

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking on the
Commission's Own Motion to Conduct a
Comprehensive Examination of Investor Owned
Electric Utilities' Residential Rate Structures,
the Transition to Time Varying and Dynamic
Rates, and Other Statutory Obligations.

Rulemaking 12-06-013
(Filed June 21, 2012)

**SAN DIEGO GAS & ELECTRIC COMPANY (U 902-E)
QUARTERLY REPORT
ON PROGRESS OF
RESIDENTIAL RATE REFORM**

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May 1, 2020

ATTACHMENT A

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I. Introduction

Pursuant to Decision (“D.”) 15-07-001, “Decision on Residential Rate Reform for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company and Transition to Time-of-Use Rates” (“Decision”), that the California Public Utilities Commission (“Commission” or “CPUC”) issued on July 13, 2015, San Diego Gas & Electric Company (“SDG&E”) hereby files this quarterly report.

The Decision provides for the implementation of Residential Rate Reform during the years of 2015 to 2020 and a transition to Time-of-Use (“TOU”) rates for residential customers. The Decision also requires the Investor-Owned Utilities (“IOUs”) to provide the Commission and interested parties with regular updates on the progress of understanding TOU rates and other rate reform impacts. These updates, or Progress on Residential Rate Reform (“PRRR”), are reported on a quarterly basis.

This PRRR report is the nineteenth progress update SDG&E has submitted, with previous reports having been submitted on the following dates:

- 2015: November 2
- 2016: February 2, May 2, August 1, November 1
- 2017: February 1, May 1, August 1, November 1
- 2018: February 1, May 1, August 1, November 1
- 2019: February 1, May 1, August 1, November 1
- 2020: February 3

II. Marketing, Education & Outreach (“ME&O”)

A. ME&O Plan

On February 8, 2018, the Commission adopted Resolution E-4910 approving, with modifications, SDG&E’s ME&O Plan filed by Advice Letter (“AL”) 2992-E submitted on November 1, 2016 and supplemental AL 2992-E-A submitted on March 15, 2017. On March 30, 2018, SDG&E filed AL 3207-E with updated information related to its ME&O plan in compliance with Ordering Paragraph 2 of the Resolution. Subsequently, SDG&E filed supplemental AL 3207-E-A on August 16, 2018 outlining slight revisions to its ME&O plan after learning more about the developing Statewide campaign.

On April 12, 2019, SDG&E filed AL 3352-E to update its ME&O budget by requesting an additional \$5.53 million for ME&O activities. Key drivers for the budget update included communications development, general and digital media, direct marketing and labor activities. Upon disposition of AL 3352-E, SDG&E will adjust its budget accordingly.

B. Community Outreach and Engagement

i. SDG&E’s Energy Solutions Partner Network (Community Based Organizations)

SDG&E’s Energy Solutions Partner Network is a key resource in communicating with its underserved and hard-to-reach customers. The network of nearly 190 grassroots, diverse, community-based organizations throughout SDG&E’s service area helps to engage customers in energy-saving solutions, including enrollment in applicable programs, services, tools and pricing plan options. As part of Rate Reform outreach and education efforts this quarter and throughout 2019, this network helped educate its constituents about SDG&E’s TOU pricing

plans, as well as energy management tools such as My Account, My Energy, the My Energy survey and the benefits of enrolling to receive goals and alerts.

In Q1 2020, outreach activities included:

- **57 events** reaching more than 4,000 people;
- **21 presentations** reaching more than 650 people; and
- **151 online activities** (social media posts, e-blasts, website posts) reaching more than 328,000 people.

During the 57 events in Q1, SDG&E's outreach staff connected customers with a variety of energy saving solutions including TOU plans, home upgrade programs like energy savings assistance ("ESA"), energy management tools, goals and alerts, programmable thermostats and more. The team continued to use the Whendell-branded outreach booth and materials at events where TOU was promoted. A life-size Whendell mascot was featured at several events throughout the quarter to draw attention to the 4 p.m. to 9 p.m. on-peak messaging. Below are few event examples from the quarter.

Assemblyman William Brough

On January 9, Outreach presented at the SDG&E Time-of-Use Forum to Assemblyman William Brough's 73rd District. The presentation was delivered at the San Juan Capistrano Library attracting some 60 attendees. The group was interested in the content and had many questions as some customers had recently received TOU transition communications. The District Director expressed gratitude and indicated she gained valuable information during the presentation.

Cesar Chavez Elementary

On February 7, the SDG&E Outreach team presented to parents from Cesar Chavez Elementary at their monthly “Coffee with the Principal” meeting. Presentations like this are scheduled throughout the year to help educate parents on pricing plans, programs and tools or other community focused updates to help customers save money and better manage their energy use.

ii. Critical Customer Groups Outreach

Oceanside Senior Center

On February 13, the Outreach team presented on TOU and SDG&E programs to 25 seniors for a “lunch and learn” at the Oceanside Senior Center. Most of the guests were already on TOU plans either through the transition journey or they opted into them. Most questions were on how to read their bills, and how solar is connected with the new pricing plans (TOUDR1 and TOUDR2). Customers were neutral or happy with the new plan choices, and some attendees stayed after the meeting to review bills and My Account with SDG&E’s Outreach staff.

Metropolitan Area Advisory Committee (MAAC)

The MAAC and SDG&E partnered to bring presentations to customers enrolling in the MAAC program. During these presentations, SDG&E offered training on TOU pricing plans and provided information on various residential programs. These presentations are done two to three times a month to approximately 10 participants at a time. The partnership has proven to be successful and customers report they’re benefiting from the information given to them.

C. Combining IDSM with TOU: CARE Programmable Communicating Thermostat (PCT) TOU Pilot

On May 3, 2018, SDG&E received approval of Advice Letter 3197-E/2655-G for the PCT or Smart Thermostat TOU Pilot, ordered in D.17-12-009. The goal of the pilot was to explore and evaluate whether a PCT paired with a mobile application impacts the behavior of high usage customers as they transition to TOU. At the end of Q1 2020, the Final Evaluation Report, authored by Evergreen Economics was submitted jointly by SCE, SDG&E, and PG&E. The full report is attached in Appendix D. It is important to note the statewide sample size for this pilot was small and is not likely to yield statistically significant results. However, some of the key findings of the report include:

TOU Plan

- There is a general understanding of the TOU periods and items in the homes that use energy
- Over 80% of respondents understand when energy costs the most
- Respondents also understand what uses energy the most

TOU Plan + Smart Thermostat

- 93% of the treatment group has a smart phone or an internet connected device
- 48% of the respondents (with thermostat and TOU) reported that they always or mostly control their smart thermostat with their smart phone or internet connection.
- Only 16% of respondents said that they never use their smart device.

TOU Plan + Smart Thermostat + Eco Plus

- Respondents with the Eco+ firmware installed on their thermostats were not widely confident in the thermostat's ability to help them control their energy use.

The report concludes that statewide participants were generally satisfied with their thermostats but that the smart thermostat alone is likely not a valuable program tool for reducing peak usage, though it can help improve customer awareness. For SDG&E, the report also concludes that customers used the thermostat to save more energy in the winter than in the summer months, however they did cut back in both seasons. It also concludes that both the treatment and control group for SDG&E showed a sudden drop in energy usage at 4:00 p.m. and was maintained during the peak period. This could be due to SDG&E's early adoption of TOU plans and other education related to those efforts in addition to the smart thermostat.

D. Annual Bill Comparisons

Defined in CPUC code 745(c)(5), each of the IOUs are required to provide all customers with a summary of their pricing plan options with estimated annual costs at least once per year. In Q1 2020, SDG&E completed communications and operational plans to meet this requirement. Customers will receive communications through 1 of 2 channels, direct mail or email, and in-language, either English or Spanish. Furthermore, customers with many service contracts on their account will get their communication in a grouped, multiple-meter layout to help improve the customer experience and reduce potential confusion. Initial mailings are scheduled for June 2020 and will continue throughout the year. Target group sizes and timing may be shifted, if needed, to support the most positive customer experience and minimize impact to the Customer Contact Center. Additional updates on customer communications, operational plans and timing will be shared in future PRRR reports.

E. Earned Media

In Q1 2020, SDG&E was focused on educating reporters on seasonal TOU best practices for customers. TOU pricing plans and the larger TOU transition were discussed in media stories and interviews several times in 2019 to support the initial waves of the TOU transition, and SDG&E plans to continue to communicate and educate customers through this channel as news stories and subjects call for it. SDG&E is also continuing to coordinate with the statewide TOU education campaign and plans to utilize earned media to further educate customers about TOU in this space moving forward.

F. Advertising and Paid Media

SDG&E's advertising and paid media strategy evolved throughout the larger TOU transition period. Throughout 2019, SDG&E focused predominantly on providing general awareness and understanding of TOU while introducing Whendell, SDG&E's TOU smartwatch spokesperson. The focus in Q2 shifted to emphasize customer choice and control, and to reinforce understanding of TOU time periods, especially between 4 p.m. and 9 p.m. Q3 focused on behavioral tips to help TOU customers be successful on their new plans, especially during the summer months. This messaging continued in Q4 with the addition of new, seasonally appropriate tips for success. In Q4, SDG&E continued to use its TOU messages across a host of tactics. SDG&E continued the mass media tactics deployed in the prior quarters such as: media activities including TV spots, radio spots and DJ endorsements, print ads, out-of-home advertising, and digital advertising (paid search, paid social, display). SDG&E also continued tactics specifically targeting critical customer groups, including Asian-language digital and Spanish-language print, radio, and digital advertising.

In Q1 2020, SDG&E started a new “thank you” communication campaign encouraging and thanking the over 800,000 customers enrolled in TOU pricing plans for their commitment to TOU and provided them with tips and solutions to continue their successful behavior moving forward. This campaign continued to show up across many mediums as highlighted in previous quarters. Some campaign examples are featured below. Later in the quarter, SDG&E halted all paid advertising such as TV, radio, print, and digital in light of the COVID-19 pandemic. Paid search advertising continued as customers actively seeking information regarding TOU could still benefit from being directed to relevant information on sdge.com/whenmatters as efficiently as possible. In addition, an update was made on the sdge.com/whenmatters landing page to address COVID-19 and provides links to the newly developed sdge.com/coronavirus and sdge.com/stayathometips pages for more information.



Digital Ad – Chinese



Print Ad - Spanish



TV Spot – General Market

At the end of the quarter, a total of 108M impressions (40.5M from digital advertising; 67.5M impressions with traditional mass media tactics) were achieved via SDG&E’s multi-channel marketing efforts. Collectively, 500M total impressions have been generated from SDG&E’s 2019 and 2020 campaigns. (140M from digital advertising; 360M from traditional mass media tactics).

G. TOU Landing Page

Throughout 2019 and 2020, SDG&E enhanced content on its TOU landing page, sdge.com/whenmatters in response to customer feedback regarding the TOU transition journey and to provide timely, seasonal information. The page is continuously monitored and updated to improve the overall customer experience, where appropriate.

In Q1 2020, updates to the TOU landing page included adding information on SDG&E's COVID-19 response and provided links to the newly developed sdge.com/coronavirus and sdge.com/stayathometips pages for more information.

Online visits to the dedicated TOU webpage remained consistent from Q4 2019 to Q1 2020. The page received 229,331 total page views, 198,167 unique page views and visitors spent approximately 2 minutes and 4 seconds on the page.

III. High Usage Charge (“HUC”)

On November 1, 2017, SDG&E implemented the High Usage Charge (HUC), which applied to customers who use more than four times their baseline allowance. The table below represents the number of customers who incurred this charge by month in Q1 2020.

High Usage Charge Impacted Customers Q1 2020	
January	12,454
February	7,024
March	3,338

At the end of Q1 2020, there were nearly 67,000 total subscriptions for HUC alerts. These HUC notifications include tips and resources for customers who approach and reach the

HUC thresholds (350% and 400% of their baseline allowance). The following table outlines the distribution of SDG&E's Q1 2020 HUC alert notifications.

High Usage Charge Notifications Distributed between January and March 2020			
	350% of Baseline Allowance	400%+ of Baseline Allowance	Total Notifications
Direct Mail	8,061	5,395	13,456
Email	2,039	989	3,028
Text (SMS)	541	320	861

Additionally, in March 2020, SDG&E sent an educational communication to 313 new customers who moved during Q1 into a home or apartment that has a history of exceeding the 350% of baseline allowance. The objective of this piece is to educate customers moving into new homes on the HUC and how it may apply to them at their new residence. The communication provides tips, tools and resources to help customers avoid the HUC and suggests TOU pricing plans as a potential solution since they are not subject to this charge.



General High Usage Education Letter

Larger samples of all the HUC communications sent to customers in Q1 can be found in Appendix B.

SDG&E's HUC webpage, sdge.com/highusage, also provides education about baseline allowance and solutions to help customers avoid the charge, and better manage their energy use. The page was updated throughout



sdge.com/highusage

2019 as needed to provide additional clarifying information and answer frequently asked questions. SDG&E will continue this pattern in 2020, as needed. In Q1 2020, the page received over 8,300 views with almost 7,000 unique page views. Viewers spent an average of 2 minutes and 18 seconds on the page during the quarter.

IV. 2018 Residential TOU Default Pilot

A. Peek™ Device

In conjunction with the end of their first year on TOU, in April 2019, SDG&E sent randomly selected Default Pilot customers a Peek™ device. Peek, a product of Ceiva Logic Inc., is a disc-shaped plug-in device that can help customers build awareness of TOU time periods along with its corresponding mobile app.



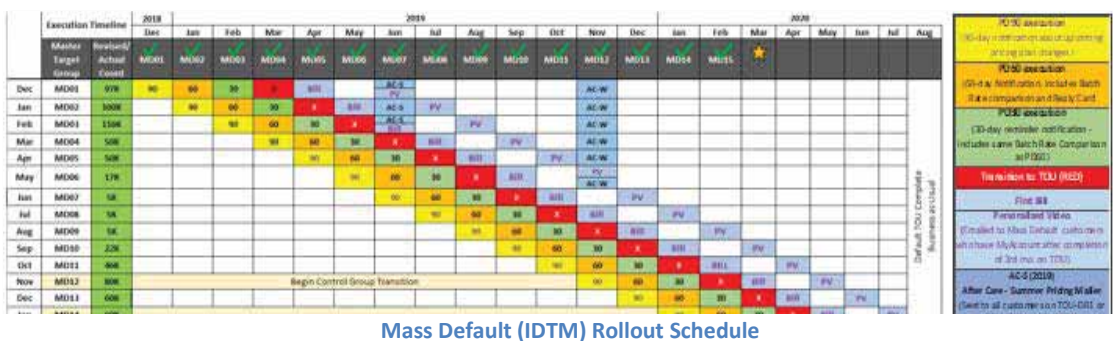
Peek Device and Mobile App

By the end of Q1 2020, 298 customers had activated their Peek devices and downloaded the mobile app. In April 2020, SDG&E will review first-year TOU data for Default Pilot customers who received and activated a Peek device to see if usage differed from that of the TOU Default Pilot control group during the same year. Overall Peek device study results will be shared in the Q2 2020 PRRR report.

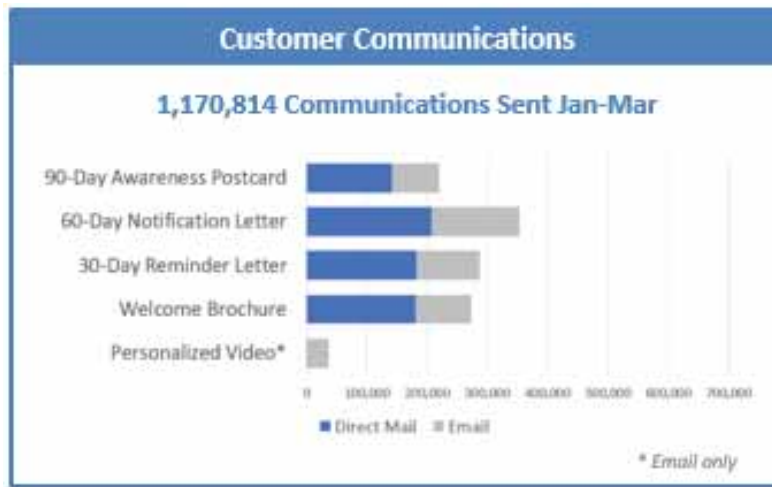
V. 2019/2020 Residential Mass Default to TOU (“IDTM”)

A. Mass Default Rollout Update

Throughout 2019 and 2020, SDG&E is transitioning nearly 797,000 residential customers on a rolling monthly cadence to a TOU pricing plan (TOU-DR1). Pre-transition communications for the first target group began in December 2018 to kick off more than 5 million communications to transition customers throughout the rollout. Although the initial plan included 14 target groups, during Q1 2020, it was determined that an additional group would be necessary to incorporate accounts that had recently become eligible for transition. This final target group included about 20,000 accounts that opened in February 2019 and just over 60,000 accounts that did not have 12 consecutive months of data available until January 2020.



In Q1 2020, SDG&E started transitioning the final groups and sent approximately 220,000 90-day awareness direct mail postcards and emails; 353,000 60-day notification direct mail letters and emails; 287,000 30-day reminder letters and emails; 273,000 welcome letters and emails; and 37,000 personalized videos via email.



New in Q1 2020, SDG&E began sending Bill Protection Ending (BPE) letters to its first groups of customers who transitioned to the new rates last year in March and April. The BPE letter informs customers they are approaching their one-year anniversary of being on a TOU pricing plan and provides an explanation of how to understand the one-year pricing comparison. The letter also further explains their options when they reach their anniversary date.



Bill Protection Ending Letter

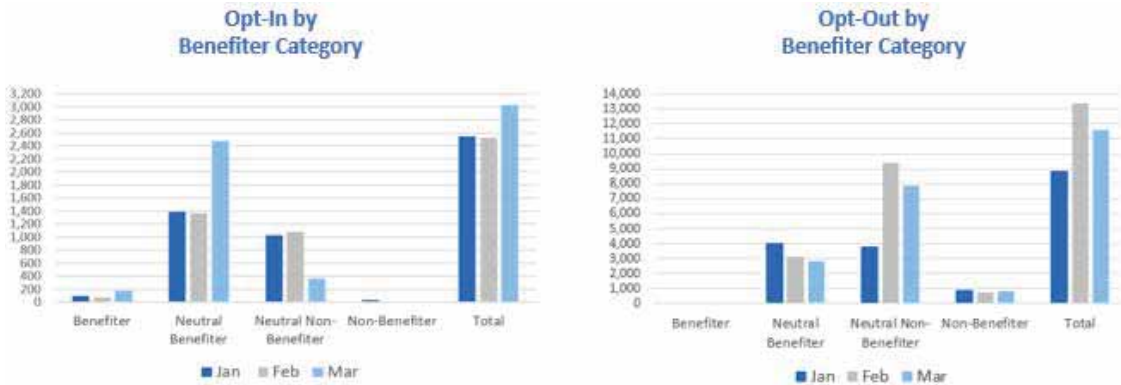
Email open and click through rates continued to be strong for the Mass Default transition communications. During Q1, the overall open rate for transition communications was 53.4% with a click through rate of 6.9%. As shown in the following table, engagement rates for almost all emails increased, and the PD90 and PD60 were the highest compared to other pre- and post-transition emails..

Q1 2020 Pre- and Post-Transition Communications Email Engagement			
Communication		Open Rate	Click Through Rate
Pre- Transition	PD90 Awareness Postcard	65.37%	4.72%
	PD60 Notification Letter	65.37%	10.36%
	PD30 Reminder Letter	54.77%	7.15%
Post- Transition	Welcome to Your New Plan	57.98%	8.30%
	Personalized Video	43.56%	3.71%

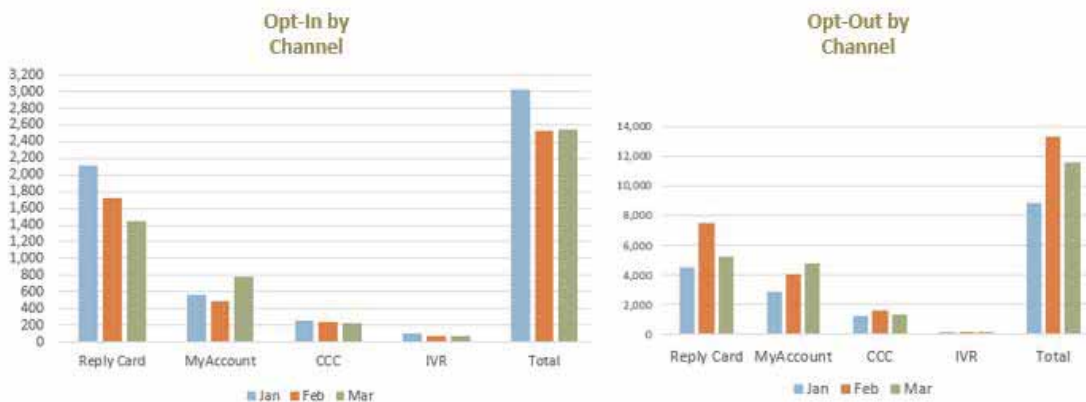
From December 2018, to the end of Q1 2020, just over 6,076,000 total Mass Default communications have been sent. These communications were sent to a total of nearly 797,000 customers, 411,000 of whom were active on TOU-DR1 by the end of Q1. The table below shows the status of all customers who have received the 90-day notification letter as part of this transition.

	Active			Pending			Opt-out to non-TOU (DR)	Chose another TOU plan	Attrition	All
	Transitioned to TOU-DR1	Opt-in to TOU-DR1	Opt-in to TOU-DR2	Transitioning to TOU-DR1	Opt-in to TOU-DR1	Opt-in to TOU-DR2				
Total	411,083	18,937	7,441	118,297	1,004	383	115,979	12,966	110,670	796,759
% of Customers	51.59%	2.38%	0.93%	14.85%	0.13%	0.05%	14.56%	1.63%	13.89%	100%

Outlined in the chart below, 64% of customers opting-in to TOU-DR1 during Q1 were customers categorized as Neutral Benefitters. Neutral Non-Benefitters were the most active group to opt -out.



Below are charts illustrating customers’ plan selections by channel. During Q1 2020, 65% of customers used the reply cards included with their 60-day pre-transition communications to opt-out while 23% used MyAccount online. Nine percent (9%) of customers called the customer care center and 3% used interactive voice response (“IVR”). The reply card was also the most used channel by customers who selected to opt-in. 51% of customers used the reply card to opt-in, and 35% of customers used MyAccount. 12% of opt-ins were through the customer care center, and 2% were through IVR.



Feedback from customers who chose to opt-out remained consistent with prior quarters. About 46% of customers opting out simply preferred to keep their current plan. Almost 17% of customers shared that they could not shift their energy use away from the 4 p.m. to 9 p.m. on-peak period, and another 16% indicated that they would not see enough savings to justify making a plan change.

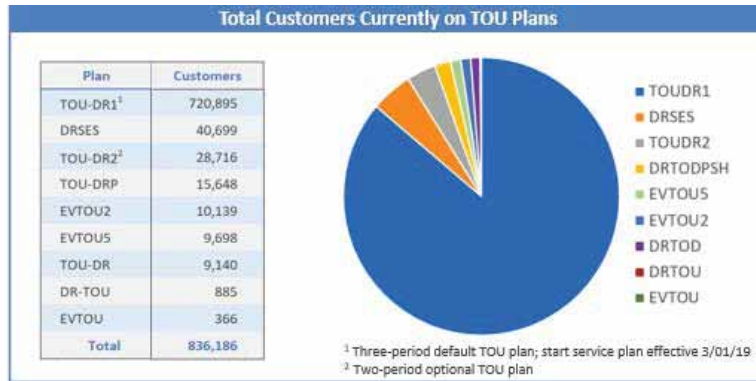
B. Customer Engagement

Q1 2020 saw more 3,400 TOU-related calls to the customer care center. About 50% of these calls were customers asking for clarification, while 30% were calling to opt-out of TOU. In Q1 2020, SDG&E's dedicated TOU webpage, *sdge.com/whenmatters*, received nearly 229,000 visits with just over 198,000 unique visitors. Use of the online bill comparison tool increased 40% in Q1 with 2,700 visits and 2,200 unique visitors.



C. Residential Customers on TOU Pricing Plans

Since March 1, 2019, new SDG&E accounts begin electric service on TOU-DR1 if the customer does not choose another plan. By the end of Q1, SDG&E had ust over 836,000 residential customers on one of nine TOU pricing plans.



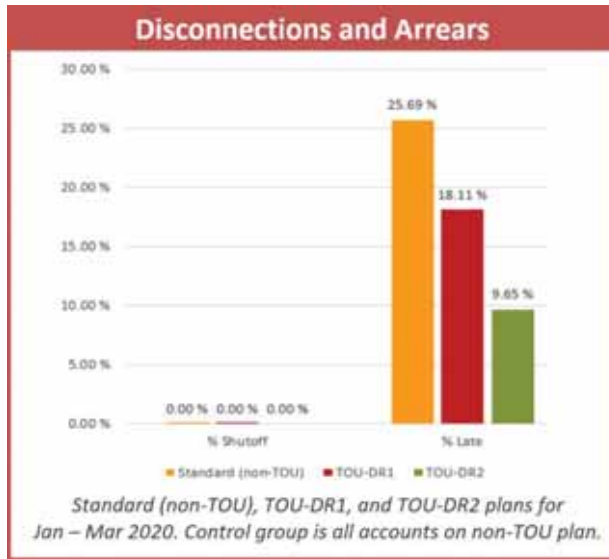
As it did with the Default TOU Pilot, SDG&E compares forecasted bills to actual bills for IDTM customers. The table below shows that in Q1 2020, about the same number of customers benefitted on TOU as originally projected.

Estimated vs. Actual Benefiter Categories

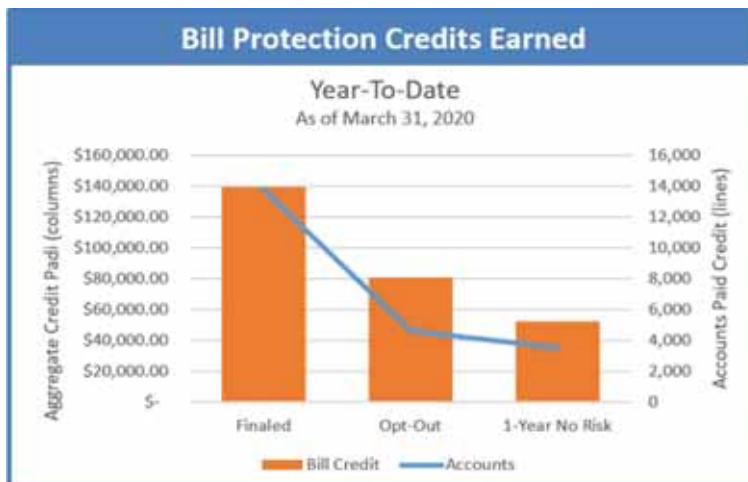
Based on Bills from Jan to Mar 2020

Benefiter Category	Estimated	Actual	Estimated	Actual
Benefiter	6,229	8,016	1.6 %	2.1 %
Neutral Benefiter	209,788	207,207	54.7 %	54.0 %
Neutral Non-Benefiter	167,465	167,453	43.6 %	43.6 %
Non-Benefiter	257	1,063	0.1 %	0.3 %
Total	383,739	383,739	100%	100%

SDG&E also continues to monitor whether TOU impacts the number of customers in arrears or that were shut off due to non-payment. The chart below compares customers in the mass default population compared to customers enrolled on the standard tiered plan (DR/DRLI). During Q1 2020, the rate of shut offs due to non-payment and the percentage of accounts in arrears remained similar to shut offs and arrears in previous quarters.



By the end of Q1 2020, approximately 3,545 Mass Default transition customers reached the anniversary of their 1-Year No Risk Pricing and were issued a collective \$52,391 in bill credits - an average credit of \$14.78 per customer. Also during the quarter, \$139,573 in bill protection credit was issued to 13,778 customers who closed accounts, and another \$80,657 issued to 4,612 customers who elected to switch from their TOU transition plan back to their former, tiered plan. The average credit for customers who closed their account was \$10.13, and the average for opt outs was \$17.49 per customer.



VI. Customer Research and Insights

A. TOU Default Customer Experience Survey: “Pulse” Survey

SDG&E continues to survey customers who recently transitioned to a TOU pricing plan. Each survey group (two-month groupings) is surveyed twice until the TOU transition period is completed in 2020. The first survey occurs shortly after transition, and the second occurs six to seven months afterward. Like the Default TOU Pilot research, the surveys are conducted by Hiner & Partners using a mixed-mode methodology (100 phone, about 200 online). The first survey measures awareness of the transition, understanding of plan choices, knowledge of peak hours, awareness of 1-year no-risk pricing, recall of specific communications, and awareness of where customers can get more information from SDG&E. The second survey addresses customer satisfaction on TOU, engagement in shifting energy usage, and impressions of their bill.

To date, five of the seven survey groups have completed the first “awareness” survey. Additionally, the first two groups of defaulted customers completed their second “satisfaction” survey early this year. Overall, to date, most scores are higher in comparison to the 2018 Default Pilot, particularly awareness of TOU pricing, awareness of advertising, and understanding of TOU plan details and impacts to a customer’s bill. The first groups of customers to transition reported a better understanding of how to manage on their current plan, as we saw an increase in their follow-up survey. Customers who transitioned in late fall (November/December 2019) indicated higher levels of understanding the benefits of lowering and shifting use away from peak times.

Below are charts illustrating some of these results from surveys 1 and 2 in more detail:

Key Measures: Survey 1 Trends

Metric	Key Measures	Survey 1									
		Pilot	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Answer Choice	
		Survey 1 May '18	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov-Dec	Jan - Feb	Mar-Apr		
		n=	3262	309	333	332	316	318			
-	Aware of Tiered pricing plan	72%	75%	72%	71%	75%	81%	-	-	% Yes	
-	Aware of TOU pricing plan	80%	88%	91%	87% ↓	91% ↑	89%	-	-	% Yes	
-	Have Tiered pricing plan	35%	21%	23%	25%	16% ↓	24% ↑	-	-	% Yes	
-	Have TOU pricing plan	49%	67%	64%	66%	56% ↓	60%	-	-	% Yes	
1	Pricing plans are available that could help you save money	61%	63%	62%	57%	58%	56%	-	-	% Yes	
-	You can choose to change your pricing plan	60%	72%	72%	64% ↓	66%	63%	-	-	% Yes	
-	Pricing plans are available that give you more control over your bill	56%	62%	61%	54% ↓	55%	54%	-	-	% Yes	
-	New Time-of-Use or T-O-U pricing plans are now available to all SDG&E customers	52%	61%	65%	60%	63%	63%	-	-	% Yes	
-	A choice of pricing plans is available so you can decide which pricing plan best suits your needs	62%	68%	71%	66%	68%	65%	-	-	% Yes	
-	Throughout 2019, many residential customers will be transitioned onto T-O-U pricing plan	47%	72%	74%	74%	72%	71%	-	-	% Yes	
-	A personalized pricing plan comparison is available to help you choose ...	47%	52%	47%	47%	45%	46%	-	-	% Yes	

Key Measures: Survey 2 Trends

Metric	Key Measures	Survey 2								
		Pilot	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Answer Choice
		Nov '18	Mar - Apr	May - Jun	Jul - Aug	Sep - Oct	Nov-Dec	Jan - Feb	Mar-Apr	
		n=	3190	367	336					
-	Aware of Tiered pricing plan	70%	70%	71%	-	-	-	-	-	% Yes
-	Aware of TOU pricing plan	81%	91%	89%	-	-	-	-	-	% Yes
-	Have Tiered pricing plan	30%	23%	19%	-	-	-	-	-	% Yes
-	Have TOU pricing plan	54%	88%	68%	-	-	-	-	-	% Yes
1	Pricing plans are available that could help you save money	47%	59%	49% ↓	-	-	-	-	-	% Yes
-	You can choose to change your pricing plan	52%	61%	56%	-	-	-	-	-	% Yes
-	Pricing plans are available that give you more control over your bill	46%	53%	47%	-	-	-	-	-	% Yes
-	New Time-of-Use or T-O-U pricing plans are now available to all SDG&E customers	45%	54%	55%	-	-	-	-	-	% Yes
-	A choice of pricing plans is available so you can decide which pricing plan best suits your needs	52%	62%	58%	-	-	-	-	-	% Yes
-	Throughout 2019/2020, many residential customers will be transitioned onto T-O-U pricing plan	43%	77%	77%	-	-	-	-	-	% Yes
-	A personalized pricing plan comparison is available to help you choose ...	39%	45%	38% ↓	-	-	-	-	-	% Yes

B. Statewide/Local TOU Advertising Campaign Effectiveness Research

In October 2019, research firm Ipsos conducted the second wave of the Statewide/Local TOU Advertising Campaign Effectiveness Research. The study measures the effectiveness of statewide and local advertising on the Key Vision Metrics (“VM”) per the Greenberg Blueprint, specifically related to Engagement, Rate Choice, and Action in Year 1 and Year 2 of customers being on TOU. SDG&E included a total of 10 different TV, Radio, OOH, Print and Digital assets in the testing, alongside 12 assets from the Energy Upgrade California (“EUC”) Campaign. In Q1, SDG&E’s results show a positive impact year over year, especially in the areas of Rate Choice and Action. Below are some of the key findings.

Key findings include:

The SDG&E service territory saw significant lifts in these specific areas compared to Year 1, particularly in Rate Choice and Action. In addition, targets were reached for all of these (two in each of the three VM categories), in Year 2:

- The time of day I use electricity matters
- Understanding of the difference in peak/non-peak hours
- Understanding of rate plan choices
- Satisfaction with rate plan
- Understand benefits of shifting/reducing
- Taken actions to reduce of shift during peak times
- Is a company I trust

In SDG&E's territory, the combined campaigns reached 75% of customers (who noticed at least one ad of the SDG&E or EUC campaigns); 18% only saw IOU ads, 16% only saw statewide EUC ads.

- Total reach of the EUC campaign in SDG&E's service area was 57%. Procrastination (TV), Glory (Radio) and OOH achieved the highest break through.
- Total reach of the IOU campaign in SDG&E's area was 59%. TV, OOH and Print achieved most success.
- Reach aside, as far as actually moving the Vision Metrics, the EUC online videos (Seize the Day, Good Things, Time for Everything) and the 39 Million Heirs TV ad had the most impact on moving the Engagement and Action metrics.

VII. Updates on Other Proceedings Impacting Residential Rate Reform and Next Steps for Rate Reform

Other current proceedings impacting activities related to the implementation of Residential Rate Reform are provided in this section.

A. 2018 Residential Rate Design Window (RDW) Application

Phase IIA is complete. On December 21, 2018, the Commission issued a final decision (D.18-12-004) for RDW Phase IIA. The final decision approved, among other things, SDG&E's ME&O and implementation plans, its proposed 3-period tiered TOU rate as the default rate, and its proposed 2-period tiered TOU rate as an optional rate for residential customers. SDG&E filed AL 3325-E and supplemental AL 3325-E-A on December 21, 2018 and January 10, 2019, respectively, to revise its tariffs in accordance the final decision. SDG&E received a Commission disposition letter on January 15, 2019, approving AL-3225 and AL 3325-E-A, effective January 1, 2019.

Phase IIB, focusing primarily on SCE's and PG&E's TOU rollout plan plus common IOU issues including Community Choice Aggregation (CCA) and Greenhouse Gas (GHG) calculations, is also complete. Hearings were held early-January 2019. A decision was issued on July 11, 2019 requiring no action from SDG&E. The decision ordered PG&E and SCE to begin defaulting applicable residential customers to TOU rates in October 2020.

Phase III was completed in March 2020 when the commission declined to adopt residential fixed charge proposals for the California IOUs and instead maintained residential minimum bills at present levels. The Commission has instructed SDG&E to propose an optional, untiered TOU rate with a fixed charge that would be available to residential customers with electric vehicle, energy storage, or heat pump technologies. This proposal will be made in SDG&E's next available rate design application.

B. Application to Eliminate Seasonality from Residential Rates

On September 23, 2019, SDG&E filed an application requesting to eliminate the summer and winter seasonal differentiation in its residential electric rates, including all TOU plans. If approved, SDG&E's application will reduce summer season rates and increase winter season rates, so residential customers will experience a single set of rates year-round. This proposal will help to reduce summer bills and bill volatility overall associated with increased usage during the summer. SDG&E's proposal will not affect residential baseline allowances (allowed kWh consumption at the lowest tier), which will still vary by season. This application is on an expedited procedural schedule, consistent with Commission direction, in order to implement before Summer of 2020.

Additionally, a second phase of SDG&E's seasonality application will address the residential HUC on a statewide basis. As part of this phase, the Commission will consider a short-term reduction to the HUC, to be effective June 1, 2020.

C. Rate Reform OIR Next Steps (R.12-06-013)

The current status and procedural schedule to move forward in addressing the next steps in the proceeding are as follows:

- Statewide ME&O – At the Commission's direction, in D.17-12-023, SDG&E continues to coordinate with the statewide agencies including the ME&O Coordinator (Coleman Inc.), IPSOS, OMD and the DDB Group. On November 30, 2019, Energy Division approved Advice Letter 3458-E, giving SDG&E the approval to amend the contract with Coleman Inc. as the ME&O Coordinator. As appropriate, SDG&E and DDB share the latest earned and paid media tactics and results in the San Diego market.
- Phase 4 – An Assigned Commissioner's Scoping Memo and Ruling was issued to address the following: 1) PG&E's "Proposal to Recover 2015-2016 Costs Recorded in the Residential Rate Reform Memorandum Account"; 2) whether the Commission should adopt a proposal to restructure the California Alternate Rates for Energy (CARE) program; 3) the continuing role of the working groups; and 4) modification or elimination of reporting requirements. No further working groups or actions occurred or are scheduled for 2020.

VIII. Expenditures

Pursuant to Ordering Paragraph 12 of D.15-07-001, SDG&E filed a Tier 1 AL 2769-E on July 31, 2015 to establish the RRMA. The RRMA is used to track verifiable incremental costs in

the following categories: (i) TOU pilots, (ii) TOU studies, including hiring of a consultant or consultants to assist in developing study parameters, (iii) ME&O costs associated with the rate changes approved in D.15-07-001, and (iv) other reasonable expenditures as required to implement D.15-07-001.

IT costs related to system changes required to implement Residential Rate Reform that are not TOU pilot-related are funded through the SDG&E base capital budget and will be excluded from the RRMA. These costs, along with other ME&O costs not included in the RRMA, are reflected in the “Non-RRMA” section of the following table.

The following table summarizes costs incurred from August 2015 through March 2020. See Appendix A for expenditure details.

Rate Reform Expenditures Summary

Rate Reform Costs Aug 2015 - March 2020*																						
	Aug - Dec 2015	Q1 - 2016	Q2 - 2016	Q3 - 2016	Q4 - 2016	Q1 - 2017	Q2 - 2017	Q3 - 2017	Q4 - 2017	Q1 - 2018	Q2 - 2018	Q3 - 2018	Q4 - 2018	Q1 - 2019	Q2 - 2019	Q3 - 2019	Q4 - 2019	Q1 - 2020	Total Budget	Total Spend	% PTD Spent of Budget	
RRMA: Time-Of-Use (in 000's)																						
TOU Mass Default Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 41	\$ 208	\$ 208	\$ 401	\$ 1,101	\$ 2,688	\$ 5,579	\$ 4,380	\$ 4,120	\$ 3,584	\$ 22,311	\$ 19,374	115.2%
TOU Default Pilot Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 225	\$ 372	\$ 324	\$ 868	\$ 2,782	\$ 1,193	\$ 1,579	\$ 1,422	\$ 1,105	\$ 76	\$ 45	\$ 3	\$ 30	\$ 10,025	\$ 11,864	\$ 84.5%	
TOU Opt-in Pilot Total	\$ -	\$ -	\$ 452	\$ 2,715	\$ 940	\$ 697	\$ 503	\$ 1,606	\$ 500	\$ 377	\$ 9	\$ 22	\$ 14	\$ -	\$ (2)	\$ 1	\$ -	\$ 11	\$ 7,845	\$ 9,020	\$ 87.0%	
Statewide Campaign	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ 23	\$ 84	\$ 79	\$ 48	\$ 5,237	\$ 5,538	\$ 2,868	\$ 5,413	\$ 183	\$ 19,475	\$ 11,900	163.7%	
TOU Total	\$ -	\$ 452	\$ 2,715	\$ 940	\$ 923	\$ 875	\$ 1,931	\$ 1,494	\$ 3,391	\$ 1,410	\$ 1,494	\$ 2,081	\$ 2,586	\$ 9,030	\$ 11,190	\$ 7,294	\$ 9,536	\$ 3,809	\$ 59,656	\$ 52,158	114.4%	
RRMA: General Rate Reform (in 000's)																						
Marketing, Education, & Outreach	\$ -	\$ 72	\$ 420	\$ 325	\$ (447)	\$ 6	\$ 24	\$ 20	\$ 197	\$ 1	\$ 1	\$ 1	\$ (127)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 494	
Information Technology	\$ -	\$ 51	\$ 130	\$ 81	\$ (216)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46	
Other	\$ -	\$ -	\$ 6	\$ 9	\$ 19	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 34	
General Rate Reform Total	\$ -	\$ 123	\$ 556	\$ 415	\$ (644)	\$ 6	\$ 24	\$ 20	\$ 197	\$ 1	\$ 1	\$ 1	\$ (127)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 574	
Total to RRMA	\$ -	\$ 123	\$ 1,008	\$ 3,130	\$ 297	\$ 929	\$ 899	\$ 1,951	\$ 1,607	\$ 3,392	\$ 1,495	\$ 2,082	\$ 2,458	\$ 9,030	\$ 11,190	\$ 7,294	\$ 9,536	\$ 3,809	\$ 60,230	\$ 60,230		
Non-RRMA (in 000's)																						
Marketing, Education, & Outreach	\$ 251	\$ -	\$ -	\$ -	\$ 273	\$ 193	\$ 97	\$ 698	\$ 210	\$ 203	\$ 177	\$ 951	\$ 1,140	\$ 387	\$ 462	\$ 586	\$ 170	\$ 104	\$ 5,903	\$ 5,903		
Information Technology	\$ 437	\$ 536	\$ 755	\$ 39	\$ 688	\$ 1,190	\$ 3,574	\$ 2,834	\$ 4,838	\$ 1,813	\$ 2,273	\$ 5,683	\$ 4,435	\$ 3,077	\$ 1,800	\$ 47	\$ 71	\$ 39	\$ 34,129	\$ 34,129		
Bill Protection	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0	\$ 22	\$ 36	\$ 896	\$ 13	\$ 57	\$ 99	\$ -	\$ -	\$ 1,125	\$ 1,125	
Non-RRMA Total	\$ 688	\$ 536	\$ 755	\$ 39	\$ 961	\$ 1,382	\$ 3,672	\$ 5,483	\$ 5,048	\$ 2,016	\$ 2,451	\$ 6,656	\$ 5,611	\$ 4,360	\$ 2,275	\$ 691	\$ 340	\$ 143	\$ 41,157	\$ 41,157		
Grand Total (RRMA + Non-RRMA)	\$ 688	\$ 659	\$ 1,764	\$ 3,169	\$ 1,258	\$ 4,571	\$ 5,409	\$ 8,739	\$ 8,069	\$ 13,389	\$ 13,466	\$ 7,985	\$ 9,876	\$ 3,951	\$ 101,388	\$ 9,876	\$ 3,951	\$ 101,388	\$ 101,388	\$ 101,388		
Guidelines and charge numbers have been established to ensure that the costs charged to the RRMA are appropriate and incremental and that they are tracked accordingly. All costs that are charged to the RRMA are reviewed and verified on a quarterly basis, at minimum. Overheads are included in all numbers and effectively double the direct labor charges.																						
Budget Updates filed via Advice Letter 3498-E/2835-G January 2019 (U 902-M)																						
* Any required corrections/adjustments are reported herein and supersede information provided in prior reports and may reflect year-to-date adjustments																						

IX. Conclusion

SDG&E is pleased to report its first quarter (January - March) 2020 efforts to the Commission and stakeholders. SDG&E looks forward to continued collaboration with the other IOUs, Energy Division and the ME&O Working Group members to develop plans and best practices that will continue to contribute to a successful implementation of Residential Rate Reform and the transition to TOU pricing plans for residential customers.

Appendix A: Rate Reform Costs August 2015 – March 2020

A. Mass Default

Rate Reform Costs Aug 2015 - March 2020*																						
RRMA: Time-Of-Use Mass Default (in 000's)	Aug - Dec 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Total	Total Budget	% PTD Spent of Budget	
Overall Plan - TOU Awareness	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 41	\$ (16)	\$ 7	\$ -	\$ 836	\$ 1,732	\$ 2,839	\$ 2,757	\$ 2,258	\$ 2,204	\$ 12,656	\$ 10,957	115.5%	
Communications Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ 340	\$ 622	\$ 710	\$ 462	\$ 243	\$ 2,378	\$ 1,050	226.4%	
General (Bill Inserts, Media, Digital Media)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 41	\$ (16)	\$ 7	\$ -	\$ 731	\$ 906	\$ 1,310	\$ 1,900	\$ 1,338	\$ 1,298	\$ 7,514	\$ 6,790	110.7%	
Direct (Email & SMS)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 103	\$ 486	\$ 907	\$ 146	\$ 459	\$ 663	\$ -	\$ 420	\$ 2,397	115.3%
Web Development (Inclusive of all activities)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 300	\$ -	0.0%
Customer Research	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150	\$ -	\$ -	\$ 49	\$ -	\$ -	\$ 57	\$ 146	\$ (62)	\$ 339	\$ 873	\$ 38.8%	
Overall	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 109	\$ (108)	\$ 150	\$ 225	\$ 66.8%	
Qualitative	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57	\$ -	\$ -	\$ 57	\$ 200	\$ 28.4%	
Quantitative	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 49	\$ -	\$ -	\$ -	\$ 37	\$ 46	\$ 132	\$ 448	\$ 29.5%	
Community Based Organizations	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 61	\$ 98	\$ 202	\$ 127	\$ 93	\$ 581	\$ 1,200	\$ 48.4%	
Energy Solutions Partner	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 51	\$ 23	\$ 31	\$ 29	\$ 67	\$ 200	\$ 225	\$ 89.1%	
Event Sponsorships - Targeted	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6	\$ 12	\$ 135	\$ 96	\$ 15	\$ 263	\$ 750	\$ 35.1%	
Engagement/Materials	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5	\$ 63	\$ 36	\$ 2	\$ 11	\$ 117	\$ 225	\$ 52.0%	
Marketing Automation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4	\$ -	\$ 1	\$ 6	\$ 450	\$ 165	\$ 626	\$ 450	\$ 139.2%	
High Usage Charge (HUC)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0	\$ 600	\$ 0.0%	
Labor (FTE & Contract)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 74	\$ 201	\$ 401	\$ 213	\$ 895	\$ 2,641	\$ 1,359	\$ 1,140	\$ 1,184	\$ 8,108	\$ 5,294	\$ 153.2%	
TOU Mass Default Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 41	\$ 208	\$ 208	\$ 401	\$ 1,101	\$ 2,688	\$ 5,579	\$ 4,380	\$ 4,120	\$ 3,584	\$ 22,311	\$ 19,374	115.2%	
RRMA: Statewide Campaign & Bill Protection	Aug - Dec 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Total	Total Budget	% PTD Spent of Budget	
Statewide Campaign	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ 23	\$ 84	\$ 79	\$ 48	\$ 5,237	\$ 5,538	\$ 2,868	\$ 5,413	\$ 183	\$ 19,475	\$ 11,900	163.7%
TOU Statewide Campaign Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ 23	\$ 84	\$ 79	\$ 48	\$ 5,237	\$ 5,538	\$ 2,868	\$ 5,413	\$ 183	\$ 19,475	\$ 11,900	163.7%
Guidelines and charge numbers have been established to ensure that the costs charged to the RRMA are appropriate and incremental and that they are tracked accordingly. All costs that are charged to the RRMA are reviewed and verified on a quarterly basis, at minimum. Overheads are included in all numbers and effectively double the direct labor charges.																						
Budget Updates filed via Advice Letter 3498-E/2835-G January 2019 (U 902-M)																						
* Any required corrections/adjustments are reported herein and supersede information provided in prior reports and may reflect year-to-date adjustments																						

B. Default Pilot

Rate Reform Costs Aug 2015 - March 2020*

Aug - Dec 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Total	Total Budget	% PTD Spent of Budget	
RRMA: Time-Of-Use Default Pilot (in 000's)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	93.9%
Planning & Design	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%
Nexant Implementation Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	68
Staff Augmentation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	95.4%
Program Management / Employee Training	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	95.4%
Measurement & Evaluation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	83.0%
Load Impacts	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	107.2%
Staff Augmentation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	58.7%
Electric Load Analysis	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	58.7%
Customer Insight & Research	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	30.3%
Design Thinking Focus Group	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%
Message/Communications Testing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	103.2%
Opt-Out Focus Groups	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%
Qualitative Research	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	38.4%
Segmentation Deeper Dive	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	87.3%
Surveys	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	32.7%
Staff Augmentation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	22.4%
Customer Data Analytics & Research	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	22.4%
Marketing, Education, & Outreach	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	53.1%
Material Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	82.9%
Energy Efficiency Component for Welcome Package	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	373.1%
Material Development	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	86.0%
Smart App	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%
Video Bill	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	148.6%
Website	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	129.0%
Pre-Transition Communications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	no budget
BRC Card & Processing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	21.5%
Early Awareness Communication	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%
Rate Comparison via direct mail	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	16.2%
Rate Comparison via email	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	186.3%
Post-Transition Communications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	no budget
Bill Protection	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	21.5%
End of Bill Protection Communication	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%
Extreme Non-Beneficial calls	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	187.8%
Level Pay Plan Information	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	362.3%
Pricing Plan Confirmation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	24.0%
Programmable Thermostat	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	no budget
Summer Rate Information	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	109.8%
Welcome Package via direct mail	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	155.5%
Welcome Package via email	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	43.3%
Winter Rate Information	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	240.0%
Staff Augmentation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	41.5%
Customer Communication	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	59.8%
Customer Outreach & Engagement	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	50.4%
Operations & Production Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	119.0%
Advanced Metering Operations	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	303.2%
Branch Offices	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	295.6%
Customer Contact Center	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	289.6%
TOU Default Pilot Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	84.5%

Guidelines and charge numbers have been established to ensure that the costs charged to the RRMA are appropriate and incremental and that they are tracked accordingly. All costs that are charged to the RRMA are reviewed and verified on a quarterly basis, at minimum. Overheads are included in all numbers and effectively double the direct labor charges.

