

**Demand Response in California:
An Update on Successes, Challenges and
Barriers**

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Demand Response in the Energy Action Plan

- The Energy Action Plan¹ is an implementation “road map” for energy policies articulated by the Governor, the CPUC and the CEC.
- The EAP places Demand Response among its highest priorities in the “loading order”, a priority sequence of action items to address the state’s increasing energy needs.

[1] The state energy agencies adopted EAP I in 2003, and adopted EAP II in August 2005.

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Demand Response in the Energy Action Plan (Continued)

- **The Energy Action Plan identifies several key Demand Response action items:**
 - Process the IOUs' proposed Advanced Metering Infrastructure (AMI) installation plans.
 - Educate Californians about the time sensitivity of energy use and how they can participate in demand response programs.
 - Create standardized measurement and evaluation mechanisms to ensure demand response savings are verifiable.
 - Incorporate demand response appropriately and consistently into the planning protocols of the CPUC, the CEC, and the CAISO.

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Demand Response Actions Taken To Date

- Rolled out interval meters for large customers (>200 kW) and placed those customers on time-of-use tariffs. (2001-2003)
- Directed the IOUs to develop new demand response programs and tariffs for customers as well as expand existing emergency triggered programs. (2003 - present)
- Adopted aggressive demand response goals (MW) for the IOUs. (2003)*

* (see Slide 6)

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Demand Response Actions Taken To Date (Continued)

- **Completed a two-year pilot program, the Statewide Pricing Pilot, to estimate the demand response capability of residential and small commercial customers as input to the utility business case for AMI. (2003)**
- **Evaluating the utilities' Advanced Metering Infrastructure (AMI) applications: (2004 - present)**
 - Authorized \$70 million in pre-deployment activities for PG&E, SCE and SDG&E in 2005.
 - Authorized PG&E to fully deploy AMI in its territory (\$1.7 billion) over the next 5 years.
- **Directed the utilities (and other Load Serving Entities) to incorporate demand response into their Resource Adequacy Requirements (RAR). (2004 – present)**

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Demand Response Goals

- **Demand response goal for the utilities: 5% of system peak demand by 2007 (D.03-06-032)**
 - Purpose: to develop demand response as a resource to “enhance electric system reliability, reduce power purchase and individual consumer costs, and protect the environment.”
 - Application: “over and above” demand response achieved through existing emergency programs
 - Implementation: “through programs and tariffs that are triggered by price and not by emergency conditions”
- **Goals clarified in 2005 (D.05-01-056)**
 - “Price-responsive” tariffs and programs categorized as “day-ahead”
 - Reliability programs (interruptibles; load control) categorized as “day-of”

Types of Demand Response Programs in California

- **“Day-Ahead” Programs**
 - Critical Peak Pricing: Participants receive reduced on-peak energy rates for most summer hours in exchange for paying high on-peak rates during 12 “critical peak” periods.
 - Triggered by the IOU under the following conditions: high wholesale electricity prices, temperature, high system peak demand and/or low generation reserves.
 - Demand Bidding Program: Participants ‘bid’ load reductions they can provide the following day and are paid for the actual amount of load they reduce.
 - Triggered by the IOU upon issuance of a day-ahead Alert by the CAISO for the affected territory or a CAISO day-ahead forecast of 43,000 MW.

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Types of Demand Response Programs in California (Continued)

- **Day-Ahead Programs (Continued)**
 - Demand Reserves Partnership: aggregators nominate load (via contracts with end-use customers) and are compensated with capacity/energy payments.
 - The program is reserved the day-ahead and then triggered during critical demand situations or when wholesale power prices are high. Participants are required to reduce their demand within 3.5 hrs. of being notified.
 - Peak Day 20/20 Program: customers receive a 20% discount for a 20% reduction in their average demand.
 - Triggered by temperature, utility system load, high spot market prices, or a special alert by the CAISO.

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Types of Demand Response Programs in California (Continued)

- **Emergency or Day-Of Programs:** *triggered by the IOUs upon notification by the ISO of statewide or local emergencies (Stage 2 alert or transmission-related)*
 - Interruptible tariffs and programs: Participants receive rate discounts or bill credits based on the amount of load they are willing to reduce in emergency situations. Penalties are assessed for failure to reduce to their contracted firm service level.
 - Air Conditioner Cycling: Participants receive bill credits based on number and length of interruption to their air conditioner unit.

Types of Demand Response Programs in California (Continued)

- **Other**
 - Marketing/Customer education programs to either promote demand response programs or educate customers about demand response concepts: includes mass media campaigns (*Flex Your Power Now!*) as well as programs that target specific groups such as water agencies, medium-size businesses, government agencies.
 - Technical Assistance and Technology Incentives: customers receive free 'audits' to identify demand response potential, and rebates for technologies that can enable automated demand response.

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Program	Subscribed MWs		
	SCE	SDG&E	PG&E
I-6 or E-19/E-20	699		300
AL TOU CP and RBRP		15	
BIP	101	8	27
ACCP	424	12	
OBMC/RBRP	10	65	14
AP-I/Emergency CCP/DBP-E/DBP-E	72	12	
Smart Thermo		2	
Interruptible Sub-Total	1306	114	341
CPP Programs	2	15	45
DBP	181	31	205
CAL-DRP	160	5	248
CI 20/20 or BEC		51	10
Demand Response Sub-Total	343	102	508
Total	1649	216	849

Source: Agency forecasts for Summer '06 based on IOU monthly reports and Filings made in A.05-06-006.

