analysis

Evergy's Stipulation Agreement specifies that Evergy must demonstrate that customer enrollment in the TOU rate is not driven entirely by customers whose load profiles enable them to realize windfall gains by simply transferring to the TOU rate without effecting any additional changes in behavior. Such a situation would be easily identifiable in the results of Guidehouse's evaluation: if customers only enrolled in the program in anticipation of windfall gains without any intention to undertake behavioral changes, the evaluation would report material bill impacts without any commensurate TOU period energy impacts. In fact, as shown in this report, participants in nearly all segments in both jurisdictions demonstrated behavioral response to the TOU pricing in line with the incentives it provides, specifically: average reductions in

consumption during the highest price on-peak periods. Enrolled participants have exhibited behavioral response to the TOU rates in line with the incentives embedded in that rate.

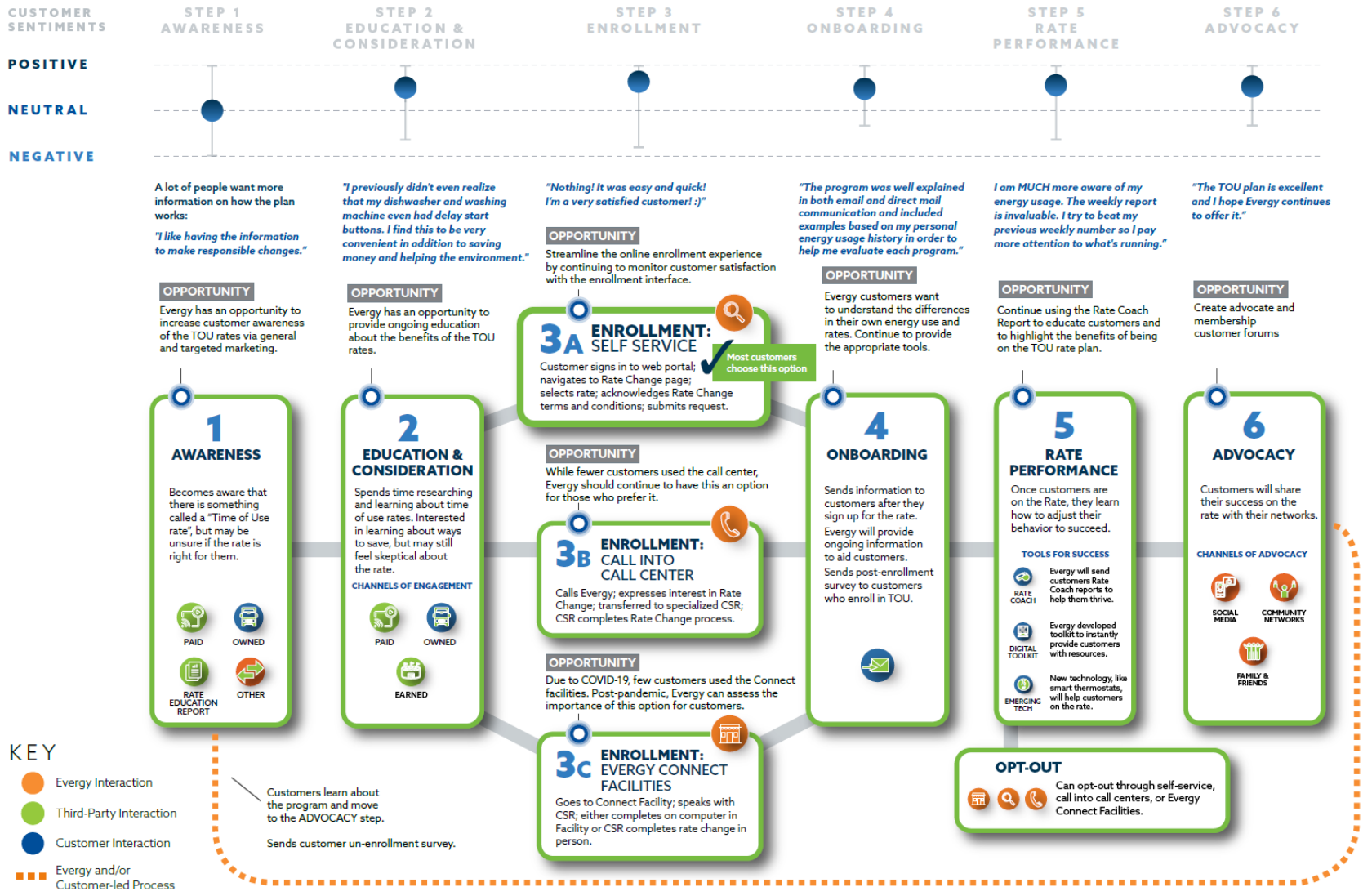
3.3 Journey Map and Customer Research Summary

The Guidehouse team presents the customer research findings along the phases of the customer journey. These six customer journey phases were identified before the launch of the rate plan as the likely journey through which customers would experience the rate plan. The team created the customer journey map depicting these phases and potential areas of customer satisfaction and opportunities for improvement before the start of the rate plan. This expected customer journey was based on customer feedback (focus groups, interviews, surveys) collected during the rate plan development phase. During a July 2021 interview with the program manager, the Guidehouse team confirmed these phases still accurately represent the implemented rate plan:

1. Awareness
2. Education and Consideration
3. Enrollment
4. Onboarding
5. Rate Performance
6. Advocacy

This section summarizes the customer research that informed the development and update of the customer journey map.

Figure 48. Customer Journey Map



Source: Guidehouse team

3.3.1 Awareness

During the Awareness phase, customers hear about the TOU rate plan and decide whether to learn more. Most participants became aware of the TOU rate plan through Evergy's targeted outreach. This outreach included a general recruitment letter or postcard, a rate comparison letter, and an email (66%). Almost a quarter of participants (23%) learned about the pilot through Evergy's website. Few (6%) learned about the rate plan through word of mouth, social media, or radio.

Table 14. How Customers First Heard About TOU Rate Plan

Channel	Percentage
Email	23%
Website	23%
Rate comparison letter	22%
Letter/postcard	21%
Family, friends, or neighbors	3%
Social media	2%
Radio	1%

Source: Enrollment survey, Q8 (n=1,612)

3.3.2 Education and Consideration

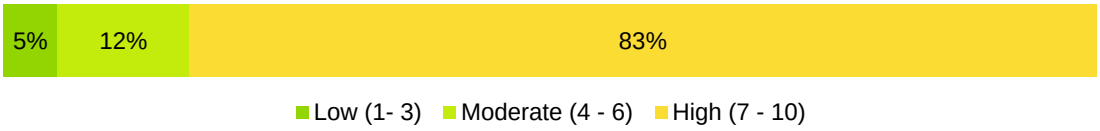
After initially learning about the TOU rate plan, customers may spend more time researching and learning. Participants consulted materials (online tools, emails, and rate comparison reports) to make their decision. Customers found these tools easy to use, and many customers reported the rate comparison tool had a high influence on their decision to participate. Ultimately, most customers were motivated to sign up by the opportunity to save money.

3.3.2.1 Education Materials

About half of participants recalled seeing or using the rate comparison tool (51%, n=1,602). The rate comparison tool lets customer compare their rates under different rate plans. About three-quarters of those participants that recalled the rate comparison tool said it had a high influence on their decision to enroll (75%, n=773), 16% said that it had a moderate influence, and 10% noted it had a low influence.

Most enrollment survey respondents (83%) thought the materials about the available rate plans, such as online tools, emails, and rate comparison reports, were helpful in making a decision and easy to understand (see Figure 49). A small percentage of respondents (5%) thought the materials were not helpful or easy to understand.

Figure 49. Helpfulness of Materials to Make a Decision



Source: Enrollment survey, Q7 (n=1,647)

Renters, non-seniors, and higher income customers found materials easier to understand than their counterparts (see Table 15), though there were no differences in the ratings about the helpfulness of the materials.

Table 15. Ease of Understanding Materials by Group

Group	Agreed (4-5)	Neutral (3)	Disagreed (1-2)
Ownership*			
Owners (n=1,129)	81%	6%	13%
Renters (n=424)	88%	4%	8%
Others (n=26)	81%	4%	15%
Income†			
Below $60,000 (n=632)	82%	6%	10%
Between $60,000 and $100,000 (n=336)	81%	5%	13%
More than $100,000 (n=216)‡	87%	2%	11%
Age			
Seniors (above 62) (n=462)§	77%	7%	16%
Not seniors (under 62) (n=1,088)	85%	5%	10%

* Significantly different from renters at p-value <.001.

† 378 participants preferred not to answer this question.

‡ There is a statistically significant difference between higher and moderate income customers at p-value <.05.

§ Seniors found materials less easy to understand than non-senior customers (p-value <.001).

Source: Enrollment survey, Q7, Q18, Q21, Q23 (n=1,589)

3.3.2.2 Motivations for Enrolling

Customers were motivated to sign up for the TOU rate plan by the opportunity to save money (see Table 16). Of enrollment survey respondents, 94% identified saving money as one of their reasons to sign up for the rate plan. One-third or fewer respondents gave other reasons such as environmental benefits (34%), electric grid stability (27%), and to have a choice of rate plans (10%). Relatively few customers (16%) signed up because they are not home during peak times.

Table 16. Motivations for Enrolling

Motivation	Percentage
Save money on my electric bill	94%
It would help the environment	34%
It would make the electric grid more stable for everyone	27%
I am rarely home between 4 p.m. and 8 p.m. weekdays so TOU is a good fit for my lifestyle	16%
I wanted to switch rate plans	10%
I own an EV and this TOU rate plan allows me to charge it at a cheaper rate	3%
My neighbors or someone I know also made the change	2%

Source: Enrollment survey, Q9 (n=1,589)

3.3.3 Enrollment

Customers who decide to participate move on to the Enrollment phase. The TOU rate plan exceeded the stipulated enrollment goal of 1,750 customers per jurisdiction by the end of 2020. Evergy offers a simple website where customers can easily switch between rate plans. The process is fully automated with no manual adjustments needed, and the new plan takes effect the next business day. Most customers used the online enrollment options, found enrollment to be quick and easy, and gave high satisfaction ratings.

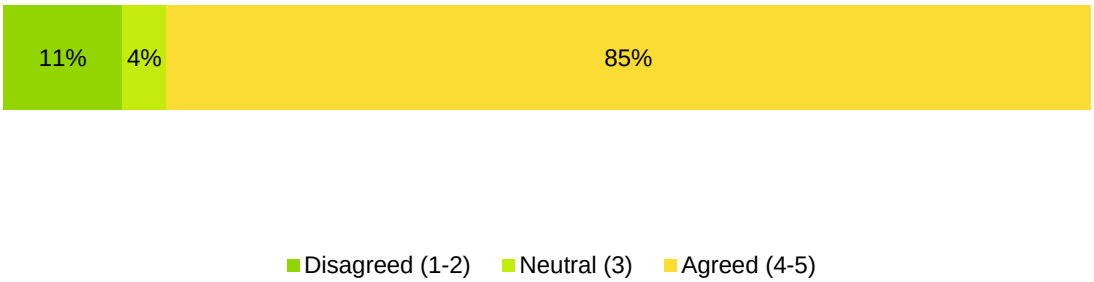
3.3.3.1 Enrollment Method

In the original TOU rate plan, customers had three options for enrolling: online, phone call, or in-person. However, due to the COVID-19 pandemic, the Evergy Connect in-person facilities were closed throughout 2020. Most TOU participants enrolled online (92%), while a few enrolled by calling customer service (7%) (n=1,628).

3.3.3.2 Enrollment Satisfaction

Most participants agreed that the enrollment process was quick and easy (85%); a few disagreed (11%) or were neutral (4%) (see Figure 50).

Figure 50. Percentage of Participants that Thought the Enrollment Process was Quick and Easy



Source: Enrollment survey, Q4 (n=1,627)

Renters were more likely to find the process easy—92% of renters thought it was quick and easy (n=424) compared to 83% of owners (n=1129). Differences between other groups were not significant (see Table 17).

Table 17. Ease of Enrollment Process by Group

Group	Agreed (4-5)	Neutral (3)	Disagreed (1-2)
Ownership			
Owners (n=1,129)	83%	4%	13%
Renters (n=424)*	92%	2%	6%
Others (n=26)	73%	19%	8%
Income†			
Below $60,000 (n=632)	87%	4%	9%
Between $60,000 and $100,000 (n=336)	85%	3%	13%
More than $100,000 (n=216)	88%	3%	9%
Age			
Seniors (above 62) (n=462)	79%	6%	15%
Not seniors (under 62) (n=1,088)	77%	7%	17%

* Statistically significantly different at p-value <.001.

† 378 participants preferred not to answer this question.

Source: Enrollment survey

Most TOU rate pilot participants were highly satisfied with the TOU rate enrollment process, with 91% rating it a 7-10 on a 10-point scale (n=1,628). When asked about what changes could be made to the process to make it better, most respondents either did not answer or indicated no changes. A few customers who offered suggestions needed more information about the plan and comparisons between plans (see Table 18).

Table 18. Enrollment Process Improvement Suggestions

Enrollment Improvement Suggestion	Number of Times Suggested
Need more information about the plan, rates, and comparison between plans and rates	40
Send email confirmation after enrollment	10
Improve website functionality	5
Need better transition from budget billing	5

Source: Enrollment survey, Q5 (n=1,627)

3.3.4 Onboarding

During the Onboarding phase, customers become acclimated to the TOU rate plan, using materials from Evergy and making changes to their energy use behaviors based on cost, comfort, and household needs. Enrollees found the Rate Coach reports and hourly data available online to be most helpful. Most enrollees reported existing strategies they use to manage energy use and that they place a high priority on managing the cost of their electric bill.

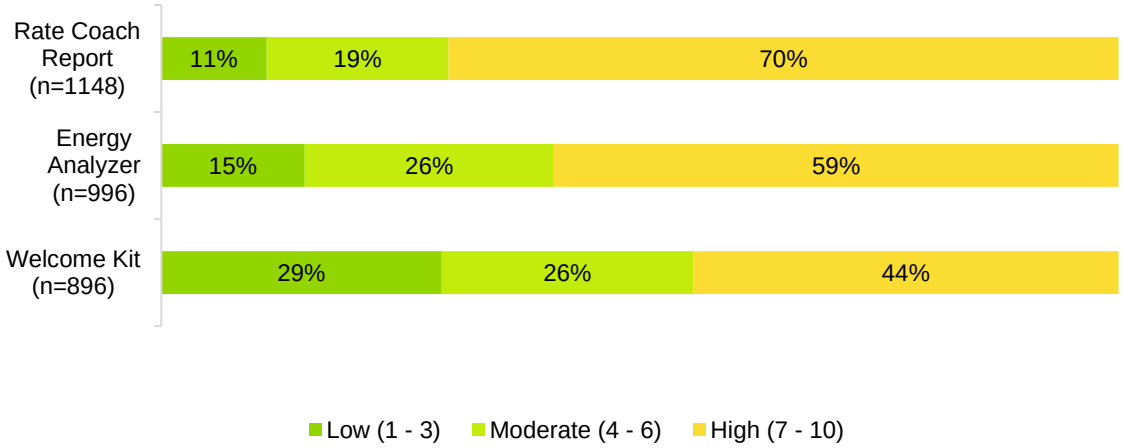
3.3.4.1 TOU Rate Plan Tools

Evergy provided several tools for customers to learn about and be successful on the TOU rate plan:

- **Welcome kit:** Customers who enrolled online received an emailed confirmation of enrollment and what to expect next. Through 2020, Evergy sent a direct mail welcome kit within a week of enrollment; the kit included paper with information on the plan, key information to reference about the plan, pricing, and a dishwasher magnet. The kit was discontinued as Evergy research showed that customers were not recalling the kit or making use of it.
- **Rate Coach report:** Customers with an email on file are automatically enrolled in the Rate Coach report within 14 days of enrolling in the TOU rate plan. The Rate Coach report is a weekly coaching email that goes to customers that includes key information and visuals on TOU and helps customers continue to succeed on the plan.
- **Energy Analyzer:** This is an online dashboard that customers can visit to see graphics displaying their energy use each hour.

Participants found the Rate Coach report to be most useful (70%). Fifty-nine percent found the Energy Analyzer available online very useful, and 44% found the welcome kit (letter and magnet) very useful.

Figure 51. Usefulness of TOU Rate Plan Tools



Source: Behavior survey, Q12a, b and c

The behavior survey also asked respondents to rate the usefulness of the hourly usage at Evergy.com, another way of describing the Energy Analyzer. Of participants, 25% had never used this tool while 25% used it more than 6 times. Fifty percent of customers used it between 1 and 5 times (see Table 19). Almost 70% of customers thought the hourly usage at Evergy.com was very useful in managing energy use (69% rated it a 7-10 on a 10-point scale, n=1,200).

Table 19. Frequency of Access to Hourly Usage at Evergy.com

Frequency	Count	Percentage
None	331	25%
1-2 times	354	27%
3-5 times	311	24%
6+ times	324	25%
Total	**1,320**	**100%**

Source: Behavior survey, Q13

3.3.4.2 Energy Behaviors

Prior to enrolling in the TOU rate plan, the most frequent energy-saving behaviors that participants engaged in were turning off unnecessary lights (98%) and running the dishwasher and clothes washer only when full (88% and 86%, respectively). The least frequent behaviors they engaged in were unplugging electronic equipment (43%) and air-drying laundry (45%). (see Table 20).

Almost all participants had central air conditioning (93%), 39% had a smart washing machine, 38% had a smart thermostat, and 25% had a smart dishwasher. Only 4.5% had an EV and 2% had a battery storage system.