Budget Updates filed via Advice letter 34-98E/2835-G January 2019 (U 902-M)

* Any required corrections/adjustments are reported herein and supersede information provided in prior reports and may reflect year-to-date adjustments

C. Other

Rate Reform Costs Aug 2015 - March 2020*																						
	Aug - Dec 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Total	Total Budget	% PTD Spent of Budget	
RRMA: Time-Of-Use Opt-In Pilot (in 000's)																						
Planning & Design	\$ -	\$ -	\$ -	\$ 550	\$ (483)	\$ 20	\$ 7	\$ -	\$ 97	\$ 221	\$ 2	\$ 47	\$ 14	\$ -	\$ (1)	\$ -	\$ -	\$ -	\$ -	\$ 475	\$ -	
Measurement & Evaluation	\$ -	\$ -	\$ 11	\$ -	\$ -	\$ -	\$ 1	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (1)	\$ -	\$ -	\$ -	\$ 11	\$ -	
Customer Insight	\$ -	\$ -	\$ 46	\$ -	\$ 67	\$ 1	\$ 58	\$ 151	\$ -	\$ -	\$ -	\$ 1	\$ -	\$ -	\$ (1)	\$ 1	\$ -	\$ -	\$ -	\$ 324	\$ -	
Recruitment	\$ -	\$ -	\$ 395	\$ 1,228	\$ 640	\$ 60	\$ 1	\$ 844	\$ 2	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,171	\$ -	
Customer Support	\$ -	\$ -	\$ -	\$ 105	\$ 142	\$ 148	\$ 225	\$ 314	\$ 263	\$ 146	\$ 6	\$ (23)	\$ -	\$ -	\$ (0)	\$ -	\$ -	\$ -	\$ 11	\$ 1,336	\$ -	
Outreach & Education	\$ -	\$ -	\$ -	\$ 210	\$ 172	\$ 172	\$ 17	\$ 15	\$ 9	\$ 9	\$ -	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 490	\$ -	
Technology	\$ -	\$ -	\$ -	\$ 623	\$ 401	\$ 83	\$ 36	\$ 32	\$ 34	\$ (1)	\$ -	\$ (6)	\$ -	\$ -	\$ (0)	\$ -	\$ -	\$ -	\$ -	\$ 1,200	\$ -	
Technology Operations Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1	\$ 319	\$ 158	\$ 96	\$ 11	\$ -	\$ 3	\$ -	\$ -	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ 838	\$ -	
TOU Opt-In Pilot Total	\$ -	\$ -	\$ 452	\$ 2,715	\$ 940	\$ 697	\$ 503	\$ 1,606	\$ 500	\$ 377	\$ 9	\$ 22	\$ 14	\$ -	\$ (2)	\$ 1	\$ -	\$ 11	\$ 7,845	\$ 9,020	87.0%	
RRMA: General Rate Reform (in 000's)																						
Marketing, Education, & Outreach	\$ -	\$ 72	\$ 420	\$ 325	\$ (447)	\$ 6	\$ 24	\$ 20	\$ 197	\$ 1	\$ 1	\$ 1	\$ (127)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 494	\$ -	
Information Technology	\$ -	\$ 51	\$ 130	\$ 81	\$ (216)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46	\$ -	
Other	\$ -	\$ -	\$ 6	\$ 9	\$ 9	\$ 19	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 34	\$ -	
General Rate Reform Total	\$ -	\$ 123	\$ 1,008	\$ 3,130	\$ 297	\$ 929	\$ 899	\$ 1,951	\$ 1,607	\$ 3,392	\$ 1,495	\$ 2,082	\$ 2,458	\$ 9,030	\$ 11,190	\$ 7,294	\$ 9,536	\$ 3,809	\$ 60,230	\$ 52,158		
Non-RRMA (in 000's)																						
Marketing, Education, & Outreach	\$ 251	\$ -	\$ -	\$ -	\$ 273	\$ 193	\$ 97	\$ 698	\$ 210	\$ 203	\$ 177	\$ 951	\$ 1,140	\$ 387	\$ 462	\$ 586	\$ 170	\$ 104	\$ 5,903	\$ -		
Information Technology	\$ 437	\$ 536	\$ 755	\$ 39	\$ 688	\$ 1,190	\$ 3,574	\$ 2,834	\$ 4,838	\$ 1,813	\$ 2,273	\$ 5,683	\$ 4,435	\$ 3,077	\$ 1,800	\$ 47	\$ 71	\$ 39	\$ 34,129	\$ -		
Bill Protection	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0	\$ 2	\$ 22	\$ 36	\$ 896	\$ 13	\$ 57	\$ 99	\$ -	\$ 1,125	\$ 7,665	15%	
Non-RRMA Total	\$ 688	\$ 536	\$ 755	\$ 39	\$ 961	\$ 1,382	\$ 3,672	\$ 3,532	\$ 5,048	\$ 2,016	\$ 2,451	\$ 6,656	\$ 5,611	\$ 4,360	\$ 2,275	\$ 691	\$ 340	\$ 143	\$ 41,157	\$ -		
Grand Total (RRMA + Non-RRMA)	\$ 688	\$ 659	\$ 1,764	\$ 3,169	\$ 1,258	\$ 2,311	\$ 4,571	\$ 5,483	\$ 6,655	\$ 5,409	\$ 3,946	\$ 8,739	\$ 8,069	\$ 13,389	\$ 13,466	\$ 7,985	\$ 9,876	\$ 3,951	\$ 101,388	\$ -		

Guidelines and charge numbers have been established to ensure that the costs charged to the RRMA are appropriate and incremental and that they are tracked accordingly. All costs that are charged to the RRMA are reviewed and verified on a quarterly basis, at minimum. Overheads are included in all numbers and effectively double the direct labor charges.

Budget Updates filed via Advice Letter 3498-E/2835-G January 2019(902-M)

* Any required corrections/adjustments are reported herein and supersede information provided in prior reports and may reflect year-to-date adjustments

Appendix B: Customer Communications January – March 2020

Communications	Description	Spanish	Direct Mail	Email
High Usage Charge General Education	Explanation of High Usage Charge; tools and solutions		X	
High Usage Charge 350% of Baseline	Approaching High Usage Charge	X	X	X
High Usage Charge 400% of Baseline	High Usage Charge Incurred	X	X	X
Mass Default PD-90 Postcard	Provides awareness of upcoming changes to pricing plan	X	X	X
Mass Default PD-60 with Reply Card (versions listed below)	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X
Non-NEM Benefiter	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X
Non-NEM Neutral	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X
Non-NEM Non-Benefiter	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X
NEM Benefiter	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X
NEM Neutral	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X

Communications	Description	Spanish	Direct Mail	Email
NEM Non-Benefiter	60-day notification letter containing personalized plan comparison; includes reply card	X	X	X
Mass Default Reply Card	Allows customers to make pricing plan selections		X	
Mass Default Multiple Meter 60-Day Email	Alerts customers to watch for a Multiple Meter 60-day notification mailer			X
Mass Default Multiple Meter 60-Day Mailer with Reply Form	Mailer providing customers with multiple meters a chance to make plan changes		X	
Mass Default PD-30 with Insert (versions listed below)	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
Non-NEM Benefiter	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
Non-NEM Neutral	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
Non-NEM Non-Benefiter	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
NEM Benefiter	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
NEM Neutral	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
NEM Non-Benefiter	30-day reminder notification letter containing personalized plan comparison; mailing includes quick reference card insert	X	X	X
Mass Default PD-30 Insert	Quick reference card with tips for success on TOU; included in all PD-30 mailings	X	X	

Communications	Description	Spanish	Direct Mail	Email
Mass Default Welcome Brochure	Brochure welcoming consumers to TOU with details of their individual plan.	X	X	X
TOU-DR1 Mass Default with Bill Protection	Sent with effective pricing between January 2020 – March 2020	X	X	X
TOU-DR2 Mass Default with Bill Protection	Sent with effective pricing between January 2020 – March 2020	X	X	X
TOU-DR1 Turn On with No Bill Protection	Sent with effective pricing between January 2020 – March 2020	X	X	X
TOU-DR2 Turn On with No Bill Protection	Sent with effective pricing between January 2020 – March 2020	X	X	X
Mass Default Personalized Video	Emails including a personalized video were sent to customers in the Mass Transition target groups			X
Bill Protection Ending Mailer	Notification that bill protection is coming to an end; sent to Mass Default and opt-in customers		X	



STATE-MANDATED HIGH USAGE CHARGE

Based on past energy use at
123 Main St,
this charge could affect you.

We know moving can be exciting, and we're here to help you avoid any unwanted surprises on your energy bill. Past high electricity usage at your new address indicates you could be affected by the High Usage Charge if you aren't prepared. This is a state-mandated charge for customers whose electricity use exceeds **four** times their Baseline Allowance. Below are some energy savings tips and solutions to help you better understand what this means, and how to successfully manage energy costs in your new home.



KNOW YOUR BASELINE

Baseline Allowance is the amount of electricity allotted for your basic needs and varies by season, where you live and if your home has just electricity, or both natural gas and electricity. Your Baseline Allowance for electricity can be found on your bill, or you can calculate it at sdge.com/highusage.



SWITCH TO A TIME-OF-USE PLAN

- Time-of-Use plans are not subject to the High Usage Charge.
- These plans are based on *how much* and *when* you use energy, giving you more control over your monthly bill.
- Learn more at sdge.com/whenmatters.



SIGN UP FOR ENERGY ALERTS

Even if you're on the go, you can keep track of your energy use and costs with email or text alerts. These alerts give you information about your account, bill, energy use and more. There are many alerts you can subscribe to, including:

- Spending and usage goals
- Weekly energy use summary
- Emergency outage notifications

Go to sdge.com/myaccount.
Look for "Alerts & Subscriptions" at the top.



TIPS AND SOLUTIONS

- Easily pay your bill, view power outages, set up alerts and more with SDG&E's new mobile app. Download the app in the App Store or Google Play, or learn more on sdge.com/mobileapp.
- See when and where your home uses energy most and explore all your account details by creating a My Account profile. Go to sdge.com/myaccount to get started.
- Our online marketplace can help you find rebates and energy-saving deals. Visit sdge.com/marketplace to see if you qualify.

More ways to save



MAKE YOUR HOME ENERGY EFFICIENT

- Find out if you qualify for no-cost home improvements through our Energy Savings Assistance Program or Residential Direct Install Program.

Find out more at sdge.com/ESA or sdge.com/RDI



USE ONLINE TOOLS TO MANAGE YOUR ENERGY USE

- Take the home energy survey through My Account to get personalized, energy-savings tips.
- Set a spending goal and get email or text alerts when you've reached it.

Go to sdge.com/myaccount



SHOP, COMPARE, GET REBATES ON MARKETPLACE

- Shop for the best prices on energy-efficient products. You can also get price-change alerts.
- Apply for rebates through an easy online process.

Shop now at sdge.com/marketplace

Extra energy allowance available for medical needs



If you or someone in your household has a qualifying medical condition, you may be eligible to receive more energy at the lower price. Qualifying households receive an additional Baseline Allowance, which means you may be able to avoid the High Usage Charge. To learn more about the Medical Baseline Allowance Program, visit sdge.com/medicalbaseline.

Keep your CARE bill discount



If you are a CARE customer, you are currently receiving a monthly bill discount of 30% or more. If you exceed four times the amount of your Baseline Allowance, you will still be subject to the High Usage Charge. Also, a pattern of high usage may require you to recertify for CARE eligibility. To learn more, visit sdge.com/care.

Learn more at sdge.com/highusage. Visit sdge.com. Call 1-800-411-7343.
Si desea recibir esta información en español, sírvase llamar a SDG&E al 1-800-311-7343.

High Usage Charge 350% of Baseline



COURTESY NOTIFICATION

Based on your current electricity use, you may incur a state-mandated charge for high use this month.

Account number:

Meter number:

You're close to using more than four times the amount of your Baseline Allowance and may have a High Usage Charge on this month's bill.

The state-mandated High Usage Charge took effect on November 1, 2017.



ANALYZE YOUR HOME'S ENERGY USE

With My Energy Survey, you get energy and money-saving suggestions that may help you avoid the High Usage Charge.

Provide details about your home, appliances and other energy use habits to build an Action Plan with energy-saving actions tailored to your home.

- Log in to sdge.com/myaccount.
- Click on the "My Energy" tab.
- Go to "My Energy Survey" to get started.

Once completed, update your details at any time to refresh your Action Plan.



SIGN UP FOR ALERTS

Subscribe to High Usage alerts so you'll know in advance when you're close to the High Usage Charge:

- Go to sdge.com/myaccount.
- Look for "Alerts & Subscriptions" at the top.
- Click on "Alerts."
- Click on "Subscribe" next to "Alert before a High Usage Charge."
- Select the email addresses and phone numbers to receive alerts.

You'll only receive this letter notification once per year. To receive ongoing email or text message notifications, subscribe to High Usage alerts. For more information on your Baseline Allowance or tips to avoid the charge, visit sdge.com/highusage.

High Usage Charge 400% of Baseline



COURTESY NOTIFICATION

You incurred a state-mandated charge for high energy use this month.

Account number:

Meter number:

You've used more than four times the amount of your Baseline Allowance and will have a High Usage Charge on this month's bill.

The state-mandated High Usage Charge took effect on November 1, 2017.



HIGH USAGE CHARGE ON MY BILL

You can find the High Usage Charge in the Electric Service section of your bill.

ELECTRIC CHARGES		Amount
Electricity Delivery (Details below)	1,576 kWh	
Power Cost	2025.14/baseline	31,487.54/baseline
kWh used	512	1,384
Power	\$,07293	\$,28541
Charge	\$17.29	- \$201.47
Summer High Usage Charge	2,296 kWh x \$,21250	484.65

High Usage This Bill Period:
You incurred a state-mandated charge for energy use that was more than four times your baseline allowance. For more information on the charge and how to save, visit www.sdge.com/highusage.

This sample bill is for illustrative purposes only.



SIGN UP FOR ALERTS

Subscribe to High Usage alerts so you'll know in advance when you're close to the High Usage Charge:

- Go to sdge.com/myaccount.
- Look for "Alerts & Subscriptions" at the top.
- Click on "Alerts."
- Click on "Subscribe" next to "Alert before a High Usage Charge."
- Select the email addresses and phone numbers to receive alerts.

You'll only receive this letter notification once per year. To receive ongoing email or text message notifications, subscribe to High Usage alerts. For more information on your Baseline Allowance or tips to avoid the charge, visit sdge.com/highusage.

Mass Default PD-90 Postcard



IT'S ABOUT TIME YOU SAVE MONEY ON YOUR ENERGY BILL. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 30, 2019

John Q. Sample - P6A 3/4/2019
1234 Anywhere Street
San Diego, CA 92123

March 4, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 30, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1), which rewards you for shifting energy use to lower-cost times, away from the on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

WHAT DOES THIS CHANGE MEAN FOR ME?

Based on analysis of the energy used in your home last year, you are likely to save on the **Time-of-Use (TOU-DR1) plan**. The cost of energy for this plan is highest only during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours **and** reducing your overall use.

WHAT ARE MY CHOICES?

Since you're likely to save on the Time-of-Use (TOU-DR1) plan, let us **automatically move** you. You also have two other options: **choose** the Time-of-Use (TOU-DR2) plan or **stay** on your current plan. Both Time-of-Use plans include **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whenmatters, or return the enclosed response card.

YOUR THREE PLANS COMPARED

Details as of: 03/04/19 Account number: 999999999 Meter number: 99999999

<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN</p> <h3 style="margin: 0;">TOU-DR1</h3> <p>INCLUDES This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p> <div style="background-color: #f4a460; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px auto;"> 1 YEAR </div>	<p style="font-size: 24px; font-weight: bold; margin: 0;">\$4,650</p> <p style="font-size: small; margin: 0;">Annual estimated cost*</p>
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN</p> <h3 style="margin: 0;">TOU-DR2</h3> <p>INCLUDES This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p> <div style="background-color: #f4a460; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px auto;"> 1 YEAR </div>	<p style="font-size: 24px; font-weight: bold; margin: 0;">\$4,655</p> <p style="font-size: small; margin: 0;">Annual estimated cost*</p>
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN</p> <h3 style="margin: 0;">STANDARD (DR)</h3>	<p style="font-size: 24px; font-weight: bold; margin: 0;">\$4,781</p> <p style="font-size: small; margin: 0;">Annual estimated cost*</p> <p style="font-size: x-small; margin: 0;">Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>

See the enclosed brochure for more information, visit sdge.com/whenmatters or call us at 1-877-558-1674.



Time to save.

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WHAT DO I DO NOW?

The choice is yours. You have three options:

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 30, 2019.
2. Choose the **Time-of-Use (TOU-DR2)** pricing plan by returning the reply card or contacting us.
3. Stay on your current **Standard (DR)** pricing plan by returning the reply card or contacting us.

Since you're likely to save on the Time-of-Use (TOU-DR1) pricing plan, you can make the switch early. Complete and return the reply card or log in to My Account at sdge.com/planenroll before June 30, 2019.

INCLUDES



**1
YEAR**

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan, we will credit you the difference.

WHAT IS THE BENEFIT OF SWITCHING TO TIME-OF-USE?

During the on-peak hours from 4 p.m. to 9 p.m., the cost of producing and delivering energy can increase. By shifting some of your usage to lower-priced off-peak hours, you'll help decrease demand on the power grid, which benefits the environment, as well as your monthly bill.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, a little earlier or later. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed brochure and see just how easy it is to save even more.


*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.


Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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IT'S THE LITTLE THINGS THAT COUNT. CHANGING A LITTLE MIGHT HELP YOU SAVE. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 30, 2019.



John Q. Sample - P6C 3/4/2019
 1234 Anywhere Street
 San Diego, CA 92123


SDGE | Time to save.
San Diego Gas & Electric

March 4, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 30, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1). This plan rewards you for shifting energy usage to lower-cost times, away from on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

WHAT DOES THIS CHANGE MEAN FOR ME?

Based on analysis of the energy used in your home last year, you may be able to save on **Time-of-Use** plans if you can reduce your overall energy use **and** shift some of it to the lower-priced hours. Energy costs are highest only during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours **and** reducing your overall use.

WHAT ARE MY CHOICES?

To really save on Time-of-Use plans, consider your energy use and whether you're able to use less energy from 4 p.m. to 9 p.m. If you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan or **choose** the Time-of-Use (TOU-DR2) plan. Both plans come with **one-year no-risk pricing**, and you can switch to another available plan at any time. If these plans aren't right for you, then select the option to **stay** on your current plan. Get more information and make your choice online at sdge.com/whentmatters, or return the enclosed response card.

YOUR THREE PLANS COMPARED
Details as of 03/04/19 Account number: 9999999999 Meter number: 99999999

Plan	Annual Estimated Cost*	Includes
IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1	\$1,133	This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.
OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2	\$1,059	This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.
OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)	\$1,224	Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.

See the enclosed brochure for more information, visit sdge.com/whentmatters or call us at 1-877-558-1674.

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WHAT DO I DO NOW?

The choice is yours. You have three options:

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 30, 2019.
2. Choose the **Time-of-Use (TOU-DR2)** pricing plan by returning the reply card or contacting us.
3. Stay on your current **Standard (DR)** pricing plan by returning the reply card or contacting us.

You can get more information by going to sdge.com/whentmatters. Or make your choice now. Complete and return the reply card or log in to My Account at sdge.com/planenroll before June 30, 2019.

INCLUDES



**NO RISK PRICED
1
YEAR**

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan, we will credit you the difference.

WHAT IS THE BENEFIT OF SWITCHING TO TIME-OF-USE?

During the on-peak hours from 4 p.m. to 9 p.m., the cost of producing and delivering energy can increase. By shifting some of your usage to lower-priced off-peak hours, you'll help decrease demand on the power grid, which benefits the environment, as well as your monthly bill.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, a little earlier or later. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed brochure and see just how easy it is to start saving.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA program, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.

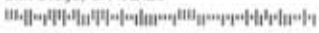
Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.


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PRC_099 DHW_PRC_09_01_04_000002_PRC

YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 30, 2019.

John Q. Sample - P6E 3/4/2019
 1234 Anywhere Street
 San Diego, CA 92123





Time to save.

March 4, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 30, 2019**, your pricing plan is scheduled to change to a Time-of-Use plan (TOU-DR1). You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

WHAT DOES THIS CHANGE MEAN FOR ME?


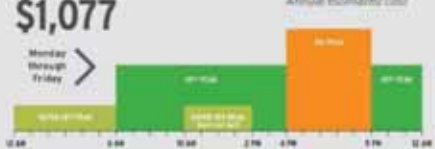
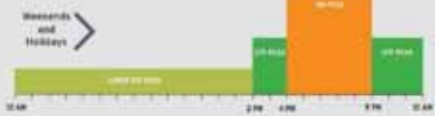

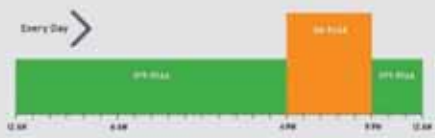
Based on analysis of the energy used in your home last year, if you continue to use energy the same way, **Time-of-Use plans** may not be right for you. To save on these plans (TOU-DR1 or TOU-DR2), you'll need to reduce your overall energy use **and** shift some use to lower-priced hours. Energy costs are highest only during the on-peak hours between 4 p.m. and 9 p.m. Time-of-Use plans include **one-year no-risk pricing**, so you can try it out and see if it's right for you.

WHAT ARE MY CHOICES?

Consider your energy use and whether you're able to use less energy and shift some away from 4 p.m. to 9 p.m. If you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan or **choose** the Time-of-Use (TOU-DR2) plan. Both plans come with **one-year no-risk pricing**, and you can switch to another available plan at any time. If Time-of-Use plans aren't right for you, then select the option to **stay** on your current plan. Get more information and make your choice online at sdge.com/whenmatters, or return the enclosed response card.

YOUR THREE PLANS COMPARED

Details as of: 03/04/19 Account number: 999999999 Meter number: 9999999

Plan Description	Annual estimated cost*	Pricing Structure
<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES  This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>	\$1,077	<p>Monday through Friday</p>  <p>Weekends and Holidays</p> 
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES  This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>	\$1,087	<p>Every Day</p> 
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p>	\$659	<p>Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>

See the enclosed brochure for more information, visit sdge.com/whenmatters or call us at 1-877-558-1674.

PNC_019
ZWHL_PRCR_04_18_19_000001_PFE

WHAT DO I DO NOW?

The choice is yours. You have three options:

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 30, 2019.
2. Choose the **Time-of-Use (TOU-DR2)** pricing plan by returning the reply card or contacting us.
3. Stay on your current **Standard (DR)** pricing plan by returning the reply card or contacting us.

You can get more information by going to sdge.com/whentmatters. Or make your choice now. Complete and return the reply card or log in to My Account at sdge.com/planenroll before June 30, 2019.

INCLUDES

TRY IT RISK-FREE

NO RISK PRICING 1 YEAR

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan, we will credit you the difference.

WHAT IS THE BENEFIT OF SWITCHING TO TIME-OF-USE?

During the on-peak hours from 4 p.m. to 9 p.m., the cost of producing and delivering energy can increase. By shifting some of your usage to lower-priced off-peak hours, you'll help decrease demand on the power grid, which benefits the environment, and possibly your monthly bill.

DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, a little earlier or later. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed brochure.

SHIFT TO SAVE

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA program, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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PH2_019 2019_PAGE_NO_NB_AD_04_000001_P02

FIND MORE WAYS TO SAVE ON YOUR ENERGY BILL.
 YOU ARE SCHEDULED TO SWITCH TO A
 TIME-OF-USE PLAN ON JUNE 30, 2019.

John O. Sample - P6G 3/4/2019
 1234 Anywhere Street
 San Diego, CA 92123

March 4, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 30, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1), which rewards you for shifting energy use to lower-cost times, away from the on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

AS A SOLAR CUSTOMER, WHAT DOES THIS MEAN FOR ME?

Based on analysis of the energy used in your home last year, you are likely to save on the **Time-of-Use (TOU-DR1) plan**. The cost of energy for this plan is highest during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours and reducing your overall use. If your system happens to generate excess energy, we'll continue to track and apply your generation credit. We'll be here to provide power to supplement your system when you need it.

YOU HAVE CHOICES

Since you're likely to save on the Time-of-Use (TOU-DR1) plan, let us **automatically move** you. You also have two other options: **choose** the Time-of-Use (TOU-DR2) plan or **stay** on your current plan. Both Time-of-Use plans include **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whenmatters, or return the enclosed response card.

YOUR THREE PLANS COMPARED

Details as of 03/04/19 - Account number: 9999999999 - Meter number: 99999999

Plan Name	Annual Estimated Cost	Annual estimated cost including applicable NEM true-up credits and charges.*
IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1 INCLUDES This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use. 	\$4,650	
OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2 INCLUDES This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use. 	\$4,655	
OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR) INCLUDES Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.	\$4,781	

Time to save.

SDGE
 San Diego Gas & Electric

See the enclosed brochure for more information, visit sdge.com/whenmatters or call us at 1-877-558-1674.

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WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 30, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan
3. Stay on your current **Standard (DR)** pricing plan

Since you're likely to save on the Time-of-Use (TOU-DR1) pricing plan, consider making the switch early. Complete and return the reply card or log in to My Account at sdge.com/planenroll before June 30, 2019.

INCLUDES



TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHY THE SWITCH TO TIME-OF-USE?

Thanks to customers like you who are committed to a cleaner, greener future, there's more renewable energy generated earlier in the day. Because of these changes in energy production patterns, on-peak hours have shifted to 4 p.m. to 9 p.m.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, earlier in the day when you are generating energy or later in the evening after on-peak hours. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed brochures.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-5T.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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IT'S THE LITTLE THINGS THAT COUNT. CHANGING A LITTLE MIGHT HELP YOU SAVE. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 30, 2019.

John D. Sample - P61 3/4/2019
 1234 Anywhere Street
 San Diego, CA 92123

March 4, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 30, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1). This plan rewards you for shifting energy usage to lower-cost times, away from on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

AS A SOLAR CUSTOMER, WHAT DOES THIS MEAN FOR ME?

Based on analysis of the energy used in your home last year, you may be able to save on Time-of-Use plans if you can reduce your overall energy use **and** shift some of it to the lower-priced hours. Energy costs are highest during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours and reducing your overall use. If your system happens to generate excess energy, we'll continue to track and apply your generation credit. We'll be here to provide power to supplement your system when you need it.

YOU HAVE CHOICES

To really save on Time-of-Use plans, consider whether you're able to use less energy from 4 p.m. to 9 p.m. If you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan or **choose** the Time-of-Use (TOU-DR2) plans. Both plans come with **one-year no-risk pricing**, and you can switch to another available plan at any time. If these plans aren't right for you, then select the option to **stay** on your current plan. Get more information and make your choice online at sdge.com/whentmatters, or return the enclosed response card.

YOUR THREE PLANS COMPARED

Details as of: 03/04/19 Account number: 0000000000 Meter number: 00000000

Plan Name	Annual Estimated Cost	Annual Estimated Cost including applicable NEM true-up credits and charges*
<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES 1 YEAR No-Risk Pricing</p> <p>This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>	\$7,133	
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES 1 YEAR No-Risk Pricing</p> <p>This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>	\$7,059	
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p> <p>INCLUDES 1 YEAR No-Risk Pricing</p> <p>Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>	\$7,224	

SDGE
San Diego Gas & Electric

Time to save.

See the enclosed brochure for more information, visit sdge.com/whentmatters or call us at 1-877-558-1674.

No. 3219 3/16/19, PAGE 01, 02, 03, 04, 000000, P00

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 30, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

You can get more information by going to sdge.com/whentmatters. Or make your choice now. Complete and return the reply card or log in to My Account at sdge.com/planenroll before June 30, 2019.

INCLUDES



**1
YEAR**

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHY THE SWITCH TO TIME-OF-USE?

Thanks to customers like you who are committed to a cleaner, greener future, there's more renewable energy generated earlier in the day. Because of these changes in energy production patterns, on-peak hours have shifted to 4 p.m. to 9 p.m.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, earlier in the day when you are generating energy or later in the evening after on-peak hours. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed brochure.

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Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 30, 2019.

John Q. Sample - P6K 3/4/2019
 1234 Anywhere Street
 San Diego, CA 92123

March 4, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 30, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1). You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

AS A SOLAR CUSTOMER, WHAT DOES THIS MEAN FOR ME?

Based on analysis of the energy used in your home last year, if you continue to use energy the same way, **Time-of-Use** plans may not be right for you. To save on these plans (TOU-DR1 or TOU-DR2), you'll need to reduce your overall energy use **and** shift some use to lower-priced hours. Energy costs are highest during the on-peak hours between 4 p.m. and 9 p.m. These Time-of-Use plans include **one-year no-risk pricing**, so you can try it out and see if one is right for you. If your system happens to generate excess energy, we'll continue to track and apply your generation credit. We'll be here to provide power to supplement your system when you need it.

YOU HAVE CHOICES

Consider whether you're able to use less energy and shift some away from 4 p.m. to 9 p.m. If you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan or **choose** the Time-of-Use (TOU-DR2) plan. Both plans come with **one-year no-risk pricing**, and you can switch to another available plan at any time. If Time-of-Use plans aren't right for you, then select the option to **stay** on your current plan. Get more information and make your choice online at sdge.com/whentmatters, or return the enclosed response card.

YOUR THREE PLANS COMPARED

Details as of: 03/04/19 Account number: 9999999999 Meter number: 99999999

	Annual estimated cost including applicable NEM true-up credits and charges.*
<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES 1 YEAR This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>	<p>\$1,077</p>
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES 1 YEAR This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>	<p>\$1,087</p>
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p>	<p>\$659</p> <p>Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>

Time to save.

See the enclosed brochure for more information, visit sdge.com/whentmatters or call us at 1-877-558-1674.

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2019_PDR_01_NR_01_04_000001_PA4

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 30, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

You can get more information by going to sdge.com/wherematters. Or make your choice now. Complete and return the reply card or log in to My Account at sdge.com/planenroll before June 30, 2019.

INCLUDES



TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHY THE SWITCH TO TIME-OF-USE?

Thanks to customers like you who are committed to a cleaner, greener future, there's more renewable energy generated earlier in the day. Because of these changes in energy production patterns, on-peak hours have shifted to 4 p.m. to 9 p.m.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, earlier in the day when you are generating energy or later in the evening after on-peak hours. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed brochure.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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PA6_0216 2018 PA60_M_NB_A034_000006_P06

Mass Default Reply Card included with PD-60 mailings

I'M READY TO CHOOSE MY PRICING PLAN		
To switch to a new plan right away or remain on your current plan, complete and return this card before your plan change date.		
Name: John Q. Sample	Account number: 9999999999	
Service Address: 1234 Anywhere Street San Diego, CA 92123	Meter number: 99999999	
Select one option. <i>(Please fill in circle completely)</i>	If you're choosing to remain on your current plan, please select the reason why. <i>(Please fill in circle completely)</i>	For research purposes: Do you currently own or lease a plug-in Electric Vehicle? <i>(Please fill in circle completely)</i>
<input type="radio"/> Switch me now to the TOU-DR1 Pricing Plan	<input type="radio"/> I can't shift my energy use away from 4 p.m. to 9 p.m.	<input type="radio"/> Yes
<input type="radio"/> Switch me now to the TOU-DR2 Pricing Plan	<input type="radio"/> The pricing plan is too confusing	<input type="radio"/> No
<input type="radio"/> I want to remain on my current plan	<input type="radio"/> I prefer to keep my current plan	<input type="radio"/> I don't have one right now but am planning on buying/leasing one in the next year
<input type="radio"/> I won't see enough savings	<input type="radio"/> I'm concerned about my bill increasing	
Signature _____		Date _____
<small>PSA_0319</small>		<small>ZHMS_P60E_NN_SE_AD_04_000001_P6A</small>

REMINDER: IT'S ABOUT TIME YOU SAVE MONEY ON YOUR ENERGY BILL. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 28, 2019.

John Q. Sample - P3A 4/15/2019
 1234 Anywhere Street
 San Diego, CA 92123



April 15, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 28, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1), which rewards you for shifting energy use to lower-cost times, away from the on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

WHAT DOES THIS CHANGE MEAN FOR ME?

Based on analysis of the energy used in your home last year, you are likely to save on the **Time-of-Use (TOU-DR1) plan**. The cost of energy for this plan is highest during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours **and** reducing your overall use.

WHAT ARE MY CHOICES?

Since you're likely to save on the Time-of-Use (TOU-DR1) plan, let us **automatically move you**. You also have other options: **choose** the Time-of-Use (TOU-DR2) plan, choose another available plan or **stay** on your current plan. Both Time-of-Use plans include **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whentmatters.

YOUR THREE PLANS COMPARED

Details as of: 04/04/19 Account number: 9999999999 Meter number: 99999999

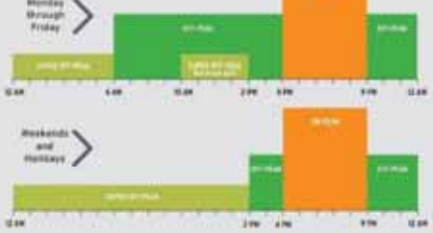
IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN
TOU-DR1

INCLUDES This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.

1
YEAR

\$4,650

Annual estimated cost*



OR YOU CAN CHOOSE TO MOVE TO THIS PLAN
TOU-DR2

INCLUDES This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.

1
YEAR

\$4,655

Annual estimated cost*



OR YOU CAN STAY ON YOUR CURRENT PLAN
STANDARD (DR)

INCLUDES Two pricing tiers based on monthly usage. Price does not vary by hour of the day. **MAY INCLUDE HIGH USAGE CHARGE.**

\$4,781

Annual estimated cost*

See enclosure for additional information, visit sdge.com/whentmatters or call us at 1-877-558-1674.

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B-22

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 28, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

Since you're likely to save on the Time-of-Use (TOU-DR1) pricing plan, consider making the switch early. Log in to My Account at sdge.com/planenroll or call us at 1-877-558-1674 before June 28, 2019.

INCLUDES



**1
YEAR**

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHAT IS THE BENEFIT OF SWITCHING TO TIME-OF-USE?

During the on-peak hours from 4 p.m. to 9 p.m., the cost of producing and delivering energy can increase. By shifting some of your usage to lower-priced off-peak hours, you'll help decrease demand on the power grid, which benefits the environment, as well as your monthly bill.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, a little earlier or later. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed insert and see just how easy it is to save even more.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervise and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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P14_0292445_P103_NN_BE_AD_04_000002_P14

REMINDER: IT'S THE LITTLE THINGS THAT COUNT. CHANGING A LITTLE MIGHT HELP YOU SAVE. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 28, 2019.

John Q. Sample · P3C 4/15/2019
 1234 Anywhere Street
 San Diego, CA 92123





Time to save.

April 15, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 28, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1). This plan rewards you for shifting energy usage to lower-cost times, away from on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

WHAT DOES THIS CHANGE MEAN FOR ME?

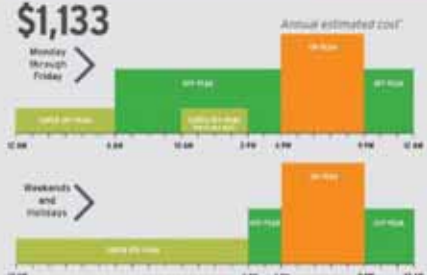
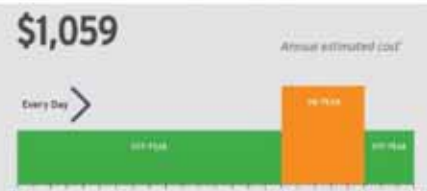
Based on analysis of the energy used in your home last year, you may be able to save on **Time-of-Use** plans if you can reduce your overall energy use **and** shift some of it to the lower-priced hours. Energy costs are highest during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours **and** reducing your overall use.

WHAT ARE MY CHOICES?

To really save on Time-of-Use plans, consider your energy use and whether you're able to use less energy from 4 p.m. to 9 p.m. If you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan. You also have other options: **choose** the Time-of-Use (TOU-DR2) plan, **choose** another available plan or **stay** on your current plan. Both Time-of-Use plans include **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whenmatters.

YOUR THREE PLANS COMPARED

Details as of 01/04/19 · Account number: 9999999999 · Meter number: 99999999

<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES 1 YEAR This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>	<p>\$1,133 Annual estimated cost*</p> 
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES 1 YEAR This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>	<p>\$1,059 Annual estimated cost*</p> 
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p> <p>INCLUDES 1 YEAR Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>	<p>\$1,224 Annual estimated cost*</p>

See enclosure for additional information, visit sdge.com/whenmatters or call us at 1-877-558-1674.

P3C_2019
THAT_P3C_NA_NE_AD_CA_000002_P3C

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 28, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

You can get more information by going to sdge.com/whentmatters. Or make your choice now. Call us at 1-877-558-1674 or log in to My Account at sdge.com/planenroll before June 28, 2019.

INCLUDES

NO RISK PRICING

1 YEAR

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHAT IS THE BENEFIT OF SWITCHING TO TIME-OF-USE?

During the on-peak hours from 4 p.m. to 9 p.m., the cost of producing and delivering energy can increase. By shifting some of your usage to lower-priced off-peak hours, you'll help decrease demand on the power grid, which benefits the environment as well as your monthly bill.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, a little earlier or later. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed insert and see just how easy it is to start saving.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-5T.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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REMINDER: YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 28, 2019.

John Q. Sample - P3E 4/15/2019
 1234 Anywhere Street
 San Diego, CA 92123



April 15, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 28, 2019**, your pricing plan is scheduled to change to a Time-of-Use plan (TOU-DR1). You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.



Time to save.

WHAT DOES THIS CHANGE MEAN FOR ME?



Based on analysis of the energy used in your home last year, if you continue to use energy the same way, **Time-of-Use** plans may not be right for you. To save on these plans (TOU-DR1 or TOU-DR2), you'll need to reduce your overall energy use **and** shift some use to lower-priced hours. Energy costs are highest during the on-peak hours between 4 p.m. and 9 p.m. Time-of-Use plans include **one-year no-risk pricing**, so you can try it out and see if it's right for you.

WHAT ARE MY CHOICES?

Consider your energy use and whether you're able to use less energy and shift some away from 4 p.m. to 9 p.m. if you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan. You also have other options: **choose** the Time-of-Use (TOU-DR2) plan, **choose** another available plan or **stay** on your current plan. Both Time-of-Use plans include **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whenmatters.

YOUR THREE PLANS COMPARED

Details as of: 01/04/19 Account number: 999999999 Meter number: 99999999

<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN</p> <h2 style="margin: 0;">TOU-DR1</h2> <p>INCLUDES NO RISK PRICING 1 YEAR This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>	<h1 style="margin: 0;">\$1,077</h1> <p style="font-size: small;">Annual estimated cost*</p>	<p>Monday through Friday</p> 	<p>Weekends and Holidays</p> 			
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN</p> <h2 style="margin: 0;">TOU-DR2</h2> <p>INCLUDES NO RISK PRICING 1 YEAR This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>	<h1 style="margin: 0;">\$1,087</h1> <p style="font-size: small;">Annual estimated cost*</p>	<p>Every Day</p> 				
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN</p> <h2 style="margin: 0;">STANDARD (DR)</h2> <p>INCLUDES NO RISK PRICING 1 YEAR Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>	<h1 style="margin: 0;">\$659</h1> <p style="font-size: small;">Annual estimated cost*</p>					

See enclosure for additional information, visit sdge.com/whenmatters or call us at 1-877-558-1674.

PN_009
2019_P3E_PN_06_02_04_000001_P0

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 28, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

You can get more information by going to sdge.com/whentomatters. Or make your choice now. Call us at 1-877-558-1674 or log in to My Account at sdge.com/plansenroll before June 28, 2019.

INCLUDES



**1
YEAR**
NO RISK PRICING

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHAT IS THE BENEFIT OF SWITCHING TO TIME-OF-USE?

During the on-peak hours from 4 p.m. to 9 p.m., the cost of producing and delivering energy can increase. By shifting some of your usage to lower-priced off-peak hours, you'll help decrease demand on the power grid, which benefits the environment, and possibly your monthly bill.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, a little earlier or later. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed insert!

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-Year No-Risk Pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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PK_D19 2019_P30E_NN_NB_A2_G4_000001_PK

REMINDER: FIND MORE WAYS TO SAVE ON YOUR ENERGY BILL. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 28, 2019.

John Q. Sample - P3G 4/15/2019
 1234 Anywhere Street
 San Diego, CA 92123


April 15, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available. On **June 28, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1), which rewards you for shifting energy use to lower-cost times, away from the on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

AS A SOLAR CUSTOMER, WHAT DOES THIS MEAN FOR ME?

Based on analysis of the energy used in your home last year, you are likely to save on the **Time-of-Use (TOU-DR1) plan**. The cost of energy for this plan is highest during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours and reducing your overall use. If your system happens to generate excess energy, we'll continue to track and apply your generation credit. We'll be here to provide power to supplement your system when you need it.

YOU HAVE CHOICES

Since you're likely to save on the Time-of-Use (TOU-DR1) plan, let us **automatically move** you. You also have other options: **choose** the Time-of-Use (TOU-DR2) plan, **choose** another available plan, or **stay** on your current plan. Both Time-of-Use plans include **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whenmatters.

YOUR THREE PLANS COMPARED

Details as of 03/04/19 Account number: 9999999999 Meter number: 99999999

	\$4,650	Annual estimated cost including applicable NEM true-up credits and charges.*
<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES  This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>		
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES  This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>		
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p> <p>INCLUDES  Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>	<p style="font-size: 24px; font-weight: bold;">\$4,781</p>	

SDGE
 Time to save.

See enclosure for additional information, visit sdge.com/whenmatters or call us at 1-877-558-1674.

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2019 PD 30 SE 43 04 000004 PD

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 28, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

Since you're likely to save on the Time-of-Use (TOU-DR1) pricing plan, consider making the switch early. Log in to My Account at sdge.com/planenroll before June 28, 2019.

INCLUDES



NO RISK PRICING
1
YEAR

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHY THE SWITCH TO TIME-OF-USE?

Thanks to customers like you who are committed to a cleaner, greener future, there's more renewable energy generated earlier in the day. Because of these changes in energy production patterns, on-peak hours have shifted to 4 p.m. to 9 p.m.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, earlier in the day when you are generating energy or later in the evening after on-peak hours. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed insert and see just how easy it is to save even more.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-year no-risk pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM 5T.

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PGC 029 (098) PG&E, N, RE, AS, SA 000044_P02

REMINDER: IT'S THE LITTLE THINGS THAT COUNT. CHANGING A LITTLE MIGHT HELP YOU SAVE. YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 28, 2019.

John Q. Sample - P31 4/15/2019
 1234 Anywhere Street
 San Diego, CA 92123


April 15, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available.

On **June 28, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1). This plan rewards you for shifting energy usage to lower-cost times, away from on-peak hours of 4 p.m. to 9 p.m. You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

AS A SOLAR CUSTOMER, WHAT DOES THIS MEAN FOR ME?

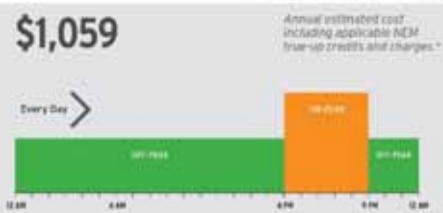
Based on analysis of the energy used in your home last year, you may be able to save on Time-of-Use plans if you can reduce your overall energy use **and** shift some of it to the lower-priced hours. Energy costs are highest during the on-peak hours between 4 p.m. and 9 p.m. This new approach to pricing gives you more choice and control by allowing you to save in two ways: choosing to use energy during off-peak hours **and** reducing your overall use. If your system happens to generate excess energy, we'll continue to track and apply your generation credit. We'll be here to provide power to supplement your system when you need it.

YOU HAVE CHOICES

To really save on Time-of-Use plans, consider whether you're able to use less energy from 4 p.m. to 9 p.m. If you can, let us **automatically move** you to the Time-of-Use (TOU-DR1) plan. You also have other options: **choose** the Time-of-Use (TOU-DR2) plan, choose another available plan, or **stay** on your current plan. Both plans come with **one-year no-risk pricing**, and you can switch to another available plan at any time. Get more information and make your choice online at sdge.com/whenmatters.

YOUR THREE PLANS COMPARED

Details as of 04/04/19 Account number: 999999999 Meter number: 99999999

	\$1,133	
<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES  This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>		<p>Annual estimated cost including applicable NEM true-up credits and charges.*</p>
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES  This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>		<p>Annual estimated cost including applicable NEM true-up credits and charges.*</p>
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p> <p>INCLUDES  Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>		<p>Annual estimated cost including applicable NEM true-up credits and charges.*</p>

See enclosure for additional information, visit sdge.com/whenmatters or call us at 1-877-558-1674.



Time to save.

#3_029
J945_F03_N_M_A0_04_060002_F3

WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 28, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

You can get more information by going to sdge.com/whentmatters. Or make your choice now. Call us at 1-877-558-1674 or log in to My Account at sdge.com/planenroll before June 28, 2019.

INCLUDES



**1
YEAR**

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHY THE SWITCH TO TIME-OF-USE?

Thanks to customers like you who are committed to a cleaner, greener future, there's more renewable energy generated earlier in the day. Because of these changes in energy production patterns, on-peak hours have shifted to 4 p.m. to 9 p.m.



DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, earlier in the day when you are generating energy or later in the evening after on-peak hours. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed insert and see just how easy it is to start saving.

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Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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PR_029 2486_7006_06_04_04_000001_P3

REMINDER: YOU ARE SCHEDULED TO SWITCH TO A TIME-OF-USE PLAN ON JUNE 28, 2019.

John Q. Sample - P3K 4/15/2019
 1234 Anywhere Street
 San Diego, CA 92123

April 15, 2019

Choices are coming to your energy pricing. Throughout California, new pricing based on when you use energy is now available. On **June 28, 2019**, your pricing plan will change to a Time-of-Use plan (TOU-DR1). You can **automatically move** to this new plan, **choose** another plan, or **stay** on your current plan.

AS A SOLAR CUSTOMER, WHAT DOES THIS MEAN FOR ME?

Based on analysis of the energy used in your home last year, if you continue to use energy the same way, **Time-of-Use** plans may not be right for you. To save on these plans (TOU-DR1 or TOU-DR2), you'll need to reduce your overall energy use **and** shift some use to lower-priced hours. Energy costs are highest during the on-peak hours between 4 p.m. and 9 p.m. Time-of-Use plans include **one-year no-risk pricing**, so you can try it out and see if one is right for you. If your system happens to generate excess energy, we'll continue to track and apply your generation credit. We'll be here to provide power to supplement your system when you need it.

YOU HAVE CHOICES

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YOUR THREE PLANS COMPARED

Details as of: 01/04/19 Account number: 9999999999 Meter number: 99999999

	\$1,077	Annual estimated cost including applicable NEM true-up credits and charges.*
<p>IF NO ACTION IS TAKEN YOU WILL AUTOMATICALLY MOVE TO THIS PLAN TOU-DR1</p> <p>INCLUDES 1 YEAR This plan has three pricing periods that differ between weekdays and weekends/holidays. Time-of-Use pricing has two tiers based on overall energy use.</p>		<p>Monday through Friday</p> <p>Weekends and Holidays</p>
<p>OR YOU CAN CHOOSE TO MOVE TO THIS PLAN TOU-DR2</p> <p>INCLUDES 1 YEAR This plan has two pricing periods each day. Time-of-Use pricing has two tiers based on overall energy use.</p>		<p>Every Day</p>
<p>OR YOU CAN STAY ON YOUR CURRENT PLAN STANDARD (DR)</p> <p>INCLUDES 1 YEAR Two pricing tiers based on monthly usage. Price does not vary by hour of the day. MAY INCLUDE HIGH USAGE CHARGE.</p>		<p>Annual estimated cost including applicable NEM true-up credits and charges.*</p>

See enclosure for additional information, visit sdge.com/whentmatters or call us at 1-877-558-1674.

Time to save.

PSH_2019
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WHAT DO I DO NOW?

The choice is yours. You're in control.

1. Do nothing, and we'll automatically move you to the **Time-of-Use (TOU-DR1)** pricing plan on June 28, 2019.
2. Enroll now in **Time-of-Use (TOU-DR1)**, **Time-of-Use (TOU-DR2)** or another available pricing plan.
3. Stay on your current **Standard (DR)** pricing plan.

You can get more information by going to sdge.com/whentmatters. Or make your choice now. Call us at 1-877-558-1674 or log in to My Account at sdge.com/planenroll before June 28, 2019.

INCLUDES



NO RISK PRICING
1
YEAR

TRY IT RISK-FREE

Enjoy bill protection. You can try a new Time-of-Use pricing plan risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference.

WHY THE SWITCH TO TIME-OF-USE?

Thanks to customers like you who are committed to a cleaner, greener future, there's more renewable energy generated earlier in the day. Because of these changes in energy production patterns, on-peak hours have shifted to 4 p.m. to 9 p.m.



