

The Story Behind the Bill: User Experience Results to Support Quantitative Analysis of Bill Salience Reductions

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ABSTRACT

Programs that provide information and behavioral “nudges” to help customers reduce their energy consumption have become a mainstay of residential energy efficiency portfolios for over a decade. Academic research has shown that receiving a utility bill can have a similar effect, leading to average energy savings on the order of 0.6-1% in the days following the receipt of a bill. This previous research was unable to disaggregate impacts between customers who receive and pay their bills in different modes, such as email vs. mailed paper bills, and autopay vs. mailing in a check due to lack of data. We conducted a study to replicate these results and disaggregate customer responses, but also assess the underlying mechanisms through follow-up qualitative research. The quantitative analysis of this project (Close, Dinsmoor, and Rustamov 2021) found that an average bill salience impact of 0.2% existed, but varied widely among customer groups. Two dimensions stood out as correlated with impacts: customer engagement with the billing and payment process (receipt of a paper bill vs. electronic bill and/or actively paying vs. autopay), and income.

To understand more about the drivers of this result, we conducted usability tests on customers who received paper bills to understand how residential utility customers interact with their energy bill, and to identify what improvements, or what additional offerings, would make the bill more salient in reducing energy consumption. The objectives of this research were to understand the overall salience of bill for customers, understand customer behaviors upon receiving a bill and identify opportunities for improving the bill pay experience.

Introduction

This report details the methodology and findings from two complementary phases of research undertaken to help Southern California Edison (SCE) understand bill salience for its residential energy customers: a quantitative analysis using statistical techniques to detect bill salience effects across customers (represented in Close, Dinsmoor, and Rustamov 2021), and a set of user experience interviews to provide greater insight into the human drivers of reduced consumption attributable to receiving a bill.

This research set out to answer key questions related to bill salience effects, or changes in energy usage following the receipt of a bill, including whether a measurable bill salience effect exists for SCE customers and, if so, how large it is, how long it lasts, and for whom. The incorporation of qualitative user experience interviews also allowed us to delve further into residential customers’ bill-related practices to provide insight into what elements of the bill may be particularly instrumental in any potential bill salience effects.

Taken together, the findings from both arms of this research effort allow us to better understand what elements of a utility bill are salient and which groups of customers experience different effects, shedding light on areas of opportunity to increase energy savings.

Previous Research

The most relevant research regarding bill salience effects comes from Gilbert and Zivin (2014). The authors found that there was an average decrease in customers' usage after they received a utility bill. That study, however, is limited by the inability to analyze the data by whether bills were sent by mail or email, or if customers paid through an automatic bill pay channel or another method. Arguably, when studying bill salience, these details about the bill must be known in order to understand how responses differ based on these factors and thus what the nature of the effect is.

This is highlighted by the finding in a study by Sexton (2015) that automatic bill payment (ABP) increased residential electricity consumption by 4% for a publicly owned electric utility. The importance of payment channel is also highlighted in DNV GL's research for the California Public Utility Commission (CPUC) on PG&E residential customers in which they found that customers who enrolled in ABP or Budget Billing (BB) programs have higher energy usage than other customers. That study, however, noted this increase in energy usage was mitigated for customers enrolled in Home Energy Report (HER) programs. Home Energy Report programs provide customers with information about energy usage (price and quantity); therefore, the provision of this information seems to be important.

The importance of information for moderating potential salience effects is supported by a randomized control trial studied by Jessoe and Rapson (2014) that mixed increases in prices during an event period with information provided by an in-home display (IHD). The authors of that study were interested in understanding the price elasticity of electricity consumers and asked if the lack of complete information made consumers appear inelastic to price or if consumers actually were price inelastic. They found that relative to the control, residential electricity customers who were exposed to information feedback via their IHDs during an increased pricing event exhibited an 8-22% decrease in energy usage in that event period, whereas households who only experienced the price increase reduced demand by 0-7% during pricing events (households in both treatment groups were informed of upcoming price increases via email, voicemail, or text message). Thus, with real-time information, households became more elastic to price. Furthermore, they found that the treatment effects spilled over into non-event hours and days as customers formed conservation habits.

Timing of the bill has also been investigated as an important factor in energy demand. Households in Germany receive their energy bills just once a year, in contrast to monthly billing in the United States. A recent study by Singhal (2020) found that German households used less energy for heating annually if their bill preceded the winter heating season as compared to households that were billed during off-winter months.

The above evidence suggests that timing, program enrollment, payment channel, and information feedback are important considerations for bill salience research.

Summary of Quantitative Results

Through the use of analytical approaches using advance metering infrastructure (AMI) data and SCE's customer data, we were able to identify whether a decrease in energy use is occurring following bill receipt, for how long and for whom, and under what conditions. The overall approach we used was to analyze energy usage following the receipt of a bill relative to energy use preceding the bill to understand the nature of any energy reduction and how it varies across customers.

This analysis used statistical techniques to detect whether customers' energy consumption after receiving a bill was lower than it was before receiving the bill, controlling for other key drivers of consumption, such as temperature. Using AMI data for nearly 22,000 residential customer, we estimated these energy usage changes using a within-subject modeling approach to provide estimates for each unique account and bill combination. That is, we used a treatments effects model that included each week immediately prior to a statement date and each 10-day period immediately after a statement date to estimate the reduction in energy consumption after a bill was created. After joining a series of metadata for each account, the research team identified key variables correlated with these estimates across all customers using machine learning techniques. Then, we performed an impact segmentation analysis to understand the differences between these groups of customers and quantify bill salience estimates within various subgroups of customers or time periods.