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Program	Expected		
	SCE	SDG&E	PG&E
I-6 or E-19/E-20	585.8		276.8
AL TOU CP		1.7	
BIP	60.8	0.2	25.8
ACCP	353.7	8.6	
OBMC/RBRP	10	25.2	13.5
AP-I/Emergency CCP/DBP-E/DBP-E	34	5.6	
Smart Thermo		1.4	
Interruptible Sub-Total	1044	43	316
CPP Programs	0.9	5.8	28.3
DBP	37.4	0.7	64.8
CAL-DRP	35.4	3.2	226.0
CI 20/20 or BEC		8.7	3.2
Demand Response Sub-Total	74	18	322
Total	1118	61	638

Source: IOU monthly reports and filings made in A.05-06-006 adjusted by staff to account for customer performance in 2005.

Challenges and Barriers

- **How to expand customer acceptance/participation?**
 - Education?
 - Sticker shock effect for customers, who tend to focus on the high on-peak or super-peak rate, not on off-peak discounts that offset the costs for most customers
 - Perception by large customers that the costs of participation are not offset by the benefit potential of DR programs/tariffs.
 - Large customer groups resistance to default (opt-out) Critical Peak Pricing rates on principal
 - Increase Incentives?
 - Constrained by other considerations – cost-effectiveness, revenue neutrality.

Challenges and Barriers (continued)

- **Need to develop a cost-benefit framework for demand response programs**
- **How to measure/verify demand response savings?**
 - Currently there is no adopted protocol for measuring and accounting for demand response
 - What is required for the CAISO to count price-responsive demand response toward resource adequacy requirements?
- **Developing appropriate time-varying rates has particular challenges:**
 - AB1-X: rate freeze for residential customers?
 - MRTU creation of day-ahead hourly price market might help (more detail in a later slide)

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What's Coming Up

- CPUC decision on **San Diego Gas & Electric's full deployment AMI application** – expected by **end of 2006**.
- Default Critical Peak Pricing for large customers: to be developed in each IOUs' respective General Rate Case.
- Development of a Demand Response **measurement protocol** and **cost-effectiveness methodology** – starting in 2006
- **Hourly pricing tariffs** - to be developed via IOUs' next General Rate Case applications following CAISO implementation of an hourly day-ahead market price.

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How Can the CAISO help promote DR?

- **Coordination between agency staff and ISO staff is very good**
 - ISO staff involved in DR working group
 - ISO staff very involved in Resource Adequacy and playing an important role of quantifying grid needs and requirements
- **Yet there are a few issues**
 - DR as price responsive or as a “program”
 - Price formation in day-ahead and real time markets
 - Impact of forward capacity contracts
 - Accounting for and dispatching DR resources -- a smooth process from resource adequacy to ISO scheduling and dispatch
 - ISO tariff modifications to enable aggregated response and other programs (or possibly this occurs at the utility level)
 - ISO posted data and underlying system conditions

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How Can the CAISO help promote DR?

- **DR as price responsive or as a “program”**
 - Initially, DR was envisioned as customers responding to transparent price signals, providing a direct tie between wholesale and retail prices
 - At this time, without such transparent price signals most DR responds to Stage 2 emergencies or other types of system needs
 - CPP tariffs (with only limited enrollment as indicated earlier) set a high price for 50-70 hours per year and are invoked by utilities in response to high temperatures, high loads or system conditions
 - Not really tied to wholesale market prices (or we really don't know if this is the case since this is all confidential)
 - Certainly both sorts of DR can exist yet we may have to modify our vision of a transparent price signal

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How Can the CAISO help promote DR?

- **Price formation in day-ahead and real-time markets**
 - Not currently a transparent day-ahead price but MRTU might develop one six or seven years after the demise of the CalPX
 - Yet it is not clear how forward capacity contracts might impact this price
 - For example, will the day-ahead price be robust and “representative” enough to use as a basis for real-time pricing?
 - If not, how to link wholesale and retail prices?
- **Accounting for and dispatching DR resources -- a smooth process from resource adequacy to ISO scheduling and dispatch**
 - How DR resources are accounted for in future resource adequacy proceedings
 - How DR resources are dispatched
 - The dispatch constraints associated with DR resources -- time to respond, duration of response, limitations on number of call, etc
 - Residual Unit Commitment and DR resources
 - Reliability Capacity Service Tariff and DR resources

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How Can the CAISO help promote DR?

- **ISO tariff modifications to enable aggregated response and other programs (or possibly this occurs at the utility level)**
 - It may be rather difficult for most load to meet the participating load agreement conditions
 - Yet, how much visibility the ISO needs for various services might be an important factor in how much load participates
 - Possibly, utilities become aggregators under programs, such as interruptible tariffs, and the ISO has no or limited visibility
 - However, for Ancillary Services this may not be acceptable
- **ISO posted data and underlying system conditions**
 - Some enhancements could provide a better “view” of ISO system conditions in different regions of the state.