

Automated Demand Response (AutoDR) For Industry Overview

What is being proposed?

Demand Response (DR) is a set of actions taken to reduce electric loads when contingencies, such as emergencies or congestion, occur that threaten supply-demand balance, and/or market conditions occur that raise electric supply costs. Demand response programs and tariffs are designed to improve the reliability of the electric grid and to lower the use of electricity during peak times to reduce the total system costs. Automated Demand Response (AutoDR) is a set of standard, continuous, open communication signals provided over the internet to allow facilities to automate their demand response with no “human in the loop.”

Who initiated this idea?

The Demand Response Research Center (DRRC) <<http://drcc.lbl.gov>>, which is sponsored by the California Energy Commission’s (CEC) Public Interest Energy Research (PIER) Program, has been developing standard methods to automate demand response.

The DRRC has tested AutoDR systems in 40 commercial buildings over the last four years. Most of the building strategies have focused on lighting and cooling system strategies. Previous work has focused on building Energy Management Systems. The DRRC is actively evaluating strategies, techniques, and the application of AutoDR for industrial facilities.

Why AutoDR for industry?

In California industry represents 20% of base electricity peak demand, or approximately 8600 MW. Initial estimates indicate that as much as 30-40% of industrial loads may be automatic demand response (AutoDR) candidates¹.

Automating demand response will make DR more visible, repeatable, reliable, and lower cost:

- More visible because the two-way communication systems allow internet tracking of the receipt of DR signals from end-use customers.
- More repeatable and reliable because the DR signals trigger fully automated controls strategies that are “hardened” and programmed into software and hardware.
- More affordable because automation can help reduce labor costs associated with manual DR strategies initiated by facility staff.

¹ PIER Demand Response R&D Strategy, Commissioner Geesman Briefing August 24, 2006

Which utility service territories offer AutoDR programs?

In California, Pacific Gas and Electric (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E), currently/plan to offer Auto-DR to facilities through their own programs. “Direct-Access¹” industrial facilities customers are also eligible to participate in the DR programs offered within the service territories of these utilities.

What’s the value proposition for industry?

- Financial
 - Lower electricity bills. Reducing energy consumption during high-price periods cuts energy costs.
 - Several demand response programs offer financial and other benefits to businesses that can reduce electric load during periods of extreme usage.

¹ Direct Access Customers are those who engage in accessing their energy needs directly with electric service providers such as Calpine, Strategic Energy, etc.

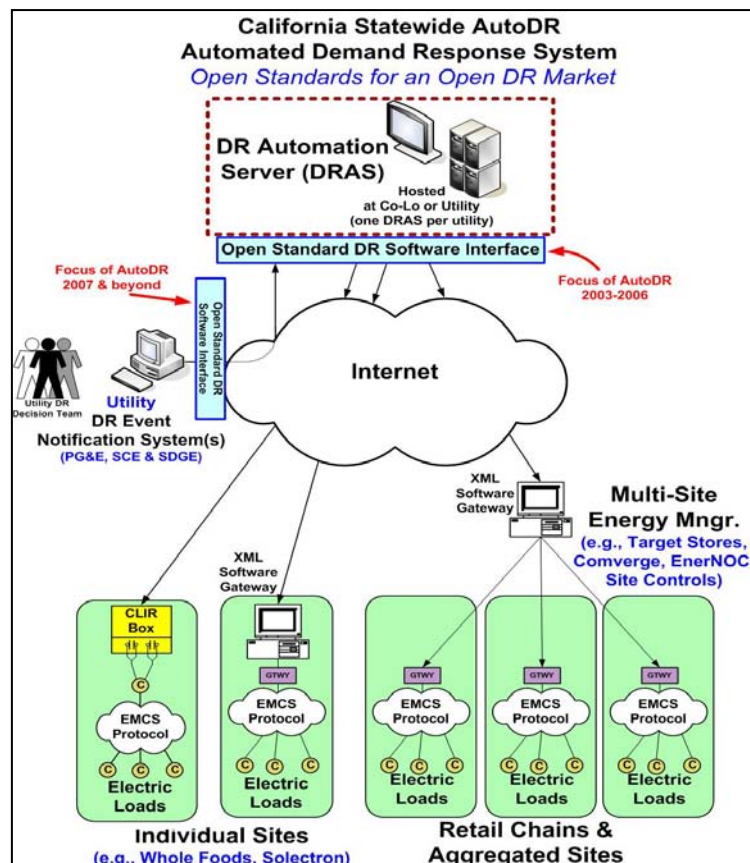
- Reliability
 - Reducing peak energy use helps eliminate exposure to rotating outages.
- Environmental
 - Cutting electricity is the most environmentally sound way of securing power — reducing use minimizes the need for generation and therefore, the amount of emissions released into the air from the production of electricity.²
- Social
 - Your neighborhood will benefit too — lights will stay on, businesses will keep running and people that rely on electrical equipment, often schools and the elderly, will not suffer from power disruptions.

