

Comments on Demand and Distributed Energy Market Integration Working Group

Department of Market Monitoring

November 6, 2025

Summary

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on the *Demand and Distributed Energy Market Integration Working Group* presentation dated October 16, 2025.¹ In these comments, DMM summarizes our previous comments from the Demand and Distributed Energy Market Integration (DDEMI) Working Group Meetings as the ISO develops their Discussion and Issue Papers.

DMM appreciates the work that is going into the DDEMI effort. However, the ISO has not presented information on the costs and benefits of these enhancements. DMM recommends that an assessment of the effort required for these market improvements should be included in this stakeholder process. Without any such assessment, it appears to DMM these enhancements should have a lower priority than numerous other policy efforts currently underway, such as EDAM congestion rent allocation refinements, congestion revenue rights reforms, storage bid cost recovery and default energy bids, and uncertainty products.

DMM offers summaries of our previous comments on the following five topics:

- **Baselines methodologies.** DMM cautions against adding additional baseline methodologies that take resources to develop, introduce additional potential for error in calculation, and may ultimately go unused. DMM recommends improving the “control group” baseline methodology, and cautions against any prescriptive baseline methodology based on historical averages.
- **RDRR modeling.** Reliability Demand Response Resources (RDRR) should have their minimum on-line times, minimum load costs, and start-up costs accurately included in the market only as necessary to accurately model the physical characteristics of the resources. Should these parameters be included, DMM recommends the ISO have processes in place to validate the reasonableness of these parameter submissions. Additionally, DMM supports the removal of discrete dispatch size limits for RDRR, to the extent this may be needed to more accurately reflect RDRR physical operating characteristics.
- **Modeling demand response resources as participating load.** DMM recommends the ISO incrementally work to evolve demand response to a demand-side resource from the current supply-side model. Further, DMM recommends in this stakeholder process the ISO consider the interactions of this change to long-term planning for resource adequacy obligations, and methods to value the resource adequacy of demand-side resources if they are treated as load.

¹ *Demand and Distributed Energy Market Integration Working Group*, California ISO, October 16, 2025: <https://stakeholdercenter.caiso.com/InitiativeDocuments/Presentation-Demand-and-Distributed-Energy-Market-Integration-Oct-16-2025.pdf>

- **Real-time load bidding.** DMM supports enhancements to real-time load bidding for resources that are able to respond to real-time economic signals to increase market reliability and efficiency.
- **Western Energy Imbalance Markets (WEIM) demand response models.** DMM supports expanding the demand response models available to WEIM entities. Real-time load bidding and resource participation are preferred models. However, DMM cautions any model must not allow for double counting of the resource capacity in the resource sufficiency evaluation test.

Comments

Baseline methodologies

Demand response baselines are an empirically estimated counterfactual used to determine a precise and accurate response of the resource in the absence of any action. The goal of demand response baselines are similar to those found in the economic literature to study the impacts of a rule or policy. The goal of such estimation procedures are to provide a “what-if” the policy (or schedule) was not in place, in order to estimate the impact of the policy (or demand response deployment). To accurately and precisely estimate these impacts, the econometric methods use differences in time and space to isolate the effect.

The ISO currently offers more than 50 demand response baseline methodologies to estimate the response of a range of demand response methodologies and technologies. These methodologies generally use difference using control groups (space) and day matching (time) to estimate the impact of a demand response event. The ISO also offers methods with meter generation output and sub-metering arrangements to estimate the performance of specific types of demand response.

In the current initiative, DMM recognizes that some stakeholders are proposing the development of new baseline methodologies and enhancements to existing baseline methodologies. The goal of baselines should be to create a like-for-like estimate when the resources are scheduled—or not—that are compared against robust counterfactual conditions.^{2,3} DMM understands that existing baseline methodologies were developed with this intent, with extensive stakeholder input in past policy initiatives. Therefore, DMM asks stakeholders to clarify how the current baselines that utilize the current estimation procedures are insufficient to estimate the impacts of demand response events, and why the extensive number of existing baseline methodologies are so underutilized.⁴

DMM cautions against adding additional baseline methodologies unless absolutely necessary. Additional baseline methodologies can be prone to errors, miscalculations, and potential strategic gaming. Additionally, the development of new baseline methodologies requires staff time and resources. DMM

² *Comments on Demand and Distributed Energy Market Integration*, Department of Market Monitoring, March 28, 2025: <https://www.caiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-mar-28-2025.pdf>

³ *Comments on Demand and Distributed Energy Market Integration*, Department of Market Monitoring, May 1, 2025: <https://www.caiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-apr-07-2025-working-group-may-01-2025.pdf>

⁴ *Comments on Demand and Distributed Energy Market Integration*, Department of Market Monitoring, February 21, 2025, p 3: <https://www.caiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-feb-05-2025-working-group-feb-21-2025.pdf>

recommends the ISO carefully consider the need for additional methodologies, as the current set of options is underutilized, and the day matching methods appear robust for the majority of resources.

