Mystified by Automated Demand Response?

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In this article, which provides a primer on Automated Demand Response (Auto-DR) technology and results, we hope to ease the mystery that surrounds Auto-DR and to open the door for ongoing ideas and discussions.

What is Auto-DR?

Auto-DR is a communication and technology platform designed to provide an end-to-end automated demand response system – from the issuance of electronic price and reliability signals initiating DR events, to the site-specific DR strategies that control customer end-use loads, through the use of energy management control systems. Auto-DR is intended to improve the reliability of DR programs so they can achieve the same operational status as conventional generation resources at a fraction of the cost. Capable of supporting all DR and pricing options, Auto-DR is not a program but rather a platform for enabling existing and proven technologies.

How Does Auto-DR Work?

The Auto-DR system, shown in Figure 1, is designed to implement DR with no human intervention. The steps involved during an Auto-DR event are: (1) The Demand Response Automation Server (DRAS) operator issues a DR event through the DRAS; (2) the DR event and price services are published on the DRAS; (3) DRAS Clients request event data from the DRAS every minute; (4) Customized pre-programmed DR strategies determine action based on event price or mode; (5) the facility Energy Management Controls System (EMCS) carries out load reduction based on DR event signals and strategies.

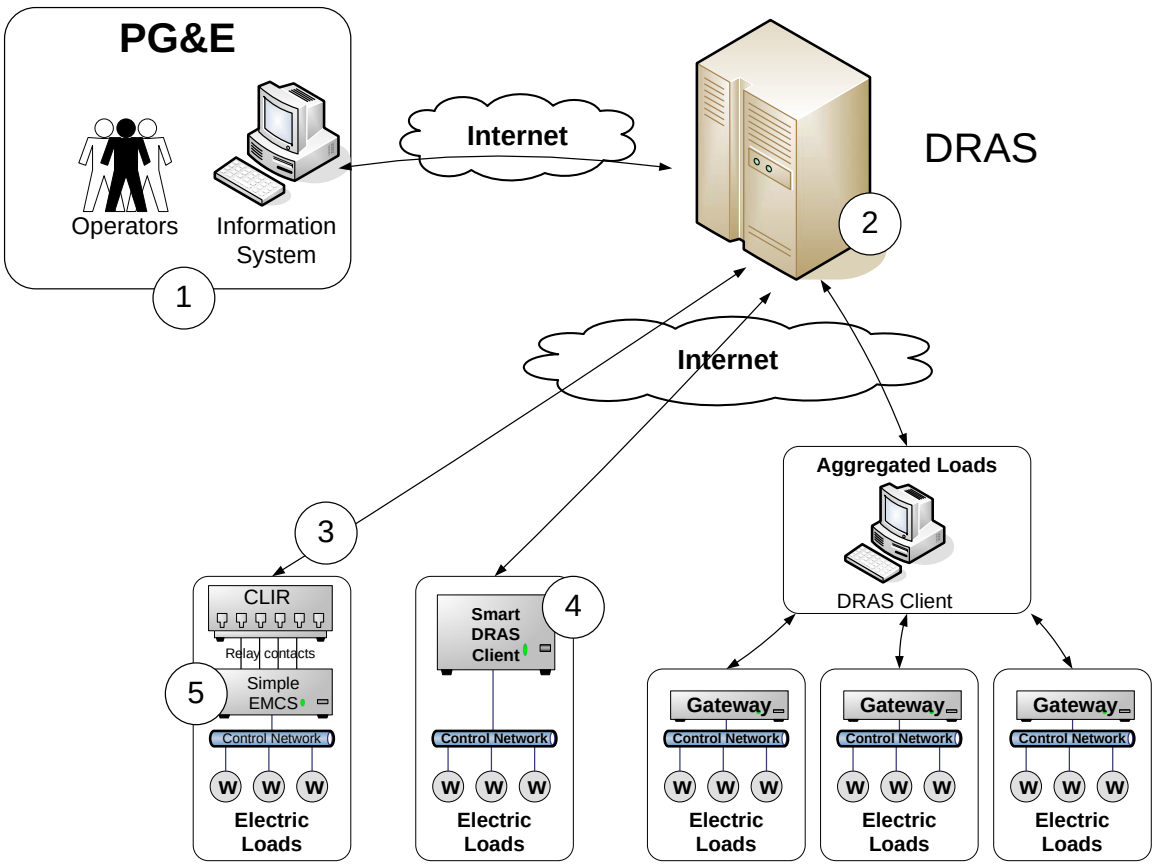

Figure 1 – Auto-DR System Architecture

What Has Auto-DR Achieved?

Auto-DR has been offered to utility customers at the pilot or full implementation stage in California since 2005. As shown in Table 1, Auto-DR currently has approximately 55 MW of load reduction capability, recruited across more than 200 service accounts and representing 14 different types of industries. With over half of the accounts tested and ready for program deployment, the remaining customers are expected to be fully capable by the end of 2008.

Industry Type	Number of Sites	Estimated Load Reduction (kW)	kW Percent of Total
Biotechnology	5	240	0.4%
Chemical Products	5	25,085	45.3%
Electrical Equipment	2	4,650	8.4%
Food Processing	7	1,453	2.6%
Government Building	27	2,835	5.1%
Healthcare	4	383	0.7%
High Tech	22	3,670	6.6%
Miscellaneous	2	109	0.2%
Office Buildings	16	1,901	3.4%
Petroleum Products	2	1,040	1.9%
Primary Metals	3	5,432	9.8%
Retail	98	6,228	11.2%
School	4	58	0.1%
Transport Equipment	5	2,293	4.1%
Total	**202**	**55,377**	

Table 1 – Recruited Auto-DR Participants in California in 2008

For customers who were fully Auto-DR-enabled during 2008 DR events, Pacific Gas & Electric's Critical Peak Pricing customers performed at 70% of shed capability during 11 events, while its Demand Bidding Program customers performed at 85% of bid amounts for a test event in July. Southern California Edison's Critical Peak Pricing customers performed at 15% greater than shed capability during 12 events held in 2008.

What is Next for Auto-DR?

Auto-DR's transition into the mainstream of DR is expected due to its prominent role in all California IOU plans for 2009-11. Important developments to watch for include Open Automated Demand Response (OpenADR) Communication Standards to be published in the November-December 2008 time frame; the role of Auto-DR in distribution and feeder congestion management, expansion of Auto-DR into a broader range of DR programs, and expanded efforts that will better integrate energy efficiency and DR.

For additional information on Auto-DR please go to www.auto-dr.com or contact the authors (Greg Wikler – gwikler@gepllc.com; Ingrid Bran – ibran@gepllc.com; Mary Ann Piette – mapiette@lbl.gov; Sila Kiliccote – skiliccote@lbl.gov).