

California Demand Response: A Vision for the Future

Joint statement by the staff of the California Energy Commission, California Public Utilities Commission, and California Independent System Operator, Inc.

Vision Statement

No later than 20XX, All California electricity consumers will have the opportunity and capability to adjust their usage, with numerous and diverse customers voluntarily reducing or shifting their demand in response to time-varying signals reflecting economic, reliability, economic or environmental conditions.

Definitions

DEMAND RESPONSE is the voluntary reduction of electric demand at the end-use customer level allows end-use electric customers to reduce their electricity usage in a given time period, or shift that usage to another time period, in response to a reliability signal, a price signal, a financial incentive, or an environmental condition or a reliability signal.

TYPES OF DEMAND RESPONSE will include utility tariff demand response programs, third-party demand response programs supplied by Demand Response Providers/Curtailment Service Providers, and, after MRTY Release 1/1a, demand response products supplied through the market directly to the CAISO.

DEMAND RESPONSE PROVIDER/CURTAILMENT SERVICE PROVIDERS may sponsor design and implement demand response programs and sell the demand response load reduction to utilities, but are not necessarily load-serving entities (LSEs). After MRTU Release 1A, and/or the CAISO, but are not necessarily load serving entities. A Demand Response Providers may also aggregate demand and bid demand reductions or act as an agent on behalf of retail customers to the CAISO or via bilateral contracts with the utilities, LSEs, ESPs, SCs, etc., to aggregate retail customer load as part of a demand response program.

Objectives

Enhance Infrastructure and Reliability - Demand Response should be used to obtain the following objectives:

- Numerous and diverse customers voluntarily reducing or shifting their demand in response to economic signals is preferable to Decrease the number of controlled outages during power system emergency situations
- Timely demand response (within seconds, minutes or hours) from customers can Defer the need for investment in generation, transmission, and/or distribution by ensuring that demand response programs are consistently available during peak periods [**This bullet seems to belong in “Manage Electricity Costs” section rather than Reliability section**]
- Cost-effective demand response should be used in resource planning, procurement planning, and Help satisfy operating reserve requirements through resource and procurement planning
- Demand response can be used to Maintain grid and market reliability, ease delivery constraints, used on a locational or regional basis to improve system reliability on a locational or regional basis, meet emergency system needs and reduce electricity costs.
- Provide customers with information that can be used to increase their energy efficiency through infrastructure upgrades or facility operational improvements
- Demand response can provide a market for renewables to meet load that has been shifted to off-peak when some intermittent renewable resources are more coincident.
- Technologies to enable demand response may also 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 should be used to manage electricity costs by:

- Demand response can give Encouraging individual customers an opportunity to reduce their energy costs by adjusting their usage in response to time variant retail prices
- Ensuring Customers should have the opportunity to financially benefit from providing demand response

- Demand response tariffs dynamically incorporate the cost of providing electricity service, thereby encouraging consumers to adjust their usage and lowering overall wholesale electricity costs for all customers [repetitive]
- Timely demand response can Being consistently available during peak periods to help mitigate wholesale market power and ensure reasonable prices
- To encourage demand response, LSEs should design and offer retail rates that dynamically incorporate the marginal cost of providing electricity service [Repetitive]
- Implementing and installing properly designed and cost-effective programs 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 should:

- Demand response can Reduce consumer electricity usage during peak periods when the least efficient generation units would be operating, thereby reducing greenhouse gas and other air emissions
- Reduce environmental impact of new infrastructure construction (Generation, Transmission, and Distribution) by reducing or delaying the need for new investment in infrastructure to meet peak electric demand
- Demand response via permanent load shifting can help Facilitate the integration of intermittent, off-peak-time, renewable resources into the electric grid through temporary or permanent load shifting
- The agencies' definition of demand response does not include or encourage switching to use of fossil-fueled emergency backup generation

Goals and Principles

Consumer Education and Customer-Oriented Design

- Electric consumers in California should be made aware of the time-variable nature of electricity costs and of general steps they can take to help lower those costs

- All customers ~~that desire it should be able to~~ have easily access ~~their to~~ information about their own electricity use with the option for hourly or more frequent information and with the option to share their information with a demand response provider, of their choosing
- Demand response should be designed to be customer-friendly, simple, and easy to understand

Ability to Participate in Dynamic Pricing and Dispatchable Programs

- Dynamic pricing tariffs should be made available for all customers, thereby allowing customers to manage their usage in response to appropriate price signals
- All customers should ~~also~~ have the option to participate voluntarily in demand response where they can provide demand reductions as a dispatchable resource, including:
 1. In ISO markets: real-time, day ahead, day-of, emergency, and ancillary services
 2. In retail markets: utility programs including direct load control, controllable thermostats, and other demand response automatically 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 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 data information and provide the customers and Demand Response Providers 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 network¹ and manage their energy usage. Furthermore, customers who choose to should be able to conveniently access their usage information

¹ A home area network is a network contained within a user's home that connects a person's digital devices, from multiple computers and their peripheral devices to telephones, home entertainment units, home security systems, smart appliances and other digital devices that are wired into the network.

using communications media (*e.g.*, over the internet, via on-site devices, or other means chosen by the customer)

- The broadest possible range of metering, ~~and communications~~ and demand response technologies, that are compatible with Title 24 devices, which can enable demand response should be encouraged, provided that all technologies should be designed in an open architecture manner such that they are compatible with utility billing and other back-office systems and can easily be made accessible to third parties
- 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 technologies will have beneficial effects on grid reliability and operation~~
- The use of a 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 to ISO, LSE and ESPs and overall grid stability [Is this suggesting a smart grid for the entire state grid? Is this in addition to AMI? How do you link this to the home area network?]
- State building code (Title 24) updates provide a cost-effective opportunity to introduce demand response technologies during the construction of new buildings or renovation of existing buildings

Demand Response in the Wholesale Market – [Should this be part of the Objectives Section rather than Principles?]

- Market rules, including technical and operational standards, should not limit the ability for demand to bid directly into the wholesale market, including into capacity, ancillary services and energy markets
- Market rules should allow for small load to be aggregated and bid into the wholesale market
- Load serving entities and demand response providers should be able to freely participate and compete directly in the wholesale market
- 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
- Demand response participants should be given ~~appropriately aligned~~ accurate and timely wholesale market pricing signals, which incorporate locational marginal prices
- The demand response market shall be appropriately structured to ensure competitive participation while protecting California's ratepayers

Investor-Owned Utility (IOU) Issues

- IOUs should incorporate demand response resources into their overall procurement portfolio and as a portion of their reserve requirements
- IOUs should treat demand response resources similar to other resources in their procurement portfolio when considering a mix of resources necessary to satisfy their load-serving obligation
- All IOU demand response efforts should be periodically evaluated to determine past performance and improve future effectiveness
- IOUs should competitively procure demand response resources in an open and competitive demand response market

Coordination between 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:
 - IOU procurement planning
 - IOU rate design modifications, either in general rate cases, or separate venues
 - Energy efficiency (and other public purpose) programs
 - Other peak demand reduction programs
 - ISO efforts to develop transparent wholesale market pricing mechanisms
 - Renewable Portfolio Standards
- Changes to ISO market rules to allow additional participation by non-IOU demand response providers
- Necessary legislative changes to rationalize rate design structures