California Demand Response: A Vision for the Future

Proposed joint statement of the staff of the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and California Independent System Operator, Inc. (CAISO)

Introduction

The CPUC, CEC, CAISO and stakeholders created five working groups as a collaborative effort to advance demand response (DR) and enable greater participation from demand resources in the wholesale power markets. The CPUC is the lead agency for the Vision for Demand Resources working group and has published this paper for comment and discussion by the working group. For additional information on the demand response working groups, please visit the CAISO's Demand Response Initiative web page found at:
http://www.caiso.com/1893/1893e350393b0.html

This document serves as a Vision Statement that is intended to be a broad policy statement for encouraging the use of demand responsive programs in California. This Vision Statement should be read in the context of the state's goals to maximize the efficient use of resources, while maintaining the economic vitality of businesses in the state, as well as the health, welfare, and comfort of electricity users.

We acknowledge that demand response is one resource among many that may be procured by utilities on behalf of their electricity customers. With this in mind, we also seek to indentify the most cost-effective investments in demand response from an overall societal perspective.

Finally, this document is intended as a starting point for discussion, and should not be interpreted as prejudging the outcome of analysis and recommendations delivered by the working groups to the policymakers in any proceeding.[1] Further, we intend to use this vision as a guide to our efforts, will continue to reevaluate its validity and assumptions as we progress, and will make any modifications, as necessary and appropriate, when new information becomes available.

[1] *E.g.*, CPUC rulemaking R.07-01-041 on policies and practices for demand response.

Vision Statement

All California electricity consumers will have the opportunity and capability to adjust their usage in response to time-varying signals reflecting economic, reliability or environmental conditions.

Definition

DEMAND RESPONSE is the means by which end-use electric customers can reduce their electricity usage over a given time period, shift that usage to another time period, or contribute to grid reliability as a balancing resource in response to a price signal, to a financial incentive, to an environmental condition or to a reliability signal.

DEMAND RESPONSE PROVIDER/CURTAILMENT SERVICE PROVIDERS (which could be an investor-owned utility (IOU), load-serving entity (LSE), electric service provider (ESP), community choice aggregator (CCA), or other third party) may sponsor or design and implement demand response programs and sell the demand response to utilities and/or to the CAISO. Customers should have the choice to sell their demand response to a Demand Response Provider or to the CAISO.

TYPES OF DEMAND RESPONSE may include programs and tariffs that reduce peak consumption, shift usage to off-peak hours and/or be used to adjust demand. These programs may be offered by a utility or other third party Demand Response Provider.

Rates more dynamic than Time-of-Use (TOU) rates, such as Critical Peak Pricing (CPP) and Real-Time Pricing (RTP), are tools of DR which will be utilized by customers differently and impact the market distinct from traditional demand response programs where incentives are paid to participants.

Objectives

Enhance Infrastructure and Reliability

- Decrease controlled outages, such as rolling blackouts, during power system emergency situations.

- Defer the need for investment in generation, transmission, and/or distribution by decreasing peak demands.
- Help satisfy operating and planning reserve requirement criteria, by serving as a resource for use in planning and procurement.
- Assist in maintaining grid reliability, easing congestion and delivery constraints, improving system reliability on a locational and regional basis, and meeting emergency system needs.
- Interact with intermittent renewable resources to assist in their integration and in order to help meet Renewable Portfolio Standards.
- In conjunction with enabling technologies, provide other customer service benefits, including outage detection and management, power quality management, increased energy efficiency and other information capabilities.

Manage Electricity Costs

- Demand response can give customers an opportunity to have greater control over their energy use, and enable more effective response to dynamic tariffs and prices which reflect the time-varying cost of energy.
- Customers should be educated on the value of demand response and should have the opportunity to receive the benefits derived from their providing demand response, including lower electricity costs and savings resulting from more efficient management of their electricity usage.
- Demand response tariffs that dynamically incorporate the cost of providing electricity service can encourage consumers to adjust their usage and, in the aggregate, lower overall wholesale electricity costs for all customers.
- Enhance market efficiency and help mitigate wholesale market power.
- To encourage demand response, LSEs should design and offer retail rates that dynamically incorporate the marginal cost of providing electricity service.
- Demand response activities and infrastructure should be designed to be cost-effective from a societal perspective.

Reduce the Environmental Impact Caused by Electricity Usage

- Demand response can reduce electricity use during peak periods when the least efficient generation units would be operating, thereby reducing greenhouse gas and other air emissions.

- Demand response via permanent load shifting can help integrate intermittent, non-peak time, renewable resources into the electric grid and benefit the system load factor.
- The definition of demand response does not include or encourage switching to use of fossil-fueled auxiliary or emergency backup generation.

Goals and Principles

Consumer Education and Customer-Oriented Design

- Electricity consumers in California should be made aware of the time-varying value of electricity costs and steps they can take to help lower those costs.
- Electricity consumers in California should be made aware of the grid reliability and environmental benefits of demand response.
- All electricity customers should be provided timely and easy access to their available time-based information about their own electricity use along with their monthly bill, with the option for hourly or more frequent information via a website or other appropriate means and with the option to share their information with a demand response provider of their choosing.
- Time-based electricity usage information will be made available to the customer, or their demand response provider, within a time period necessary to allow the customer to review and plan their electrical usage, while also meeting the operational needs of the electric grid.
- Demand response programs, contracts and/or tariffs should be designed to be customer-oriented, simple, voluntary, and easy for the customer to understand and implement.