Among the existing baseline methodologies, the control group approach offers a conceptually sound and empirically grounded framework for estimating demand response. This methodology compares the performance of like-for-like resources—evaluating differences in demand between dispatched and non-dispatched customer accounts—to estimate the treatment effect. Such comparative techniques are widely accepted in economic analysis for constructing counterfactuals. These methods can be extended to include counterfactual estimates in time, as well as space. Despite its analytical robustness, few resources have utilized the control group methodology recently.

Importantly, the control group approach is applicable to behind-the-meter storage resources, provided a suitable comparison customer account is available that is not dispatched and shares similar operational characteristics. Pacific Gas and Electric has proposed enhancements to this methodology, which DMM generally supports.⁵ These enhancements include registration and methodological refinements aimed at expanding the pool of comparable resources and improving the accuracy of demand response measurement for scheduled events.

Separately, Leap has proposed a “prescriptive” baseline methodology, currently used in a California Energy Commission program.⁶ While conceptually similar to the control group approach, the prescriptive baseline relies on a state-level average and is established in advance of the operational period. DMM cautions against adopting this methodology within the ISO market framework. Unlike the control group approach, the prescriptive baseline does not meet the like-for-like standard necessary for reliable counterfactual estimation. Demand response performance is often sensitive to ambient conditions, and a statewide average fails to account for temporal and locational variability. As such, DMM does not recommend implementing the prescriptive baseline as proposed, given its inability to reflect the near-identical load patterns and conditions required for accurate measurement. As a result, DMM recommends the ISO develop methods to improve the control group baseline methodology for improved baseline estimation.

⁵ *Proposal to Revise Demand Response Control Group Settlement Methodology*, Pacific Gas and Electric, March 3, 2025: <https://stakeholdercenter.caiso.com/InitiativeDocuments/Presentation-PGE-Settlement-Methodology-Mar-03-2025.pdf>

⁶ *Prescriptive Baselines in CAISO*, Leap, March 3, 2025: <https://stakeholdercenter.caiso.com/InitiativeDocuments/Presentation-Leap-Prescriptive-Baselines-Mar-03-2025.pdf>

Reliability demand response resource modeling

DMM continues to support efforts to ensure that Reliability Demand Response Resources (RDRR) have their physical and economic characteristics accurately represented in the market.^{7,8,9} These characteristics may include minimum on-line time, startup costs, and minimum load costs. If RDRR require the ability to reflect these parameters to ensure accurate scheduling and cost recovery, their inclusion in the market model is appropriate. Doing so supports continued participation of RDRR and helps preserve access to these reliability resources.

In the development of the discussion and issue papers, DMM recommends the ISO also consider the broader implications for operational integrity and market efficiency. Accurate representation of resource characteristics contributes to efficient commitment and dispatch decisions, and helps ensure that market outcomes reflect actual system capabilities and costs. These changes include the elimination of the 100 MW cap for discrete RDRR, which may allow some market participants to more accurately reflect their resources to the market, supporting more efficient access to reliability resources.

While DMM supports consideration of proposals to allow RDRR to submit additional operating parameters, the ISO should ensure that appropriate validation processes are in place to assess the reasonableness of submitted commitment costs. Currently, Proxy Demand Response (PDR) resources are permitted to submit a broader range of operating parameters, including minimum on-line times and startup costs. This precedent suggests that similar functionality could be extended to RDRR.

DMM has observed instances where PDR resources have submitted disproportionately high commitment costs relative to the capacity offered. To maintain market efficiency and avoid distortions in commitment decisions, DMM recommends that the ISO develop clear guidelines and validation protocols for commitment cost submissions if this functionality is expanded to RDRR.

The ISO should work toward a long-term goal of modeling demand response resources as participating load

DMM continues to recommend a long-term goal of modeling demand response as a load resource rather than as a supply-side resource whenever technologically feasible.¹⁰ Treating demand response as a real-time demand-side resource improves market efficiency by adding slope to the demand curve, which enhances reliability and reduces system costs by avoiding uneconomic load scheduling.

Near-term enhancements could expand the existing day-ahead participating load model to real-time. Over time, as technology and experience evolve, additional demand response models could be adapted

⁷ *Comments on RDRR Bidding Enhancements Issue Paper/Straw Proposal*, Department of Market Monitoring, November 12, 2021: <https://www.aiso.com/documents/dmm-comments-rdr-bidding-enhancements-issue-paper-straw-proposal-nov-12-2021.pdf>

⁸ *Comments on RDRR Bidding Enhancements Revised Straw Proposal*, Department of Market Monitoring, January 11, 2022: <https://www.aiso.com/documents/dmm-comments-reliability-demand-response-resource-bidding-enhancements-revised-straw-proposal-jan-11-2022.pdf>

⁹ *Comments on Demand and Distributed Energy Market Integration Working Group*, Department of Market Monitoring, July 22, 2025: [dmm-comments-on-demand-and-distributed-energy-market-integration-jul-08-2025-working-group-jul-22-2025.pdf](https://www.aiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-jul-08-2025-working-group-jul-22-2025.pdf)

¹⁰ *Comments on Demand and Distributed Energy Market Integration Working Group Discussion Paper*, Department of Market Monitoring, July 11, 2025: [dmm-comments-on-demand-and-distributed-energy-market-integration-jun-13-2025-working-group-discussion-paper-jul-7-2025.pdf](https://www.aiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-jun-13-2025-working-group-discussion-paper-jul-7-2025.pdf)

to support broader demand-side integration. In the development, the ISO should maintain or improve baseline integrity and measurement accuracy.