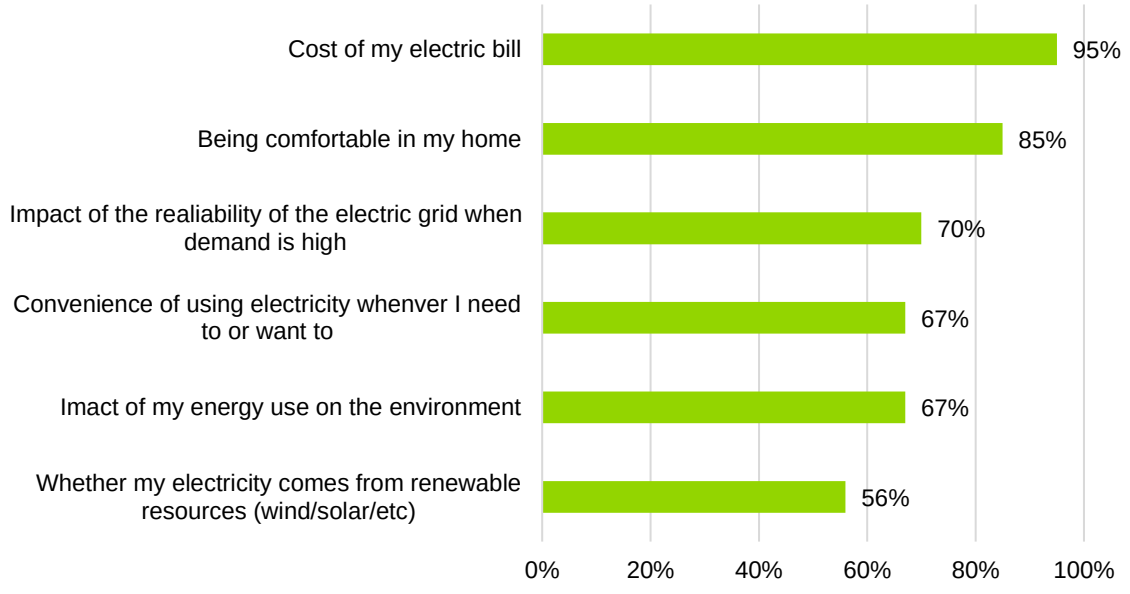
Table 20. Behaviors Currently Doing to Save Energy

Behavior	Percentage
Turn off unnecessary lights	98%
Only run the dishwasher when full	88%
Adjust thermostat settings when no one is home	86%
Only run the clothes washer with full loads	86%
Keep thermostat settings low when heating my home	86%
Reduce the amount of sunlight entering my house in the summer	84%
Maximize the amount of sunlight entering my home during winter months	83%
Turn off electronic equipment when not in use	82%
Use only CFLs and LEDs in your light fixtures	76%
Keep thermostat settings high when running my air conditioning	74%
Typically wash clothes in cold water	67%
Minimize the length of showers	58%
Air dry some or all my laundry	45%
Unplug electronic equipment when not in use	44%

Source: Enrollment survey, Q14 (n=1,576)

At the time of enrollment, the most important considerations when making decisions about electricity usage were the cost of the electricity bill and being comfortable at home (see Figure 52).

Figure 52. Primary Considerations when Using Electricity



Percentage of participants who rated the importance of each consideration as a 4 or 5 on a Likert-type scale from 1 to 5.

Source: Enrollment survey, Q13

3.3.5 Rate Performance

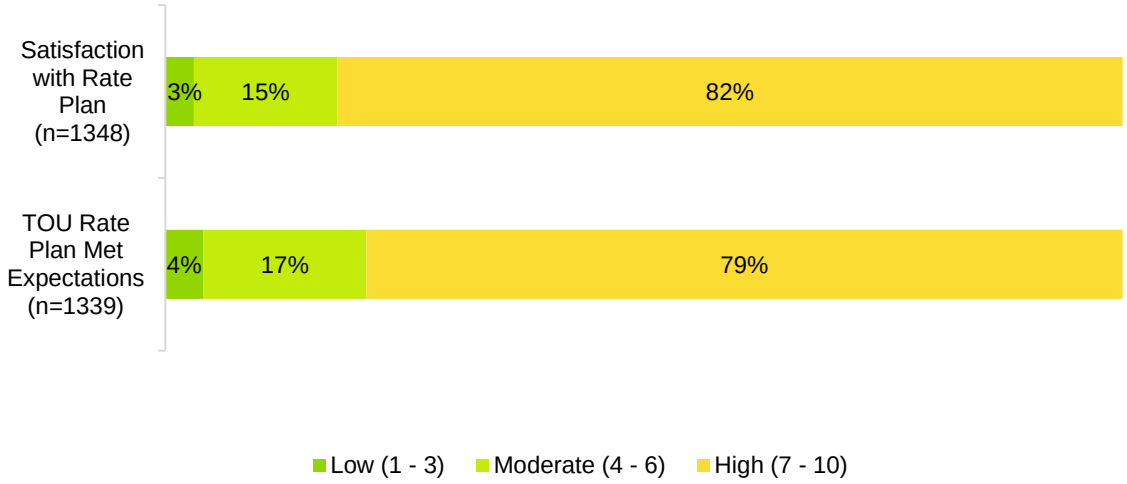
During the Rate Performance phase, customers integrate energy management behaviors into their lives, continue to track the impact on their bills, or decide to unenroll. Customers expressed high levels of satisfaction with the TOU rate plan and generally found it easy to shift behaviors such as clothes washer/dryer and dishwasher use; customers were divided on whether they could shift stove or oven use. Notably, EV owners were successful in shifting their charging times away from peak periods to off-peak periods.

Among customers who unenrolled from the plan and responded to the survey, about 40% reported concern over the impact on bills, while 30% reported unenrolling because they moved. About one-third of unenrolled customers expressed interest in re-enrolling if they could experience bill savings while on the plan.

3.3.5.1 TOU Rate Plan Satisfaction

Most customers were highly satisfied with the TOU rate plan[9] (82%). Similarly, most customers (79%) thought the TOU rates met their expectations very well (see Figure 53). Moderate income customers were more satisfied than higher or lower income customers (see Table 21).

Figure 53. Satisfaction with TOU Rate Plan



Source: Behavior survey Q1, Q3

[9] Rating of 7-10 on a Likert-type scale from 1 to 10.

Table 21. Satisfaction with TOU Rates by Group

Group	High (7-10)	Moderate (4-6)	Low (1-3)
Income*			
Below $60,000 (n=478)	81%	14%	4%
Between $60,000 and $100,000 (n=265)†	87%	15%	3%
More than $100,000 (n=242)	82%	19%	3%
Age			
Seniors (above 65) (n=391)	85%	13%	2%
Not seniors (under 65) (n=900)	81%	15%	4%

*308 participants preferred not to answer this question.

† Moderate income customers are more satisfied than lower and higher income customers (statistically significant at p-value <.05).

Source: Behavior survey

3.3.5.2 Energy Behaviors

Most behavior survey respondents (76%) reported they were highly successful in shifting behaviors outside of the 4 p.m. - 8 p.m. peak period during weekdays. In addition, most customers demonstrated an understanding of how the TOU rate plan works and how to shift their behaviors—71% stated they were aware that weekends and holidays were always off-peak. Similarly, around 75% thought that off-peak pricing during weekends and holidays made it easy to switch behaviors such as doing laundry or cooking; 25% were not sure or thought it did not. Notably, customers were able to change behaviors even though most were home during the peak periods. Around 84% of participants were at home from 4 p.m. to 6 p.m., while 95% of participants were at home from 6 p.m. to 8 p.m.

The behaviors that most customers shifted successfully were using the washer (85%) or dryer (76%) during off-peak times and running the dishwasher (76%) at off-peak times (see Table 22). A little over half of respondents (57%) found it challenging to turn off appliances (coffee pot, TV, etc.) during peak hours (see Table 23). Customers were divided on stove/oven use: 40% felt they could shift that use and 49% felt that use was challenging to shift.

Table 22. Behaviors Successfully Shifted

Behavior	Percentage
Using washer or dryer during Saver or Super Saver times	85%
Running dishwasher during Saver or Super Saver times	76%
Adjusting the thermostat to run less during peak hours	49%
Using the stove/oven less during peak hours	40%
Turning off appliances such as coffee pot, TV, etc. during peak hours	23%

Source: Behavior survey, Q7 (n=1,337)

Table 23. Most Challenging Behaviors to Shift

Behavior	Percentage
Turning off appliances such as coffee pot, TV, etc. during peak hours	57%
Using the stove/oven less during peak hours	49%
Adjusting the thermostat to run less during peak hours	37%
Running dishwasher during Saver or Super Saver times	2%

Source: Behavior survey, Q8 (n=966)

3.3.5.3 Seasonal Differences

For many customers the ease of changing behaviors varies by season: 48% of behavior survey respondents (n=1,309) thought it was harder to shift electricity usage in warmer weather, 28% saw no impact, and 22% thought it was easier. During the 2020 interviews, participants also noted seasonal differences. Some interviewees were concerned about whether they would be able to save money on the TOU rate plan during the summer months. A few said they would try to avoid using their air conditioning during the peak hours, but others had no strategy for alleviating the need for air conditioning from 4 p.m. to 8 p.m.

3.3.5.4 COVID-19 Pandemic

The COVID-19 pandemic also affected customers' ability to shift energy use. During the pandemic, participants suffered several lifestyle changes such as being at home more often than normal (65%) or working from home (39%), as Table 24 shows.

Table 24. Impact of COVID-19 Pandemic

Impact	Percentage
People at home more often than normal	65%
One or more family members working from home	39%
None	25%
Kids homeschooling	14%
Unemployed due to COVID-19	12%
Other	5%

Source: Behavior survey, Q15 (n=1,310)

3.3.5.5 EV Owners

EV owners reported they were able to successfully shift vehicle charging to Super Saver times. Before signing up for the plan, 25% charged their vehicle in this timeframe, and 82% charged their vehicle at this time after signing up for the TOU plan (see Table 25). The portion of customers charging their vehicle during peak times dropped from 30% before enrolling in the TOU rate plan to 2% after enrolling.

Table 25. EV Owners' Charging Behaviors

Behavior	Saver (6 a.m.-4 p.m. | 8 p.m.-12 a.m.)	Super Saver (12 a.m.-6 a.m.)	Peak (4 p.m.-8 p.m.)	Does not charge at home
Before TOU plan	32%	25%	30%	12%
After TOU plan	11%	82%	2%	5%

Source: Behavior survey, Q27 (n=57)

3.3.5.6 Unenrollment

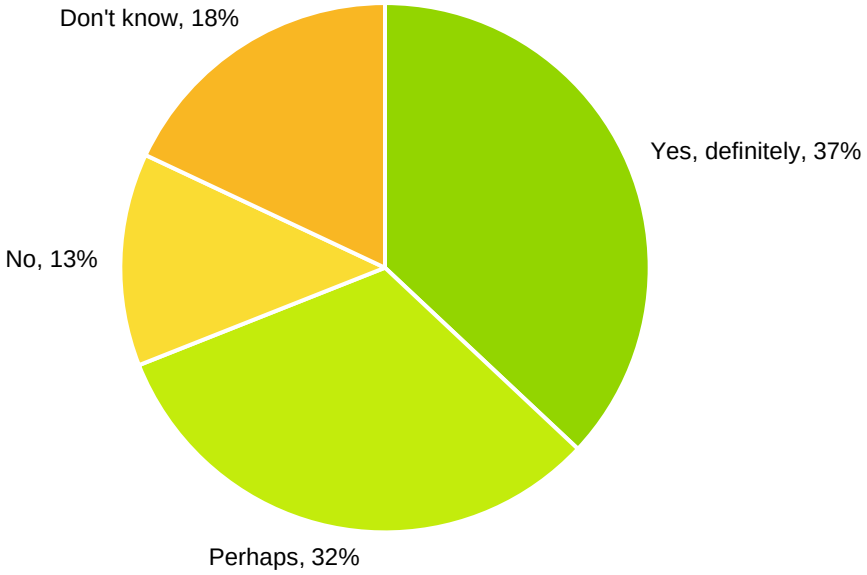
Nearly half of respondents (48%) indicated they dropped from the TOU rate plan for bill-related reasons—either their bill increased (30%), they were concerned that their bill may increase in the future (5%), they did not save as much as they had expected (8%), or they were not sure they were saving money (5%). About 40% of participants changed their plan because they moved to a new residence (30%) or their lifestyle changed (8%).

Among unenrolled customers, 92% had household members at home from 4 p.m. to 6 p.m. This is slightly higher than the TOU participants overall. About 84% of respondents to the behavior survey reported having household members home during that time period. The percentage of customers with household members home from 6 p.m. to 8 p.m. was 95% for both groups.

TOU participants that dropped from the plan believed their family put in a lot of effort to shifting behaviors (82%; score of 7-10 on a Likert-type scale from 1 to 10). The most common behaviors that participants started changing when they signed up for the TOU rates were running the dishwasher during non-peak hours (16%), running the washer and dryer during non-peak hours (15%), and turning off lights when not in use (15%). The hardest behaviors to change, according to survey participants, were shifting the use of the dishwasher to non-peak hours (31%), setting the thermostat to a higher temperature (17%), and shifting oven use to non-peak hours (10%).

Close to 40% of participants thought that if the right changes were made, they would consider switching back to the TOU rate plan (see Figure 54).

Figure 54. Willingness to Switch Back to TOU Rates



Source: Cancellation survey, Q7 (n=213)

About one-third of respondents wanted to see more bill savings as a way to improve the plan. Notably, about a third (32%) did not note any changes that could keep them in the plan (see Table 26)

Table 26. Changes to Keep You in the Plan

Suggestion	Percentage
Have (more) savings, lower bills	33%
Nothing to change	32%
Better information on plan (comparison, rates, tips, etc.)	17%
Change peak time (Peak time is hard, especially in summer)	13%
Other	4%

Source: Cancellation survey, Q5 (n=198)

3.3.6 Advocacy

Customers remaining on the TOU rate plan have a high understanding of the purpose of the plan, experienced a reduction in their energy bills, and are likely to recommend the TOU rate plan to family or friends. Customers appreciate the bill savings from participation. Among those who are less satisfied, making changes to energy use in the 4 p.m. - 8 p.m. timeframe is difficult or customers are not seeing bill savings.

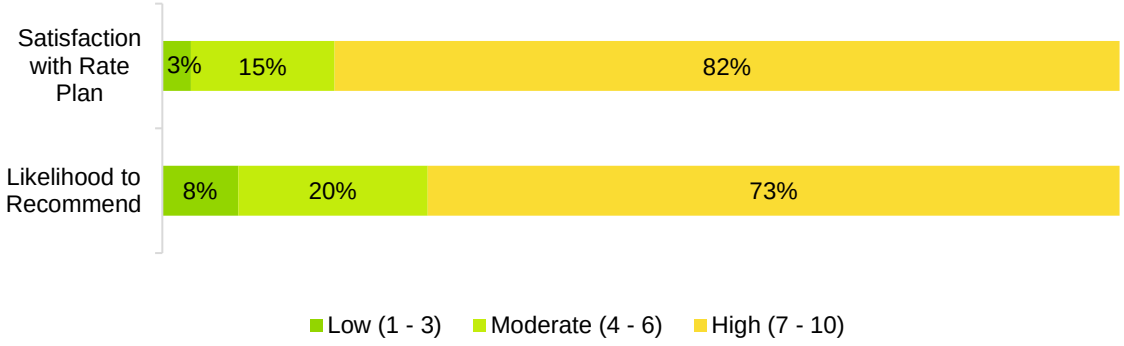
3.3.6.1 Rate Plan Understanding and Impact on Bills

Most respondents to the behavior survey understood that Evergy offered the TOU rate plan to reduce energy usage during the 4 p.m. - 8 p.m. peak demand period (88%, n=1,302) and to provide customers with choices (52%). Only a few thought the purpose was for Evergy to increase profits (17%). Most respondents to the behavior survey saw a decrease in their energy bill (76%, n=1,333) while a few saw an increase (7%) or no change (16%).

3.3.6.2 Participant Satisfaction

Most participants are satisfied with the TOU rate plan (82%) and would recommend it to family or friends (73%) (see Figure 55). Many customers appreciated the optional aspect of the rate plan. If TOU rates were mandatory, 51% of behavior survey respondents said their opinion of Evergy would be much less favorable or somewhat less favorable. One-third of customers said it would have no impact, and 17% said it would be more favorable.

Figure 55. Satisfaction with TOU Rate Plan



Source: Behavior Survey Q1, Q21 (n=1,333)

Similar to why customers enrolled in the TOU rate plan, when asked about what they like best about the TOU rate plan, more than half of behavior survey respondents (51%) identified saving money (see Table 27). Monitoring (22%) and managing (12%) energy use were the next most common responses. Only 6% of respondents named helping the environment.

Table 27. Like Most About the TOU Rate

Ability to	Percentage
Saving money	51%
Monitoring, being more aware, or having control over energy use	22%
Managing or shifting my energy use	12%
Having options	6%
Helping the environment	6%
Other	2%

Source: Behavior survey, Q19 (n=1,017)

The following are some illustrative quotes from open-ended responses on the behavior survey about what participants liked:

- *"The awareness of my energy usage, working to save money consciously by shifting activities. Gives me a small sense of control over my bills."*
- *"Based on our actions, the ability to determine how much we spend on this utility."*
- *"Ability to decide when to save money."*
- *"Being able to get better pricing while also helping our power supplier be more environmentally friendly. Also making an action plan on how to best reduce our usage during peak times."*
- *"Being able to try and control my usage at different rates."*

Interviews conducted with TOU rate customers in 2020 found similar results—customers primarily liked saving money. Other factors contributing to satisfaction noted in the interviews were as follows:

- Sense of control over cost
- Shifts are not too painful or not necessary
- Weekly and monthly reports providing encouragement and reminders
- Helping the environment
- Option to choose best fit plan
- Ability to cancel if not happy

Nearly one-third (30%) of respondents did not provide a response to what they like least about the TOU rate plan. The most common responses of things customers liked least were that 4 p.m.-8 p.m. is a bad time (25%), they did not see a change in their bills or had higher bills (17%), and they had difficulty shifting behaviors around energy use (14%).

Table 28. Like the Least about the TOU Rate

Behavior	Percentage
Nothing, no downside	30%
4 p.m.-8 p.m. is a bad time (e.g., not using AC in the summer)	25%
No change in bills or higher bills	17%
Difficulty in changing or shifting behaviors around energy use	14%
Having another chore to think about or keeping track of time	8%
Hard to understand, confusing	4%
Other	4%

Source: Behavior survey, Q20 (n=958)

The following are some illustrative quotes from open-ended responses on the behavior survey about what participants disliked:

- *"It's very, very difficult to change my schedule to save a little."*

- *"Between 4 and 8 is when everyone is hungry or getting home so having to wait is a pain."*
- *"Compared to this time last year, it has increased my bill."*
- *"Cooking dinner and cooling the house and getting kids to co-operate are all tough."*
- *"Sometimes I have to stay up later because I waited until after 8 p.m. to do laundry."*
- *"It was very clear and easy to understand. The only part I questioned was, 'Will we be penalized if we don't turn our thermostat down to a certain temperature during peak time? And if so, what is that required temperature?'"*
- *"One thing I am not clear about is whether there are any penalties, if I do need to use my high energy appliances during peak energy usage hours."*

Interviews conducted with TOU rate customers in 2020 also found that questions about whether customers are saving money and if they had difficulty changing activities contribute to dissatisfaction. For example, the interviews noted the following:

- It is difficult to interpret from Rate Coach and the online tool whether the TOU plan is saving money for the household.
- It is hard to avoid the peak hours, especially for cooking and baths.

