

Transformation of the Non-Residential Sector to Critical Peak Pricing Rates

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ABSTRACT

The California Public Utilities Commission established policies and practices for advance metering, demand response and dynamic pricing in June of 2002 in response to the state's energy crisis. The California investor-owned utilities (IOU's) developed a portfolio of demand response (DR) programs and introduced them to the market in 2004. While the IOU's achieved a modest level of success, the CPUC recognized that the initial levels of participation, particularly in the price-responsive programs, needed to be increased. In late 2004, the CPUC made a major change to the Critical Peak Pricing (CPP) rate, ruling that the rate would shift from voluntary to default for all customers with interval meters.

This policy is intended to raise awareness and to shift customer behavior towards energy use, especially as Smart Meters are deployed to the mass market. KEMA conducted a process evaluation of the California IOU's non-residential CPP rate programs, including SDG&E's CPP-Default rate, to assess what is working and not working and how these lessons may apply to a default strategy. Key results presented in this paper include awareness of CPP and DR, customer action during CPP events, reasons that customers opted out of the default CPP rate, barriers to and benefits from participation in DR, and effectiveness of program marketing and customer communications.

Introduction

The California Public Utilities Commission established policies and practices for advance metering, demand response and dynamic pricing in June of 2002 in response to the state's energy crisis. The California investor-owned utilities (IOU's) developed a portfolio of demand response (DR) programs and introduced them to the market in 2004. While the IOU's achieved a modest level of success, the CPUC recognized that the initial levels of participation, particularly in the price-responsive programs, needed to be increased. In late 2004, the CPUC made a major change to the Critical Peak Pricing (CPP) rate, ruling that the rate would shift from voluntary to default for all customers with interval meters.

This paper presents results from a KEMA evaluation of select California IOU DR programs, with a specific focus on San Diego Gas & Electric's (SDG&E) CPP-Default rate (CPP-D). The following sections provide an overview of the CPP-D rate, evaluation objectives and approach, information obtained from program staff interviews, the Account Executive (AE) workshop and customer research results.

CPP-D Rate Highlights

SDG&E began defaulting non-residential customers on the CPP-D rate in May 2008. The CPP-D roll-out began with non-residential customers with load of 200 kW and eventually included non-residential customers with loads of 20 kW or greater who had existing Smart

Meters. Customers were provided 45 days from the default date to opt-out. Given the significantly reduced load requirement for CPP-D, there was a much higher number of customers eligible for DR participation under the CPP-D rate. Furthermore, defaulting customers onto the CPP-D rate and requiring customers to actively opt-out of the CPP-D rate led to a substantial expansion of DR participants in SDG&E territory, and allowed SDG&E to capture traditional non-participants in DR.

Customers on the CPP-D rate receive day-ahead notification no later than 3 p.m. prior to a CPP event. Events can be called year round, any day of the week between 11 a.m. and 6 p.m., but typically occur between May 1 and September 30. A maximum of 18 events may be called per year. Customers are given the option of reserving a specific amount of electricity (specified in kW) that is protected from the higher CPP event prices through the Capacity Reservation Charge (CRC). The default CRC is 50% of a customer's summer maximum demand that is protected from higher event rates, but customers have the option of setting the CRC higher or lower or having no CRC at all. Customers are assessed a fixed monthly fee that is based on the amount of electricity they choose to reserve. All electricity usage during a CPP event that is protected under the CRC for a given customer is billed at the non-CPP event day on-peak period rate for CPP events that occur on weekdays and billed at the off-peak period rate for CPP events that occur on weekends and holidays. All electricity usage that is not protected under a customer's CRC is billed at the CPP-D period rates.

A CPP Rate Analysis Tool assists customers in estimating and comparing costs under the CPP-D rate and the CPP-D Opt-Out rate under different scenarios. With the CPP Rate Analysis Tool, customers can estimate costs of being on the CPP-D rate under different combinations of event days, CRC reserve, and amount of load reduction. As a means of encouraging more customers to go on the CPP-D rate, SDG&E offers bill protection, which protects customers from paying more under the CPP-D rate than the Opt-Out rate during their first 12 months on the CPP-D rate. The SDG&E Energy Management Tool (EMT)¹ allows customers to view energy usage in 15-minute intervals and makes usage data available to customers each morning.

