

Day Ahead Market Enhancements - Stakeholder Comments

Submitted by	Company	Date Submitted
Aditya Chauhan aditya.chauhan@sce.com	Southern California Edison	7/11/19

Southern California Edison (SCE) offers the following comments on the California Independent System Operator (CAISO) Day Ahead Market Enhancements (DAME) 6/7 MSC meeting and 6/20 Workshop¹.

Approaching the need for enhancements

1. The CAISO's focus should be on actual RT load as its goal rather than manipulating intermediaries

Throughout this initiative, the CAISO's approach has been focused on existing systems rather than a comprehensive look at the goal - efficiently and effectively meeting actual RT load. To this end, there have been several proposals on introducing various variables and reorienting/hybridizing the existing market structure. SCE recommends that the CAISO focuses on meeting actual RT load given existing resources without being overly invested in the existing paradigm. SCE does not support the CAISO's over-emphasis on its forecasts, whether RUC or FMM. Further, SCE supports inclusion of RT FRP redesign in the setup of approaching this problem. Omitting RT FRP redesign from the scope risks over-procurement of reserves due to misidentification of uncertainty.

SCE recommends that the CAISO should procure reserves with an aim to meet actual RT load, given the available physical energy procured in the DAM. Meeting the actual RT load as the focus of any procurement, should also reduce non-convergence issues between the markets in the future. SCE realizes there is a market timing mismatch which causes additional uncertainty². Given the CAISO's recent explanations, this market timing mismatch is unavoidable and will exist in any proposal. One of many possible avenues is to consider learning from the RT FRP procurement setup where resources are reserved for 5-minute space by commitment in 15-minute space.

¹ http://www.caiso.com/Documents/Presentation-Day-AheadMarketEnhancementsJune7_2019.pdf
<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=B82857F0-1434-4F7C-9CFE-5E354591A529>

² While the CAISO frequently uses a granularity argument, market timing mismatch is simply one type of uncertainty.

The alternative to the IFM-RUC simultaneous optimization proposal is the IFM-RDA sequential optimization proposal. While the latter internalizes procurement decisions to resolve the uncertainty between the DAM and the RTM with explicit pricing for such actions, it does not resolve reliability issues encountered during real-time operations. Importantly, any incremental procurement in the RTM for reliability purposes will likely occur through exceptional dispatch which perpetuates out-of-market actions that affect the convergence between the DAM and RTM.

Ultimately, a trade-off between market efficiency and reliability/uncertainty may be necessary with the alternatives proposed given the effort to accomplish efficient pricing in the real-time market while satisfying real-time demand at least cost.

2. What is the problem the CAISO sees itself trying to address?

It is SCE's understanding that, during the 6/20 Workshop, the CAISO stated that its intent is to reduce operator actions. SCE requests the CAISO confirm this understanding. In this case, how does the CAISO believe that a determinant affecting economics (that is, operator action) can be accounted for with a non-economic statistical method, as is the CAISO's existing proposal?

A mathematical solution is a necessary though not a sufficient condition to arrive at a market solution. The solution must have appropriate economic meaning for any meaningful interpretation of the market outcome. With the CAISO's proposal on simultaneous IFM-RUC optimization, what ability do market participants have to incorporate their costs into their bids? If they cannot, then there is no economic foundation to the CAISO's proposal. What are the economic incentives created by this proposal, and can participants avail of them?

Issues particular to the CAISO proposal

1. There is a fundamental problem with having a simultaneous IFM-RUC and Convergence Bidding

The first two constraints of the simultaneous model proposal can be added together to represent a single constraint of:

$$\sum_i EN_{i,t} + \sum_j EN_{j,t} + \sum_i REN_{i,t} = \sum_i L_{i,t} + \sum_j L_{j,t} + Loss_t + \sum_i (EN_{i,t} + RCU_{i,t} - RCD_{i,t})$$

This means that Convergence supply and demand are substitutes for the reliability variables. This is contrary to the economic reasoning of reserving resources for reliability needs outside of the market's determination due to the lack of fungibility between physical and Convergence resources. This will apply whenever a problem is defined simultaneously since all constraints can be represented as mathematical combinations of each other as long as they are defined within the same optimization problem. While the component constraints (#1 and #2 of page

19³) will be satisfied, the optimization also views the above mathematical combination as valid. Therefore, it will always see physical and Convergence resources as fungible. Hence, there can exist mathematical solutions that will not have economic relevance.