SHIFT TO SAVE

DO I HAVE TO STOP USING ENERGY DURING ON-PEAK HOURS?

No, you do not. With Time-of-Use pricing plans, it can be as simple as shifting some of your household activities, like running the dishwasher or doing laundry, earlier in the day when you are generating energy or later in the evening after on-peak hours. Little changes can add up to big savings over the long run. For additional tips, check out the enclosed insert.

*Estimates are based on an analysis of your home's electricity use last year. Some costs may be estimated or rounded. If you're already enrolled in the CARE or FERA programs, it will be carried over to your newly selected plan. All pricing plans (rates) are subject to the supervision and regulation of the California Public Utilities Commission (CPUC) and are subject to change by CPUC order. One-year month pricing is applicable for up to 12 months while on TOU-DR1 or TOU-DR2 and does not apply to customers with NEM-ST.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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PK_029 PMS_PDF_MN_42_04_000006_Pk

Every little bit helps. Make saving energy a daily habit.

Here are a few tips to help you get started:

-  Turn off your dishwasher after the wash cycle and let your dishes air dry
-  Run your washer/dryer during off-peak hours and do multiple loads
-  Set a programmable thermostat to turn off or adjust during on-peak hours
-  Run your higher energy-consuming appliances, such as air conditioners and pool pumps during off-peak periods

Discover more energy-saving ideas at sdge.com/whenmatters



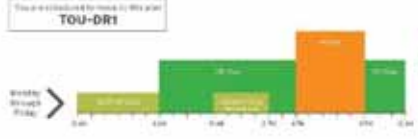
TIME IS MONEY.
WHEN YOU USE
ENERGY DETERMINES
HOW MUCH YOU
CAN SAVE.

 Time to save.

EXPLORE TIME-OF-USE PRICING, AND DECIDE WHICH ENERGY PLAN BEST FITS YOUR NEEDS.

TOU-DR1


Standard Rate



Standard Rate: 0.12/kWh
Off-Peak: 0.08/kWh
On-Peak: 0.18/kWh

TOU-DR2

Standard Rate



Standard Rate: 0.12/kWh
Off-Peak: 0.08/kWh
On-Peak: 0.18/kWh

SHIFT TO SAVE

BOTH PLANS INCLUDE ONE-YEAR NO-RISK PRICING

You can try the new SDGE or TOU-DR2 pricing plans risk-free for up to one year. If you end up spending more than you would have on your current plan during the first year, we will credit you the difference. In addition, there's no high usage charge with either of the plans, and you can switch to another available plan at any time.

1 YEAR

Time-of-Use plans provide greater ability to save by both shifting energy use to off-peak times and by reducing overall use. If you can change some of your daily energy habits, you may be able to save energy and money by switching to Time-of-Use.

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Mass Default – Welcome Brochure
TOU-DR1 with Bill Protection

QUESTIONS?

Visit sdge.com/whennmatters

or contact us at [800.442.4444](tel:8004424444) or [951.442.4444](tel:9514424444)

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Time to save.

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(619) 442-1342

WELCOME TO YOUR NEW PRICING PLAN.

Time to save.

YOUR NEW TIME-OF-USE PLAN IS ALL ABOUT WHEN

Throughout California, new pricing based on when you use energy is being implemented. You are now on a Time-of-the-Day pricing plan.

With your new plan, your energy costs will be lowest not only on how much energy you use, but also when you use it. Your energy prices will be lowest off-peak, except between the on-peak hours of 4 p.m. and 9 p.m. when prices are highest.

This new approach to pricing gives you more choice and control over your energy costs. Your new plan allows you to save in two ways. You can shift some of your energy use to the lower priced off-peak hours, and you can save by reducing your overall use.

By shifting your energy use to off-peak hours, you'll help decrease demand on the power grid, which benefits the environment and can save you money.

YOUR ON-PEAK HOURS ARE 4 P.M. TO 9 P.M.

WHY IS THE ON-PEAK 4 P.M. TO 9 P.M.?

For many years, the on-peak time for energy use was in the middle of the day, because of an increase in renewable energy, the on-peak time for energy has shifted to later in the day when the sun starts to go down and renewable energy production declines.

On-peak hours are now 4 p.m. to 9 p.m. when demand for energy is highest.

The less energy that you use during these on-peak hours, the less non-renewable energy will be used to meet it, it's good for the environment and good for your budget.

ONE-YEAR NO-RISK PRICING

Your Time-of-Day pricing plan comes with one-year no-risk pricing. If you end up spending more than you would have on the Standard Only plan during the first year, you'll receive a bill credit for the difference. In addition, with Time-of-Day pricing, there's no high-charge charge, and if you prefer to switch to another available plan, you can do so at any time.

PRICING FOR YOUR NEW TOU DR1 PLAN

Here's some quick information to help you better understand your new plan, its benefits, and ways to save on energy costs. Your new plan breaks your day into three time periods: on-peak, off-peak and super off-peak. Energy costs will be lowest during the off-peak and super off-peak hours and highest during the on-peak hours. The on-peak hours are 4 p.m. to 9 p.m. While you don't have to stop using energy during the on-peak hours, shifting some of your energy habits can have a positive impact on your monthly bill.

SHIFT TO SAVE

BASELINE AND TIME-OF-USE WORK TOGETHER

Time-of-use works in combination with baselines. The amount of energy you consume at a minimum delivery charge. Your electricity pricing includes a baseline allowance, which covers the amount of power used for some of your basic energy needs. The baseline allowance is determined by your climate zone, season, number of days in your billing cycle, and whether you're an electricity-only customer or natural gas and electricity customer.

Knowing your baseline means knowing the basic monthly allowance of energy you can get at the lowest price.

Summer prices differ from winter prices. Your baseline amount of energy is important because since you use 100% of it, you have to be higher according to pricing. Learn more at sdge.com/whennmatters.

Winter Season November - May

Off-Peak 12¢	Off-Peak 12¢	Super Off-Peak 8¢
On-Peak 20¢	On-Peak 20¢	On-Peak 20¢

Summer Season June - October

Off-Peak 12¢	Off-Peak 12¢	Super Off-Peak 8¢
On-Peak 24¢	On-Peak 24¢	On-Peak 24¢

IT'S THE LITTLE THINGS

When thinking about how to save energy in your home, don't overlook the little things. So, as if you thought an energy-efficient water heater can help you save on your bill, another simple way to save is to switch out your home's traditional light bulbs for LEDs that use 75% less energy. Easy! We'll help.

WHEN YOU USE ENERGY MATTERS

Time is money when it comes to energy use. You may be able to save on your energy bill by shifting some of your basic activities outside the peak hours of 4 p.m. to 9 p.m. Here are a few tips that can help lower your energy costs:

- ▶ **W**ash your clothes only during off-peak hours.
- ▶ **R**un off your dishwasher after the wash cycle and let your dishes air dry.
- ▶ **T**ell a programmable thermostat to turn off or adjust during on-peak hours.
- ▶ **R**un your higher energy-consuming appliances, such as air conditioners and pool pumps, during off-peak periods.

SIGN UP FOR ENERGY ALERTS

Even if you're on the go, you can keep track of your energy use and costs with email or text alerts. These alerts give you information about your account, bill, energy use, and more. You can subscribe to any or all of these alerts by going to sdge.com/whennmatters and "Alerts & Subscriptions."

- ▶ Your pre-set spending goal was exceeded
- ▶ Notice of move to a higher priced electric tier
- ▶ The set electric use limit
- ▶ Monthly energy use summary with billing tip

DISCOVER MORE ENERGY-SAVING IDEAS AT:
SDGE.COM/WHENMATTERS

Mass Default – Welcome Brochure
TOU-DR2 with Bill Protection

QUESTIONS?

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- Instagram.com/sdger

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800-451-7242

WELCOME TO YOUR NEW PRICING PLAN.

Time to save.

YOUR NEW TIME-OF-USE PLAN IS ALL ABOUT WHEN

Throughout California, new pricing based on when you use energy is being implemented. You are now on a Time of Use pricing plan.

With your new plan, your energy costs will be lowest not only on how much energy you use, but also when you use it. Your energy prices will be lower all day, except between the on-peak hours of 4 p.m. and 9 p.m. when prices are higher.

This new approach to pricing gives you more choice and control over your energy costs. Your new plan allows you to save at two ways. You can shift some of your energy use to the lower priced off-peak hours, and you can save by reducing your overall use.

By shifting your energy use to off-peak hours, you'll help decrease demand on the power grid, which benefits the environment, and can save you money.

YOUR ON-PEAK HOURS ARE 4 P.M. TO 9 P.M.

WHY IS THE ON-PEAK 4 P.M. TO 9 P.M.?

For many years, the on-peak time for energy use was in the middle of the day, but, because of an increase in renewable energy, the on-peak time for energy has shifted to later in the day when the sun starts to go down and renewable energy production drops.

On-peak hours are now 4 p.m. to 9 p.m. when demand for energy is highest!

The less energy everyone uses during these on-peak hours, the less non-renewable energy will be used overall. It's great for the environment and good for your budget.

ONE-YEAR NO-RISK PRICING

**1
YEAR**

Your Time of Use pricing plan comes with one year of no-risk pricing. If you end up spending more than you would have on the Standard (SM) plan during the first year, you'll receive a bill credit for the difference. In addition, with Time of Use pricing, there's no High Usage Charge, and if you prefer to switch to another available plan, you can do so at any time.

PRICING FOR YOUR NEW TOU-DR2 PLAN

Here's some quick information to help you better understand your new plan, its benefits, and ways to save on energy costs. Your new plan breaks your day into two time periods: on-peak and off-peak. Energy costs will be lower during the off-peak hours and higher during the on-peak hours. The on-peak hours are 4 p.m. to 9 p.m.

While you don't have to stop using energy during the on-peak hours, shifting some of your energy habits can have a positive impact on your monthly bill.

**SHIFT
TO
SAVE**

BASELINE AND TIME-OF-USE WORK TOGETHER

Time of Use works in combination with baselines, the amount of energy you can receive at a minimum delivery charge. Your electricity pricing follows a baseline structure, which covers the amount of power used for some of your basic energy needs. The baseline allowance is determined by your climate zone, season, number of days in your billing cycle, and whether you're an electricity-only customer or natural gas and electricity customer.

Maximize your baseline credits knowing the best monthly allowance of energy you can get at the lowest price.

Maximize your off-peak savings. Your baseline amount of energy is important because once you use 100% of it, you move to the higher on-peak pricing. Learn more at sdge.com/baselines.

November	May
20¢	36¢
28¢	26¢

June	October
15¢	36¢
45¢	23¢

IT'S THE LITTLE THINGS

When thinking about how to save energy in your home, don't overlook the little things. An act as simple as unplugging unused electronics can help you save on your bill. Another simple way to save is to switch-out your home's traditional lightbulbs for LEDs that use 75% less energy. Every little bit helps.

WHEN YOU USE ENERGY MATTERS

Time is money when it comes to energy use. You may be able to save on your energy bill by shifting some of your best activities outside the peak hours of 4 p.m. to 9 p.m. Here are a few tips that can help lower your energy costs.

- Run your washer/dryer during off-peak hours.
- Turn off your dishwasher after the wash cycle and let your dishes air dry.
- Set a programmable thermostat to turn-off or adjust during on-peak hours.
- Run your higher energy-consuming appliances, such as air conditioners and pool pumps, during off-peak periods.

SIGN UP FOR ENERGY ALERTS

Even if you're on the go, you can keep track of your energy use and costs with email or text alerts. These alerts give you information about your account, bill, energy use, and more. You can subscribe to any or all of these alerts by going to sdge.com/Myaccount and "Alerts & Subscriptions".

- Your pre-set spending goal was exceeded
- Notice of move to a higher priced electric tier
- Pre-set electric use limit
- Monthly energy use summary with saving tips

DISCOVER MORE ENERGY-SAVING IDEAS AT
SDGE.COM/WHENMATTERS

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WELCOME TO YOUR NEW PRICING PLAN.

Time to save.

YOUR NEW TIME-OF-USE PLAN IS ALL ABOUT WHEN

Throughout California, new pricing based on when you use energy is being implemented. You are now on a Time-of-Day pricing plan.

With your new plan, your energy costs will be based not only on how much energy you use, but also when you use it. Your energy prices will be lower all day, except between the on-peak hours of 4 p.m. and 9 p.m. when prices are higher.

This new approach to pricing gives you more control over your energy costs. Your new plan allows you to save in two ways: You can shift some of your energy use to the lower priced off-peak hours, and you can save by reducing your overall use.

By shifting your energy use to off-peak hours, you'll help decrease demand on the power grid, which benefits the environment and can save you money.

WHY IS THE ON-PEAK 4 P.M. TO 9 P.M.?

For many years, the on-peak time for energy use was in the middle of the day. Now, because of an increase in renewable energy, the on-peak time for energy use shifted to later in the day when the sun starts to go down and renewable energy production drops.

On-peak hours are now 4 p.m. to 9 p.m. when demand for energy is highest.

The less energy everyone uses during those on-peak hours, the less non-renewable energy will be used overall. It's good for the environment and good for your budget.

IT'S TIME TO THINK ABOUT ENERGY DIFFERENTLY.

PRICING FOR YOUR NEW TOU DR1 PLAN

Here's some quick information to help you better understand your new plan, its benefits, and ways to save on energy costs. Your new plan breaks your day into three time periods: on-peak, off-peak and super off-peak. Energy costs will be lowest during the off-peak and super off-peak hours and highest during the on-peak hours. The on-peak hours are 4 p.m. to 9 p.m. While you won't have to stop using energy during the on-peak hours, shifting some of your energy habits can have a positive impact on your monthly bill.

Weekdays through Friday

Weekends and holidays

HOW TO KNOW YOU'VE SAVED

Upstart provides customers the ability to set up alerts to receive text and/or email notifications in case you're not used to your bill being higher than usual. If you're not used to your bill being higher than usual, you may want to check your usage and see if you can shift some of your energy use to off-peak hours. You can also check your usage and see if you can shift some of your energy use to off-peak hours.

MONDAY THROUGH FRIDAY	
Super Off-Peak	Off-Peak
4:00-7:00 AM	7:00-4:00 PM
9:00-4:00 AM	4:00-9:00 PM

WEEKENDS AND HOLIDAYS	
Super Off-Peak	Off-Peak
4:00-7:00 AM	7:00-4:00 PM
9:00-4:00 AM	4:00-9:00 PM

IT'S THE LITTLE THINGS

When thinking about how to save energy in your home, don't overlook the little things. An act as simple as unplugging unused electronics can help you save on your bill. Another simple way to save is to switch out your home's traditional appliances for LEDs that use 75% less energy. Every little bit helps.

WHEN YOU USE ENERGY MATTERS

There's money when it comes to energy use. You may be able to save on your energy bill by shifting some of your best activities outside the on-peak hours of 4 p.m. to 9 p.m. Here are a few tips that can help lower your energy costs:

- Run your washer/dryer during off-peak hours.
- Turn off your dishwasher after the wash cycle and let your dishes air dry.
- Set a programmable thermostat to turn off or adjust during on-peak hours.
- Run your higher energy-consuming appliances, such as air conditioners and pool pumps, during off-peak periods.

SIGN UP FOR ENERGY ALERTS

Each if you're on the go, you can keep track of your energy use and costs with email or text alerts. These alerts give you information about your account, like energy use, and more. You can subscribe to any or all of these alerts by going to sdge.com/whymatter and "Alerts & Subscriptions".

- Your general spending goal was exceeded.
- Notice of move to a higher general electric tier.
- The bill electric use limit.
- Monthly energy use matching with billing tips.

DISCOVER MORE ENERGY-SAVING IDEAS AT SDGE.COM/WHYMATTER.

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TOU-DR2 with no Bill Protection

QUESTIONS?

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- [Facebook.com/LeadingGreenW&CO](https://facebook.com/LeadingGreenW&CO)
- [Nextdoor.com/@sdge](https://nextdoor.com/@sdge)
- [Pinterest.com/sdge](https://pinterest.com/sdge)

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1-800-461-7343

WELCOME TO YOUR NEW PRICING PLAN.

Time to save.

YOUR NEW TIME-OF-USE PLAN IS ALL ABOUT WHEN

Throughout California, new pricing based on when you use energy is being implemented. You are now on a Time-of-use pricing plan.

With your new plan, your energy costs will be based not only on how much energy you use, but also when you use it. Your energy prices will be lower all day except between the on-peak hours of 4 p.m. and 9 p.m. when prices are higher.

This new approach to pricing gives you more choice and control over your energy costs. Your new plan allows you to save in two ways: You can shift some of your energy use to the lower priced off-peak hours, and you can save by reducing your overall use.

By shifting your energy use to off-peak hours, you'll help decrease demand on the power grid, which benefits the environment and can save you money.

WHY IS THE ON-PEAK 4 P.M. TO 9 P.M.?

For many years, the on-peak time for energy use was in the middle of the day. Now, because of an increase in renewable energy, the on-peak time for energy has shifted to later in the day when the sun starts to go down and renewable energy production drops.

On-peak hours are now 4 p.m. to 9 p.m. when demand for energy is highest.

The less energy you use during those on-peak hours, the less non-renewable energy will be used overall. It's good for the environment and good for your budget.

IT'S TIME TO THINK ABOUT ENERGY DIFFERENTLY.

YOUR ON-PEAK HOURS ARE 4 P.M. TO 9 P.M.

PRICING FOR YOUR NEW TOU-DR2 PLAN

Here's some quick information to help you better understand your new plan, its benefits, and ways to save on energy costs. Your new plan breaks your day into two time periods: on-peak and off-peak. Energy costs will be lower during the off-peak hours and higher during the on-peak hours. The on-peak hours are 4 p.m. to 9 p.m.

While you don't have to stop using energy during the on-peak hours, shifting some of your energy usage can have a positive impact on your monthly bill.

BASELINE AND TIME-OF-USE WORK TOGETHER

One of our goals is to continue our commitment to providing the amount of energy you need at a minimum dollars charge. Your electricity pricing includes a baseline allowance, which covers the amount of power used for some of your basic energy needs. The baseline allowance is determined by your climate zone, season, number of days in your billing cycle, and whether you're an electric-only customer or natural gas and electric customer.

Knowing your baseline means knowing the basic monthly allowance of energy you can get at the lowest price. Summer prices differ from winter prices. Your baseline amount of energy is important because once you use 100% of it, you move to the higher on-peak pricing. Learn more at sdge.com/whentmatters.

Winter Season November - May		Summer Season June - October	
On-peak	Off-peak	On-peak	Off-peak
27¢	16¢	53¢	18¢
29¢	26¢	43¢	23¢

* Excludes one baseline, up to 100% of allowance.

IT'S THE LITTLE THINGS

When thinking about how to save energy in your home, don't overlook the little things. It can be simple as unplugging unused electronics or turning off your TV. Another simple way to save is to switch out your home's traditional appliances for LEDs that use 75% less energy. Every little bit helps.

SIGN UP FOR ENERGY ALERTS

Even if you're on the go, you can keep track of your energy use and costs with email or text alerts. These alerts give you information about your account, SDGE energy use, and more. You can subscribe to any or all of these alerts by going to sdge.com/whentmatters and "Alerts & Subscriptions."

- 1 Your pre-set spending goal was exceeded
- 1 Notice of move to a higher priced electric tier
- 1 Pre-set electric use limit
- 1 Weekly energy use summary with saving tips

DISCOVER MORE ENERGY SAVING IDEAS AT SDGE.COM/WHENTMATTERS

WHEN YOU USE ENERGY MATTERS

- Run your washer/dryer starting off-peak hours.
- Run off your dishwasher after the wash cycle and let your dishes air-dry.
- Set a programmable thermostat to turn off or adjust during on-peak hours.
- Run your higher energy-consuming appliances, such as air conditioners and pool pumps, during off-peak periods.



TIPS TO HELP YOU SAVE.

WASHER/DRYER
Run your washer/dryer before
4 p.m. or after 9 p.m.

DISHWASHER
Turn off your dishwasher
after the wash cycle and
let your dishes air dry.

For more tips visit
sdge.com/whenmatters.

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Be social - Join the conversation

PRICING PLANS MY VIDEO MY ACCOUNT

Wonder how you are doing on Time-of-Use?

Account number: XXXXX45013

HI, NINA
CLICK NOW TO WATCH YOUR VIDEO

WATCH YOUR VIDEO

Your Time-of-Use plan is all about *when* you use energy. Shifting your energy use to off-peak hours helps decrease demand on the power grid, which benefits the environment and can save you money.



Time to save.

Did you know that there are only a few weeks left on the one-year no-risk pricing offer that came with your current Time-of-Use plan(s)? This means you will soon know whether you saved money during your first 12 months of trying out Time-of-Use. If you end up spending more than you would have on your former Standard (DR) plan, you will automatically receive a one-time bill credit for the difference.

Please note your current plan will remain in effect unless you choose to switch to another available plan.

HOW DID I DO ON TIME-OF-USE?

Look for "Your Electricity Dashboard" on your monthly bill. That page includes a one-year no-risk pricing chart comparing your actual bills to date on Time-of-Use with what you would have spent on your former Standard (DR) plan.

ACCOUNT NUMBER: 0000 000 000 0
DATE DUE: Apr 7, 2020
DATE BILLED: Mar 19, 2020
Page 5 of 6
sdge.com

Your Electricity Dashboard
 *Charts may not display. For more data is unavailable

Period: 02-13 - 02-17

Average Hourly Electric Usage

For each day in the billing cycle, an hourly usage is calculated by peak. At the end of the bill cycle, hourly usage is averaged and displayed on the chart by peak.

Highest Usage Hour
 Highest Usage Hour this month:
 5.3 kWh on March 16, 2020. Peak Time on Peak.
 This is the highest amount of electricity used at a given point in time.

1 Year No-Risk Pricing

Month	Rate	Usage	Amount
02-13	\$0.16	100	\$16.00
02-14	\$0.16	100	\$16.00
02-15	\$0.16	100	\$16.00
02-16	\$0.16	100	\$16.00
02-17	\$0.16	100	\$16.00
02-18	\$0.16	100	\$16.00
02-19	\$0.16	100	\$16.00
02-20	\$0.16	100	\$16.00
02-21	\$0.16	100	\$16.00
02-22	\$0.16	100	\$16.00
02-23	\$0.16	100	\$16.00
02-24	\$0.16	100	\$16.00
02-25	\$0.16	100	\$16.00
02-26	\$0.16	100	\$16.00
02-27	\$0.16	100	\$16.00
02-28	\$0.16	100	\$16.00
02-29	\$0.16	100	\$16.00

If you saved, you've chosen the plan that's best for you.

If you're close to saving, see if you can identify a few more ways to shift your energy use to lower-cost hours.

If you decide you're not able to save, you may benefit by switching to another plan.

Make the choice that's best for you.

WHAT ARE MY CHOICES?

1. Do nothing, and you'll stay on your current Time-of-Use plan.
2. Switch to another available plan by logging in to My Account at sdge.com/MyAccount.

Have a question? See our FAQs at sdge.com/whenmatters or contact us at 1-800-411-7343.

HOW CAN I SAVE MORE ON TIME-OF-USE?



Time-of-Use plans are all about timing. Since energy costs are highest between 4 p.m. and 9 p.m., identifying which of your higher energy-consuming activities you can shift to off-peak hours is key. Some of the best ways to save energy and lower your bill are the easiest ways. Here are some tips to get you started. No doubt you'll come up with many more.



Run your washer/dryer during off-peak hours.



Turn off your dishwasher after the wash cycle and let your dishes air dry.



Set a programmable thermostat to turn off or adjust during on-peak hours.



Run your higher energy-consuming equipment, such as pool pumps, and charge your electric vehicle during off-peak periods.

YOU DESERVE THE BEST.

You're in control of your energy habits. You know best what changes you can make to take advantage of off-peak savings. To review your current plan and compare it with other options, log in to My Account at sdge.com/MyAccount. If you still have questions, give us a call at 1-800-411-7343.

The one-year, no-risk pricing offer that came with your current Time-of-Use plan(s) is ending soon for the following accounts and meters:

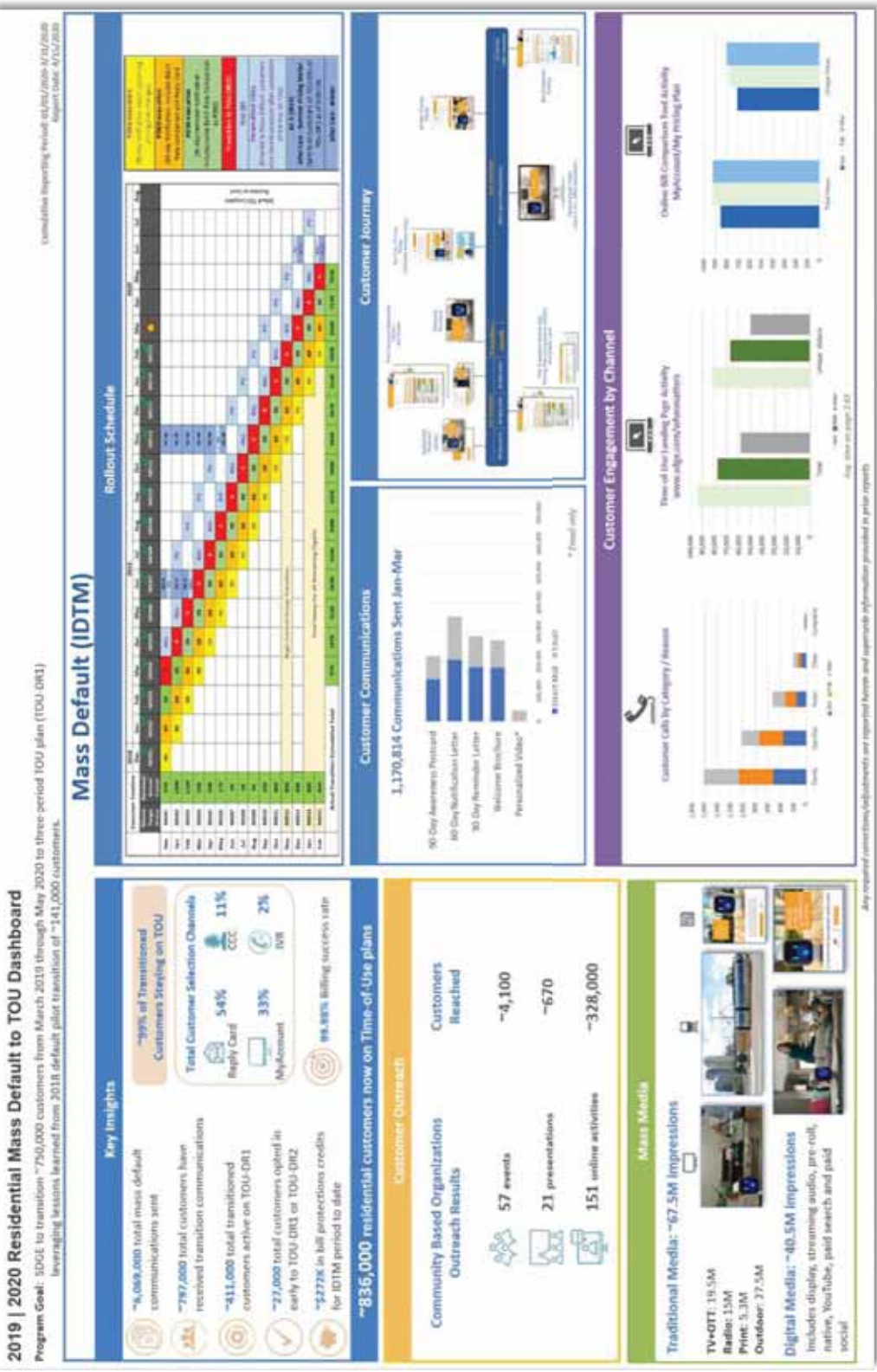
Account Number	Water Number	Water Address	Plan Name
999999999	99999999	1234 Anywhere Street	Time of Use (TOU-DR1)

One-year no-risk pricing is applicable for up to 12 months and requires continuous service at your current location while on the TOU-DR1 or TOU-DR2 plan, and does not apply to NEM-ST customers or accounts opened after 2/28/19.

Actual savings may vary and will depend on various factors, including geographic location, weather conditions, equipment installed, usage rates and similar factors.

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Appendix C: Q1 2020 Dashboard



Appendix C: Q1 2020 Dashboard

2019 | 2020 Residential Mass Default to TOU Dashboard

Program Goal: 100% to transition ~797,000 customers from March 2019 through May 2020 to three sorted TOU plan (TOU-DN1) leveraging levers learned from 2018 default pilot transition of ~141,000 customers.

Comprehensive Reporting Period: 01/01/2019-01/31/2020
Report Date: 01/31/2020

Customer Status

Estimated vs. Actual Benefitter Categories
Based on bills from Jan to Mar 2020

Benefitter Category	Estimated	Actual	Estimated	Actual
Benefitter	6,229	8,016	1.6%	2.2%
Neutral Benefitter	209,788	207,207	54.7%	54.0%
Neutral Non-Benefitter	157,465	157,453	43.5%	43.5%
Non-Benefitter	257	1,063	0.1%	0.1%
Total	383,739	383,739	100%	100%

Customer Selections

After	Pushing	Opt-Outs	Opt-In	Opt-Out	Opt-In
Transitioned Opt-In to Transitioning Opt-In	Opt-In to Non-TOU	Opt-In to Non-TOU	Opt-In to Non-TOU	Opt-In to Non-TOU	Opt-In to Non-TOU
81,701,000	101,000	101,000	101,000	101,000	101,000
2.6%	0.03%	0.03%	0.03%	0.03%	0.03%

Post-Default Status

Benefitter Category	Opt-Out	Opt-In	Opt-Out	Opt-In
Total	411,283	31,340	3,939	4,811
% of Customers Transferred	10.6%	8.2%	1.0%	1.3%

Customer Selections

Mass Default Customer Selections
After Receiving 90-Day Awareness Postcard (PD-90)

After	Pushing	Opt-Outs	Opt-In	Opt-Out	Opt-In
Transitioned Opt-In to Transitioning Opt-In	Opt-In to Non-TOU	Opt-In to Non-TOU	Opt-In to Non-TOU	Opt-In to Non-TOU	Opt-In to Non-TOU
81,701,000	101,000	101,000	101,000	101,000	101,000
2.6%	0.03%	0.03%	0.03%	0.03%	0.03%

Benefitter Definitions

Category	Est. Avg. Monthly Bill Impact
Benefitter	Save on electricity
Neutral Benefitter	Save on electricity
Neutral Non-Benefitter	Save on electricity
Non-Benefitter	Pay more for electricity

Customer Selections

Opt-In by Benefitter Category

Customer Selections

Opt-Out by Benefitter Category

Customer Selections

Opt-In by Channel

Customer Selections

Opt-Out by Channel

Customer Selections

Bill Protection Credits Paid

Customer Selections

Disconnections and Annals

Customer Selections

Total Customers Currently on TOU Plans

Plan	Customers
TOU-DN1	720,095
DNES	40,699
TOU-DN2	28,716
TOU-DN3	11,648
EVTOU2	10,139
EVTOU5	9,698
TOU-DN	9,140
DN-TOU	585
EVTOU	398
Total	854,108

Customer Selections

Total Customers Currently on TOU Plans

Customer Selections

Disconnections and Annals

Customer Selections

Disconnections and Annals

Customer Selections

Disconnections and Annals

Customer Selections

Disconnections and Annals

Evaluation of the California Statewide Smart Thermostat Time of Use Pilot



Report for Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric

I. Submitted by Evergreen

Economics March 31, 2020

We would like to acknowledge the following utility staff who were instrumental in study design, management and providing data for this research:

- Greg Buchler, Southern California Edison
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Graphic Summary



Design

Evergreen Economics compared **three groups** of low-income customers on the time-of-use (TOU) rate



Goal: This pilot aimed to understand if smart thermostats were a useful tool in transitioning low-income customers to a time of use billing rate.

Study Challenges: Difficulty recruiting customers into pilot leading to low participation. Delayed activation by Ecobee of eco+ feature (which shifts usage to non-peak periods) on thermostats. Inability to activate eco+ feature on all thermostats.

Methodology

Customer Segmentation

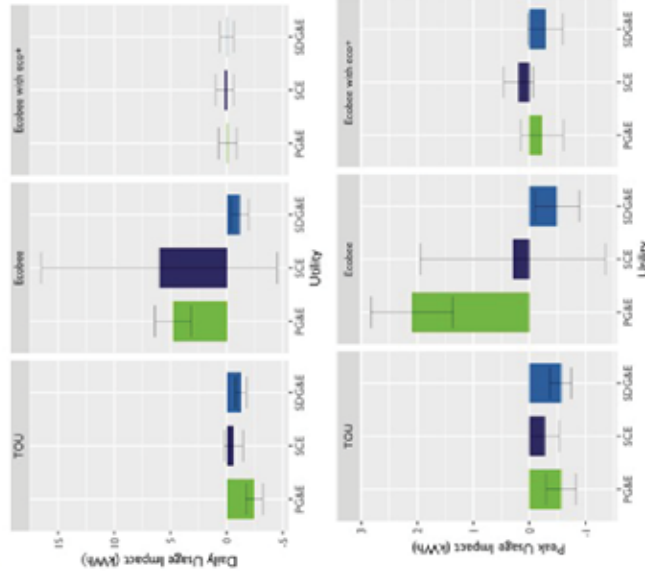
Billing Analysis

Three web surveys (before pilot, after summer, end of pilot)

Findings

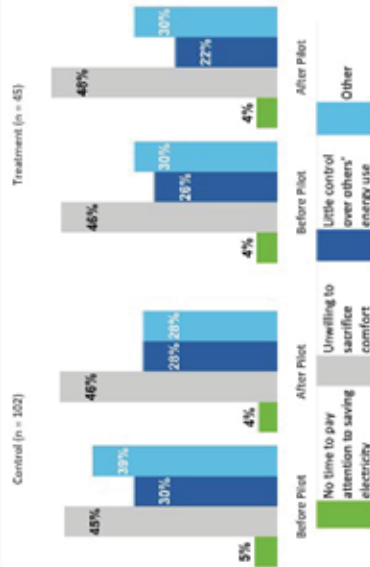
Estimates of Pilot Program Savings

The TOU rate alone lead to customers lowering their overall energy usage during the peak period and throughout the day. Some of these savings were cannibalized by use of a new smart thermostat. There were some savings associated with the eco+ feature.



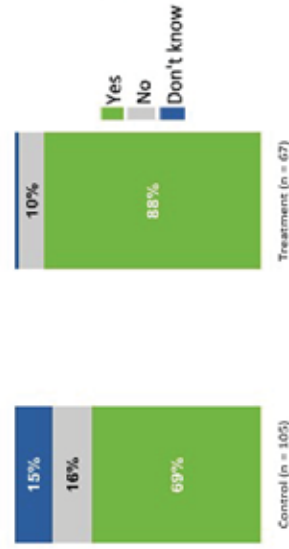
Increase in Usage Associated with Increase in Comfort

Participants who installed smart thermostats increased their comfort, which may explain some of the increase in energy usage.



Increased Awareness of Rate Change for Treatment Group




The treatment groups were more likely to be aware of the change in rate compared to the control group, suggesting that participation in the smart thermostat pilot helped households learn about the transition to the TOU rate.



Group	PG&E		SCE		SDG&E	
	Treatment	Control	Treatment	Control	Treatment	Control
1. Transitioned to TOU	88	96	86	82	48	81
2. Ecobee installed	40	n/a	36	n/a	42	n/a
3. eco+ connection	15	n/a	32	n/a	34	n/a

At the request of the California Public Utilities Commission (CPUC), the three California electric investor-owned utilities (IOUs) each ran a year-long pilot focused on identifying how to ease the transition to a time of use (TOU) rate for low-income customers. The TOU rate is meant to encourage residential customers to shift their usage away from the hours when the most electricity demand on the grid occurs.

Pilot Methodology: This pilot aimed to understand if smart thermostats were a useful tool in transitioning low-income customers to a time of use billing rate. Evergreen Economics was hired to evaluate this pilot. Customers were recruited into the pilot by the IOUs and were told they would be placed in one of two groups:

- 
1. (Quasi) Control group: Customers in this group were transitioned to a time of use rate, and kept their current thermostat. This is considered “quasi” control group as they still received the treatment of a rate change.
- 

2. Treatment group: Customers in this group were transitioned to a time of use rate, with installation of Ecobee smart thermostats enabled with an “eco plus” (eco+) feature to automate energy savings during the peak period.

All pilot participants were given bill protection, which will credit any amount of payment over what would have been billed on the old tiered rate at the end of the full year of participation. Evergreen then randomly assigned customers to either a matched control or treatment group.

In late January and early February of 2019, customers were told which group they were assigned to and were transitioned to the new rate at the start of their monthly billing cycle. The IOUs hired implementation contractors to install smart thermostats and educate customers about the thermostat functions.

In the late summer of 2019, the thermostat manufacturer notified the study team that the eco+ functionality had not been included in the pilot thermostats, meaning that customers had not been automatically shifted away from heating and cooling usage during the peak TOU hours for the majority of the pilot period. This fractured the treatment group into two distinct sets of pilot participants after one group had eco+ pushed to their devices.





While this compromised Evergreen's research, Evergreen were able to perform analysis on the small period of time (August through November 2019) when eco+ was enabled, though this unfortunately limited Evergreen from reviewing a full year of customer interaction with this technology.

Analysis Methodology: Before customers were told if they were in the control group or the treatment group, they were asked to respond to an initial web survey that provided a baseline for self-reported thermostat usage and attitudes towards saving energy in their home.

Customers were surveyed again in the early fall of 2019, after they had received at least two warm-season bills, and then again in February of 2020, after nearly a full year of pilot participation. These surveys had many of the same questions, meant to track changes in attitude and behavior over time. The final survey included questions to assess treatment group satisfaction with the thermostat and impressions from the full year of pilot participation.

Evergreen Economics analyzed hourly advanced metering infrastructure (AMI) energy usage data to see how energy usage changed across the entire day, and during the peak period in particular. In interpreting the impact and process findings together, Evergreen identified conclusions that cover the TOU rate change and the additional impact of offering a smart thermostat, with and without eco+. At the end of the study, there were a total of 398 pilot participants.

TOU Rate



The move to the TOU rate, on its own, lowered energy usage, though only around half of these savings occurred during the peak period (for both SCE and SDG&E customers). For PG&E customers, one-quarter of the savings attributed to the move to the TOU rate occurred during the peak period.

Participant survey responses indicated that they had a general understanding of the TOU rates and that heating and cooling were the largest energy uses in their homes. Almost all respondents were able to correctly identify when energy costs the most (during the peak period for their IOU), but when respondents described when they thought their own homes used the most energy, their responses did not always align with the peak period. Customers were only able to accurately estimate when their home used the most energy between 47 and 73 percent of the time.

Close to half of customers reported that they wished they had been told more about the TOU rate before the pilot started and were particularly interested in **additional information on the rate, including the best times to use appliances.**

TOU Rate *with* a Smart Thermostat (no eco+)



The addition of the smart thermostat allowed low-income pilot participants to improve comfort in their homes, increased their awareness of the TOU rate, and gave them more control via smart devices, but was not beneficial in reducing peak and daily energy usage for PG&E and SCE participants. SDG&E participants with smart thermostats managed to further reduce energy use beyond their counterparts who did not receive the smart thermostats. Participants were generally satisfied with their thermostat when asked at the end of the pilot.

For PG&E customers, Evergreen saw a statistically significant increase in energy usage both in the peak period and daily, attributed to use of the smart thermostats. For SCE customers, the same was true, though this finding was not statistically significant. When Evergreen looked at SCE customers only in the summer, it appeared that thermostats were utilized to reduce air conditioning (AC) usage, though their overall change in energy usage was less than what Evergreen observed in the control group (i.e., TOU rate with no smart thermostat). In the winter, SCE customers were less likely than in the summer to see reduced usage from the thermostats. Across all seasons, this resulted in an increase in energy usage for SCE customers who had the smart thermostat installed, though this was not statistically significant.

SDG&E participants with the smart thermostats were able to save more energy than their counterparts in the control group who had kept their own manual and programmable thermostats and were moved to the TOU rate. They were able to save more energy in the winter, but also saw summer reductions compared to the control group.

There are two findings that may help to explain why the smart thermostat increased treatment group energy usage relative to the control group:

- **All pilot participants reported that the main hurdle standing in their way of saving additional energy is an unwillingness to sacrifice comfort in their home.** The new thermostat may have allowed them to better manage comfort in their home. Both control and treatment group participants reported that they had a preference for manually adjusting their thermostats though this may have meant different things to each group, depending on the functionality of their thermostats.
- The control group was less sure that they knew bill changes were attributable to the TOU rate. **This suggests that the participants with a smart thermostat may have been more likely to attribute a change in their bills to the TOU rate.**

Treatment group participants were initially told that their thermostats were already being “smart” and modifying their usage during the peak hours, though this was untrue through July of 2019.



This may have made them feel like they did not need to make as many changes on their own, during the peak period or in general.

The control group was more likely to report using their appliances less frequently to avoid the peak period during the summer months. While this was not statistically significant, it may indicate that the **control group was more likely to take action in non-cooling related ways in absence of the smart thermostat**, whereas the **treatment group may have been more likely to have interpreted the smart thermostat offering as more of a one-stop solution to the change in rate**.

The smart thermostat alone (and in the absence of eco+) is likely not a valuable program tool for reducing peak usage, though it can help improve customer awareness of the TOU rate and improve customer comfort.

TOU Rate *with a Smart Thermostat and eco+*



In the period when Evergreen were able to analyze customers with eco+ enabled on their smart thermostats, Evergreen did not detect any statistically significant energy savings on the average day that could be attributed to the smart thermostat with eco+, relative to the control group.

There was a sudden drop in energy use at 4 p.m. for SDG&E participants with eco+ enabled, which was then sustained into the remainder of the peak period. SDG&E participants may have lowered their energy usage beginning at the start of the peak period as a reaction to large summer bills (SDG&E had steeper rates compared to the other IOUs), or customers may have been re-educated or reminded about the peak period when eco+ was pushed to their smart thermostats. This may have also been easier for customers to do without sacrificing comfort, given that SDG&E participants live in a more temperate climate. SCE participants also seemed to have the majority of their energy usage mid-day, compared to PG&E and SDG&E customers who used more energy in the evening hours.

Nearly all of the survey respondents who answered all three surveys aligned with the participants that had eco+ enabled in August. Responses from this group show that they were **not widely confident in the thermostat's ability to help them control their energy bills, or help them lower their energy use**.



2 Introduction

The three largest California electric investor-owned utilities (IOUs) were directed in Decision 16-11-022 as modified by Decision 17-12-009 to propose a plan to implement a pilot that examines interventions that may help low-income, high-usage customers reduce their energy use as they adapt to time of use (TOU) rates. These program interventions include programmable communicating thermostats (PCTs), alternative pricing mechanisms, and mobile phone applications. The electric IOUs developed variations of the pilot, each using a treatment and control group of low-income customers who are willing to move to a TOU rate with a total of up to 1,600 pilot participants. The three pilot variations differ in the key ways shown in Table 1. Individually, each pilot will allow for comparisons within each IOU's low-income high-usage populations in warmer climate zones.

Table 1: IOU Pilot Differences

IOU	Past Program Participation	Climate Zones*	Total Targeted Participants
SCE	ESA before summer 2017 + high usage CARE customers + general CARE (signed up or verified)	14 and 15	<ul style="list-style-type: none"> • 150 treatment • 150 control
PG&E	ESA between summer 2013 and summer 2017	11 to 14	<ul style="list-style-type: none"> • 150 treatment • 150 control
SDG&E	ESA before summer 2017 + high usage CARE customers	All	<ul style="list-style-type: none"> • 500 treatment • 500 control

* Building climate zones as defined by the California Energy Commission (CEC)
https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

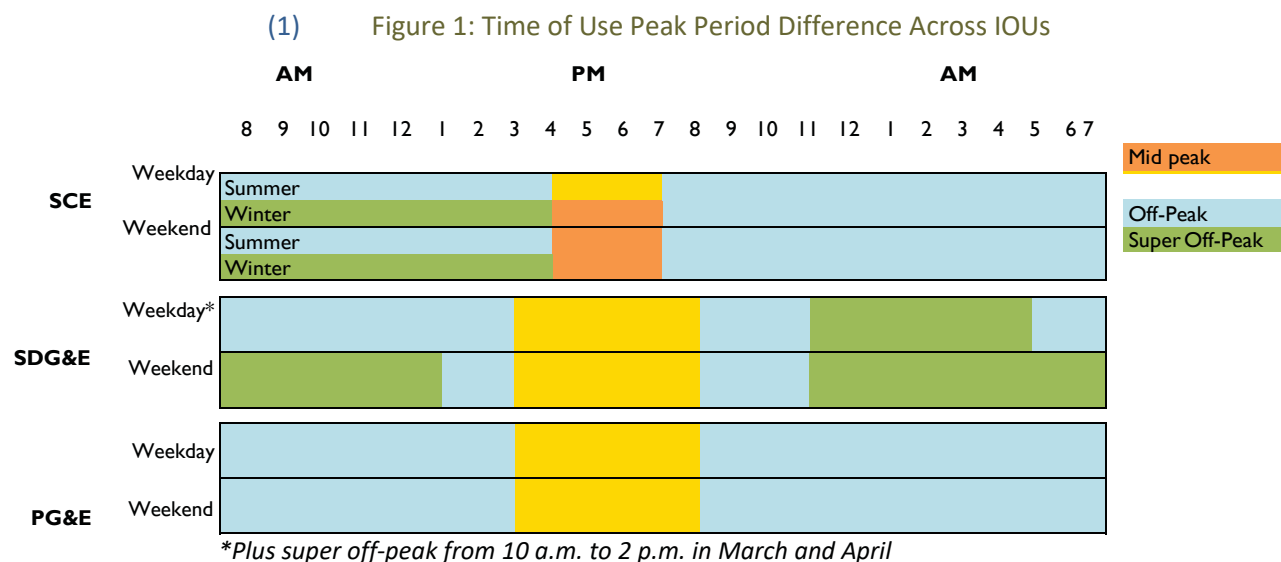
The IOUs recruited customers who had already participated in a low-income program. Altogether, the participants were required to:

- Receive electric service (gas optional);
- Own their home with no plans to move during the study period;
- Have and use central cooling (central air conditioning [AC] or heat pump);
- Have wireless internet in their home, and
- Not yet be on a TOU rate plan or have a connected PCT.

Over the course of the research, the total participant group dropped due to issues with thermostat installation and challenges re-contacting customers. These challenges are further explained in Appendix C and D.



Figure 1 demonstrates IOU differences in peak periods for the TOU rates applicable to this pilot. SDG&E and PG&E have on-peak hours between 4 PM and 9 PM, while SCE has peak from 5 PM to 8 PM with different rates for weekdays and weekends. The on-peak charges (\$/kWh) for SCE and SDG&E are much larger than PG&E, relative to off-peak hours.



In the summer of 2019, Ecobee announced that the thermostats used in this pilot study had not been running the Peak Relief functionality that was designed to help customers adjust to TOU rates. Ecobee pushed an updated version of Peak Relief (eco+) to a majority of the thermostats installed through the pilot, but this further fragmented the treatment group. It also greatly shortened the period that treatment customers experienced the Peak Relief functionality (now “eco+”) during the full run of the pilot.

2.1 Study Objectives

This evaluation approach is designed to meet the following study objectives:

1. Conduct a load impact analysis that includes load shifting profiles, and gross energy and demand savings impacts.
2. Survey pilot participants to understand their experience and opinions of how the smart thermostat impacted their usage, especially during TOU periods. Evergreen asked demographic, behavioral, attitude, and knowledge questions to help contextualize Evergreen’s findings in the load impact analysis.
3. Combine survey data with the customer usage data to further explore the relationship between customer self-report and demographic characteristics with usage patterns.
4. Understand if smart thermostats are a useful tool for low-income customers in transitioning to a TOU rate.
5. Identify beneficial messaging for future marketing or educational materials.



3 Methodology

3.1 Assign Treatment and Control Groups

The three IOUs recruited customers into the Low Income Programmable Communicating Thermostat (PCT) Time of Use (TOU) Pilot, letting them know that they would be moved to the TOU rate, and that they may or may not receive a PCT.

As required for a true randomized control trial (RCT) design, Evergreen randomly assigned these customers to either a treatment group or a control group. Prior to the assignment, Evergreen grouped customers into similar categories based on energy usage, average load shape, and possibly location (if needed). The Advanced Metering Infrastructure Customer Segmentation (AMICS) model framework (discussed in further detail below) was very useful in this regard, as an initial binning process allowed Evergreen to identify similar customers and group them together based on average energy use and load shapes (through the *k*-means cluster analysis).¹ Once similar customers were grouped in this manner, the randomized selection between the treatment and control groups was completed.

3.1.1 Verify Pilot Eligibility

The IOUs recruited a total of 764 customers into the pilot, well below the initial target of 1,600. This was in part due to recruitment challenges documented in Appendix C and D.

Evergreen verified criteria used during utility recruitment with the utility billing data and measure incentive records, where feasible. A total of 34 customers were screened out of the initial IOU recruitment pool because they did not meet all of these eligibility criteria (for example, six had previously received incentives for PCTs, and one was already on a TOU rate). The IOU recruitment relied on customer self-report, which was not always sufficient to confirm eligibility for participation in the pilot.

An additional 36 customers opted out of the pilot prior to Evergreen's analysis. The remaining 694 customers were randomly assigned to the treatment and control groups (Table 2).

¹ In effect, clustering automatically groups customers with similar hours of energy usage and magnitude of usage. This process identifies groups of customers with relatively homogenous patterns in energy usage, without relying on customer characteristics that are often not tracked (or not regularly updated) by the IOUs.