Some customers provided suggestions to improve the TOU rate plan. These included wanting to be able to monitor energy use in real time through an app, lower rates, and different or shorter peak times (see Table 29).

Table 29. Suggested Improvements to TOU Rates

Suggestion	Percentage
Nothing to change	41%
Ability to monitor usage more closely (by appliance, real time, through app)	16%
Lower rates	12%
Have different, shorter peak times	11%
Ability to compare plans/rates	10%
More information, education (on how to save energy, how energy use impacts energy bill)	7%

Source: Behavior survey, Q24 (n=720)

The following are some illustrative quotes from open-ended responses on the behavior survey about suggestions for improvement:

- *"Weekly email is helpful, although not as detailed as it could be, e.g., breakdown of costs in all time periods, easier way to compare costs on previous plan -- difficult to tell if saving money or spending more right now."*
- *"Year over year comparison showing my TOU plan performance projected against a year without TOU plan."*

- *"The rate coach emails are not all that helpful, particularly the one that's supposed to say which week was lowest. It doesn't really tell me anything useful. I'd like the rate coach email to provide daily information instead of weekly, and not just about the peak period, but about all times of day, with a focus on the peak."*
- *"The website tells me a lot, but I would love to see a graph of my daily usage graphed to see how much energy I have used during the different rate times."*
- *"Wish the monetary incentive was larger. When getting up at 5 a.m. to dry clothes I often wonder if it is worth it."*

4. Conclusion

The estimated results of Guidehouse's analysis indicate that participants in both jurisdictions responded to the TOU prices by changing their consumption patterns. The impacts in both seasons are broadly similar across the Missouri Metro and Missouri West jurisdictions. All estimated summer demand reductions (across all participants combined) in the on-peak and off-peak periods were statistically significant. Likewise, super-off-peak response by participants overall led to estimated increases in consumption, increases that were statistically significant in the summer for Missouri Metro participants, and the winter for Missouri West participants.

The overall magnitude of the summer impacts (i.e., the kWh impacts) is greater than in the winter, consistent with the findings of the interim analysis and other evaluations of TOU pilots in temperate climates with a customer base that primarily uses gas (rather than electricity) for home heating. Although there are many ways for customers to reduce or shift their loads away from the on-peak period, air conditioning is one of the largest discretionary loads in most homes, and—particularly for participants with smart or programmable thermostats—one of the simplest to adjust in response to TOU pricing.

In the summer, the monthly system coincident peak demand occurs during the on-peak period, so impacts are similar to those of the on-peak period. In the winter, the monthly system coincident peak demand frequently occurs in the morning during the off-peak periods; thus, the winter system coincident peak demand impacts are generally lower than those of the on-peak period impacts.

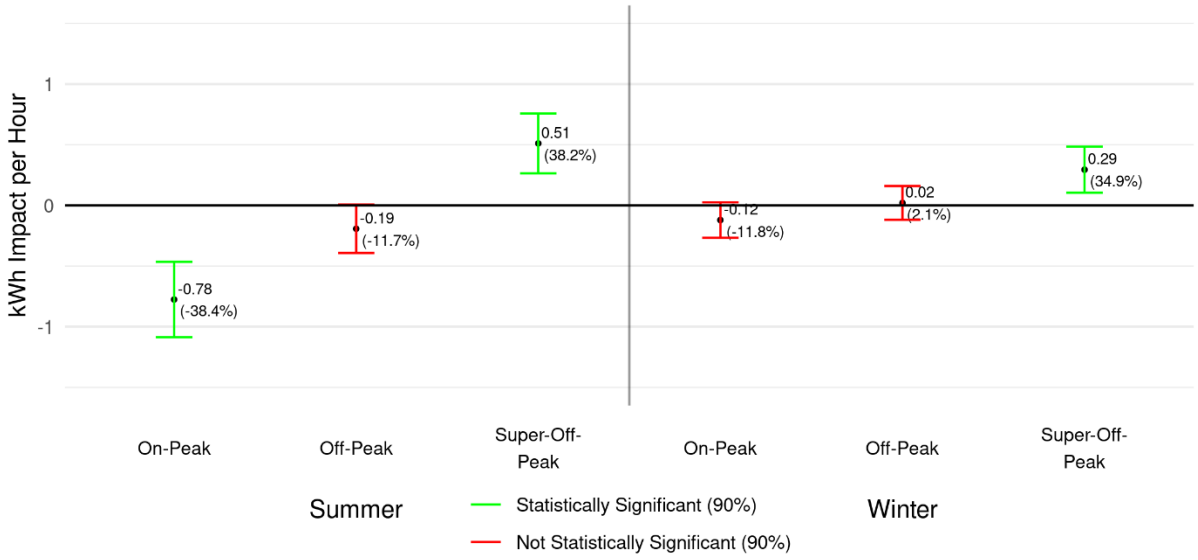
Bill impacts exhibit a similar pattern: the summer bill savings are higher than winter bill savings, with some customer groups experiencing increases in their average bill during the winter. While the changes in the rate structure alone meaningfully affect seasonal average bills, across the year as a whole, structural impacts tend to not have a really material net effect as would be expected of a rate designed to be approximately revenue neutral, assuming no change in behavior. The notable exception to this trend is for Missouri Metro residential space heating customers whose increased average monthly bill appears to be driven in large part by the new rate structure itself.

Appendix A. TOU Rate Impacts by Segment

This appendix presents the energy, bill, and conservation impacts by each customer segment along with their study period load shapes. The explanations provided in Section 3.1 apply. Some segments such as low income and electric vehicles (EVs) have small sample sizes and have wider confidence bands, meaning the results should be interpreted with caution.