Modeling demand response as load will require coordination with the current capacity planning framework. Price-responsive demand affects both long-term load forecasts and the qualifying capacity of resources. DMM recommends the ISO consider how participating load interacts with resource adequacy forecasting and accreditation processes.

Additionally, demand response model enhancements proposed for WEIM balancing authorities could serve as pilot programs to test and refine this functionality.

Real-time load bidding

DMM continues to support enhancements to market design that enable load resources to respond to real-time economic signals.^{11,12} Under the current framework, load may submit economic bids in the day-ahead market, however all load is served in real-time without regard to price. This includes participating load resources that may be capable of adjusting consumption in response to real-time price signals. The same limitation applies to load-serving entities within Western Energy Imbalance Market (WEIM) balancing authorities, as discussed further below.

DMM supports the introduction of real-time bidding functionality—initially for participating load resources—as a means to improve system flexibility and introduce additional slope to the demand curve. A more responsive demand curve can enhance price formation, reduce reliance on higher-cost supply by enabling existing on-line capacity to meet system needs without requiring additional supply, and thereby lowering real-time system costs and improving overall market efficiency of real-time dispatch. Over time, this functionality could be incrementally extended to other demand response models, provided the resources demonstrate the ability to respond reliably to real-time market conditions so the ISO does not unforeseeably end up having more load than clears the market for the resource.

To support implementation and assess feasibility, DMM recommends that the ISO consider pilot efforts focused on real-time load bidding. Pilots would allow for evaluation of operational impacts, participant responsiveness, and potential benefits to system reliability and cost efficiency. Such efforts would also provide valuable insights into the scalability of real-time load bidding across different resource types and balancing authorities.

Western Energy Imbalance Market

DMM recommends that the ISO explore development of real-time load bidding functionality for Western Energy Imbalance Market (WEIM) entities. Like the CAISO balancing authority, other WEIM balancing authorities lack the ability to economically schedule load in real-time because generation is matched to forecasted load. Enabling real-time load bidding would allow WEIM entities to self-schedule inflexible load while bidding flexible load, thereby introducing price-responsive demand into their balancing areas. This could enhance system reliability and reduce costs by improving dispatch efficiency.

¹¹ *Comments on Demand and Distributed Energy Market Integration*, Department of Market Monitoring, February 21, 2025: <https://www.caiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-feb-05-2025-working-group-feb-21-2025.pdf>

¹² *Comments on Demand and Distributed Energy Market Integration Working Group Discussion Paper*, Department of Market Monitoring, July 11, 2025: [dmm-comments-on-demand-and-distributed-energy-market-integration-jun-13-2025-working-group-discussion-paper-jul-7-2025.pdf](https://www.caiso.com/documents/dmm-comments-on-demand-and-distributed-energy-market-integration-jun-13-2025-working-group-discussion-paper-jul-7-2025.pdf)

To support implementation, DMM recommends pilot efforts to evaluate operational feasibility, participant responsiveness, and market impacts across WEIM entities.

Resource adequacy

In developing real-time load bidding functionality, DMM highlights the importance of clarifying how real-time participating load resources would interact with resource adequacy (RA) accreditation. Participating load resources that submit bids similar to demand response and demonstrate verifiable load reductions should be eligible to receive qualifying capacity, or adjust RA procurement obligations. While RA accreditation is under the purview of local regulatory authorities (LRAs), DMM encourages the ISO to coordinate with LRAs to ensure appropriate monitoring and verification of RA treatment for these resources.

DMM supports expanded demand response participation models for use in the Western Energy Imbalance Market

DMM supports expanding demand response participation models to enhance functionality for WEIM entities. This could include enabling DR registration and allowing base schedule adjustments to reflect DR programs. DMM recommends these models support real-time bidding of demand response as participating load, where feasible.

Currently, demand response in the WEIM participates either as supply-side dispatchable demand response (DDR) or as a non-price-responsive load modifier. While DDR enables economic dispatch, load modifiers lack transparency and do not support robust performance evaluation.

WEIM entities have expressed interest in DR participation using their own Performance Evaluation Methodologies (PEMs). DMM recommends the ISO further evaluate this approach, as less-transparent PEMs may compromise resource performance and market integrity.

To avoid capacity leaning, DMM recommends the ISO assess how demand response participation interacts with the resource sufficiency evaluation. Demand response capacity must not be double counted—e.g., shown both as a resource and as a base schedule adjustment—which could mask capacity shortfalls at the balancing authority level.

As a long-term goal, DMM supports modeling demand response as real-time participating load. Extending real-time load bidding and base schedule adjustment capabilities would be a viable first step toward this goal, provided WEIM demand response resources are technologically capable.