California ISO

Stakeholder Comments Template

Day-Ahead Market Enhancements Phase 1 Initiative

This template has been created for submission of stakeholder comments on the straw proposal that was published on February 7, 2020. The proposal, February 10, 2020 Stakeholder meeting presentation, March 5, 2020 Stakeholder call presentation, and other information related to this initiative may be found on the initiative webpage at: http://www.caiso.com/StakeholderProcesses/Day-ahead-market-enhancements

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on March 26, 2019.

Submitted by	Organization	Date Submitted
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Please provide your organization's overall position on the DAME straw proposal:

- ☐ Support
- ☒ Support w/ caveats
- ☐ Oppose
- ☐ Oppose w/ caveats
- ☐ No position

In sum, MRP supports some aspects of the CAISO's proposal, does not yet support other aspects of the CAISO's proposal, and is still considering still other aspects of the CAISO's proposal on which it has not yet formulated a position.

Please provide written comments on each of the straw proposal topics listed below:

1. **New day-ahead market products, including reliability energy, reliability capacity, and imbalance reserves.**

MRP supports the creation of the Day-Ahead Imbalance Reserve Product ("DAIRP") to provide the CAISO with an operating envelope of flexibility sufficient to account for uncertainty arising between the Day-Ahead Market ("DAM") and real-time operations. Given that the CAISO is also proposing to limit the real-time must-offer obligation ("MOO") to resources that are awarded Day-Ahead energy, ancillary service, reliability energy and DAIRP awards, the success of this paradigm will depend on how robust the CAISO's Day-Ahead awards are. MRP will provide additional comment on these topics in Sections 3 and 8.

The CAISO is proposing to eliminate the Residual Unit Commitment ("RUC") process and implement in RUC's place four new products within the Day-Ahead market construct: reliability capacity up and down and reliability energy up and down. Currently, the RUC process develops capacity schedules above the energy schedules produced by clearing the Day-Ahead market at the intersection of the bid-in supply curve and the bid-in demand curve. There currently is no "reliability capacity down"; if the Day-Ahead market clearing satisfies the CAISO's load forecast and any other reliability needs, the CAISO simply issues no RUC capacity schedules. In this Straw Proposal, the CAISO is contemplating awarding "reliability capacity down", along with negative-priced energy schedules, when the CAISO's demand forecast is less than the level at which the Day-Ahead energy market energy clears.

The CAISO, in effect, is taking a novel step: imposing the financial consequences of its demand forecast on the financial results of the Day-Ahead energy market. If the CAISO's demand forecast was always accurate, this result might be reasonable; if the CAISO's demand forecast is not always correct, the CAISO is, in effect, substituting its judgment for the natural functioning of the market where that judgment might, but also might not, improve reliability. It is one thing for the system operator to act to enhance reliability where the market has not sufficiently ensured reliability. It is something else altogether for the system operator to act to reduce the overall level of reliability based on the system operator's demand forecast. In that case, the system operator's forecast had better be right.

In the case where the CAISO's demand forecast is (1) higher than the market clearing level and (2) the CAISO's demand forecast is correct (or at least more correct than the market energy clear), the CAISO's proposal would result in optimizing the energy schedules associated with its demand forecast. This seems the right outcome: Day-Ahead market energy schedules that reflect the expected

reliability need (i.e., the additional capacity and energy needed to meet the CAISO's Day-Ahead demand forecast).

In the case where the CAISO's demand forecast is less than the level at which the Day-Ahead market clears, however, the CAISO will be reducing energy margins (due to the negative reliability energy prices) and providing a "capacity payment" for "capacity down" – something that will offset, to some extent, the negatively-priced reliability energy awards.

If the CAISO's demand forecast is correct (or, at least, more correct than the clearing of the energy market), then energy prices will better reflect the "real" outcome.

But what if the CAISO's demand forecast is not a better predictor of actual real-time conditions than the natural clearing of the Day-Ahead market? In that case, the CAISO may, or likely, will have altered financial outcomes in a manner contrary to the true reliability need. MRP struggles with this aspect of the CAISO's proposal and cannot yet support it.

In sum, MRP:

- Supports the development of a day-ahead imbalance reserve product (with concerns noted in Section 8 below).
- Supports the CAISO's efforts to better ensure the deliverability of its Day-Ahead products (at least relative to Day-Ahead conditions; MRP understands that, because conditions change, nothing the CAISO can do can ensure real-time deliverability based on what is known at the time the Day-Ahead market is run);
- Supports incorporating into Day-Ahead prices the financial consequences of actions taken to enhance reliability when the prudency of those actions is borne out by actual real-time conditions;
- Reserves judgment as to the CAISO taking actions with financial consequences, the prudency of which is not supported by actual real-time conditions. As such, MRP is not yet ready to support the CAISO's proposal to replace RUC with the reliability energy/capacity paradigm.