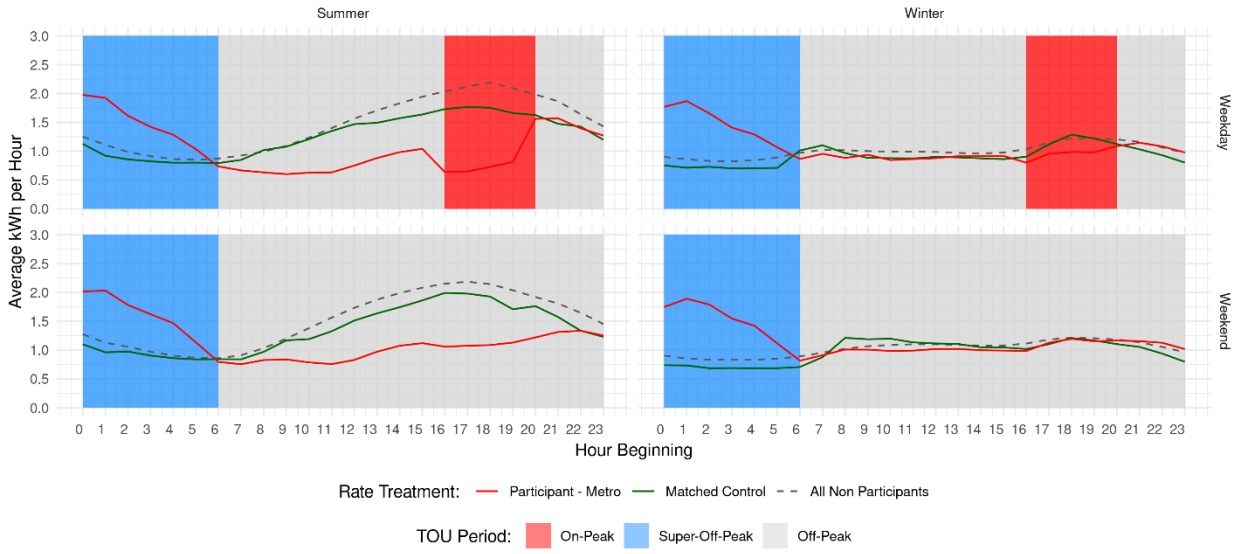
A.1 EVs

Figure A-1. EV TOU Rate Impacts – Missouri Metro



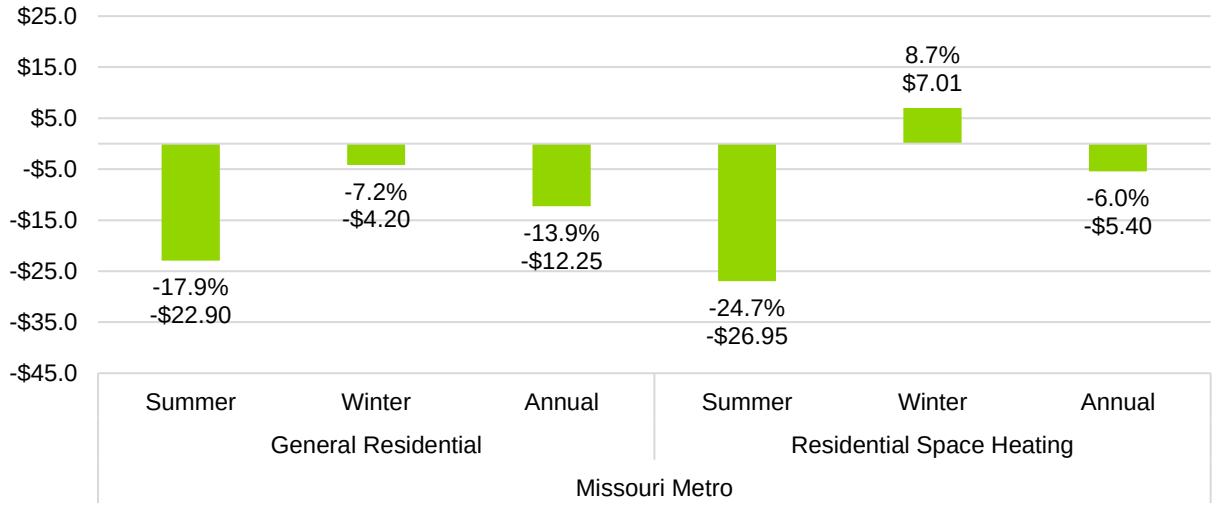
Source: Guidehouse analysis

Figure A-2. EV Post-Period Load Shapes – Missouri Metro



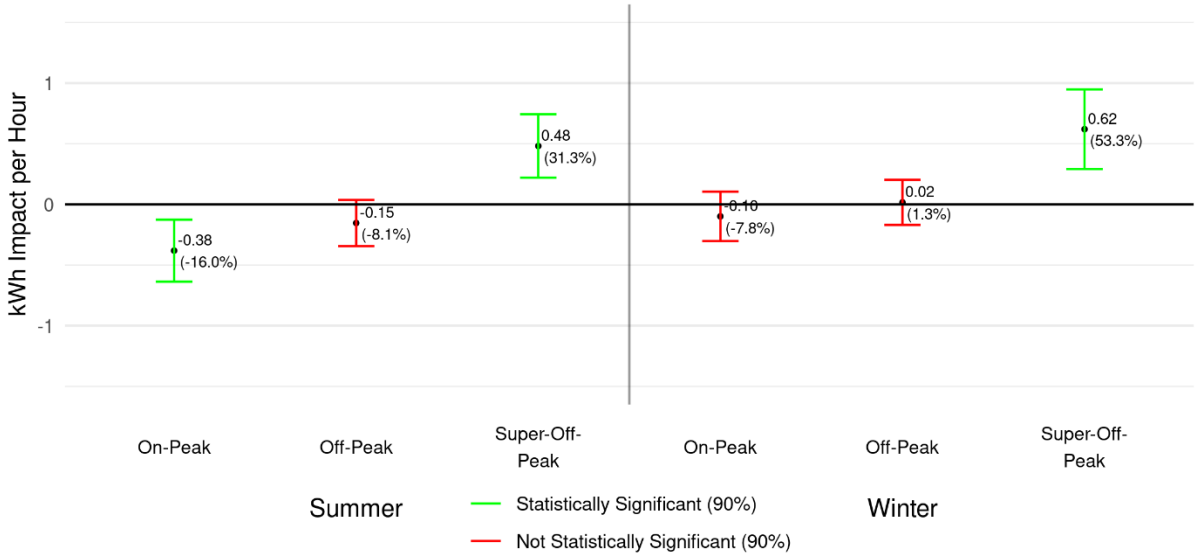
Source: Guidehouse analysis

Figure A-3. EV TOU Bill Impacts – Missouri Metro



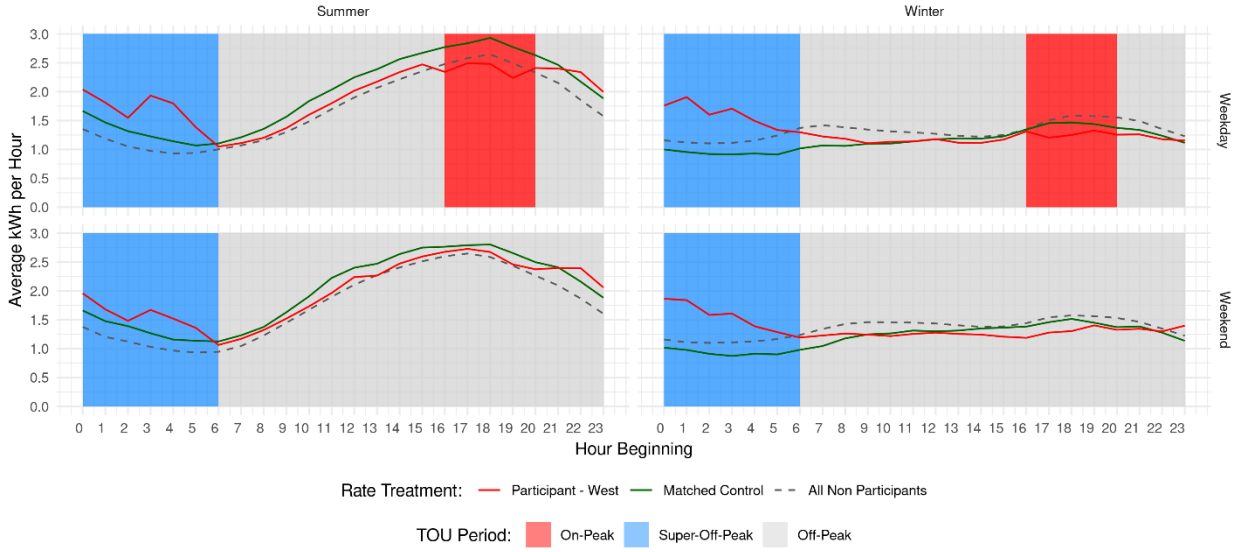
Source: Guidehouse analysis

Figure A-4. EV TOU Rate Impacts – Missouri West



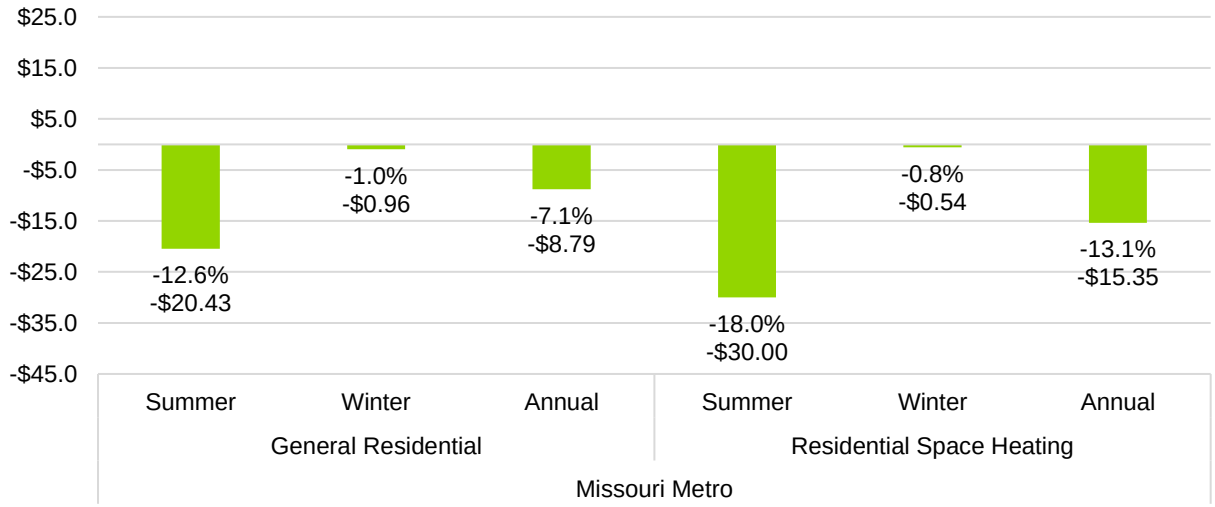
Source: Guidehouse analysis

Figure A-5. EV Post-Period Load Shapes – Missouri West



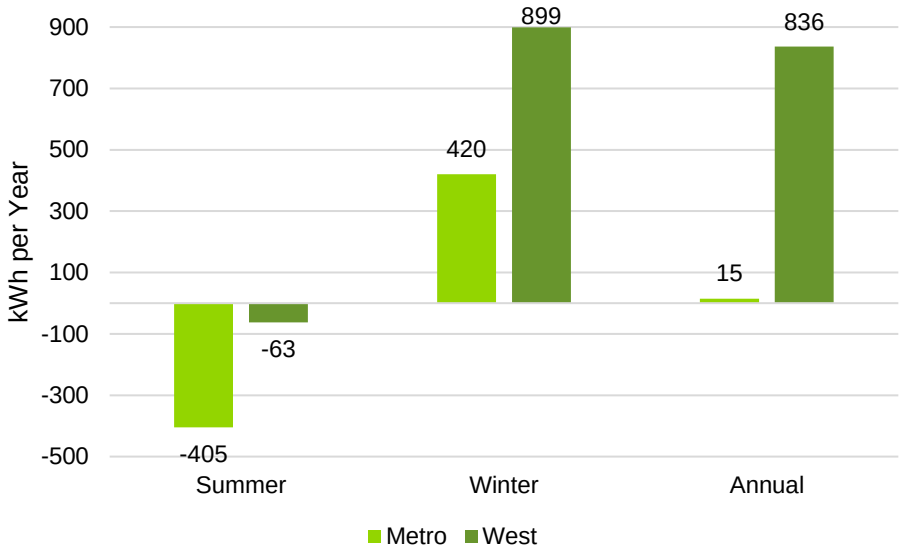
Source: Guidehouse analysis

Figure A-6. EV TOU Bill Impacts – Missouri West



Source: Guidehouse analysis

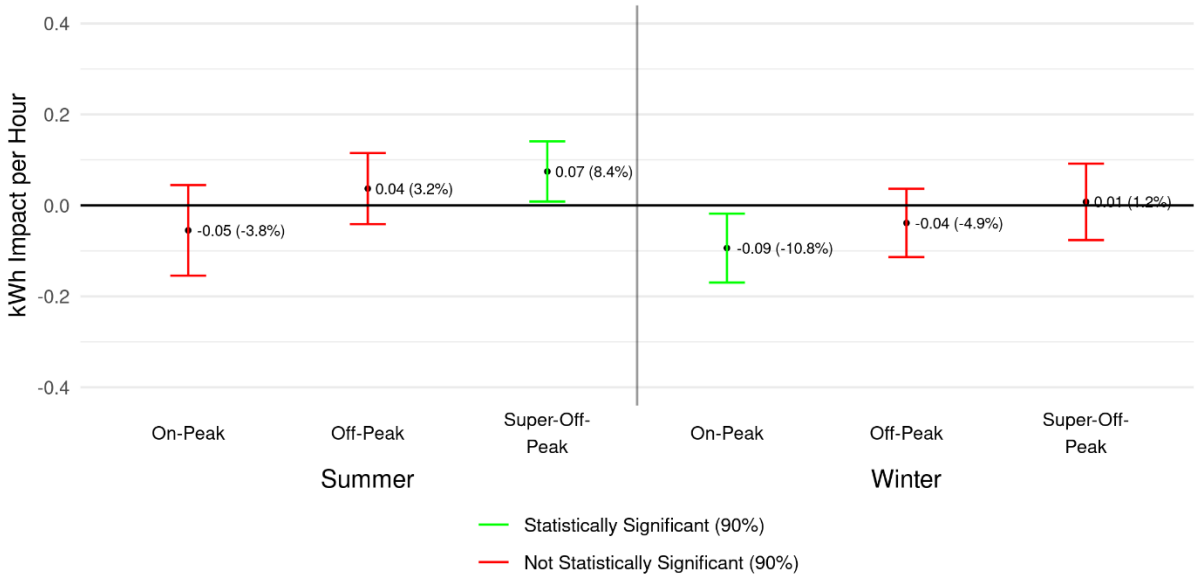
Figure A-7. Conservation Impacts – EVs



Source: Guidehouse analysis

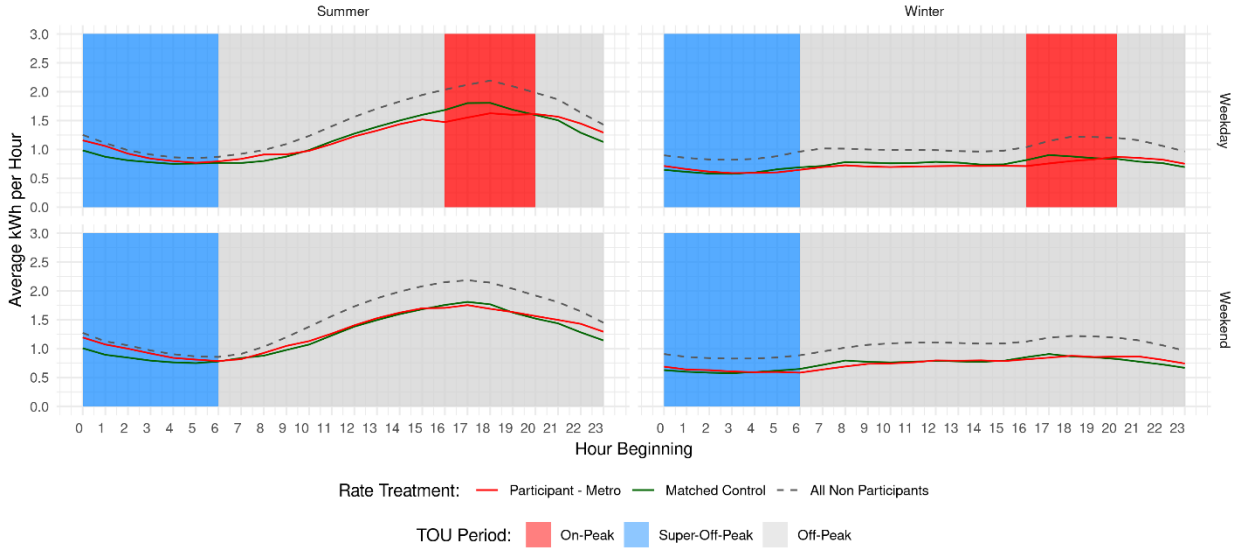
A.2 Low Income

Figure A-8. Low Income TOU Rate Impacts – Missouri Metro



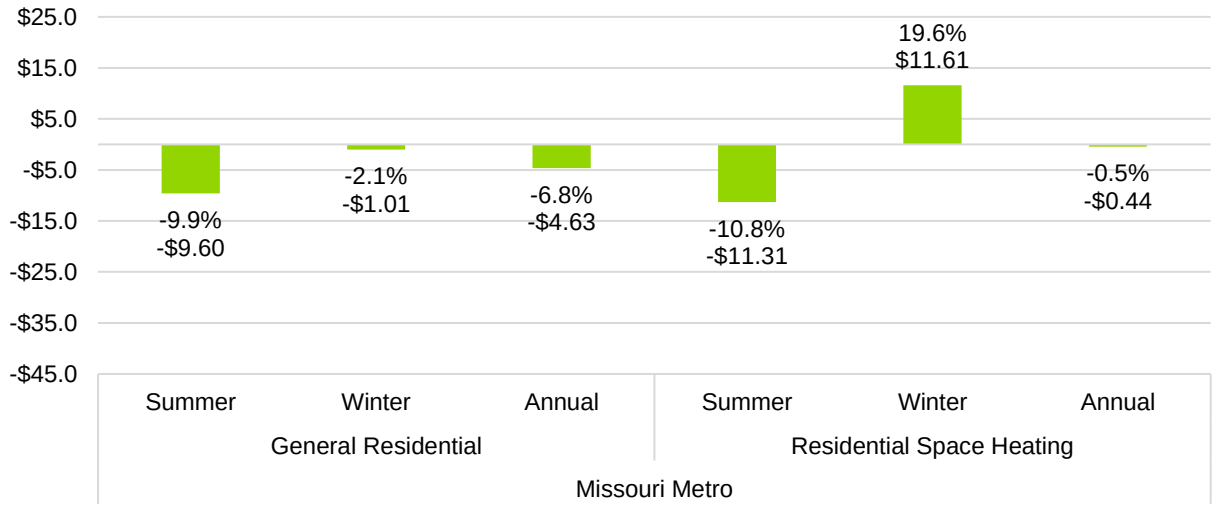
Source: Guidehouse analysis

Figure A-9. Low Income Post-Period Load Shapes – Missouri Metro



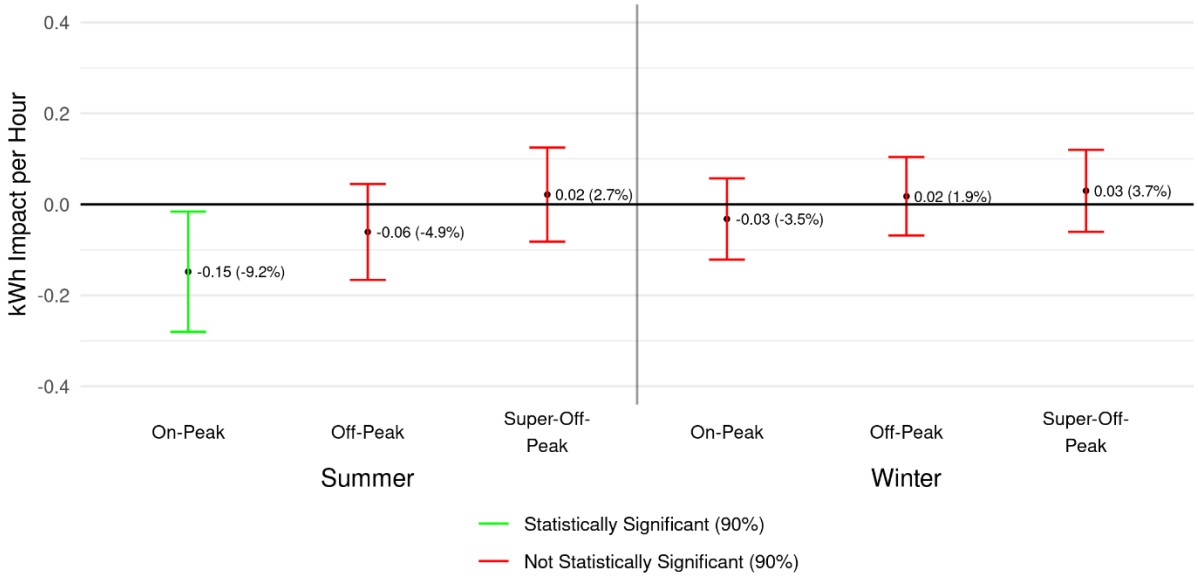
Source: Guidehouse analysis

Figure A-10. Low Income Bill Impacts – Missouri Metro



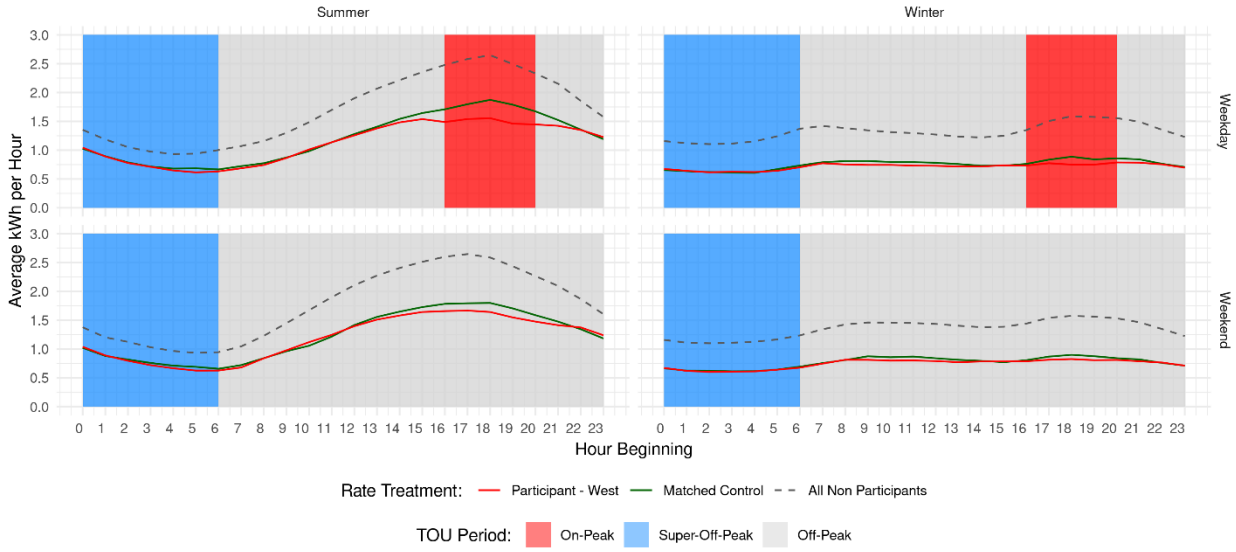
Source: Guidehouse analysis

Figure A-11. Low Income TOU Rate Impacts – Missouri West



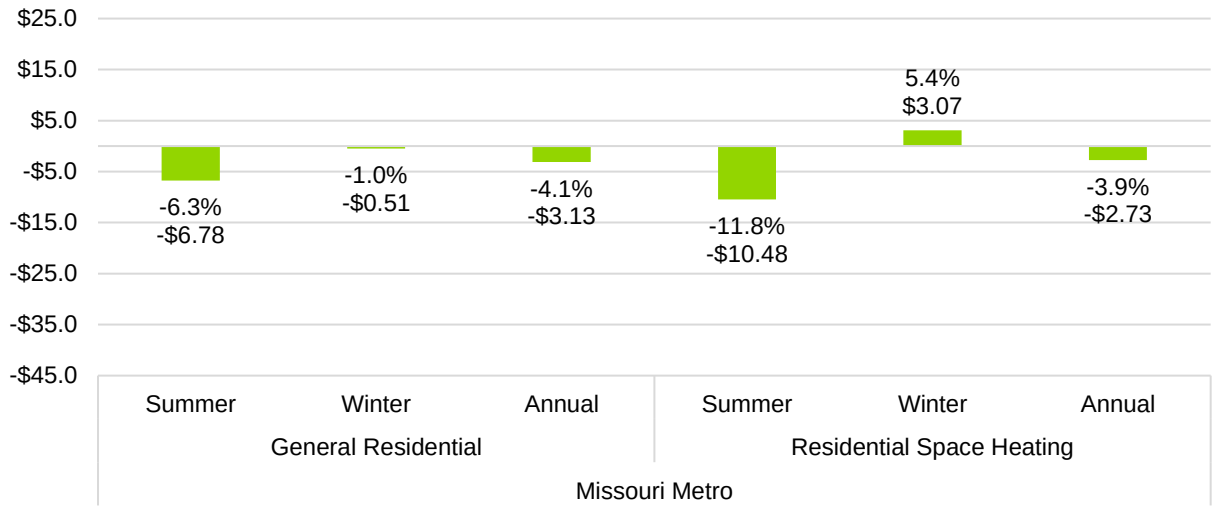
Source: Guidehouse analysis

Figure A-12. Low Income Post-Period Load Shapes – Missouri West



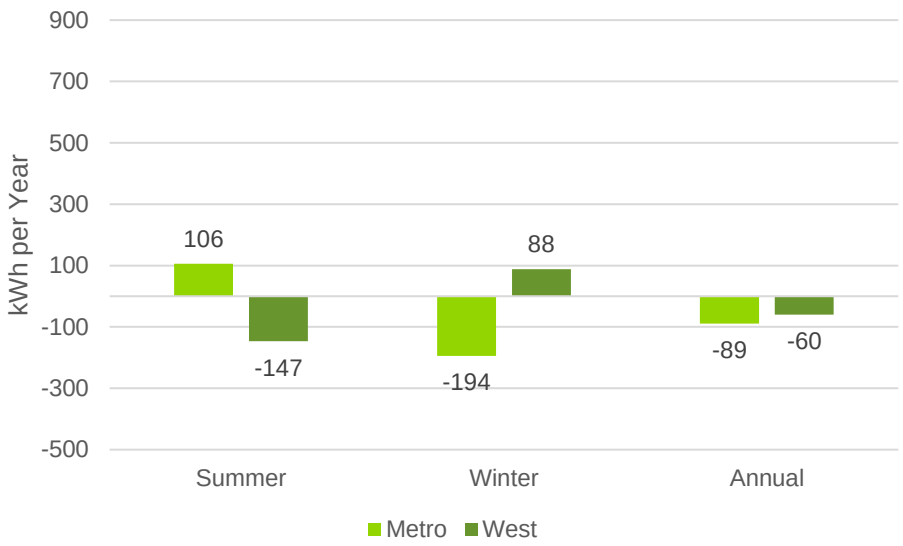
Source: Guidehouse analysis

Figure A-13. Low Income Bill Impacts – Missouri West



Source: Guidehouse analysis

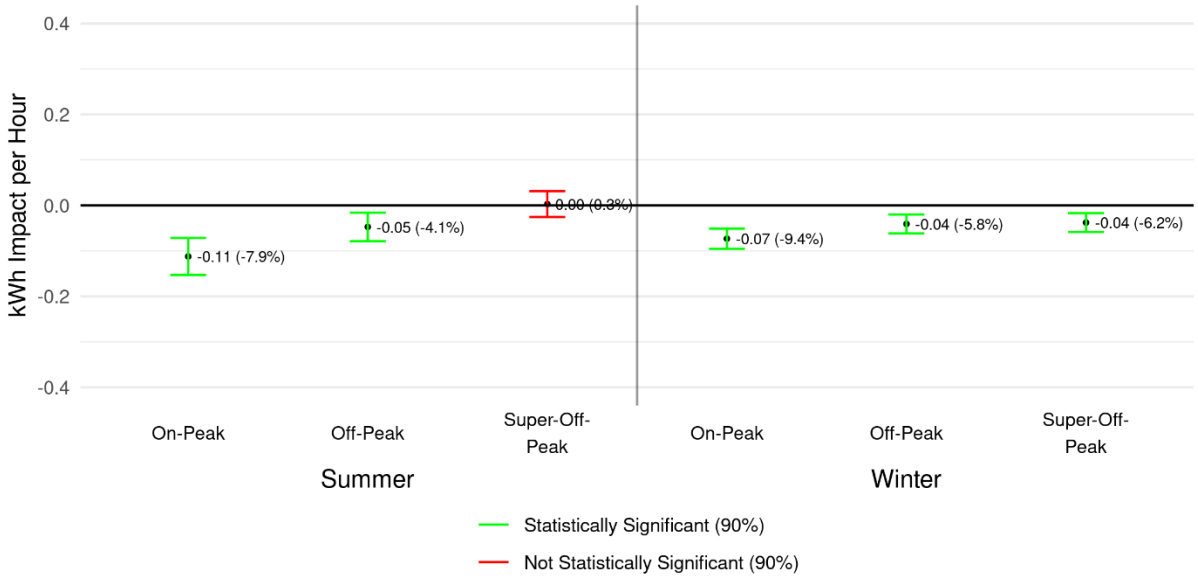
Figure A-14. Conservation Impacts – Low Income



