

Critical Peak Pricing Lowers Peak Demands and Electric Bills in South Dakota and Minnesota

Sioux Valley Energy (SVE) is an electric cooperative serving approximately 21,000 customers in seven counties in South Dakota and Minnesota. SVE's Smart Grid Investment Grant (SGIG) Advanced Metering Infrastructure Project is a customer-focused initiative to assist customers with better managing their electricity consumption and associated costs, and to help SVE realize operational efficiencies and ultimately lower power supply costs. To achieve these goals, the Advanced Metering Infrastructure Project is deploying smart meters to all of its customers along with associated communications and data management systems for automating various metering services, offering time-based rates, and providing customers with information on their hourly electricity consumption and costs.

The SVE project involves total funding of approximately \$8 million, including \$4 million from the U.S. Department of Energy's (DOE) SGIG Program. According to Ted Smith, Director of Engineering and Operations, "DOE's SGIG program came along at a perfect time for SVE; we were putting plans in place to upgrade our automated meter reading (AMR) system, which was installed in the mid-1990s and had reached the end of its useful economic life. DOE funding has allowed us to accelerate our schedules and cut implementation times in half—from 5 to 2½ years. In addition, the DOE funds allowed us to use meter functions, such as tamper detection and voltage monitoring, that we probably would not have addressed for several years."

Critical Peak Pricing for Lowering Peak Demand

SVE is billed by its power suppliers based on monthly peak demand levels. Reductions in electricity use during peak periods translate directly into cost savings for SVE, which are then passed on to their customers.

During the summer of 2011, SVE offered critical peak pricing (CPP) to about 600 customers to participate in a pilot program to reduce their electricity consumption on those days and times when hot weather and air conditioner use would normally push SVE into buying more expensive power from suppliers.

Of the customers participating in the CPP pilot, some volunteered (opt-in), while a larger number of others were included in the program but were allowed to leave (opt-out) if they were not interested in participating. Those customers who chose to opt-out were placed back on the standard rate. A third group of program participants consisted of customers who were not placed on the CCP rate but were encouraged to monitor their consumption through a web portal or an in-home display. As part of the program, SVE wanted to learn whether giving customers access to information on their consumption and costs alone would have an effect on peak demand.

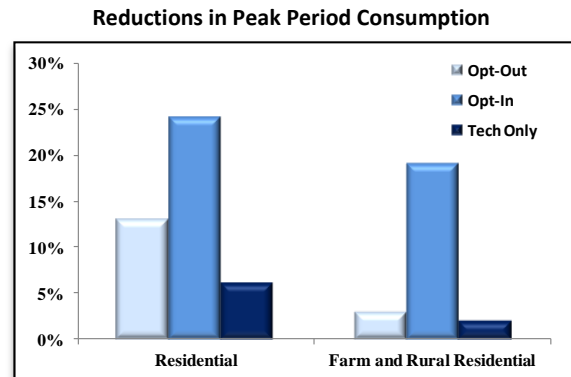


SVE's smart meters report consumption levels every 30 minutes, which enables SVE to bill customers for critical peak events that occur on particular days and during particular time periods. This detailed billing cannot be done with conventional meters.

The CPP rate went into effect on days identified by SVE when system electricity demand would reach peak levels and result in higher wholesale power costs. Participating customers were notified of the critical peak event one day in advance using phone calls, email, text messages, or in-home displays. SVE could have announced up to 35 critical peak events over the summer, but chose to be cautious and called only 13 critical peak events. When called, the critical peak events covered a four-hour period between 4:00 p.m. and 8:00 p.m.

When the rate was in effect, CPP participants paid fifty cents per kilowatt-hour, compared to less than seven cents during all other times. SVE customers on standard rates paid more than nine cents per kilowatt-hour, so the CPP participants could save money (about two cents per kilowatt-hour), particularly if they were able to reduce electricity use during critical peak events. The critical peak price of fifty cents per kilowatt-hour provided a financial incentive for participants to shift optional activities, such as clothes washing and drying and dish washing, to times other than critical peak periods.

Results from SVE’s pilot program demonstrated that the CPP strategy was successful in lowering peak demand. Residential customers in the pilot reduced their consumption during peak periods by about 5 to 25 percent, depending on whether they were in opt-in, opt-out, or technology-only groups. Findings for farms and other rural residential customers in these same groups were tallied separately; they also reduced their consumption during peak periods, but by somewhat lower amounts.