Ability to Participate in Dynamic Pricing and Dispatchable Programs

- Dynamic pricing tariffs should be made available, on an opt-out basis, to all customers, thereby allowing customers the ability to manage their usage in response to appropriate price signals.
- All customers should have the option to participate voluntarily in a demand response program where they can provide demand reductions as a dispatchable resource, including:
    1. In CAISO markets: real-time, day-ahead, and day-of energy and ancillary services; and

2. In retail markets: utility programs including direct load control, controllable thermostats, and other demand response automated communicating systems that are based on an open communications architecture and support residential, commercial and/or industrial consumers' ability to provide load reductions.

Technologies and Infrastructure

- All customers should be provided with cost-effective advanced metering systems capable of supporting time-varying tariffs with metering done on an hourly basis or better, and with minimal hardware upgrades necessary to participate in various dynamic pricing tariffs.
- Any advanced metering systems should support the ability to automatically retrieve energy usage/data information and provide the customer with timely access to this retrieved data.
- All residential customers should be enabled through communications media interfaces to remotely control devices in their "home area network"[2] and manage their energy usage. Furthermore, customers who choose to should be able to conveniently access their usage information using communications media (*e.g.*, over the internet, via on-site devices, or other means chosen by the customer), and this information should also be made available to those providers who have a contractual relationship with the customer.
- The broadest possible range of metering and communications technologies, that are compatible with current and future open codes and standards, which can enable demand response should be encouraged. Preference should be given to technologies that are compatible with utility and third-party billing and other back-office systems.
- Advanced metering infrastructure, automated demand response and direct load control should be encouraged to provide customers with the opportunity to reduce usage with minimal intrusion and effort. Proliferation of user-friendly and open-architecture technologies are likely to have beneficial effects on grid reliability and operation.

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[2] A "home area network" is a network contained within a user's home that connects to various digital devices contained within the home. Examples of digital devices could include electronics and appliances ranging from multiple computers and their peripheral devices to home heating and air conditioning devices, lighting, telephones, home entertainment units, home security systems, smart appliances and other digital devices that are wired into the network.

- The enhancement of the power distribution infrastructure, also known as the "smart grid," allows for greater implementation of demand response. Smart grid technologies provide real-time information on the transmission and the distribution level that can enable efficient use of demand response resources, offset grid enhancements, increase the visibility of customer usage by ISOs, LSEs and ESPs and enhance overall grid stability.
- State building code (California Code of Regulations, Title 24) updates provide a cost-effective opportunity to introduce design standards for the implementation of demand response technologies during the construction of new buildings or renovation of existing buildings.

Demand Response Participation in the Wholesale Electricity Markets

- Market rules, including technical and operational standards, should not unduly limit the ability for demand to be bid directly into the wholesale electricity markets, including the capacity, ancillary services and energy markets.
- Market rules should allow for small load to be aggregated and be bid into the wholesale electricity and ancillary services markets.
- Demand Response Providers should be able to freely participate and compete directly in the wholesale markets.
- Demand Response Providers should have access to customer data, with appropriate confidentiality protection, to enable the development and implementation of demand response products that meet customer needs.
- Demand response should be treated as a resource for planning and procurement purposes, including any load reduction that results from dynamic pricing rates.
- LSE's may submit a decremental bid based on any forecasted load reduction that is the result of dynamic pricing rates.
- Demand response participants should be given appropriately aligned wholesale market pricing signals, which may incorporate locational marginal prices.
- The demand response market should be appropriately structured to ensure competitive participation while protecting California's ratepayers.
- Demand response program designs and implementation activities should integrate and align with the CAISO's wholesale market structure.

Load Serving Entity (LSE) Issues

- LSEs should incorporate demand response resources into their overall procurement portfolio and as a portion of their reserve requirements.
- LSEs should give preferential treatment to cost-effective demand response resources over other resources in their procurement portfolio when considering a mix of resources necessary to satisfy their load-serving obligation, in accordance with the Energy Action Plan.
- All LSE demand response efforts should be periodically evaluated to determine past performance and improve future effectiveness.
- LSEs should competitively procure demand response resources in an open and competitive demand response market.

Coordination between the CPUC, CEC and CAISO

- Effective demand response efforts will require coordination among the agencies promulgating this Vision Statement.
- The CAISO will follow FERC Order 890 in coordinating transmission planning as it relates to considering demand response resources.
- Coordination will also be necessary related to:
    - LSE procurement planning and resource adequacy;
    - Direct access rules;
    - IOU rate design modifications, either in general rate cases, or separate venues;
    - Energy efficiency (and other public purpose) programs;
    - Other peak demand reduction programs; and
    - Efforts to develop transparent wholesale market pricing mechanisms.
- Changes to CAISO market rules to allow additional participation by non-IOU demand response providers.
- Necessary legislative changes to rationalize rate design structures.