

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE  
STATE OF CALIFORNIA**

Order Instituting Rulemaking to Enhance  
the Role of Demand Response in Meeting  
the State's Resource Planning Needs and  
Operational Requirements.

Rulemaking 13-09-011

**CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION  
RESPONSE TO ADDITIONAL QUESTIONS IN REGARD TO 2018 AND BEYOND  
DEMAND RESPONSE PROGRAMS**

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**I. Introduction**

The California Independent System Operator Corporation (CAISO) files this response pursuant to Administrative Law Judge (ALJ) Hymes’ May 20, 2016 Ruling Requesting Responses to Additional Questions in Regard to 2018 and Beyond Demand Response Programs (Ruling).

**II. Discussion**

This response addresses those questions from the Ruling that are relevant to the CAISO. The sections below provide the full text of the relevant question and the CAISO’s response thereto.

**Category 1 Questions: Demand Response Goal and Objectives**

1. *In general, what should the Commission expect demand response to accomplish?*

CAISO Response:

Demand response is a means for electricity users to adjust their usage patterns, either up or down, to either favorably reshape the net load curve or to help balance supply and demand and maintain transmission and distribution system reliability. The Commission’s bifurcation policy provides a solid foundation for setting appropriate expectations for demand response.

Bifurcation recognizes that supply-side demand response can balance supply and demand and maintain system reliability. Load modifying demand response can favorably reshape the net load curve by using rates and other price signals to effectively cause electricity users to change usage patterns. Whether categorized as supply-side or load modifying, demand response should enable curtailment or incremental consumption, whichever is necessary, to meet needs on the

transmission and distribution systems. To achieve maximum benefits, demand response must be flexible and responsive to both system and customer needs. Supply resources should provide real-time balancing services, flexible ramping capabilities, and grid services, such as contingency reserves and regulation. Load modifying demand response should flatten the net load curve by reducing net peak demand, shortening extreme ramps, and minimizing periods of over-supply.

2. *In general, what are your expectations of demand response in California?*

CAISO Response:

The CAISO expects procured demand response solutions to meet the state's energy needs and climate objectives. To do so effectively, demand response must evolve from a product that is typically use-limited and only available during peak periods into a flexible resource that assists in integrating significant amounts of renewable resources into the California grid. The Commission has properly developed a demand response policy in which resources are configured as either (1) load modifiers, with load impacts embedded in the state's load forecasts or (2) supply resources, with attributes and capabilities integrated, optimized, and dispatched through the CAISO market, like all other market resources.

Moving forward, the Commission should ensure that load modifying demand response expands by creating new rates, rate designs, and increased consumer price responsiveness to avoid the need for new capacity or transmission infrastructure additions. When new system, local, or flexible capacity is needed, supply demand response should have the opportunity to compete with traditional resources to supply capacity needs and grid services. Creating cost-effective and flexible resources that can both curtail and consume load will require demand response policies that promote technology agnostic solutions, such as aggregations of distributed energy resources to modify load and provide grid services while achieving California's climate objectives. To grow into a robust resource, demand response must take advantage of advances in technology and automation, and it must perform in ways that are less impactful to the end-use customer than current demand response programs.

The Commission can help spur innovation by promoting market-driven demand response solutions and encouraging demand response suppliers to customize products to meet both system and individual customer needs.

3. *Should the Commission set a different goal for load modifying and supply demand response resources? If yes, respond to the first two questions separately for load modifying and supply demand response.*

CAISO Response:

If the Commission sets discrete demand response goals, it should set separate goals for load modifying and supply demand response resources because they impact system reliability and costs differently.

Load modifying demand response delivers value if consumers consistently respond to price signals conveyed through rates and rate designs that favorably reshape the net load curve, thereby reducing the need for new capacity and lowering marginal costs. If load serving entities create rates that incentivize industrial, commercial and residential customers to consistently respond to price signals and create a flatter system load profile, load modifying demand response can deliver both avoided energy and capacity benefits over time (similar to how energy efficiency has favorably “bent the curve” on California’s load growth). Thus, any goal for load modifying demand response resources should be tied to year-over-year load profiles relative to an adjusted baseline, normalized for weather and hydro conditions. Favorable load modification will occur as customers choose to respond to rates, rate designs, and new energy shifting and saving technologies and strategies. New load growth, such as transportation electrification, should not be assumed to exacerbate the load shape, but should instead be incented from the beginning to help create a more favorable system load shape.