(2) Table 2: Pilot Customer Recruitment and Screening

	PG&E	SCE	SDG&E	Total
IOU Recruitment Eligibility	Prior/current low-income program participation in climate zones 11-14		Prior/current low-income program participation	
Customers Targeted	300	300	1,000	1,600
Customers Recruited	414	174	176	764
Screened Out by Evergreen (not eligible)	25	0	9	34
Opted Out	36	0	0	36
Remaining	353	174	167	694

3.1.2 Customer Segmentation

Prior to the random assignment of customers into the control and treatment groups, Evergreen sorted customers into similar categories based on their average load shape in the pre-period and other characteristics. Evergreen used the AMICS model framework to identify similar customers and group them together based on their energy usage to improve the matching between the treatment and control groups.

Evergreen created different customer segments for each IOU (listed below) due to the variations in eligibility criteria, sample size, and pre-period load shapes across IOUs. The segments were chosen to minimize the baseline model error (as measured by repeated cross validation holdout tests) and group customers with similar potential for savings from the TOU pricing and/or PCTs, while also minimizing the number of customers isolated by the segmentation method (that is, solo customers without peers to enable a post-period comparison).

- PG&E: 5 daily energy usage (magnitude) groups and 7 normalized load shape clusters (hours-of-use)
- SCE: 2 eligibility categories (i.e., prior participation in the Energy Savings Assistance program) and 11 load shape clusters (magnitude and hours-of-use)
- SDG&E: 2 climate zone groups and 11 load shape clusters (magnitude and hours-of-use)

For the daily energy usage groups, Evergreen assigned customers to one of five bins according to their average daily energy usage in the pre-installation period, such that each bin contained roughly the same total kWh usage. The number of customers in each bin varied, with the highest energy usage bins containing the fewest customers. This binning strategy isolated customers who are atypical, reducing error in the model without removing these customers from the analysis.

The load shape clusters for each IOU were made up of customers with similar hours of use, identified by *k*-means clustering, such that each customer segment contains a subset of customers with similar hours of energy use during the pre-installation period. The benefit of cluster analysis is that similar customers are grouped automatically from the AMI data, rather than relying on



customer characteristics that are often not tracked (or not regularly updated) by the IOU. Some customers have relatively flat load shapes with little change in energy usage throughout the day, while others exhibit a steep increase in energy usage in the morning and afternoon hours until they reach a peak in the evening and drop back down.

3.1.3 Random Assignment

Once similar customers were grouped in this manner, the randomized selection between the treatment and control groups could be completed. Specifically, Evergreen randomly assigned 50 percent of the customers in each IOU customer segment to the treatment group or the control group. In a few cases, Evergreen manually shifted customers with no peers (that is, those assigned to a segment with only $n=1$ customer) to the opposing groups to maintain a balance between the groups. Table 3 provides a side-by-side comparison of the average pre-period energy usage, low-income program participation, and home characteristics based on IOU program, billing, and customer information system data.

(3) Table 3: Attributes of Control and Treatment Group

	PG&E		SCE		SDG&E	
	Control	Treatment	Control	Treatment	Control	Treatment
N	176	177	87	87	84	83
Avg. daily kWh	23	24	28	28	19	19
Avg. kWh during peak hours	2.1	2.2	2.7	2.7	1.5	1.5
Avg. summer-shoulder ratio*	1.9	1.9	2.9	2.6	1.7	1.8
Avg. fixed-effects baseline**	0.49	0.49	0.63	0.63	0.42	0.42
% participated in ESA	100%	100%	8%	6%	27%	39%
% enrolled in CARE - late 2018	84%	84%	48%	54%	93%	88%
Avg. home square-footage	1,632	1,712	1,721	1,686	not available	not available
Avg. home built year	1982	1980	1986	1988	not available	not available
Avg. total CDD for the year	1,789	1,783	3,266	3,062	1,246	1,257
Avg. total HDD for the year	2,788	2,779	2,049	2,159	1,789	1,775

*Average hourly kWh in summer (months 6-8)/average hourly kWh ratio in shoulder months (11, 2-3). The concept is that the larger ratio is indicative of high HVAC usage, and thus more potential savings from a thermostat or AC program.

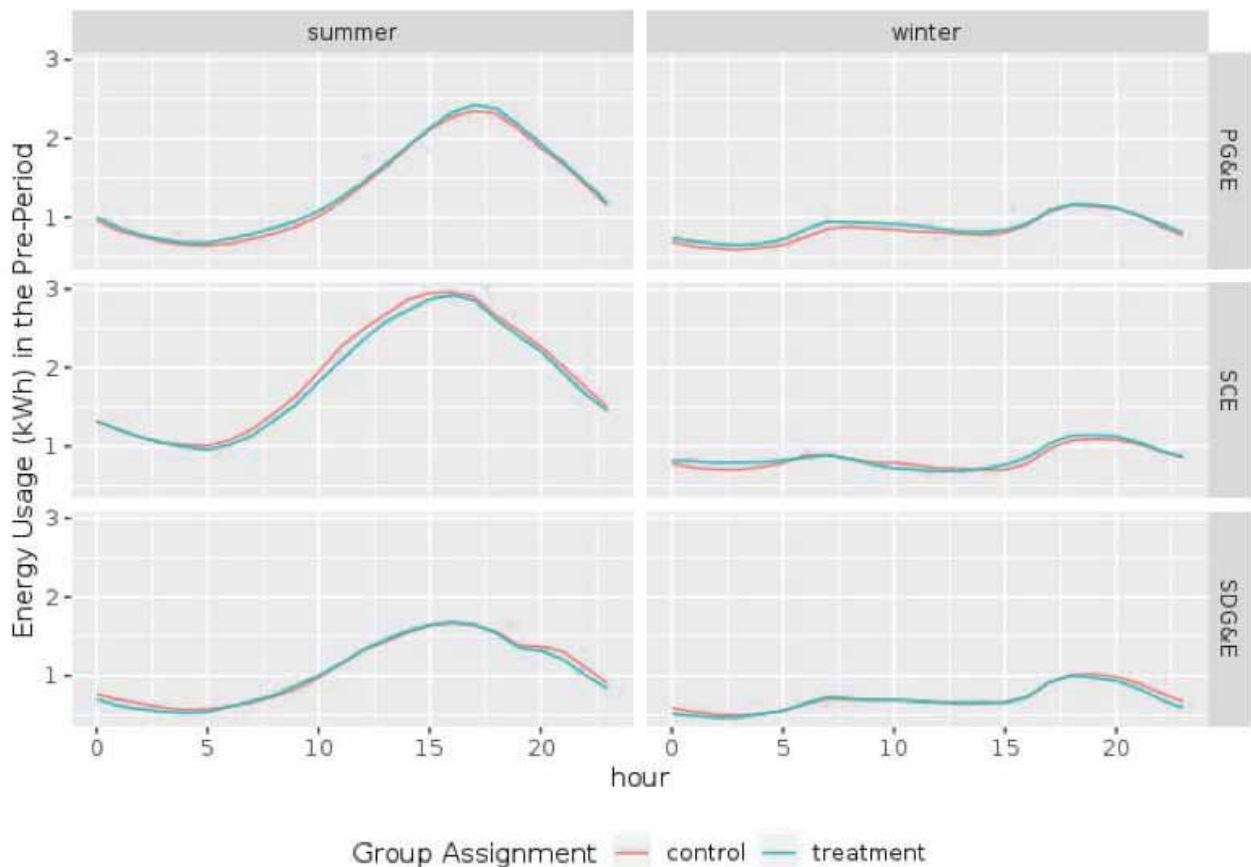
** Estimated baseline kWh, customer fixed-effects coefficients from a simplistic regression model using a full year of pre-period days (on days with defined temperatures). $kWh \sim \alpha + hdd + cdd$.

Figure 2 shows the average kWh energy usage during the summer and winter months, by customers assigned to the control (pink) versus the treatment (blue) group prior to any program



intervention. The overall kWh energy usage (scale) and shape differ across the three IOUs, but in both seasons, the control and treatment groups appear well matched. This is especially important during the summer peak hours, when Evergreen expects to see the largest impact from the TOU rates and/or PCTs.

(4) Figure 2: Average Load Shape of Treatment and Control Group by Season and IOU



3.2 Customer Surveys

Evergreen designed and implemented a total of six web surveys over the course of the evaluation. This included three surveys for each study group (control and treatment) on three separate occasions: before the pilot began, after summer bills were received, and then in February 2020 after almost a year of participation in the one-year pilot.

For the first survey, Evergreen sent pilot participants both a postcard and an email that contained a unique link to a web survey before alerting them of their placement in the control or treatment group. Evergreen offered an incentive of a \$25 to \$50 gift card to either Target or Walmart (varied by IOU) for completing the first web survey.

Table 4 shows the initial IOU incentives along with the incentives planned for the three surveys. Respondents to all three surveys received an additional “kicker” incentive in some cases, as shown.

(5) Table 4: Incentives by IOU and Treatment vs. Control Group

	PG&E		SCE		SDG&E	
	Treatment	Control	Treatment	Control	Treatment	Control
Initial IOU Incentive	Thermostat	None	Thermostat	\$100	Thermostat	\$100
First Survey	\$50	\$50	\$25	\$25	\$25	\$25
Second Survey	\$50	\$50	\$25	\$25	\$25	\$25
Third Survey	\$50	\$50	\$25	\$25	\$25	\$25
Survey "Kicker"	\$50	\$50	N/A	N/A	\$25	\$25
Final Incentive	N/A	N/A	N/A	\$100	N/A	N/A
Total Possible	\$200	\$200	\$75	\$275	\$100	\$200

In Table 5, Evergreen presents the survey response rate over the course of the study. Columns labeled "n" include the total number of respondents that received surveys. There was a significant drop in the number of surveys sent to customers between the first and second survey due to participants dropping out of the study after learning their group assignment or after possible participants were unwilling to sign release forms. Attrition during this period of the study is discussed thoroughly in the interim findings memo included as Appendix D.

(6) Table 5: Survey Response Rate

	First Survey			Second Survey			Third Survey		
	Completed	n	Response Rate	Completed	n	Response Rate	Completed	n	Response Rate
PG&E	93	354	26%	77	142	54%	80	142	56%
Control	66	176	38%	49	99	49%	55	99	56%
Treatment	53	178	30%	28	43	65%	25	43	58%
SCE	93	174	53%	34	123	28%	36	123	29%
Control	34	87	39%	19	87	22%	23	87	26%
Treatment	29	87	33%	15	36	42%	13	36	36%
SDG&E	104	167	62%	67	133	50%	83	133	62%
Control	55	84	65%	41	84	49%	56	84	67%
Treatment	49	83	59%	26	49	53%	27	49	55%
Total	290	695	42%	178	398	45%	199	398	50%

Table 6 shows how many of the respondents to the third survey had responded to the prior two surveys, allowing Evergreen to analyze responses and how they changed over the course of the pilot.



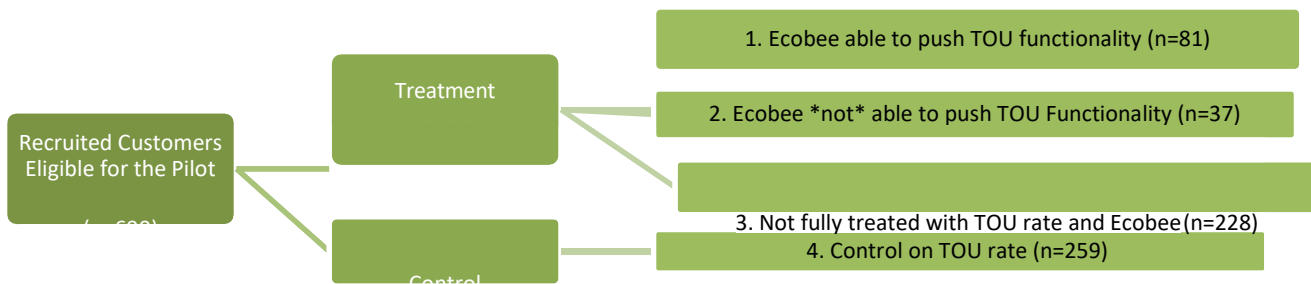
(7) Table 6: Percentage of Respondents from Third Survey that Responded to All Three Surveys

	Completed All Three Surveys	n	Response Rate
PG&E	46	80	58%
Control	30	55	55%
Treatment	16	25	64%
SCE	18	36	50%
Control	12	23	52%
Treatment	6	13	46%
SDG&E	45	83	54%
Control	33	56	59%
Treatment	12	27	44%
Total	109	199	55%

3.3 Billing Analysis

Evergreen conducted an analysis of pre and post participation load and billing data to estimate potential energy and bill savings associated with TOU-enabled PCTs. Pilot participants were randomly assigned to two balanced groups: treatment and control. Each of these two groups fractured into varying levels of treatment or control, as shown in Figure 3.

(8) Figure 3: Pilot Participant Treatment and Control Groups after the Program Intervention



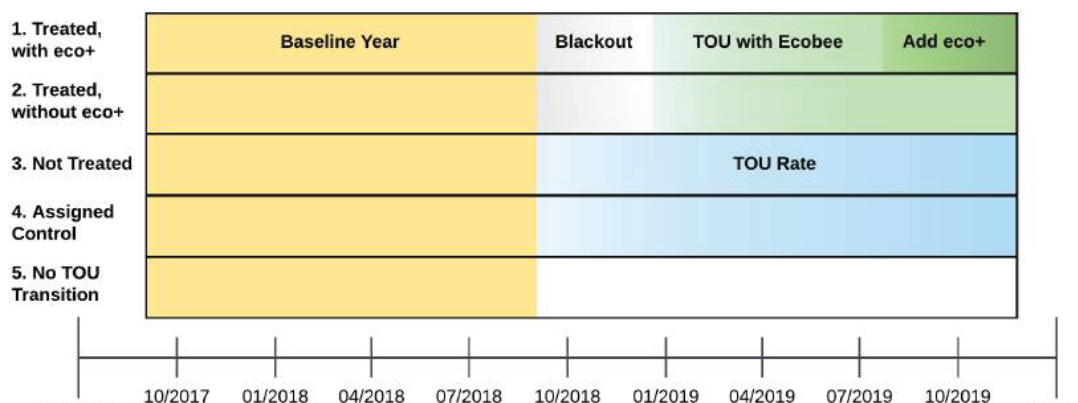
There are now four groups of pilot participants:



1. Treatment participants who installed the smart thermostat in early 2019, and received the full TOU functionality by the end of August 2019;
2. Treatment participants who installed the smart thermostat in early 2019, but will never receive TOU functionality due to connectivity issues;
3. Treatment participants who were not fully treated because they were not moved to a TOU rate or unable/unwilling to have the smart thermostat installed; these customers were either moved to a TOU rate without the device or dropped from the program by the IOUs;
4. Control group participants who were moved to the TOU rate.

Evergreen’s original research plan assumed a full year of baseline and post-period data from the full treatment and control groups. Figure 4 provides the revised pilot program timeline by participant group. Due to delays in recruitment and limitations in scheduling the Ecobee PCT installations, the program intervention was completed between December 2018 and January 2019 (instead of October 2018, as originally planned).² The eco+ TOU-optimization feature was enabled for a subset of the customers with Ecobee PCTs (group 1) between July and August 2019. In order to accommodate reporting deadlines set by the CPUC, Evergreen was required to cut off data collection on November 30, 2019; hence, Evergreen has less than a full year of observations after the program intervention. In order to balance the baseline and reporting periods, Evergreen restricted the baseline period utilized in the regression models to the same time period in the prior year; the end of 2018 will be treated as a blackout period. The impacts of Ecobee and eco+ TOU-optimization functionality can only be estimated for the post-period observed in the data. Annualized impacts of eco+ TOU-Optimization are not feasible unless the pilot were to be extended through the summer months of 2020.

(9) Figure 4: Program Intervention Timeline by Group



For the treatment group with PCTs (groups 1 and 2), the time between the TOU rate switch and the Ecobee PCT installation will be a blackout period for the analysis. Those customers who were assigned to the treatment group but never received a PCT (group 3) received the same intervention as those assigned to the control group (group 4). However, these customers were offered an Ecobee PCT but were unwilling or unable to receive a PCT, which makes them systematically different from groups 1, 2, and 4. The fifth group shown in Figure 4 contains



customers who were randomly assigned to the treatment group or the control group, but were never transitioned to a TOU rate (e.g., they moved). There is no program intervention to assess in group 5, but they can still be utilized in the baseline models because Evergreen has already verified that they are eligible to participate in the program.

3.3.1 Database

PG&E, SCE, and SDG&E recruited 764 low-income customers to participate in the pilot. Evergreen received customer account details and a full year of hourly interval AMI billing data for each customer prior to any program intervention, from September 2017 to August 2018. A total of 694 participants were assigned to the treatment or the control group as described in Section 3.1.

Evergreen received additional post-period data after adoption of TOU rates and installation of thermostats. This post intervention data again included customer account characteristics and hourly interval AMI billing data, from September 2018 to November 2019. Table 7 provides a detailed view of how the sample fractured after the original assignments.

There were some customers originally assigned to the pilot for which Evergreen did not receive post intervention data. There were issues with PG&E transitioning customers to TOU rates due to an inability to collect signature forms confirming acceptance of the terms of the pilot. Only 53 percent of customers recruited for the pilot by PG&E were transitioned to a TOU rate, compared to 97 percent from SCE and 94 percent from SDG&E. There were difficulties with implementation of PCT installations for the treatment group across all three IOUs, due to a wide range of issues such as installation scheduling logistics, incompatible home wiring, and customer refusal to accept the smart thermostat. For PG&E specifically, there was a challenge in getting customers to sign agreements with the utility. This is further detailed in Appendix D.

In August of 2019 the study team was notified by Ecobee that none of the thermostats installed had the correct software that would allow for automated load shifting away from the IOU's peak periods. Ecobee made efforts to update this software on each pilot thermostat though they were unable to do this to each and every thermostat.

(10) Table 7: Fractured Treatment and Control Groups by IOU

Group	PG&E		SCE		SDG&E	
	Treatment	Control	Treatment	Control	Treatment	Control
Assigned	176	173	87	87	83	84
Received post-period AMI	176	173	87	87	53	84
Transitioned to TOU rate	88	96	86	82	48	81
At least six months of post data	87	95	82	77	46	79
Ecobee installed	40	n/a	36	n/a	42	n/a
eco+ connection	15*	n/a	32	n/a	34	n/a

² The TOU, Ecobee, and eco+ activation dates vary across customers. The Ecobee PCTs were installed between December 18, 2018 and January 18, 2019. eco+ was activated between July 18, 2019 and August 30, 2019.



*Evergreen determined active eco+ thermostats using data shared by an Ecobee file dated September 6th, 2019. At two later dates (October 2019 and March 2020) Ecobee provided additional information regarding four thermostats that were later activated. These four thermostats are excluded from our analysis.

Table 8 provides an overview of the resulting sample available for Evergreen’s analysis. Evergreen defined the baseline year (i.e., pre-period) as the time between October 2018 and the first program intervention (TOU activation or Ecobee installation). The post-period begins after all relevant program interventions are completed for an individual customer. For groups 1 and 2, any dates that fall between TOU activation and Ecobee installation were excluded from the analysis. In late August 2019, Ecobee notified PG&E there was an additional defect impacting only PG&E installations (half of the thermostats received by PG&E were not set up correctly by Ecobee), which prevented 24 of the installed thermostats from accepting firmware upgrade over the cloud. A matching algorithm was utilized to identify a subset of the control group (group 4) that appears similar to the treated customers with thermostats installed (groups 1 and 2) during the baseline period; see Appendix E for details. The timeline of the control group was further restricted to match that of the treatment group prior to the difference-of-difference calculation of program impacts.

(11) Table 8: Final Analysis Sample by Pilot Intervention and IOU

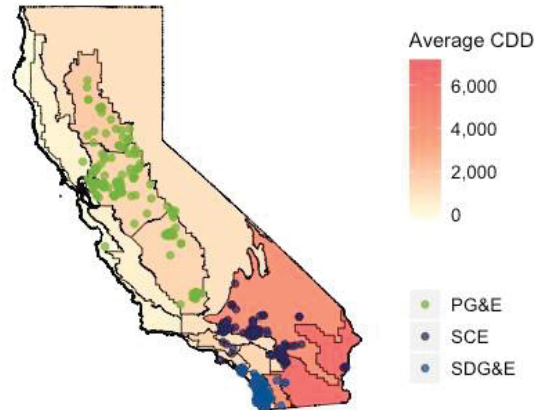
		Control	Treatment	
Group		Group 4	Group 1+2	Group 2
Intervention		TOU	TOU with Ecobee	TOU, Ecobee, eco+
Post-Period Timeline		Oct 2018 - Nov 2019	Dec 2018 - Aug or Nov 2019	Dec 2019 - Nov 2019
Number of Customers	PG&E	95	40	15
	SCE	77	36	32
	SDG&E	79	42	34
	Total	251	118	81

The IOUs also provided Evergreen with hourly weather data from 60 distinct weather stations, spanning all service territories from September 2017 through November 2019. Across all stations and dates required for the analysis, 96 percent of days contained a full 24 hourly observations. Evergreen merged these weather data with the billing records, using the IOUs’ preferred weather station for each customer service account or determining the nearest station.

Figure 5 provides a map showing the geographic spread of the pilot participants by utility. The lines provide the boundaries of the California CEC Building climate zones. Each zone has been shaded with the annual cooling degree-days (CDD), with the hottest regions in red. Most of the participants from PG&E and SCE are inland, while many of SDG&E’s participants are located along the coast. Many of the SCE participants are located in CZ14 and CZ15, the two hottest climate zones in California. These participants have a greater need for cooling throughout the year. PG&E and SDG&E customers are located in much milder climate zones, that have much lower cooling

needs. The geographic distribution of participants is displayed below in Figure 5, along with the average annual CDD for the climate zone³.

(12) Figure 5: Pilot Participants by Utility and Climate Zone



The IOU customer account details allowed Evergreen to identify 134 customers (19%) that were enrolled in a demand response program during the pilot deployment. These programs include a direct load control AC switch program and a voluntary load reduction incentive program (with optional enabling technologies). To avoid attributing peak load reductions to the pilot that are actually caused by concurrent participation in these other programs, Evergreen excluded all observations on event days for customers enrolled in an existing demand response program.⁴ It was not necessary to remove these customers from the analysis entirely, because these programs will only impact their energy usage during events.

3.3.2 AMI Customer Segmentation Model

In this task, Evergreen analyzed AMI interval billing data for the pilot participants from each of the IOUs. Evergreen used the AMI Customer Segmentation (AMICS) modeling approach to estimate the energy savings attributable to the Ecobee smart thermostat and eco+, independent of the transition to TOU rates.

The AMICS model has been used successfully in several residential applications to date and has produced very accurate estimates of load shapes, along with very detailed (i.e., hourly) estimates of program impacts. In 2018, Evergreen used the AMICS model to estimate impacts for SCE's

³ Average annual degree-days for reference city within climate zone:

https://www.pge.com/includes/docs/pdfs/about/edusafety/training/pec/toolbox/arch/climate/california_climate_zones_01-16.pdf

⁴ While we do acknowledge that the pilot interventions may have increased the peak load reduction that participants were able to achieve during events, teasing out the savings of concurrent programs was outside the scope of this study.



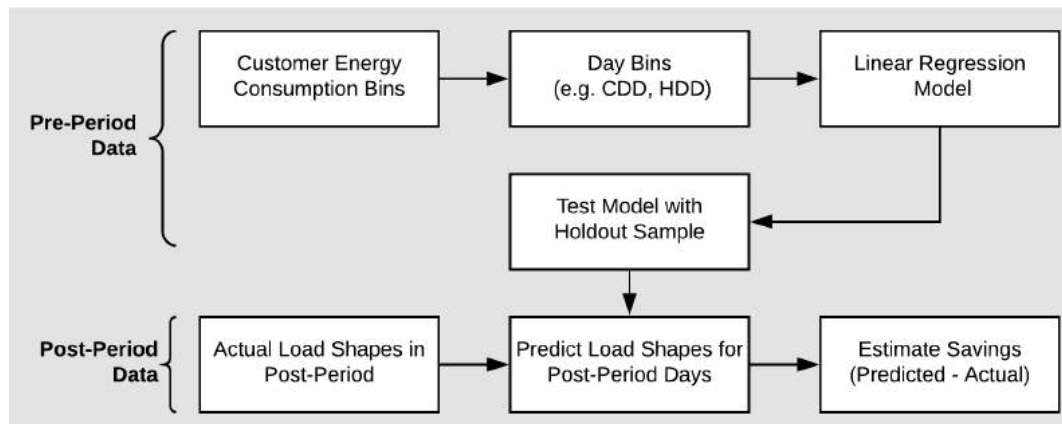
Optimized Connected Thermostat Project, and much of that work will be directly applicable to this evaluation. This project involved smart thermostats in California and had a very limited sample size (n=314), providing very promising indications that the model can be applied very effectively to the current pilot and address some of the potential study limitations (e.g., small sample sizes, lack of additional control groups). Evergreen’s previous research for the IOUs has demonstrated that the AMICS modeling approach produces similar results to a traditional fixed effects billing regression model at the *program* level, while also providing the time of day the savings occurred.⁵ This is not a proprietary “black box” method, but rather a series of simple linear regressions that are estimated with open source statistical software (R and PostgreSQL).

A unique step in the AMICS modeling approach is segmenting the AMI data into thousands of distinct segments (bins), as shown in Figure 6. Each bin contains interval energy use data for customers (from the treatment and control groups) with similar energy usage patterns on days with specific weather conditions. Binning the data and then estimating separate regression models for each bin limits the variation (across customers and days) for which each model must account. The AMICS approach produces a portfolio of daily energy-use load shapes and savings estimates, representing how each customer uses energy when experiencing specific (actual or expected) weather conditions.

In the second stage, the model is tested against a holdout sample of customers that were excluded from the original model estimation. If the model can predict the load shape for the holdout sample with sufficient accuracy (preferably within 1%), then Evergreen proceed with the third stage, which involves predicting load shapes for the post period and then comparing them with actual energy use. In this case, Evergreen has two separate phases of the post-period to assess: 1) Ecobee installation with TOU rate plan enrollment and 2) eco+ TOU-optimization activation. The same pre-period baseline model can be applied to each of the post-period phases.

⁵ The AMICS approach has been extensively tested and shown to accurately estimate energy savings for residential and commercial customers participating in HVAC programs, multifamily whole building retrofit programs, and home energy reports programs (both recipients and controls). In each study, repeated holdout testing was conducted to demonstrate the model’s ability to make reasonable and consistent load shape predictions across the diverse sample of customers and days.

(13) Figure 6: AMICS Model Overview



The customer segmentation and billing regressions within the AMICS approach can be customized for each IOU to address differences across the IOUs with respect to variations in program design, customers recruited, and climate. This includes using different variables in the segmentation and/or regression models to reflect program variations. Details on the final segmentation method and regression specification are detailed in Appendix E Section 5.1.1. The post-period analysis will account for differences in weather conditions across the three IOUs, with peak savings corresponding to each IOU's peak period definition (e.g., summer weekdays from 4 p.m. to 9 p.m.).

Model Validation

To validate the model's ability to make reasonable predictions, Evergreen conducted a holdout test using only pre-period data. This involves randomly selecting 30 percent of the customers in Evergreen's data as a holdout sample, defining the bins and estimating the model using the remaining 70 percent, and finally using the model results (from the 70 percent sample) to predict energy usage for the holdout. This is sometimes referred to as a *cross-validation* exercise.

If the holdout test reveals customer or day bins with high prediction error, Evergreen can adjust the binning criteria (e.g., the number of load shape clusters) to refine the segmentation and then repeat the holdout process to confirm improvement.⁶ The iteration process continues with small variations to the AMICS binning criteria until the model prediction error stops showing significant improvement. If multiple binning strategies result in similarly low prediction errors, the simplest model is selected for ease of interpretation.

⁶ We consider a segmentation approach successful if the resulting AMICS model is able to separate patterns in energy usage from the simple random noise of individual observations, as measured by our holdout validation tests. This must be balanced with a need for easy interpretation, as the model results by customer segment will be used to provide insights into the characteristics of customers that were able to achieve the greatest energy savings.



The results of one such holdout test are shown in Figure 7, comparing the predicted pre-period load shape from the model (red line) of customers from each IOU to the actual pre-period load shape for the holdout sample (blue line). When the model is performing well, the two lines will overlap. The holdout test relies exclusively on pre-period data so that any differences between the predicted and actual energy usage can be attributed to model error, not to program savings. Evergreen specified a separate AMICS model for each of the IOUs, but the predictions for the control group and treatment group are based on the same AMICS model—these two groups were nearly identical in the baseline period, prior to the program intervention. Provided the limited modeling samples by IOU (n=214 for PG&E, n=110 for SCE, and n=92 for SDG&E) and a single year of baseline data, this is a strong result. In most cases, the model predictions track closely to actual load between 4 p.m. and 9 p.m., when Evergreen expect the largest pilot impacts (reduced peak energy usage) will occur.

(14) Figure 7: Holdout Sample in Pre-Period, Actual vs. Predicted Usage by IOU

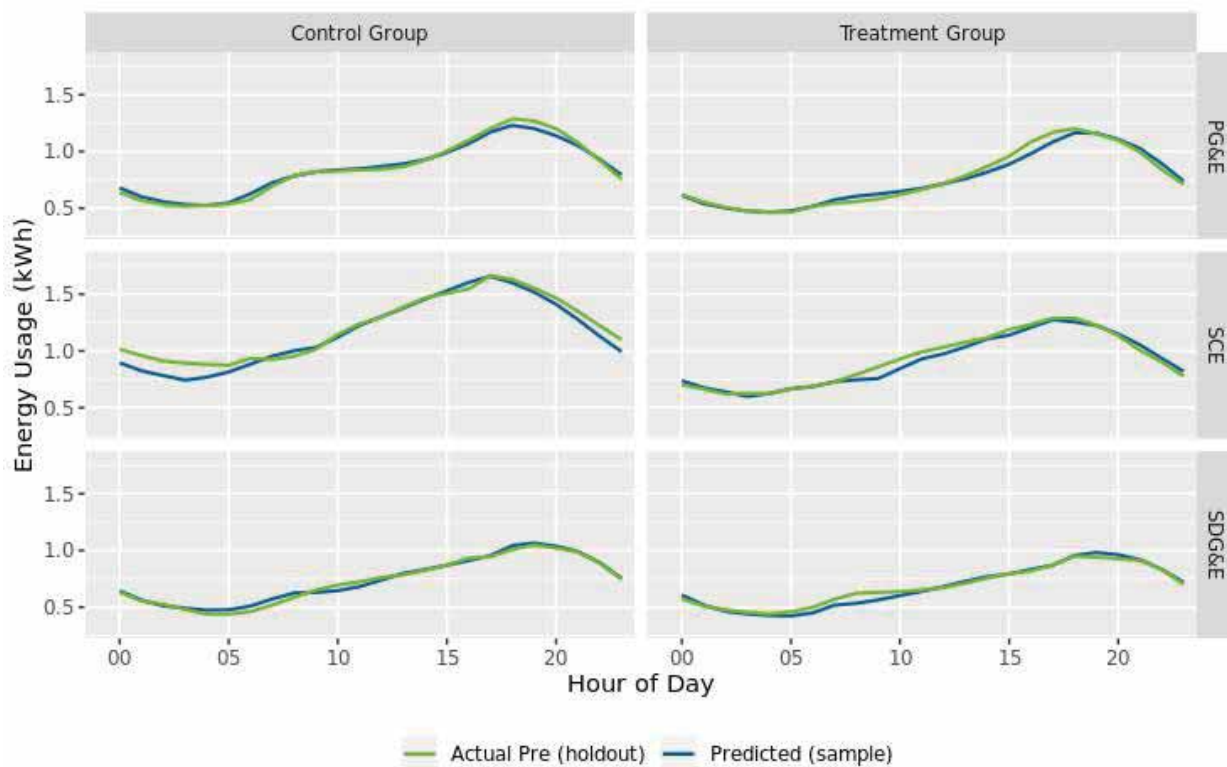


Table 9 provide some statistics characterizing the results of the holdout test with Evergreen’s baseline model specification for the treatment and control groups by IOU.

(15) Table 9: Summary of Baseline Model Holdout Test Results

IOU	Group*	Holdout t N	Normalized Mean Bias Error (NMBE)	Root Mean Square Error (RMSE)
PG&E	Treatment	13	- 0.6%	0.69
	Control	35	0.2%	0.68
SCE	Treatment	12	- 1.6%	0.78
	Control	30	- 3.7%	0.93
SDG&E	Treatment	15	- 1.2%	0.58
	Control	24	1.1%	0.59

* This test was limited to customers that successfully participated in the pilot. This means that they were 1) assigned to the treatment group, transitioned to a TOU rate, and installed an Ecobee PCT, or 2) were assigned to the control group and transitioned to a TOU rate.

b) *Post-Period Load Shapes and Savings*

Once Evergreen was confident that the AMICS model accurately predicted the pre-period consumption for the observations in Evergreen’s holdout sample, Evergreen re-estimated the model using the full sample (no holdout) to take advantage of all available data. Evergreen then used the model to predict what the load shapes would have looked like (for each customer segment on each day) in the post-period if the program pilot had not existed. Evergreen then compared these predicted load shapes to actual energy consumption over the same period to determine the total change from the pre- to post-period while controlling for any differences in weather and day type.

The control group allowed Evergreen to distinguish any naturally occurring changes from those caused by the program (difference-of-differences) for each type of customer and day (i.e., within each bin).

The main output of this task was a series of load shapes demonstrating the results of the pre-period holdout tests and post-period changes with hourly program impacts (i.e., savings). As the preceding graphs suggest, the load shapes obtained from the AMICS model allowed Evergreen to determine if there is load shifting occurring as a result of the pilot, which is one of the research objectives of this evaluation.

c) *Acknowledgement of Limitations*

The small pilot sample posed significant limitations for the regression analysis. A large number of observations are needed for a regression model to separate patterns in energy usage from random noise (e.g., meter measurement error, unusual events). This concern will apply to any regression model, not just the method Evergreen selected. However, **the holdout test demonstrates that the AMICS model is able to produce reasonable load shape estimates when limited to an even smaller sample (the 70% of customers remaining after the 30% holdout sample was excluded, or n=214 for PG&E, n=110 for SCE, and n=92 for SDG&E), thereby**



validating the use of this method. The final model predictions are based on the full sample (n=321 for PG&E, n=174 for SCE, and n=137 for SDG&E), increasing the number of observations available to the model and improving the accuracy of its predictions. The error bounds on the post-period load shape predictions and corresponding savings estimates reflect the remaining uncertainty in the AMICS load shape predictions.

Another limitation of this study is that the balance between the treatment and control groups was disrupted by the fractured treatment (e.g., failed Ecobee installations, Ecobee without eco+). However, the segmentation aspect of the AMICS approach is especially valuable in situations such as this. To build the model, Evergreen defined a series of customer segments that contain customers with similar baseline energy usage (i.e., magnitude of energy usage and hours of use). Many of these customer segments contain households from both the treatment and control groups. In effect, the segmentation phase identifies customers from the control group who are most similar to the treated customers based on the segmentation criteria, akin to comparison group selection. In this way, **segmentation accomplishes the same goal as matching.**

If a customer segment does not contain both treatment and control groups, the post-period changes are omitted from the difference-of-differences calculation. This is by design; **Evergreen can only assess program savings for the treated customers that have peers in the control group that will allow for a valid comparison in the difference-of-differences.** All but four customers in the treatment group had at least one well-matched comparison site in the control group.⁷ However, not all of these matches had perfect overlap in post-period weather conditions and day types; some customer-days are thus omitted from the calculations of savings for the Ecobee above and beyond the TOU rate.

⁷ All 40 treated customers from PG&E and 42 from SDG&E had well-matched comparison sites in the control group. Unfortunately, 4 of the 36 treated customers from SCE (11%) did not have any well-matched comparison sites; these customers had especially high peak period energy usage. By chance, none of the highest energy users assigned to SCE's control group were successfully transitioned to the TOU rate, and were thus dropped from the pool of customers available for selection into the matched comparison group for the post-period analysis.



4 Findings

This section includes both process and impact findings. The process findings cover results from the three surveys and the impact findings cover the billing analysis.

4.1 Process Findings

In this section, Evergreen share findings from the three surveys that occurred over the course of the pilot. Results were analyzed across all three surveys:

- January 2019, before respondents were notified of their assignment as either treatment and control groups
- November 2019, after customers on the pilot had received their summer bills
- February 2020, after nearly a full year of participating in the yearlong pilot.

A total of 109 respondents completed all three surveys. The response rate for each survey, across each group (control, treatment, IOU) ranged from 26 to 67 percent.

Some questions were asked across all three surveys in order to track changes in perceptions over time, and some questions were asked just once (in the first survey, or a latter survey if participants did not respond to the first survey) in order to understand demographic information such as the existence of certain equipment in the home or prior thermostat usage.

Where Evergreen present results that identify perceptions over the course of the study, Evergreen only include results where respondents participated in all three surveys. Evergreen also excluded respondents that initially took the first survey but later decided to leave the pilot either because they did not like the group they had been placed in (treatment or control) or because they did not sign the correct release forms to participate in the pilot.

In this section, Evergreen cover the types of customers that participated in the pilot and include information on how they understand household energy use, how they use heating and cooling, and what types of items they have that use energy in their home. Following the respondent background, Evergreen cover experiences with the time of use (TOU) rate and with thermostats, as well as findings relevant to educational materials and strategies for a program similar to this pilot.

4.1.1 Respondent Background

The majority of respondents (98% of the treatment group and 97% of the control group) stayed in their same household across the course of the pilot. Respondents from the treatment group who moved and had the program thermostat installed all left the thermostat in their prior household,

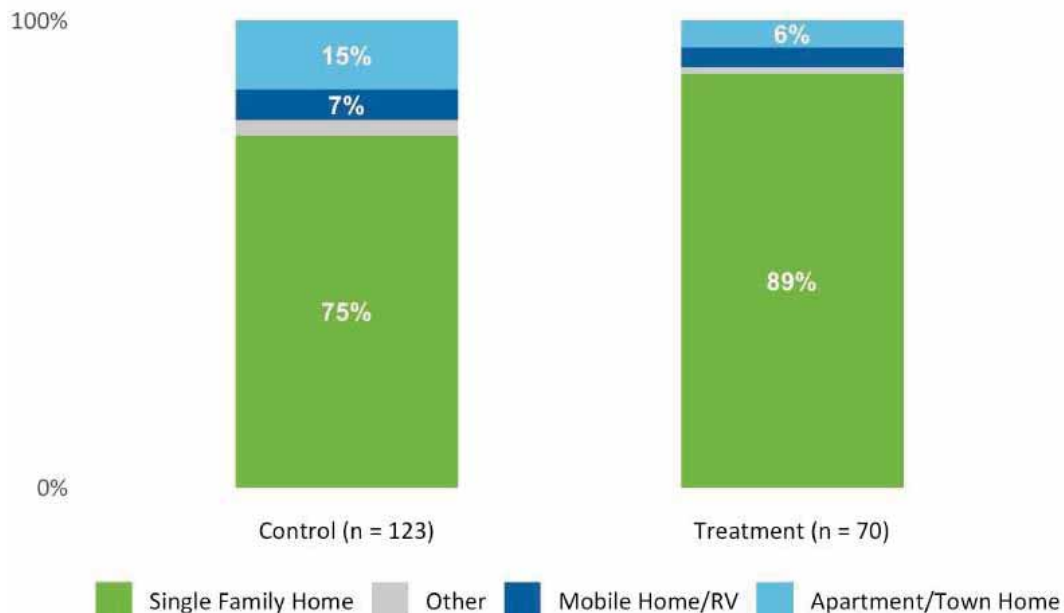
and have thus been excluded from survey analysis. The same is true of the three control group participants who moved from their homes and are no longer considered part of the pilot.

Respondents in the treatment and control groups were similar in a number of ways:

- They had slightly more than one thermostat on average, before the study (an average of 1.06 thermostats for the control group and 1.11 for the treatment group).
- Before the study, over half of the participants in both groups reported owning a programmable thermostat (73% of the treatment group and 66% of the control group).
- Similar percentages reported having equipment that could contribute to higher bills.
- They both had similar and education levels, approximately three people in each home over the entire year, and 14 to 16 percent of respondents had an additional resident in the summer.

One area where the control and treatment groups *did* differ was in the likelihood that they lived in an apartment or townhome. There was a slightly higher amount of control group participants who reported living in apartments or townhomes (Figure 8).

(1) Figure 8: Reported Home Type, Control vs. Treatment Groups

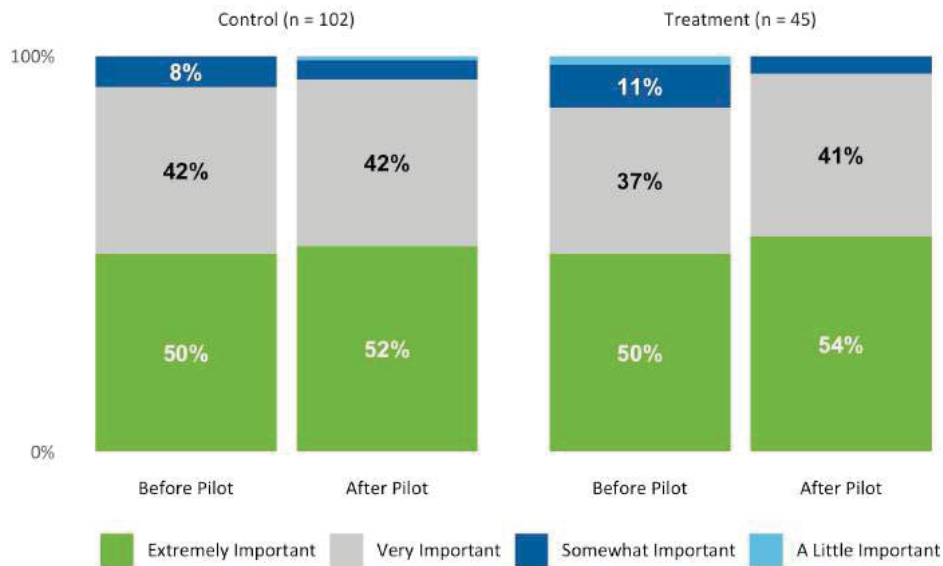


4.1.2 Attitudes Towards Energy

Before and after the pilot, Evergreen asked respondents about the importance of saving energy in their household. Nearly all respondents across the control and treatment groups reported that they felt that it is very or extremely important. After the pilot, as shown in Figure 9, the treatment group was more likely to report that they felt saving energy is extremely or very important, though this difference is not statistically significant. These results are broken out by IOU in Figure 9.

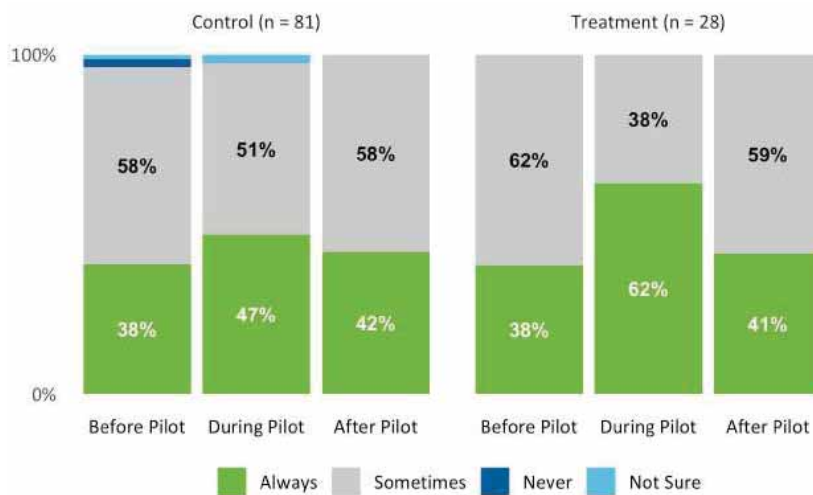


(2) Figure 9: Reported Household Views on the Importance of Energy Efficiency Before and After Pilot



Almost 100 percent of respondents in both groups stated that they were sometimes or always doing everything they could to conserve energy when asked before, during, and after the pilot. These attitudes may have implications on their willingness to do more to save energy during peak periods or overall. While Figure 10 shows that respondents across both groups were more likely to say they were doing everything they could do all of the time in the summer (when AC loads are greater and likely when they had seen their highest bills), this is not a statistically significant jump or difference between the two groups. These results are broken out by IOU in Appendix A.

(3) Figure 10: Reported Household Views Doing Everything They Can to Save Energy Before, During and After Pilot

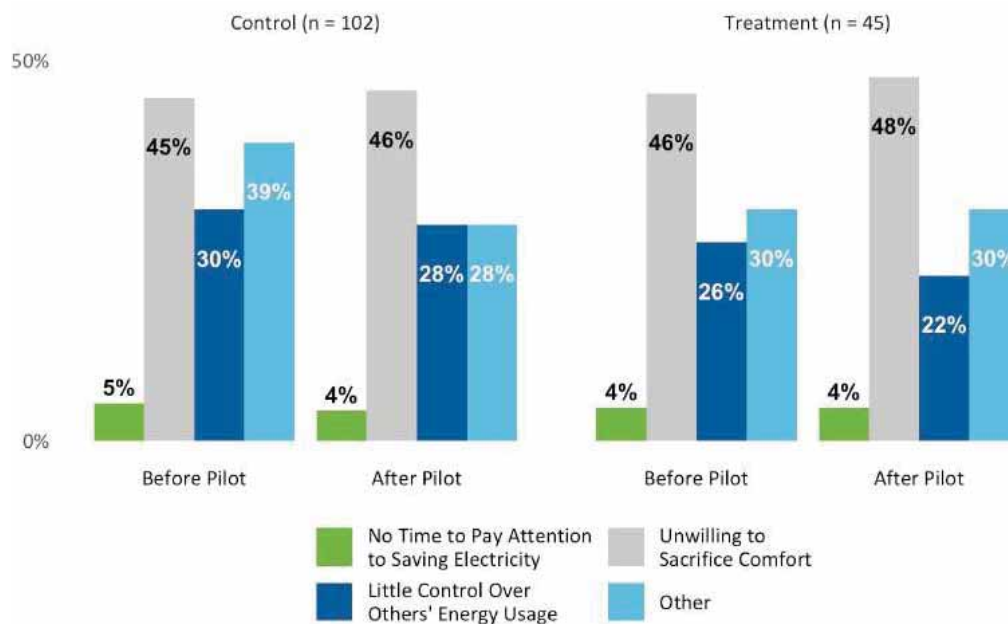




Participants were asked about perceived factors that prevented them from saving more electricity in their homes. Almost half of participants in both groups stated that an unwillingness to sacrifice comfort in their homes was the main factor that prevented them from saving more energy. Comfort levels are often related to heating and cooling and may explain why Evergreen saw customers with the smart thermostats increase usage that ended up offsetting savings from the TOU rate. Evergreen will discuss this further in Section 4.2. If half of respondents (Figure 11) are not willing to sacrifice comfort, they may not be willing to reduce their usage during peak billing hours.

Other factors that prevented participants in the control group from saving more electricity included health issues (n=8), older or non-energy efficient appliances (n=8), and older homes with poor insulation (n=2). The treatment group reported similar factors including health issues (n=3) and older or non-energy efficient appliances (n=2).

(4) Figure 11: Limitations to Saving Energy Before and After Pilot



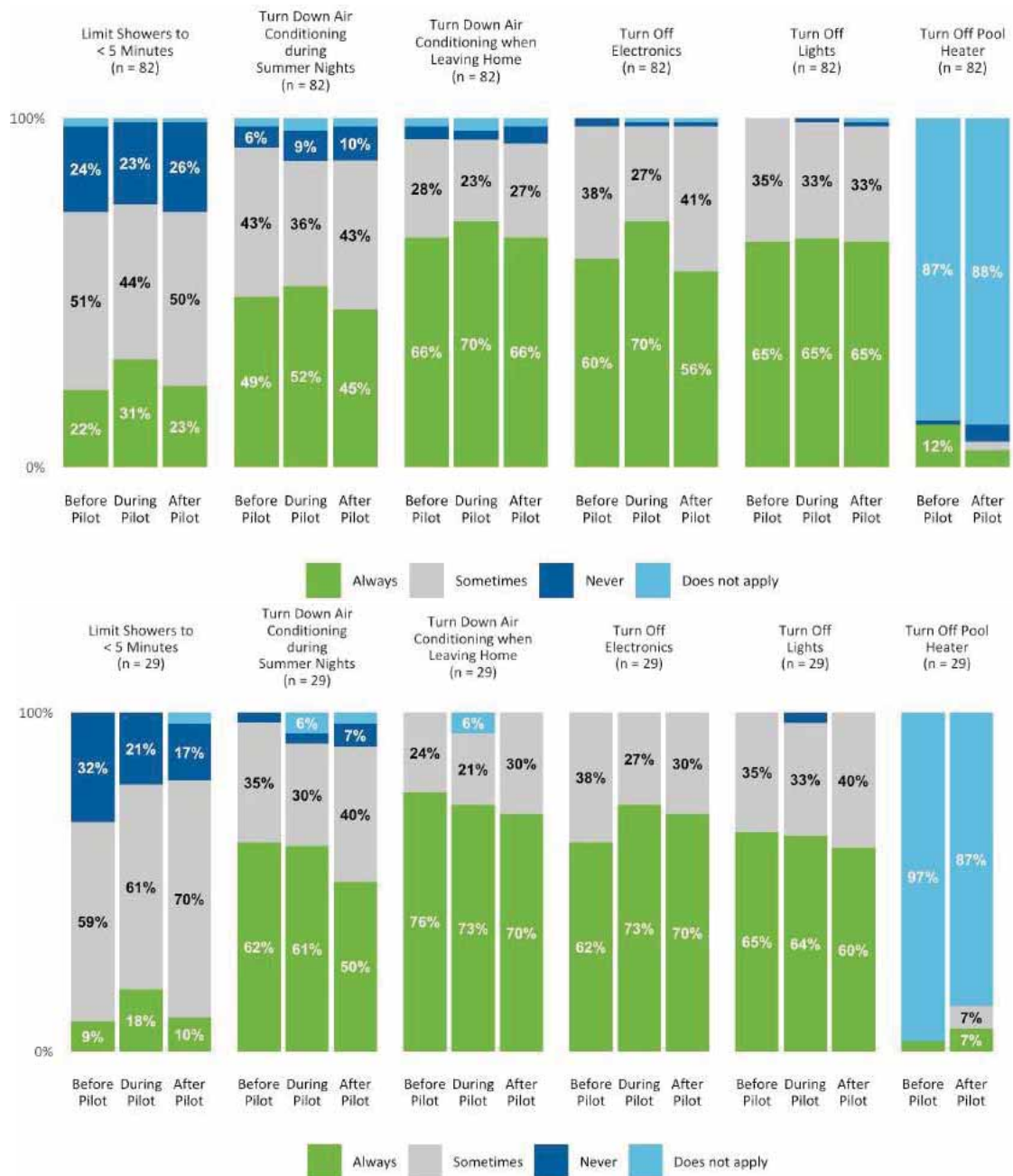
To get additional detail on what respondents were doing to save energy before, during, and after the pilot, Evergreen asked them about how often they do a set of five activities.

