Enhancing Price Response Programs through Auto-DR: California's 2007 Implementation Experience

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ABSTRACT

This paper describes automated demand response (Auto-DR) activities, an innovative effort in California to ensure that DR programs produce effective and sustainable impacts. Through the application of automation and communication technologies coupled with well-designed incentives and DR programs such as Critical Peak Pricing (CPP) and Demand Bidding (DBP), Auto-DR is opening up the opportunity for many different types of buildings to effectively participate in DR programs.

We present the results of Auto-DR implementation efforts by the three California investor-owned utilities for the Summer of 2007. The presentation emphasizes Pacific Gas and Electric Company's (PG&E) Auto-DR efforts, which represents the largest in the state. PG&E's goal was to recruit, install, test and operate 15 megawatts of Auto-DR system capability. We describe the unique delivery approaches, including optimizing the utility incentive structures designed to foster an Auto-DR service provider community. We also show how PG&E's Critical Peak Pricing (CPP) and Demand Bidding (DBP) options were called and executed under the automation platform. Finally, we show the results of the Auto-DR systems installed and operational during 2007, which surpassed PG&E's Auto-DR goals. Auto-DR is being implemented by a multi-disciplinary team including the California Investor Owned Utilities (IOUs), energy consultants, energy management control system vendors, the Lawrence Berkeley National Laboratory (LBNL), and the California Energy Commission (CEC).

Introduction

Auto-DR is not a demand response program. Auto-DR is a communications infrastructure to provide DR program participants electronic, internet-based price and reliability signals that are linked to the facility energy management control systems (EMCS) or related building and automated process control systems. Auto-DR price and reliability signals trigger in an automated manner with pre-programmed energy management and curtailment strategies developed by the customers. The Auto-DR price and reliability signals can be used to automate the response to dynamic pricing as well as conventional interruptible and demand bid options. Enabling Auto-DR requires three basic technologies- a price or reliability signal generator (DR Automation Server); a communications device at each facility to receive the price and reliability signals (gateways and relays); and a customer-provided facility energy management and control system or related system for lighting, HVAC (heating, ventilation, or air-conditioning), industrial process and other controls. One important concept in Auto-DR is that a facility manager must have the ability to "opt out" or "override" a DR event if the event comes at a time when a reduction in end-use services is not acceptable.

Auto-DR was developed through LBNL's Demand Response Research Center, funded by the CEC's Public Interest Energy Research (PIER) program (Piette et al, 2005a, 2005b, 2006, 2007). LBNL has been operating Auto-DR pilot research programs since 2003 in a number of facilities throughout California.

Results from the pilot efforts demonstrate that Auto-DR can deliver low-cost, reliable, consistently repeatable electric demand response in different types of facilities (mainly commercial buildings). Four years of LBNL research documents that Auto-DR provides a low-cost communication and technology infrastructure capable of supporting a broad range of reliability and economic demand response programs. Auto-DR also improves the repeatability of the demand response, reduces on-site labor costs associated with manual DR, and hardens the resource by requiring commitment to a consistent set of strategies. Auto-DR with standardized, open protocols provides a DR infrastructure for future wide scale implementation that can be extended into future building and appliance controls. Because HVAC and lighting typically are the facility loads most likely to be controlled, the greatest demand response potential is available on hot summer weekday afternoons. Researchers at LBNL have also developed a technical guide to DR strategies to help facility managers evaluate their HVAC and lighting controls and develop appropriate DR strategies (Motegi et al, 2007). Auto-DR participants in the industrial sector also rely on load shed strategies derived from their process loads, where weather conditions are a minimal factor.

Drawing from the successful results of LBNL's pilot efforts, the California Public Utilities Commission (CPUC) required all California IOUs to deploy larger-scale Auto-DR efforts in their service territories as a way to enhance their overall demand response program portfolios and be better prepared to respond to severe heat storms that typically hit the state during the summer months. This paper highlights the results of the three IOU efforts, with a particular emphasis on PG&E's 2007 Auto-DR implementation model and results.

Statewide Auto-DR Efforts in 2007

Following the CPUC's August 22, 2006 Assigned Commissioner's Ruling (ACR) to expand demand response programs for 2007, each IOU submitted plans to implement a program tailored to their unique DR program offerings and customer mixes. PG&E opted to significantly expand its previous pilot efforts with a comprehensive implementation strategy (outlined in greater detail later in this paper). PG&E's, Auto-DR is being implemented through a collaboration that includes an outside consulting team consisting of Global Energy Partners LLC (GEP) (based on Lafayette, CA), LBNL (based in Berkeley, CA) and Akuacom (based in San Rafael, CA). Southern California Edison (SCE) opted for a pilot implementation of Auto-DR that would only be applicable to their CPP rate option participants. SCE's 2-year goal is to achieve 10 MWs of Auto-DR capability by 2008. SCE plans to expand their Auto-DR efforts in 2008 to include Auto-DR for their DBP program, in addition to the CPP rate option. Auto-DR is being implemented internally at SCE, with the assistance of an outside consulting team from GEP, LBNL and Akuacom. San Diego Gas & Electric decided to implement Auto-DR only for their Capacity Bidding (CBP) program. SDG&E encouraged third-party aggregators to include an Auto-DR component in their CBP program portfolios.