As MRP further considers the CAISO's proposal, MRP requests the CAISO provide information with regards how the Day-Ahead market clears relative to the CAISO's Day-Ahead demand forecast relative to actual observed real-time demand and how well virtual trading acts to address differences between Day-

Ahead energy market clears and observed real-time conditions. This information will help MRP and other market participants contextualize the CAISO's proposal.

2. Settlement and cost allocations.

The CAISO proposes the following cost allocation for energy, reliability energy (REN) and reliability capacity up and down (RCU/RCD):

- EN capacity cost at the reliability energy marginal cost is allocated to cleared virtual supply/demand and bid-in load.
- RCU Tier 1 cost at the reliability energy marginal cost is allocated to net virtual supply and under-scheduled load.
- RCU Tier 2 cost will be allocated to metered demand.
- RCD Tier 1 cost at the reliability energy marginal cost is allocated to net virtual demand and over-scheduled load.
- RCD Tier 2 cost will be allocated to metered demand.

The CAISO proposes the following cost allocation for imbalance reserves up and down (IRU/IRD):

- IRU Tier 1 cost will be allocated to net negative demand deviation and net virtual supply.
- IRU Tier 2 cost will be allocated to metered demand.
- IRD Tier 1 cost will be allocated to net positive demand deviation between day ahead and real time, and net virtual demand.
- IRD Tier 2 cost will be allocated to metered demand.

RCU and RCD are costs incurred to clear the energy market at the CAISO's demand forecast instead of at the natural clearing of the supply and demand curves. The cost allocation described above seems intuitively obvious when the CAISO's actions represent actions taken to enhance reliability. However, if the CAISO's demand forecast is wrong relative to the clearing of the market, allocating costs in these ways will not reflect cost causation relative to the true reliability result; it will only reflect cost causation relative to the CAISO's actions to clear the market at its demand forecast. Allocating RCD cost to net virtual demand that was trying to push the cleared demand higher when the CAISO's forecast of demand turns out to be wrong (e.g., the CAISO forecast turns out to be lower than the actual demand) will be a difficult pill to swallow. MRP acknowledges that currently allocating RUC costs to virtual supply when the CAISO's forecast of demand turns out to be too high is a tough pill to swallow; however, in that case, the CAISO was

only purchasing additional capacity insurance (not energy) that may have come at a very reasonable price, given that RA capacity is obligated to bid into RUC at a $0 price. Costs incurred under the new paradigm when the CAISO's forecast turns out to be wrong relative to the market clearing may not be as benign.

3. **Bidding rules and offer obligations.**

The CAISO proposes to require Day-Ahead bids for energy, reliability capacity and imbalance reserves as show in the table below.

	DA Bid (SS or Economic) for Energy	DA Bid (Economic) for Reliability Capacity	DA Bid (Economic) for Imbalance Reserves
System RA	Yes	Yes	Not required
Local RA	Yes	Yes	Not required
Flex RA	Yes (economic)	Yes	Yes

MRP does not yet fully understand or appreciate the CAISO's rationale for not requiring system and local RA capacity to submit imbalance reserve bids in the Day-Ahead market but requiring only flexible capacity to submit bids to provide imbalance reserves and requests the CAISO provide additional information on this aspect of the proposal.

The CAISO's proposal to limit the real-time MOO to only those resources with DA market awards creates two concerns. MRP's first concern is that the CAISO must secure, in the Day-Ahead time frame, awards and commitments that account for the maximum amount of uncertainty that could arise between the Day-Ahead and Real-Time time frames. To MRP, the CAISO's discussion of how it will conduct the regression analysis to determine the DAIRP requirements seems more focused on ensuring that the CAISO does not over-procure DAIRP than about ensuring that the CAISO does not under-procure DAIRP. This discussion does not provide MRP with a sense of confidence that the CAISO will, in fact, procure a robust amount of DAIRP.

MRP's second concern is that limiting the Real-Time MOO to the resources secured in the Day-Ahead will lead to an increased amount of Exceptional Dispatch in the Real-Time – in effect, shifting post-Day-Ahead Exceptional Dispatch to the real-time - an outcome that MRP would not support.

4. **Scheduling rules for variable energy resources.**

The CAISO proposes:

- To incorporate both the variable energy resource ("VER") forecast and the system operator demand forecast in the market optimization;
- To limit the VER's upper economic limit to the system operator's day-ahead forecast (VERs will not be allowed to submit their own forecasts, but may use virtual bids to take a different financial position in the Day-Ahead market);
- To not pay a resource that does not bid into the day-ahead market for reliability capacity up so that it is not forced to participate in the real-time market,
- To not subject VERs that only provide Day-Ahead market self-schedules to the RT MOO (the CAISO observes that it will not be possible for a VER to self-schedule some amount other than the CAISO's forecast amount); and
- To award reliability capacity or imbalance reserves only to VERs that submit economic bids.