Limiting showers was the least popular activity amongst both the control and treatment groups, followed by turning down the air conditioner during summer nights.

Figure 12 shows that the control group reported taking on more energy efficient actions after the summer months (during the pilot), and the treatment group respondents reported doing slightly less as the pilot progressed. These changes over time are not statistically significant, nor are the differences between the control and treatment groups.

(5)

Figure 12: Frequency of Energy Savings Activities Before, During, and After Pilot, by Control (top) and Treatment (bottom) Groups



4.1.3 Understanding of Household Energy Use

Part of the intention of delivering a smart thermostat alongside the transition to TOU rates is meant to signal that heating and cooling are significant users of energy during peak hours. Customers were aware that the thermostat offer was a possibility even before the pilot started. From the very beginning of the pilot, customers in both the control and treatment groups ranked

cooling methods such as AC and fans as the items in their home that use the most energy (Table 10 and Table 11).

(6) Table 10: Ranking of Items That Respondents Believe Use More (lower number) or Less Energy by Season, Before and After Pilot, Control Group

Household Appliance	Before Pilot		After Pilot - Summer		After Pilot - Winter	
	Average	n	Average	n	Average	n
Cooling (AC/Fans)	2.62	99	1.75	99	8.22	99
Heating	4.01	94	7.08	97	2.15	97
Refrigerator	4.09	99	3.58	99	4.03	99
Lighting	5.33	99	4.93	99	4.30	99
TV	5.52	99	5.07	99	5.14	99
Water Heating	5.76	99	4.29	99	3.82	99
Pool/Spa Equipment	6.47	19	4.27	15	5.87	15
Oven	6.66	99	6.68	99	5.87	99
Laptop / Cellphone Chargers	7.29	99	6.69	99	6.59	99
Other (Personal/Business Equipment)	4.13	99	9.42	99	9.62	99

Table 11: Ranking of Items That Respondents Believe Use More (lower number) or Less Energy by Season, Before and After Pilot, Treatment Group

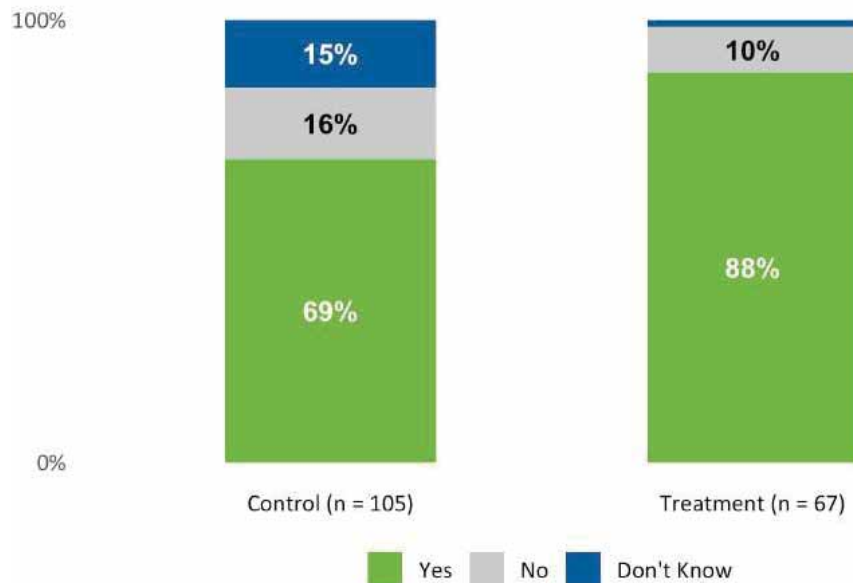
Household Appliance	Before Pilot		After Pilot - Summer		After Pilot - Winter	
	Average	n	Average	n	Average	n
Cooling (AC/Fans)	2.21	43	1.56	43	8.44	43
Heating	3.69	42	7.50	42	2.05	42
Refrigerator	4.23	43	3.95	43	4.28	43
Lighting	5.26	43	4.58	43	4.28	43
TV	5.93	43	4.74	43	4.74	43
Water Heating	5.09	43	3.91	43	3.47	43
Pool/Spa Equipment	2.67	3	2.00	7	3.29	7
Oven	6.93	43	6.72	43	5.74	43
Laptop / Cellphone Chargers	7.67	43	7.07	43	7.00	43
Other (Personal/Business Equipment)	4.35	43	9.81	43	9.98	43

4.1.4 Experience with Time of Use Rate

Understanding of the Time of Use Rate

At the beginning of each survey, Evergreen asked respondents if they recalled switching to a new rate in the beginning of 2019. For this question, Evergreen did not specify the *type* of rate they were switched to because Evergreen later wanted to test their knowledge of the difference in rates. The treatment group was much more likely to be aware of the change in rate (this is statistically significant at the 90% level), suggesting that the additional treatment of the thermostat (or extra effort needed to schedule installation) may have helped them to be aware of (and possibly react to) a change in rate (Figure 13).

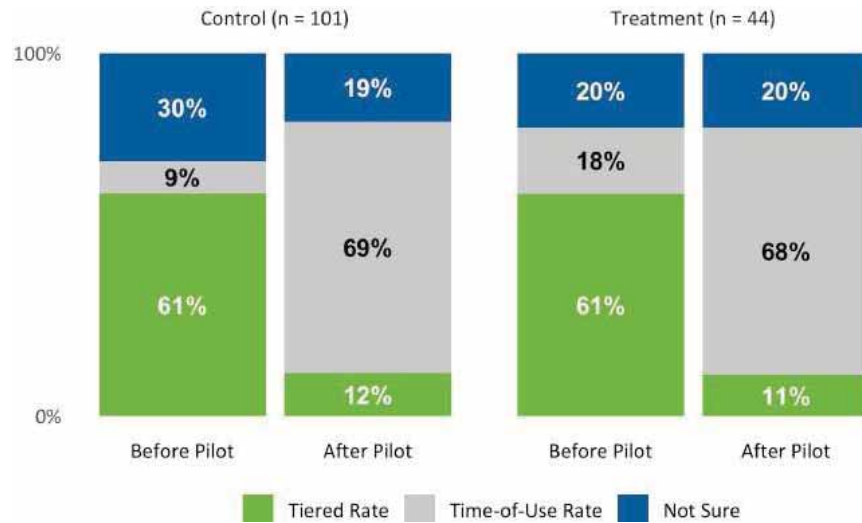
(7) Figure 13: Awareness of Rate Change by Control and Treatment Group



Throughout the remainder of this research, when reporting on questions specific to the TOU rate, Evergreen do not include the respondents who did not know or did not recall their rate changing in the beginning of 2019 in Evergreen's analysis.

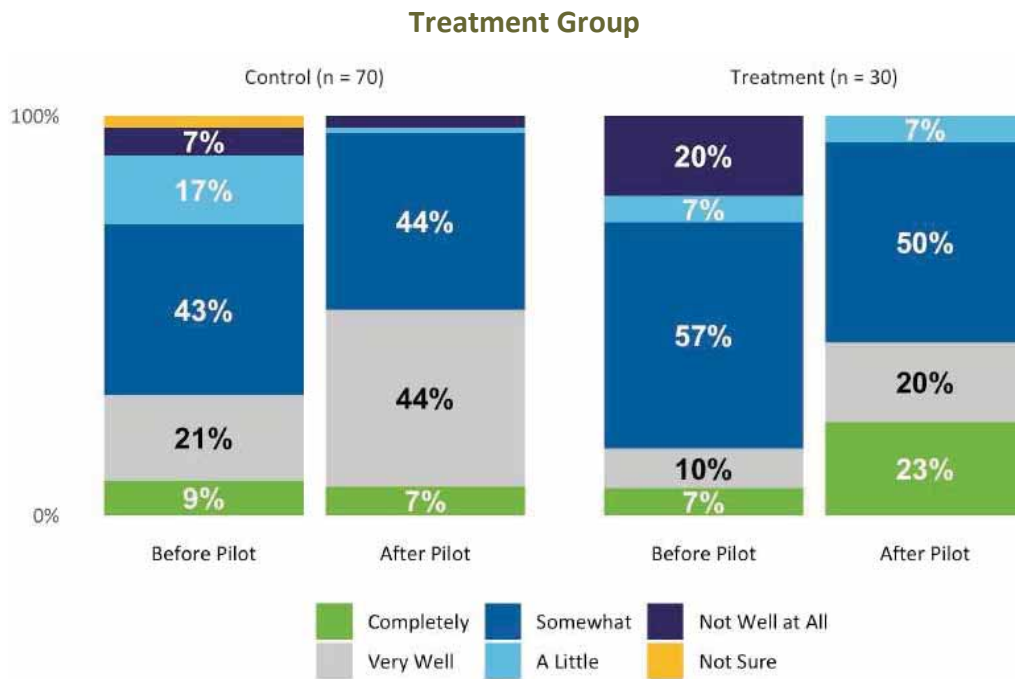
To understand if respondents were changing any behavior *in reaction to* the TOU rate, Evergreen first wanted to test respondents' awareness of their current rate before the pilot (tiered) or after the pilot (time of use). In general, nearly 20 percent of respondents were unaware of what type of rate they were on, and close to 70 percent of respondents knew they were on a TOU rate by the time the pilot ended. Depending on the group, 9 to 18 percent of respondents already thought they were on the TOU rate before the pilot started (Figure 14).

(8) Figure 14: Awareness of Current Rate by Control and Treatment Group



Of respondents who *knew* that they were on the TOU rate, it appears that the full year of participation in the pilot increased their self-reported understanding of the rate amongst both the control and treatment groups. This increase is statistically significant amongst the control group but not amongst the treatment group, likely due to the smaller sample size. Figure 15 shows responses to the question “How well do you understand the time of use rate?” While it appears that the control group and treatment group started with varied understandings of the rate, these differences are not statistically significant.

(9) Figure 15: Level of Understanding of Time of Use Rate Before and After Pilot, Control vs. Treatment Group



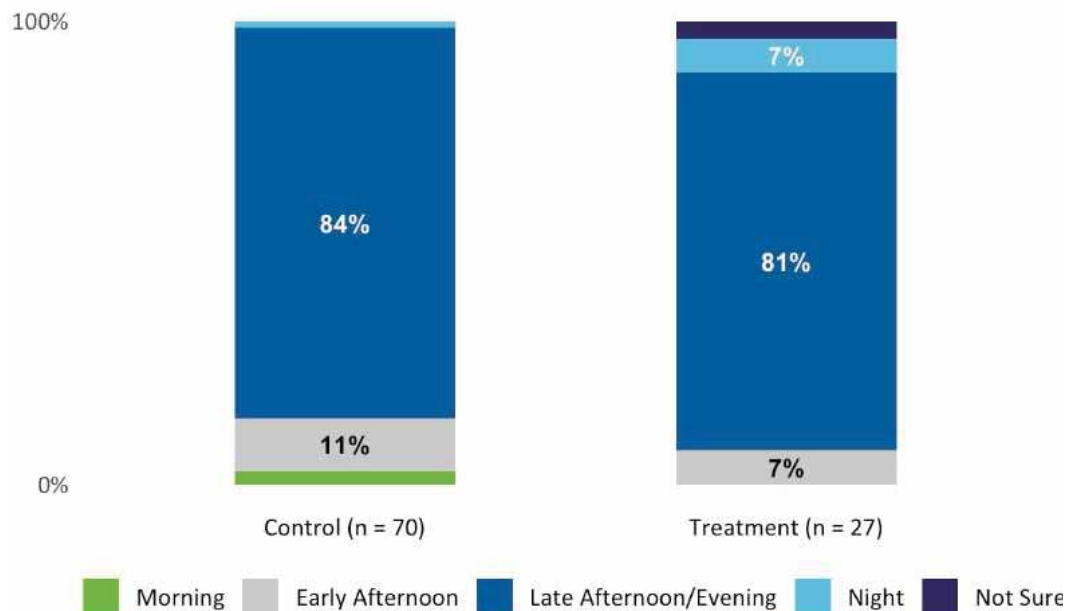


At a later point in the second of three surveys, Evergreen asked respondents who reported seeing their bill increase or decrease compared to the two prior years and understood that they were on the TOU rate, how well they felt they understood the rate. The intent of this question was to understand the impact of getting these higher or lower bills on customers interpretation of their understanding of the time of use rate. Since nearly all respondents reported at least some change in their bill compared to the prior year, it is not surprising that these results also showed that the majority of respondents thought they understood the bill somewhat, very well, or completely.

After the summer months of the pilot, Evergreen asked respondents about when they think energy costs the most during the summer. The majority of respondents (all of whom were aware that they were on the TOU rate) gave a response that seemed to reflect an understanding of the rate (Figure 16).

(10)

Figure 16: Awareness of When Energy Costs the Most During the Summer, in Fall of 2019, by Control and Treatment Groups



While customers seemed aware of when energy costs are the highest, this did not always align with when their reported *usage* was the highest. Despite an awareness that energy cost was the highest in the evening, a smaller proportion of respondents reported that their own home used the most energy during that time (Figure 17, compared to Figure 16) which may suggest that some respondents either do not agree that they use the most energy during the utility-identified peak time, or that they feel unable to shift their usage out of the peak hours.

While Figure 17 shows that over the course of the pilot, an increased percentage of the treatment group reported that they use the most energy in the evening. This difference is not statistically significant.



(11) Figure 17: Understanding of When Households Use the Most Electricity Before and After Pilot, Control vs. Treatment Group

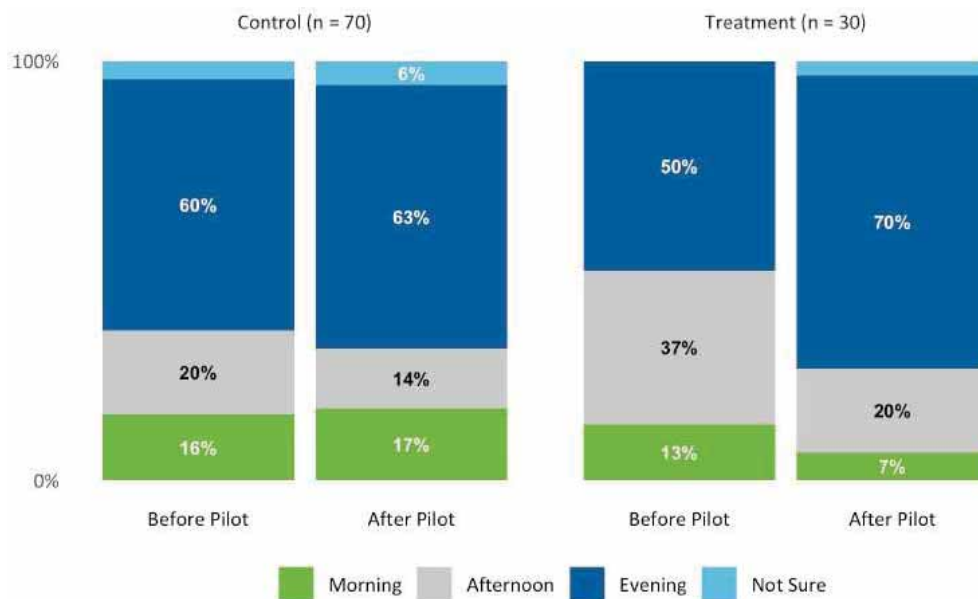
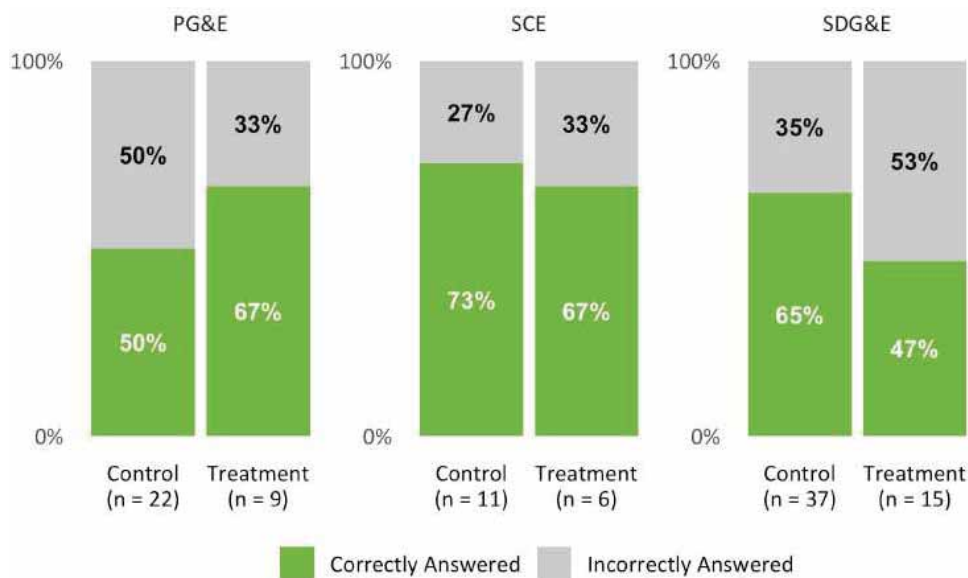


Figure 18 shows the actual usage in the baseline period for pilot participants, using AMI energy usage data provided by the utilities. Participants were not very successful in identifying when their households use the most energy when Evergreen compared responses to the full period of billing data. Depending on the IOU, customer success in accurately describing their peak usage window ranged from 47 to 73 percent as shown in Figure 18.

(12) Figure 18: Accuracy of Self-Reported Time of Household Use Compared to Actual Household Use



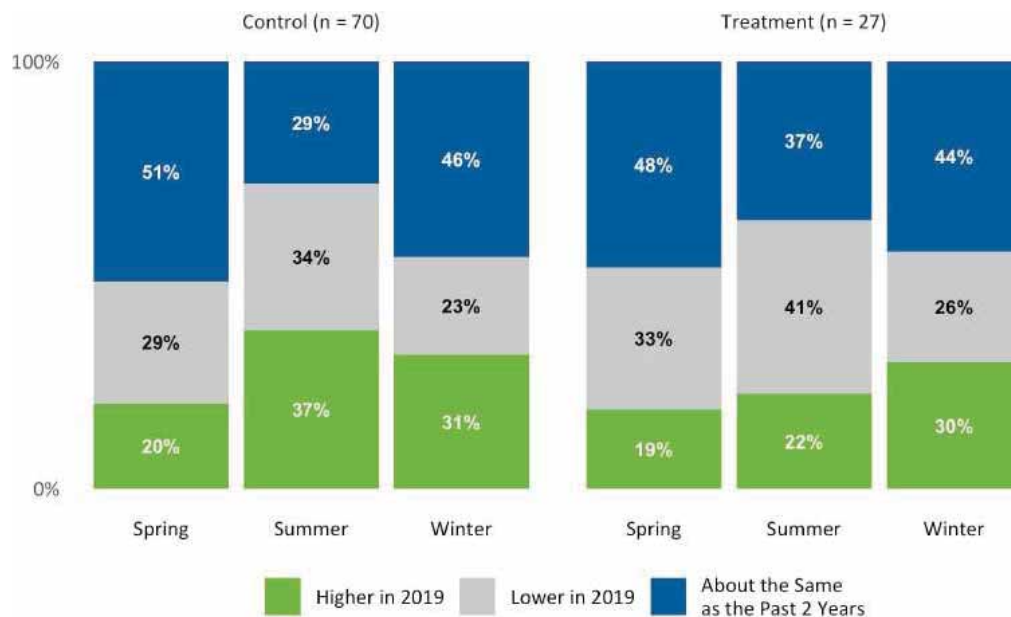
Bill Impacts of the Time of Use Rate

Right after the summer months, Evergreen asked respondents to report if they had seen their bills go up or down in the pilot period, compared to the prior two years. Evergreen asked them about three periods of time: Spring (March to May 2019), Summer (June to August 2019), Winter (December 2018 to February 2019).

Figure 19 shows that respondents were more likely to notice a bill change in the summer compared to the winter or spring months, likely due to cooling load. Interestingly, the treatment group had a large portion of respondents (41%) who thought that their bills during the summer of the pilot were lower than they had been in prior years. This may be due to an inability to recall bills from the past two years. This information is broken out by IOU in Appendix A.

(13)

Figure 19: Respondent Interpretation of Bill Change During Pilot Compared to Prior Two Years of Those Aware They Were on TOU



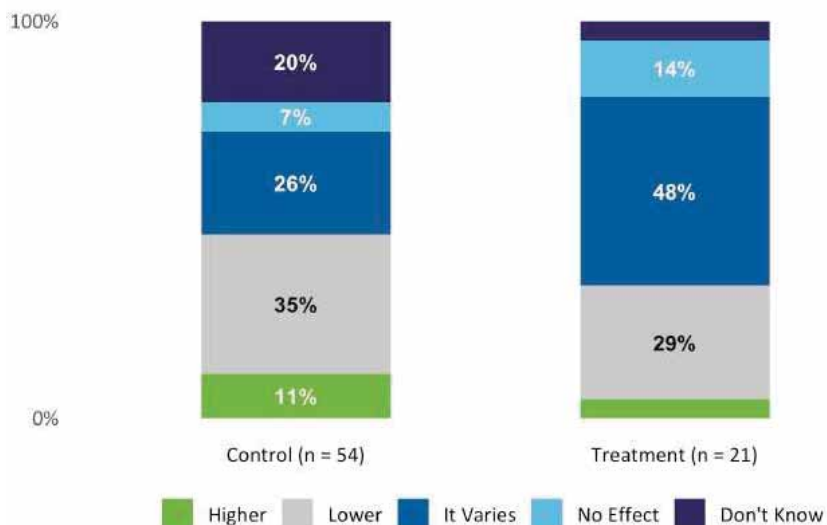
Of the respondents who reported seeing their bill increase or decrease during one or more seasons in 2019 compared to 2018 (before the pilot), respondents were asked about the impact of the TOU rate on their bill change. Each respondent group (treatment vs. control) had different responses regarding if the TOU rate made their bill higher, lower, or varied (Figure 20). The treatment group was more confident in their ability to identify the impact of the TOU rate compared to the control group, which was more likely to report that they did not know (statistically significant).

Evergreen know from prior research that evening usage (and thus peak charges) generally increase in the summer with cooling loads during time of use, and decrease in the winter months, which may be the reason for respondents reporting that the effect of the TOU rate on their bill differs



(Figure 20). Evergreen report more on how customers responded to the TOU rate by changing behaviors in the next section.

(14) Figure 20: Overall Impact on Utility Bills Attributed to Time of Use Rate, of Control and Treatment Group Respondents Who Knew They Were on Time of Use Rate



Responding to the Time of Use Rate

To further identify what respondents did in reaction to the TOU rate, Evergreen asked what helped them reduce energy usage during the peak billing periods. Responses below only include respondents who were aware that they were on the TOU rate.

A much higher proportion of the control group reported not using appliances or lights (80%) compared to the treatment group (60%), though likely because of small sample size; this is not statistically significant. Surprisingly, modifying cooling and heating was rarely mentioned. This finding aligns with what Evergreen saw in the impact evaluation, specifically with PG&E where Evergreen saw a cut back in energy usage during the day amongst the control group.

(15) Table 12: What Respondents Reported as Helping Them Save the Most Energy During TOU Peak Periods, of Those Aware They Were on TOU Rate

Control Group (n=70)	Treatment Group (n=30)
<ul style="list-style-type: none"> 56 of 70 mentioned not using appliances or lights (laundry and dishwashers were the most frequently mentioned appliances, but people also mentioned lights and stovetops) Being aware of peak/off-peak times in general – 8 of 80 Seven people did not have anything to say. 	<ul style="list-style-type: none"> Not using appliances or lights (e.g., laundry [almost all of this group mentioned laundry], dishwasher, dryer, EV charger – 1 person, AC, pool filter – 1 person) – 18 of 30 Being aware of peak/off-peak times in general – 8 of 30 Thermostat (eco+ feature specifically) – 2 of 30 Two people did not think anything was helpful.



Satisfaction with the Time of Use Rate

One way to understand satisfaction with the TOU rate is to see if respondents would recommend the rate to a neighbor or friend. When Evergreen looked at satisfaction this way, almost all respondents regardless of whether they were in the control or treatment groups said they were at least somewhat likely to recommend it to a friend.

Evergreen received somewhat similar results when Evergreen measured satisfaction another way. Close to 75 percent of respondents reported that they were somewhat to extremely satisfied with the TOU rate. Of the respondents that reported being less than satisfied, Evergreen asked them to report on what would have made them more satisfied. The most common response was that they expected to see savings on this rate but that ended up not being the case (Table 13).

(16) Table 13: What Would Have Increased Customer Satisfaction with the TOU Rate?

Control Group (n=15)	Treatment Group (n=7)
<ul style="list-style-type: none"> ○ 9 of 15 said that they did not see the amount of savings that they expected ○ 5 of 15 said that they did not like the peak times ○ 1 of 15 was concerned about how the rate would affect switching to solar in the future 	<ul style="list-style-type: none"> ○ 5 of 7 said that they did not see the amount of savings they expected (some people said that their bills even went up) ○ 1 of 7 did not like the how the Ecobee thermostat worked ○ 1 of 7 said they did not pay much attention to anything

4.1.5 Experience with Thermostats

In addition to testing how low income customers adjust to a TOU rate, this pilot tested if those who were given a smart thermostat had an easier transition to the TOU rate. Respondents in the treatment group were given an Ecobee thermostat with the intent that each thermostat would have a program installed on it which would help shift usage away from peak hours. In reality, this feature “eco +” was not added to thermostats until seven or eight months after the start of the pilot (August and September 2019). This error may have caused treatment group participants to already think their thermostats were working behind the scenes through the summer to help shift their energy usage during the peak hours.

d) Thermostat Attrition

Before analyzing the treatment group and their experience with the Ecobee thermostat specifically, it is important to understand who this group of respondents represents. In order to narrow down the treatment group for this analysis, Evergreen excluded:

- Any respondents who were assigned to the treatment group but rejected the offer of a thermostat.



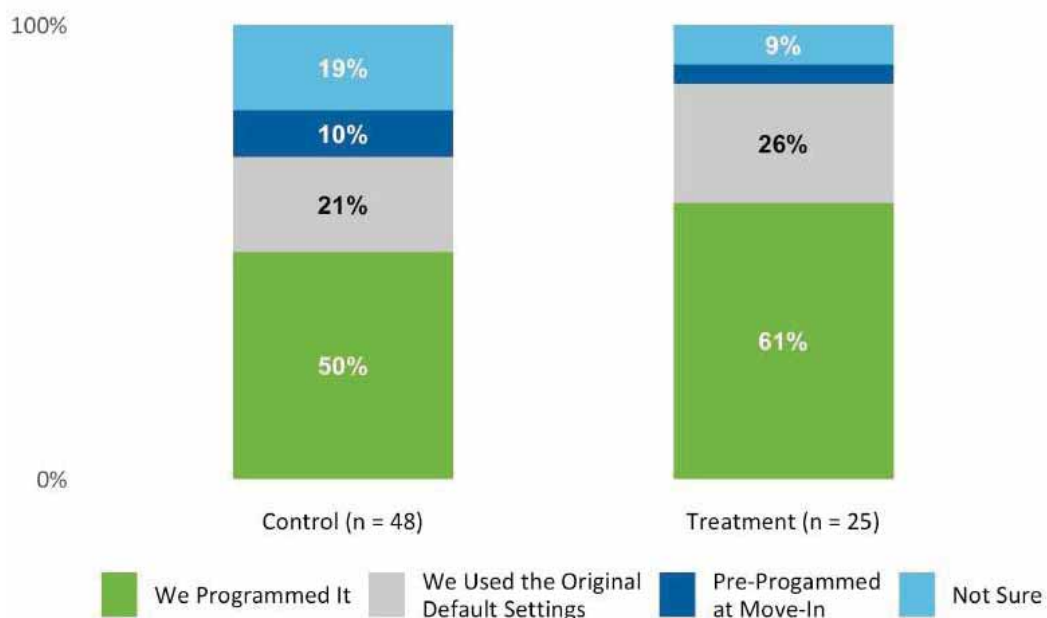
- Any respondents who believed that their thermostat was no longer installed and working. Evergreen did, however, include respondents who responded that they did not know if their thermostat was installed and working because they can still explain how they used their thermostat.
- Three respondents who did not end up having eco+ on their Ecobee thermostat (according to data from Ecobee), in order to keep the group consistent.

Evergreen did include in analysis three respondents who reported that their thermostats were online and working, despite a report from Ecobee suggesting that they were offline. Evergreen made this decision assuming that Ecobee’s data were from a single point in time, and that the respondent had a better idea of the operability of their thermostats.

e) How Thermostats are Used

Before the pilot began, there were no statistically significant differences in how the control and treatment group programmed their existing thermostats (Figure 21). In general, 50 percent or more of the survey respondents reported programming their thermostats.

(1) Figure 21: How Respondents Programmed (or Did Not Program) Thermostats Before Pilot

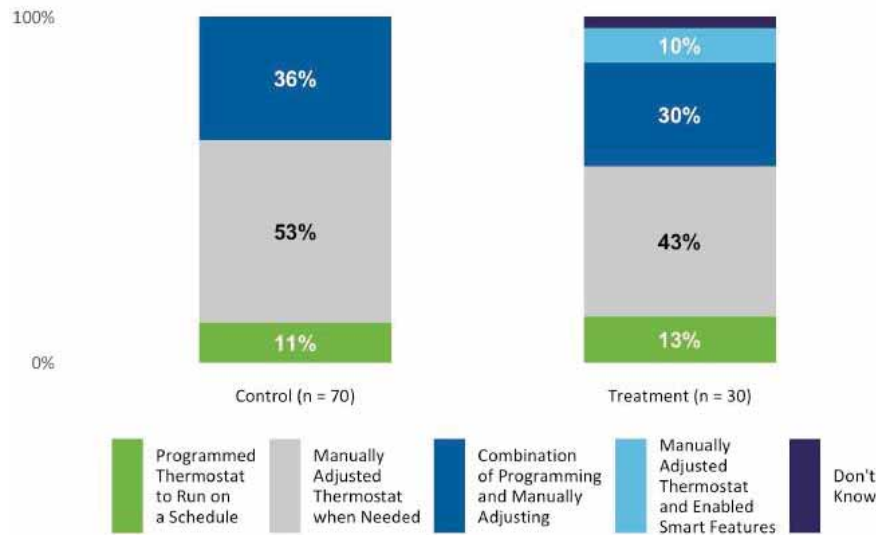


Thermostat Usage During the Pilot

At the end of the pilot, Evergreen asked respondents to report how they used their thermostats over the past year. The treatment group was given an additional response option of being able to enable smart features, though only 10 percent of the treatment respondents reported taking such action. There were no significant differences in how the two groups reported interacting with their thermostat, suggesting there was a similar preference for programming and manually adjusting the thermostat across both the treatment and control group respondents Figure 22.



(2) Figure 22: How Respondents Reported Interacting with Their Thermostat Over the Pilot Year



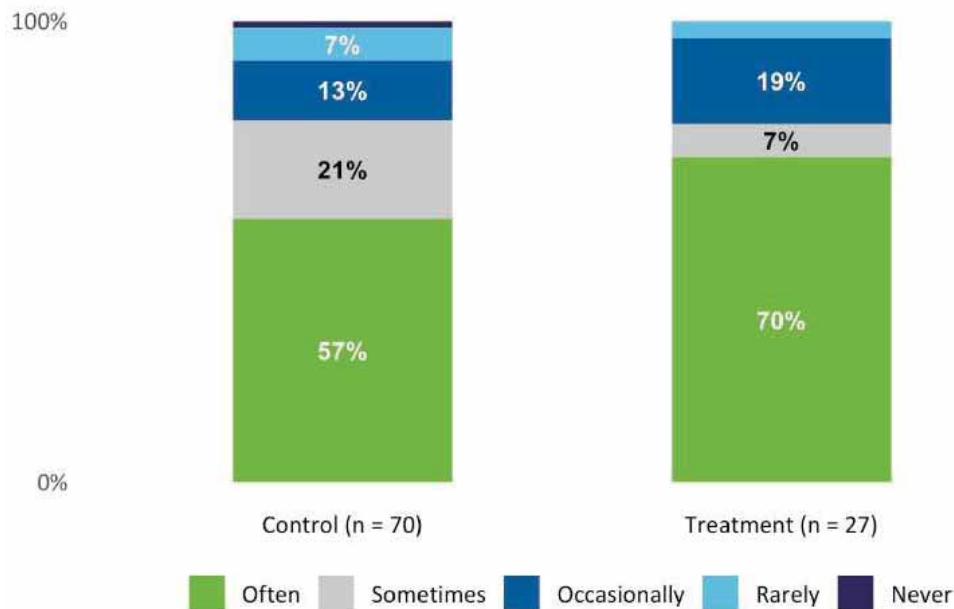
Despite nearly 83 percent of respondents in the treatment group reporting that they interacted with their thermostats *other than* programming a schedule, when Evergreen asked respondents if they ever adjusted the thermostats away from the initial settings, 46 percent reported that no, they did not adjust their thermostat. When looking at the group that said no or do not know in response to the question about adjusting the thermostats, Evergreen see that the majority of each of these response groups reported manually adjusting their thermostats. It is possible that they interpreted the question as asking about adjusting away from the initial settings in a more permanent way. This would explain the difference in responses to these two questions.

(3) Table 14: How Smart Thermostats were Used

How Thermostat Was Used	Yes (n=4)	No (n=11)	Don't Know (n=8)
Programmed Thermostat to Run on a Schedule	20%	18%	13%
Manually Adjusted Thermostat When Needed	20%	45%	63%
Combination of Programming and Manually Adjusting Thermostat	60%	27%	13%
Manually Adjusted Thermostat and Enabled Smart Features	0%	9%	13%

To further understand if customers with the Ecobee (the treatment group) interacted with their thermostats differently during the pilot than participants in the control group (with non-smart thermostats), Evergreen asked participants about how they interact with their thermostat by personally making adjustments to the thermostat to avoid using electricity during peak hours (Figure 32). While it appears that the treatment group reported adjusting their thermostat “often” more than the control group, this difference is not statistically significant. “Often” was clarified to mean almost daily in the survey question.

(4) Figure 23: How Often Respondents Reported Personally Adjusting Thermostat to Avoid Using Electricity During the Peak Time of Day After Summer of Pilot (Q70)



Those who reported adjusting their thermostat occasionally or more often were asked about what actions they took to avoid the higher cost of energy during peak hours (Table 15). The treatment group was more likely to adjust the thermostat in some way (62%) compared to the control group (47%). Though this difference is not statistically significant, it may indicate that the smart thermostat enabled the treatment group to make more adjustments to their temperatures than the control group. The control group was more likely to report limiting other appliance usage compared to the treatment group. This finding is not statistically significant, likely due to the small sample size.

(5) Table 15: Of Those Who Adjusted Thermostat at Least Once a Month or More, Self-Reported Actions to Avoid the Higher Cost During Peak Hours (Q71)

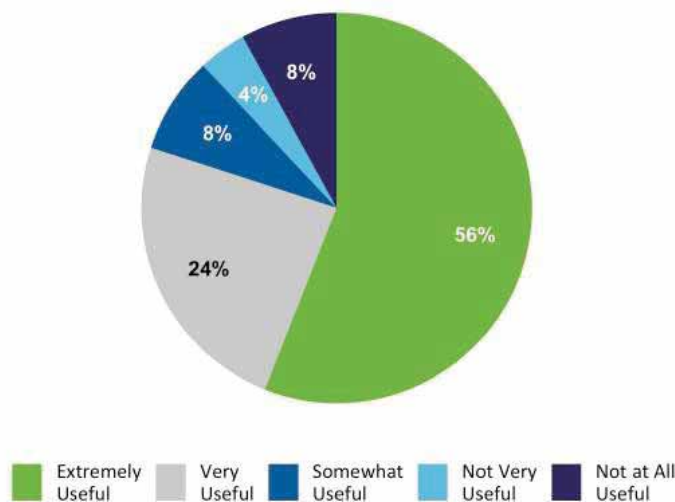
Control Group (n=64)	Treatment Group (n=26)
<ul style="list-style-type: none"> ○ Adjust heating/cooling temperature (n=30 of 64) ○ Limit other appliance use (washers, dryers, TV, etc.) (n=24 of 64) ○ Reducing energy in general (5 of 64) ○ 2 got evaporative coolers ○ 1 switched to LEDs ○ 2 did not have anything to say 	<ul style="list-style-type: none"> ○ 16 of 26 mentioned adjusting their thermostat in some way (e.g., turning off the heat/AC more often/during peak hours, using off-peak hours, lower temps in winter and higher temps in summer, etc.) ○ 4 of 26 used other appliances less often (dishwasher, washer, dryer) ○ Reducing energy in general (4 of 26) ○ 2 of 26 had nothing to say

f) Use of Smart Devices

The majority (93%) of the treatment group respondents reported having had a smart phone or an internet connected device. Of this group, nearly half (48%) of the respondents reported that they always or mostly control the Ecobee thermostat with their smart phone or internet connected device. Only 16 percent of respondents said that they never use their smart device.

Excluding the treatment group respondents who never use their smart device to control their thermostat, respondents found the smart device very or extremely useful for controlling their thermostat (80%, Figure 24).

(1) Figure 24: Usefulness of the Ability to Control Thermostat from Smart Phone

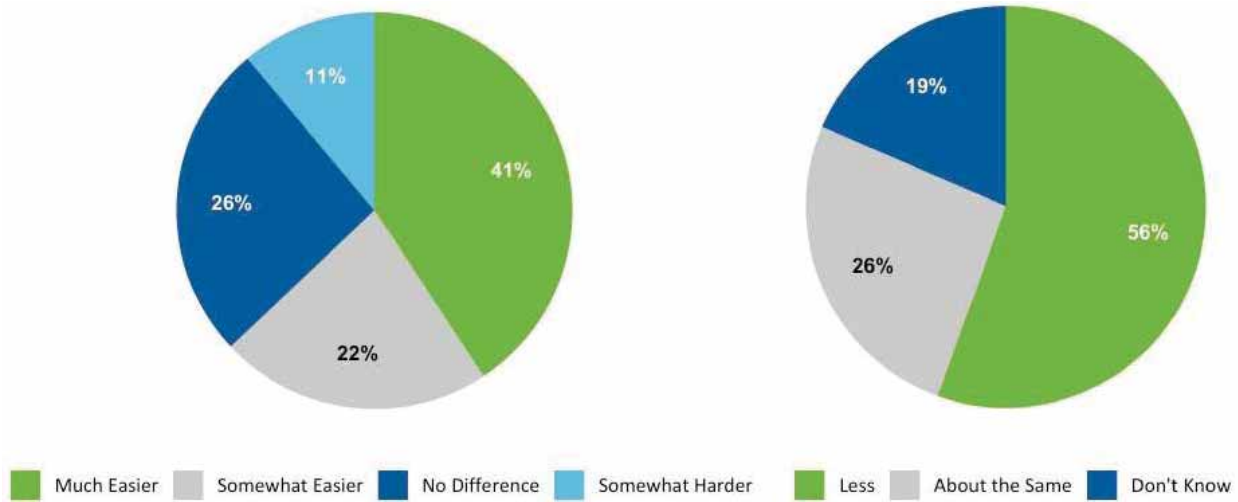


Satisfaction with Smart Thermostat

In general, respondents with eco+ installed on their thermostat (almost all treatment group respondents) were not widely confident in the thermostat's ability to help them control their energy bills or help them lower their energy use, or on the existence of eco+. Respondents who reported either an increase or decrease in their bills compared to the past two years were asked if they found that the new thermostat made their ability to control bills easier or harder than their prior thermostat (Figure 25). Sixty-three percent of respondents found the thermostat made it somewhat to much easier to control their bills, while 11 percent reported finding it harder. Just under half of respondents reported either that they think they use about the same amount of energy with the smart thermostat or that they did not know. No one thought that the new thermostat increased their energy usage.



(2) Figure 25: Thermostat Impacts on Ability to Control Energy Bills and Thermostat Impacts on Energy Bills (n=27)



The respondents who were confident that the thermostat contributed towards lowering their energy bill attributed it to the ease of seeing and controlling the temperature settings (Table 16).

(3) Table 16: Why Respondents Thought the Smart Thermostats Impacted Their Ability to Control Their Energy Bills

More Ability to Control Energy Bills (n=15)	About the Same Ability to Control Energy Bills (n=9)
<ul style="list-style-type: none"> ○ The ability to control their thermostats remotely/when they are not at home (5 of 15) ○ More conscious of energy use (2 of 15) ○ Thermostat made it easier to see and control the temperature settings (3 of 15) ○ eco+ features (3 of 15) ○ 2 had nothing to say 	<ul style="list-style-type: none"> ○ They do not use it too much (3 of 9) ○ Consciously set temperatures (4 of 9) ○ 2 of 9 did not have anything to say

Despite only slightly over half of respondents thinking that that the thermostats helped them to control their energy bills, slightly more respondents (67%) responded that yes, “the thermostat was a useful tool for shifting energy usage to off-peak, less expensive times.” These results only include respondents who were aware that they were on the TOU rate.

Evergreen asked respondents to explain why they did or did not think the thermostat was useful for shifting to off peak hours. The main reason that respondents found the thermostat useful was that it was easy to control temperature settings, especially remotely or from a smartphone (Table 17). Evergreen checked to see if responses differed by the type of thermostats that respondents



were used to having; amongst those who found it useful or not useful, there was a similar percentage of customers with programmable versus manual thermostats before the study.

(4) Table 17: Why Respondents Did or Did Not Think The Thermostat Was a Useful Tool for Shifting Energy Usage to Off-Peak Hours

Yes, Useful (n=18)	No, Not Useful (n=6)
<ul style="list-style-type: none"> ○ Easy to control temperature settings (especially remotely/from smartphone) (10 of 18) 	<ul style="list-style-type: none"> ○ People adjusted their thermostats manually and used their thermostats when they felt like they needed them (6 of 6)
<ul style="list-style-type: none"> ○ Thermostat made it easier to see and control the temperature settings (4 of 18) 	<ul style="list-style-type: none"> ○ 1 of 6 said that the Ecobee settings were unreliable and thus did everything manually
<ul style="list-style-type: none"> ○ More conscious of energy use (1 of 18) 	
<ul style="list-style-type: none"> ○ 3 of 18 did not have anything to say 	

Evergreen’s ability to interpret customers’ experiences with eco+ is limited due to eco+ not being enabled until August of 2019 or later. Only 21 percent of customers recall noticing that the thermostat automatically adjusted to help them save energy and money during the time of day when energy is more expensive. 33 percent of the 24 respondents reported that they did not know, and the remaining 46 percent reported that they were not aware.

Evergreen then asked customers about eco+ specifically by name and described that it is designed to help save them money when energy costs the most by automatically adjusting the temperature set-point during peak usage times. Evergreen also noted that eco+ would be displayed on their thermostat. Of the 24 respondents who answered the question, all of whom had the feature installed, only half of the respondents reported that the eco+ function was currently working on their thermostat. This again suggests that there was rather low awareness of the eco+ feature among those who had it installed.

g) Overall Satisfaction

Overall satisfaction with the thermostat provided through this pilot was high (89% of respondents reported that they were at least somewhat satisfied with the thermostat), despite the mixed reviews of the thermostat’s ability to help shift usage and avoid peak hours. Regardless of the usefulness of the thermostat, it may have been seen as a nice offering that was paired with the TOU rate transition. When Evergreen followed up with those who were either neutral or not satisfied, one person said it did not work well (specifically that it runs too long in the morning), one person said it was not as user friendly as their old standard thermostat, and one person said they did not use it much.

Evergreen asked customers to compare their new thermostat directly to the thermostat that they had before the pilot. Table 18 shows what respondents liked more and less about the pilot-



provided thermostat. The majority of respondents reported that there was nothing they liked more about their prior thermostat (77%), and respondents touted that the pilot thermostat was better in that it allowed them to control the device when not at home (22%) and from their smart device (22%).

(1)

Table 18: Features of the Thermostat That Respondents Liked More or Less Than Their Original Thermostat (n=27)

Better with the Pilot Thermostat	Worse than the Prior Thermostat
<ul style="list-style-type: none"> ○ Ability to control the app when not at home (6 of 27) ○ Ability to control the app from their own smart device (6 of 27) ○ Easy to use and understand (6 of 27) ○ Touch screen/digital features (4 of 27) 	<ul style="list-style-type: none"> ○ 21 of 27 did not have anything they disliked ○ 3 of 27 said that it was more complicated than their old systems ○ 2 of 27 did not like the limited temperature ranges (e.g., cannot set AC higher than 80 degrees) ○ 1 of 27 said it was hard to program with their smartphone

4.1.6 Beneficial Messaging for Future Emails or Marketing

To understand how to improve education about the TOU rate, Evergreen asked respondents who were aware they were on the TOU rate what they wished they knew about the rate before they started the pilot (Q20). Over half of both the treatment (19 of 30) and control groups reported that there was nothing else they wish they would have known. Of the remaining participants, Table 19 shows what each group was interested in learning. The most common request for both groups was additional information on the rate, including the best times to use appliances.

(2) Table 19: Additional Desired Information for the Time of Use Rate (n=27)

Control (n=33)	Treatment (n=11)
<ul style="list-style-type: none"> ○ Also interested in more rate information (13 of 33), e.g., off peak times, best times to use appliances, how could changing your thermostat by a degree or two decrease your energy costs, how to maximize savings in the summer, etc. ○ Interested in seeing comparisons with their past energy bills in terms of how much they saved when they were on the new rate (9 of 33) ○ People were also confused about what the rate was (4 of 33) ○ Importance of sticking to the timeframe (2 of 33) ○ One person wished they had an automated thermostat, one person wished the rate was available sooner, and three people complained about the rate 	<ul style="list-style-type: none"> ○ 7 of 11 remaining (disregarding the 19 above) said that they wish they would have known more about the numbers (e.g., the summer and winter rate details, details about the costs during the new rate, how the costs would fluctuate, and one person asked for statistical models that discussed different rate plans ○ 1 person wanted to know when they used the most energy, 1 person was still unclear about what the rate was (although they understood they were on the new rate), and 2 people complained about their thermostats



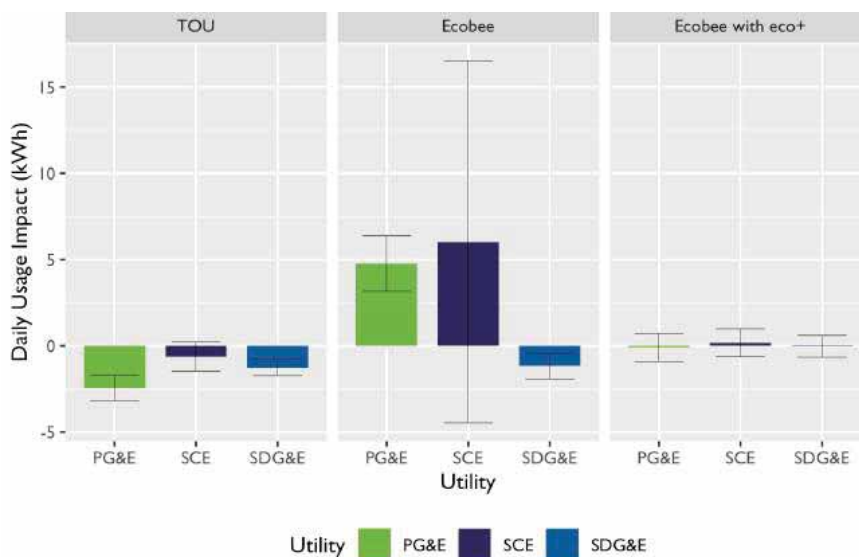
4.2 Impact Findings

This section provides Evergreen’s estimates for the energy savings experienced by customers that can be attributed to the LI TOU PCT Pilot program interventions, based on the AMICS models, by IOU. Evergreen start by comparing just the TOU rate and the TOU rate with the smart thermostat, and then address the eco+ feature.

Figure 26 provides an overview of Evergreen’s estimated incremental impacts, as an average change in daily kWh across the full post-period, for each of the program interventions by utility.⁸ The error bars indicate the bounds for a 95 percent confidence interval around each estimate. The TOU rate led to reduced energy usage for all three IOUs, but this change was only statistically significant for PG&E and SDG&E. The incremental impact of the smart thermostat without eco+ (Ecobee) was an increase in energy usage for PG&E and SCE, but a further reduction in energy usage (i.e., savings) for SDG&E.