All three IOUs make extensive use of the Technical Assistance/Technology Incentive (TA/TI) funding to support their Auto-DR efforts. The first element of TA/TI offers engineering assistance (up to $100/kW of identified load reduction capability) to help determine how, and by how much, customers may be able to reduce their peak demand under the utility demand response or reliability options. The second element of the program (TI) offers cash incentive payments for the installation of equipment or control software that provides demand response. The incentive cap is normally $250/kW of verified load reduction capability however the CPUC has allowed the utilities to pay customers who opt for Auto-DR an extra $50/kW to accommodate the higher costs and to reward them for early adoption of the Auto-DR technology platform.

The CPUC's August 22nd ACR included four Auto-DR related objectives:

- **Objective #1 – Accelerate Implementation**: With Auto-DR, it was predicted that a larger number of customers would be inclined to participate in demand response events because of the ease brought about by automation.
- **Objective #2 – Expand Auto-DR Beyond CPP**: Since Auto-DR is a technology platform that enables loads to automatically respond to outside communication signals, it was believed that automation could be adapted beyond the confines of the CPP tariff into other price response programs such as DBP and CBP, and possibly reliability options such as interruptible tariffs.
- **Objective #3 – Expand the Role of Auto-DR Technical Providers**: Given the anticipated high volume of Auto-DR participants and the highly technical needs that are necessary to enable Auto-DR systems, it was deemed necessary that a community of capable Auto-DR technical providers be established to ensure the sustainability of the technology.
- **Objective #4 – Improve DR Peak Reduction Performance**: With automation in place, it was predicted that a greater share of the customer loads could be enabled to participate in DR events relative to those customers that rely on manual methods to respond to DR events.

In a recent LBNL briefing to the CPUC on Auto-DR, results of the statewide efforts to date were summarized relative to these four objectives. Figure 1 summarizes the results according to each of the objectives. All four objectives are being met. The program implementation has been accelerated from 1 MW to 25 MW of peak load reduction statewide. In addition to CPP, there are now two additional DR offerings (DBP and CBP) that have the Auto-DR technology overlay. Eight vendors have been trained as Auto-DR Technical Coordinators (TCs) who are able to assist customers in the Auto-DR assessment and enablement process. Finally, the peak reduction performance has been drastically improved from 13% to 34% average load reduction by the inclusion of industrial customers with process flexibility and resident automation capability.

Figure 1: Statewide Results of Auto-DR Implementation[1]

CPUC ACR Objectives	2006	2007 Installed	2007 In-Process	2007 Total
1. Accelerate Implementation				
▪ Commercial participants	13	125	16	141
▪ Industrial participants	0	3	8	11
▪ Peak Load Reduction	1 MW	18 MW	7 MW	26MW
2. Expand AutoDR beyond CPP to other DR options	CPP only	CPP, DBP, CBP		
3. Expand the role of Technical Providers	none	8 industry participants		
4. Improve DR performance (Peak Reduction)				
▪ Commercial	13%	23%	12%	21%
▪ Industrial	--	46%	66%	52%
▪ Aggregate All Participants	--	31%	37%	34%

[1] Lawrence Berkeley National Laboratory Demand Response Research Center. "Automated Demand Response for Commercial and Industrial Facilities: A Progress Report to the CPUC." December 2007.

PG&E's Auto-DR Efforts

The DRRC and the CEC initiated the Auto-DR effort in 2003 with a pilot demonstration involving five commercial sites located in Santa Barbara, Concord, Palo Alto, and two in Oakland. Each of the initial facilities had internet controls that could host the advanced communication technology infrastructure. The first automated CPP effort with PG&E was Summer 2005. The Auto-DR pilot effort continued through 2006 and grew to a total of 13 commercial sites. LBNL, working with an outside team of automation contractors and software developers, established the Auto-DR technology and communication platform to support different types of demand response customers and facilities. The platform is a client-server system, the server is referred to as the Demand Response Automation Server or DRAS. Akuacom worked with LBNL to develop the DRAS. Current work at the DRRC involves developing the Auto-DR signaling system into an open standards-based automation platform that could be used by any utility, aggregator, or Independent System Operator (ISO) and multiple vendors could offer DR Automation Servers and clients. The DRAS clients are further described below.

