Comments of Powerex Corp. on
Day-Ahead Market Enhancements August 13 Workshop

Submitted by	Company	Date Submitted
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Please provide comments on the preferred market structures that were discussed during the August 13, 2019 working group meeting. Include the pros and cons for each option.

1. At this time, does your organization support moving forward with **Option 1: Financial**, **Option 2: Financial + Forecast**, or **undecided**. Provide supportive comments (in favor of, or in opposition to) below.

Powerex reiterates its position stated in its previous comments in this initiative:

1) The current "status quo" approach to procuring upward capacity and upward flexible capacity (including ramping capability) through post Day-Ahead Market (DAM) processes, such as the Residual Unit Commitment (RUC), exceptional dispatch and load biasing:
    a. ***is inefficient*** (as it unnecessarily raises total production costs relative to an efficient co-optimization approach);
    b. ***creates unnecessary reliability risks*** (as operators regularly have to search for out-of-market supply to try to ensure reliability in real-time); and
    c. ***is completely unworkable for any proposed Extended Day Ahead Market (EDAM)*** spanning a multi-state region of balancing authority areas (BAA).

2) **Option 1: Financial** is fatally flawed. As Powerex expressed in its previous written comments and at the workshop, and as further detailed herein, the CAISO's Option 1 approach largely shares the shortcomings of the status quo, resulting in similar ***inefficiencies and unnecessary reliability risks while also being completely unworkable for any EDAM that may be formed.*** This is because:
    a. It fails to ensure that sufficient total upward capacity (*i.e.*, total physical energy awards, contingency reserves, regulation up, and imbalance reserves up) is procured in the DAM to ensure reliability.
    b. It incorrectly treats virtual supply and physical supply as fully fungible from a day-ahead capacity contribution perspective, resulting in inefficient dispatch, pricing, and compensation.
    c. It would enable financial participants—through their virtual supply and virtual demand participation—to determine the level of physical day-ahead unit commitment in the CAISO BAA and, if an EDAM is implemented, non-CAISO BAAs as well.
    d. It contains a fatal flaw that (i) will provide opportunities for systemic profits for virtual supply with no corresponding benefits; (ii) will consequently result in increased virtual supply awards and a corresponding reduction in day-ahead physical energy, largely nullifying the day-ahead capacity commitment benefits of the proposed day-ahead imbalance reserve up product; and (iii) will thus cause

the need for continued post-DAM supply procurement by CAISO operators to make up for this shortfall in physical energy awards, with harmful impacts to market efficiency while increasing reliability risks. This particular concern is detailed in Appendix A.

3) **Option 2: Financial with Physical Capacity Constraint** (re-characterized by Powerex). As Powerex has previously stated, and as further detailed herein, Powerex supports the Option 2 approach subject to certain enhancements. Only the Option 2 approach, with enhancements, has the potential to:
    a. ***achieve market efficiency*** (by minimizing total production costs through the efficient co-optimized procurement of all physical supply products required to maintain reliability);
    b. ***minimize reliability risks*** (through DAM procurement of sufficient total physical capacity and flexible capacity, including ramping capability, to meet expected demand as well as net load expected movement and uncertainty);
    c. ***properly distinguish between the capacity, flexibility and energy attributes*** of virtual supply and different physical supply products and resource technologies in the DAM dispatch, pricing, and settlement processes;
    d. ***efficiently enable the participation of virtual supply and virtual demand*** to protect against buyer market power while efficiently converging DAM and FMM energy prices; and
    e. ***be leveraged in the development of a potential EDAM*.**

Option 1:	**Option 2:**
☐ Support	☐ Support
☐ Support with caveats	☒ Support with caveats
☒ Oppose	☐ Oppose
☐ Undecided	☐ Undecided

Stakeholder Input

As detailed below, Powerex believes there are three important topics related to stakeholder input in this stakeholder process that are worth further consideration by CAISO:

1. The need to more fully acknowledge and respond to the substantive feedback provided by stakeholders.
2. Creating additional opportunities for stakeholders to thoroughly present their ideas in this critical and complex stakeholder process.
3. Recognizing the tension between the interests of certain market participants—who may reap financial benefits from DAM design inefficiencies—and achieving CAISO's broader policy objective of increasing market efficiency, minimizing production costs, and protecting reliability.

CAISO should fully acknowledge and respond to stakeholder feedback

In its previous comments, Powerex provided an extensive discussion of the reasons for its opposition to Option 1 and its support for Option 2 (subject to key improvements to that option). Seventeen other stakeholders in addition to Powerex also submitted comments on the earlier workshop, and the large majority of those comments expressed clear opposition to Option 1. Stakeholder feedback on Option 1 and Option 2 is summarized in the table below:

Stakeholder	Option 1	Option 2
DMM	Support w/ caveats*	Oppose*
SCE	Undecided*	Oppose*
LS Power	n/a	Support
SDGE	Oppose	Support
PPC	n/a	Support w/ caveats*
BPA	Oppose	Support w/ caveats
Chelan	Oppose	Support w/ caveats
EWEB	Oppose	Support w/ caveats
PGP	Oppose	Support w/ caveats
Powerex	Oppose	Support w/ caveats
PSE	Oppose	Support w/ caveats
SCL	Oppose	Support w/ caveats
Tacoma	Oppose	Support w/ caveats
Wellhead	Undecided	Support w/ caveats
MRP	Undecided	Undecided
NVE	Undecided	Undecided
PG&E	Undecided*	Undecided*
Six Cities	Undecided	Undecided
WPTF	Undecided	Undecided

***Note**: Some stakeholders provided written comments but did not complete CAISO's template requesting a selection of "Support", "Support with caveats", "Oppose" or "Undecided" for each option. Where possible, Powerex included the response that was most consistent with Powerex's understanding of the stakeholder's written comments on each option.*

At the August 13 Workshop, CAISO staff appeared to suggest that stakeholders' stated preferences must be the result of the name and description that CAISO had given to each option, and CAISO once again posed the same question to stakeholders in the present round of comments. Powerex disagrees, and requests that CAISO acknowledge the widespread opposition to a DAM design that does not integrate and co-optimize the procurement of (financially-binding) energy awards with the procurement of sufficient total physical capacity and total physical flexible capacity to meet the range of potential real-time conditions.