For all three IOUs, the Ecobee with eco+ activated had a very small and insignificant impact on energy usage. It appears that the eco+ feature does help avoid an increase in energy usage that often occurs with the Ecobee on its own. However, it is important to provide a caveat for these findings with a reminder that the Ecobee and Ecobee with eco+ impacts are based on a limited timeframe and smaller sample than the TOU impacts. The impacts of these limitations are addressed later in this section.

(3) Figure 26: Estimated Daily Usage Impact (kWh) of Pilot Program Interventions by IOU



⁸ The Ecobee impact provides an estimate for the *incremental* impact of installing an Ecobee on a customer’s energy usage, not the *combined* impact of installing an Ecobee during the transition to a TOU rate (i.e., TOU + Ecobee).



Figure 27 provides a similar comparison of program impacts by IOU, this time focusing on the utility peak-period (4 to 9 p.m. for PG&E and SDG&E, 5 to 8 p.m. for SCE). The TOU rate led to statistically significant reductions in energy usage on average during the peak period for all three IOUs. The incremental impact of the smart thermostat without eco+ (Ecobee) was a large increase in energy usage for PG&E and a small and insignificant increase for SCE, versus a further reduction (i.e., savings) for SDG&E. For all three IOUs, the Ecobee with eco+ activated had a small and insignificant impact on energy usage. It appears that the eco+ feature also helped customers from PG&E avoid an increase in peak-period energy usage that commonly occurred with the Ecobee on its own. Again, the Ecobee peak impact estimates are based on a limited timeframe and smaller sample than the TOU impacts.

(4) Figure 27: Estimated Peak Usage Impact (kWh) of Pilot Program Interventions by IOU

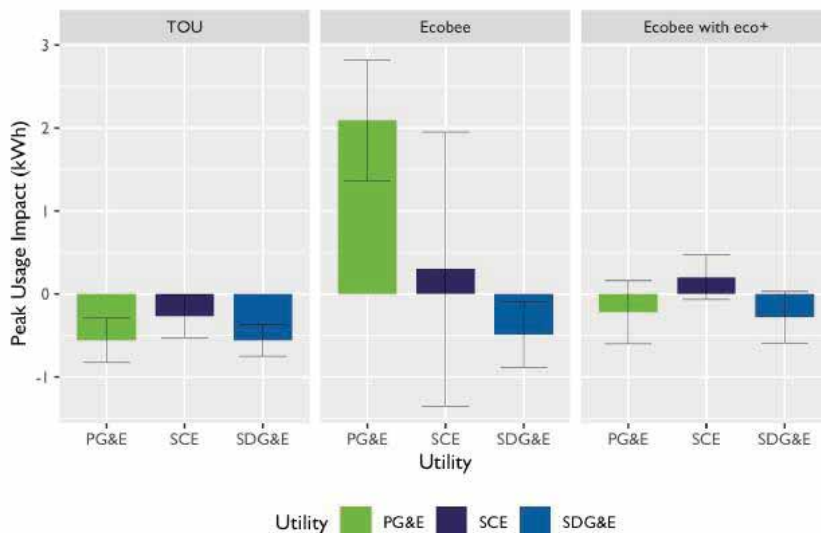


Table 20 provides the estimated impacts of the Ecobee with and without eco+ on customer bills, as a cost per day. This is based on Evergreen’s estimated kWh impacts and the current TOU rate schedules by utility, season, and hour. Most participants will likely think of the program impact in terms of changes in their bill, not directly considering their energy usage in kWh. SDG&E customers who installed the Ecobee smart thermostat saved an average of \$0.79 per day, with larger bill reductions in the winter months of \$0.91 per day, whereas PG&E customers spent an average of \$0.80 more after installing the Ecobee, with an increase of around \$0.34 in the summer and \$1.03 in the winter. Participants from SCE had much more erratic bills with the Ecobee, with bill increases of \$2.42 per day in the summer that were offset by reductions in the winter months of \$2.20 per day. The impact of the Ecobee with eco+ was much more mild, within \$0.10 per day of the bill costs experienced by customers who were transitioned to the TOU rate without a smart thermostat. Keep in mind that the three IOUs have different rate structures (e.g., ratio of on-peak to off-peak rates, complexity of rate schedule by seasons and day type) and weather conditions. The purpose of this table is to translate the energy savings impacts into bill impacts experienced by the customers, to aide the comparisons.

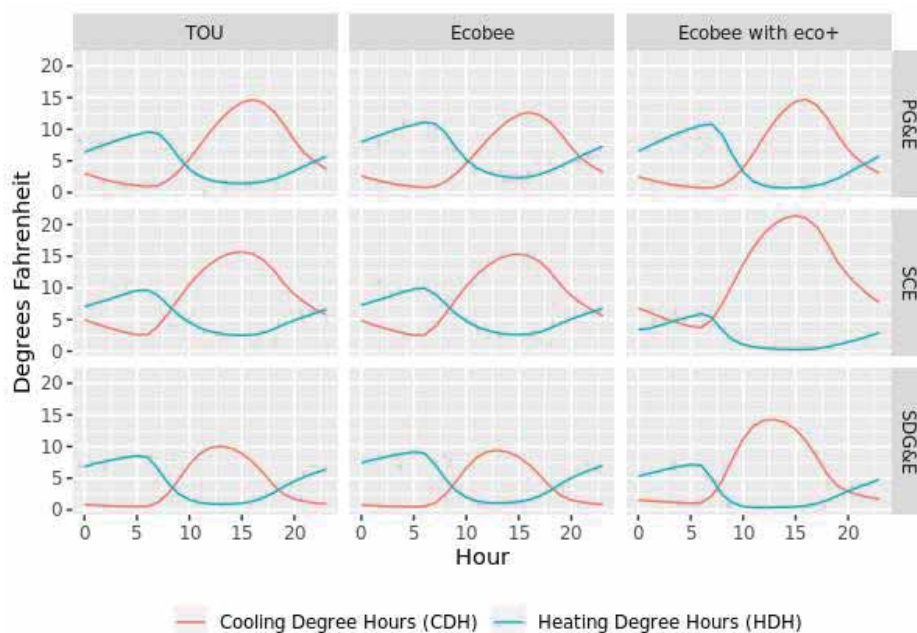


(5) Table 20: Estimated Impact of Pilot Program Interventions on Customer Bills (\$/day)

Estimated Bill Impact		PG&E	SCE	SDG&E
Ecobee	Average Day in Post-Period	\$0.80	-\$0.66	-\$0.79
	Summer Day	\$0.34	\$2.42	-\$0.54
	Winter Day	\$1.03	-\$2.20	-\$0.91
Ecobee with eco+ Average Day in Post-Period		\$0.03	-\$0.09	\$0.04

Figure 28 provides the average heating and cooling load for the average customer on the average day in the post-period for each of the program interventions (TOU, Ecobee, and Ecobee with eco+) by utility. The post-period for the TOU impact estimate is based on a full year of AMI data, with a wide range of heating and cooling needs. SCE customers experienced the most extreme weather conditions of the IOUs with an average of 8.7 CDD and 5.7 HDD, whereas SDG&E customers experienced the most temperate weather conditions with an average of 3.9 CDD and 4.4 HDD. Even though the post-period for the Ecobee is less than a full year (approx. Jan – Nov 2019), Evergreen have a similar balance of heating and cooling load reflected in this post-period, when compared to the full year of post-period in the TOU impacts. Therefore, it is unlikely that the timeline limitation has significantly biased the Ecobee impact estimate. The post-period of the Ecobee with eco+ (approx. July-Nov 2019) has more cooling and less heating (except in the case of PG&E) and more cooling load than the Ecobee without eco+. Therefore, the impact estimate for eco+ should be interpreted more as a summer or summer/fall estimate. SCE customers had the highest cooling needs during the eco + post-period, with an average of 11.7 CDD and only 2.4 HDD; whereas PG&E and SDG&E averaged 5.9 CDD with 5.0 and 3.2 HDD, respectively.

(6) Figure 28: Average Daily Cooling and Heating Loads Reflected in the Post-Period Impacts





4.2.1 TOU and Ecobee Impacts

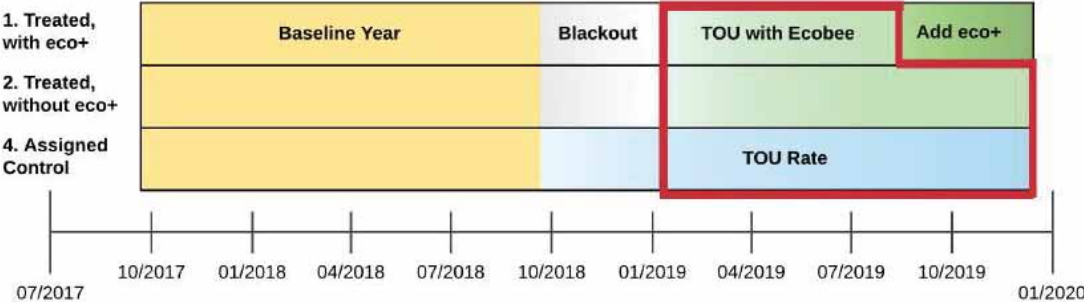
Table 21 provides an overview of the pilot participants who are depicted in this analysis. Figure 29 provides a visual representation of the analysis timeline, with the post-period outlined in red. In this case, the post-period is defined as the time period after each customer was transitioned to the TOU rate; for the treatment group, Evergreen must further refine this to exclude the blackout period before the Ecobee installation and any observations after the activation of eco+.⁹ The AMICS model was estimated on a full year of baseline data from every customer, but since the treatment group did not have the Ecobee installed for a full year, the post-period difference-of-differences will be limited to the time frame of the treatment group. Therefore, the timeline depicted in this analysis is between the initial program intervention (i.e., the transition to a TOU rate, with the addition of an Ecobee for the treatment group) between September 2018 and January 2019, and the end of the post-period on November 30, 2019 or activation of eco+.

Evergreen has between 77 and 95 customers in the control group and 36 and 42 customers in the treatment group, depending on the IOU.

(7) Table 21: Post-Period Analysis Sample by Pilot Intervention and IOU

		Control	Treatment
Post-Period Timeline		Oct 2018 - Nov 2019	Dec 2018 - Aug or Nov 2019
Number of Customers	PG&E	95	40
	SCE	77	36
	SDG&E	79	42
	Total	251	118

Figure 29: Post-Period Timeline for TOU, Ecobee and eco+ Impacts



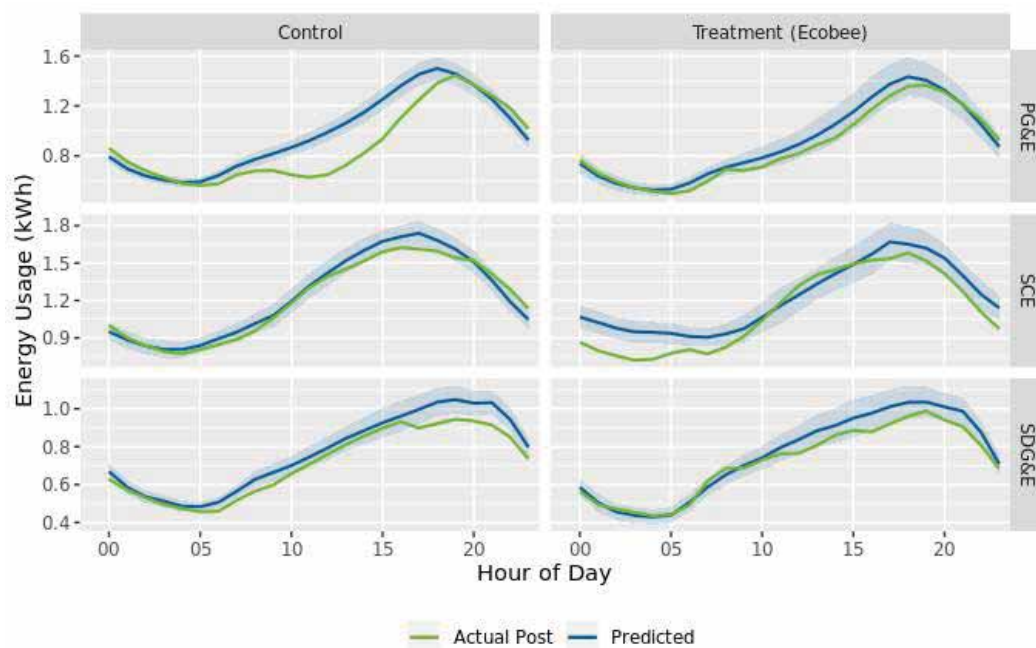
⁹ We have provided estimates of the combined impact of the Ecobee with eco+ in the next section (4.2.2). This section focused on the impact of the Ecobee without eco+. Though this was not part of the original pilot plan, we ended up with a large number of customers with nearly a full year of an Ecobee on a TOU rate without eco+, enabling Evergreen to conduct this analysis. The results improve our understanding of the device’s impact on energy usage when a specialized program like eco+ is not available or not functioning correctly on the device.



Figure 30 shows the post-period predicted load shape (blue) with the actual post-period load shape (green) across all customers who participated in the pilot (i.e., transitioned to a TOU rate and installed an Ecobee if they were assigned to the treatment group). This prediction is based on the pre-period consumption model and post-period weather data; it represents the expected load shape for these customers in absence of program pilot participation. The error of each hourly prediction is depicted as a 95 percent confidence interval in the shaded area around each estimate. Whenever the actual post-period load shape (green line) falls outside the predicted post-period load region (blue area), this indicates that a statistically significant change was observed during that hour.

The AMICS model finds statistically significant reductions in the whole-building energy usage of the control group across all three IOUs (i.e., green line falls below blue shaded area). The model also detected changes in the energy usage of the treatment group, with increases in energy usage during some of the morning hours and decreases during some evening hours. As the treatment group received two program interventions, further analysis is required to tease out the changes in load shape caused by the Ecobee installation (prior to eco+ activation) from the TOU rate itself.

(8) Figure 30: Actual Post-Period Load vs. Baseline Model Predictions by IOU



As the control group only received one program intervention and the model predictions account for any differences in weather, Evergreen can attribute any change in the load shape of the control group to the TOU rate, shown in Table 22. The largest savings attributed to the TOU rate were seen in the control group from PG&E, with average daily energy savings of 2.4 kWh or 10 percent, followed by SDG&E with 1.3 kWh and SCE with 0.6 kWh savings. However, most of these savings exhibited by PG&E occurred outside the peak hours of 4 to 9 p.m. (with 0.6 kWh savings during



these peak hours), while closer to half of the savings exhibited by the control group from SCE and SDG&E occurred during peak hours. This may be due to differences in the TOU educational materials, end use equipment, and other differences across the IOUs.

(9) Table 22: Changes in Energy Usage (kWh) Attributed to the TOU Rate, by IOU

IOU	N Customers *	Average Daily Energy Usage				Peak Hours**	
		Predicted	Actual Post	Change (kWh)	Change (%)	Change (kwh)	Change (%)
PG&E	95	23.5	21.1	-2.44 ± 0.75	-10%	-0.56 ± 0.27	-7%
SCE	77	29.6	29.0	-0.61 ± 0.85	-2%	-0.27 ± 0.26	-4%
SDG&E	79	18.4	17.1	-1.26 ± 0.48	-7%	-0.56 ± 0.19	-9%

* Refers to the number of customers in the control group, who were transitioned to the TOU rate without any additional program interventions.

** Peak is 4 to 9 p.m. for PG&E and SDGE or 5 to 8 p.m. for SCE.

Figure 31 shows estimated hourly change in kWh by group for a difference-in-differences estimation of the impact of an Ecobee, with error bars depicting 95 percent confidence intervals. The difference-in-differences between the control and treatment groups are performed within each customer-day segment and then weighted by the number of observations in the treatment group during the post-period. This helps to control for any known differences in the composition of customers and weather conditions in the control and treatment groups.¹⁰

The customers in the control group (in orange) reduced their energy usage during the morning hours of 6 a.m. to 11 a.m. after starting the TOU rate; these are off-peak hours. This indicates that the control group customers are taking action to reduce their energy usage; these actions are not limited to the peak period. Both the control group and treatment group from all three IOUs reduced their energy usage during peak hours after being transitioned to the TOU rate. However, the relative changes observed in the control and treatment groups differ across the three IOUs. As the control group provides Evergreen's best estimate of the change that the treatment group would have experienced transitioning to the TOU rate without the Ecobee, this will influence Evergreen's conclusions about the incremental impact of the Ecobee.

¹⁰ This comparison is restricted to customer and day segments that were observed in the post-period with both treatment and controls. This restriction excludes some observations, as 15 percent of treatment customer-days in the post-period had no similar customers and/or days in the control group during the post-period. This is a result of the fractured groups, where many customers did not complete their assigned program interventions (Section 3).



(10) Figure 31: Comparison of Post-Period Changes by Group and IOU

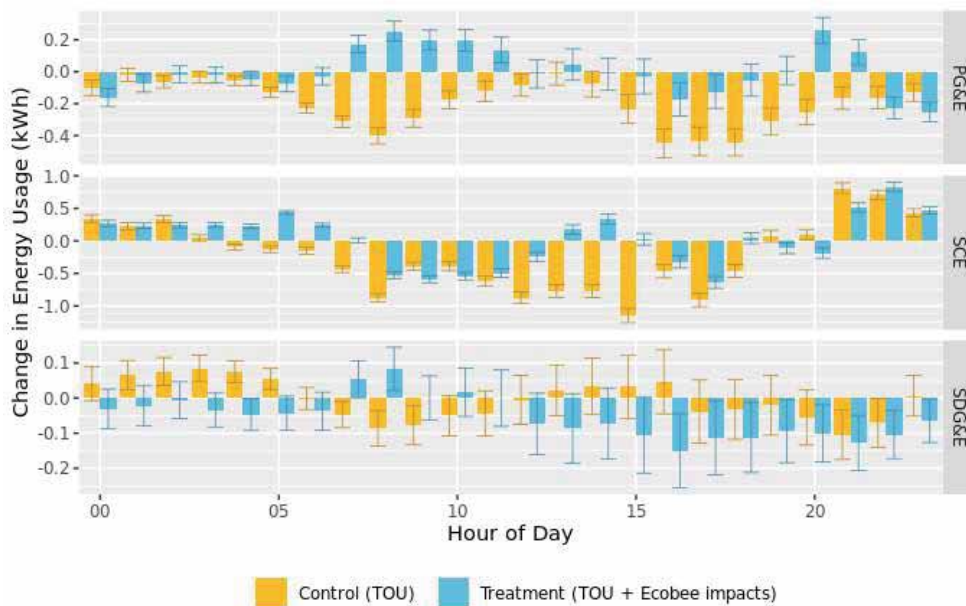
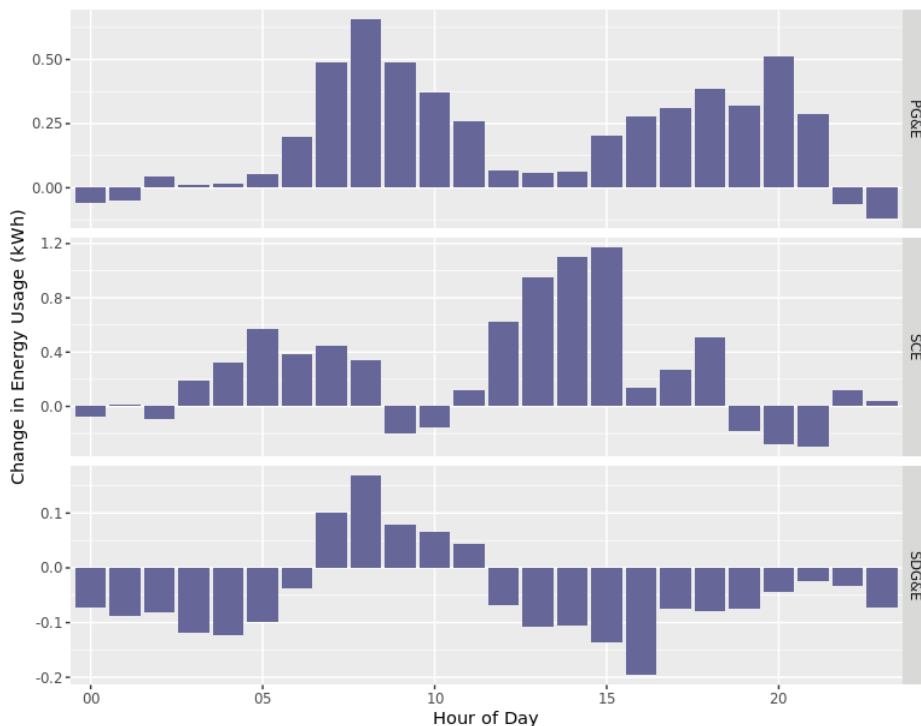


Figure 32 shows Evergreen’s estimate of the hourly incremental impact of the Ecobee. This is based on the difference-in-differences between the control group and treatment group. None of the Ecobees included in this analysis had eco+ enabled, so these changes are associated with the default settings and built-in features of the Ecobee (e.g., programmable schedule, remote controls). Evergreen sees a similar pattern in Ecobee impacts from PG&E and SCE, where the Ecobee is associated with an increase in energy usage in the morning and either afternoon or evening hours. There are only a few hours where Evergreen sees any reductions (i.e., savings) associated with these smart thermostats. SDG&E exhibits a very different trend, where the Ecobee increased energy usage from 6 a.m. to 11 a.m., but led to savings during all other hours, including the peak hours. The customers, building stock, smart thermostat installers, and educational materials differ across the three IOUs, but the technology was the same.



(11) Figure 32: Estimated Incremental Impact of Ecobee



The Ecobee impact is estimated as the difference between the total change observed in the treatment group and the change observed in the control group.

Table 23 provides a summary of these changes by IOU. Increases in energy usage are shown in red, while savings (i.e., reductions in energy usage) are shown in black. A 95 percent confidence interval is provided for the estimated impact of the Ecobee. Figure 33 and Figure 34 present these same estimated impacts in a visual form, with bars to represent the incremental impacts of the TOU rate and Ecobee, which combined, account for the change observed in the treatment group.

Evergreen found a statistically significant increase in energy usage on the average day attributed to the Ecobees for PG&E and a statistically significant decrease in energy usage for SDG&E. During the peak hours, Evergreen found statistically significant savings attributable to the Ecobees from SDG&E, significant increases from PG&E, and no significant changes from SCE. During the peak hours, while on the TOU rate, the thermostats often had impacts in the opposite direction of the TOU rate (i.e., offsetting the TOU impacts). The TOU rate lowered usage during the peak period across all three IOUs, then the smart thermostat offset this with an increase in usage during the peak period for PG&E and SCE. Over the course of the day, this same trend was observed.



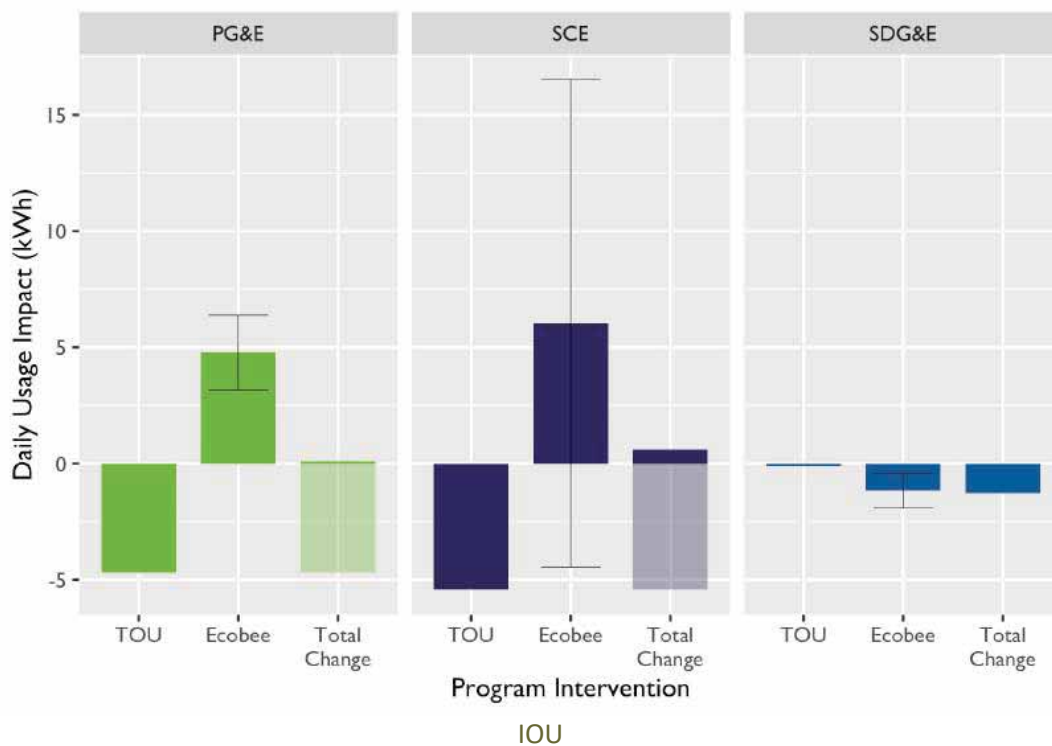
(12) Table 23: Changes in Energy Usage (kWh) Attributed to the Ecobee, by IOU

	N Treated Customers*	Average Day				Peak Hours**			
		Total Change (in treat)	TOU Impact control)	Ecobee Impact (difference)	Ecobee (in %)	Total Change	TOU Impact	Ecobee Ecobee Impact %	
PG&E	40	0.09	-4.69	4.77 ± 1.61	15%	0.04	-2.06	2.09 ± 0.73	16%
SCE	36	0.62	-5.41	6.03 ± 10.50	7%	-0.90	-1.21	0.30 ± 1.65	2%
SDG&E	42	-1.27	-0.10	-1.17 ± 0.75	6%	-0.70	-0.21	-0.49 ± 0.40	8%

* Refers to the number of customers in the treatment group, who were transitioned to the TOU and installed the Ecobee smart thermostat.

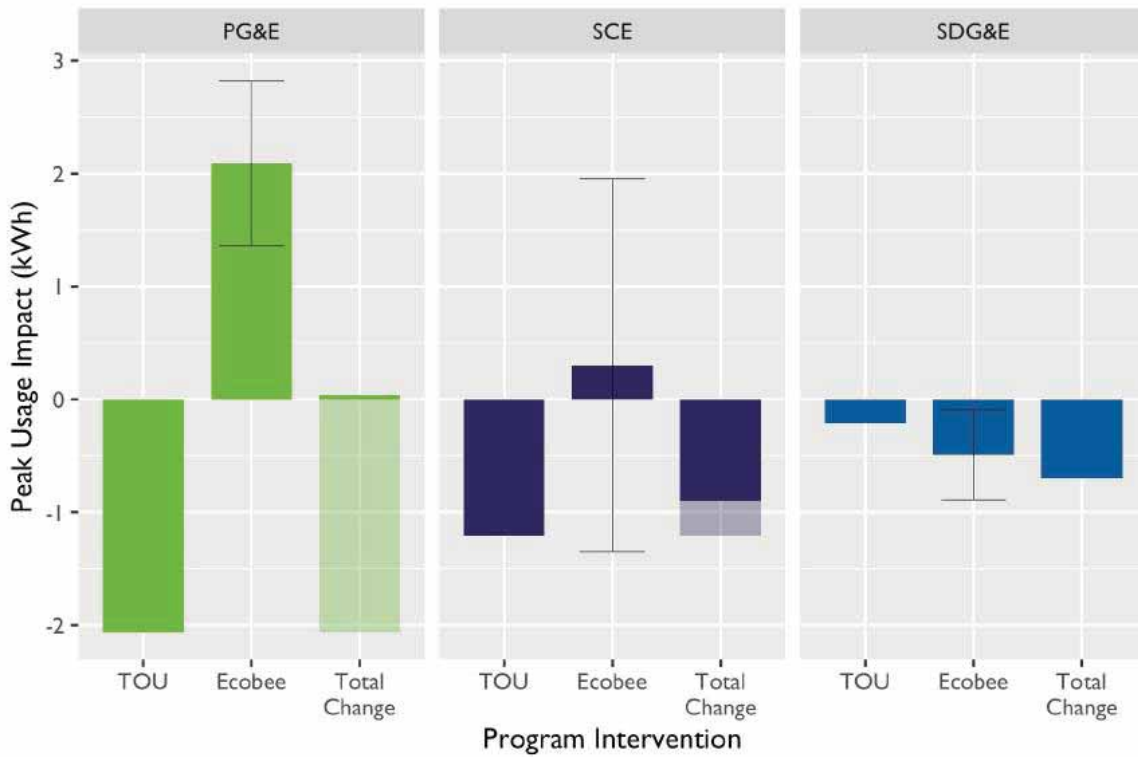
** Peak is 4 to 9 p.m. for PG&E and SDGE or 5 to 8 p.m. for SCE.

(13) Figure 33: Changes in Daily Energy Usage (kWh) Attributed to the Ecobee, by





(14) Figure 34: Changes in Peak Energy Usage (kWh) Attributed to the Ecobee, by IOU



To help understand how the smart thermostats were being used throughout the year, Evergreen looked at impacts for the two main HVAC seasons: summer and winter. Figure 35 shows Evergreen’s estimated hourly change in kWh by group, with error bars depicting 95 percent confidence intervals around each estimate. The most interesting finding is in the control group (TOU rate only) from SCE. These customers reduced their energy usage from 7 a.m. until 7 p.m. during the summer months, but then increased their energy usage during this time period in the winter months. The treatment group did reduce their energy usage during the day for both seasons, but exhibited larger reductions in the summer months. These findings suggest that SCE’s customers are more willing or able to cut back on usage during the summer than in the winter.

Figure 36 shows Evergreen’s estimate of the hourly incremental impact of the Ecobee based on the difference-in-differences between the changes observed in the control group (TOU only) and treatment group (TOU with Ecobee) by season. For customers from SCE, the Ecobee led to an increase in energy usage during summer months and a decrease in usage during winter months relative to the TOU rate on its own. This inconsistent benefit across the two main HVAC seasons helps to explain the statistical insignificance of the overall Ecobee impact results for SCE.

(15) Figure 35: Comparison of Post-Period Changes by Group and IOU, by Season

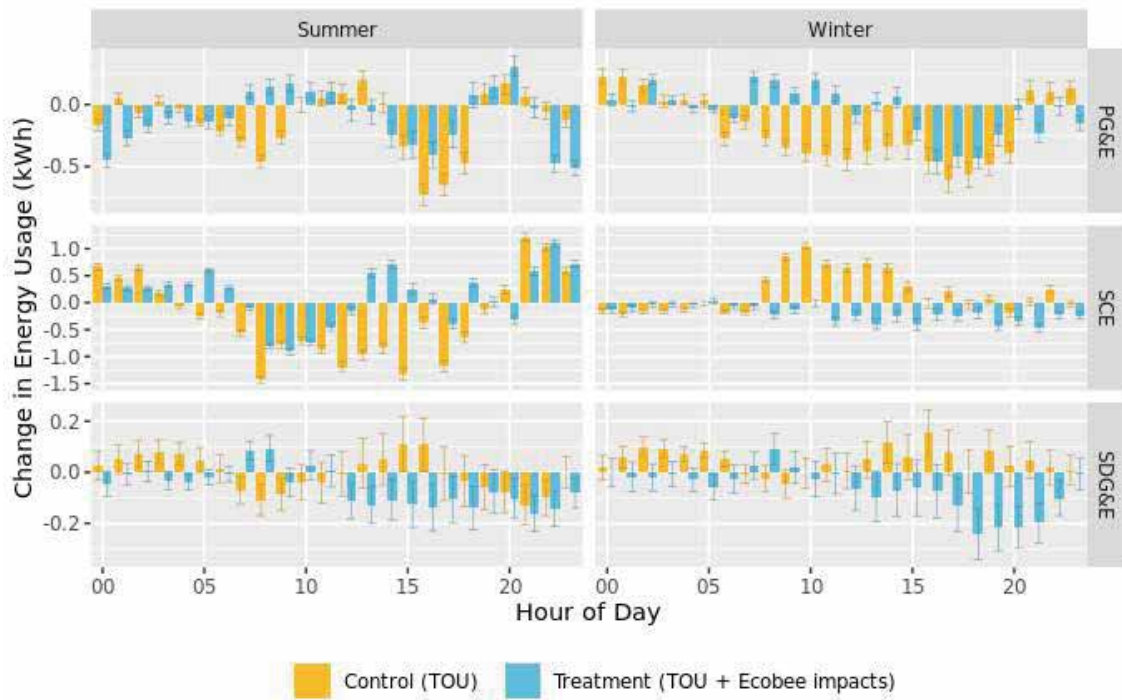
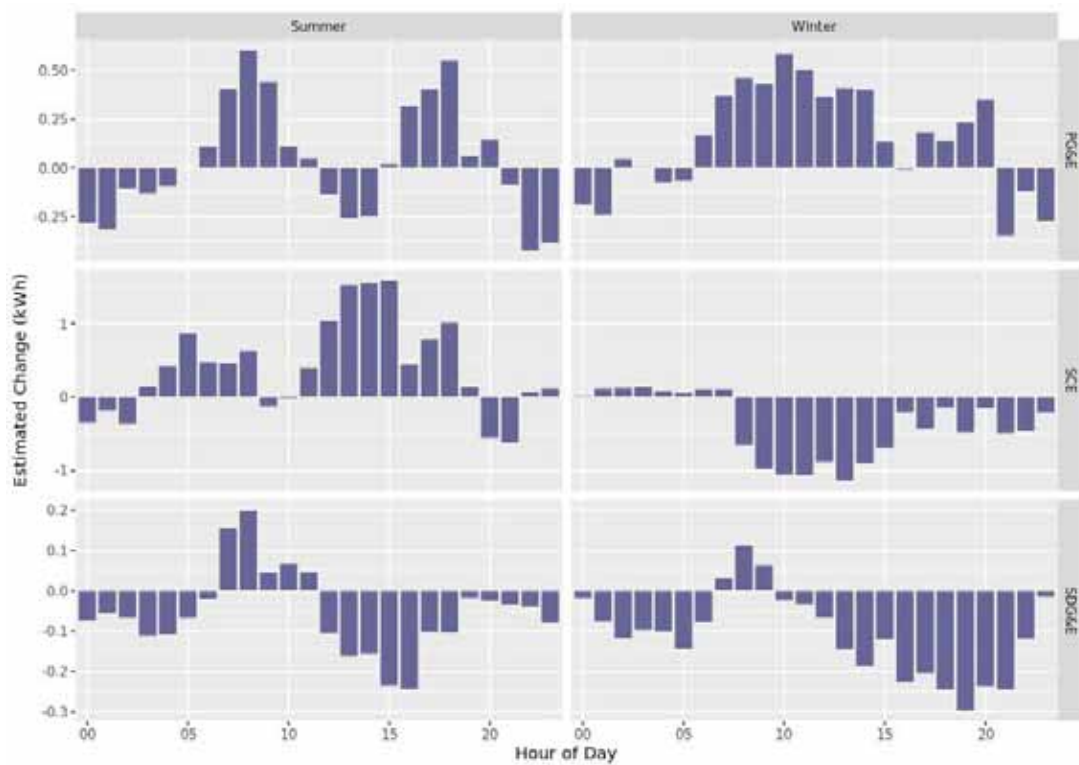


Figure 36: Estimated Incremental Impact of Ecobee, by Season





4.2.2 Ecobee with eco+ Impacts

As mentioned earlier, eco+ was only installed and activated in the Ecobee thermostats for a short period towards the end of the pilot, for only 69 percent of treatment group participants. This limited Evergreen’s ability to fully assess the value of eco+ as it did not cover the entire summer period, and it did not cover the entire treatment group as originally intended. Despite these limitations, Evergreen did investigate any eco+ impacts in the portion of the post-period when eco+ was active.

Table 24 provides an overview of the pilot participants who are depicted in this analysis. Figure 37 provides a visual representation of the analysis timeline, with the post-period outlined in red. In this case, the post-period is defined as the days **between the activation of eco+ in July-August 2019 and the end of the post-period on November 30, 2019**. The post-period is defined as the time period after the customers who were assigned to the treatment group had the eco+ TOU functionality activated on their Ecobee. The AMICS model was estimated on a full year of baseline data from every customer (with controls for weather and seasonality), but since the treatment group only had the eco+ feature activated for three to four months, the post-period difference-of-differences is limited to the time frame of the treatment group. Evergreen have between 77 and 95 customers in the control group and 15 and 34 customers in the treatment group, depending on the IOU.

(16) Table 24: eco+ Analysis Sample by Pilot Intervention and IOU

		Control	Treatment
Intervention		TOU	TOU with Ecobee and eco+
Post-Period Timeline		June 2019 - Nov 2019	July or Aug 2019 - Nov 2019
Number of Customers	PG&E	95	15
	SCE	77	32
	SDG&E	79	34
	Total	251	81

Figure 37: Post-Period Timeline for Ecobee with eco+ Impacts

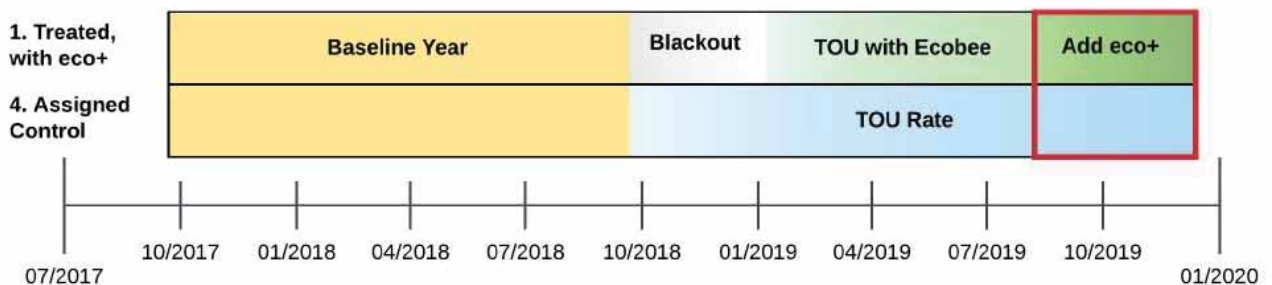




Figure 51 compares the post-period predicted load shape (blue) with the actual post-period load shape (green) for customers in the control group and the subset of the treatment group who activated the eco+ feature on their Ecobee. This prediction is based on the pre-period consumption model and post-period weather data from July to November 2019; it represents the expected load shape for these customers in absence of the program interventions. The error of each hourly prediction is depicted as a 95 percent confidence interval in the shaded area around each estimate. Whenever the actual post-period load shape (green line) falls outside the predicted post-period load region (blue area), this indicates that a statistically significant change was observed during that hour.

The AMICS model finds statistically significant reductions in the whole-building energy usage of the control group for PG&E during the morning and afternoon hours (i.e., green line falls below blue shaded area), followed by an increase in energy usage at night. The changes in the treatment group appear more erratic, likely due to the small sample size (n=15, 32, and 34 for PG&E, SCE and SDG&E respectively) and limited timeframe. Both groups from SDG&E show a sudden drop in energy usage at 4 p.m. that is maintained after peak hours until 11 p.m.

(17) Figure 38: Actual Post-Period Load vs. Baseline Model Predictions by IOU After eco+

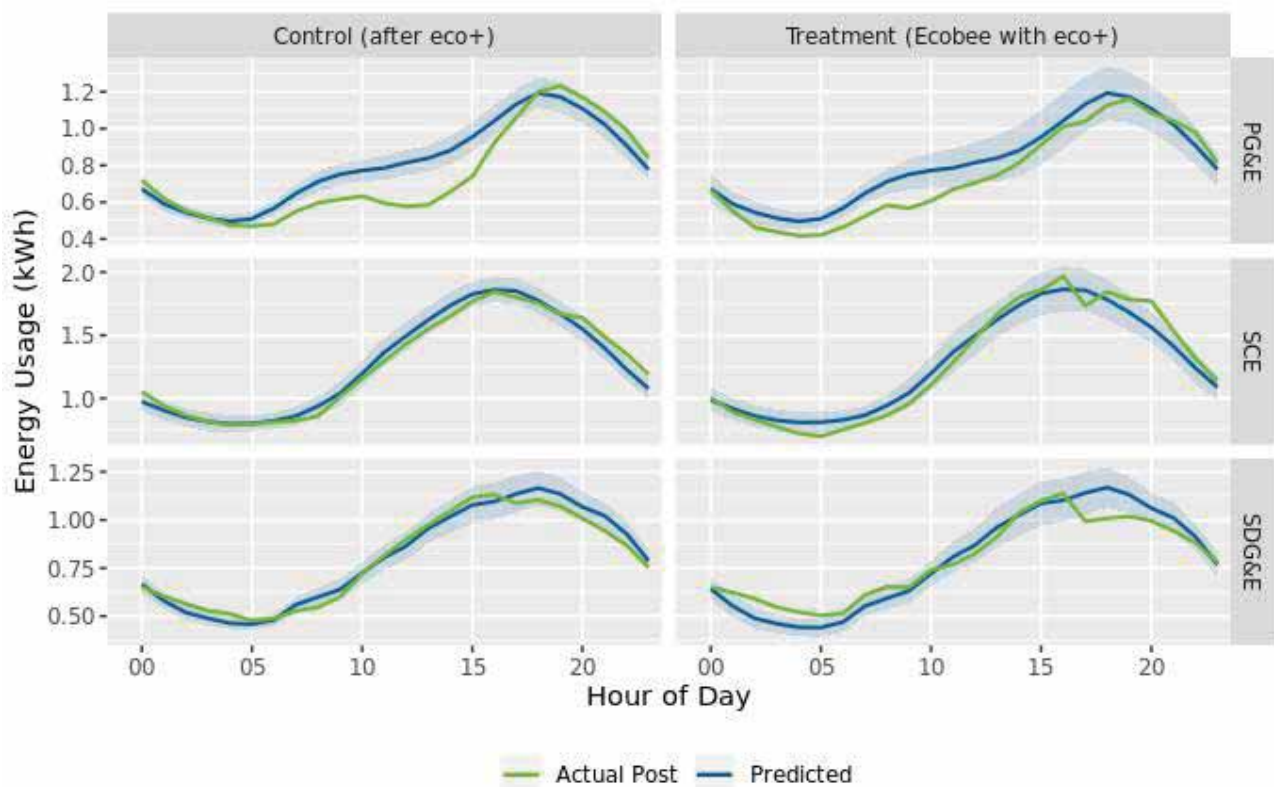


Figure 39 shows the estimated hourly change in kWh by group for a difference-of-differences estimation for the impact of an Ecobee with eco+ enabled, with error bars depicting 95 percent



confidence intervals around each estimate. Again, the difference-in-differences between the control and treatment groups were performed within each customer-day segment and then weighted by the number of observations in the treatment group during the post-period to control for any known differences in the composition of customers and weather conditions in the control and treatment groups.¹¹

Both the control group and treatment group from SDG&E reduced their energy usage during the peak hours after being transitioned to the TOU rate, though not all of these changes were statistically significant. As the control group provides Evergreen’s best estimate of the change that the treatment group would have experienced transitioning to the TOU rate without the Ecobee, Evergreen are most interested in the relative difference between the control group and treatment group.

(18) Figure 39: Comparison of Post-Period Changes after eco+ Enabled by Group and IOU

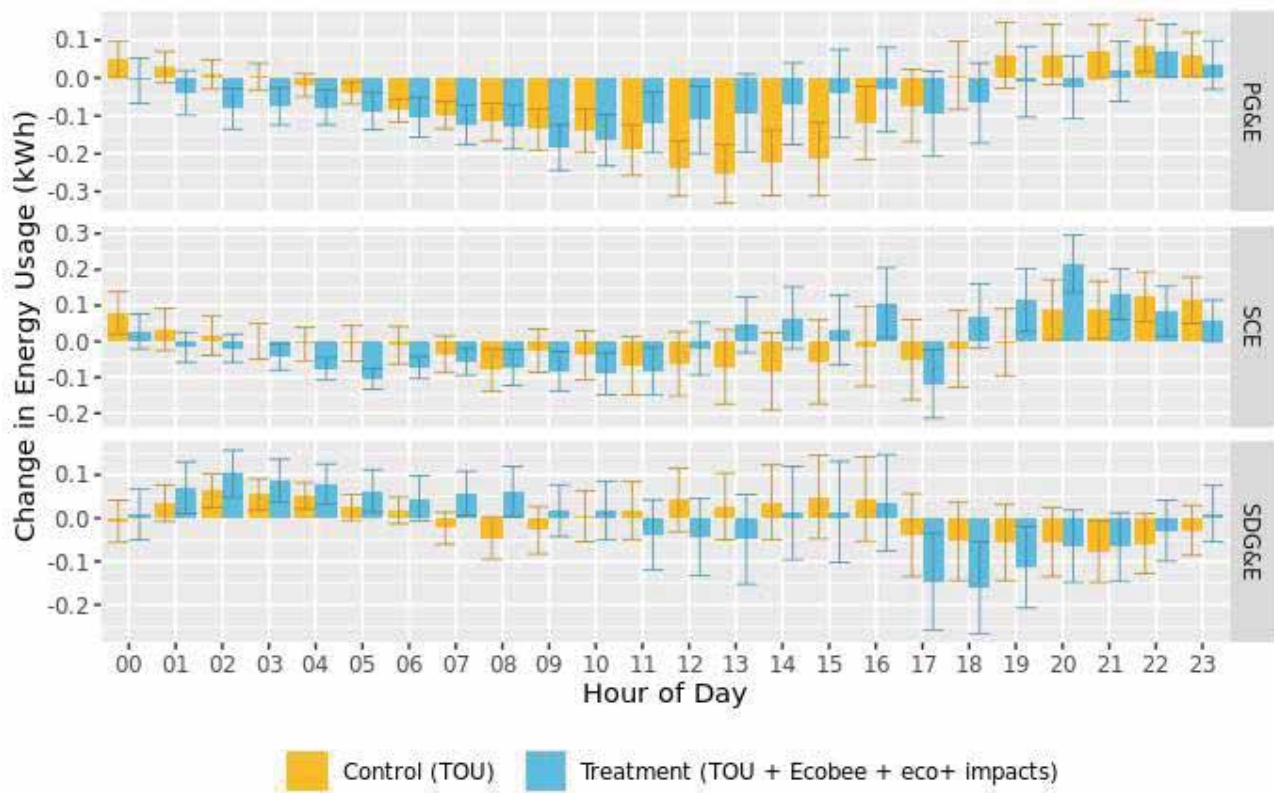


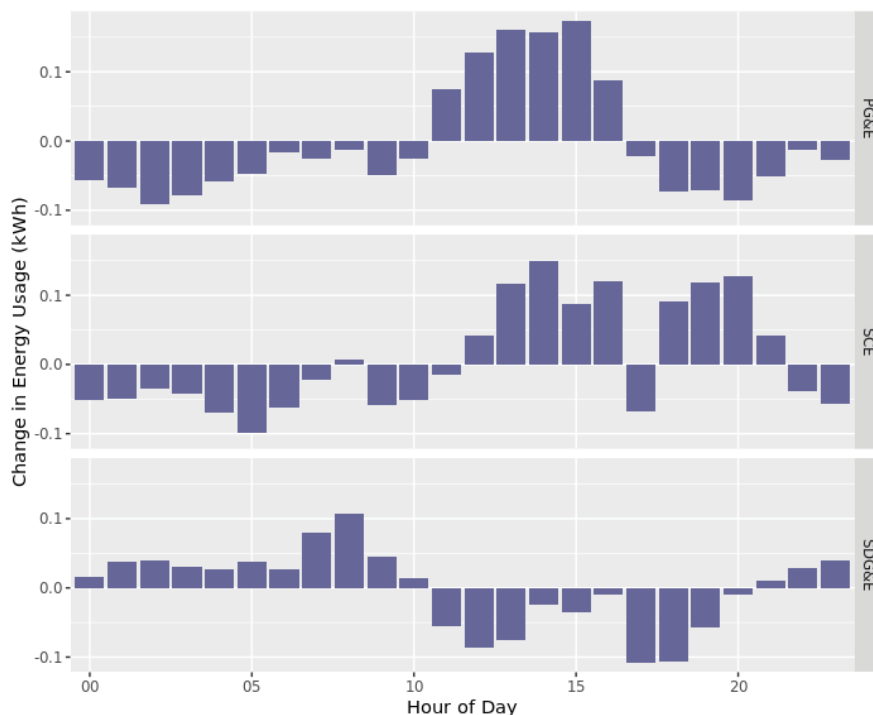
Figure 40 shows Evergreen’s estimate of the hourly incremental impact of the Ecobee with eco+. This is based on the difference-in-differences between the control group and treatment group. The

¹¹ This comparison is restricted to customer and day segments that were observed in the post-period with both treatment and controls. This restriction excludes some observations, as 3 percent of treatment customer-days in the post-period had no similar customers and/or days in the control group during the post-period.



customers who installed the Ecobee and activated eco+ from PG&E exhibited the most consistent improvements, with reduced energy usage from 5 p.m. until 10 a.m., though most of these savings are offset by increases in usage between 11 a.m. and 4 p.m. Unfortunately, customers with an Ecobee and eco+ from SCE increased energy usage from 12 p.m. until 9 p.m., relative to the control group.

(19) Figure 40: Estimated Incremental Impact of Ecobee with eco+ Enabled



The Ecobee with eco+ impact is estimated as the difference between the total change observed in the treatment group after eco+ and the change observed in the control group during the same timeframe. Table 25 provides a summary of these changes by IOU. Increases in energy usage are shown in red, while savings (i.e., reductions in energy usage) are shown in black. A 95 percent confidence interval is provided for the estimated impact of the Ecobee. Evergreen did not detect any statistically significant energy savings on the average day attributed to the Ecobees with eco+. During the peak hours, Evergreen found statistically significant increases attributable to the Ecobees with eco+ from SCE, and no significant changes from the other two IOUs. Figure 41 presents these same estimated impacts in a visual form, with bars to represent the incremental impacts of the TOU rate and Ecobee with eco+, which combined, account for the change observed in the treatment group.