Auto-DR Overview

The PG&E Auto-DR goal for 2007 was to achieve 15 MW peak load reduction. The DR events were to be initiated through PG&E's existing price-based demand response programs including CPP and DBP. GEP was retained by PG&E to work with LBNL to commercialize the Auto-DR pilot efforts from previous years into 2007 and beyond. Working with LBNL, GEP established a team of industry experts to perform the tasks necessary to successfully implement the project. GEP retained a variety of subcontractors who played key roles in the project, including the Electric Power Research Institute (EPRI), and C&C Building Automation, Inc. PG&E directly retained Akuacom, Inc. to further expand the DRAS for the DBP program.

Auto-DR was implemented in a structured manner by the project team. Below is a summary of the tasks that were directed by PG&E to GEP, LBNL and Akuacom:

- Develop Auto-DR marketing collateral
- Expand the DRAS capability for DBP
- Qualify and train Auto-DR technical service providers
- Screen and recruit customers for Auto-DR
- Conduct Auto-DR technical assessments and formalize customer participation
- Install Auto-DR systems, coordinate installations and process customer incentives
- Validate and test Auto-DR system installations
- Operate the Auto-DR during DR events
- Assess the results and make recommendations for future improvements

Auto-DR technical capabilities were delivered to customers using a variety of delivery strategies. First, a website was established (www.auto-dr.com) to serve as a repository of information and resources that could be accessed by customer and technical providers. Second, a testimonial video was developed by Tech Closeup TV to highlight the Auto-DR technology and its effects on the building operations. Third, GEP worked extensively with PG&E's sales representatives to identify and meet with prospective customers about Auto-DR.

Incentives were provided to customers using the PG&E TA/TI program. Specifically, the TI program element provides for a total incentive of $300/kW for Auto-DR customers. The TI incentive was designed into the following categories:

- Recruitment: Outside vendors were paid up to $40/kW to recruit viable Auto-DR customers. Customers were typically existing clients of the recruitment vendors.

- Technical Coordinators (TC): Trained energy management control system vendors were paid up to $70/kW for their services in conjunction with: (a) assisting the customer in understanding the selected Auto-DR control strategies for their facilities; (b) assisting the customer in selecting the equipment vendors; (c) participating in the verification of the installed Auto-DR equipment; and (d) maintaining contact with the customer during the DR season to ensure that the Auto-DR equipment is properly operating and that estimated load reductions are being realized.
- Equipment: Customers were reimbursed up to $140/kW for the costs associated with the design, procurement, and installation of the Auto-DR supportive technologies and measures. In nearly all cases, this incentive covered 100% of the customer's Auto-DR project costs.
- Participation and Performance: Customers were qualified for a participation incentive of up to $50/kW for their participation and validated performance during the DR-event period (May 1, 2007 through October 31, 2007).

Auto-DR Technology Architecture

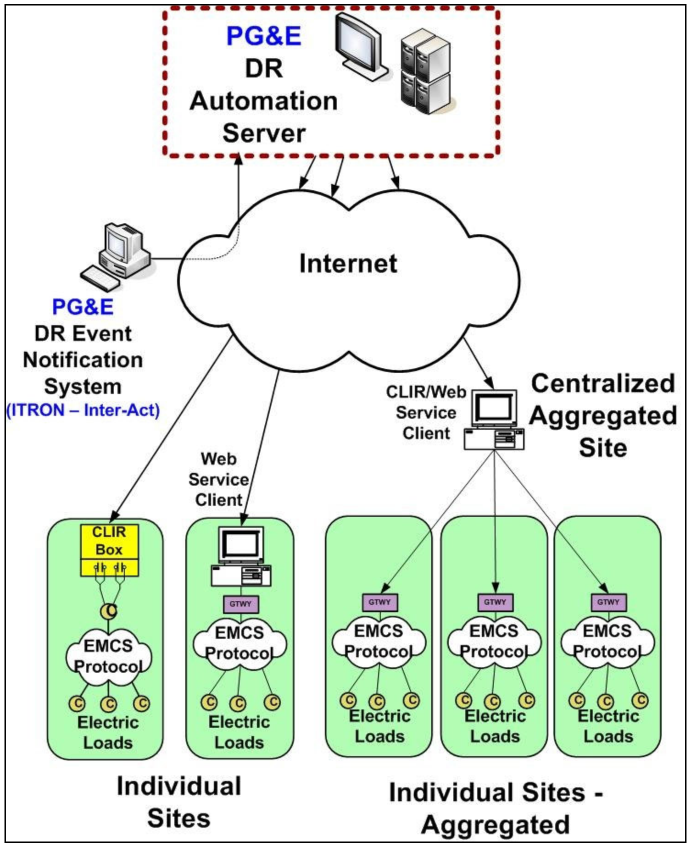
The Auto-DR technology architecture for the PG&E effort is illustrated in Figure 2. The architecture consists of two major elements built on an open-interface standards model. First, the DRAS provides signals that notify participating customers of DR events. Second, a DRAS client for each customer's site listens to automation signals and is linked to existing pre-programmed DR strategies independent of control network protocols such as BACnet, Modbus, etc. There are two types of DRAS clients:

1. Client and Logic with Integrated Relay (CLIR) for legacy control systems that need hardware and software for their internet connectivity.
2. Web Services (WS) software for control systems that are already linked to the Internet and has the capability to react on the signals sent by DRAS.

As shown in Figure 2, the steps involved in the Auto-DR process during a DR event include:

1. PG&E's DR event notification system calls for a DR event (typically triggered based on forecasted high temperatures or ISO grid reliability constraints)
2. PG&E's InterAct Curtailment system sends these signals to the DRAS.
3. DR event and price information are published on the DRAS.
4. DRAS clients (CLIR or WS) request real-time event data from the DRAS every minute.
5. Customized pre-programmed DR strategies determine load shed actions in customer's facility based on event price/mode.
6. Facility Energy Management Control Systems (EMCS) or related controls carry out load reductions based on DR event signals and strategies.

Figure 2: PG&E Auto-DR Technology Architecture

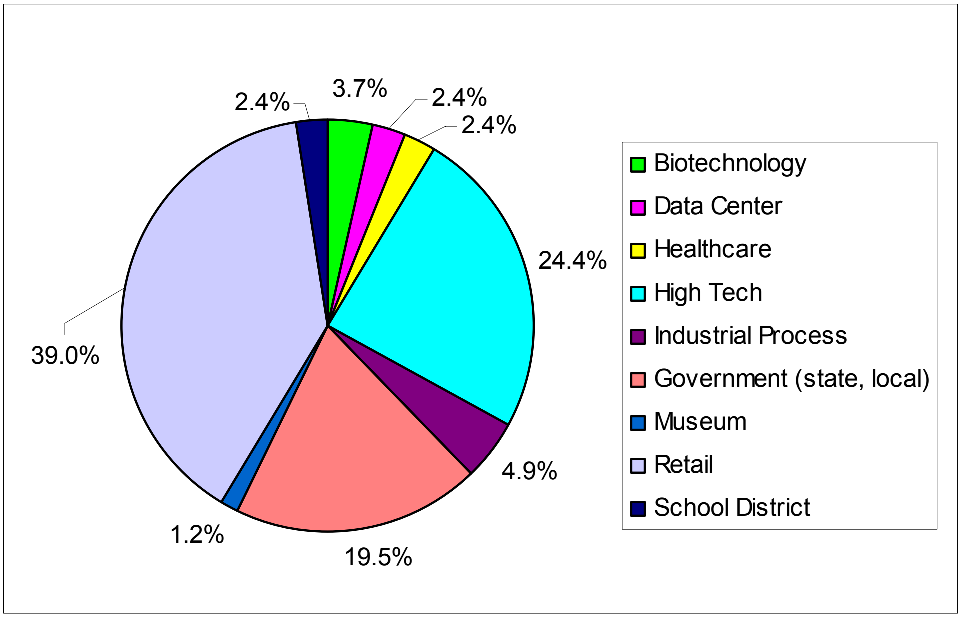


Auto-DR systems are built using XML and SOAP based secure Web Service Oriented Architecture (SOA) for platform-independent, interoperable systems and use low-bandwidth TCP/IP connections. Auto-DR has been used for PG&E CPP participants during the past three years. The PG&E's DBP program element was added to the DRAS in 2007. The DBP component of DRAS automates the bid and acceptance elements that are typical in demand bidding programs.

Recruitment and Participant Makeup

Over the course of the 2007 Auto-DR implementation, the GEP team recruited a total of 24 commercial, industrial and government customers. Participants included legacy customers (i.e., those who had continued their participation from the 2006 pilot program efforts) and new customers. A total of 82 PG&E service accounts were represented by these 24 customers. Figure 3 identifies the makeup of the 82 participating accounts by facility type. As can be seen from the chart, the largest share of participants was from retail stores. Retail chain stores typically already have advanced automation systems in place thus enhancing and simplifying their ability to participate in Auto-DR efforts. High tech facilities in the Silicon Valley were also ideal candidates for Auto-DR given their natural inclination toward adopting advanced and cutting-edge automation systems for their building operations. A large number of state and local government facilities also participated in the program.