Overall, our models found that on average there is a positive bill salience impact of approximately 0.18% in the 10 days after the statement is created. The savings vary by post day, with the highest savings occurring on the 6th and 7th day after a statement is created, as shown in Figure 1. These savings primarily occur overnight. The pattern of daily savings is surprisingly consistent across groups of customers with differences in magnitudes and slight differences in overall shape, but no major deviation from the overall pattern between customer groups. This is surprising given that the amount of time it takes for a bill to reach customers likely varies between electronic and paper delivery mechanisms.

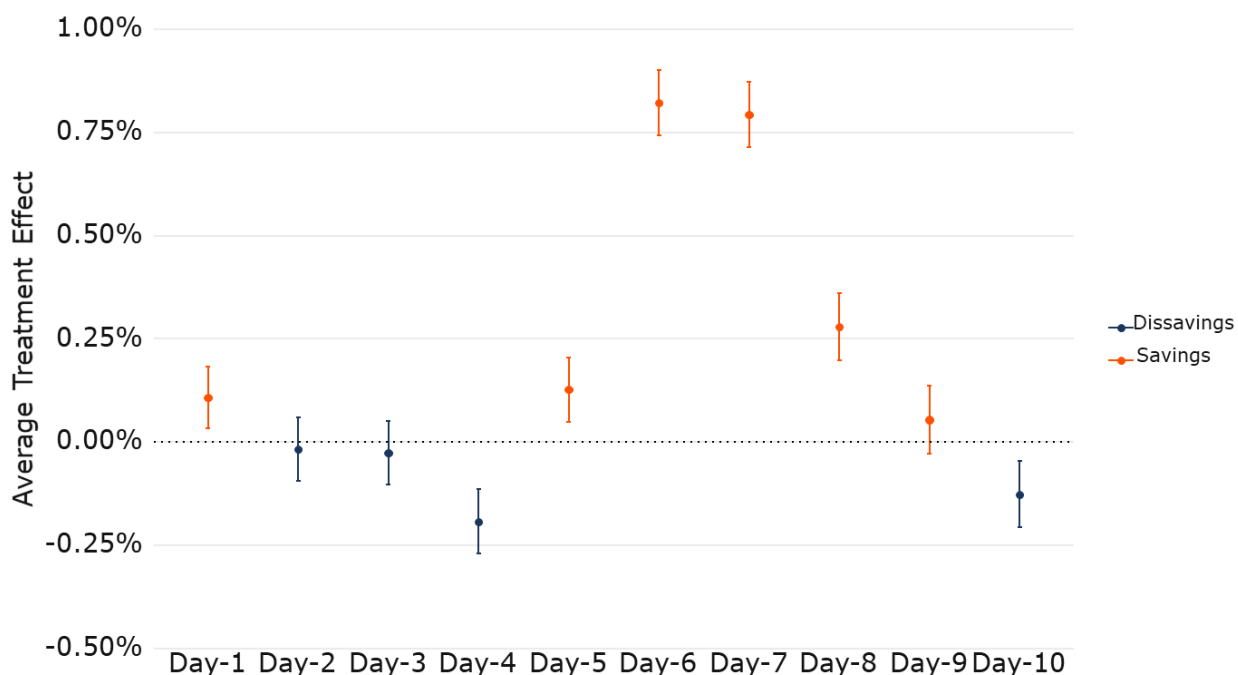


Figure 1. Average Bill Salience Impacts by Day after Bill Creation

The data in our analysis contain three primary bill delivery types: CheckFree, Paper bill, and SCE.com. CheckFree bills and SCE.com bills are electronic forms of delivery whereas paper bills are mailed to customers. We explored how salience impacts varied between these three delivery types. All three delivery types have positive point estimates, meaning on average, there

is a reduction in energy usage after the statement is created for each of these channels. None of the point estimates appear to be statistically significantly different from one another. When broken out by post day, the positive salience effect for paper bills appears on 9 of the 10 days after the statement is created, whereas bills delivered through SCE.com have a positive salience effect for roughly half of the days.

SCE offers a variety of payment channels for which customers may pay the balance on their bill. We estimated impacts by payment channel for channels with a sufficient number of accounts in the data to explore these differences. The models identified small, positive salience effects (reductions in energy consumption) for Authorized Payment Agencies, Credit/Debit Cards, and Mailed payment channels. Further, payments through Authorized Payment Agencies and Credit/Debit Cards appear to have positive impacts for several days after the statement is created. The other channels (payment through the Quick Check or Direct Pay systems, payment with an Electronic Funds Transfer, and payment through SCE.com, as well as payment through multiple channels on the same bill) have no statistically significant salience effect. We did not identify any substantial differences within each payment channel broken out by income.

Some of these payment channels require an active form of payment, meaning the customer must take action each billing period to pay their bill (e.g., mailing a check). Other payment channels allow a passive form of payment, allowing the customer to utilize automatic payment options online. The active channels shows positive impacts in our model. This seems plausible – the customer must actively take time to pay their bill, thus increasing the salience of the bill. The passive channels shows approximately zero salience impact in our model, suggesting that lower levels of engagement with the bill may lead to less salience.