The CAISO summarizes how it will base VER energy and reliability energy schedules on their level of participation in the Day-Ahead market:

  - No bid: cleared EN = 0 MW, REN = system operator forecast, but is not settled
  - Self-schedule Only: cleared EN = REN = system operator forecast
  - Economic bid: cleared EN + RCU – RCD = REN <= system operator forecast

At first impression, eliminating the VER owner's right to submit its own forecast and requiring that VER owners use virtual bids to take a position in the market different than the CAISO's forecast introduces additional complexity and risk, the tradeoffs for which are not fully known. MPR is still evaluating this aspect of the CAISO's proposal.

5. **Deliverability approach for reliability capacity and imbalance reserves.**

The CAISO has proposed to validate, through its network models, that energy from DAIRP can be delivered, at least based on the Day-Ahead optimization solution. MRP supports this.

6. **Approach for congestion revenue rights.**

The CAISO proposes that market participants can use CRRs to hedge energy congestion resulting from energy schedules, reliability energy schedules, or imbalance reserve awards. MRP is still evaluating this aspect of the proposal and has no comments now.

7. Approach for local market power mitigation.

The CAISO proposes that it will (1) continue to rely on the CAISO's dynamic local market assessment and mitigation approach, and (2) develop a default capacity bid to use when mitigating reliability capacity and imbalance reserve offers.

As an initial matter, the CAISO's local market power assessment and mitigation currently applies only to energy bids. The CAISO has not proposed to implement dynamic local market power mitigation for start-up and minimum load bids until Fall 2022. To the extent there is an interaction and relationship between the local market power assessment and mitigation proposed in this initiative and what is being proposed and developed for CC-DEBE, the CAISO should describe that interaction or relationship, including any effect on the timing of implementation for either initiative, in the next straw proposal.

While the CAISO has only described its intent to develop a default capacity bid, and has not provided any detail as to how the CAISO will develop such a default capacity bid, this exercise is very central to the topic of applying local market power mitigation to reliability capacity and imbalance reserve product bids, and MRP is keenly interested in how this topic will develop.

8. Regression approach to determine the imbalance reserve requirement.

Given that the "operating capacity envelope" that the CAISO will have after the Day-Ahead market runs will be set by the imbalance reserve requirements, and further given that the CAISO is proposing to limit the RT MOO to this envelope and to awarded DA ancillary services, MRP believes it critical that the CAISO not skimp on the procurement of Day-Ahead imbalance reserves.

The CAISO appears to be proposing to use quantile regression because that regression technique better incorporates outlier or tail events. MRP fully supports this approach for the same reason.

The critical step in the CAISO's proposal to translate the quantile regression results to the CAISO's imbalance reserve requirements is to develop the so-called "adjustment ratio". The CAISO describes the adjustment ratio as follows:

However, the method above systematically over-estimates the 97.5 percentile of net load imbalance. In reality, because of the identity Net Load = Load – Wind – Solar, a 97.5 percentile net load imbalance would not simultaneously have 97.5 percentile load imbalance and 2.5 percentile wind imbalance and 2.5 percentile solar imbalance at the same time. Therefore, the regression output values need to be scaled using an "adjustment ratio".

An adjustment ratio for each hour and month can be calculated leveraging the histogram approach. Refer back to the orange line in Figure 10, which shows the histogram approach to setting the imbalance reserve up requirement using net load imbalance up values. The orange line can be re-estimated by using the histogram approach to calculate load, wind, and solar imbalance requirements separately and then combining the values using the identity Net Load = Load – Wind – Solar (similar to steps 1-4 above).

The red line in Figure 11 below illustrates what happens when this calculation is carried out – net load values are overestimated. However, the ratio of the values represented by the orange and red lines in Figure 11 can be used to define the adjustment ratio. Then, output values calculated from the regression approach can be multiplied by this adjustment ratio to scale back the overestimated net load values. Figure 12 illustrates the regression output values scaled by the adjustment ratio. The darker green line represents the original regression output values and the lighter green line represents the values scaled by the adjustment ratio. Notice the light green line more closely "tracks" the blue line. (Straw Proposal at page 37.)

Graphically, the "adjustment ratio" – the ratio between the orange and red histogram lines in Figure 11 – appears to range roughly between 0.50 and 0.95:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hist 1 (red)	4000	4200	4100	4150	3950	3700	3300	4000	4300	5800	4000	3400
Hist 2 (orange)	2400	3050	2950	3950	2000	1800	1750	3700	3100	4200	3000	2800
Ratio Hist 2 to Hist 1	0.60	0.73	0.72	0.95	0.51	0.49	0.53	0.93	0.72	0.72	0.75	0.82

The adjustment ratio plays such a critical role in establishing the imbalance reserve requirements that it warrants further detail and discussion and, ideally, more supporting data and sample calculations. As such, MRP is not prepared to support this aspect of the proposal at this time.

Finally, if and when the CAISO implements the DAIRP, it should publish the details of how it will determine the imbalance reserve requirements in its tariff and commit, in

tariff language, to regularly publishing the data and calculations that establish the imbalance reserve requirements. This transparency will be critical given the critical nature of the CAISO's imbalance reserve product.

9. **Additional comments:** none. MRP thanks the CAISO for the opportunity to provide these comments.