Figure 3: PG&E Auto-DR Participant Makeup



Nearly two-thirds of the 82 participants signed up for the Demand Bid Program (DBP) option. PG&E's Critical Peak Pricing (CPP) tariff design,[2] which includes a potential of 6-hour critical peak period, tended to attract customers with the flexibility in their operations to sustain DR control strategies for the full 6-hour timeframe. Other customers were more inclined to sign up for the DBP option since event participation is voluntary and customers can bid in as few as two consecutive hours for any DR event. The Auto-DR element to DBP was that much more attractive for customers since they only had to define their default kW reduction and the hours that they would enable those reductions at the outset of their enablement process. After that point, their participation in DBP events was automatic. All of the CPP and DBP customers had the ability to opt out of DR events if their situations were not conducive to shedding loads on any particular event day.

DR Control Strategies

The DR control strategies adopted by the majority of participants primarily affected HVAC and lighting loads. Industrial customers adjusted their process loads to accommodate the DR events. The types of control strategies that were adopted included the following:

- Global temperature adjustment: Existing energy management control systems (EMCS) were adjusted to receive the DR event signal from the DRAS. Once that signal was received, the EMCS would raise the setpoint temperature established by a customer (usually in the range of 2 to 8 degrees) for a period of time.
- HVAC equipment cycling: For buildings that had multiple packaged HVAC systems, select units were configured to receive the DR event signal from the DRAS. Once that signal was received, compressor units were shut off for a subset of the building's systems during an acceptable period of time. Additional signals were then sent to restart those units and shut off other units.

[2] The PG&E CPP tariff includes a 6-hour event period from Noon to 6PM, where in the first three hours the price is elevated to three-times the peak price and in the second three hours the price jumps to five-times the peak price.

- Other HVAC adjustments: Other shed strategies that were employed included decrease in duct pressures, auxiliary fan shutoff, pre-cooling, valve limits and boiler lockouts.
- Light shutoff: Various lighting circuits were wired to receive the DR event signal from the DRAS. When signaled, these loads would be tripped for the entire duration of the DR event. Typically these were for lighting applications in common areas with sufficient natural light or for task applications that could accommodate full shutoff given the proximity of other lighting in the area.
- Other lighting and miscellaneous adjustments: Other shed strategies that were employed included bi-level lighting switches and motor/pump shutoff.
- Process adjustments: Given the varying nature of industrial processes, the strategy for each customer was tailored to their particular process. The most common Auto-DR strategy employed was modifying ancillary processes where there is sufficient storage capability such that the customer can accommodate complete equipment shutdowns during DR events and catch up production later in the day or the following day.

While a few data centers participated in the program, cooling loads associated with the data center function were not addressed in the 2007 program.

Estimated Load Reductions

PG&E's Auto-DR implementation was successful in recruiting more customers than necessary to meet its 15 MW load reduction goal for 2007. Table 1 summarizes the estimated load reductions by facility type. The 82 service accounts that were recruited and enabled for Auto-DR represented a total load reduction potential of 22.8 megawatts, or almost 52% more than PG&E intended to achieve. About two-thirds of the load reductions are attributable to four industrial process facilities.

Table 1: Estimated Load Reduction by Type of Facility

Facility Type	Number of Service Accounts	Estimated Load Reduction (kW)	kW Percent of Total
Biotechnology	3	172	0.8%
Data Center	2	842	3.7%
Healthcare	2	276	1.2%
High Tech	20	1,670	7.3%
Industrial Process	4	15,275	66.9%
Government (state, local)	16	934	4.1%
Museum	1	24	0.1%
Retail	32	3,608	15.8%
School District	2	34	0.1%
Total	**82**	**22,835**	

Table 2 shows the breakout of the estimated loads for the PG&E Auto-DR implementation. Over two-thirds of the service accounts and nearly 90% of the estimated load reduction is attributable to the DBP program. Table 3 shows the breakout of the estimated loads according to DR control strategy. Aside from the process system adjustments, the strategy that yields the next largest load reduction comes from the combined effects of HVAC adjustments and lighting reductions.

Table 2: Estimated Load Reduction by DR Option

DR Option	Number of Service Accounts	Estimated Load Reduction (kW)	kW Percent of Total
Critical Peak Pricing (CPP)	21	2,559	11.2%
Demand Bidding (DBP)	60	20,164	88.3%
CPP/DBP Combined	1	112	0.5%
Total	**82**	**22,835**	

Table 3: Estimated Load Reduction by DR Control Strategy

DR Shed Strategy	Number of Service Accounts	Estimated Load Reduction (kW)	kW Percent of Total
HVAC Adustments	40	3,365	14.7%
HVAC Adjustments and Lighting Reductions	38	4,195	18.4%
Process System Adjustments	4	15,275	66.9%
Total	**82**	**22,835**	

Participant Enablement Process and Cost

One of the early objectives of the PG&E Auto-DR efforts was to expand the role of technical providers who could cost-effectively deliver Auto-DR to customers. GEP held a number of TC training sessions during the early stages of the 2007 implementation, and ultimately brought under contract a total of eight companies to support the program as TCs.