Thus, a simultaneous optimization of capacity that supports flexibility and reliability within the network is not possible due to the presence of Convergence bidding within the market framework. That is, the economic assumptions underlying the market optimization have been violated (such as assumption that virtual bids can provide physical reliability) and the CAISO's proposal does not provide an economically meaningful model.

2. Further material issues that should be addressed

Several key questions on the CAISO's proposal remain unanswered. These stem from:

1. A lack of comparability between the sequential and simultaneous optimization options. The former does not have any defined constraints for the RUC replacement process. The CAISO proposes operator discretion for the RUC successor in the sequential option yet proposes mathematical constraints for the RUC successor in the simultaneous option.
 - a. Why has the CAISO chosen to have constraints for RUC/successor in the simultaneous optimization option but not have any for the sequential option?
 - b. How can stakeholders be expected to make a reasonable comparison of the two models when the CAISO has deliberately precluded the sequential option from having an economic approach?
2. A lack of Corrective Capacity in any of the constraints as well as in any of the descriptive material showing the interaction between Energy, Reliability Capacity (RC), and Flexible Ramping (FR).
3. While the June 2018 simultaneous IFM+RUC optimization proposal may be problematic and should be rejected, the CAISO should provide details of the issues of that proposal, and demonstrate how its new proposal would avoid those issues seen in the June 2018 proposal⁴.
4. Using nodal procurement for the proposed RC but maintaining sub-regional procurement for FR. How are these products comparable if they have such different procurement dimensions?
5. Using a capacity price for RC. To date, all the constraints presented have incorporated energy variables. This includes the relation between Reliability Energy, Energy Schedules, and RC awards. This means that RC awards are also energy awards.
 - a. How does the CAISO explain a capacity price for an energy award?
 - b. How does the CAISO calculate a capacity price for an energy award, more so with all the variables in the constraints being energy variables?

³ <http://www.caiso.com/Documents/Presentation-Day-AheadMarketEnhancementsWorkshop-Jun20-2019.pdf>

⁴ While the CAISO explained, during the June 7 MSC meeting, that this was due to physical versus financial pricing issues, stakeholders should be provided with complete details as to why the June 2018 proposal failed but this new proposal is apparently feasible.

6. No details are provided on the RDA in the sequential IFM-RUC/RDA component of the proposal.

In addition to these questions, there are some material issues with the new IFM-RUC simultaneous optimization proposal that should be addressed:

1. Inconsistency in prices for physical energy schedules and convergence bids. The proposal essentially compensates physical energy schedules at an LMP plus a new price (i.e., from the RCU/RCD constraint) in the DAM and the LMP in the RTM. Convergence bids would be settled at LMP in the DAM and RTM.
2. The additional constraint (i.e., requiring physical energy plus RCU/RCD to meet demand forecast) introduces a structural difference between DAM and RTM, because this constraint only exists for the DAM and not RTM. Because of this, it's unclear what prices between DAM and RTM Convergence Bids are designed to converge? This constraint would also lead to different financial settlement between a MW of physical energy schedule and a MW of virtual schedule, while today both are valued equally (i.e., at the resource's LMP).
3. Would the proposal create double payment for FRP awards? The proposal appears to not apply FRP deviation settlements, which contrasts to today's design where essentially all schedules (energy, ancillary service products, etc.) are subject to deviation settlements, i.e., incremental/deviations from a DA award are settled at the RTM prices.
4. The proposal should evaluate whether any changes to the current LMPM would be needed. This is because the LMPM is based on congestion and the congestion now can be due to capacity awards under the proposal of including ancillary services and FRP in the network constraints. For instance, how would the LMPM work when a transmission constraint binds due to a capacity award in the DAM, e.g., how the local market power would be tested, which bids would be mitigated (would it be both energy bids and capacity bids), and what are the default energy bids for the capacity products.
5. This proposal alters the relationship between physical and virtual resources within the DAM clearing and indirectly affects the real-time congestion values on account of the price coupling between energy flows and capacity reserved for reliability.
6. When a physical resource satisfies multiple constraints simultaneously and is marginal, the energy market outcome influences the relationship between physical and virtual resources and creates uncertainty about market efficiency and price convergence between the IFM and RTM.