Understanding bill delivery type and bill payment type differences are only one piece to the puzzle. It's plausible that the salience effect is correlated with both of these channels. To investigate this hypothesis, we classified bill delivery types and payment types into broader groups. We classified bill delivery types into either paper or electronic delivery and classified payment channels into either active or passive payments. Our two-by-two classification and modeling approach showed that bills with an electronic delivery and a passive form of payment have approximately no salience effect whereas all other classifications show positive effects, as shown in Figure 2. This suggests that customers who either receive a physical (paper) bill or actively have to make a payment for their bill, have higher salience effects.

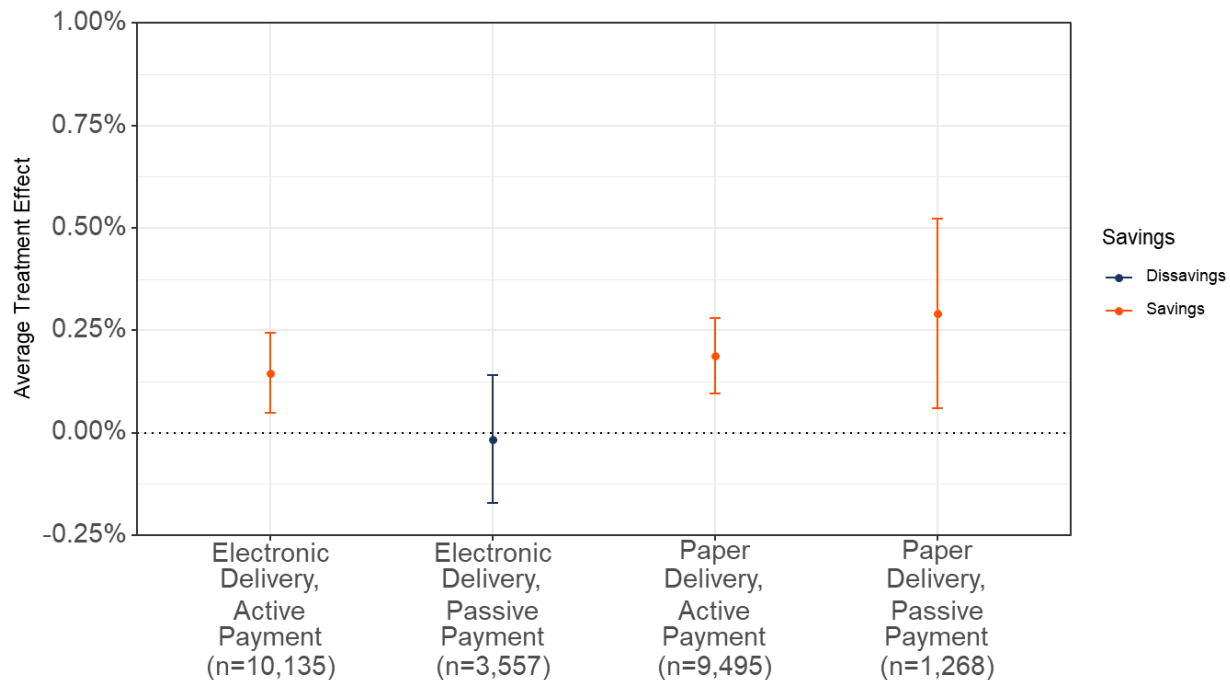


Figure 2. Average Bill Salience Impact by Delivery and Payment Category

Income-related groupings also provided key findings regarding differences between groups. Overall, we found that customers in the lower two income quintiles had larger bill salience impacts than customers in the highest three income quintiles. In addition, a number of other key income-related factors demonstrated notable differences. Customers who were protected from a service shut-off due to SCE's COVID-19 shut-off moratorium (i.e. customers who would have been subject to a cutoff if not for the moratorium) had larger salience effects than other customers. Across customers, there were larger salience impacts following receipt of a bill for which there was no payment or a late payment, and customers with one or more bills that were not paid had higher average salience impacts than customers with no non-payments, although there was no difference between customers who had more than one later payment compared to no late payments. Taken together, these results are consistent with a pattern of customers with greater constraints on their disposable income having larger bill salience impacts.

In addition to billing, payment, and income-related findings, we found a number of other characteristics that inform the user experience results. First, customers with Net Energy Metering (NEM) had significantly larger bill salience impacts than customers without NEM. Finally, we did not find evidence of differences in bill salience impacts for different times of the year. We had hypothesized that there would be larger impacts in summer months when bills tend to be higher, but did not find such a difference. This topic is discussed in greater detail below. For other notable findings see Close, Dinsmoor, and Rustamov (2021) or TRC (2022).

Qualitative User Experience Results

This section details key findings the research team extracted from the user experience interview effort. Based on the findings from the qualitative analysis and the goals of the project, we stratified our sample by passive vs. active payment channel and whether the respondent was

enrolled California Alternative Rates for Energy (CARE), an income-qualified rate structure. Conducting these user experience interviews allowed us to have a detailed discussion with respondents about their bill that provides greater detail than would be possible through a survey. Detailed findings are organized by theme.

