

# **REAL MASS MARKET CUSTOMERS REACT TO REAL TIME-DIFFERENTIATED RATES: WHAT CHOICES DO THEY MAKE, AND WHY?**

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There has been a good deal of speculation over the years about whether – and why – mass market customers would choose to participate in multi-part time-differentiated rates. Many conference presentations have argued that mass market customers who have typically had no choice of rate options, should – and would – find value in new time-differentiated rates. Besides perhaps saving customers money, these rates might also provide customers with a greater sense of control over their energy use and their bill, and / or with the less tangible, but potentially also compelling benefit of contributing to a societal good, such as conserving energy and / or reducing the need to build new power plants.

Fortuitously, a change in the implementation plan for California’s Statewide Pricing Pilot (SPP) provided an opportunity to address these questions directly. As most industry observers know by now, the SPP was implemented in order to explore the reactions of IOU customers in California to several different time-differentiated rates. The SPP asked a sample of customers to participate in one of several different rate conditions to which they were assigned. These rate conditions included:

- A two-part TOU rate
- A three-part Critical Peak Pricing rate (that had higher on-peak prices on a limited number of days), that also differed in the fact that:
  - For some customers the critical peak periods were fixed in length (CPP-F)
  - While for others the peak period was variable (CPP-V)

Originally, the SPP was expected to end at the conclusion of a two-year period, with all program participants assigned back to their original standard electricity rate (with participants having no choice about whether or not they were re-assigned to this standard rate at the conclusion of the pilot). Administrative changes that occurred over the course of the pilot, however, meant that program participants could be offered the opportunity to select a time-differentiated rate at the conclusion of the pilot at the end of 2004. In fact, program participants were typically given a set of choices that included, staying on their assigned time-differentiated rate, moving to another time-differentiated rate, or returning to their standard rate. Even further, different groups of program participants were assigned to different conditions such that some participants would “default” to their time-differentiated rate if they did not make an active decision to do otherwise, while others would “default” back to the standard rate. This new characteristic of the SPP provided a perfect opportunity to not only see what program participants would choose once they had had experience with a time-differentiated rate, but also to understand the

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logic for those choices, making it possible to explore a variety of questions about how and why customers choose time-differentiated rates in “live” markets, including:

- Once mass market participants have experience with time-differentiated rates, do they continue to choose those rates?
- Do they do so equally if they have to opt-in vs. opt-out?
- Do they do so equally regardless of the original rate condition to which they were assigned?
- Why do they choose such rates, if they do?

### Rates Offered During the Pilot

Table 1 below provides a summary of the key features of example summer rate options provided to residential program participants during the SPP (note that the specific prices and participant groups associated with the different rate options varied across the participating utilities):

**Table 1: Key Features of Example Summer SPP Rate Options for Residential Program Participants**

	Time-of-Use Rate	CPP-F Rate
<b>Ratio of On-Peak/ Super Peak price to Off-Peak price</b>	On-Peak / Off-Peak: 2:1	Super-Peak / Off-Peak: 6.6:1  On-Peak / Off-Peak: 2.4:1
<b>Other Notes:</b>	On-Peak hours from 2-7pm weekdays	Up to 15 Super Peak days per year, with On-Peak / Super Peak hours from 2-7pm weekdays

While both the Time-of-Use (TOU) rates and the fixed-period Critical-Peak-Pricing (CPP-F) rates had on-peak periods from 2-7 pm weekday afternoons, the CPP-F rate also included the option for the utility to call up to 15 Super Peak days each year during which the on-peak price would rise substantially in comparison with the regular, weekday on-peak price. Program participants on the CPP-F rate were notified of Super Peak days the day before a Super Peak day occurred.

Program participants placed on new time-differentiated rates during the pilot were told that there were several different benefits that they might experience as a result of participating in the new rates. These included:

- Helping to create a more secure energy future for California
- Reducing our need to use older and less efficient power plants to meet peak demands
- Receiving information and capabilities they need to better manage their electricity costs
- Achieving energy bill savings, depending on participants’ ability to change the way they use electricity

## Choices Offered at the Conclusion of the Pilot

As we noted earlier, the SPP was modified during its implementation so that at the conclusion of the pilot, program participants were given the opportunity to retain a time-differentiated rate if they chose to do so. The structure of the choices made available to participants, however, and the specific rate options available differed across participant groups. Note also, that, while the specific rates offered at the conclusion of the pilot were similar in structure to those offered during the pilot, they differed in some details.