How will AutoDR work and what will it include?

AutoDR requires standardized signals between different utilities and industrial facilities based on standardized communication technologies that integrate with third-party proprietary controls and communications software.

The essential elements of an AutoDR system are shown in the figure below and include:

- Demand Response Automation Server (DRAS) for Auto-DR (OpenADR) is based on the interoperable, open-standard architecture using Web Service³ software system.
- Client & Logic with Integrated Relay (CLIR) box, XML software gateway, etc., that fit into individual deployment requirements for a facility and provides flexibility for enrollment.
- Energy Management Control Systems, Energy Information Systems (EMCS/EIS) or other forms of building automation are used for DR strategies within the facility.



² Flex Your Power, http://www.fypower.org/now/demand_resp_faq.html#what_adv. Accessed April 3, 2007

³ Web services (WS) is a set of modular applications that are self-describing and self-contained that can be easily integrated with other Web services to create objects and processes. WS are built using open Internet standards, thus enabling systems to be constructed and integrated with applications on any platform and programming language.

What types of programs are available?

Presently the following types programs are offered:

- *Automated Critical Peak Pricing (Auto-CPP)*, offered by PG&E and SCE, is a form of price-responsive demand response that automates the demand response for critical days as part of a critical peak pricing tariff.
 - PG&E: http://www.pge.com/biz/demand_response/critical_peak_pricing
 - SCE: <http://www.sce.com/RebatesandSavings/LargeBusiness/DemandResponse>
- *The Automated Demand Bidding Program (Auto-DBP)*, offered by PG&E, is also a form of price-response that allows participants to provide a bid for a certain load shed level (kW) during a two to 8 hour period.
 - PG&E: http://www.pge.com/biz/demand_response/demand_bidding_program
- *The Automated Capacity Bidding Program (Auto-CBP)*, is currently under consideration by SDG&E, is voluntary and a form of reliability demand response and is based on certain guaranteed monthly payments on an agreed level of bid load reduction at fixed price when requested. It comes w/ more incentives for load reduction during critical peak days in summer.
 - SDG&E: <http://www.sdge.com/drp/glance.shtml>

Who else will be involved?

- Private companies subcontracted by utilities to commercialize AutoDR systems
- Industrial energy management experts
- Governmental and Non-governmental organizations

What is the process for participation?

The DR programs are different among utilities. For PG&E's Auto-CPP and Auto-DBP programs, participants have to go through an application process subcontracted by PG&E to Global Energy Partners, LLC (GEP) <http://www.gepllc.com>.

Where can I get more specific information about Auto-DR?

- DRRC – <http://drcc.lbl.gov>
- **Flex Your Power** information program provides a summary of voluntary and utility sponsored DR concepts and programs in California:
 - http://www.fypower.org/now/demand_resp.html
 - http://www.fypower.org/now/demand_resp_faq.html
- PG&E Auto-DR program details – <http://www.auto-dr.com> (under construction)
- PG&E DR – <http://www.pge.com/demandresponse/>;
- SCE DR – <http://www.sce.com/RebatesandSavings/LargeBusiness/DemandResponse/>
- SDG&E DR – <http://www.sdge.com/drp/glance.shtml>

LBNL Contact(s)

Aimee T. McKane <ATMcKane@lbl.gov> 518.782.7002

Anthony Radspieler Jr. <ARadspieler@lbl.gov> 510.486.2799

<http://drcc.lbl.gov>