Bill Pay Habits

The bill-pay habits of the respondents varied slightly by strata. Those who paid by passive payment (auto-pay) — usually through a direct connection to their bank account — all paid on the due date, as the payment was pre-scheduled to pull on the date the bill was due. This means that these customers do not consciously have to think about when to pay their bill or the bill amount, unless they are interested in looking at the contents of their bill.

Active payment customers typically paid online through the website, though a few reported they previously paid over the phone or through check. These customers were less likely to wait until the due date to pay the bill, and instead pay it immediately or according to a household bill pay schedule (either bi-weekly or monthly). Two respondents reported that they intentionally determined their bill pay schedule based on their paycheck payment schedule. Of these customers, one participated in the CARE program and one did not. The details of the payment schedule can be found in Table 1.

Table 1. Bill Payment Schedule

	Overall	Non-CARE, Passive Payment	Non-CARE, Active Payment	CARE Participant, Active Payment
Due Date	11	8	2	1
Later date	2	0	1	1
Immediately	4	0	3	1
Based on pay cycle	2	0	1	1

Active payment customers, by necessity of their payment type, need to think about the amount they owe, how to pay their bill, and when to pay it. Therefore, these customers' energy usage may be more salient to them than customers whose bills are automatically drawn from their account, as similar results were found in Sexton (2015) that automatic bill pay increased usage by 4%. In order to pay their bill, active payment customers need to open their bill and, at minimum, read the amount they owe. This gives them an opportunity to reflect on the amount of energy they use — and how that impacts their bill amount. This may be especially true for customers (i.e., low-income customers) who have financial constraints; their ability to pay their bill depends greatly on the amount of energy they use.

Customers are Confused by Bill Content, but Satisfied

The theoretical underpinning of the idea of bill salience is that the bill raises the salience of the cost of energy, leading customers to allocate scarce attention to their energy use and reduce consumption. For the mechanism to be effective, the bill must provide an effective stimulus, that is, it must provide them with intelligible information to guide the reallocation of

their attention. More than half (n=11, 57%) of respondents found one or more parts of their SCE bill to be confusing or difficult to understand. Some customers dialed in on specific sections of the bill, while others cited overarching sources of confusion with the information presented on the bill. While few customers made a direct connection between confusion over the bill and the bill being less salient during their interviews, customers did mention skipping over sections they found confusing. Customers skipping over vital information that could help them to better understand their energy use could lead to a decrease in overall comprehension of their energy usage. If customers do not understand their energy usage, they will not have the information or tools they need to understand how to reduce it. The findings from the quantitative analysis in Close, Dinsmoor, and Rustamov (2021) are consistent with a hypothesis that greater engagement with the billing process increases the salience effect; a corollary is that content that causes customers to disengage with the bill can decrease the salience effect.

Details of New Charges Section Confuse Customers

The Details of New Charges section (located on page 2 of the bill) was a pain point for 32% of respondents overall and 54% of those that had confusion with their bill. For these respondents, a chain of emotions appeared to follow when we focused on this section of the bill – first confusion, then either acceptance or frustration. These respondents found the language and presentation of the information to be unclear, noting:

- “Explanation of delivery changes... doesn’t make any sense to me.”
- “I don’t understand what any of this means. I know that at one point I got a credit back – but didn’t really understand why.”
- “Delivery charges. There’s an awful lot of charges, and I don’t understand what any of them mean.”
- “I’ve never read [this section]. Still doesn’t make any sense now that I’m reading it, and I never question it.”

While some customers appeared to be comfortable not fully understanding the content of the Details of New Charges section, others felt frustrated by the lack of clarity and/or frustrated about having the charges applied to their account.

Vocabulary Used in Bill is Confusing to Customers

Others (26% of respondents) had issues with the specific vocabulary used in the bill and noted that specific terms did not make sense to them. When probed, these respondents felt that the information was communicated to them in a way they could not understand. A few key terms were called out specifically:

- “I have no idea what these public purpose funds are. Maybe [they] promote education? This doesn’t make sense to me.”
- “I don’t know what this DWR bond charge is? How am I supposed to know what that is?”
- “I understand there is a tier system, but I don’t understand what they mean. How do they calculate these?”

When discussing terms that felt confusing, respondents typically appeared to be frustrated. While some understood that this could be language the utility was required to include,

others seemed to feel like the terminology was intentionally opaque. They wanted more clarity and easy-to-understand terminology to better understand the information presented in their bill.

Ease of Bill-Pay Rating

Interestingly, respondents had favorable responses when we asked them to rate their billing process. Respondents rated the difficulty of the billing process an average of 8.4 out of 10 (where 1 is “very difficult” and 10 is “very easy”), as shown in Figure 3. This signals that, while the majority of respondents found one or more parts of the bill to be confusing, the majority of respondents also thought the billing process overall was very easy to navigate.