The participants' load reducing capabilities were enabled through a variety of equipment and technology solutions that primarily adapted existing automation systems through programming code changes to accommodate the receipt of signals from the DRAS. As of November 2007, more than 72% (16.5 MW) of the estimated load reduction capability has been enabled for Auto-DR. Enablement requires that the equipment was installed, verification procedures implemented, load reducing capabilities tested under DR program conditions, and site certified for participation in the CPP and/or DBP programs. Participants were oftentimes enabled for Auto-DR through the use of their own control system providers and vendors.

The cost of the Auto-DR equipment enablement for the 82 service accounts is estimated to be $1.5 million. This yielded an enablement cost of $66/kW, and was fully covered through the TI incentive offered by PG&E. The full TI cost for the 2007 Auto-DR efforts, when including the costs associated with recruitment, technical coordination, equipment and participation was $230/kW.

DR Events and Shed Results

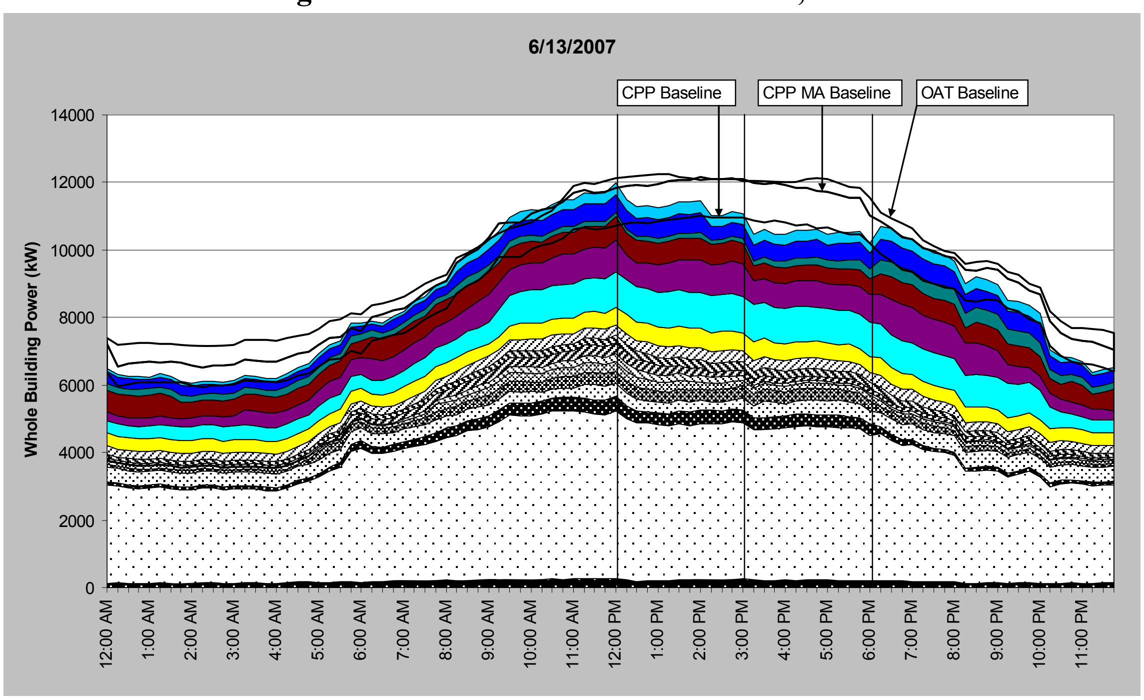
PG&E called the maximum 12 CPP events during the period from June 13th to August 31st. Only one DBP test event was called on August 30th. The unusually small number of called DBP events had much to do with the fact that 2007 was a cooler than normal summer in Northern California and wholesale prices remained significantly below the DBP incentive level of $0.50/kWh.

CPP Results. The results of the 12 CPP events are summarized in Table 4. A total of 17 enabled sites were able to participate in all 12 events over the course of the summer. During the 3-6PM timeframe on the 12 days, when the CPP price level jumped to five-times the peak price, all participating customers were able to drop 67% of their estimated loads. Note that on some days (7/9 and 8/1 in particular), the customers were able to meet or exceed their estimates. Figure 4 provides the 24-hour load shape aggregated for all 17 customers during the first CPP event day (June 13th). The load drop during the DR event is illustrated by the clear area between the top colored line and the three lines above.