Section 4: Findings

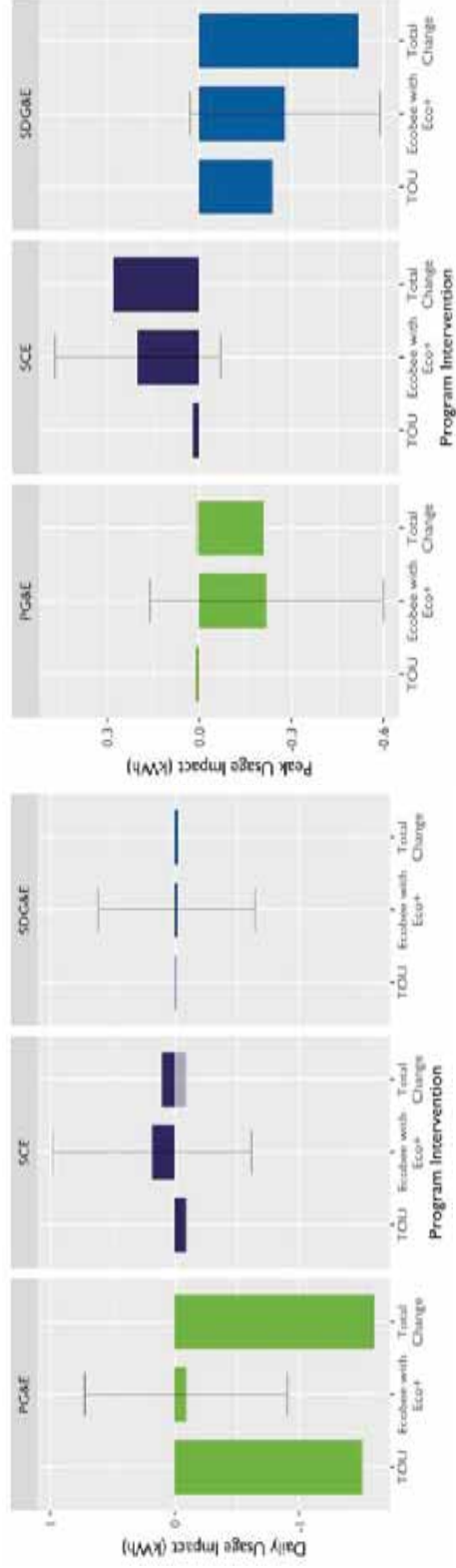
(20) Table 25: Changes in Energy Usage (kWh) Attributed to the Ecobee with eco+, by IOU

N Treated Customers*	Total Change (in treat)	Average Day		Peak Hours*			
		TOU Impact (in control)	Ecobee eco+ Impact (difference)	Total Change	TOU eco+ Impact	Ecobee Impact	Ecobee eco+ %
PG&E	-1.60	-1.51	-0.09 ± 0.81	-0.21	0.01	-0.22 ± 0.38	3%
SCE	0.10	-0.09	0.18 ± 0.80	0.28	0.02	0.27 ± 0.27	4%
SDG&E	-0.03	-0.01	-0.02 ± 0.63	-0.52	-	-0.28 ± 0.31	4%
					0.24		

* Refers to the number of customers in the treatment group who were transitioned to the TOU rate, installed the Ecobee smart thermostat, and successfully activated the eco+ feature.

* Peak is 4- to 9 p.m. for PG&E and SDGE or 5 to 8 p.m. for SCE.

(21) Figure 41: Changes in Daily Energy Usage and Peak Energy Use (kWh) Attributed to the Ecobee with eco+



5 Conclusions

This study looks specifically at low-income customers who often face higher energy burdens and aging housing stock. At the beginning of the pilot, most respondents thought they were already doing everything they could to save energy some to all of the time, suggesting they did not think they had many remaining opportunities to save additional energy, regardless of rate.

Customers also reported that they were less likely to take actions that were comfort related (such as shorter showers and turning down the AC at night) compared to actions such as turning off lights and electronics, and comfort was the most commonly chosen reason for not being able to save energy.

Conclusions below cover the TOU rate change and the additional impact of offering a smart thermostat with and without eco+.



TOU Rate Change

Half of the savings attributed to the TOU transition occurred during peak hours for SCE and SDG&E; this percentage was lower for PG&E, with most of those customer energy savings attributable to the TOU transition *outside* of the peak period of 4 to 9 p.m.

Survey responses from customers reflected a general understanding of the TOU period, as well as of the items in their home that use the most energy:

- Almost all respondents know *when* energy costs the most, it does not always align with when they think their own household uses the most energy.
- Respondents were aware of the peak hours of the day and that heating and cooling were the most energy intensive items in their home. This was consistent at the beginning and end of the pilot.

Respondents were split about wishing they had been told more about the TOU rate before the pilot started. Over half of respondents reported there was nothing else they wanted to know, and of the remaining half, the most common request was for **additional information on the rate, including the best times to use appliances.**



Smart
Thermostats

Smart thermostats seem to cannibalize savings from transitioning to the TOU rate. Smart thermostats without eco+ did not provide consistent and significant benefits to low-income customers. The exception is SDG&E customers, whose peak reductions and average daily kWh both improved with the smart thermostat.

- PG&E customers likely used the thermostat to improve comfort year round. Evergreen saw a statistically significant increase in usage attributed to the smart thermostat amongst PG&E participants both during the peak period and across all hours of the day.
- SCE customers did not use the thermostat to cut AC usage (they had more AC usage than the control group, but still represented a reduction compared with the pre-period year) but did use the thermostat to save energy in winter (less heating). On an annual basis, this was reflected as an overall increase in kWh.
- SDG&E customers used the thermostat to save more energy in the winter (reduced heating) than in the summer (reduced AC), but did cut back in both seasons (beyond what the control group could do).

Smart thermostats allow customers to better control comfort. An unwillingness to sacrifice comfort was the most common reason chosen for not saving additional energy. This, alongside the increased ability to modify thermostat set points with a smart device/phone may have contributed to this cannibalization of savings from the TOU rate.

If increased awareness of the TOU rate is more important to the IOUs than the cannibalization of savings, it may make sense for the IOUs to offer thermostats; otherwise, they will see more savings with the TOU rate alone:

- The treatment group was more likely to be aware that their rate changed, suggesting that **the thermostat is useful if increased awareness of the TOU rate is important to the IOUs.**
- Similarly, respondents in the control group were more likely to report that they did not know if the TOU bill was the reason for any observed change in their bills over the course of the year. This suggests **that the participants with a thermostat may have been more likely to attribute a change in their bills to the TOU rate.**

Respondents were **very satisfied with the thermostat** (89 percent were at least somewhat satisfied), and respondents **appreciated the ability to control their thermostat with their smart phone or smart device.**

Sixty-three percent of respondents reported that the thermostat made it easier to control their bills, while 11 percent found it more difficult. This interpreted ease may be due to the ability to control set points through a smart device.

Both treatment and control group respondents reported that they had a preference for programming and manually adjusting the thermostat, suggesting that **most treatment group customers modified the default settings**. This aligns with what Evergreen found in the impact results, where thermostats seem to be used more to increase comfort than to shift usage off of peak hours.

Comparing the control and treatment respondents who reported that they modify their thermostat set points and settings, **the control group was more likely to report using their appliances less frequently to avoid the peak period during the summer months**. While this was not statistically significant, it may indicate that the **control group was more likely to take action in non-cooling related ways in absence of the smart thermostat**, whereas the **treatment group may have been more likely to have interpreted the thermostat offering as more of a one-stop solution to the change in rate**. This interpretation may have been due to their impression that the thermostat was set up to adjust off peak hours, though in actuality this feature was not installed until three-quarters of the way through the year-long pilot.

Unfortunately, a manufacturer error in programming the devices prohibited Evergreen from having a full year of information to assess the impact of eco+. Evergreen were, however, able to assess the short time period that eco+ was enabled (July through November 2019), and also review the impact of the smart thermostat without eco+ on participants' ability to adapt to TOU.



Smart
Thermostat &
eco+

In general, respondents with eco+ installed on their thermostat were **not widely confident in the thermostat's ability to help them control their energy bills or help them lower their energy use**, or on the existence of eco+ or a similar feature.

(22) Evergreen did not detect any statistically significant energy savings on the average day attributed to thermostats with eco+.

Both the control and treatment group at SDG&E showed a sudden drop in energy usage at 4 p.m., which was maintained through the peak period, suggesting they may be well-educated on the TOU rate.

Appendix A: Survey Results by IOU

Table 1: Type of Energy Using Equipment for Control Group Survey Respondents by IOU

Group	Object	PG&E	SCE	SDG&E
Control - Percentages	Well	10%	13%	0%
	Shop Equipment	14%	21%	7%
	Pool Pump	14%	15%	11%
	Medical Equipment	21%	21%	10%
	Jacuzzi, Hot Tub, or Heated Pool	16%	0%	20%
	Irrigation Pump	3%	13%	2%
	Electric Vehicle Charger	10%	5%	3%
Control - Counts	Well	63	38	61
	Shop Equipment	63	38	61
	Pool Pump	71	37	67
	Medical Equipment	63	38	61
	Jacuzzi, Hot Tub, or Heated Pool	71	37	67
	Irrigation Pump	63	38	61
	Electric Vehicle Charger	63	38	60

**Table 2: Type of Energy Using Equipment for Treatment Group Survey Respondents by IOU**

Group	Object	PG&E	SCE	SDG&E
Treatment - Percentages	Well	15%	9%	3%
	Shop Equipment	11%	22%	15%
	Pool Pump	9%	12%	18%
	Medical Equipment	18%	15%	6%
	Jacuzzi, Hot Tub, or Heated Pool	6%	24%	12%
	Irrigation Pump	3%	3%	6%
	Electric Vehicle Charger	7%	3%	8%
Treatment - Counts	Well	33	33	33
	Shop Equipment	33	33	34
	Pool Pump	33	33	33
	Medical Equipment	33	33	33
	Jacuzzi, Hot Tub, or Heated Pool	33	33	33
	Irrigation Pump	33	33	33
	Electric Vehicle Charger	27	32	34



Table 3: Reported Household Views Doing Everything They Can to Save Energy Before, During and After Pilot, by IOU

Group	Time Period	Response	PG&E	SCE	SDG&E
Control	Before Pilot	Always	35%	46%	38%
		Sometimes	56%	54%	62%
		Never	6%	0%	0%
		Don't Know	3%	0%	0%
	During Pilot	Always	44%	38%	53%
		Sometimes	53%	62%	44%
		Never	0%	0%	0%
		Don't Know	3%	0%	3%
	After Pilot	Always	32%	46%	50%
		Sometimes	68%	54%	50%
		Never	0%	0%	0%
		Don't Know	0%	0%	0%
Total Control N			34	13	34
Treatment	Before Pilot	Always	62%	0%	54%
		Sometimes	29%	100%	46%
		Never	0%	0%	0%
		Don't Know	0%	0%	0%
	During Pilot	Always	71%	0%	62%
		Sometimes	29%	100%	38%
		Never	0%	0%	0%
		Don't Know	0%	0%	0%
	After Pilot	Always	36%	0%	54%
		Sometimes	64%	100%	46%
		Never	0%	0%	0%
		Don't Know	0%	0%	0%
Total Treatment N			14	2	13

Table 4: Understanding of Current Rate Before and After the Pilot, by IOU

Group	Time Period	Response	PG&E	SCE	SDG&E	
Control	Before Pilot	Tiered Rate	49%	69%	70%	
		Time-of-Use Rate	20%	6%	0%	
		Not Sure	32%	25%	30%	
	After Pilot	Tiered Rate	15%	19%	7%	
		Time-of-Use Rate	54%	69%	84%	
		Not Sure	32%	13%	9%	
	Total Control N			41	16	40
	Treatment	Before Pilot	Tiered Rate	53%	88%	58%
			Time-of-Use Rate	18%	13%	21%
Not Sure			29%	0%	21%	
After Pilot		Tiered Rate	0%	25%	16%	
		Time-of-Use Rate	53%	75%	79%	
		Not Sure	47%	0%	5%	
Total Treatment N			17	8	19	

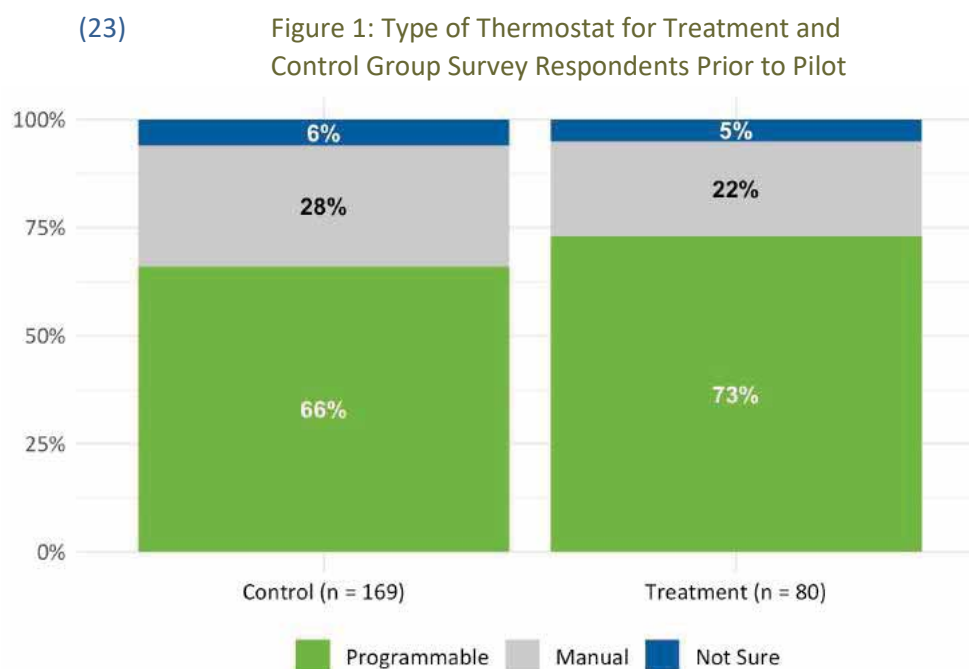
Table 5: Respondent Interpretation of Bill Change During Pilot Compared to Prior Two Years of Those Aware they were on TOU (Q61, Q62, Q63)

Group	Time Period	Response	PG&E	SCE	SDG&E
Control	Spring	Higher in 2019	18%	55%	11%
		Lower in 2019	32%	18%	30%
		About the same as the past two years	50%	27%	59%
	Summer	Higher in 2019	41%	73%	24%
		Lower in 2019	27%	9%	46%
		About the same as the past two years	32%	18%	30%
	Winter	Higher in 2019	45%	36%	22%
		Lower in 2019	18%	18%	27%
		About the same as the past two years	36%	45%	51%
Total Control N			22	11	37
Treatment	Spring	Higher in 2019	22%	0%	21%
		Lower in 2019	22%	25%	43%
		About the same as the past two years	56%	75%	36%
	Summer	Higher in 2019	22%	25%	21%
		Lower in 2019	33%	75%	36%
		About the same as the past two years	44%	0%	43%
	Winter	Higher in 2019	56%	0%	21%
		Lower in 2019	11%	50%	29%
		About the same as the past two years	33%	50%	50%
Total Treatment N			9	4	14

Appendix B: Additional Survey Results

Before the pilot started, the control and treatment groups reported having roughly the same number of thermostats in their homes. The control group (n=159) reported having 1.06 thermostats, while the treatment group (n=79) reported having 1.11 thermostats. No one in either group reported having more than two thermostats

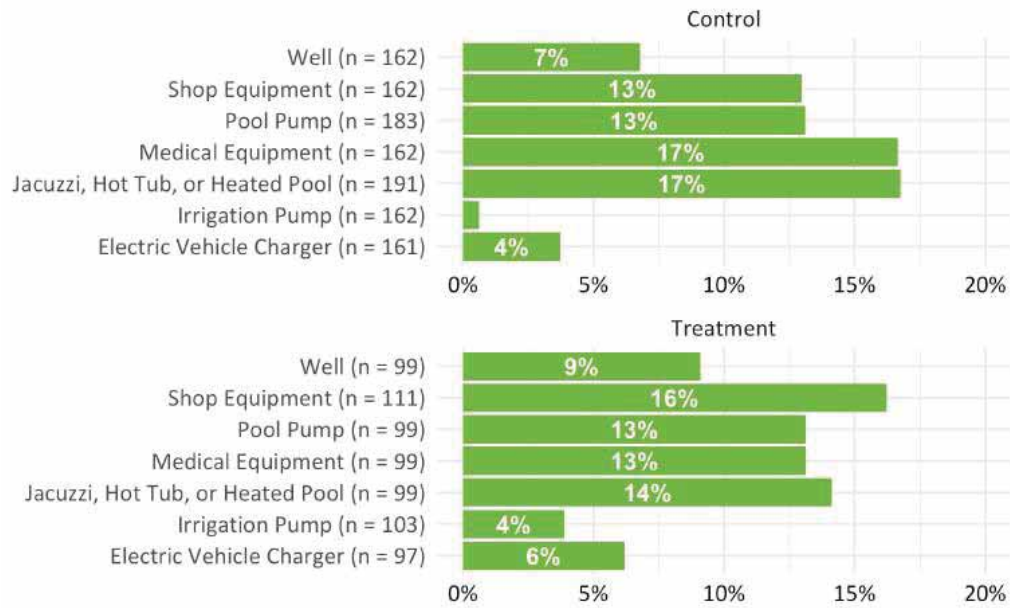
Figure 155 presents different types of thermostats in both the control and treatment groups before the implementation of the pilot. Over half of participants in both groups reported owning a programmable thermostat, while approximately a quarter of participants in both groups reported having a manual thermostat. The differences in thermostat types are not significant at the 90% level of confidence.



Across both groups, participants reported similar percentages of larger equipment that could contribute to higher energy bills. Differences between the control and treatment groups shown in Figure 256 are not statistically significant.

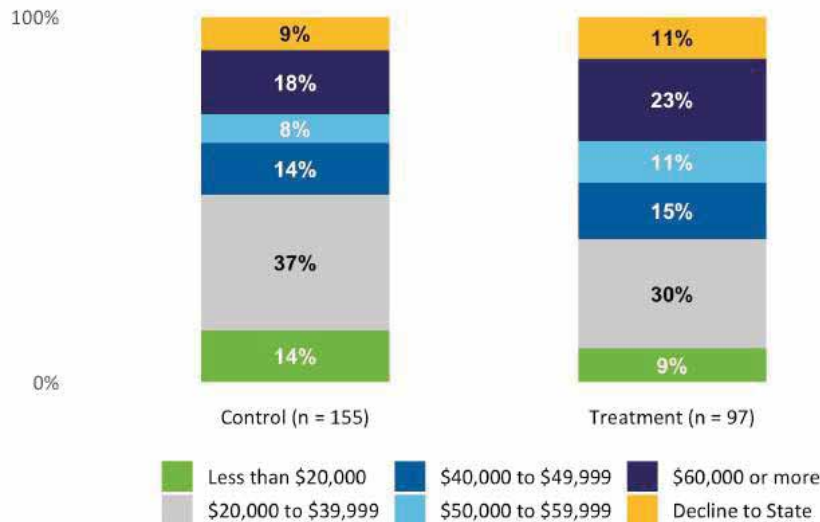


(24) Figure 2: Type of Energy Using Equipment for Treatment and Control Group Survey Respondents



The control and treatment group gave similar responses (no statistically significant differences) in terms of income and education levels. The same was true for household composition (approximately three people in each home over the entire year) and in terms of additional residents in the summer (14 to 16% of respondents had an additional resident in the summer).

(25) Figure 3: Reported Income Levels, Control vs. Treatment Groups



Evergreen asked respondents if the people who live in their home generally agree on the ideal temperature in their household. While the difference is not statistically significant, slightly more of



the control group respondents reported this is the case (84%) compared to the treatment group respondents (75%).

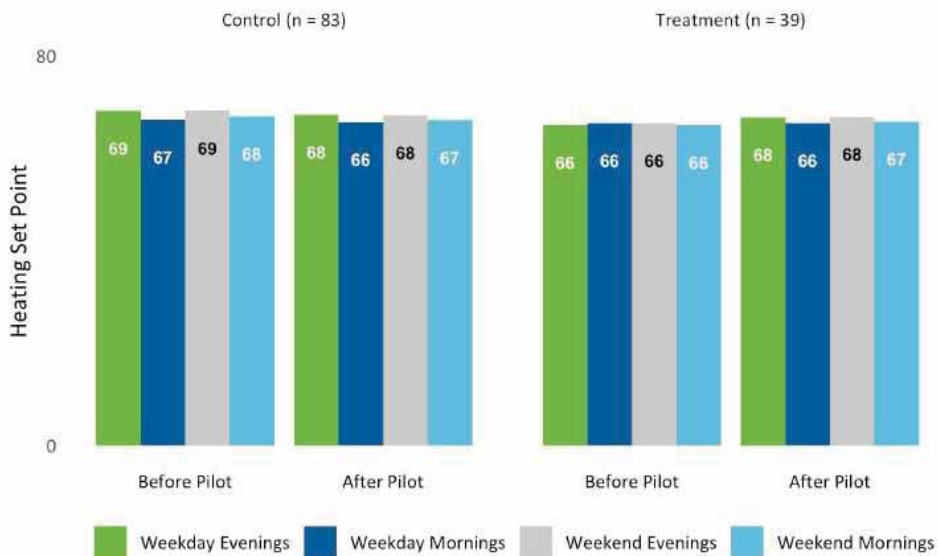
1.1.1 Use of Cooling and Heating

Evergreen asked respondents to report how they use and interact with heating and cooling to understand if there are any initial differences in the strategies between the control and treatment groups and also to see if they reported changing their behavior in regard to heating and cooling over the course of the pilot.

In regard to cooling set point, the way cooling is used, and supplemental cooling strategies, there were no significant differences between the treatment and control groups or in behaviors before or at the end of the pilot. The most common cooling strategy outside of central AC for both groups was ceiling fans. Additional information on cooling can be found in Appendix B.

In regard to heating, over 93 percent of both the treatment and control groups had central heating in their homes. On average, across weekdays/weekends and mornings and evenings, the average reported set points were consistent (ranging from 66 to 69 degrees Fahrenheit). Customers in the control group were more likely to report that their set point was lower at the end of the pilot than before the pilot, whereas customers in the treatment group were more likely to report a higher average set point after the pilot. These differences are minor, but it may show that there is a slightly more active effort to lower set points (even slightly) amongst the control group.

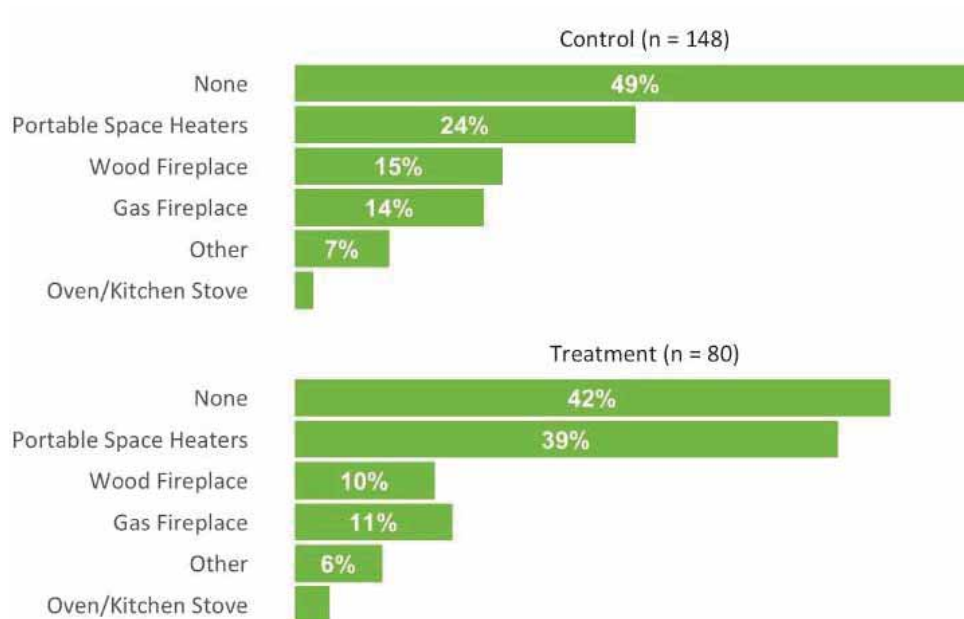
(26) Figure 4: Average Heating Set Point (in degrees Fahrenheit) at Different Types and Times of Day Before and After the Pilot, by Comparison and Treatment Groups





One interesting difference in heating strategies amongst the control and treatment group respondents was that the treatment group was much more likely to utilize portable space heaters compared to the control group. This difference is statistically significant.

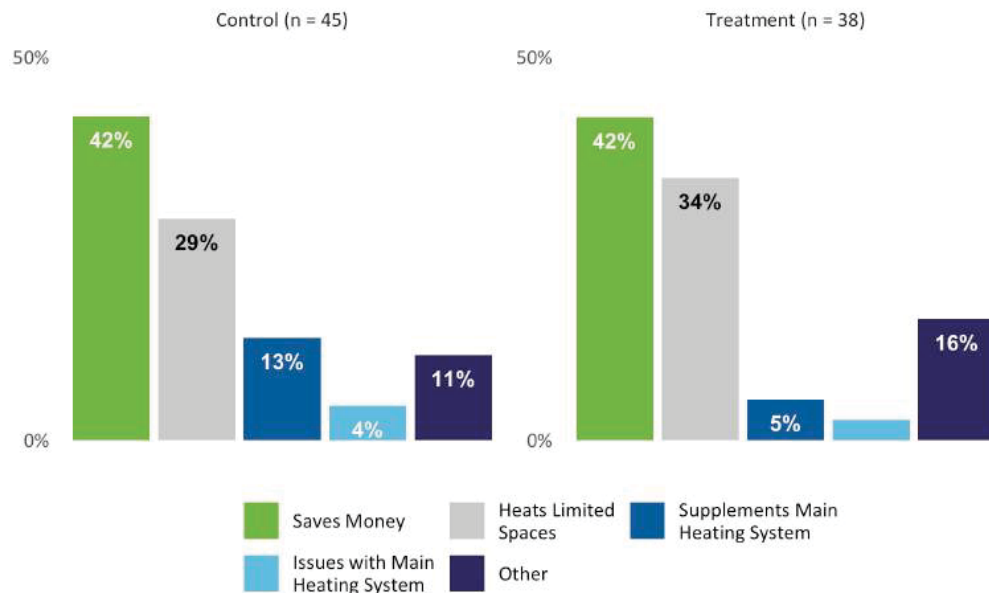
(27) Figure 5: Use of Non-Central Heating Systems by Comparison and Treatment Groups



In terms of *how* respondents report using space heaters, 42 percent of participants in both the treatment and control groups reported using space heaters in place of their central heating system in order to save money on their bill (Figure 618). There are no statistically significant differences in the responses between the treatment and control groups.



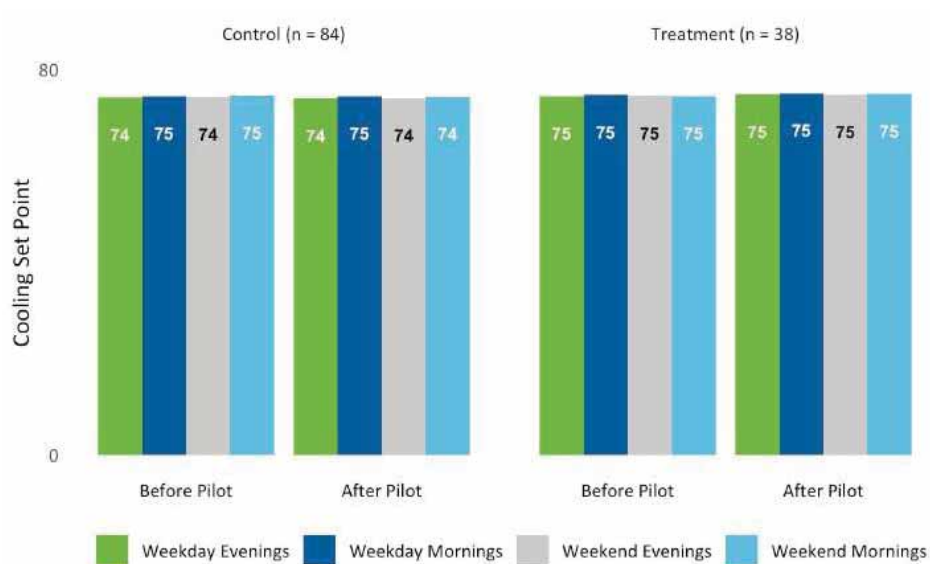
(28) Figure 6: Reasons Why Participants Use Portable Space Heaters



Cooling

On average, across weekdays/weekends and mornings/evenings, the average respondent reported set points were very consistent at 74 or 75 degrees Fahrenheit (Figure 59).

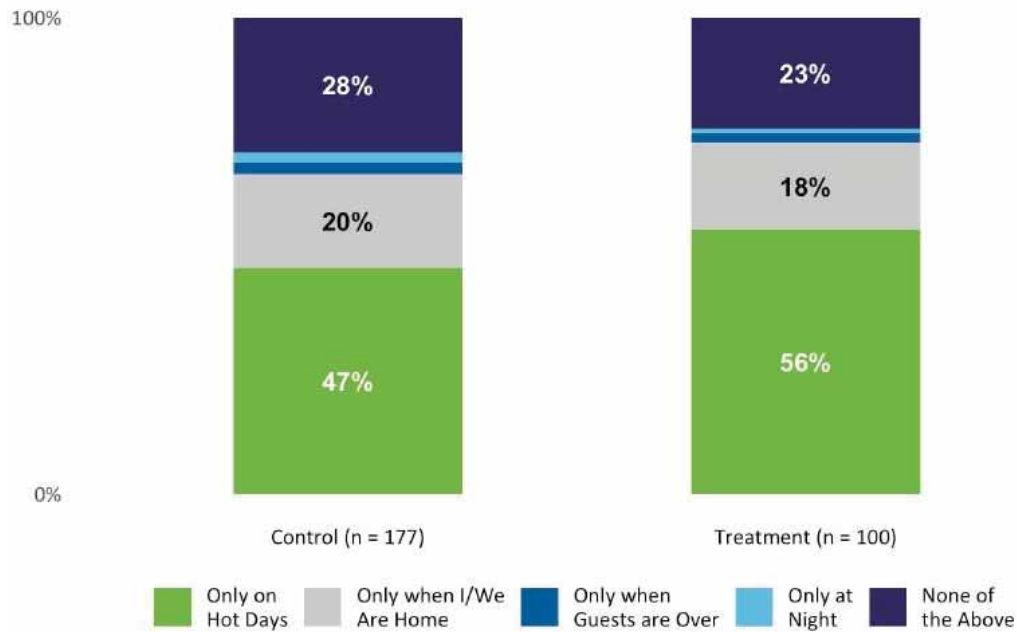
(29) Figure 7: Average Cooling Set Point at Different Types and Times of Day Before and After the Pilot, by Comparison and Treatment Groups



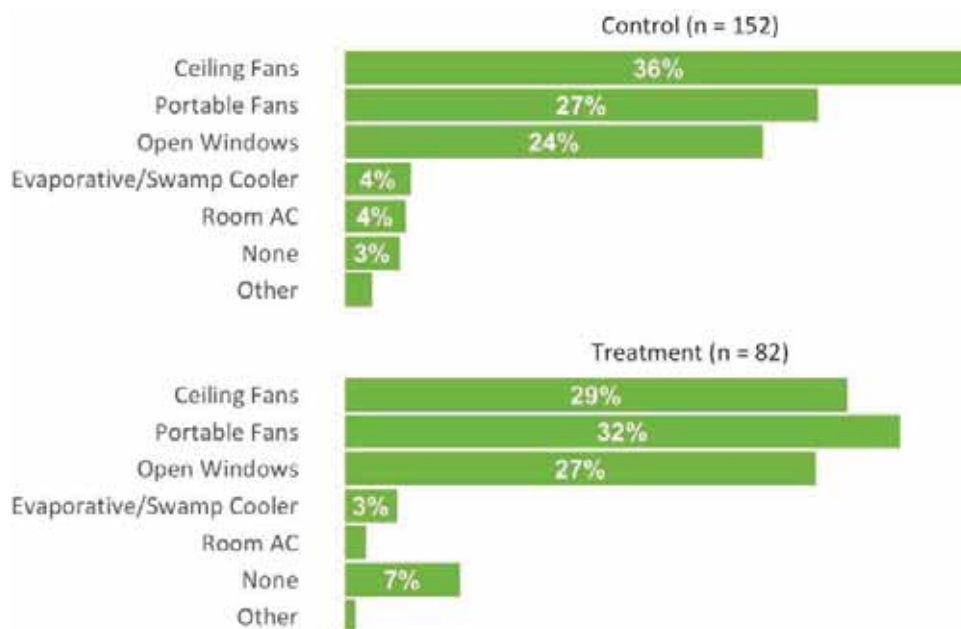


The treatment group respondents were more likely to report that they used their air conditioning only on hot days compared to the control group as shown in Figure 60, though this difference is not statistically significant.

(30) Figure 8: How Air Conditioning is Used, Treatment vs. Control Group



There were no significant differences between the treatment and control groups with regards to how they use other methods of cooling. The most common non-Central AC strategies for both groups were ceiling fans and portable fans.



(31) Figure 9: Use of Non-Central Cooling Systems by Comparison and Treatment Groups

Appendix C: Survey Questions



Survey Questions

Question	Survey 1	Survey 2	Survey 3
2 Have you moved since January 2019? o Yes o No		x	x
3 When you moved, what did you do with the smart thermostat that had been installed in your prior residence? A) Took it and then installed it in my new home (or had it installed) B) Kept it, but have not installed it at my new residence [Ask control group questions] C) No longer have it [Ask control group questions] D) Don't know		x	x
4 Our records indicate that at the beginning of the program you were offered a smart thermostat from [IOU] that would be installed in your home. Do you recall this? o Yes o No		x	only if did not respond to Survey 2, only if refused treatment
5 [IF YES] Do you recall why you decided to not receive and install the smart thermostat? o Yes (please explain why) _____ o No o Don't know		x	only if did not respond to Survey 2, only if refused treatment
6 [If yes] How would you rate the usefulness of the instruction you got on your new thermostat? o Extremely useful o Very useful o Useful o Not very useful o Not at all useful		x	only if did not respond to Survey 2, only if refused treatment



Question	Survey 1	Survey 2	Survey 3
7 Is the thermostat [IOU] gave you still installed and working? o Yes o No o Don't know		x	x
8 [If no or don't know] What happened to the thermostat? o Text [skip to end of orange questions]		x	only if did not respond to Survey 2
9 [if yes]Our records indicate that your thermostat is no longer online. Is there anything that has changed that you think may have caused the thermostat to no longer be online? o Text [skip to end of orange questions]		x	only if did not respond to Survey 2
10 In January 2019, you were switched to a new type of billing rate structure for your electric bill. Do you recall this? o Yes o No [Thank and terminate] o Don't know [thank and terminate]		x	x
11 Now that you have been on the time-of-use rate for almost a year, we want to know how likely you'd be to recommend the rate to a friend or neighbor. o extremely likely o somewhat likely o likely o not likely o not very likely			x
12 How satisfied are you with the time-of-use rate overall, compared to the billing structure you were on in 2018, before this pilot? o extremely satisfied o somewhat satisfied o neither satisfied nor unsatisfied o not satisfied o not at all satisfied			x
13 [if less than somewhat satisfied ask] What would have made you more satisfied with the new rate? [free response]			x

Question	Survey 1	Survey 2	Survey 3
<p>** NEW ** [for treatment group] Which of these statements best describe how you used your thermostat over the past year?</p> <p>A. I manually adjusted the temperature whenever I was uncomfortable (use a knob/buttons on the thermostat or in the app as needed)</p> <p>14 B. I programmed the thermostat to certain temperatures for each day and time (rarely changed settings, just kept it on a schedule)</p> <p>C. I enabled the “smart” features to learn my schedule and temperature preferences (let it make adjustments on its own)</p> <p>D. Combination of A and B</p> <p>E. Combination of A and C</p> <p>F. Don’t know</p>			x
<p>[for control group] Which of these statements best describe how you used your thermostat over the past year?</p> <p>A. I manually adjusted the temperature whenever I was uncomfortable (use a knob/buttons on the thermostat or in the app as needed)</p> <p>15 B. I programmed the thermostat to certain temperatures for each day and time (rarely changed settings, just kept it on a schedule)</p> <p>C. Combination of A and B</p> <p>F. Don’t know</p>			x
<p>[If had smart thermostat] How satisfied are you with your Ecobee smart thermostat?</p> <p>16 <input type="radio"/> extremely satisfied</p> <p><input type="radio"/> somewhat satisfied</p> <p><input type="radio"/> neither satisfied nor unsatisfied</p> <p><input type="radio"/> not satisfied</p> <p><input type="radio"/> not at all satisfied</p>			x
<p>[if less than somewhat satisfied ask] What would have made you more satisfied with your Ecobee thermostat? [free response]</p> <p>17</p>			x



Question	Survey 1	Survey 2	Survey 3
18 [If had thermostat] Thinking over the whole past year, was the Ecobee thermostat a useful tool for shifting your energy usage to off-peak, less expensive times? (list hours dependent on utility)? Yes No Don't know			x
19 Why do you say that?			
20 Looking back, what do you wish you knew about the rate before you started on it?			
21 When do you think your household uses the most electricity? a. Morning b. Afternoon c. Evening d. Not sure	x		x
22 When do you think electricity use is highest in your neighborhood? a. Morning b. Early afternoon c. Late afternoon d. Evening/night e. Not sure	x		x
23 Does anyone in your household regularly use any medical equipment that plugs in and uses electricity? a. Yes b. No c. Not sure	x	x	first timers only



Question	Survey 1	Survey 2	Survey 3
24 Does your household have a well? a. Yes b. No c. Not sure	x	x	first timers only
25 Does your household have an irrigation pump? This is different than your standard irrigation system. a. Yes b. No c. Not sure	x	x	first timers only
26 Does your household have a pool pump? a. Yes b. No c. Not sure	x	x	x
27 Does your household have a Jacuzzi, hot tub, or heated pools? a. Yes, but it's shared amongst households b. Yes, just for my household c. No d. Not sure	x	x	x
28 Does your household have any shop equipment such as air compressors or power tools that you use often? a. Yes b. No c. Not sure	x	x	first timers only
29 Does your household have a plug-in electric vehicle charger? a. Yes b. No c. Not sure	x		first timers only

Question	Survey 1	Survey 2	Survey 3
<p>How important is saving electricity to your household?</p> <p>30 a. Extremely important</p> <p>b. Very important</p> <p>c. Somewhat important</p> <p>d. A little important</p> <p>e. Not at all important</p>	x		x
<p>Do you think you do everything you can to save electricity (such as open windows in the summer, line dry clothes, only run full loads of laundry, take shorter showers)?</p> <p>31 a. Always</p> <p>b. Sometimes</p> <p>c. Never</p> <p>d. Don't know</p>	x	x	x
<p>Which of the following would you say keep you from saving more electricity in your home? Which are true for you? (select all that apply)</p> <p>32 a. I don't want to sacrifice comfort in my home</p> <p>b. I don't have time to pay attention to saving electricity</p> <p>c. I have little control over when others in my household use electricity</p> <p>d. Other: _____</p>	x		x

Question	Survey 1	Survey 2	Survey 3
<p>How often do members of your household do any of the following? Choose never, sometimes, always, or does not apply. [Will rotate a-e]</p> <p>In the summer we:</p> <p>a. Turn down or off the air conditioning at night during the summer months</p> <p>33 b. Turn down or off the air conditioning when you leave your home</p> <p>c. Turn off pool heater</p> <p>All year we:</p> <p>d. Turn off lights when not in use</p> <p>e. Turn off electronics like TVs and computers when no one is using them</p> <p>f. Limit showers to five minutes or less</p>	x	x	x
<p>How many thermostats do you have?</p> <p>1</p> <p>2</p> <p>3</p> <p>34 4+</p> <p>Don't know</p> <p>[ask thermostat questions for each thermostat if >1]</p>		x	first timers only
<p>What type of thermostat do you have in your home?</p> <p>a. Manual (use a knob, or lever, or switch to adjust the heating or cooling temperature, cannot program)</p> <p>35 b. Programmable (allows you to set heating and cooling to come on at certain temperatures and even on certain days or times)</p> <p>c. Not sure</p>	x	x	first timers only



Question	Survey 1	Survey 2	Survey 3
<p>36 [If programmable or not sure] Is your thermostat Wi-Fi enabled so that it can be connected to your home's Wi-Fi to take in weather data and adjust temperatures?</p> <p>a. Yes b. No c. Not sure</p>	x	x	first timers only
<p>37 [If programmable or not sure] Is it "smart" meaning that it can learn your behaviors and preferred temperature settings and make adjustments on its own?</p> <p>a. Yes b. No c. Not sure</p>	x	x	first timers only
<p>38 Approximately how old is your thermostat?</p> <p>a. less than 5 years b. 5 to 10 years c. More than 10 years d. Don't know</p>	x	x	first timers only
<p>39 [If programmable or not sure] Did you or someone in your home program your thermostat or are you using the original default settings?</p> <p>a. We programmed it b. We used the standard settings c. It was already programmed when we moved in d. Not sure</p>	x		first timers only
<p>40 Do you have central heating?</p> <p>a. Yes [CENTRAL HEATING=YES] b. No c. Not sure</p>	x		first timers only

Question	Survey 1	Survey 2	Survey 3
41 [If CENTRAL HEATING=YES] What temperature do you set your thermostat at for heating on [a weekday during the day/weekday during the evening/weekend during the day/weekend in the evening (question will be asked four times to cover each time period)] a. __ degrees (will be dropdown menu) b. Not sure	x		x
42 What cooling temperature do you set your thermostat to on [a weekday during the day/weekday during the evening/weekend during the day/weekend in the evening (question will be asked four times to cover each time period)] ? a. __ degrees (will be dropdown menu) b. Not sure	x		x
43 How do you use your AC? a. Only at night. b. Only on very hot days. C. Only when guests are over. D. Only when I/we are home. E. None of the above, we use it at varying times.	x	x	first timers only
44 Does everyone in your household agree on a temperature setting? a. We generally agree b. We disagree on the ideal temperature c. I live alone d. Don't know	x	x	first timers only



Question	Survey 1	Survey 2	Survey 3
<p>[If CENTRAL HEATING=YES] Besides your central heating system, do you use anything else to heat your home? Check all that you use:</p> <p>45 a. portable space heaters b. Fireplace c. Oven/kitchen stove d. Other _____</p>	x	x	first timers only
<p>[If CENTRAL HEATING=YES] When would you typically use [response from prior question, asked for each response]? [will rotate options]</p> <p>46 a. When we don't want to use our central system in order to save money / keep our utility bill lower b. In addition to the main heating system since it doesn't provide enough heat c. Because the main heating system does not work well so we use this instead of the main heating system d. To heat just a limited space or single room where the central system doesn't work well e. Not sure f. Other _____</p>	x	x	first timers only
<p>Besides your central cooling system, do you use or do anything else to cool your home? Check all that you use:</p> <p>47 a. portable fans b. Room AC c. Ceiling fans d. Open the windows e. evaporative cooler / swamp cooler f. Not sure g. Other _____</p>	x	x	first timers only



Question	Survey 1	Survey 2	Survey 3
<p>Which do you think uses the most electricity in your home in the summer? Please rank these from highest electricity use to lowest electricity use. (The order will be randomized for each participant)</p> <p>a. TVs</p> <p>b. Chargers for laptops and cellphones</p> <p>c. Oven</p> <p>d. Stovetop</p> <p>48 e. Refrigerator</p> <p>f. Cooling (AC and/or fans)</p> <p>g. Heating</p> <p>h. Lighting</p> <p>i. Heating water for washing clothes and dishes, and bathing</p> <p>j. pool/spa equipment</p> <p>k. other: (personal/business equipment such as table saws, workout machines, fish tanks)</p> <p>_____</p>	x		x
<p>Which do you think uses the most electricity in your home in the winter Please rank these from highest electricity use to lowest electricity use? (The order will be randomized for each participant)</p> <p>a. TVs</p> <p>b. Chargers for laptops and cellphones</p> <p>c. Oven</p> <p>d. Stovetop</p> <p>49 e. Refrigerator</p> <p>f. Cooling (AC and/or fans)</p> <p>g. Heating</p> <p>h. Lighting</p> <p>i. Heating water for washing clothes and dishes, and bathing</p> <p>j. pool/spa equipment</p> <p>k. other: (personal/business equipment such as table saws, workout machines, fish tanks)</p> <p>_____</p>	x		x



Question	Survey 1	Survey 2	Survey 3
<p>When would you typically use [response from above question, asked for each response]?</p> <p>a. to save money / keep our utility bill lower</p> <p>b. When the central cooling system doesn't provide enough cool air</p> <p>50 c. Because the central cooling system does not work well so we use this instead x</p> <p>d. To cool just a limited space or single room where the central cooling system doesn't work well</p> <p>e. Not sure</p> <p>f. Other _____</p>			first timers only
<p>How are you currently billed for electricity?</p> <p>a. Tiered rate: My rate varies based on how much electricity I use, where I pay more for each unit of electricity I use above a certain amount.</p> <p>51 b. Time-of-use rate: My rate varies based on time of day, where I pay more during the time of day when overall demand for electricity is highest. x</p> <p>c. I don't know</p>			x
<p>How well do you understand how you are billed for electricity?</p> <p>a. Completely</p> <p>52 b. Very well</p> <p>c. Somewhat x</p> <p>d. A little</p> <p>e. Not at all</p> <p>f. Don't know</p>			x



Question	Survey 1	Survey 2	Survey 3
<p>[if NOT SCE]: Do you live in a:</p> <p>a. Single family home – with no shared walls with neighbors</p> <p>53 b. An apartment/townhome/condo where I share walls with a neighbor</p> <p>c. A mobile home or RV</p> <p>d. Other _____</p>	x	x	first timers only
<p>[if NOT SCE, if prior question =B]: How many units would you estimate are in your building?</p> <p>a. 2</p> <p>54 b. 3-5</p> <p>c. 5-15</p> <p>d. 16-50</p> <p>e. 50+</p> <p>f. Not sure</p>	x	x	first timers only
<p>What is the highest grade or year of school that you have completed? ?</p> <p>a. some primary or secondary school</p> <p>55 g. a high school diploma or GED</p> <p>h. some college</p> <p>l. a two-year college degree</p> <p>j. a four-year college degree</p> <p>k. an advanced degree</p>	x	x	first timers only
<p>How many people live in your home 12 months of the year, including any children?</p> <p>a. 1</p> <p>56 b. 2</p> <p>c. 3</p> <p>d. 4</p> <p>e. (scroll option with numbers up to 20)</p>	x	x	first timers only



	Question	Survey 1	Survey 2	Survey 3
57	<p>How many of those people are 18 or under?</p> <p>a. 1 b. 2 c. 3 d. 4 e. (scroll option with numbers up to 20)</p>	x		first timers only
58	<p>Do you have any additional people living with you during the summer for more than a month? This might include college students home for the summer or any other people who come to live with you in the summer.</p> <p>a. Yes b. No c. Don't know</p>	x	x	first timers only
59	<p>How many additional people live with you during the summer, for more than a month?</p> <p>a. 1 b. 2 c. 4 d. 5+</p>	x	x	first timers only
60	<p>Select the income range that best describes your household's 2017 income.</p> <p>a. Less than \$20,000 b. \$20,000 to \$40,000 c. \$40,000 to \$50,000 d. \$50,000 to \$60,000 e. \$60,000 or more f. Don't know g. Decline to state</p>	x	x	first timers only

Question	Survey 1	Survey 2	Survey 3
<p>61 What was your energy cost like this past winter (December 2018 to February 2019)? Would you say they were higher, lower, or about the same in early 2019 as they were the past 2 winters?</p> <ul style="list-style-type: none"> o Higher in 2019 o Lower in 2019 o About the same as the past 2 years (on average) 		x	only if did not respond to Survey 2
<p>62 What was your energy cost like this past spring (March to May)? Would you say they were higher, lower, or about the same in 2019 as they were the past 2 springs?</p> <ul style="list-style-type: none"> o Higher in 2019 o Lower in 2019 o About the same as the past 2 years (on average) 		x	only if did not respond to Survey 2
<p>63 What was your energy cost like this past summer (June to August)? Would you say they were higher, lower, or about the same in 2019 as they were the past 2 summers?</p> <ul style="list-style-type: none"> o Higher in 2019 o Lower in 2019 o About the same as the past 2 years (on average) 		x	only if did not respond to Survey 2
<p>64 [If more or less to winter, spring, summer questions] Why do you think your bills were different this year? [Text]</p>		x	only if did not respond to Survey 2
<p>65 Based on your understanding - energy cost the most during which set of hours in the summer?</p> <ul style="list-style-type: none"> o Morning (1) o Early afternoon (2) o Late afternoon/evening (code time based on IOU [4-9PM for SDG&E, 5-8 for SCE, 3-8 for PG&E- PG&E to confirm) (3) o Night (4) o Not sure (5) 		x	only if did not respond to Survey 2



Question	Survey 1	Survey 2	Survey 3
<p>66 How well do you feel you understand the change from tiered billing to time-of-use rates for your electricity billing (called time-of-use)?</p> <p><input type="radio"/> Extremely well</p> <p><input type="radio"/> Very well</p> <p><input type="radio"/> Somewhat well</p> <p><input type="radio"/> Not very well</p> <p><input type="radio"/> Not at all</p>		x	only if did not respond to Survey 2
<p>67 [If more or less to winter, spring, summer questions] How do you think the new rate system (time-of-use) has affected your energy bills? Do you think that the new rate system you're on has made your bills higher, lower, or had no effect compared to the old way you were billed?</p> <p><input type="radio"/> higher</p> <p><input type="radio"/> lower</p> <p><input type="radio"/> no effect</p> <p><input type="radio"/> it varies</p> <p><input type="radio"/> doesn't know</p>		x	only if did not respond to Survey 2
<p>68 [If more or less to winter, spring, summer questions] How do you think the new thermostat's functioning has affected your ability to control energy bills? Do you think the new thermostat has made it easier, harder, or had no effect on your ability to control your energy bills compared to your prior thermostat?</p> <p><input type="radio"/> harder</p> <p><input type="radio"/> easier</p> <p><input type="radio"/> no effect</p> <p><input type="radio"/> it varies</p> <p><input type="radio"/> doesn't know</p>		x	only if did not respond to Survey 2
<p>69 Do you recall your thermostat ever automatically adjusting to help you save energy and money during the time of day when energy is more expensive [will list utility specific hours]?</p> <p><input type="radio"/> yes</p> <p><input type="radio"/> no</p> <p><input type="radio"/> doesn't know</p>		x	only if did not respond to Survey 2



Question	Survey 1	Survey 2	Survey 3
70 How often did you change how you use energy by personally adjusting your thermostat, to avoid the higher- cost time of day? <input type="radio"/> Often (almost daily) <input type="radio"/> Sometimes (at least once a week) <input type="radio"/> Occasionally (at least once a month) <input type="radio"/> Rarely <input type="radio"/> Never		x	only if did not respond to Survey 2
71 [If occasionally to often] What did you change to avoid the higher cost? [text]		x	only if did not respond to Survey 2
72 <i>Now I want to ask you about some of the features of your thermostat and how you use it.</i>		x	only if did not respond to Survey 2
73 Do have a smart phone or internet connected device? <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know		x	only if did not respond to Survey 2
74 [If yes] How often, if ever, do you control your thermostat using your smart phone or internet connected device? <input type="radio"/> I always control the thermostat using my smart phone or internet connected device <input type="radio"/> I mostly control the thermostat using my smart phone or internet connected device <input type="radio"/> I sometimes control the thermostat using my smart phone or internet connected device <input type="radio"/> I occasionally control the thermostat using my smart phone or internet connected device <input type="radio"/> I never control the thermostat using my smart phone or internet connected device		x	only if did not respond to Survey 2



Question	Survey 1	Survey 2	Survey 3
<p>[If yes] How useful did you find the ability to control your thermostat from your smart phone?</p> <p>75</p> <ul style="list-style-type: none"> <input type="radio"/> Extremely useful <input type="radio"/> Very useful <input type="radio"/> Somewhat useful <input type="radio"/> Not very useful <input type="radio"/> Not at all useful 		x	only if did not respond to Survey 2
<p>ECO+ is a thermostat function that is designed to help save you money when energy costs the most by automatically adjusting the temperature set=point during peak usage times. ECO+ would be displayed on your thermostat to let you know when it's in use.</p> <p>76</p> <p>Is the ECO+ function currently working on your thermostat?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know 		x	only if did not respond to Survey 2
<p>Overall, how much do you think the new thermostat has made it easier or harder for you to adjust to the new time-of-use rate, or has it made no difference?</p> <p>77</p> <ul style="list-style-type: none"> <input type="radio"/> Much easier <input type="radio"/> Somewhat easier <input type="radio"/> No difference <input type="radio"/> Somewhat harder <input type="radio"/> Much harder 		x	only if did not respond to Survey 2
<p>78</p> <p>Why did you say [response from above]?</p> <ul style="list-style-type: none"> <input type="radio"/> Text 		x	only if did not respond to Survey 2
<p>79</p> <p>Have you ever adjusted the thermostat settings from the way they were set up when [IOU] installed the thermostat?</p> <ul style="list-style-type: none"> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know 		x	only if did not respond to Survey 2



Question	Survey 1	Survey 2	Survey 3
80 Now that you have the smart thermostat, do you think you use more, less, or about the same energy? o More o Less o About the same o Don't know		x	only if did not respond to Survey 2
81 [If more] How do you think the smart thermostat helped you save more energy?		x	only if did not respond to Survey 2
82 [If less] How do you think the smart thermostat caused you to use more energy?		x	only if did not respond to Survey 2
83 [If about the same] Why do you think it has not changed the amount of energy you used?		x	only if did not respond to Survey 2
84 Compared to your old thermostat, what do you like more about the new thermostat? [text]		x	only if did not respond to Survey 2
85 Compared to your old thermostat, what do you like less about the new thermostat? [text]		x	only if did not respond to Survey 2
86 Lastly, thinking of any changes you've made in using energy since you started on the new rate, What has helped the most for you to save energy during the peak period of 4 to 9 [will adjust based on IOU] when rates are higher?		x	x



Appendix D: Interim Finds Memo

MEMORANDUM

Date: April 30, 2019

To: IOU Low Income Programmable Communicating Thermostat Time of Use Pilot Study Team

From: Martha Wudka and Sarah Monohon, Evergreen Economics

Re: Interim Findings from first PCT TOU Pilot Study

This memo provides a summary of findings from the first of three surveys sent to participants of the Investor-Owned Utilities (IOU) Low Income Programmable Communicating Thermostat (PCT) Time of Use (TOU) Pilot conducted by Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E).