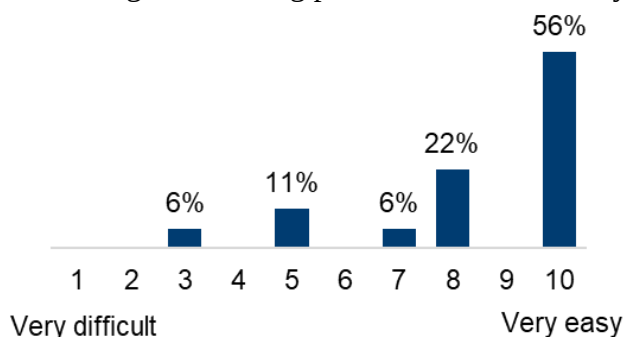


Figure 3. Difficulty of the Billing Process

Additionally, while all customers were fairly satisfied with the perceived ease of the billing process, those who were participants in the CARE program were slightly less likely to rate the ease of the process favorably. There was a negligible difference between the customers that were not CARE program participants but had either active or passive forms of payment. These differences in ease of bill payment ratings can be seen in Figure 4. Of the three strata, CARE active payment customers found the bill pay experience to be the most difficult; they may experience financial constraints that make the “difficult” part of the bill pay process their ability to pay the bill.

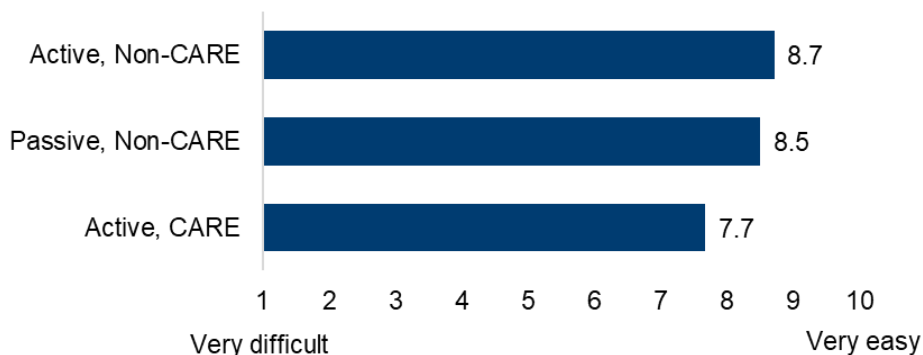


Figure 4. Ease of Bill Payment by Strata

How Confusion about Bill Impacts Bill Salience

The quantitative analysis portion of this research (Close, Dinsmoor, and Rustamov 2021) shows that greater average salience impacts exist for customers that have more engagement with the bill paying process. Confusion with the bill itself appears to lessen the engagement with the

bill pay process. The disconnect between the perceived ease of the bill pay process and confusion about the bill could indicate that respondents do not typically pay careful attention to their bill when they receive it. If this is the case, customers may simply not read their bill carefully enough to internalize the areas that are confusing. As mentioned above, by skipping over “confusing” sections of the bill, customers may miss out on key information that could help them better understand their energy use – and, by extension, not take action to reduce their energy use.

Customers Have Expectations of the Bill Amount

The idea of bill salience requires the bill to be an effective stimulus; that is, it must provide customers with some new information that leads them to reallocate their attention. Respondents’ previous usage patterns shape how they interact with their bill. The respondents we interviewed had years of history as SCE customers – on average, respondents had been an SCE customer for 26 years.

Established Customer Habits Shape Bill Pay Actions

Out of 19 respondents, 10 (52.6%) reported that when they open and pay their bill, they have expectations around how much they would owe and how much energy they would use. Several of these customers referred to their bill pay activity, either implicitly or explicitly, as a routine. These respondents have well-established patterns that correlate with their bill pay actions and are likely to only pay close attention when something is not in line with their expectations. Respondents noted:

- “I wouldn’t look at the third page unless it was really high – I never read the delivery charges. Just looked at tiers – since that is the usage I have control over.”
- “As long as the bill appears reasonable, I just pay.”
- “If the bill is under a certain amount, I don’t pay attention to the bill. If it’s over, I will look at the details.”
- “I see if everything is in my ballpark and meets my expectations. I want to make sure there are no outliers. If everything looks normal, I don’t investigate.”

More than half (52.6%) of respondents reported having established expectations about the information they would find on their bill each month – and noted they would not scrutinize the bill unless the amount owed was unexpected. This applied to both for the amount due and for the bill format. They noted:

- “I’ve been an SCE customer for decades, so I know what to look for.”
- “I’m very familiar with the bill, as I have been getting it for 40 years.”

There appeared to be a correlation between a customers’ length of time as an SCE customer and the scrutiny with which they reviewed their bill. While these respondents expressed high familiarity with the bill, they did not appear to read it closely – instead, they would scan it to make sure nothing looked irregular, then make their payment.

How Expectations About Bill Impact Bill Salience

For the respondents that reported not looking into their bill unless it was outside their expectations, the bill will likely have a greater salience effect when it is considered “abnormally

high”. What is considered to be “normal” for a bill will depend on a customer’s energy use, their income, their usage of solar panels, and the seasons. Additionally, what is considered a deviation from “normal” will also depend on these factors. For one individual, an increase in their expected amount of \$10 could be considered substantial, while for another they may not notice a bill fluctuation of \$50 or more. The quantitative analysis did not find differences in the bill salience effect depending on season; this may indicate that customers have adjusted their expectations significantly based on seasonal variation in the bill amount.