Impacts varied by type of SVE CPP pilot participant class and whether they were placed on CPP or just had access to a web portal or in-home display.

SVE conducted surveys to determine customer acceptance (which was found to be high) and to better determine the causes of the results. One of the leading factors was the degree to which the customers identified themselves as environmentally and energy conscious, or “green.” The greater the level of identification as green, the greater the reduction in electricity use during peak periods. The surveys showed that there were more green participants in the opt-in group than in the other groups.

Participants who were not on the CPP rate but who had access to information through the web portal or in-home displays also reduced their consumption during peak periods, but by much less than those on the CPP rate. Regarding participation in the CPP program, one customer commented, “If it helps SVE save money, we are all for it; a little pre-planning is all that is needed to comply with the peak load periods. We were pleased that our actions helped reduce our bills, too.”

Providing Information and Education

According to SVE, approximately 90 percent of customers said they were likely to continue on the CPP rate, about half of whom said they were very likely to continue. One reason for this positive response is that most of the participating customers realized direct savings on their electrical bill. Only a handful of

customers provided negative feedback, with the most complaints received after CPP events were called on consecutive days.

With high levels of acceptance in 2011, SVE decided to expand the CPP pilot for a second year of testing during the summer of 2012. About 2,000 letters were recently sent to potential participants for the volunteer opt-in group. The response has been enthusiastic, and the 2012 quota of customers was quickly filled. SVE indicated that interest was so high that a few customers were asked to wait for another opportunity in 2013.

SVE credits the high level of customer acceptance to their efforts to inform and educate customers. SVE began before the meters were installed by providing monthly stories in its newsletter which explained why the project was being done and outlined the potential benefits from the customer's point of view. SVE took every opportunity to alert customers about installation schedules and timelines and experienced very few complaints as a result. SVE produced a smart meter guide, which was posted on its website.¹ The smart meter guide was also the basis for a series of presentations to customer groups at eleven district meetings, the annual customer meeting, and an on-line webinar.

According to Debra Sommers, Director of Customer and Employee Services, "We don't think it is possible to communicate too much about the new technologies, systems and rate options being offered to our customers. These are new things to them, and they require changes and accommodations. Some customers expressed suspicions, but we were easily able to allay their concerns with frequent and factual information about what we were doing and how they could benefit."

SVE reports that the new web portal has been a particularly effective customer education tool. One SVE customer noted, "The information has been very helpful to me, as I am a very energy-conscious consumer. I want to know how much I use and when I use it so I can try to reduce my consumption and bills. I look at my information almost daily and at least twice per week."

Lessons Learned and Next Steps

SVE's activities in time-based rates and customer education are the beginning steps of a long-term plan for the company. According to Ted Smith, "While we're very pleased with last summer's results, we are not ready for full-scale rollouts because there are other rates we want to test and we need more operating experience to fine-tune our procedures and protocols for calling critical events. Our aim is to be ready for system-wide rollout of time-based rates in about five years."

SVE plans to do a new pilot in the summer of 2013 involving critical peak rebates, and the utility is in the process of programming their meter data management system to accommodate this type of rate in their billing system and web portal. Time-based rate programs are also being considered in order to lower peak demand in the winter months. According to Mr. Smith, "Winter rate designs will be trickier since critical peak events can occur on weekends or during holidays, depending on the weather." SVE also has plans for offering pre-payment billing schedules.

¹ <http://www.siouxvalleyenergy.com/pdf/smart%20grid%20guide%20November%202011%20for%20website.pdf>

SVE's experiences from the summer of 2011 produced a few lessons learned for summer 2012 operations. For example, SVE is interested in calling more critical peak events to improve their business case for lowering wholesale power supply costs. The utility also plans to explore better procedures for forecasting critical peak events and is continuing to work with its power suppliers to identify more effective forecasting procedures. Since more critical peak events will affect customer acceptance, this too will need to be thoroughly assessed.

For SVE, the peak demand reductions, along with the operational savings from tamper detection and remote service connections, have made the investment in advanced metering infrastructure a win-win for themselves and their customers.

Learn More

The American Recovery and Reinvestment Act of 2009 (Recovery Act) provided the U.S. Department of Energy with \$4.5 billion to fund projects that modernize the Nation's energy infrastructure and enhance energy independence. For more information about the status of other Recovery Act projects, visit www.smartgrid.gov. To learn about DOE's Office of Electricity Delivery and Energy Reliability's national efforts to modernize the electric grid, visit www.oe.energy.gov.



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