

**Comments on Day-Ahead Market Enhancements:
August 13, 2019 Working Group
Department of Market Monitoring**

September 6, 2019

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on the August 13, 2019 Day-Ahead Market Enhancements (DAME) Working Group meeting.¹

Overview

As part of the DAME initiative, the ISO proposes a new imbalance reserve product for the day-ahead market. The new product would increase the extent to which flexible reserves are procured and priced in ISO markets and is aimed at reducing out-of-market operator actions. Designing deliverable day-ahead and real-time flexible reserve products that work effectively together would make the ISO markets more flexible and resilient in the face of increasing net load ramps and net load uncertainty. The ISO has also emphasized that a day-ahead flexible reserve product is critical for expanding markets through the Extended Day-Ahead Market (EDAM).

The DAME proposal also includes an option to add reliability energy (REN) constraints that would integrate the day-ahead market and residual unit commitment (RUC) process. This is the latest iteration of options the ISO has proposed over the last couple of years for combining the IFM and RUC. Combining IFM and RUC represents a very significant change to the standard multi-settlement design structure of U.S. wholesale electricity markets, which is much more complex than just designing a day-ahead imbalance reserve product.

Designing the details of a new day-ahead imbalance reserve product is by itself a complicated and important project. As discussed in these comments, DMM believes it is critical that the ISO also address several current issues with the real-time flexible capacity product in order for any new day-ahead imbalance reserve product to be effective. Going further and combining the IFM and RUC is a much larger and more complicated change market design.

Therefore, DMM recommends the ISO proceed cautiously before adding a combined IFM-RUC option onto a new imbalance reserve product design that is by itself already a complicated market design undertaking. DMM also recommends that ISO address the problems and limitations with the real-time flexible capacity product as an integral part of the effort to develop new day-ahead imbalance reserve product. Completing these needed enhancements to the flexible ramping product should have a higher priority than adding a combined IFM-RUC option onto a new imbalance reserve product design.

¹ *Day-Ahead Market Enhancements: Stakeholder Working Group*, California ISO presentation, August 13, 2019: <http://www.caiso.com/Documents/PresentationDayAheadMarketEnhancementsWorkingGroupMeeting81319.pdf>

Increasing the effectiveness of flexible reserves should better prepare ISO markets for regional expansion

The ISO is preparing for significant changes to its day-ahead markets. The potential future EDAM initiative would expand LMP markets, increasing opportunities for the efficient trading of power. Expanding trade has become more important, and will continue to become more important, as the western grid continues to transition to increased renewable generation. Procuring flexible reserves in the day-ahead market is also becoming more important as net load ramps and net load uncertainty increases while the ISO continues to rely on long-start resources and imports that require commitments in the day-ahead market timeframe.

In the DAME initiative, the ISO seeks to create day-ahead flexible reserve products. It appears that the DAME flexible reserve design is an important feature that may need to be in place for ISO's EDAM initiative. However, the day-ahead flexible reserve design still has much work to be done including: (1) the product definition, (2) the demand curve formulation, (3) deliverability, (4) settlements/re-settlements, and (5) bidding rules.

Further, the effectiveness of day-ahead flexible reserves depends on the effectiveness of the real-time market's use of flexible reserves. However, there is mounting evidence that the real-time flexible ramping product is not effectively managing flexible reserves to meet operational needs. DMM believes this lack of effectiveness comes mainly from two issues:²

1. **Transmission constraints are not incorporated in flexible ramp procurement.** Without accounting for transmission constraints, flexible ramping capacity procured to meet flexibility needs is often not actually available.
2. **The time horizon for the real-time flexible ramping product is too short to ensure sufficient ramping capacity is available.** The current flexible ramping product is designed to address uncertainty between 15-minute and 5-minutes intervals in the FMM and RTD markets. In real-time, grid operators face significant uncertainty about loads and resources over a longer timeframe (e.g., 30, 60, and 120 minutes from the current market interval).

Because of these current limitations with the flexible ramping product, ISO operators are placing increased reliance on various manual actions to manage ongoing growth in net load ramps and net load uncertainty. These manual actions include (1) manual increases in RUC requirements, (2) commitment and ramping up of gas-fired units through exceptional dispatches, (3) routinely increasing the hour-ahead and 15-minute forecast by large amounts during ramping hours, and (4) out-of-market purchases of additional imports during the evening ramping hours.

² As previously stated in DMM's 2018 Annual Report on Market Issues & Performance pp.24: <http://www.caiso.com/Documents/2018AnnualReportonMarketIssuesandPerformance.pdf>

Making the ISO markets more flexible and resilient in the face of increasing net load ramps and uncertainty, and preparing the markets for expansion through the EDAM, will require more than simply developing a new day-ahead flexible reserve product. It is equally or more important that the ISO enhance the current market design to make flexible reserves procured in the real-time or day-ahead markets deliverable and to increase the effectiveness of real-time flexible reserves. Completing needed enhancements to the flexible ramping product should be an integral part of the effort to develop new day-ahead imbalance reserve product and should have a higher priority than adding a combined IFM-RUC option onto a new imbalance reserve product design.

