

Consumer Behavior Study Sacramento Municipal Utility District *SmartSacramento*[®]

Abstract

Sacramento Municipal Utility District’s (SMUD) SmartSacramento project includes a consumer behavior study evaluating the impacts of time-based rates, enabling technologies, and recruitment treatments on energy consumption and peak demand.

Consumer Behavior Study Features

Goals and objectives center on customer acceptance of and customer response to varying combinations of enabling technologies, recruitment methods, and time-based rates. SMUD is focused on the impact of customer response during peak hours and critical peak events.

Study design involves a study sample of approximately 57,000 residential customers and a test period from June 2012 to September 2013. Due to the variety of treatments, the study involves three experimental designs: randomized control trial (RCT) with delayed enrollment (i.e., “recruit and delay”), randomized encouragement design (RED), and within-subjects design. In the RCT “recruit and delay” study design, a randomly selected group of customers from the study sample are recruited into a specific treatment (opt-in), but only half of those who are invited to participate are eligible to be exposed to that treatment in year one while the remainder serve as a control group on the existing inclining block rate in years one and two; however, they are permitted to enroll in the offered rates after the study period has ended in the second year. In the RED study design, a group of randomly assigned customers from the study sample serves as the control group and remains on SMUD’s standard inclining-block (tiered) rates without any form of technology offered by SMUD as part of the study. SMUD then offers a randomly selected second group of customers from the study sample a specific treatment, “encouraging” them all to accept the offer on an opt-in basis or to reject the offer on an opt-out basis, depending upon the treatment. All of these “encouraged” customers are considered in the study for evaluation purposes regardless if they accept or reject the treatment. The within-subjects design uses no explicit control group; instead, it estimates the effects of the treatment for each participant individually, using observed electricity consumption behavior both before and after becoming a participant in the study as well as on critical peak event and non-event days. The control group selected for the RED design will be used to control for exogenous effects in the within-subjects design.

At-A-Glance

Recipient: Sacramento Municipal Utility District

State: California

Timing: June 2012 – September 2013

Interim Evaluation Reporting: April 2013

Final Evaluation Reporting: January 2014

Sample Frame: ~57,000 Residential Customers

Number of Treatments: 7

Experimental Designs: Randomized Control Trial with Delayed Application of Treatments, Randomized Encouragement Design, and Within-Subjects

Rate Treatments

- Tiered w/ Time-of-Use Pricing Overlay (opt-in and opt-out)
- Tiered w/ Time-of-Use and Critical Peak Pricing Overlay (opt-out)
- Tiered w/ Critical Peak Pricing Overlay (opt-in and opt-out)

Control/Information Technology Treatments

- Programmable Communicating Thermostat with In-home Display
 - Web Portal
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Sacramento Municipal Utility District *(continued)*

Rate treatments include the implementation of three time-based rate programs in effect from June through September. SMUD is implementing a time-of-use (TOU) rate that augments its existing tiered rate structure and includes a 3-hour on-peak period each weekday. In addition, SMUD is testing the effects of substituting, during the 3-hour on-peak period, a higher critical peak price (CPP) on critical peak event days with either a stand-alone CPP overlay or a TOU with CPP overlay, both with an underlying tiered structure during the off-peak hours. Customers participating in any CPP rate treatments receive day-ahead notice of critical peak events, called when wholesale market prices are expected to be very high and/or when system emergency conditions are anticipated to arise. CPP participants will be exposed to 12 critical peak events each year of the study. The rates proposed for this study are subject to formal approval by SMUD’s Board of Directors, which is scheduled for June 2012.

Control/information technology treatments include the deployment of programmable communicating thermostats (PCTs) with information display or comparable devices. These devices, in conjunction with customer Web portal access, facilitate two-way information exchange and enable customers to better manage their electricity bills through improved understanding of electricity consumption patterns of appliances and equipment. SMUD is offering the PCTs to all opt-out treatment customers and some opt-in treatment customers. All customers receive Web portal access, customer support, and a variety of education materials.

Key Milestones

Key Milestones	Target Dates
SMUD consumer behavior study test period begins	June 2012
SMUD provides Interim Evaluation Report	April 2013
SMUD consumer behavior study test period ends	September 2013
SMUD provides Final Evaluation Report	January 2014

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