Source: Guidehouse analysis

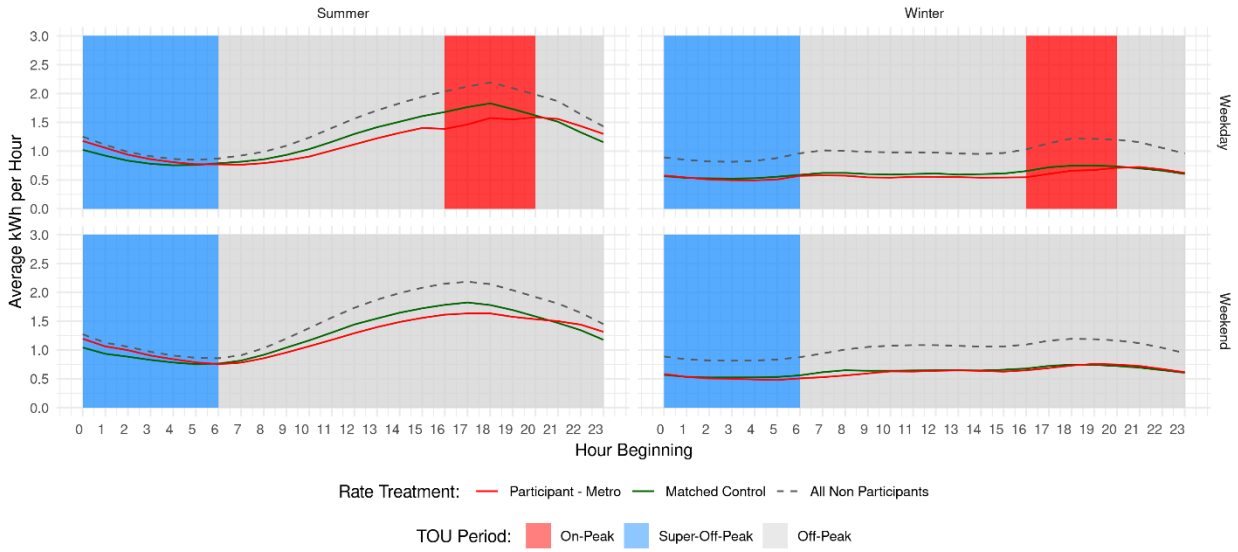
A.3 Renters

Figure A-15. Renters TOU Rate Impacts – Missouri Metro



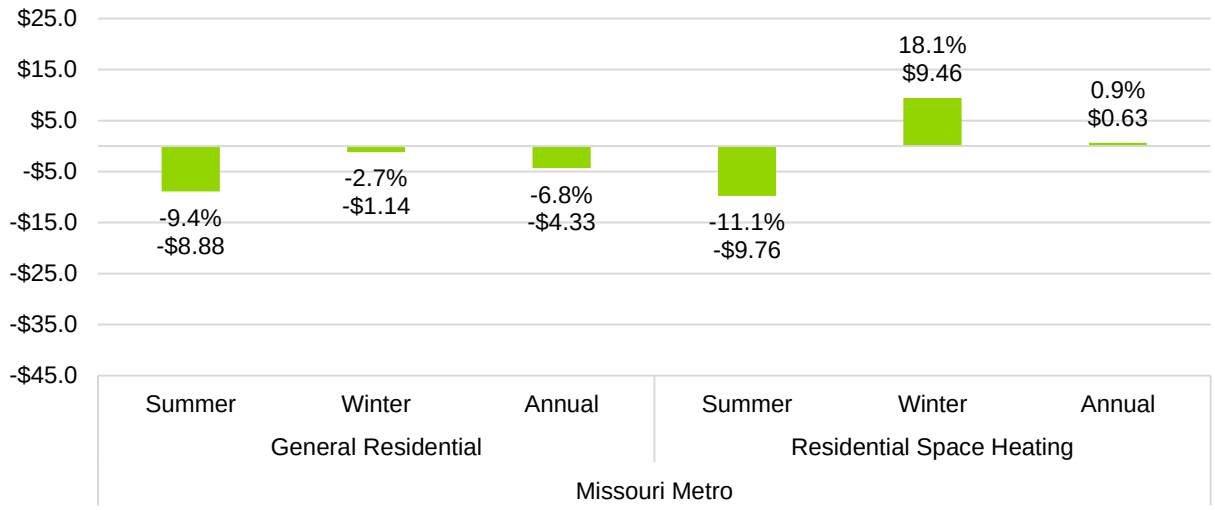
Source: Guidehouse analysis

Figure A-16. Renters Post-Period Load Shapes – Missouri Metro



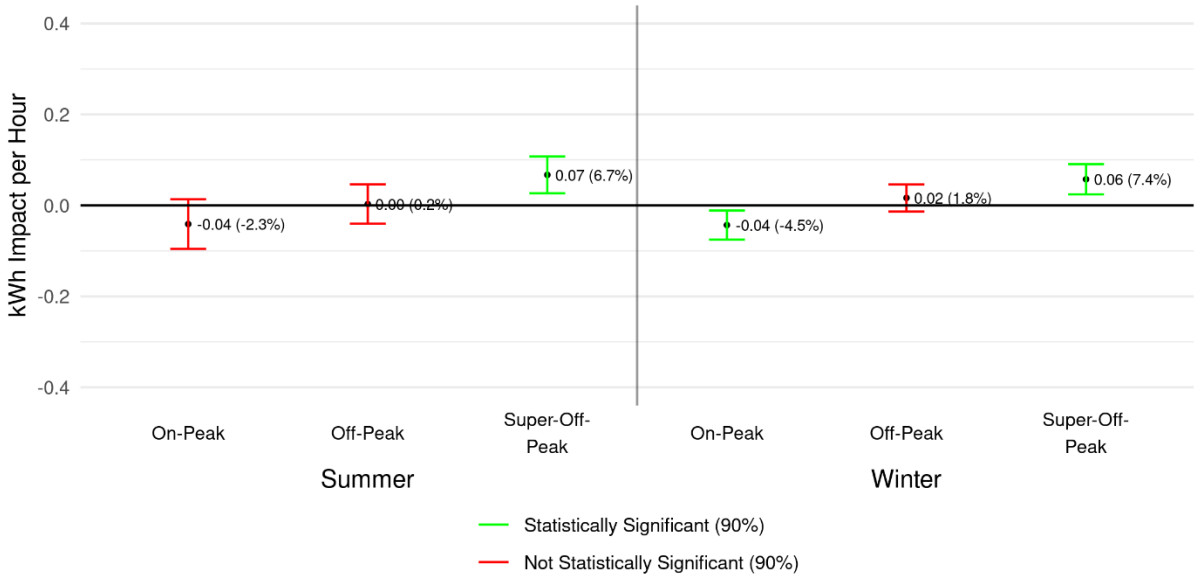
Source: Guidehouse analysis

Figure A-17. Renters Bill Impacts – Missouri Metro



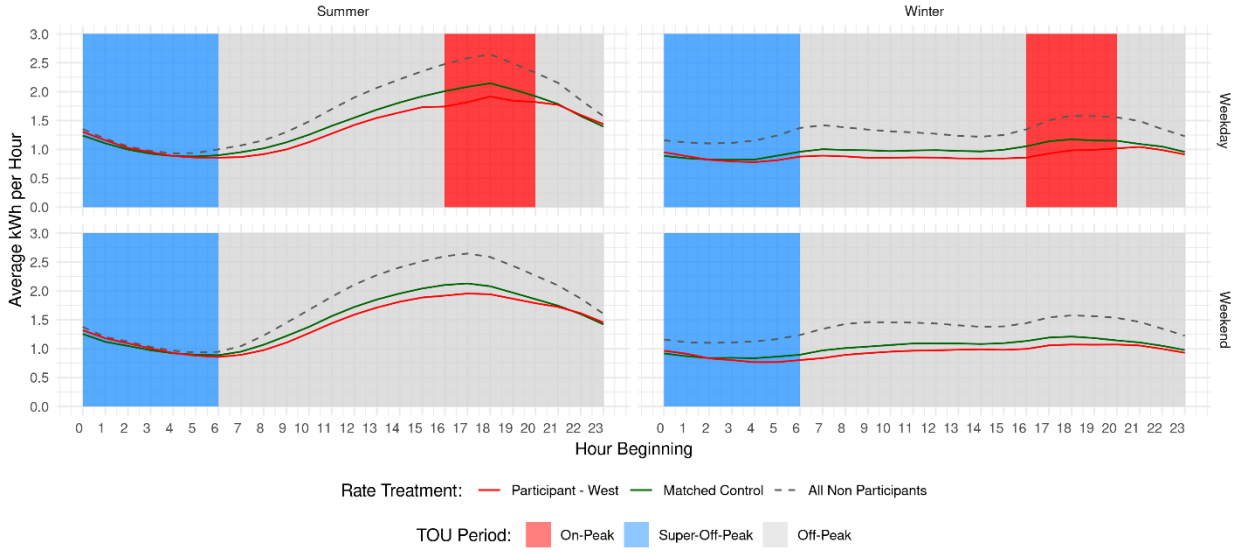
Source: Guidehouse analysis

Figure A-18. Renters TOU Rate Impacts – Missouri West



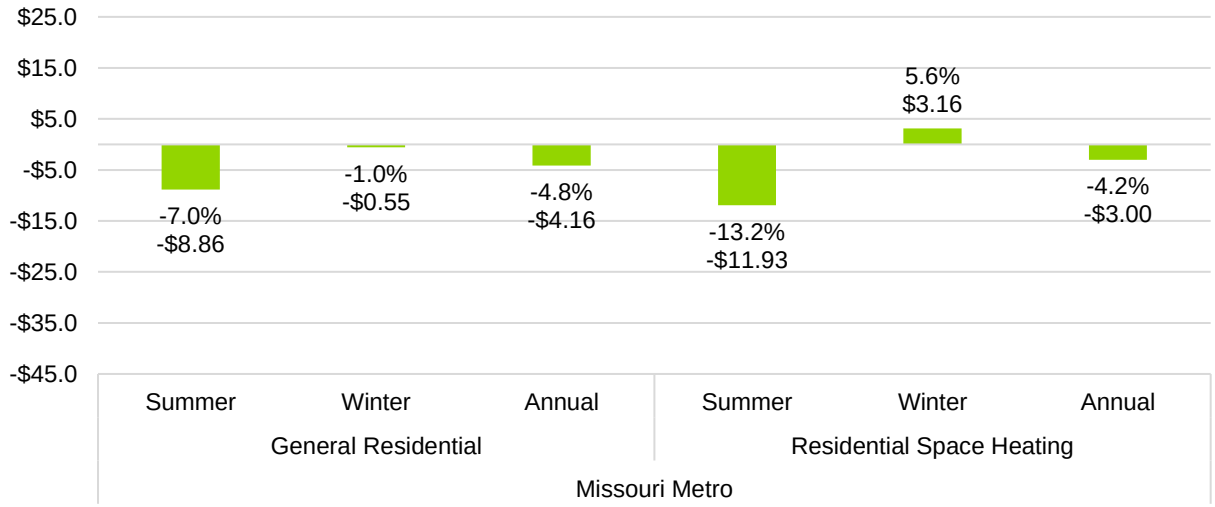
Source: Guidehouse analysis

Figure A-19. Renters Post-Period Load Shapes – Missouri West



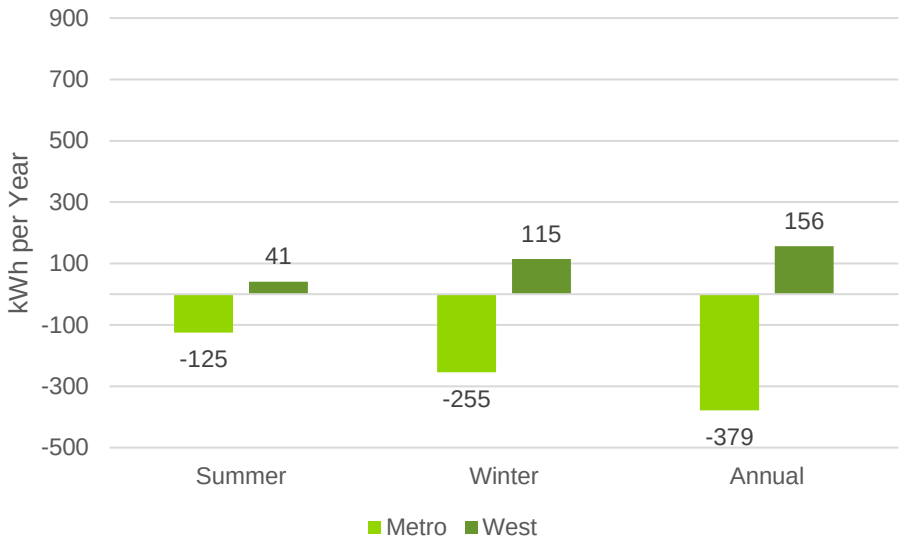
Source: Guidehouse analysis

Figure A-20. Renters Bill Impacts – Missouri West



Source: Guidehouse analysis

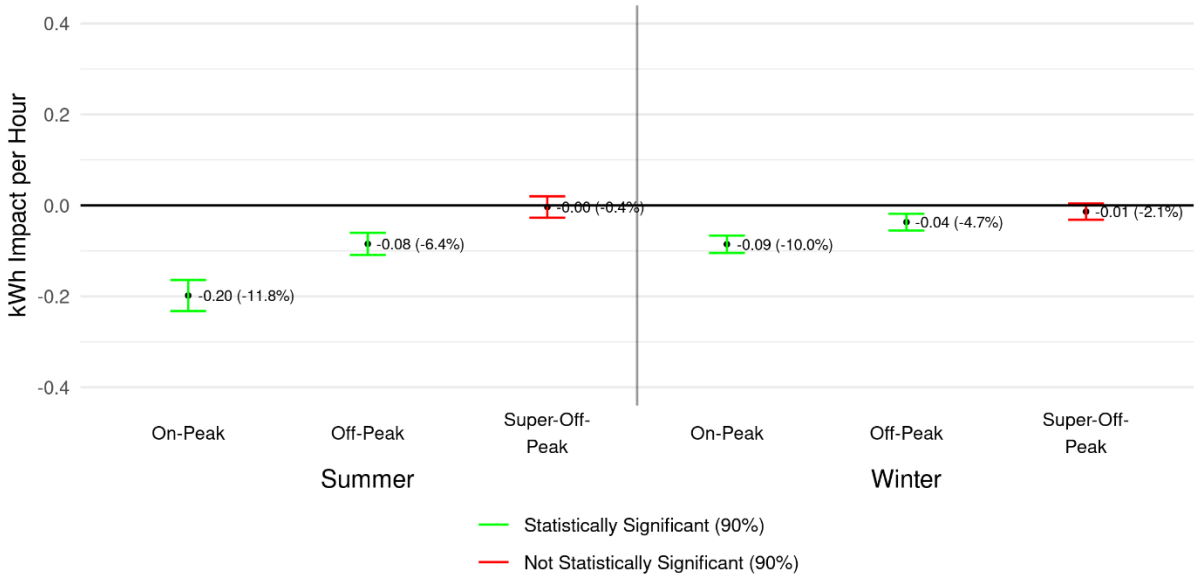
Figure A-21. Conservation Impacts - Renters