The effects of the “Reliability Energy” constraint have not been fully vetted

The DAME proposal includes an option to integrate the day-ahead market and residual unit commitment with the use of reliability energy (REN) constraints.

The ISO’s current day-ahead market is a financial market. Participants that clear the day-ahead market face the real-time market prices if their real-time schedules change. Because the day-ahead market creates financial obligations for participants, the market participants manage their risks of not being able to meet their day-ahead schedules.

The use of the REN constraint would shift the design away from allowing markets to manage these risks towards relying on the ISO to manage these risks. The ISO would decide which resources’ schedules count (or how much different resources count) towards the REN constraint. The ISO’s day-ahead market forecasts would directly impact the quantity and price of energy that cleared in the day-ahead market.

Clearly the ISO does not currently rely only on the market to manage reliability risk. The ISO runs a residual unit commitment process and operators will take other necessary actions to maintain reliability. But the REN constraints would create a far more active role for ISO actions in the day-ahead market. The REN constraints would cause ISO decisions to much more directly impact day-ahead market schedules and prices. The consequences of such a significant change to the standard multi-settlement electricity market design structure have not been fully vetted. The last section below describes some potential oddities and issues based on what DMM understands the REN constraint proposal entails.

More clarity is needed so stakeholders can better understand the proposals

During the working group, the MSC meeting and the prior workshop, stakeholders have expressed significant confusion about what the ISO’s proposals actually are, how the uncertainty is calculated, and how the settlements would work. This is understandable as it has been hard to keep track of the proposal and its ongoing changes through the series of presentations over the last two meetings. It would be helpful if the ISO provided clear formulations, explanations, and examples of what the proposals are and how they would work in a more defined paper. Increasing clarity will help the DAME initiative move forward.

Potential REN oddities and issues

While not all the implications of introducing the REN constraints have been laid out, there are some potential issues that are already clear.

First, the REN constraint creates a revenue shortfall that must be allocated in some fashion. The shortfall will equal the product of the REN price and ISO forecast. Allocating this shortfall in a way that is equitable and does not adversely affect incentives would require careful design.

Another issue is that the REN constraint and REN prices would only exist in the day-ahead market. Energy and other products in the day-ahead market are also traded and priced in the real-time market. If a participant’s real-time schedule for a product is less than their day-ahead schedule, they pay for the difference at that product’s real-time price. This is a standard aspect of a multi-settlement market. The REN product does not fit easily into a multi-settlement market because REN does not have a real-time settlement price.

Consider a simple example. A participant schedules one megawatt each of load and supply into the day-ahead market. In the real-time market the participant clears zero megawatts of load and supply. As shown in Table 1 below, the participant would on net be paid the REN price. It is unclear what value this outcome provides to the market.

Table 1. Example of Potential REN Settlement³

	<i>Day-Ahead</i>	<i>Real-Time</i>	<i>Net</i>
<i>Supply</i>	$\lambda_{DA}^{En} + \lambda_{DA}^{REN}$	$-\lambda_{RT}^{En}$	$\lambda_{DA}^{En} + \lambda_{DA}^{REN} - \lambda_{RT}^{En}$
<i>Load</i>	$-\lambda_{DA}^{En}$	λ_{RT}^{En}	$-\lambda_{DA}^{En} + \lambda_{RT}^{En}$
<i>Net</i>	λ_{DA}^{REN}	0	λ_{DA}^{REN}

This example was raised in the meeting and it was suggested that a charge could be applied for resources that “do not deliver” REN in real-time. But in the context of REN, what does “not delivering” REN in real-time mean? There is no real-time REN constraint, i.e. the real-time market does not ask for REN. There is no REN delivered to the market optimization by anyone. All REN does is create a requirement to submit bids in real-time.

In the example, should the ISO charge the load for not showing up and reducing the need for real-time supply? Should the ISO charge supply for reducing its schedule in the real-time? How would the ISO decide which supply reduction to charge and which not to? Clearly the ISO cannot charge all real-time reductions in supply schedules as this would, at the very least, distort bidding incentives. Also, unlike the products that have prices in both day-ahead and

³ This is based off the settlements shown on pp. 52 of *Day-Ahead Market Enhancements: Stakeholder Working Group*, California ISO presentation, August 13, 2019.

real-time markets, any “price” used to charge REN for “not delivering” runs the risk of being arbitrary, creating the poor incentives, or creating other unintended results.

During the meeting it was also suggested that exports be treated as negative imports which would stop the issue in Table 1 from occurring on the ties. If this were the case then exports would be charged the energy price plus the REN price (instead of just the energy price which internal load would be charged). Assuming it is determined that charging exports the additional REN price is correct, exports could avoid the charge by scheduling virtual load in the day-ahead market and then scheduling the export in real-time.

If the ISO were to move forward with the REN constraints option, it would need to carefully design the out-of-market allocation rules and charges to manage the issues created by the REN constraints without creating other unintended incentives or results.