Evaluation Objectives

The overall goal of the evaluation was to provide feedback to program designers and administrators on which DR goals and objectives were successfully achieved and which areas of DR program/rate implementation need to be improved. Key areas of assessment included:

- Customer awareness of CPP-D and DR
- Effectiveness of program marketing and utility communications
- Changes in customer behaviors during CPP events
- Reasons customers opted out of CPP-D
- Barriers to and benefits from participation in DR programs

¹ The SDG&E Energy Management Tool is called kWickview, but will be referred to as EMT in this paper.

Evaluation Approach

The evaluation approach consisted of a multi-tiered data collection and analysis strategy using an online surveys and in-depth phone surveys with customers and workshops and in-depth interviews with program staff and Account Executives (AE's). Online surveys provided mostly quantitative information from CPP-D customers, but also allowed for the collection of qualitative feedback via optional open-ended responses. In-depth customer phone surveys provided more qualitative feedback from customers and corroborated quantitative and qualitative results obtained in the online surveys. Workshops and in-depth interviews with program staff and AE's were used to determine program theories and rationale and to assess the effectiveness of CPP-D implementation.

Program Staff Interviews

In-depth interviews with program staff responsible for overseeing the implementation of the CPP-D rate provided a unique and timely opportunity to gain insight into lessons learned from the SDG&E CPP-D roll-out.

Tariff Design

CPP-D did not fit particularly well within SDG&E's broader Demand Response portfolio. The tariff overlapped with many existing programs. Customer eligibility for the tariff was not straight forward, and significant effort was required to determine customer eligibility.

The rate was designed at the meter/account level and was not customer friendly. For example, customers with multiple accounts could have some accounts default and others not. Also, the rate was tied to meter read dates associated with each account, meaning one customer could have many different default dates associated with their many accounts. Key lessons learned with respect to tariff design include:

- Do a better job of integrating the new DR rates into the portfolio (or redesign the DR portfolio) so the tariffs are easy for customers to understand.
- Ensure that the parameters for customer eligibility are clear and that eligibility is easy to determine using existing utility data.
- Bear in mind how the rate will impact customers, not just accounts, and consider conducting customer research on the rate design.

Internal Planning and Processing

Representatives from SDG&E reported that determining customer eligibility was not straightforward as it involved multiple factors such as the customer size, type of meter and length of time the meter had been installed. Certain unexpected issues had to be addressed as they arose, such as customers with multiple accounts who chose to adopt the rate for some of their accounts and not others. As a result, new processes had to be worked out that required coordination across various departments. Due to the tight implementation timeline, however, some processes had to be performed manually until there was time to develop more systematic processes.

Lessons learned from the internal planning and processing of the CPP-D roll-out include the following:

- Allow for adequate internal planning and customer research time (at least one year).
- Automate internal customer data processing.
- Use online customer enrollment.
- Determine the rules and process for establishing customer eligibility ahead of time, addressing major issues such as customers with multiple accounts, and allow enough time to develop a final eligible customer list before the roll-out.
- Develop efficient procedures for continuously updating the customer eligibility list.

Customer Outreach

The main approach to educating customers about the default tariff was direct communication by SDG&E Account Executives. SDG&E DR program staff also held workshops directly with customers and trade associations, and trained AE's on the details of the tariff to assist them with customer outreach.

AE's who worked with larger customers that had been assigned to them in many cases through prior participation in a DR program (with between 25 and 80 customers each) were much more successful in their outreach than those that had smaller customers. This was attributable largely to the number of customers the AE's were responsible for. AE's with larger customers tended to have between 25 and 80 customers each, whereas AE's with smaller customers usually had 150 customers each. AE's struggled to develop a clear and consistent message to deliver to their customers due to the complicated nature of the tariff, the short time period for educating customers, evolving customer eligibility, and lack of internal policies and procedures. The AE's who were successful at customer outreach about the CPP-D rate were very hands-on, meeting face-to-face with many of them and staying in touch regularly via phone and email with updates and new information. The key lessons learned with respect to customer outreach:

- Plan for at least 6 months to communicate with customers.
- For large customers, the hands-on AE approach worked well.
- For the more numerous smaller customers more lead time is needed in order to develop effective customer communication strategies.
- Include suggestions in customer communications about the CPP-D rate on what strategies customers may use during a DR event.
- Include an explicit line item for marketing and outreach in the budget, because even though CPP-D is a tariff, customer outreach is paramount to successful implementation and customer retention on the tariff.

Account Executive Workshop

AE's attempted to contact all their customers by setting up face to face meetings and encouraging them to participate in the rate introduction workshops. The CPP-D roll-out provided an opportunity for AE's to make contact not only with facility personnel, but also decision

makers. However, some decision makers did not respond after numerous attempts to contact them were made.