**Table 2: Key Features of Example Post-SPP Rate Options Offered to Residential Participants**

	Time-of-Use Rate	CPP-F Rate
<b>Ratio of SUMMER On-Peak/ Super Peak price to Off-Peak price</b>	On-Peak / Off-Peak: 3.6:1	Super-Peak / Off-Peak: 5:1  On-Peak / Off-Peak: 2:1
<b>Other Notes:</b>	On-Peak hours from 2-7pm weekdays  Also added a daily meter charge	Up to 15 Super Peak days per year, with On-Peak / Super Peak hours from 2-7pm weekdays  Also added a daily meter charge

Besides the mostly minor differences in the specifics of the rate options offered to program participants at the end of the pilot period, there were also differences in the “default” conditions to which participants were assigned. Each program participant had the opportunity to return a card indicating their rate choice, or alternatively, if they did not return a card, they were assigned to a “default” rate. Different residential participant groups, however, were assigned to different default conditions:

- Residential program participants on an SPP TOU rate had the chance to stay with a TOU rate, select a CPP-F option, or as their default condition, could go back to their old standard, tiered rate
- Residential program participants on an SPP CPP-F rate had, as their default condition, remaining with their CPP-F rate, but they could also choose a TOU rate, or to go back to their old standard, tiered rate.

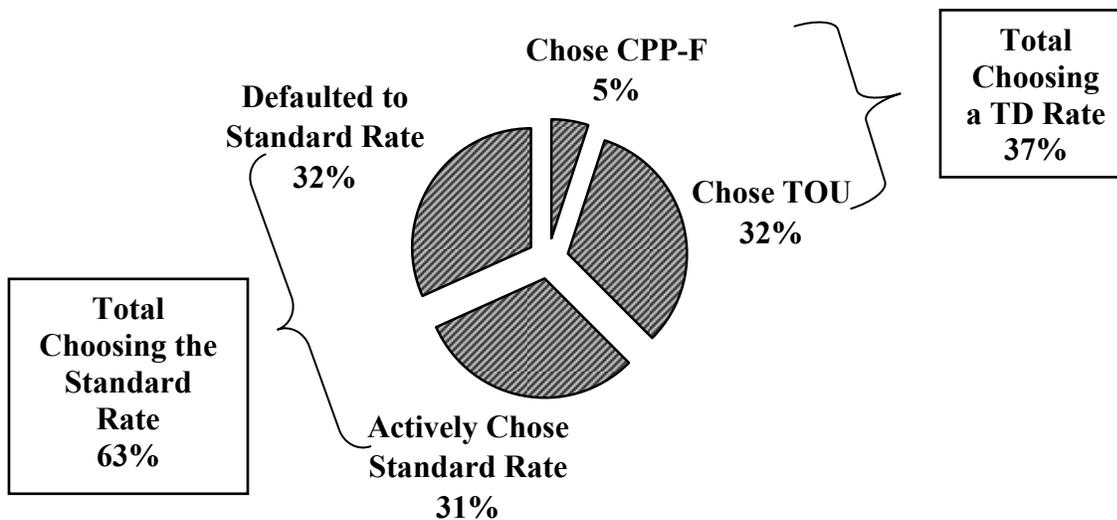
Residential TOU program participants, in other words, had to “opt-in” to remain with a time differentiated rate at the end of the pilot (if they did nothing, they would be assigned to a traditional rate). Residential CPP-F participants, alternatively, had to “opt out” of a time-differentiated rate if they did not want to be on such a rate any longer.

## What Did SPP Program Participants Do?

Before jumping into the specifics of the way that program participants responded to these options, it is worth noting why we have maintained a distinction between the responses of these program participants and a more generic description of these results as being relevant to the broader category of “residential customers” as a whole. SPP program participants knew that they were participating in what was effectively described to them as an “experiment” that had a specific set of purposes and a limited timeline. While we believe their responses are instructive (since they do, in fact, represent the choices of “real customers” who have, and will, experience the cost implications of their time-differentiated rate), it is potentially the case that the way program participants responded to the conclusion of the experimental program, and the choices they made in that context, may not exactly replicate the choices that other customers might make as they face choices about selecting, and / or continuing on, time-differentiated rates. For this reason, we have been consistent in our language and described the results below as being relevant to “program participants,” and have not assumed that they would apply uniformly to broader residential customer populations.