For supply demand response, the Commission could set an expected megawatt target based on system capacity and grid services needed, as informed by the demand response potential study. Load-serving entities should run competitive solicitations for the specific capacity or grid services needed indicated in the Commission’s goal. If insufficient cost-effective bids are received to meet the established goal, the load-serving entity should have the option to develop its own cost-effective supply demand response program to meet identified needs. The Commission can review the solicitation data and results and adjust the goal and procurement process as necessary.

8. *Who should be responsible for meeting the goal and objectives of demand response?*

CAISO Response:

The load-serving entity is responsible for ensuring sufficient capacity is procured to meet long and short-term capacity needs. The load-serving entity is also responsible for rate designs and rate options. Thus, load-serving entities are best suited to fulfill Commission established supply and load modifying demand response goals.

The utility distribution company is best able to assess and deploy demand response solutions to offset the need for traditional distribution upgrades. Thus, the utility distribution company is best suited to satisfy Commission demand response goals related to deferring or avoiding traditional distribution system upgrades.

**Category 2 Questions: Improving Demand Response Program Design**

6. *Explain and justify the most important program design changes the Commission should require for the 2018 demand response portfolio. Include a detailed explanation and justification for how this change could be made.*

CAISO Response:

The CAISO believes greater market transformation can be realized by opening the demand response market to allow more third-party providers to deliver grid services through competitive solicitations. The Commission should consider employing a transition plan beginning in 2018 to move toward a competitive procurement framework for supply demand response resources by 2021. Under a competitive procurement framework, the load-serving entity specifies its capacity and energy needs and the terms and conditions under which it will procure products. In such a construct, the load-serving entity can set performance requirements tailored to its needs, and the market can offer solutions to best address those needs. Much like traditional generation procurement, if the market does not deliver viable or cost-effective solutions, the load-serving entity would retain the option to build its own cost-effective demand response programs to meet identified needs.

### **Category 3 Questions: Increasing Participation and Performance in Demand Response**

- 3. What design changes could the Commission make to current demand response programs to specifically increase the number of customers participating in the programs?*

#### CAISO Response:

The Commission should not focus on simply increasing the number of customers participating in demand response programs. Instead, the Commission should ensure that the right customers with the right capabilities are participating and delivering quality demand response service. It is the overall effectiveness of the demand response that matters, not the mere number of participants. As an example, it would be inefficient for the Commission to authorize incentives for a 1,000 customer program if three-quarters of the participants provide 90% of the overall response. An approach focused on merely increasing participant numbers does not ensure performance or quality. Programs should be designed to screen and select high performing customers and screen out low performing customers.

Under a competitive procurement framework, the Commission could be less concerned about the details such as the number of participants. Rather, the Commission could focus on whether procurement contracts are fulfilled, performance expectations are met, and goals are properly set.

### **Category 5 Questions: CAISO Market Integration of Utility Programs**

- 1. Should the Commission require that all demand response resources have one trigger or should the Commission allow multiple triggers, as is the current policy?*

#### CAISO Response:

Supply demand response resources integrated as Proxy Demand Resources (PDR) are dispatched based on scheduling coordinator bid-in prices in the CAISO market and, in extenuating circumstances defined in the CAISO tariff, as exceptionally dispatched resources to meet reliability needs. Reliability Demand Response Resources (RDRR) have a set price trigger and are also automatically triggered in the event of a declared system or transmission emergency warning. Scheduling coordinators can also dispatch supply demand response resources, whether PDR or RDRR, to address local distribution reliability issues. Maintaining these multiple triggers is appropriate and consistent with the settlement agreement adopted in Decision 10-06-034.

- In designing triggers for demand response programs, what elements should the Commission take into account? To what extent does participant fatigue factor into trigger design? Explain in detail what steps the Commission should take to ensure that demand response programs are being maximized (bid at prices that result in dispatch) while avoiding participant fatigue.*

CAISO Response:

The Commission should emphasize triggers that enable objective comparison of offers and actual deliveries across demand response providers. Certain providers are able to deliver more value by providing more availability, more dispatches, and more energy curtailment compared to other providers. Some providers may employ more innovative strategies or more sophisticated technologies to provide additional benefits. The Commission should promote best practices based on contract terms and performance analysis rather than establishing prescriptive triggers based on the least common denominator. Allowing for innovation and incorporation of new technology will not only increase the value of demand response, it may also reduce participant fatigue by insulating end-use customers from the negative consequences of curtailing load.