In the quantitative analysis we found that bills were more likely to be salient for customers that were CARE program participants. This may be in part due to the fact that their expectations for the bill amount are lower and their threshold for a deviation from normal is lower, due to income constraints. While the CARE program does help assist low-income customers afford their bills, two out of the four customers we interviewed mentioned still being afraid of opening their bill at times due to trepidation about the amount they would owe.

Customers Feel They Lack Power Over What They Owe

Nine out of nineteen respondents (47%) felt that they didn’t have any power to impact the amount they owe on their bill. People reported feeling this way due to four key reasons:

- Limited energy-saving actions in their control: 37% of respondents felt they were doing as much as much as they could do to reduce their energy use already.
- Reality of seasonal changes: 31% of respondents felt that seasonal changes – and related energy needs associated with hotter or cooler months – were an unavoidable reality.
- Lack of trust in bill information: 32% of respondents felt that SCE had set charges in place, and they – as the customer – did not have any power to impact the amount they owed.
- Scrutiny from solar customers: 21% of respondents had installed solar panels recently and felt like the information they received from their solar panel provider did not match the information they received from SCE.

Customers’ Perceived Limited Control Over the Bill

Many respondents (37%) felt they were already taking action to save energy at home but had simply exhausted their opportunities to reduce energy consumption. When we discussed this with respondents, they appeared to feel resigned that they were doing the best they could but were not seeing measurable differences on their energy bill. Respondents noted:

- “I already know how to reduce my energy use. And I’m doing it.”
- “I feel like I’m doing what I can.”
- “I took advantage of SCE’s assessment program to do upgrades, and we always turn the lights off and are careful about A/C and temperature in the house... but we’re sick of our bills going up.”

Similarly, other customers (16%) felt that overall, they had limited control over the amount they owed SCE each month, no matter how many actions they took to reduce energy consumption.

- “The bill is what it is.”

- “I look at the detail on the charges, for the charges that you can’t change – there is nothing you can do. I’m not going to call and ask about it because it is the way it is”
- “I’m always in Tier 2. I don’t know how to get down low enough to get out of it.”

These customers have the perception that they have little-to-no control over their bill, their energy use, and what SCE charges them. This likely disincentivizes them to change their behavior, even if they receive a bill that they perceive to be too high. We heard that the bill “is what it is” directly from three respondents – and this sentiment was reflected among other respondents. These respondents likely have little motivation to explore the bill or their energy use and are unlikely to change their energy use as a result of receiving their bill.

Reality of Seasonal Changes

Several respondents (31%) felt that seasonal changes dictated the peaks and valleys in their bill amounts. They felt their bill would inevitably go up during hotter months – when they would use more air conditioning – and go down in cooler months. Respondents noted:

- “It [the bill amount] just feels like a reflection of how hot it is – lower in the winter and more in the summer – not much you can do.”
- “Sometimes the tier I’m in feels outside my control, especially during warm months when I have to turn the A/C on a lot.”

When we asked one respondent whether seeing their usage prompted them to think about reducing their energy use, they noted: “Not really – it is what it is. I mean you are going to turn your lights on; you are going to use your washing machine; you are going to use the air conditioning.”

For customers in Southern California, the summer is usually the period of highest energy usage, resulting in the highest bills of the year. Respondents appeared to feel that, compared to the amount they paid in the summer when they are using their A/C, the bills in the cooler months are low enough not to cause concern. For these customers that feel that their energy use mostly depends on seasonality, it could be helpful to acknowledge this natural fluctuation in energy use and identify and communicate tips to reduce their energy use year-round.

Lack of Trust Over Bill Information

Of those interviewed, 32% of respondents cited lack of trust in SCE about the information presented on their bill. Some respondents felt there were hidden charges embedded on their bill, while others felt the charge amounts were variable and unexpected. Respondents noted:

- “They raise the rates so much; there’s a lot of hidden stuff here that isn’t clear.”
- “You never know what you are going to get.”
- “I am not a conspiracy theorist but if you ask me if I feel confident all the time about that [tier charges] – no, I don’t.”

The customers that do not trust the data on their bill may be less likely to act upon the information presented on it. For example, if they were to see usage that is considered “high,” they may not feel motivated to attempt to lower their usage.

This lack of trust also seemed to be linked directly to the tier system; several customers did not understand how and when they fall into different tiers of energy usage. The bill amount seemed to be the highest motivating factor for customers to investigate their energy usage and change their behavior – and the amount the customer is billed directly correlates to the customers’ tier. Therefore, if a customer does not trust or understand the tier system of billing, a high bill may still not motivate them to change their energy use, as they think they lack control over which tier they fall into no matter their energy use.

Scrutiny from Solar Customers

Four respondents (21%) had installed solar panels in the past few years. They noted that the usage amounts reported by their solar company did not match with SCE usage amounts, and they were suspicious of this:

- “What SCE says I’m using and what I think I’m using do not always line up. But what are you going to do? Just pay the bill.”
- “My solar app doesn’t match up with billing from SCE.”
- “I create energy but don’t get credited for all of it.”

This is an interesting puzzle for SCE: while a significant amount of solar customers’ usage is likely linked to their solar and not SCE, if they distrust the bill information presented on their SCE bill, they will be unlikely to act on it. For instance, if a solar customer is using more than they are producing and needs to use energy produced by SCE, they may be more surprised by the amount charged, but more distrustful of the amount that SCE claims that they used.