Source: Guidehouse analysis

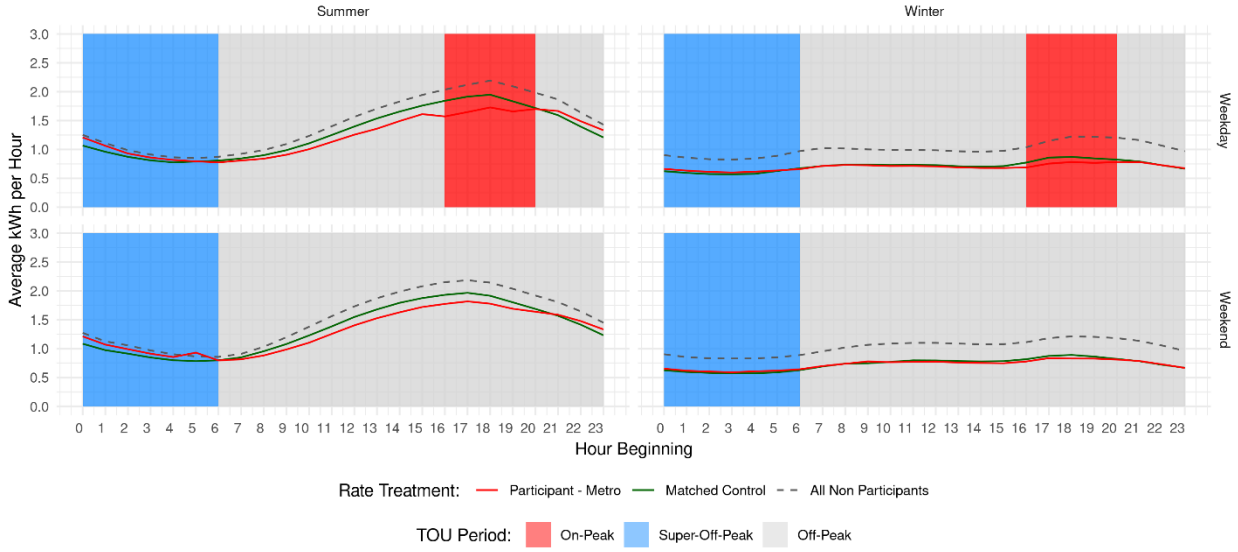
A.4 Seniors

Figure A-22. Seniors TOU Rate Impacts – Missouri Metro



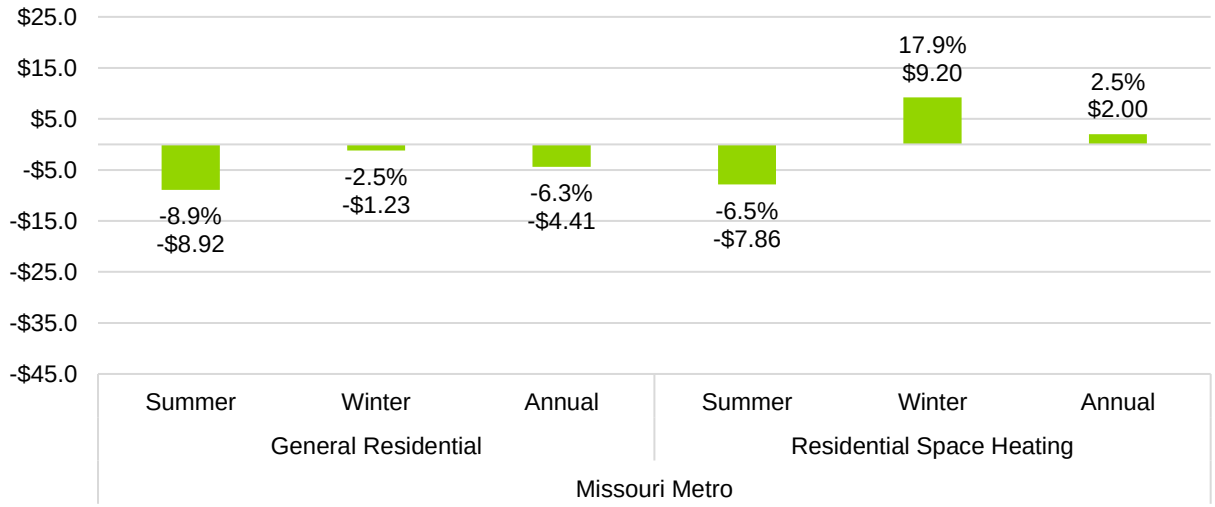
Source: Guidehouse analysis

Figure A-23. Seniors Post-Period Load Shapes – Missouri Metro



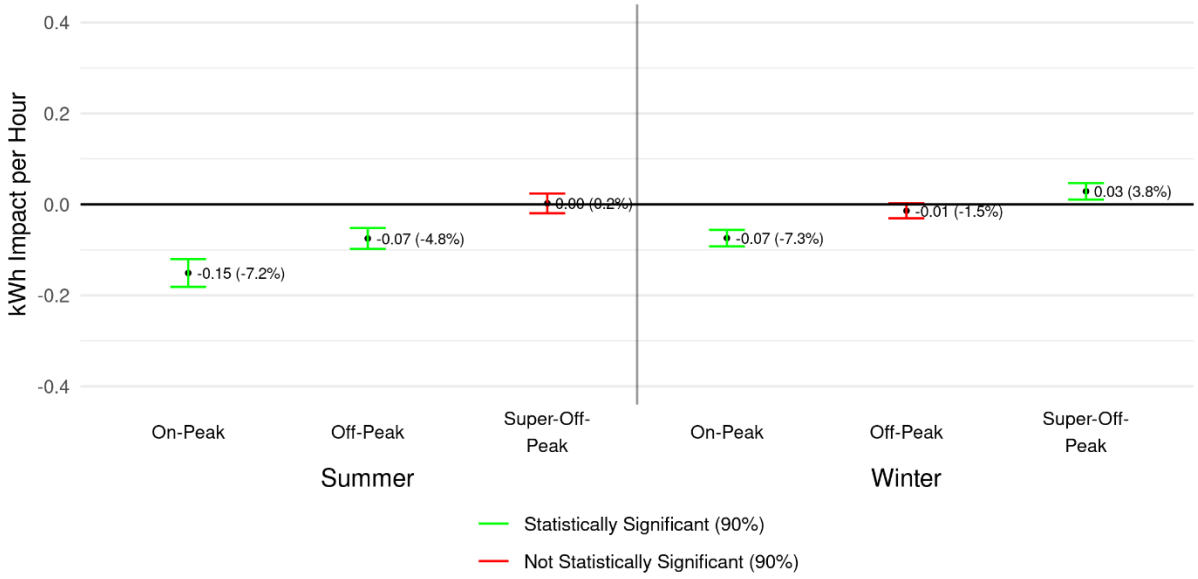
Source: Guidehouse analysis

Figure A-24. Seniors Bill Impacts – Missouri Metro



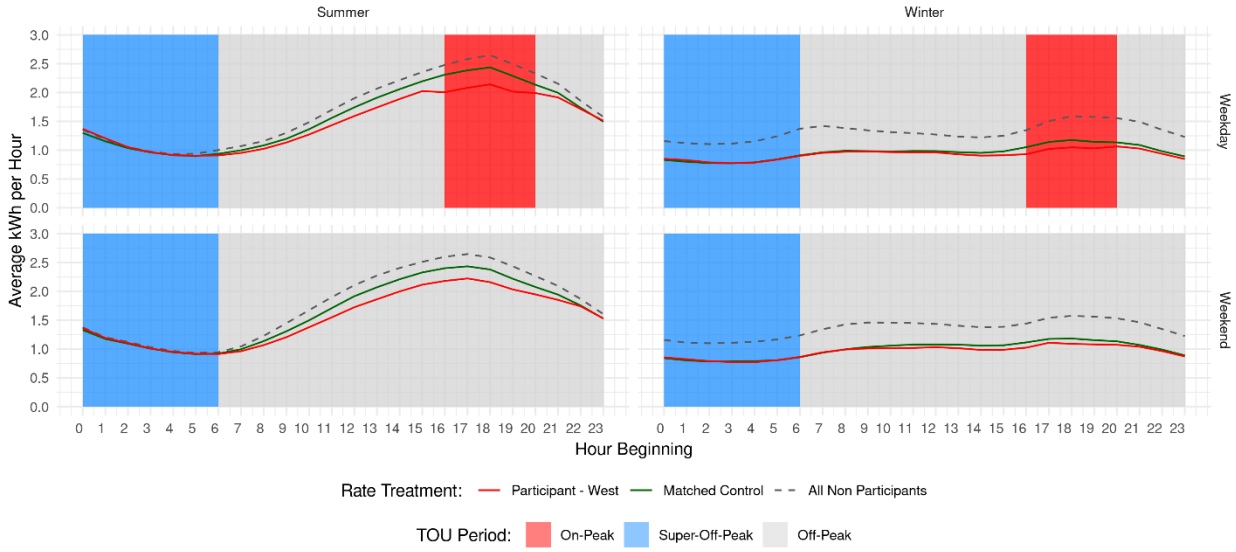
Source: Guidehouse analysis

Figure A-25. Seniors TOU Rate Impacts – Missouri West



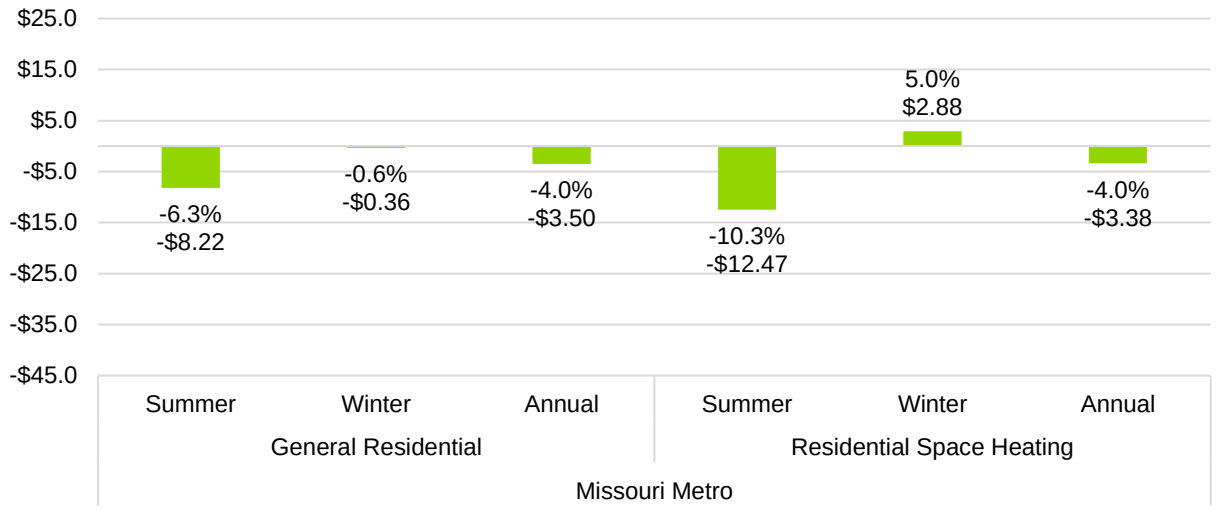
Source: Guidehouse analysis

Figure A-26. Seniors Post-Period Load Shapes – Missouri West



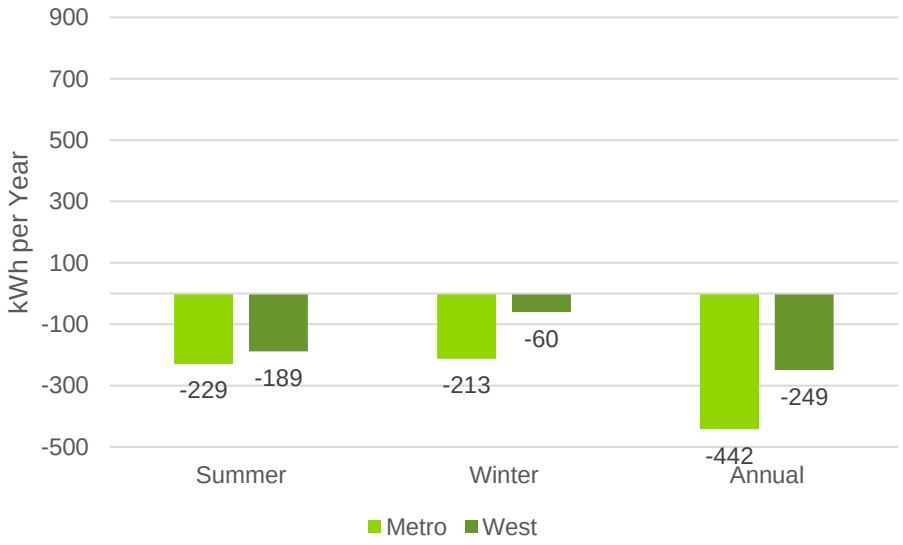
Source: Guidehouse analysis

Figure A-27. Seniors Bill Impacts – Missouri West



Source: Guidehouse analysis

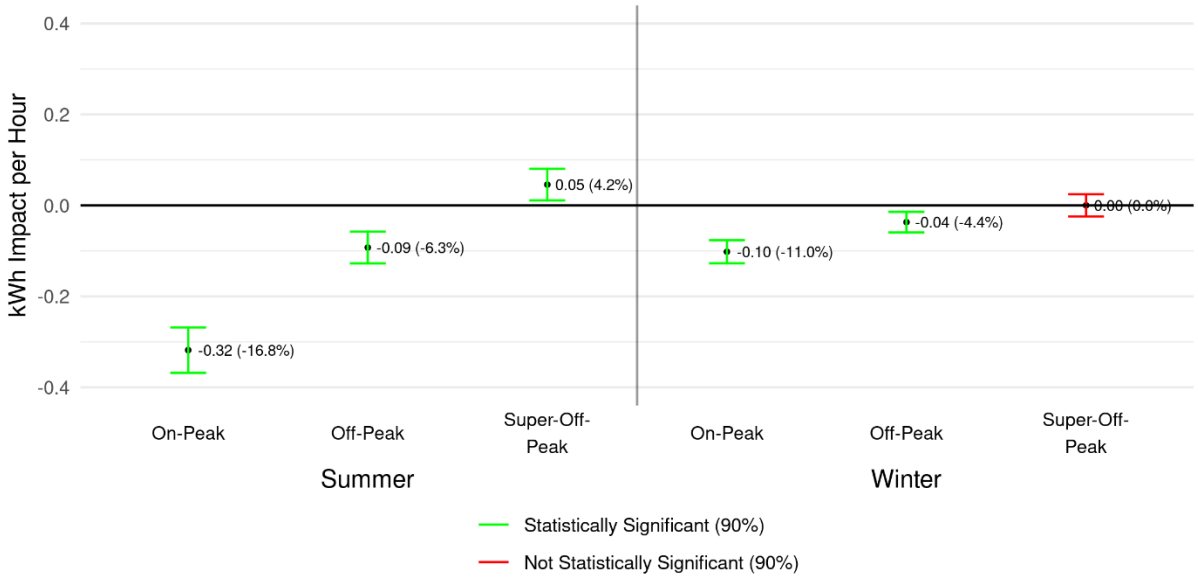
Figure A-28. Conservation Impacts - Seniors