- There has been discussion regarding the ability to pre-dispatch demand response resources in the day-ahead market to mitigate local contingency on the grid. What is the definition of pre-dispatch?*

CAISO Response:

Dispatching and positioning resources to respond quickly to a contingency event is a prudent planning and operational practice commonly performed by grid operators to meet grid needs. Slow starting resources may require advance notification through unit commitment or pre-contingency dispatch. Under these circumstances, the CAISO gives the scheduling coordinator sufficient time to start a resource and have it reach a set operating level to position the resource such that the CAISO can re-position the system within operating limits within 30 minutes following a possible contingency event. The CAISO typically commits and positions resources in critical hours when loads in transmission constrained areas are forecast to reach certain levels, or if certain transmission or generation is unavailable because of forced or planned outages. This planned “re-positioning” can be accomplished by increasing generation output or decreasing load in advance and in anticipation of a potential contingency.

The CAISO commonly dispatches resources pre-contingency through its day-ahead market through process called the Minimum Online Commitment (MOC) constraint. The MOC constraint ensures that certain Western Electricity Coordinating Council (WECC) paths and certain areas in the CAISO's balancing area remain within System Operating Limits (SOL) if a contingency occurs. The MOC constraint sets the minimum resource capacity needed in the day-ahead, considering the set of resources that are available and effective at meeting the SOL and Interconnection Reliability Operating Limits (IROLS).

The CAISO intends to implement additional commitment or pre-contingency dispatch capabilities in the near future. As part of CAISO's Stipulation and Consent Agreement with the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation related to the September 8, 2011 Pacific southwest blackout, the CAISO agreed to implement Contingency Modeling Enhancements (CME) "to ensure that the CAISO market procures resources that have the necessary characteristics to ensure the ability to recover from a contingency and be ready for the next N-1 contingency as soon as possible, but no longer than 30 minutes. Once implemented, CME will help ensure the CAISO commits the right resources with the right capabilities to recover from a contingency and be ready for the next contingency within 30 minutes."<sup>1</sup>

The CAISO's day-ahead and real-time energy markets are designed to optimize resources to reliably serve demand and meet applicable reliability criteria through a least-cost energy dispatch solution. Supply demand response resources are eligible for pre-contingency dispatch, similar to any other resources, if demand response providers accurately reflect their costs through bids and commitment costs to manage their participation in the CAISO's market.

The Commission should be cognizant of the challenges pre-contingency dispatch has on the grid and the efficiency of the wholesale electricity market. As the designated Transmission Operator,<sup>2</sup> the CAISO must plan and position local areas to be able to operate within system operating limits within 30 minutes after a first contingency. Decisions to commit resources are made based on forecasts and assumptions about system conditions and MOC needs. The earlier

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<sup>1</sup> Order Approving Stipulation and Settlement Agreement, 149 FERC ¶ 61,189.

<sup>2</sup> The NERC Glossary of Terms defines the "Transmission Operator" as "The entity responsible for the reliability of its 'local' transmission system, and that operates or directs the operations of the transmission Facilities." [http://www.nerc.com/files/glossary\\_of\\_terms.pdf](http://www.nerc.com/files/glossary_of_terms.pdf), p. 105.

these decisions are made, the less precise and accurate the forecast information is. If insufficient resources are available to respond post-contingency, the CAISO operator has no choice but to commit, and pay, long-start resources to start-up based on imperfect forecast information to prepare for a possible contingency. Commitment decisions not only cost money but can expend limited “start-ups” on use-limited resources. In contrast, if a sufficient number of fast responding resources are available post-contingency to re-position the system within operating limits, the CAISO can rely on those resources, thereby foregoing the need to start-up resources, pay commitment costs, and burn fuel to protect against the unlikelihood that a contingency actually occurs. In addition, the use-limited nature of many current demand response programs means that these programs are often best used to provide fast response capacity, which, in turn, limits dispatch hours and frequency.