Customers Respond to Visual Cues

As we walked through the bill with respondents, we noted that they liked visual depictions and elements that drew their eyes. Customer most frequently (n=11) mentioned liking the usage bar graph on the top of page 3; when we asked respondents what information was helpful to understand their bill, eleven of respondents dialed in on this section. Four customers mentioned that their eyes were drawn to font that was large and/or bolded, which they thought was helpful to help them find important information.

- When asked what on the first page they noticed first: “Routing outage. Stuff at the top and in bold.”
- “My main takeaway is the amount I have to pay. It is in bold letters and stands out a little bit – catches the eye.”

Customers also seemed to interpret the usage bar graph better than other depictions of the usage information.

- “I like the graph to quickly see my usage information.”
- “Nice bar chart – I can recognize if I’m using it too much and correct it.”
- “I find the graph interesting. I like to compare the average electricity usage.”
- “I always look at the amount due, then past and current usage. I like to look at the graphs on the second page, then look at the tier usage.”

How Visual Cues Impact Bill Salience

When customer's eyes are drawn to parts of their bill – by color, visuals, or bold text – this information will stand out in their mind as important. It will also help key information stand out as a signpost, making it easier for them to focus on as they analyze their bill each month. Respondents responded positively to the bold, large text highlighting the amount they owed. SCE may want to consider using visual cues to highlight other important information, which may increase the salience of this information among customers who view their bill.

Customers Employ Strategies to Manage Energy Use

Customers mentioned using several strategies to manage their energy use. When asked, most mentioned that they tried to purchase energy-efficient appliances, install LEDs, and turn off equipment when not in use. Full details of the strategies used to reduce energy use can be seen in Figure 5.

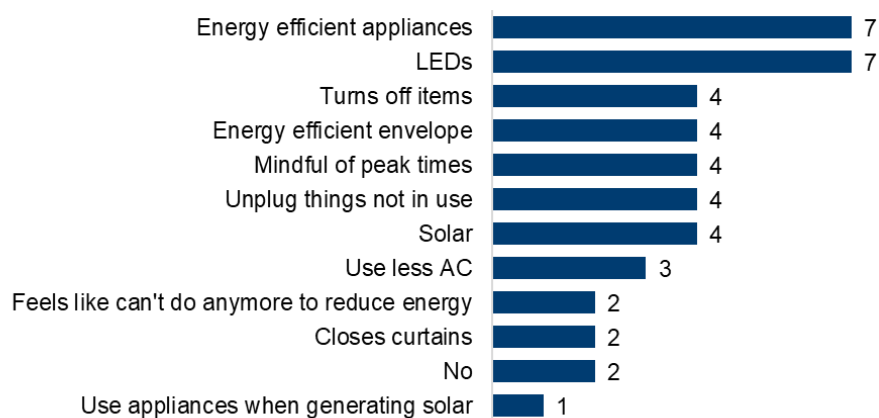


Figure 5. Strategies to Reduce Energy Use

Those who participated in the CARE program were less likely to mention purchasing appliances, replacing LEDs, and being mindful of peak timing.

Conversely, they were more likely to mention unplugging equipment when not in use, turning off equipment, and using less air conditioning. This may show that those who are on the CARE program still think about their energy use frequently, but their strategies to lower their energy use are more habit-based — such as turning off the lights — rather than purchasing more energy-efficient products.

How Customers Managing Energy Use Impacts Bill Salience

How customers manage their energy use may impact the salience of a bill. For instance, if customers have invested in longer-term strategies, such as buying energy-efficient products or installing solar panels, they may not think about needing to change their behavior to impact their bill. For those that have more habit-based strategies to reduce their energy use, such as unplugging items, being mindful of peak times, or using less AC, a high bill may prompt them to reinstate their habits.

Four respondents mentioned that, when a high bill comes, they will talk to those in their household about their energy use and remind them of energy-saving habits. This seemed to be especially true for those who had children; two respondents mentioned that their children needed

reminders of energy-saving habits, and that high bills would prompt these reminders. These two customers discussed their habits of discussing energy use with their children:

- “If the bill is really high, that is the time to have a family conversation, you know. A conversation with the kids on turning up the A/C and turning off the lights.”
- After receiving a high bill: “Yeah, we talk about it and I get upset about it but, then in the following two days they [the children] do it [use the A/C all day] all over again.”

For customers who do not report having manual or habit-based strategies to manage their energy use, it may help to make these manual strategies more top of mind, such as a simple reminder that while having energy efficient appliances is helpful, other more manual strategies are still important to reduce their energy use.

Synthesis and Conclusion

This study has built upon and expanded upon the existing research about bill salience impacts. The two primary contributions are using customer information to understand how average bill salience impacts vary between customer groups, and to investigate through user experience interviews how customers perceive their bills. This section synthesizes the results from the quantitative and qualitative research efforts that make up this study.

Our quantitative evaluation found that, on average, there is a positive bill salience effect of approximately 0.18% across the 10-day period after a bill date. This average effect peaks in general on the 6th and 7th day after a statement is created with reductions near 0.8%. These findings support existing research by Gilbert and Zivin (2014) which found that there is an average decrease in a customer’s usage after they received a utility bill. The availability of customer metadata allowed our research team to investigate these bill salience effects further based on various characteristics.