Source: Guidehouse analysis

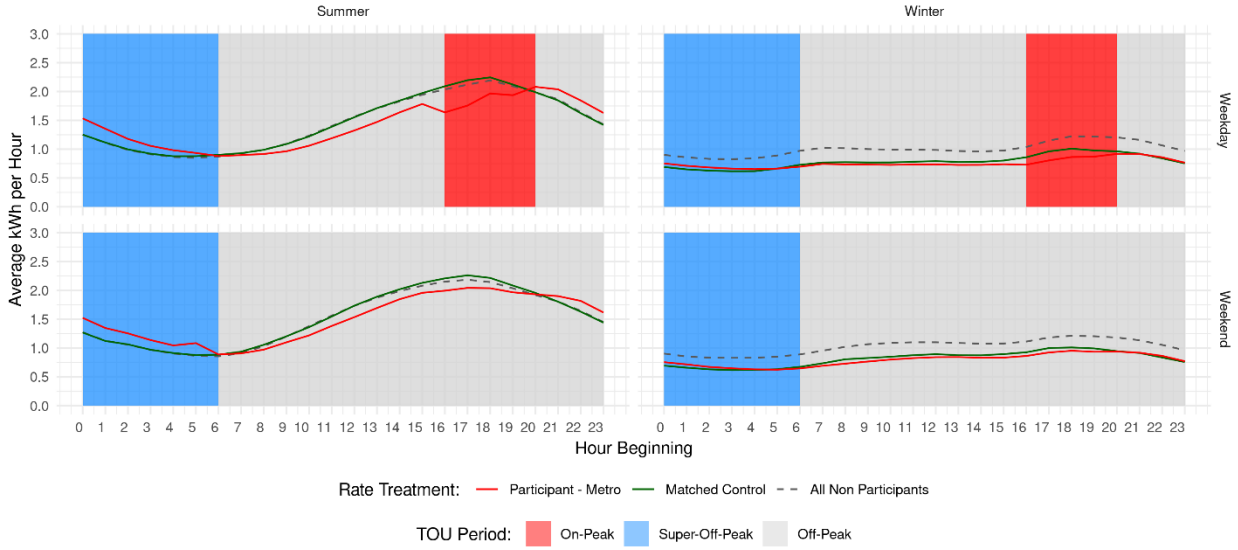
A.5 Smart Thermostats

Figure A-29. Smart Thermostats TOU Rate Impacts – Missouri Metro



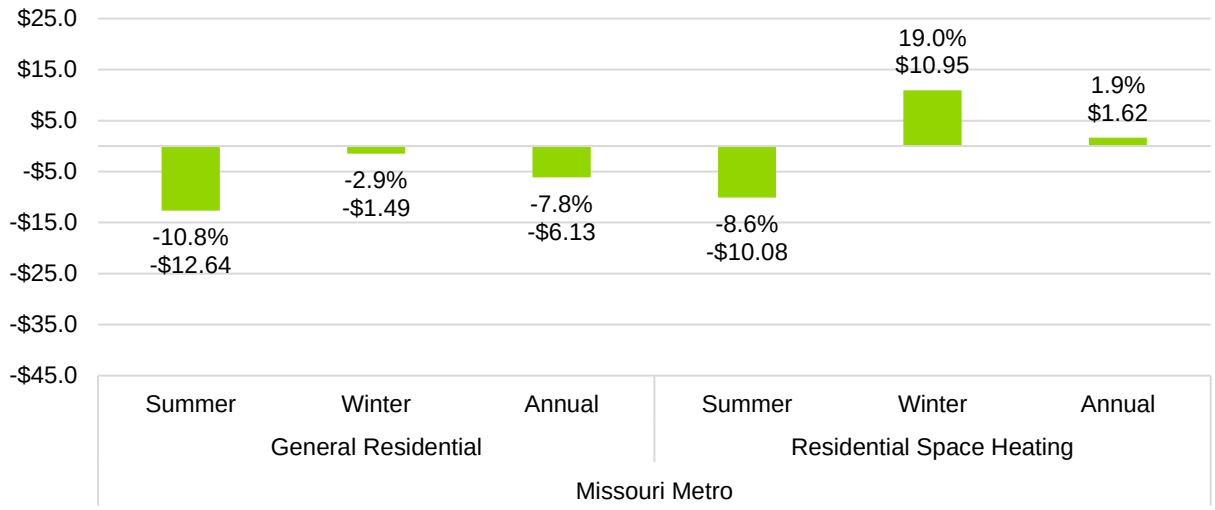
Source: Guidehouse analysis

Figure A-30. Smart Thermostats Post-Period Load Shapes – Missouri Metro



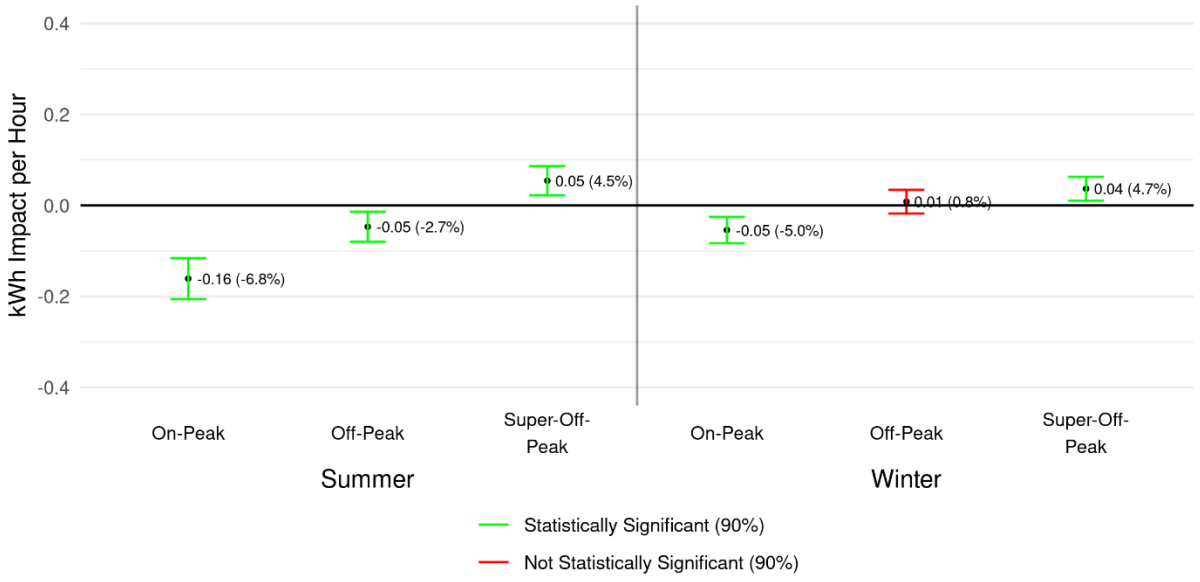
Source: Guidehouse analysis

Figure A-31. Smart Thermostats Bill Impacts – Missouri Metro



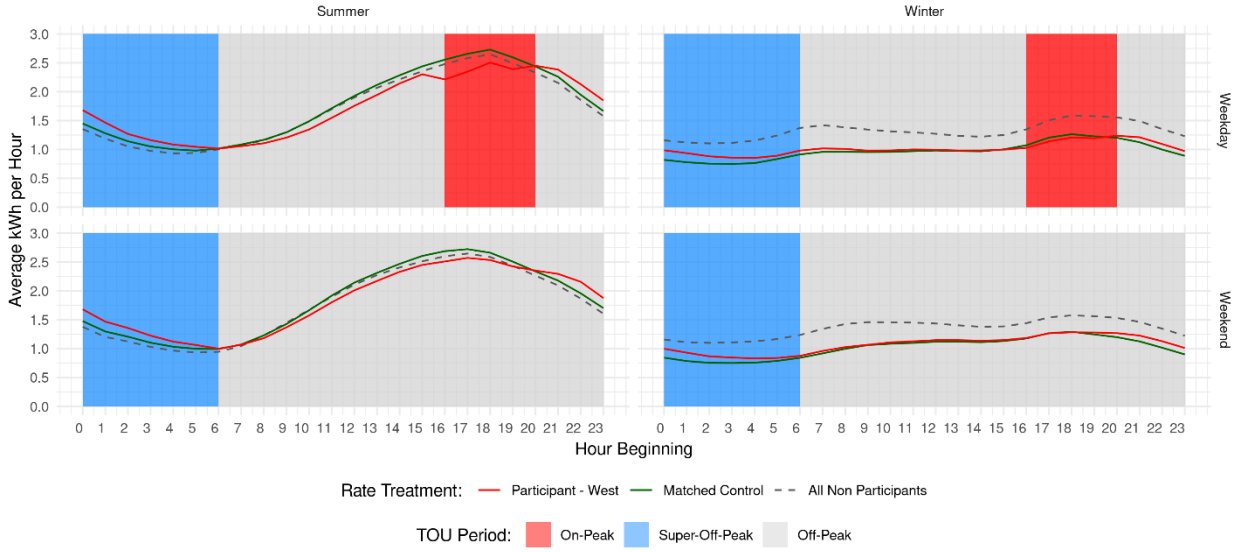
Source: Guidehouse analysis

Figure A-32. Smart Thermostats TOU Rate Impacts – Missouri West



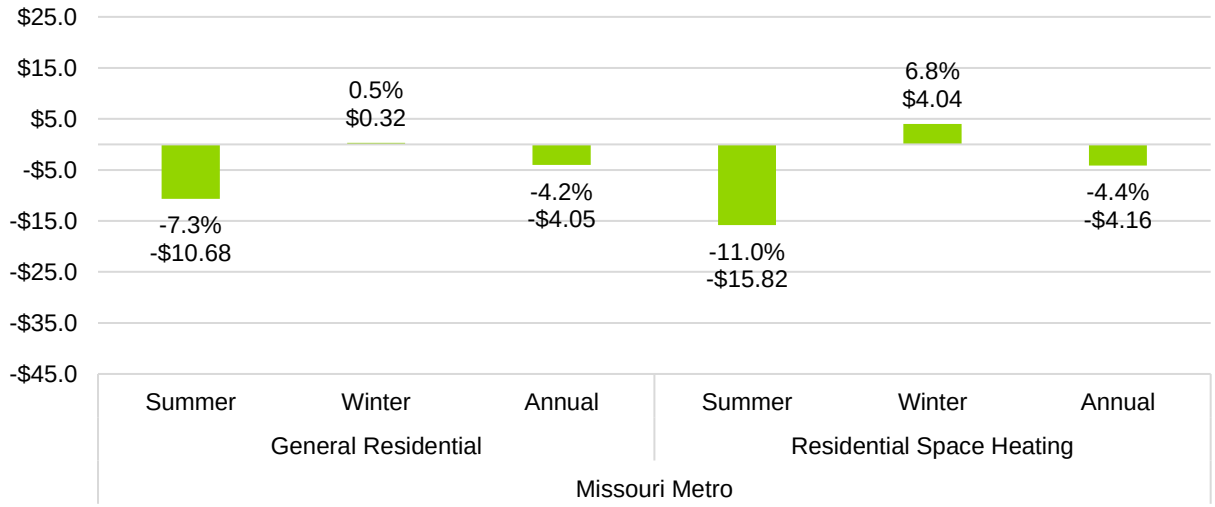
Source: Guidehouse analysis

Figure A-33. Smart Thermostats Post-Period Load Shapes – Missouri West



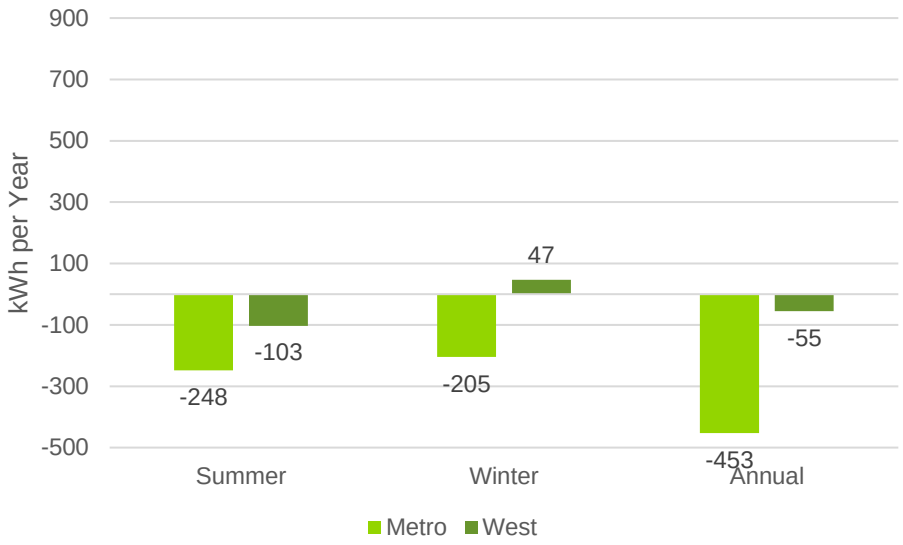
Source: Guidehouse analysis

Figure A-34. Smart Thermostats Bill Impacts – Missouri West



Source: Guidehouse analysis

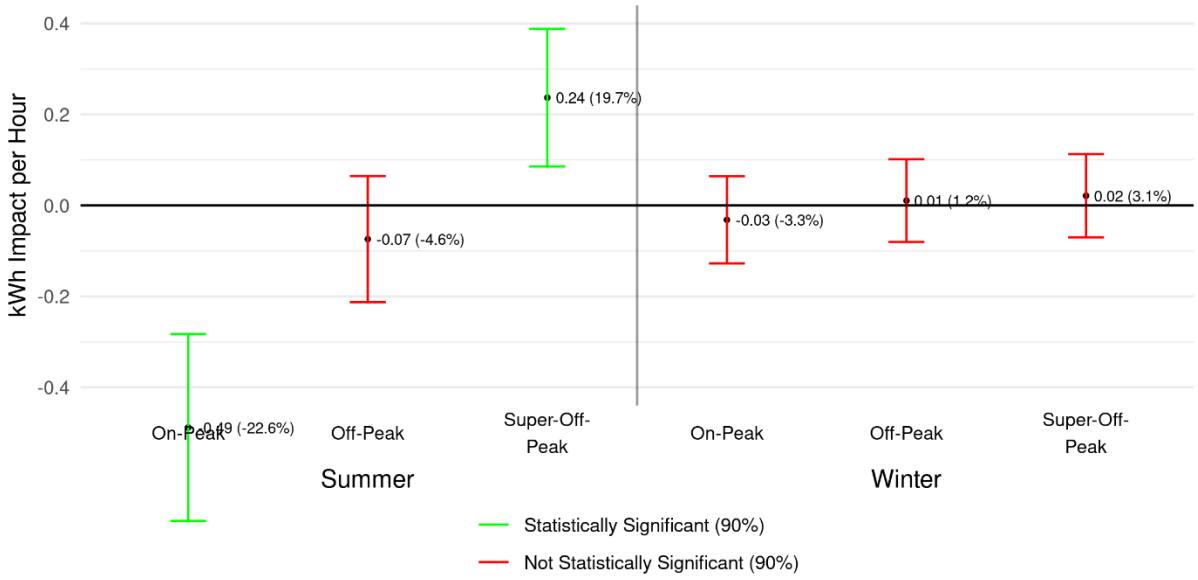
Figure A-35. Conservation Impacts - Smart Thermostats