Table 4: Auto-DR CPP Performance Summary

Date of CPP Event	Number of Participating Sites	Estimated Load Shed (kW)	Actual Load Shed (kW) CPP Baseline			Actual as Percent of CPP Baseline
			12pm-3pm	3pm-6pm	12pm-6pm	
6/13/07	17	1,568	-361.08	154.08	-103.50	10%
7/3/07	17	1,568	1,232.92	1,413.12	1,323.02	90%
7/5/07	17	1,568	545.00	680.66	612.83	43%
7/6/07	17	1,568	1,150.81	1,552.00	1,351.40	99%
7/9/07	17	1,568	1,770.77	1,879.22	1,825.00	120%
8/1/07	17	1,568	1,849.30	2,117.08	1,983.19	135%
8/21/07	17	1,568	485.99	881.49	683.74	56%
8/22/07	17	1,568	361.84	755.94	558.89	48%
8/28/07	17	1,568	844.72	1,157.01	1,000.87	74%
8/29/07	17	1,568	189.39	497.18	343.29	32%
8/30/07	17	1,568	137.21	564.35	350.78	36%
8/31/07	17	1,568	471.90	1,017.88	744.89	65%
Average	**17**	**1,568**	**723.23**	**1,055.83**	**889.53**	**67%**

Figure 4: Auto-DR CPP Event June 13, 2007



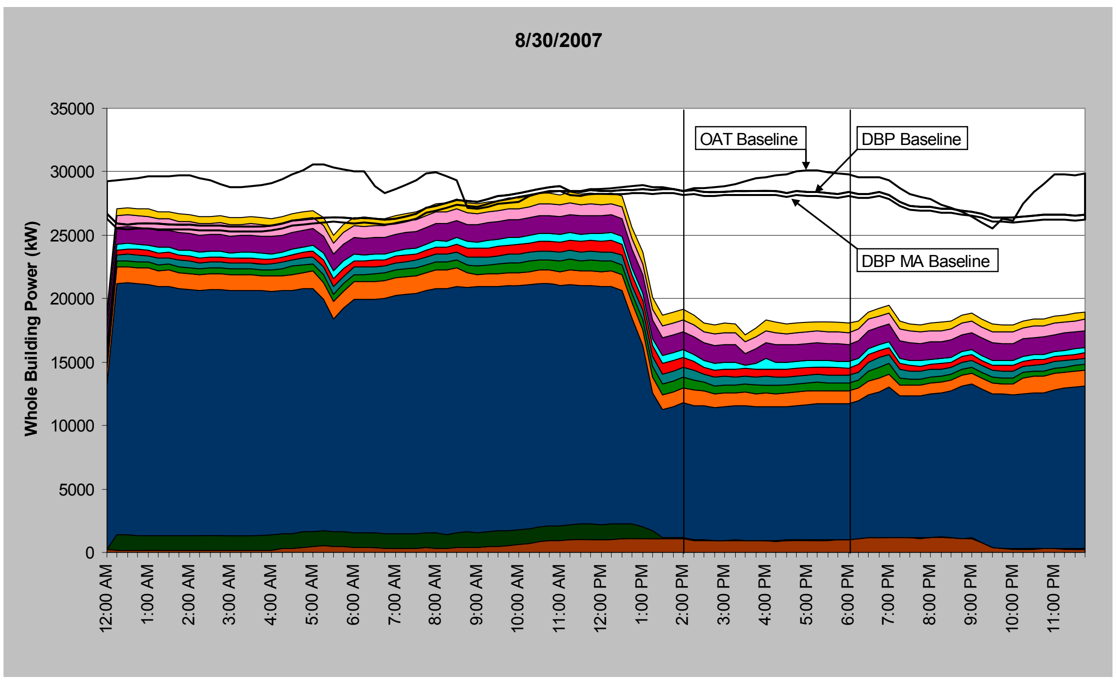
Each of the top three lines in the figure represents the various baselines from which load reductions are measured. The figure illustrates that the amount of load shed will vary depending on the baseline methodology used. The CPP baseline (using the highest three in the past ten days methodology) clearly yielded lower load drops than the other two baseline methods (morning adjustment [MA] and outside air temperature [OAT]) indicated for this particular day.

DBP Results. The results of the one DBP test event on August 30th are summarized in Table 5. A total of 11 enabled sites were able to participate during this event. During the 2-6PM timeframe on the 8/30 test day, all participating customers were able to drop 98% of their DBP baseline. Figure 5 provides the 24-hour load shape aggregated for all 11 customers during the first CPP event day (June 13th). The load drop during the DR event is illustrated by the clear area between the top colored line and the three lines above. The large industrial load was not restored until the morning following the DR event.