During the rushed roll out period, AE's also relied on support staff at SDG&E, in order to put together billing analysis scenarios for customers. While support staff provided critical assistance at this time, AE's were still responsible for aggregating the results of the analysis. More automated billing analysis tools would have streamlined the process.

Barriers to Customer Participation in Demand Response and CPP-D

According to AE's, barriers to customer participation in DR programs are largely structural. Most customers who resist participating in DR programs cite difficulties with dropping load. The following are examples of customer types that find load curtailment especially challenging or problematic:

- **Hospitals.** Although most hospitals have standby generators, the facility personnel tend to be resistant to going on the CPP-D rate, since events can be called at any time. Relying on emergency standby generators would be very risky and could potentially have a major impact on core operations.
- **Property management and offices.** Property managers also express concerns about DR participation due to tenant contracts and risking tenant complaints. Getting agreement among large numbers of tenants to go on the CPP-D rate is challenging, and in some cases, next to impossible.
- **Data centers and telecommunications.** Like hospitals, these facilities are also required to be on the grid around the clock. Dropping significant load during events is difficult.

AE's mentioned that some customers do not have an energy management system (EMS), which makes it more difficult for them to participate, especially when they have multiple sites, because the facility manager would need to go to each building to adjust the thermostat and other facility settings. There are a substantial number of customers who joined CPP-D without an EMS, but most of them have to convince management to invest in an EMS for their facilities. Demand Response is not believed to be a key driver for this decision, though.

Lastly, AE's said that customers with a lack of access to capital for investing in Energy Efficiency (EE) and DR efforts continues to be a large barrier to participation and also impacts the customer's ability to reduce demand. The AE's are trying to address this barrier by referring customers to the Technical Assistance and Technology Incentives programs (TA/TI).

Account Executive Recommendations for Improving CPP-D

The most successful strategy for promoting CPP-D to customers is the face-to-face contact and personal follow-up to answer questions and address customer concerns. AE's said that they are more effective and have more credibility than the third-party marketers because they represent the utility and they have a personal relationship with customer contacts. Unfortunately, this type of personalized attention is not necessarily available to all customers due to the large number of customers on the CPP-D rate and is proving to be one of the biggest challenges of CPP-D. These recommendations were given by AE's for improving CPP-D:

- Improve technical support services to help customers identify opportunities to reduce energy load.
- Ensure that participation in CPP-D includes a strong component to assist customers with identifying curtailment measures and incentives for controls.
- Make the CPP-D rate as simple as possible. Consider re-naming or excluding the CRC.
- Leverage multiple channels to inform customers of CPP-D. Since customers are often preoccupied with their principal job functions, marketing efforts require persistence.
- Continue to have a wide selection of other DR programs. Having a variety of programs to present to customers enables AE's to find programs that best suit customer needs.
- Provide customers with feedback on their performance during events. This type of feedback is valuable to customers, both to inform them of successful (and unsuccessful) attempts at event curtailment and to validate the financial benefits of participation.

Customer Research Results

Online surveys and in-depth interviews provided quantitative and qualitative feedback from customers on awareness of the CPP-D rate, the effectiveness of SDG&E communications about CPP-D, reasons for opting out of CPP-D, and customer actions during events. SDG&E provided the evaluation research team with customer databases, which included account numbers, email addresses, and phone numbers. A \$10 incentive was offered to customers who participated in the online surveys and in the in-depth phone interviews.

Customer Samples

For the online surveys, a customized email invitation was sent to all customers who provided email addresses. Response rates were over 13% for CPP-D and Opt-Out customers combined. Online surveys were launched immediately after CPP-D events were called.

Table 1. Online Survey Sample and Completes²

Survey	CPP-D	Opt-Out	Total
Survey Launch Date	9/9/2009	9/9/2009	
Sample (Unique Organizations)	321	180	501
Completed Online Surveys	44	22	66
Complete as % of Sample	14%	12%	13%

In-depth surveys were conducted approximately two months after the launch of the online surveys and after the online surveys closed. Roughly 15% of the in-depth survey respondents also participated in the online survey and agreed to answer follow-up questions regarding their participation and actions during the recent demand response events. The research team

² Sample populations for CPP-D and Opt-Out strata in the online survey represent unique organizations. We assume that every organization has at least one unique account number, but some have multiple accounts. Each survey completed represents a unique organization with one exception: among the 44 SDG&E CPP-D surveys completed, 42 organizations are represented. One organization submitted 3 online survey responses for 3 unique customer accounts.

completed the remaining 85% of the surveys among non-respondents to the online survey in order to address potential non-response bias in the online survey results. The purpose for the in-depth interviews was to probe for more details on key responses to online questions regarding their participation experience and to gain more knowledge about customer’s experience and actions taken during the demand response events that occurred during the summer of 2009. Response rates to the in-depth phone survey are listed below in Table 2.