Source: Guidehouse analysis

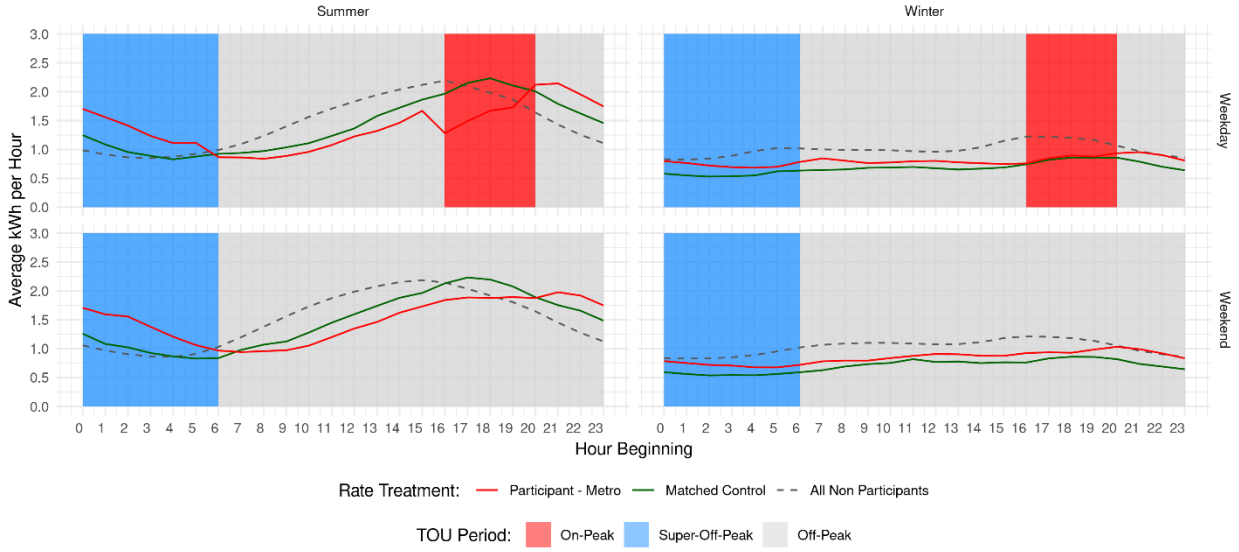
A.6 eco+ Smart Thermostats

Figure A-36. eco+ Smart Thermostats TOU Rate Impacts – Missouri Metro



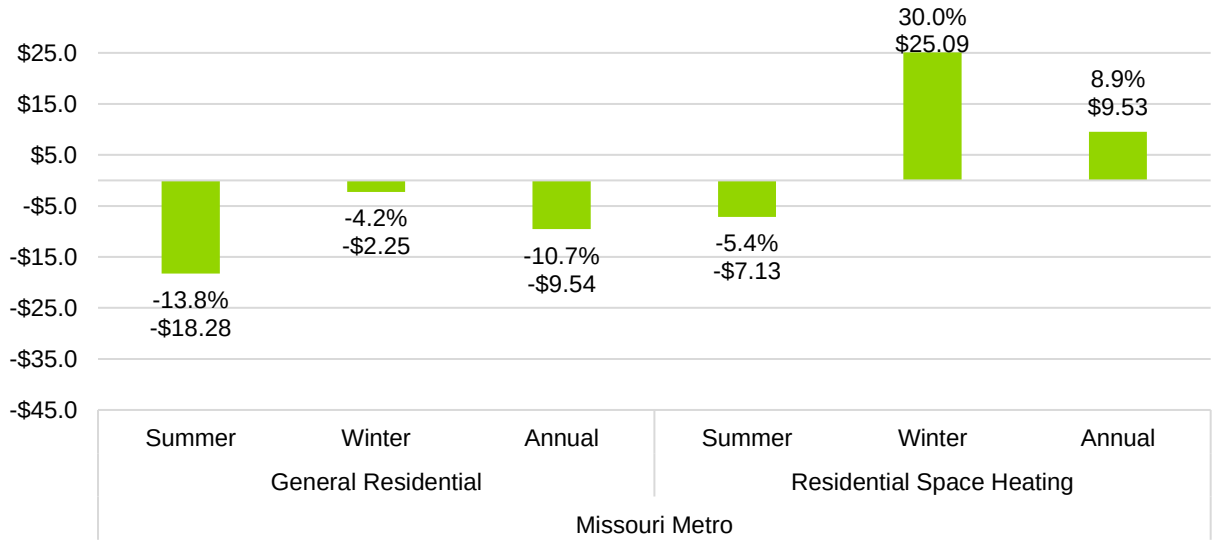
Source: Guidehouse analysis

Figure A-37. eco+ Smart Thermostats Post-Period Load Shapes – Missouri Metro



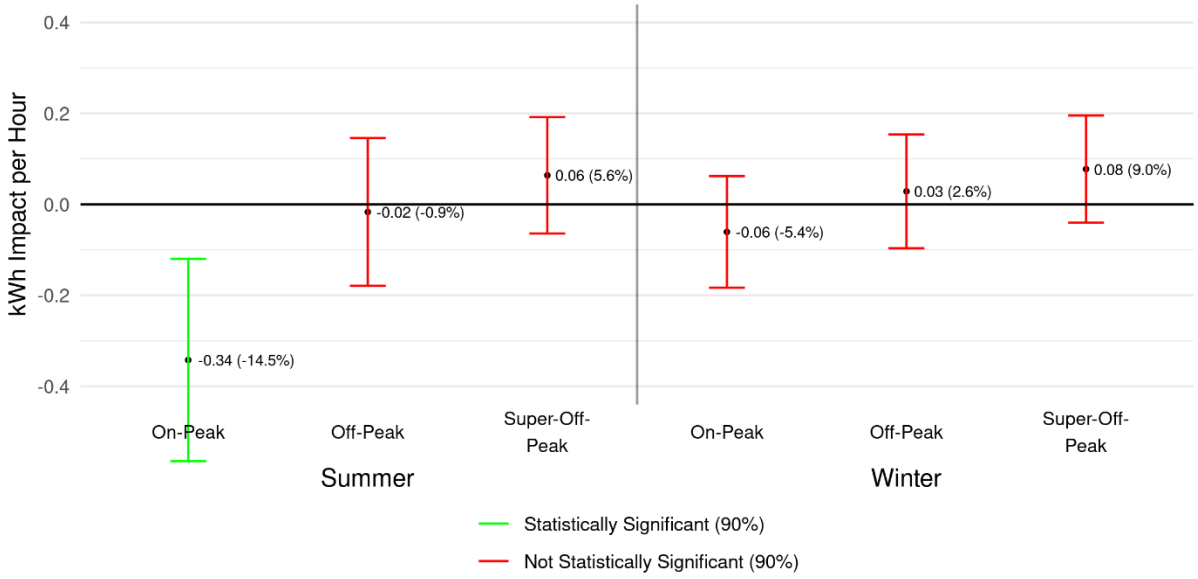
Source: Guidehouse analysis

Figure A-38. eco+ Smart Thermostats Bill Impacts – Missouri Metro



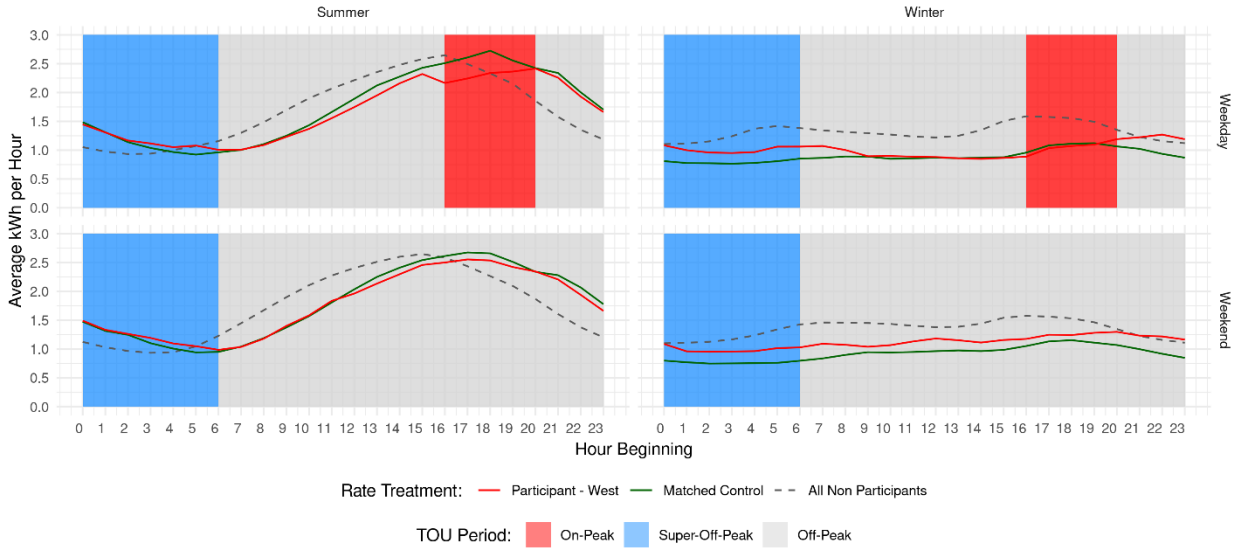
Source: Guidehouse analysis

Figure A-39. eco+ Smart Thermostats TOU Rate Impacts – Missouri West



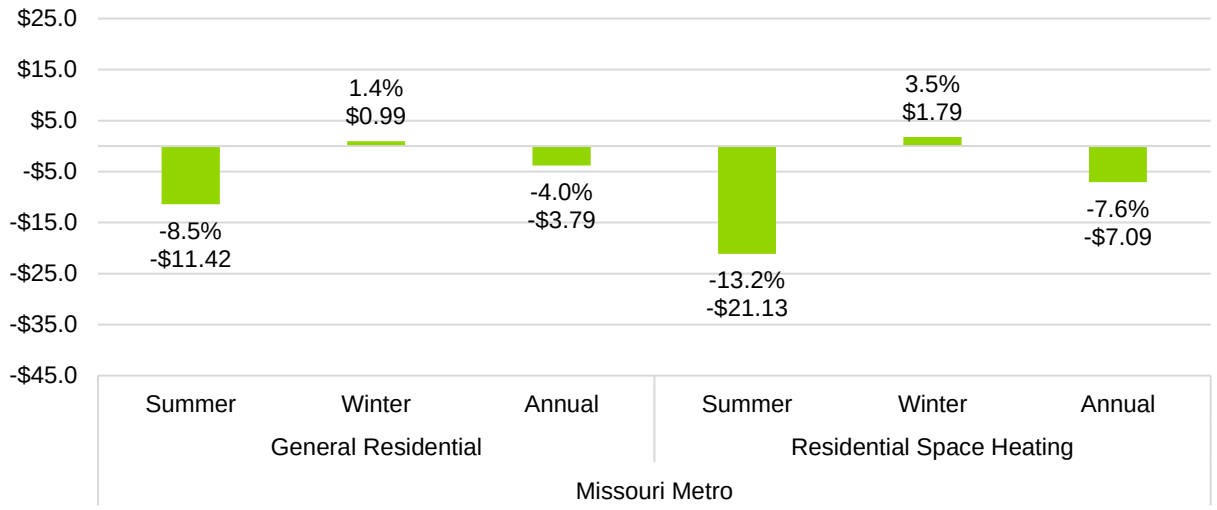
Source: Guidehouse analysis

Figure A-40. eco+ Smart Thermostats Post-Period Load Shapes – Missouri West



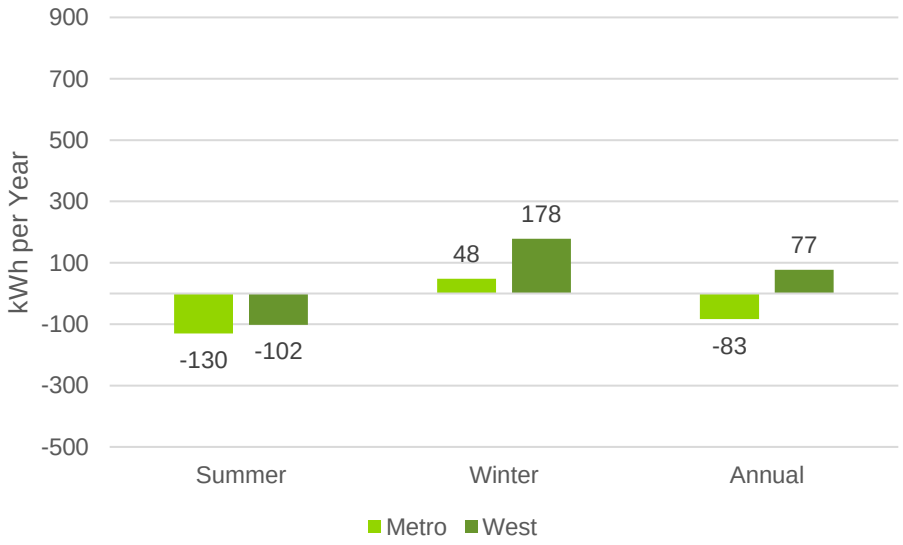
Source: Guidehouse analysis

Figure A-41. eco+ Smart Thermostats Bill Impacts – Missouri West



Source: Guidehouse analysis

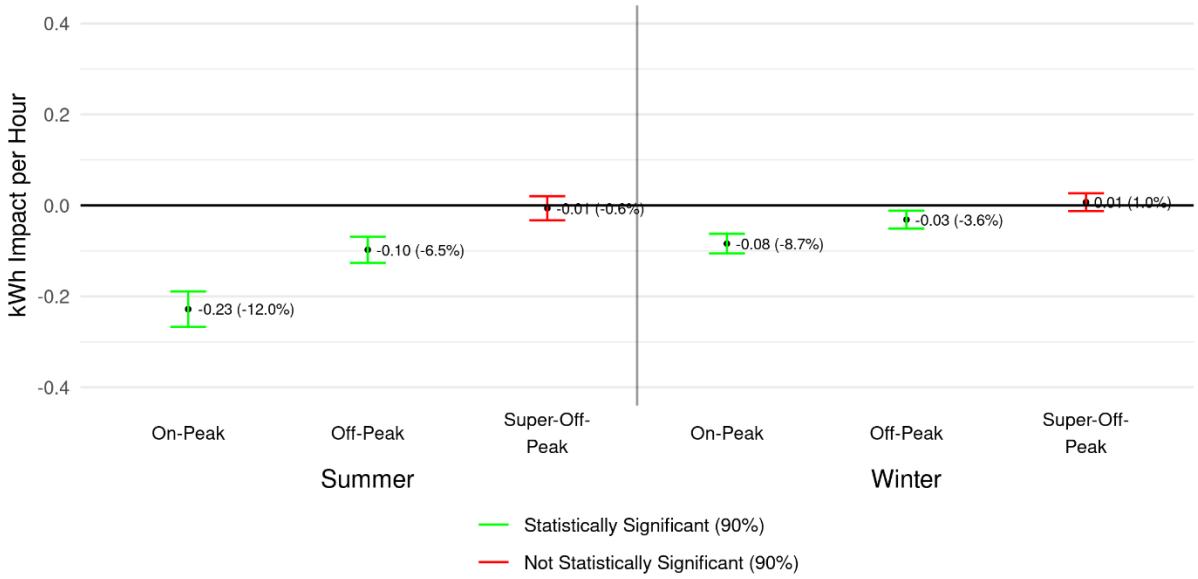
Figure A-42. Conservation Impacts – eco+ Participants



Source: Guidehouse Analysis

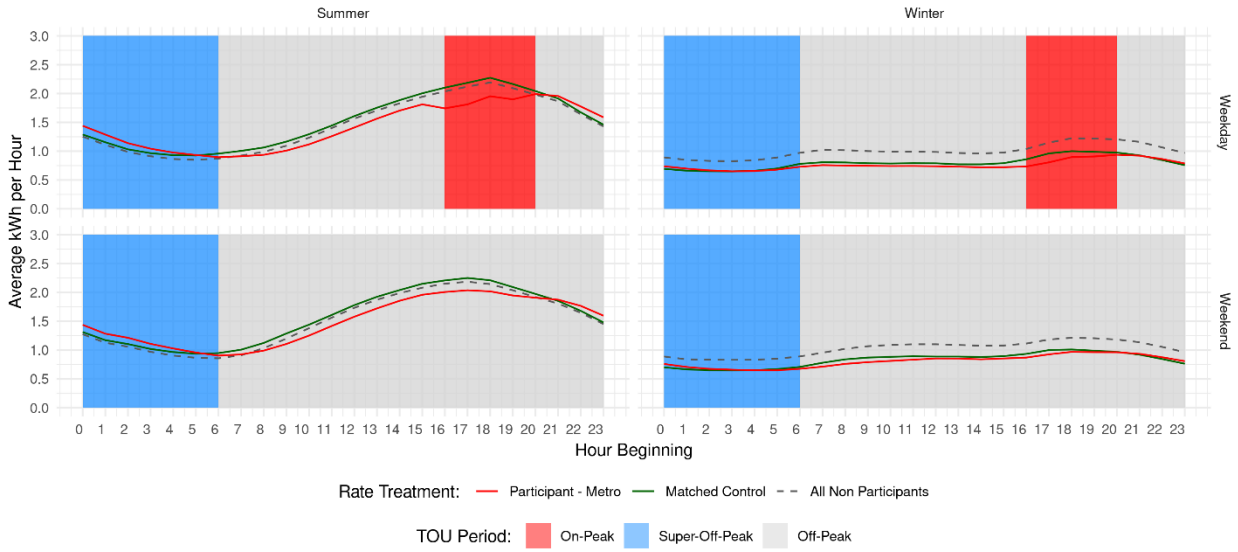
A.7 General Population

Figure A-43. General Population TOU Rate Impacts – Missouri Metro



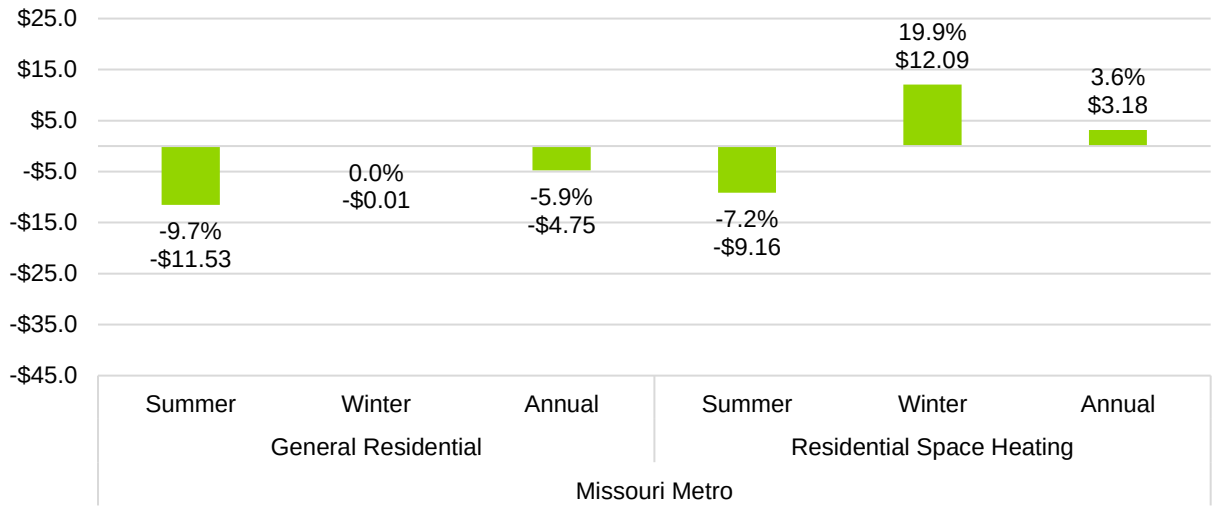
Source: Guidehouse analysis

Figure A-44. General Population Post-Period Load Shapes – Missouri Metro



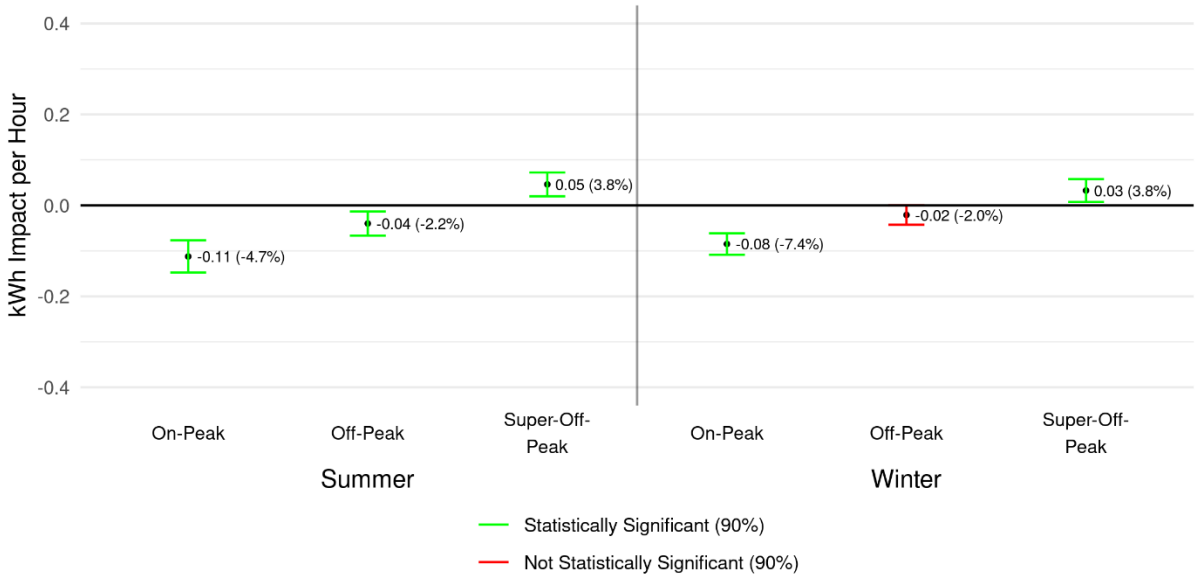
Source: Guidehouse Analysis

Figure A-45. General Population Bill Impacts – Missouri Metro



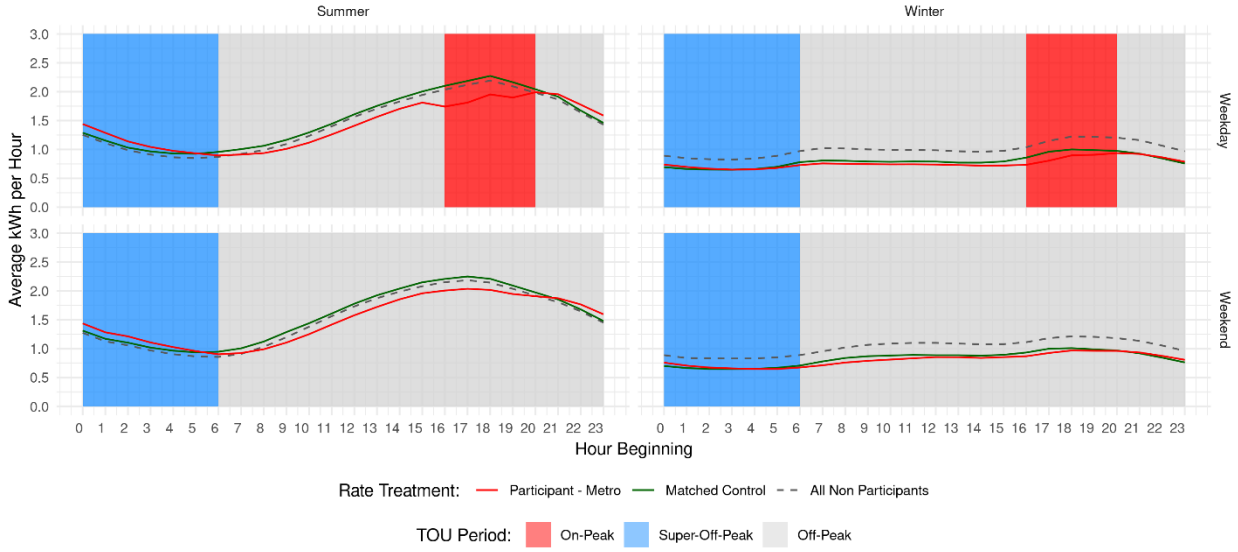
Source: Guidehouse analysis

Figure A-46. General Population TOU Rate Impacts – Missouri West



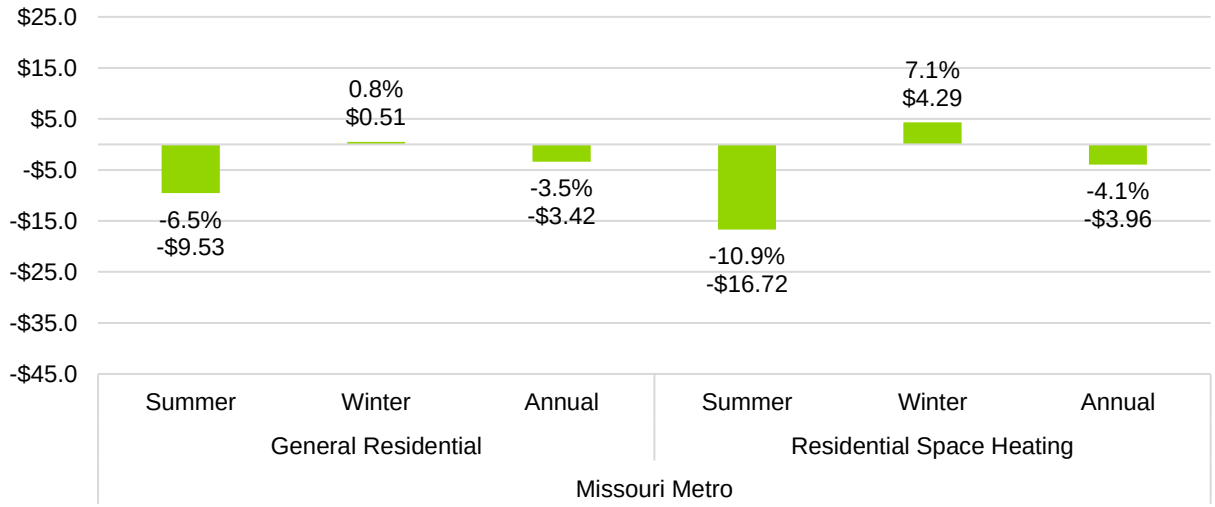
Source: Guidehouse analysis

Figure A-47. General Population Post-Period Load Shapes – Missouri West



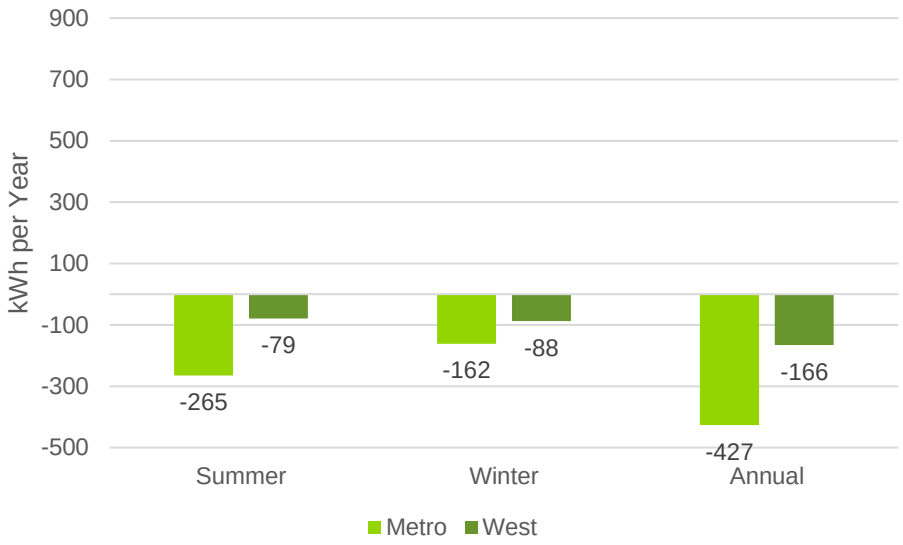
Source: Guidehouse analysis

Figure A-48. General Population Bill Impacts – Missouri West



Source: Guidehouse Analysis

Figure A-49. Conservation Impacts – General Population



Source: Guidehouse analysis

A.8 Customer Research Survey Demographics

This section provides demographic information for the enrollment survey respondents, behavior survey respondents, and cancellation/unenrollment survey respondents. Customers who unenroll in the TOU rate plan are demographically similar to all enrolled customers based on survey responses.

Table A-1. Household Income

Income Level	Enrollment Survey (n=1,562) Percentage	Behavior Survey (n=1,293) Percentage	Cancellation Survey (n=368) Percentage
Lower	33.5%	28.6%	31.5%
Mid	28.5%	28.8%	29.1%
Higher	13.8%	18.7%	17.3%
Prefer not to answer	24.2%	23.8%	22.1%

Table A-2. Education

Education Level	Enrollment Survey (n=1,561) Percentage	Behavior Survey (n=1,291) Percentage	Cancellation Survey (n=289) Percentage
No college degree	34.3%	32.4%	26.6%
Undergraduate degree	37.5%	39.4%	37.4%
Graduate degree	23.1%	25.1%	29.4%
Prefer not to answer	5.2%	3.1%	6.6%

Table A-3. Ownership

Status	Enrollment Survey (n=1,579) Percentage	Cancellation Survey (n=294) Percentage
Owner	71.5%	46.6%
Renter	26.9%	29.3%
Other	1.6%	24.1%

Table A-4. Gender

Group	Enrollment Survey (n=1,560) Percentage	Behavior Survey (n=1,291) Percentage	Cancellation Survey (n=289) Percentage
Female	52.3%	54.5%	56.4%
Male	41.5%	39.7%	35.6%
Prefer not to answer	6.2%	5.8%	8.0%

Table A-5. Age of Participant

Group	Behavior Survey (n=1,291) Percentage
Younger than 18 years old	0.2%
18 to 34 years old	16.9%
Between 35 and 64	52.6%
65 and older	31.3%