Each of the three IOUs created slightly different versions of the pilot that utilize treatment and control groups to assess if PCTs are a valuable tool to help low-income customers adjust to TOU rates. Both groups were moved to the TOU rate in the beginning of 2019, and the treatment group received a PCT and education on how to use it.

The first of three surveys was distributed in December 2018 and January 2019. This survey provides a baseline by which to assess if having a PCT has changed the way that low-income customers react to the TOU rates. A second survey will be conducted after participants experience at least two warm weather bills in the summer of 2019. The third survey will be conducted after the completion of the one-year pilot in early 2020. The customer survey results will be paired with an analysis of usage data to validate any changes in usage patterns that may have resulted from the pilot.

This memo includes four sections:

1. Methodology
2. Survey Attrition
3. Baseline Survey Results
4. Interim Findings



III. 1

Methodology

The three IOUs recruited a total of 764 customers into the Low Income Programmable Communicating Thermostat (PCT) Time of Use (TOU) Pilot, letting them know that they would be moved to the TOU rate, and that they may or may not receive a PCT. Evergreen screened and assigned recruited customers into treatment or control groups, and then sent both groups the first survey.

1.1 Screening and Control and Treatment Group Assignment

The IOUs recruited customers who had already participated in a low-income program (see first row of Table 1). Evergreen applied additional screening criteria to the IOU pool of recruits:

- Receive electric service (gas optional);
- Own their home with no plans to move during the study period;
- Have and use central cooling (central air conditioning (AC) or heat pump);
- Not yet be on a TOU rate plan or have a connected PCT; and
- Have wireless internet in their home.

A total of 34 customers were screened out of the initial IOU recruitment pool who did not meet all of these eligibility criteria (for example, six had previously received incentives for PCTs, and one was already on a TOU rate). An additional 36 customers opted out of the pilot prior to Evergreen's analysis. The remaining 695 customers were randomly assigned to the treatment and control groups (Table 1 **Error! Reference source not found.**).

(1) Table 1: Pilot Customer Screening and Assignments

	PG&E	SCE	SDG&E	Total
IOU Recruitment Eligibility	Prior low-income program participation in climate zones 11-14	Prior low-income program participation in climate zones 14-15	Prior low-income program participation	
Customers Recruited	414	174	176	764
Screened Out by Evergreen	25	0	9	34
Opted Out	36		0	36
Control	176	87	84	347
Treatment	178	87	83	348



Prior to the random assignment of customers into the control and treatment groups, we sorted customers into similar categories based on their average load shape in the pre-period and other characteristics. Evergreen used our Advanced Metering Infrastructure Customer Segmentation (AMICS) model framework to identify similar customers and group them together based on their energy usage to improve the matching between the treatment and control groups.

Evergreen created different customer segments for each IOU (listed below) due to the variations in eligibility criteria, sample size, and pre-period load shapes across IOUs. The segments were chosen to minimize the baseline model error (as measured by repeated cross validation holdout tests) and group customers with similar potential for savings from the TOU pricing and/or PCTs, while also minimizing the number of customers isolated by the segmentation method (that is, solo customers without peers to enable a post-period comparison).

- PG&E: 5 daily energy usage (magnitude) groups and 7 normalized load shape clusters (hours-of-use)
- SCE: 2 eligibility categories (i.e., low income program participation) and 11 load shape clusters (magnitude and hours-of-use)
- SDG&E: 2 climate zone groups and 11 load shape clusters (magnitude and hours-of-use)

For PG&E's daily energy usage groups, we assigned customers to one of five bins according to their average daily energy usage in the pre-installation period, such that each bin contained roughly the same total kWh usage. The number of customers in each bin varied, with the highest energy usage bins containing the fewest customers. This binning strategy isolated customers who are atypical, reducing error in the model without removing these customers from the analysis.

The load shape clusters for each IOU were made up of customers with similar hours of use, identified by *k*-means clustering, such that each cluster contained a subset of customers with similar hours of use during the pre-installation period. Cluster analysis is an unsupervised machine-learning algorithm designed to detect patterns in data.¹ The benefit of cluster analysis is that similar customers are grouped automatically from the AMI data, rather than relying on customer characteristics that are often not tracked (or not regularly updated) by the IOU. Some customers have relatively flat load shapes with little change in energy usage throughout the day, while others exhibit a steep increase in energy usage in the morning and afternoon hours until they reach a peak in the evening and drop back down.

Once similar customers were grouped in this manner, the randomized selection between the treatment and control groups could be completed. Specifically, we randomly assigned 50 percent of the customers in each IOU customer segment to the treatment group or the control group. In a

¹The *k*-means clustering algorithm randomly assigns each customer's load shape to one of *k* clusters and then calculates the sum of the distance between each load shape and the centroid (i.e., average load) of the cluster to which it was assigned. Load shapes are then reassigned to the nearest cluster centroid, and the process is repeated until the variation within each cluster cannot be improved.



few cases, we manually shifted customers with no peers (that is, those assigned to a segment with only n=1 customer) to the opposing groups to maintain a balance between the groups. Table 2 provides a side-by-side comparison of the average pre-period energy usage, low-income program participation, and home characteristics based on IOU program, billing and customer information system data.

(2) Table 2: Attributes of Control and Treatment Group

	PG&E		SCE		SDG&E	
	Control	Treat	Control	Treat	Control	Treat
N	176	177	87	87	84	83
Avg. daily kWh	23	24	28	28	19	19
Avg. kWh during peak hours	2.1	2.2	2.7	2.7	1.5	1.5
Avg. summer-shoulder ratio*	1.9	1.9	2.9	2.6	1.7	1.8
Avg. fixed-effects baseline**	0.49	0.49	0.63	0.63	0.42	0.42
% participated in ESA	100%	100%	8%	6%	27%	39%
% enrolled in CARE - late 2018	84%	84%	48%	54%	93%	88%
Avg. home square-footage	1,632	1,712	1,721	1,686	not available	not available
Avg. home built year	1982	1980	1986	1988	not available	not available

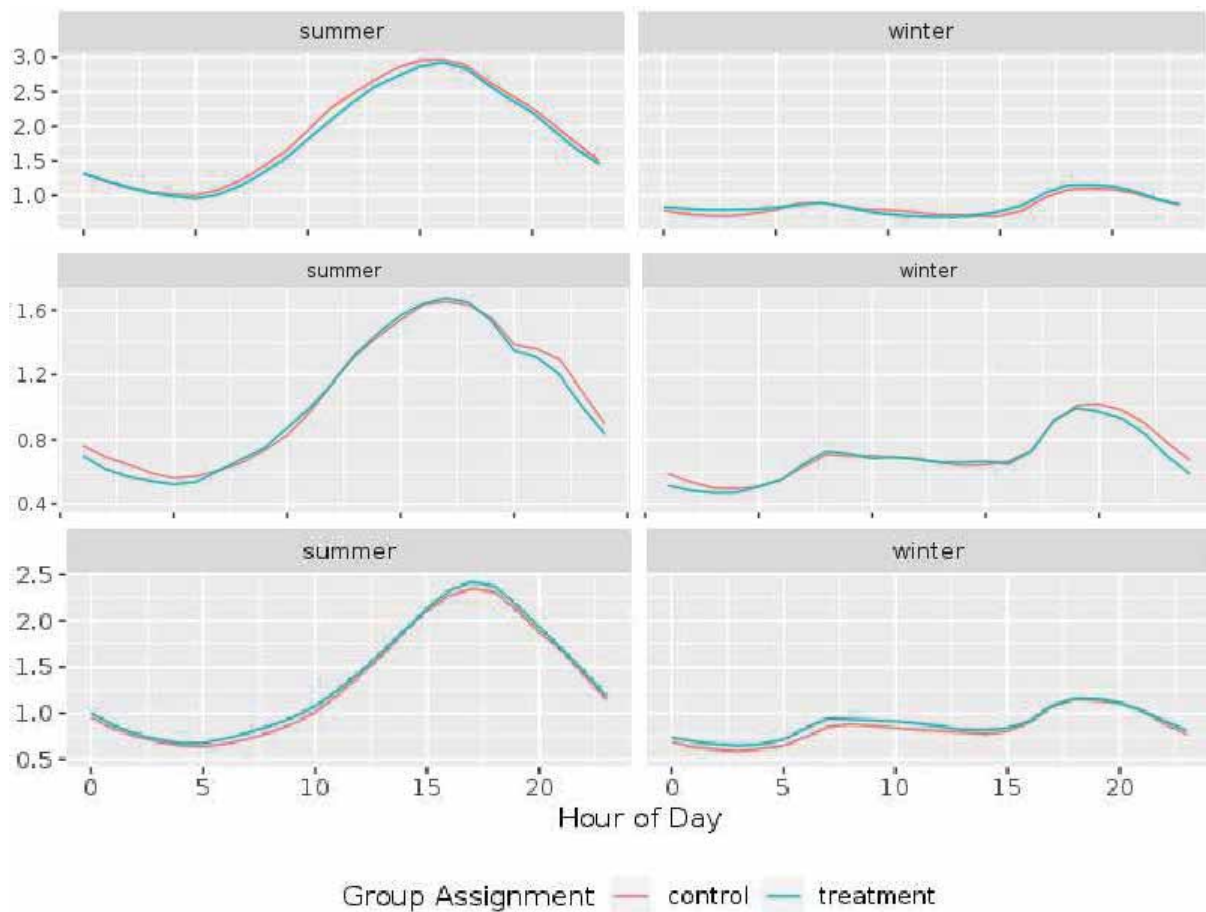
*Average hourly kWh in summer (months 6-8)/average hourly kWh ratio in shoulder months (11, 2-3). The concept is that the larger ratio is indicative of high HVAC usage, and thus more potential savings from a thermostat or AC program.

** Estimated baseline kWh, customer fixed-effects coefficients from a simplistic regression model using a full year of pre-period days (on days with defined temperatures). $kWh \sim \alpha + hdd + cdd$.

Figure 1 shows the average kWh energy usage during the summer and winter months, by customers assigned to the control (pink) versus the treatment (blue) group prior to any program intervention. The overall kWh energy usage (scale) and shape differ across the three IOUs, but in both seasons, the control and treatment groups appear well matched. This is especially important during the summer peak hours, when we expect to see the largest impact from the TOU rates and/or PCTs.



(3) Figure 1: Average Load Shape of Treatment and Control Group by Season and IOU (Top = SCE, Mid = SDG&E, Bottom = PG&E)



1.2 Survey Recruitment

Evergreen sent pilot participants both a postcard and an email that contained a unique link to a web survey before alerting them of their placement in the control or treatment group. We offered an incentive of \$25 to \$50 gift card to either Target or Walmart (varies by IOU) for completing the first web survey.

Table 3 shows the initial IOU incentives along with the incentives planned for the three surveys. Respondents to all three surveys will receive an additional “kicker” incentive in some cases, as shown.

(4) Table 3: Incentives by IOU and Treatment vs. Control Group

	PG&E		SCE		SDG&E	
	Treatment	Control	Treatment	Control	Treatment	Control
Initial IOU Incentive	Thermostat	None	Thermostat	\$100	Thermostat	\$100
First Survey	\$50	\$50	\$25	\$25	\$25	\$25
Second Survey	\$50	\$50	\$25	\$25	\$25	\$25
Third Survey	\$50	\$50	\$25	\$25	\$25	\$25
Survey “Kicker”	\$50	\$50	N/A	N/A	\$25	\$25
Final Incentive	N/A	N/A	N/A	\$100	N/A	N/A
Total Possible Incentive	\$200	\$200	\$75	\$275	\$100	\$200

A total of 286 pilot participants responded to the initial web survey (Table 4). Across all three IOUs, the average response rate was 54 percent.

(5) Table 4: Number of Respondents to First Survey

		PG&E ²	SCE	SDG&E	Total
Control and Treatment Assignments	Control	176	87	84	347
	Treatment	178	87	83	348
Respondents	Control	66	34	55	155
	Treatment	53	29	49	131

²The total number of surveys sent to PG&E pilot participants was lowered to 191 after 163 respondents who did not return a participation waiver were dropped from the pilot.



2 Attrition

Between the time that customers were recruited to the pilot and the time they were assigned to the treatment or control group, half³ (51%) of the treatment group left the pilot. In this section we explain the reasons for this attrition from data provided by SCE and SDG&E.

The most common reason for the attrition of treatment group customers was that they stopped responding to follow up outreach from the pilot installation staff (18%) as shown in Table 5. Another fifteen percent of recruited pilot participants requested to cancel participation and 10 percent could not install the PCT due to incompatible wiring or HVAC equipment.

(6) Table 5: Post Recruitment Attrition for Treatment Group (SCE and SDG&E)

	Percent of Treatment Group (n=170)
Completed PCT installation	49%
Did not move forward with pilot participation	51%
Did not respond to follow up communications	18%
Requested to cancel participation	15%
Equipment proved to be incompatible (wiring, HVAC)	9%
Already has PCT	5%
To be identified at a later date	5%

Table 6 expands upon the 15 percent of treatment group customers who requested to cancel participation. Amongst this group, the most common response (36%) was that they decided that they did not need a smart thermostat. The group that did not think they needed a thermostat reported that they “just like the regular one [they] have,” that they “don’t see the point when [theirs] works just fine.” Twenty percent were uninterested due to their age or health condition.

³ Note that PG&E attrition data will be included at a later date. This section currently covers both SCE and SDG&E.



(7) Table 6: Reasons for Request for Cancellation from Treatment Group (SCE and SDG&E)

	Percent (n=25)
Does not need a PCT	36%
Elderly or health related reason	20%
Moving	8%
Too complicated/tech averse	8%
Other/Unknown	28%

Part of the value of this pilot is understanding interest in this program amongst the targeted (low-income) population. Some of the attrition issues are valuable for future program consideration and some are irrelevant (such as moving between the time of recruitment and the pilot start date).

Attrition issues that should be considered for future program design are:

- Incompatible equipment in households (9% of treatment group customers);
- A general lack of desire for a PCT (9% of treatment group customers); and
- Elderly or health related reason for disinterest (5% of treatment group customers)

The attrition of pilot participants (which happened while the first survey was in the field) will also affect the ability to use results from this survey as a baseline going forward. Only 38 percent of the treatment group customers who took the initial survey stayed in the pilot. This means that Evergreen's results for the treatment group participants will only be able to be tracked overtime for a portion of the survey respondents.

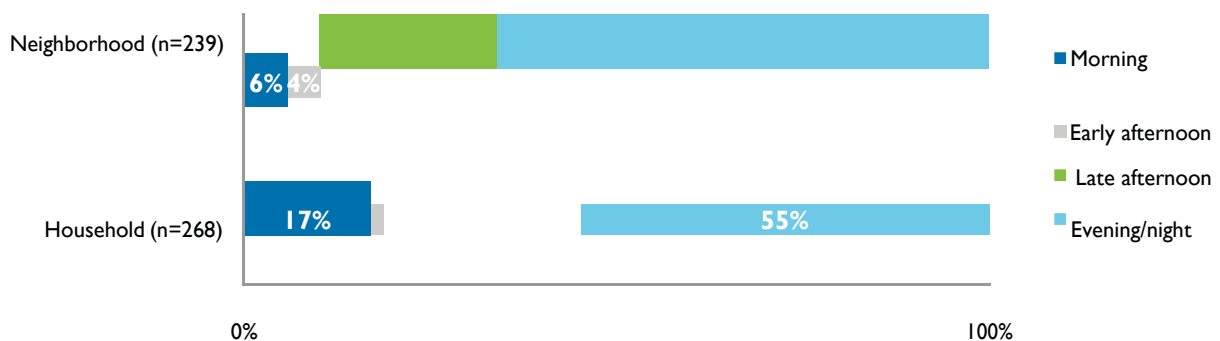
3 Baseline Survey Results

As mentioned previously, the first web survey of pilot participants provides baseline data on low-income customer perceptions of TOU rates and thermostat features, and their ability to reduce energy usage.

3.1 Perceptions of Time of Use and Rates

Customer awareness of when their energy usage is highest is important to the overall concept of TOU rates. We asked respondents when they think *their household* uses the most electricity, and then when electricity use is highest in *their neighborhood*. Excluding those who responded “not sure,” the majority (55%) of respondents thought they used the most electricity in the evening. A greater fraction of respondents (66%) thought that their neighbors used the most electricity in the evening. This may indicate that a small fraction of respondents (11%) believe they are using electricity off-peak. At the end of the pilot we will compare survey responses to usage data to see if they are in fact more likely to use electricity off-peak.

(8) Figure 2: When Respondents Think Household And Their Neighborhood Uses The Most Electricity (excluding “not sure” responses)



Respondents completed a ranking exercise for which they were given a randomized list of energy-using equipment to drag and drop in order of highest energy usage (with 1 being the highest, and 10 being the lowest). Cooling and heating were ranked as using the highest amount of energy, and chargers and the oven and stove were ranked as using the least amount of energy, according to respondents (Table 7), indicating they have a good understanding of the major energy-using end uses in their homes.

(9) Table 7: Respondent Ranking of Energy Using Equipment From Highest to Lowest

Equipment	Mean
Cooling (n=273)	2.7
Heating (n=261)	4.0
Clothes washer/clothes dryer (n=273)	4.1
Refrigerator (n=273)	4.2
Lighting (n=273)	5.2
Water heating (n=273)	5.6
TVs (n=273)	5.6
Pool/spa equipment (n=45)	5.7
Oven/stove top (n=273)	6.5
Chargers (n=273)	7.6

3.2 Thermostat Features and Settings

Households often include multiple occupants who may or may not agree on the ideal temperature. Of the respondents who live with others (80%), 81 percent say that all occupants agree on the thermostat settings. The average air conditioning set point is 74 degrees (consistent across time of day), while average heating temperature set points varied very slightly between daytime (67 degrees) and evening (68 degrees).

On average, each household had 1.1 thermostats (n=278), with almost all respondents with multiple thermostats living in a single-family home. Having at least one thermostat was a qualification for participation in the pilot. The most thermostats any household had installed was three. Respondents reported that 71 percent of existing thermostats were programmable, 26 percent were manual, and 6 percent of thermostats were of an unknown type.

To assess customer understanding of thermostats, we asked respondents with programmable thermostats if their programmable thermostats were Wi-Fi enabled “so that it can be connected to a home’s Wi-Fi to take in weather data and adjust temperature” or if it was “smart meaning that it can learn behaviors and preferred temperature settings and make adjustments on its own.”

Eleven percent of respondents with programmable thermostats reported that their existing thermostats were “smart;” 13 percent reported that they were Wi-Fi enabled (i.e., PCT). This indicates that there may be some confusion from customers (since PCTs were supposed to be screened out during the initial phone outreach), and that some respondents are not clear on the capabilities of their thermostats.



At least six of the respondents reported that thermostats that are “smart” are over five years old, and at least two of the respondent reported that thermostats that are Wi-Fi enabled are over 10 years old, indicating there is confusion on the customer side as to which thermostats denote eligibility for programs, since these technologies were not available ten years ago. Future outreach to potential pilot participants must include very clear information and descriptions of technologies to avoid any confusion among recruits. This will save time spent visiting ineligible homes for installation.

3.3 Reducing Energy Usage

Respondents were asked if they had certain equipment that may contribute to excessive electricity usage, or non-discretionary uses. This may impact how they choose to cut back during peak hours (if at all) in response to the new TOU rate. The decision to cut back electricity use might be a difficult one to make for customers who have medical equipment that needs to be powered.

(10) Table 8: Unique Equipment in Household

Energy Using Equipment	Percentage of Respondents (n=285)
Medical equipment that plugs in and uses electricity	16%
Household Jacuzzi, hot tub, or heated pool	12%
Pool pump	11%
Well	8%
Irrigation pump	1%

We asked respondents about how important it is for their household to save electricity. This metric will be compared to future surveys to see if respondents perceive saving electricity to be more or less important after participating in a full year of the pilot study. Just above half of the respondents reported that saving electricity is “extremely important” to their household. An additional 38 percent reported that it was “very important,” with just one respondent noting that it was “a little important.”

We also asked respondents what keeps them from saving more electricity in their home. This question will allow Evergreen to compare responses across the next two surveys to see if perceived barriers to saving electricity changes after pilot program participation. Respondents provided a number of reasons that they are unable to save more electricity in Table 9. Note that the first three responses listed in the table were prompted, while the other responses are categories of unprompted write-in responses. Fewer than three percent of respondents reported having trouble saving energy because of either heating, building envelope issues, being elderly, being home during the day, or using the dryer rather than a clothesline.



(11)

Table 9: What Keeps Respondents From Saving More Electricity In Their Homes (multiple responses allowed)

	Percentage of Respondents (n=285)
Comfort (prompted)	43%
Control over others in the household (prompted)	33%
Do not have the time to pay attention to saving energy (prompted)	6%
AC-related	4%
Health	3%
Heating-related	3%

Another important baseline measurement is how respondents assess their efforts to save energy. We asked participants if they think they do everything they can to save electricity. Forty percent of respondents reported that they always do everything they can to save electricity (Table 10), but the remaining 60 percent of respondents believe there is more they could be doing. Future surveys will ask this question again to see if respondents still feel the same after pilot participation.

(12) Table 10: Do Respondents Do Everything They Can To Save Electricity?

	Percentage of Respondents (n=285)
Always	40%
Sometimes	56%
Never	2%
Not Sure	1%

In order to be able to assess how valuable the smart thermostat is in helping customers adjust to time of use rates, we first asked about heating and cooling practices *before* the pilot. All pilot participants were required to have a central AC, and 95 percent reported having central heating. We asked respondents about what type of other heating and cooling devices they use to supplement their central systems.



Nearly 30 percent of respondents use portable space heaters to supplement their central heating system (Table 11). Across each of the top four supplemental heating types, respondents reported that the most common reason for using the supplemental heating source is when they do not want to use their central system in order to save money/keep their utility bill lower. Six percent of respondents with portable space heaters use them in the bathroom after showering. Those who use the oven or stove noted that they choose what type of meals to make based on the weather to benefit from the indirect heating that cooking produces.

(13) Table 11: Supplemental Heating Usage

	Percentage of Respondents (n=285)
Portable space heater	28%
Gas fireplace	13%
Wood fireplace	11%
Oven/stove	2%
Wood stove	2%
Electric fireplace	1%

Respondents report using central AC minimally, even though many are located in climate zones with very hot summers. When given four options regarding when they use their AC, 50 percent reported that they only use it on very hot days. These are often days where supply becomes critical, meaning these customers have potential to lower peak usage to help with high load days. Twenty-nine percent of respondents said that it varies, suggesting that there may be room to shift usage after the transition to TOU rates for some pilot participants.

Low usage of AC may be related to the high usage of supplemental cooling methods, the most popular of which was ceiling fans (Table 12632 12). When asked why these cooling strategies were used, the most common response chosen across the board was “to save money/keep our utility bill lower.” In some cases, the method was used to supplement the cooling system or to get air circulating in the house.

(14) Table 126: Supplemental Cooling Usage*

	Percent of Respondents (n=285)
Ceiling fans	67%
Portable fans	57%
Open the windows	50%
Evaporative cooler/swamp cooler	7%
Room AC	6%
Whole house fan	1%
Evaporative cooler	0%

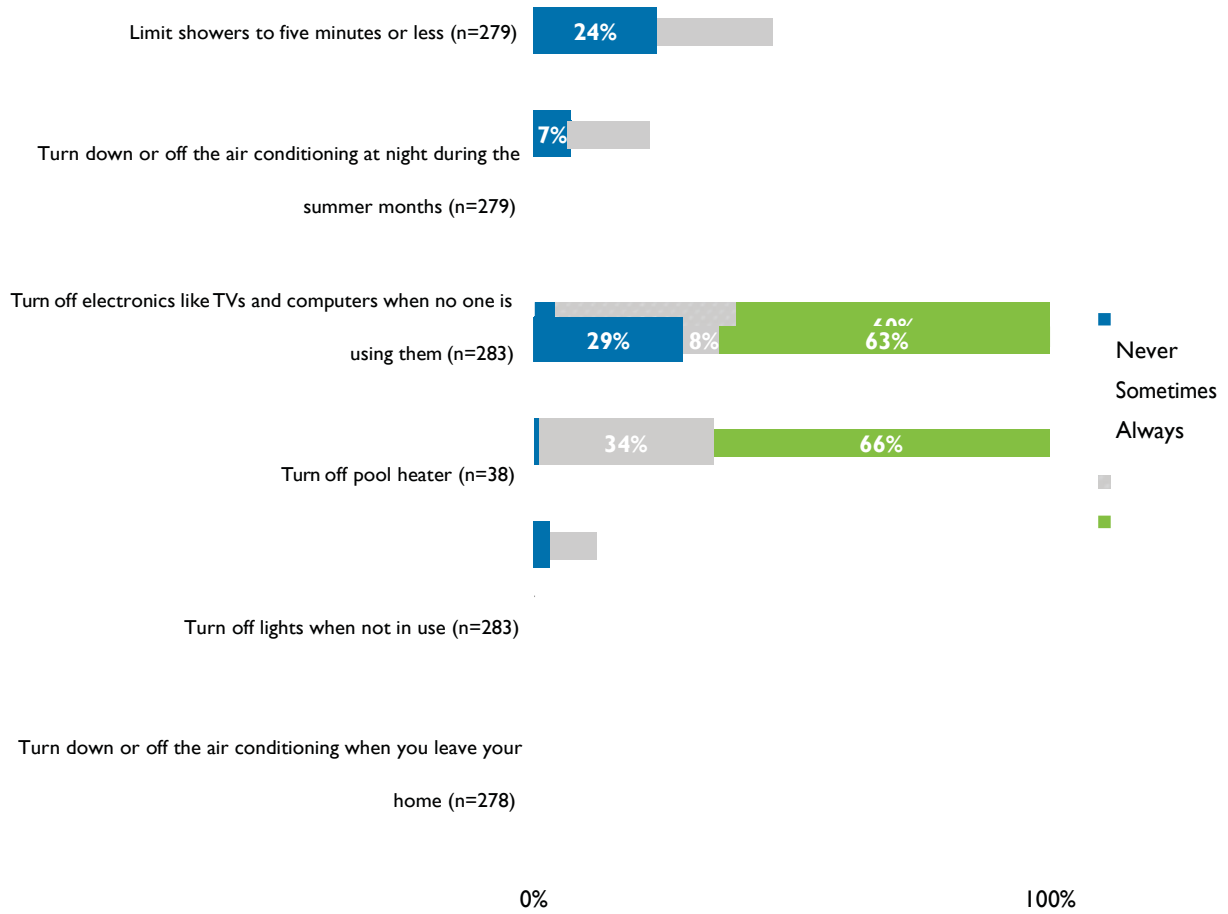
*Multiple responses allowed

We also asked respondents about behavioral energy efficiency actions that they could take and how often they do them. We expect that participants may take some of these actions in response to the application of the TOU rate, so this will be used as a baseline to see if energy efficiency behaviors change after the transition to TOU. There appears to be room for increased energy efficiency behaviors based on how often respondents take certain actions. Nearly 30 percent of respondents with their own pool never turn off the heater, and close to 50 percent of respondents always turn their AC down or off at night during the summer, leaving room for improvement for the remaining 50 percent of respondents.



(15)

Figure 3: Prompted Energy Efficiency Behavioral Actions Taken By Respondents (excludes 'does not apply')





4 Interim Findings

The baseline survey data provides information regarding how low-income customers currently view their energy usage and implications for future implementation of the program.

In designing a full-scale program, staff should be aware of barriers to participation including general lack of interest in PCTs, incompatible equipment in homes, and elderly or health related reasons for disinterest in the PCT offering.

Sixty percent of respondents think there is more they could do to save electricity but the possibility of AC savings may not be realized, given that 50 percent of respondents reported that they only use their AC on very hot days. Supplemental cooling is very popular, and survey respondents were very accustomed to turning on fans instead of using air conditioning.

Appendix E: Detailed Methods



Rebalancing the Control Group

The original balance of the treatment and control assignments did not remain intact due to lack of transition to a TOU rate, home wiring incompatibility with the Ecobee PCT, or customer refusal to allow installation. In order to estimate program impacts, it was necessary to rebalance the treatment and control groups with the remaining customers. Customers that were assigned to the treatment group but did not install an Ecobee PCT (group 3) were systematically different from the rest of the treatment group, and could not be incorporated into the control group.

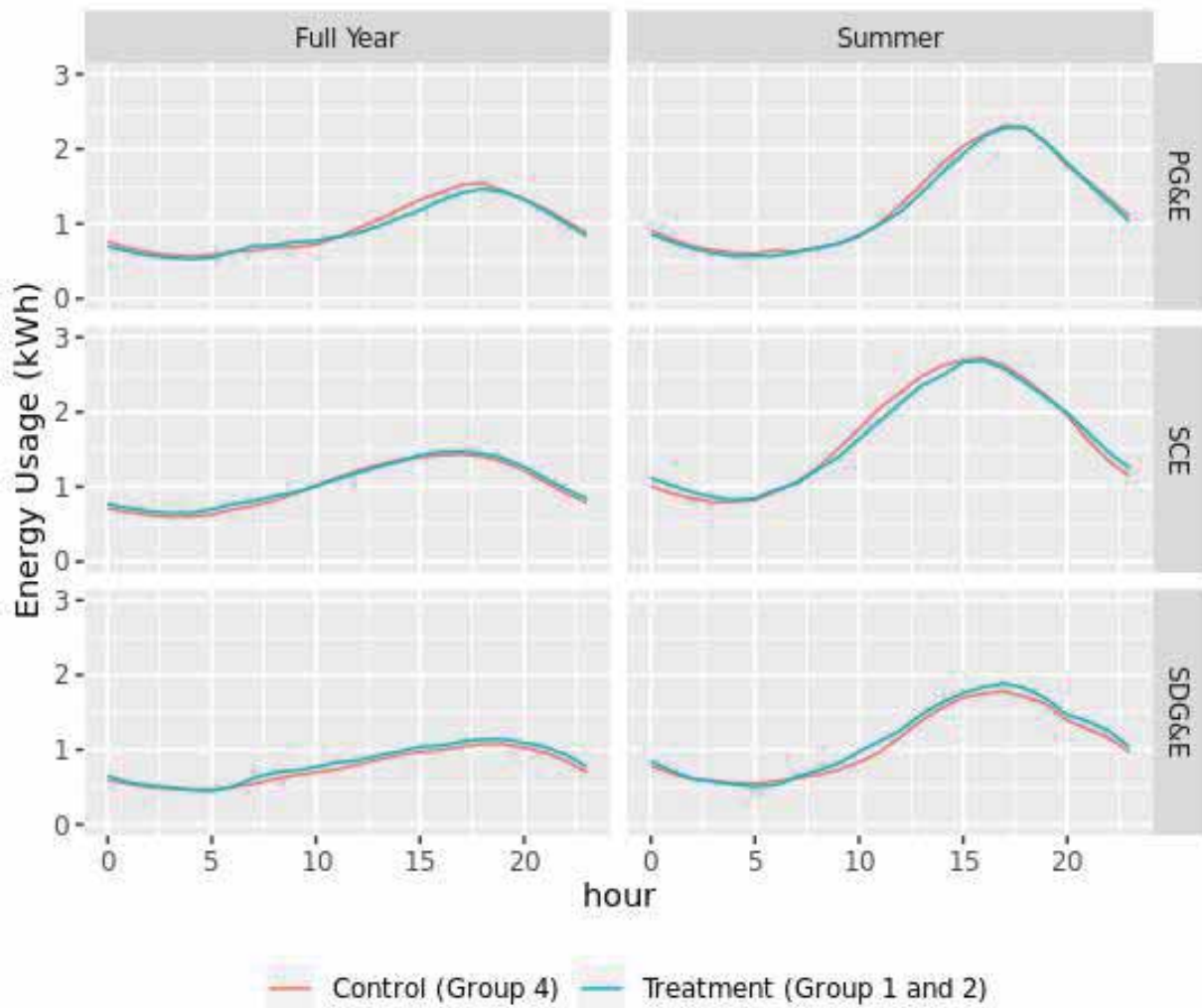
A matching algorithm was utilized to identify a subset of the control group (group 4) that appears similar to the treated customers with thermostats installed (groups 1 and 2) prior to the start of the pilot. The algorithm utilized a year of pre intervention data for each customer (prior to TOU activation date for group 4 and prior to the first intervention, the TOU activation or Ecobee installation). Each customer's average hourly consumption was determined for the full year and summer months only. This resulted in a profile of 48 hourly average consumption values (24 annual and 24 summer) for each customer.

Within each of the IOUs, each customer profile from groups 1 and 2 was compared to every profile within group 4; the sum of squares between the comparison 48 observations was calculated. A treatment customer's matched comparison is that with the lowest sum of squares. This results in matched comparisons that have similar usage over the course of the year, with additional focus on the summer months. All but four customers in the treatment group had at least one well-matched comparison site in the control group.⁴ These customers had high summer peak consumption or Net Energy Metering (i.e., onsite generation offsetting consumption) that were not observed in any of the available controls.

The output of this work is a "matched comparison" group that will be used for analysis, rather than a randomized control group. The matched comparisons broken out by IOU are shown in Figure 106.

⁴ An "adequate" match was defined as a pair with a sum of squared-errors less than 25. Four of the customers treated by SCE did not have any comparable customers in the control group with post-period data. There were comparable customers in the control group during the assignment process, but by chance, all of them dropped out of the pilot or were not transitioned to the TOU rate.

(16) Figure 10: Average Load of Treatment Group and Matched Comparison



Details on AMICS Segmentation and Regression

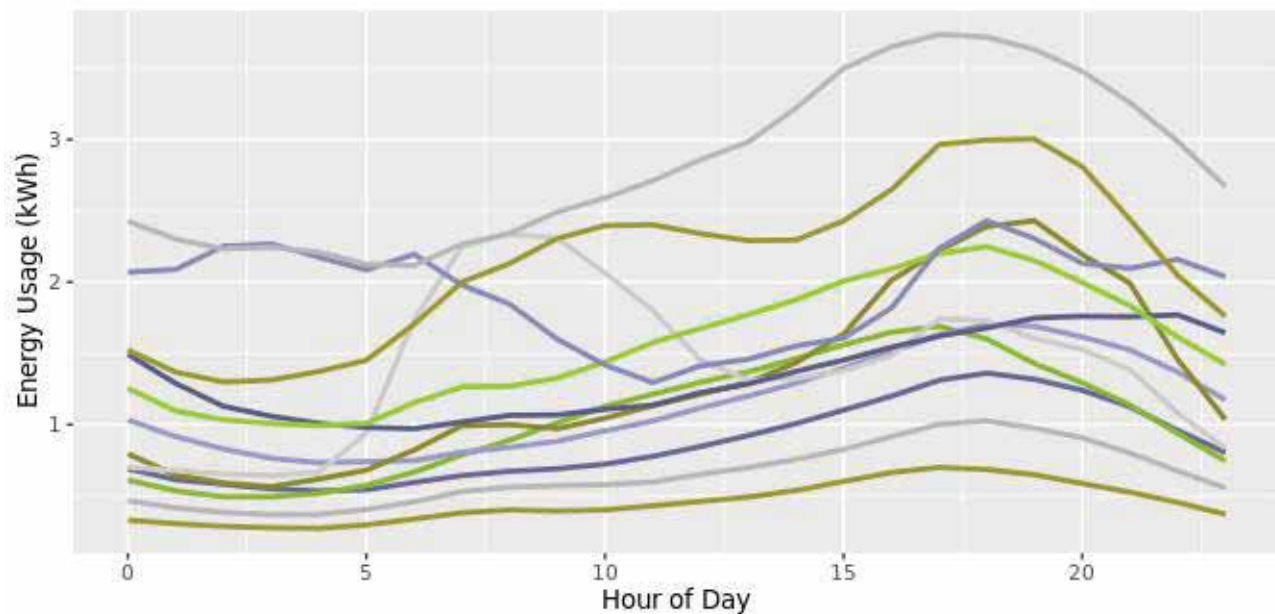
Segmentation

A key step in the AMICS modeling process is segmenting customers based on the pre-period billing data. Similar customers are modeled together, increasing the number of observations within each bin. The additional observations improve the model's ability to separate out signals in energy usage from simple random noise.

The most successful customer segmentation approach Evergreen identified for the pilot across all three IOUs was segmenting by average annual load shape (magnitude and hours of use) during the pre-period. Evergreen used *k*-means clustering to identify the 12 unique load shape clusters shown in **Error! Reference source not found.**, each containing a subset of residential customers from PG&E with similar load shapes during the pre-period. Cluster analysis is a machine-learning

algorithm designed to detect patterns in data.⁵ The benefit of cluster analysis is that similar customers are grouped automatically from the AMI data rather than relying on customer characteristics that are not typically tracked (or not regularly updated) in utility databases. These load shape clusters help account for the differences in occupant schedules, energy-intensive equipment, peak demand hours, and other factors.

(17) Figure 11: PG&E Load Shape Clusters



For SDG&E, Evergreen further segmented by climate zone. The building climate zones defined by the California Energy Commission may help to control for differences in the typical climate (including temperature, humidity, and wind) as well as housing stock (e.g., building type, vintage, existing equipment).⁶

In addition to the segmentation schemes described above based on customer characteristics, each day of the study period is also categorized in terms of its weather, day type, and season.

The weather bins are created by calculating cooling degree hours (CDH) for each hourly observation using a base temperature of 65 degrees Fahrenheit, and then taking the average of these hourly values to create a single cooling degree-day (CDD) value for each customer on each

⁵The *k*-means clustering algorithm randomly assigns each customer's load shape to one of *k* clusters and then calculates the sum of the distance between each load shape and the centroid (i.e., average load) of the cluster to which it was assigned. Load shapes are then reassigned to the nearest cluster centroid, and the process is repeated until the variation within each cluster cannot be improved.

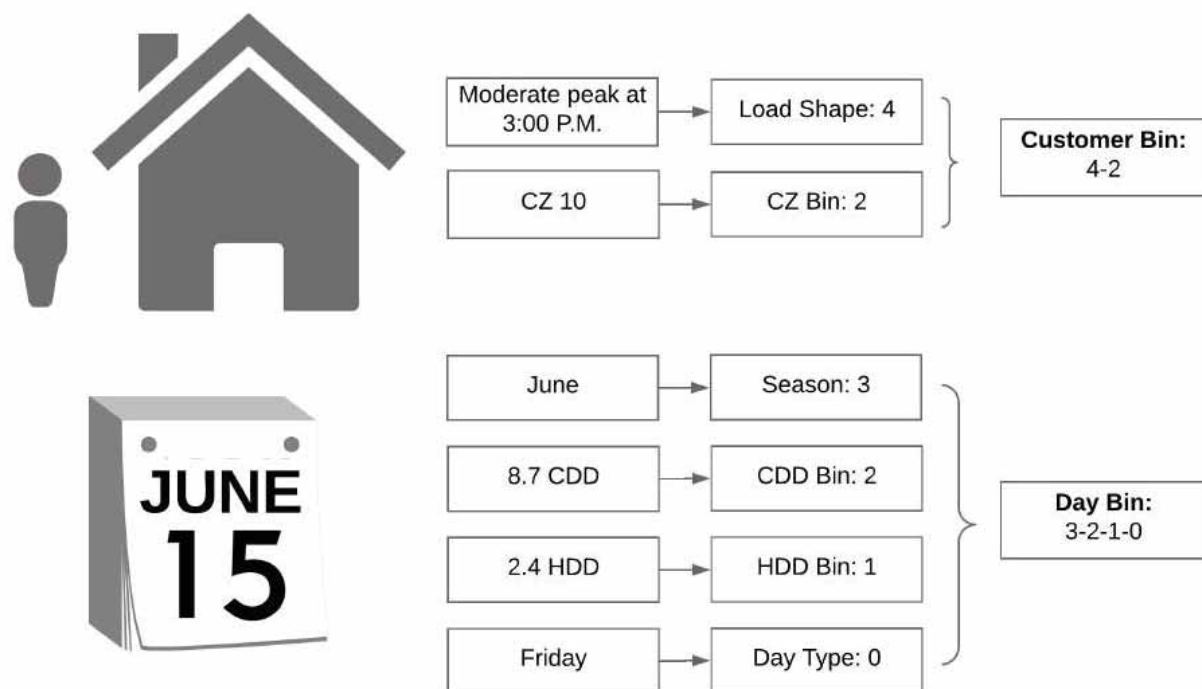
⁶A description of the CEC climate zones can be found at https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

day (i.e., each “customer-day”) in the study period.⁷ These customer-days are assigned to a series of bins, each containing a range of six CDDs. This process is repeated to assign days to heating degree-day (HDD) bins, again using a base temperature of 65 degrees Fahrenheit. Segmenting days by their CDD and HDD in this manner explicitly incorporates temperature into Evergreen’s model.

To control for the differences in energy usage across days with the same weather conditions, Evergreen also binned by day type and season. Weekends were assigned to day type 1, and weekdays were assigned to day type 0. The four seasonal bins are defined as winter (December- February), spring (March-May), summer (June-August), and fall (September-November).

Error! Reference source not found. provides an example of a single customer and day being binned. Each customer was assigned to just one customer bin, but because temperature and day type changes throughout the year, each customer has customer-days that were assigned to many different bins.

(18) Figure 12: Customer-Day Segmentation Example



⁷ A cooling degree-day (CDD) is a metric designed to measure the demand for energy required to maintain a comfortable temperature inside a building. It represents the number of degrees that the outdoor temperature exceeded an assumed baseline (in this case, 65°F), averaged across all hours in the day. By calculating this metric from hourly temperatures instead of daily averages, we can identify days that require some cooling during peak hours as well as heating in the early morning or evening.



The segmentation process has the following benefits for the pilot evaluation:

- Variation in CDD is controlled for in the bins so it does not need to be included as a variable in the model specification; the same is true for all other binning factors.
- Modeling customer-days allows Evergreen to exclude individual days from the database (e.g., demand response event days). Rather than limiting the analysis to customers with flawless data throughout the study period, Evergreen removes specific days with less than 24 consecutive hours of billing and weather data.
- Participants with no post-period observations are still useful when constructing models of the pre-period because they are simply a series of customer-days. These pre-period observations improve Evergreen's ability to produce reasonable load shape predictions for other customers in the same segment that do have post-period observations. Later in the analysis, customers with no post-period observations are automatically excluded from the impact estimates.

Baseline Load Shapes

Once the data were segmented, the AMICS model estimated an ordinary least squares (OLS) regression model for each customer-day bin, as shown in **Error! Reference source not found.**, with a single dummy variable for each hour of the day.

(19) Equation 1: AMICS Regression

$$kWh_{i,t} = \beta_{0i}H_{00,i,t} + \beta_{1i}H_{01,i,t} + \beta_{2i}H_{02,i,t} + \dots + \beta_{23i}H_{23,i,t} + \varepsilon_{i,t}$$

Where :

$kWh_{i,t}$ = Energy consumption, for customer in bin i during hour t

H_{00}, H_{01}, \dots = Array of dummy variables (0,1) representing the hour of the day

$\beta_{0i}, \beta_{1i}, \dots$ = Coefficients estimated by the model, for customers in bin i

ε = Random error, assumed normally distributed

Unlike a traditional fixed effects regression model, which estimates a single set of slope coefficients for all customers and a y-intercept specific to each individual customer, the regression modeling approach employed by the AMICS model estimates a full unique set of slope coefficient estimates for each customer segment (i.e., climate zone and load shape cluster) for each day bin (weather and day type).

b) Computing Standard Errors

In the AMICS approach, Evergreen estimate individual regression models for thousands of customer-day segments, providing a kWh energy usage prediction for each hour.

Because the AMICS model is estimated using the pre-period data, Evergreen computed the relative variance for each hour of the day for each customer-day bin as the ratio of the variance to

predicted hourly kWh usage. These relative variances are then applied to the post-period data to create confidence intervals for the model predictions of each hour of each customer-day in the post-period. With 24 hours per day and thousands of customer-day segments, Evergreen computed over 24,000 confidence intervals. For aggregated predictions, such as the annual and seasonal post-period load shapes, Evergreen used bootstrapping to estimate the relative variance for each hour, accounting for variation in the number of observations and relative kWh represented by each customer-day bin.

Any bias in the AMICS model predictions detected in the holdout validation test will be reflected in the error bounds on the predictions of post-period energy use and the corresponding savings estimates.