Table 5: Auto-DR DBP Performance Summary

Date of DBP Event	Number of Participating Sites	Estimated Load Shed (kW)	Actual Load Shed (kW) DBP Baseline		Actual as Percent of DBP Baseline
			Max 2 Hour	2pm-6pm Avg	
8/30/07	11	10,850	10,674.57	10,416.02	98%
Average	**11**	**10,850**	**10,674.57**	**10,416.02**	**98%**

Figure 5: Auto-DR DBP Event August 30, 2007



Effectiveness of Automation

While PG&E's 2007 Auto-DR effort was very successful, one outstanding question is how well the Auto-DR sites performed during event days relative to non-automated sites. To address this question, the project team reviewed the results of the load sheds for a sample of non-automated CPP customers. The results are graphically conveyed in Figure 6.

Figure 6: Scatter Plot of Automated and Non-Automated CPP Participants

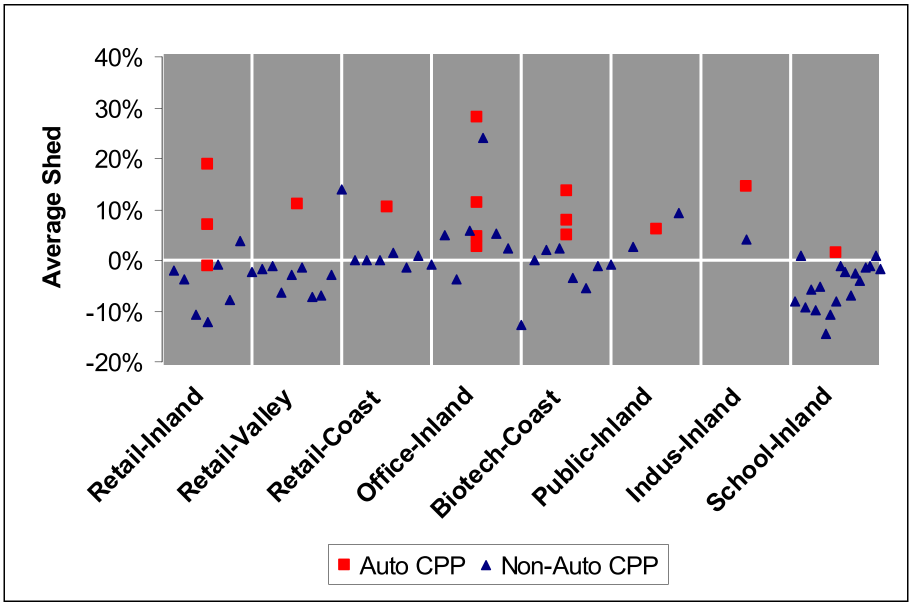


Figure 6 is a scatter plot of the average percent load shed for 72 participants in the PG&E CPP rate option during 2007. Of that total, 16 participants were enabled through Auto-DR and 59 were not equipped with any automation equipment. The plot shows that for nearly all building types and climate regions sites that are enabled with Auto-DR equipment tended to yield a higher average load reduction compared to those sites that did not have any automation equipment. The average shed for automated customers was 8.1% while the average shed for non-automated customers was -0.93%. This analysis provides strong evidence to support one of the CPUC's objectives which is to improve DR performance through automation. It is believed similar patterns will emerge for DBP sites when the data become available once events are called next summer.

Next Steps for Auto-DR

Each of the California IOUs indicated in their Auto-DR plans that they intended for their Auto-DR efforts to continue through 2008. PG&E has a goal of 15 MW per year for 2007 and 2008. SCE has a 10 MW goal during the 2007/2008 timeframe. Based on the success of their 2007 efforts, PG&E is planning to expand the Auto-DR technology to include customers in the Capacity Bidding Program (CBP). PG&E is also exploring the possibility of including an automation component for its planned Cafeteria Style Menu DR program. SCE is planning to add DBP to their Auto-DR offering in 2008, and accordingly expects participation to be significantly expanded.

Auto-DR is an innovative and ground-breaking effort that is aimed at making price-responsive DR programs far more effective than they have been in the past. The successes of this effort will serve as a model for wider-scale Auto-DR implementation throughout the United States and abroad in the years to come. Being the first state in the country to offer demand response with the enhanced features of end-to-end automation, Auto-DR is helping California's IOUs overcome many of the major barriers that DR options typically face today.

Acknowledgements

This work was sponsored by PG&E and the DRRC. The DRRC is funded by the California Energy Commission's Public Interest Energy Research Program, under Work for Others Contract No.500-03-026, Am #1 and by the U.S. Department of Energy under Contract No. DE-AC03-76SF00098. The authors are grateful for the extensive support from numerous individuals who assisted in this project.

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