Table 2. In-Depth Telephone Survey Sample and Completes³

Survey	CPP-D	Opt-Out	Total
Survey Launch Date	11/23/2009	11/23/2009	
Sample (Unique Accounts)	665	280	945
Completed Telephone Surveys	31	34	65
Complete as % of Sample	5%	12%	7%

Customer Awareness of CPP-D Rate

With the online survey, 82% of CPP-D customers (36 of 44 customers) and 73% of Opt-Out respondents (16 of 22 customers) were aware of CPP-D or the fact that they opted out of CPP-D. For the in-depth interviews, the research team wanted to make sure that the person most knowledgeable about energy usage at each organization was reached. As such, we saw awareness levels increase to nearly 100% among the 65 in-depth survey respondents. All CPP-D in-depth survey participants were aware of the rate and only one Opt-Out customer was unaware of opting out of the CPP-D rate.

Communications and Marketing

Respondents to the online and in-depth surveys were asked for feedback on communications and marketing of the CPP-D rate and key aspects of the rate.

Capacity reservation charge. CPP-D and Opt-Out respondents were asked about their understanding of the CRC.

The responses in Table 3 below reflect respondents’ unaided understanding of the CRC. In other words, respondents were not given a definition of the CRC during the survey or interview. A relatively large number of CPP-D and Opt-Out respondents did not understand the CRC (more than 40%).

³ Sample populations for CPP-D and Opt-Out strata in the telephone survey represent unique accounts. Each survey completed represents a unique organization with at least one account.

Table 3. Unaided Understanding of CRC⁴

	% all CPP-D	n= all CPP-D	% all Opt-Out	n=all Opt-Out
Understand CRC	58%	36	60%	27
Don't understand CRC	42%	26	40%	18
Total	100%	62	100%	45

Respondents who understood the CRC were also asked whether or not they selected a CRC or simply defaulted to having a CRC of 50%. Nearly two-thirds of CPP-D respondents said that they selected a CRC (28 out of 43).⁵ Most of CPP-D respondents who selected a CRC did so based on historical energy usage data or ran multiple cost analysis scenarios. A few CPP-D respondents selected their CRC with the help of their AE.

Suggestions for improving communications about programs and rates. Respondents were given the opportunity to make suggestions for improving utility communications on programs and rates, which were then post-coded and placed into categories that synthesize answers given by each respondent. For participants who took the online survey, responses to open-ended questions were optional. For in-depth survey participants, suggestions were optional as well, since some respondents had no suggestions for improving communications.

The top suggestions from CPP-D customers and CPP-D Opt-Out customers who participated in the online survey and/or in-depth survey for improving communications from SDG&E on the CPP-D rate are as follows:

- Provide more education for new customers and follow-up education for existing customers on CPP-D rate.
- The rate needs to be less complicated and AE's need to be better educated about the rate in order to provide clearer information to customers.
- Provide more tools and information about pros and cons of being on CPP-D rate, including a year-end report on an organization's performance and reports on performance during a demand response event.
- SDG&E should run comprehensive billing analyses for prospective CPP-D customers in order to emphasize potential savings.

Motivations for Participating in CPP-D or Opting-Out

Reasons for staying on CPP-D rate. In-depth telephone survey respondents were asked why they decided to remain on the CPP-D rate. Below are the top reasons cited by respondents for staying on the CPP-D rate:

- Rate/program incentives lead to cost savings
- Organization's operations are well-suited for being on CPP-D rate

⁴ This table combines data from customers who took part in the online survey and data from respondents who completed telephone interviews, but did not participate in the online survey.

⁵ Results include respondents from the in-depth interview who were given a definition of the CRC after an initial CRC understanding question in which a definition of the CRC was not provided.

- Save energy and/or environmental reasons

Another reason cited by respondents was a lack of a better alternative. That is to say, opting out of the CPP-D rate would have been worse for the organization.