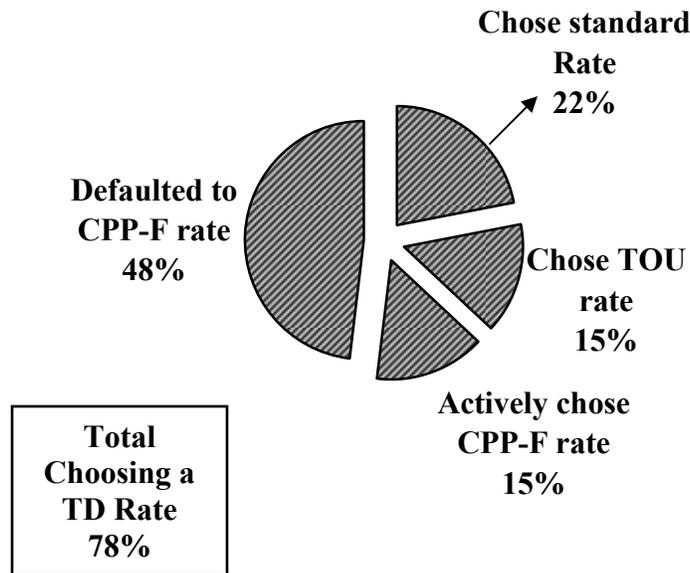
As is indicated in Figure 1 below, a total of 63% of the residential program participants on an SPP TOU rate chose to go back to a standard (non-time-differentiated rate) after the pilot was over. These participants were split between 31% who actively chose to send in a card indicating their choice (even when they did not need to do so) and 32% who defaulted to the standard rate. Alternatively, only 37% of these program participants actively selected a time-differentiated rate, with most of those participants (32%) selecting their pilot TOU rate over the CPP-F option that was also available to them.

**Figure 1: Post Pilot Choices Among SPP Residential TOU Participants**



The pattern of choices for residential CPP-F participants was very different from that demonstrated by TOU participants, and these selections are outlined in Figure 2 below.

**Figure 2: Post Pilot Rate Choices Among SPP Residential CPP-F Participants**



Among residential CPP-F participants, 78% chose a time-differentiated rate (with most of those – 63% choosing their CPP-F rate), and only 22% chose to return to their old standard rate.

Key differences between these two groups, then, include the facts that:

- CPP-F participants were more likely to choose a time-differentiated rate (78%) than are TOU participants (37%) when they have the opportunity to make a choice
- CPP-F participants were more likely to choose the default rate (which was a time differentiated rate in their case) than are TOU participants to choose the default rate (which, for them, was the standard rate)
- Although within each rate, program participants who chose a time-differentiated rate tended to choose their ingoing rate (i.e., CPP-F participants tended to choose CPP-F over TOU, while TOU participants tended to choose TOU over CPP-F).

So why did these differences occur, and what are their implications? Did more TOU participants than CPP-F participants choose a standard rate simply because the standard rate was the default for TOU participants? Did more CPP-F participants choose the “default” option simply for convenience (since the default option kept things the same – they stayed on the rate they were on – where as selecting the standard option would have required a change in rate plan)? Alternatively, are there other decision drivers at work here?

## Exploring Participant Choices

The SPP project team commissioned two pieces of research designed to understand how and why program participants reacted to time differentiated rates:

- A Pilot Rate Choice study was conducted with program participants AFTER they made their post-pilot rate selections. This qualitative research involved conducting 81 telephone, in-depth interviews with residential program participants which were designed specifically to explore the “why’s” of post-pilot rate choice
- An End-of-Pilot survey was conducted with program participants at the end of their second summer of pilot participation. This quantitative research involved conducting a total of 447 20-25 minute telephone interviews with residential program participants, focusing on issues of how they reacted to the pilot rates.

Note that other research with program participants was conducted as part of the SPP, and in particular, data was collected regarding the measured impact of changes in electricity usage across participants on different rates on different days. Key findings from that research has been discussed in other presentations. The results and discussion that follow are derived specifically from the two research efforts outlined above.

### Why Program Participants Made the Choices They Did

Starting first with the results of the qualitative research, participants told the team a very clear story. Those interviews determined that residential participants who chose to stay with, or defaulted to, a time-differentiated rate typically believed that the TD rate delivered actual savings during the SPP versus the standard rate:

- Residential program participants who stayed with their pilot TD rates (CPP-F, CPP-V, or TOU) indicate that they thought the rate would maximize their savings considering their household’s usage patterns
- Most residential TD rate takers also said that the changes they made in electricity use during peak periods were fairly easy to make, were implemented at the start of the pilot, and were adhered to through the course of the pilot and beyond

While some participants who chose a TD option did say that they expected more savings during the SPP, residential TD rate takers still believe that the TD rate they selected would be the least costly rate option for their household going forward.

Alternatively, residential program participants who chose to return to their standard tiered rate say they did not realize actual savings on the SPP pilot rate, and would not be able to save with any of the offered TD rates:

- These standard rate takers feel that higher peak rates, and especially Super Peak rates, constrained their lifestyle without resulting in a lower bill
- Many also believe that small amounts of peak usage offset any savings during off-peak hours, and their resulting bills were actually higher than pre-pilot bills
- Since they did not see any financial benefit from the TD pilot rates, these Residential participants tend to see the standard rate as an easier and safer choice

- Many of these participants also said that they needed to use their AC during peak and Super Peak hours, and then felt penalized by the higher rates for this use
  - Even if these participants paid approximately the same on the TD rate as on the standard rate, not having to “sacrifice” in terms of adjusting usage during peak events seems to have triggered the choice of the standard rate.