The qualitative user experience interviews conducted by our team provided further insight into how residential customers engage with their utility bill, with many implications for salience effects. All interview respondents received a paper bill but differed in whether they paid using active or passive payment methods. Even among this group of customers who have relatively higher engagement by virtue of their bill delivery method, engagement with their bill tended to be minimal, and the interviews revealed aspects of their experience that likely lead to lower salience.

In addition to providing insight into respondents’ bill paying routines, the interviews shed light on residential customers’ expectations and attention in interacting with their bill. One of the most striking findings from the qualitative phase of the research is the relative prominence of the bill amount relative to other bill content in terms of respondents’ attention—several respondents admitted that the amount owed and the due date are often the only elements of the bill they noticed. Most have learned over time what “normal” variation they can expect and are motivated to give other components of the bill more scrutiny only when those expectations are violated and a bill is higher than anticipated. This suggests that the bill amount is frequently the only salient information for many customers. These expectations vary with seasons, so that respondents expect high bills in the summer. This may explain why we did not observe significant seasonal variation in bill salience impacts in the quantitative analysis. When the bill amount is seen as unremarkable, it may also be less likely to generate any sort of response in terms of energy use.

That said, several participants recalled months where they have been surprised by their bill amount, despite being aware of typical use patterns and seasonal variation in their usage.

When respondents do look more closely at other parts of their bill, rather than glean a better comprehension of their usage and rates, over half (57%) encounter information and terminology that they don't understand, leading to confusion and, at times, frustration and distrust. The one exception to this pattern was the chart that shows customers' daily average usage over time, which respondents tended to readily comprehend (or at least perceive that they understood). Conversely, the Details of your new charges section was widely seen as the most confusing part of the entire bill. Crucially, this is also the part of the bill that has the most relevant information for customers when it comes to understanding why they owe the amount that they do. While there were sources of confusion, respondents for the most part rated the entire process from receiving their energy bill to making a payment as fairly easy. But this may be because individual customers have grown accustomed to skipping over the parts of their bill that they don't understand.

Some interview respondents seemed to feel a lack of agency regarding their energy bill. As one put it succinctly, "it is what it is." Several talked about feeling powerless to impact the amount they owed, either because they didn't fully understand what they were being charged for, didn't trust the charges were an accurate reflection of their usage (this was particularly true of respondents with solar panels), or didn't think there was anything else they could be doing to use less energy. Even long-time customers who felt they knew what to look for on their bill didn't necessarily feel in control or that they would know if they were being mischarged. These beliefs may inhibit customers' ability to use the information provided to effectively manage their energy use and lower their bill in the future.

However, this perceived lack of control did not mean that respondents were dismissive of energy efficiency measures or pessimistic about their efficacy. Rather, many had already taken actions or attested to adopting habits to cut back their energy use to the extent where they didn't know what more they could do to reduce their use any further. They reported a variety of longer-term measures that require costs upfront, like buying LEDs, upgrading to energy efficient appliances, or better insulating a home, as well as habitual measures like closing curtains or shifting the time of day they do laundry. Any of the measures that persist through time, such as equipment changes, would not affect the estimated bill salience impact because they affect both the pre-bill and post-bill period identically. It is possible that those who primarily employ more habitual actions, e.g., becoming more vigilant about turning lights off, may change their behaviors more after receiving a bill than those who have made longer-term investments.

Although several of the perceptions and beliefs related to the bill process described above may reduce the likelihood that customers are highly motivated to reduce their energy use after receiving a bill, it is clear from the quantitative analysis that such a reduction is taking place. While many respondents did not make an explicit connection between receiving a bill and changes in their energy use, four respondents did note that getting an unexpectedly high bill had led them to have discussions in their household about conserving energy. It is also possible that bill salience effects operate partially unconsciously, meaning customers may not have full insight into the impact engaging with their bill has on their energy-related behaviors.

It is also noteworthy that our quantitative models found that income plays an important role in bill salience, with lower income levels exhibiting higher salience effects, on average. Further, when segmenting several of the variables in the metadata by income, our team repeatedly found instances where lower income levels exhibited higher salience effects within

the subsegment. While some households may have the latitude to pay their bill no matter the amount, for a household with less disposable income, a bill may be a much more powerful cue to curb energy use. Two interview respondents shared their experiences of feeling scared to open their bill or being stressed over seeing a large bill. Moreover, respondents who were participants in the CARE program were slightly less likely to rate the ease of the bill process favorably, possibly because of difficulty related to their ability to pay, and were more likely to mention using habit-based reduction strategies.

What guidance can we take from this research to inform how utilities can leverage bill salience impacts to achieve reductions in energy usage for their customers? We know from our user experience interviews that customers only engage very passively (if at all) when their bill amount is in line with their expectations. So bills that are larger than typical for that *customer at that time of year* are opportunities to engage customers to reduce their consumption, either through short- or long-term steps. Given that customers who receive paper bills or actively pay their bills (rather than relying on autopay) have larger bill salience impacts, timely customer outreach timed to coincide with, or shortly follow, a bill may provide an opportunity for utilities to increase their uptake of energy efficiency and demand response offerings. As a corollary, investigating additional communication avenues for customers who receive email bills and have enrolled in autopay may provide additional opportunities for utilities to engage low-engagement customers.

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