Reasons for opting out of the CPP-D rate. CPP-D Opt-Out respondents were asked why they decided to opt out of the CPP-D rate. The following reasons were cited by these customers:

- Unable to shed load or could not shed load without hurting business and/or inconveniencing customers
- Staying on CPP-D rate would yield no savings or not enough savings
- The rate was not well understood and too complex

The inability to shed load during events (e.g., hospitals and data centers) or the fact that shedding load during events might hurt business or inconvenience customers were by far the most common reasons cited by respondents for opting out of CPP-D.

CPP-D Opt-Out online and in-depth survey respondents were also asked what changes were needed in order for their organizations to consider going on the CPP-D rate. Although many Opt-Out respondents (45%) said that they would not be able to go on the CPP-D rate, more than half expressed a willingness to reevaluate their decision to opt-out if certain changes were made. Below are the most frequently cited changes or actions needed that might induce Opt-Out customers to go on the CPP-D rate:

- Reach out to organizations to demonstrate the potential savings of being on CPP-D rate through a detailed billing analysis
- Rate details and benefits need to be explained more thoroughly by AE's in order for customers to feel comfortable about going on CPP-D rate
- More flexibility in the amount of load that needs to be shed for organizations that are unable to shed much load during an event; lower penalties during event periods and reduce savings during non-event periods for these organizations

Based on the responses from Opt-Out customers, there is a pool of customers who would be willing to reevaluate their decision to opt out of the CPP-D rate if they had a better understanding of how the rate worked or if a AE's were to reach out and demonstrate the potential savings of being on the rate through billing analyses tailored to specific organizations. Another group of customers would be willing to go on a modified CPP-D rate that catered to customers who could shed some load during events, but not enough load to absorb the cost of exposure to higher rates during events. These customers were discouraged from going on the CPP-D rate because of the potential risk involved.

Demand Response Events

Several CPP events were called late in the summer of 2009, which gave researchers the opportunity to ask CPP-D customers about their experiences with the events, including awareness of events, SDG&E communications regarding the events, and the effectiveness of the SDG&E EMT. CPP-D online survey respondents had the opportunity to respond to questions

about events that occurred in August and September of 2009. Likewise, all in-depth survey respondents were asked a series of questions about those events. Highlights of feedback regarding events are provided below.

Awareness of events and satisfaction with event communications. Awareness of CPP events among customers who knew they were on the CPP-D rate was universal. All 62 online and in-depth survey respondents were aware of CPP events in August and September of 2009.

Nearly all respondents who recalled having an event said that they received an email notification about the event. Secondary means of communication included phone calls, text messages, faxes, and direct communications from AE's. With respect to satisfaction with communications about 2009 CPP events, nearly all customers were satisfied (see Table 4 below).

Table 4. Satisfaction with Event Communications⁶

	% CPP-D aware of events	n=CPP-D aware of events
Satisfied ⁷	95%	59
Not satisfied	5%	3
Total	100%	62

Only three CPP-D respondents reported that they were not satisfied with event communication.

Respondents were also asked for suggestions on improving event notification. The most frequently cited suggestions for improving event notifications are listed below:

- Provide ability to notify multiple recipients of events, including adding and removing contacts.
- Provide more information in the event notifications; clearly specify the reason for the event and state which demand response participant groups need to respond to event.

Usage and effectiveness of energy management tool during events. Customer usage of the SDG&E Energy Management Tool during 2009 demand response events was not especially high. Thirty-two out of 62 online and in-depth survey respondents (52%) reported using the SDG&E EMT.

All 32 of the CPP-D respondents who used the SDG&E EMT during events found it to be helpful. With respect to suggestions among CPP-D EMT users for improving the tools, having real-time energy usage data was the most common suggestion for improving the EMT. Other CPP-D respondents mentioned that the EMT was complex and they wanted more training using it or felt that their AE needed more training on the tool in order to help CPP-D customers use the EMT.

⁶ This table combines data from customers who took part in the online survey and data from respondents who completed telephone interviews, but did not participate in the online survey.

⁷ There were 36 online survey respondents. Twenty-four (67%) of those respondents said that they were very satisfied with event notification and 11 (31%) said that they were somewhat satisfied. One respondent (3%) was somewhat unsatisfied with event communication.

Recommendations

This section summarizes lessons learned from the online and in-depth interviews regarding customers' perceptions, expectations, and satisfaction with CPP-D and provides recommendations for improvement going forward.