4. *What is the impact of pre-dispatching demand response resources if they are not ultimately needed in real time and not dispatched?*

CAISO Response:

The CAISO’s decision to commit a resource pre-contingency is based on forecast system conditions, system topology, and the need to ensure sufficient capacity with the right capabilities in the right place. The cost of committing a long-start resource is based on resource commitment costs, *i.e.* start-up and minimum load costs. The CAISO commits a resource pre-contingency to assure that the system will have sufficient energy and ramping capability to remain stable under planned-for local contingencies. The same commitment cost construct can apply to supply demand response resources. In the day-ahead timeframe, the CAISO can commit demand response resources to enable response and ramping immediately if and when needed to address a contingency. Alternatively, the demand response resource could comply with a pre-contingency dispatch instruction by curtailing load in all commitment hour(s).

The consequences of committing demand resource pre-contingency is that the resource must curtail load based on the commitment decision, in preparation for a *possible* contingency. As with any “long-start” resource, the CAISO operator must commit the unit in advance to ensure loads and resources will remain within system operating limits whether or not a contingency actually occurs. This is in contrast to fast responding demand response resources, which enable the CAISO to reposition the system post-contingency and, thus, only have to curtail load if a contingency actually occurs. Based on this understanding of system needs,

current demand response resources appear to be better suited to provide post-contingency response based on the use-limited nature of currently configured demand response programs.

9. *Explain and justify whether and how the Commission should standardize the penalties for non-performance across the utility demand response tariffs and demand response contracts with third-party providers? Explain and justify whether CAISO market penalties should be incorporated into this standardization?*

CAISO Response:

As preferred resources, supply demand response resources should displace and avoid the need for new traditional generation capacity and new transmission or distribution infrastructure. Performance guarantees and associated penalties are critical to ensure that procured resources actually avoid the need for traditional infrastructure investment. As a result, the Commission should apply performance guarantees to all supply demand response resources whose purpose is to avoid or defer non-preferred resources. Performance guarantees should apply whether the demand response resource is sourced through a utility program or a competitive solicitation.

With respect to the CAISO market, there are currently no express market penalties for under-performance. The CAISO assumes performance penalties are incorporated into power purchase agreements between buyers and sellers. The CAISO market settles all market transactions, including any over or under deliveries, as “uninstructed energy” relative to a resource’s cleared bid or schedule. The result of under delivery could be lost revenues if the real-time market clearing price is higher than the price originally paid for the energy. Conversely, an under delivery could result in additional incremental market revenue if the reverse is true, *i.e.* if the price originally paid is less than the real-time market clearing price.

Later this year, the CAISO will implement a Resource Adequacy Availability Incentive Mechanism (RAAIM). The RAAIM will pay or charge resource adequacy resources based on compliance with must offer obligations. The RAAIM will incentivize resource adequacy resources to bid in consistent with must offer obligation, but the RAAIM will not separately enforce performance requirements. As a result, the CAISO continues to believe that contractual performance obligations should be maintained.

11. *The Supply Resource Demand Response Integration Working Group Report highlighted the relationship of the net benefits test and the default load adjustment. Explain and justify whether the Commission should reevaluate its rules established in D.12-11-025 regarding the net benefits test and the default load adjustment?*

CAISO Response:

The net benefits test is a construct that applies to supply demand response bidding in the wholesale electricity markets. Demand response bid below the net benefits test price threshold is not net beneficial to CAISO because costs outweigh benefits. The Commission should continue to require jurisdictional entities to bid at or above the monthly net benefits test price threshold because bids should not be submitted that knowingly are not net beneficial.

In the CAISO market, a resource that bids above the net benefits test price threshold may ultimately deliver energy in intervals in which the market clearing price is below the net benefits test price threshold. This can occur in settlement intervals when a resource's minimum run time requires that the resource continue to operate even though the market clearing price is below the resource bid price and, consequently, the net benefits test price threshold. It is not uncommon for a resource to run uneconomically in certain intervals based on physical resource constraints. As a result, the CAISO markets have bid cost recovery mechanisms to ensure resources are made whole in such situations. With supply demand response, there is the additional complexity that when the resource runs uneconomically during intervals when the market clearing price is below the net benefits test price threshold, the default load adjustment settlement applies in addition to bid cost recovery. This occurs because any curtailed energy delivered from a supply demand response resource at a market clearing price below the net benefits test price threshold is not net beneficial to the system; therefore, the default load adjustment applies regardless of the resource's original bid price.

### III. Conclusion

The CAISO appreciates this opportunity to provide comments regarding the purpose and vision for demand response programs in the coming years. The CAISO looks forward to working collaboratively with the Commission to ensure that future demand response is effective at meeting system needs, displacing conventional generation and meeting the state's environmental and policy goals.

Respectfully submitted,  
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