The lack of SPP cost savings for Residential standard rate takers was exacerbated by the additional meter charge associated with staying on a TD rate for some of these participants.

Regardless of the choices they made, most residential participants say that:

- Participation in the SPP was “worth it” for reasons not associated with cost savings
  - It made them more aware of their usage patterns and ways to conserve energy
  - They feel that conserving energy is a valuable long-term goal for California and that the SPP promoted conservation to themselves and others
- And that they were satisfied with their participation in the SPP
- But nearly all feel that these benefits, while justifying their participation in an SPP “experiment,” are not a compelling reason to stay on TD rates permanently – regardless of the choice they made
  - That is, even the participants who chose a time-differentiated rate, did not do so for one of these non-economic reasons
- In addition, those “choosing” the default rate option (regardless of which option that entailed) were extremely likely to say they took the default route because they knew what the default option was and wanted that option
  - That is, it is not the case that participants tended to “choose” the default because it was too much trouble to make a choice, or because it was confusing, or because of simple inertia
  - Rather they “chose” the default option because they intended to choose the default option

Summary so far:

- Program participants say they chose the rate that they believed would be least costly for them
- CPP-F participants, apparently, believe more than do TOU participants, that they were able to save money during the SPP (and would still be able to save money going forward) on their time-differentiated rate
- Program participants in general agree that time-differentiated rates have non-economic benefits, but all participants – regardless of the rate choice they make – say that these non-economic benefits are irrelevant to their choice

If these perceptions are accurate, it would suggest that CPP-F participants did save more money during the pilot, and as a result, found the changes in electricity use they made during the pilot to be “worth it.” While the bill analysis to determine the direct answer to this question is not available to the SPP team at this point, there is evidence to suggest that, program participants at least, believe this is true:

Results from the End-of-Pilot survey indicate that:

- CPP-F participants are more likely than TOU participants to say:
  - They made more changes in the way they used electricity during Super Peak / On-Peak periods
  - Their changes in electricity use resulted in them using less electricity overall
- In addition, most CPP-F participants said they did respond by changing their electricity use on Super Peak days, and perhaps even more importantly, they maintained the same response strategy on non-Super Peak days
- Alternatively, TOU participants are more likely than CPP-F participants to say:
  - They believe that paid more per month on electricity than before their participation in the pilot

### **Conclusions and Implications**

Based on the aggregate results described above, it is reasonable to conclude that residential program participants respond to time-differentiated rates by:

- Basing their rate selection nearly completely on the basis of which rate they believe will be cheapest given a “reasonable” set of price response behavioral changes
  - Using their experience with a rate as the primary guide to likely economic outcomes
  - And recognizing that if participants engage in some price responsive behavior during peak periods, but see little economic return from that behavior, they will view the related behavioral changes as “sacrifices” without return, and as a result, not worth continuing (changing behaviors to “break even” is “not worth it”)

Implicitly, this means that CPP-F participants chose the CPP-F rate because they saved more money (or at least saved money more consistently) on the CPP-F pilot rate than did TOU participants. In large part, this was likely a result of two factors: 1) CPP-F participants appeared to respond more aggressively during Super Peak periods, and 2) because they implemented the same strategy during both Super Peak and “regular” on-peak periods.

There are several interesting implications of these results for potential future time-differentiated rate design and program communication:

- Residential program participants could understand the basics of two-part and three-part time-differentiated rates and tend to say that they develop different behavioral response strategies for those different rates

- Note that by “understand,” we mean that they know the days / hours when prices are “high,” or “very high,” though most program participants do not know the specifics of relative prices during different time blocs
- Program participants tended develop a “two-part” behavioral response even under a “three-part” rate, meaning that they appear to develop a single response strategy for highest price days, which they then implement on all “peaking” days (regardless of whether these are “Super Peak” or “regular peak” days)
  - Note that this strategy also serves as “protection” if a respondent for some reason doesn’t receive or doesn’t recognize a notice that the next day will be a Super Peak day (since they always implement their Super Peak strategy on every weekday, regardless of notification)
- This means that there may be substantial value in terms of stimulating behavioral response to time-differentiated rates in having a three-part rate, even if a three-part rate is not “necessary” from a pure rate design perspective
- Residential program participants did find value in time-differentiated rates as long as those rates can yield a positive (not neutral) economic outcome; non-economic benefits, while recognized, do not appear to motivate time-differentiated rate choice