Understanding of the CPP-D Rate

- Among CPP-D Opt-Out respondents, 11% believe they needed to shut down operations entirely in order to be on the CPP-D rate. Improvements in SDG&E communications regarding this aspect of the CPP-D rate would help correct this misunderstanding.
- With respect to the Capacity Reservation Charge 42% of CPP-D respondents and 40% of Opt-Out respondents do not understand the CRC. Better communications and marketing about the CRC are needed from SDG&E.

Communications and marketing. Suggestions from CPP-D customers and CPP-D Opt-Out customers for improving communications from SDG&E on the CPP-D rate are:

- Provide more education for new customers and follow-up education for existing customers on CPP-D rate.
- The rate needs to be simplified and AE's need to provide clearer information to customers about the rate.
- Provide more tools and information about the pros and cons of being on CPP-D rate, including a year-end report on an organization's performance and reports on performance during a demand response event.
- SDG&E should run comprehensive billing analyses for prospective CPP-D customers in order to emphasize potential savings

Opt-Out Customers: Actions Needed to Switch to CPP-D Rate

- Reach out to organizations to demonstrate the potential savings of being on CPP-D rate through a detailed billing analysis.
- Rate details and benefits need to be explained more thoroughly by AE's in order for customers to feel comfortable about going on CPP-D rate.
- More flexibility in the amount of load that needs to be shed for organizations that are unable to shed much load during an event; lower penalties during event periods and reduce savings during non-event periods for these organizations.

Suggested Improvements for SDG&E Energy Management Tool.

- Provide real-time energy usage data.
- Provide more training on using the EMT to customers and/or AE's.

With respect to the last recommendation, this group of customers might be more likely to join CPP-D if they had a better understanding of the CRC, which could potentially limit the amount of curtailment needed for these organizations during an event.

Conclusion

Based on feedback from CPP-D implementers, AE's, and customers, there are a number of key lessons learned in the evaluation of SDG&E's CPP-D rate. With respect to lessons learned from program staff, it is critical that parameters for customer eligibility are clear and easy to determine and that a reliable and up-to-date list of eligible customers is maintained. Furthermore, program implementers need to keep in mind how the CPP-D rate will impact customers first and foremost and should simplify their approach to dealing with customers with multiple accounts. Common themes emerged from the AE interviews and customer research. First, it is clear the CPP-D rate needs to be simplified. The complexity of the CRC, in particular, needs to be addressed. Second, AE's should conduct more comprehensive billing and rate analyses for prospective CPP-D customers to demonstrate the benefits of participation in DR. Third, AE's should offer existing CPP-D customers reports on their performance during CPP-D events to demonstrate whether or not their curtailment efforts were effective. Lastly, marketing and communication efforts regarding the CPP-D rate are critical not only during the roll-out of CPP-D, but also as a means of continuing education for participating CPP-D customers.

The roll-out of CPP default rates in the state of California represents a major shift in policy, which has had a substantial impact not only on DR participation rates and eligible customers, but also on the way program implementers think about Demand Response going forward. The pervasiveness of Smart Meters across the state in combination with the CPUC's ruling that allowed non-residential customers to default onto CPP rates greatly expanded the number of potential DR customers. While interruptible DR programs will continue to play an important role in shaping and reducing load of large non-residential customers, dynamic rates like CPP represent the future of Demand Response. SDG&E's CPP-D roll-out offers an early glimpse into the changing landscape of Demand Response. While there are concrete lessons learned from the experience of SDG&E's roll-out of CPP-D, difficult challenges still lie ahead. Most notably, CPP has now been introduced to a wider customer base, and face-to-face contact between utility representatives and their customers may not always be possible. Effective education, marketing, rate design, and implementation will all be critical as CPP rolls out in the rest of the state.

References

- Braithwait, S. D., D. G. Hansen, J. Reaser, and M. P. Welsh (Christensen Associates Energy Consulting, LLC) and J. Bode and S. George (Freeman, Sullivan & Co.) 2009. **2008 Load Impact Evaluation of California Statewide Critical-Peak Pricing Rates for Non-Residential Customers: Ex Post and Ex Ante Report** (*Draft*). Madison, Wisc.
- KEMA Inc. 2010. **California Statewide Process Evaluation of Selected Demand Response Programs: Process Evaluation of PG&E, SCE, and SDG&E's Critical Peak Pricing and Base Interruptible Programs**. Prepared for the Demand Response Measurement Evaluation Committee (DRMEC) on behalf of San Diego Gas & Electric Company. Oakland, Calif.