Powerex also requests that CAISO address the specific concerns and input detailed in stakeholders' prior round of comments, none of which were discussed at the August 13 Workshop.

CAISO Should Seek Additional Opportunities For Stakeholder Engagement

The issues CAISO seeks to address in this initiative present fundamental questions, and the resolution of these issues will clearly impact a broad array of stakeholders internal and external to the CAISO grid. Powerex greatly appreciates CAISO staff's extensive knowledge and expertise in a wide range of complex technical topics associated with organized market design. Powerex also appreciates CAISO's creativity and thoughtful ideas on various market design enhancements, as well as CAISO's continued efforts to provide opportunity for stakeholder feedback on CAISO's iterative market design proposals.

However, it is important that CAISO also strive to provide ample opportunities for stakeholders to respond with their concepts, potential refinements, and related feedback to CAISO staff and to other stakeholders, including in public workshops. This is particularly important in this critical and complex initiative, and will be of even greater importance in any future EDAM stakeholder process. While Powerex appreciates the opportunities for dialogue that CAISO currently affords stakeholders, Powerex believes that CAISO should consider scheduling one-day workshops—scheduled between each of the CAISO-led workshops—dedicated to providing stakeholders with the opportunity to present and discuss market design alternatives and impacts to more fully engage the broad array of stakeholders on these complex and critical market design issues. Powerex recently participated in such a workshop with a broad group of Pacific Northwest stakeholders, and has attached the presentation provided at that workshop in Appendix B.

DAM Design Inefficiencies Can Result in Harmful Unintended Consequences

Powerex believes it is important for CAISO, as well as for stakeholders across the west, to recognize that market inefficiencies can and often do enable significant and harmful unintended consequences, with the potential for a subset of market entities to receive financial benefits at the expense of other market participants and CAISO's broader policy objectives of increasing market efficiency, minimizing production costs and protecting reliability. Indeed, the CAISO has experienced such negative consequences resulting from the intertie virtual bidding market design flaw in 2011 and the more recent systemic losses suffered through well-documented Congestion Revenue Right inefficiencies. While it is expected that stakeholders will support positions that reflect their own priorities and interests, it is important to recognize that, in certain cases, those interests may be at odds with the elimination of market inefficiencies. There are two specific areas where Powerex believes existing market inefficiencies may benefit a subset of stakeholders:

First, Powerex believes that under either the status quo or under Option 1, total physical supply will continue to be under-procured in the DAM, resulting in CAISO operators continuing to have to acquire supply after the DAM process, and inject such supply into the FMM. These activities systemically suppress FMM prices below DAM prices, resulting in virtual sellers earning ***sustained virtual bidding profits due to the systemic asymmetry of market outcomes and lack of convergence in market prices.***

Over the past five years, virtual bidding has generated revenues of approximately $157 million, with virtual supply accounting for all of these revenues.[1] Moreover, these systemic virtual supply revenues are growing as CAISO's use of post-DAM procurement continues to expand. In a well-functioning market virtual bidding profits should be minimal over time, with virtual bidding activity promoting market efficiency. Indeed, Powerex strongly supports enabling virtual supply and virtual demand in the CAISO DAM, if carefully implemented, as this activity can increase market efficiency, promote price convergence, and reduce the potential for buyers to exercise inter-temporal market power, as has been repeatedly recognized by the Federal Energy Regulatory Commission.[2] However, virtual bidding cannot, and will not, create these benefits if the market is designed in a manner that results in systematic price differences between the DAM and FMM. Instead, such a market design will ensure predictable profits for virtual bidding while failing to generate any of the associated benefits. As the design of the DAM extends to additional products that are physical (rather than strictly financial) in nature, it is critical to more carefully consider and delineate the manner in which virtual supply and demand participate in the market. Such a necessary limitation is already reflected in the design of the existing market, in which virtual supply and demand participate in the market clearing of energy awards, but play no role in the market clearing of awards for Spinning Reserve, Non-Spinning Reserve, or Regulation. In Appendix A, Powerex provides a more detailed discussion of a material flaw related to virtual bidding under Option 1, under which this vital separation is not maintained. Powerex would welcome further discussion of this topic.

Second, notwithstanding that CAISO net purchasers tend to be the entities that fund the large and growing revenues of virtual bidding discussed above, Powerex believes that such CAISO net purchasers may also receive distinct economic benefits under the status quo and Option 1. These inadvertent benefits arise from the ***suppression of DAM energy clearing prices*** that results from the CAISO's total physical supply needs being under-procured in the DAM. In fact, any DAM design approach that ***fails to fully procure all necessary physical supply products*** through a co-optimized day ahead process will ***inefficiently suppress DAM energy clearing prices, raise overall production costs, and harm overall market efficiency***. These inadvertent outcomes are similar to the outcomes that occur when net buyers under-procure supply in an organized day ahead market that lacks virtual bidding to counteract such activity.

For example, the status quo approach inefficiently suppresses DAM energy clearing prices as a result of its failure to procure necessary upward imbalance reserves through the DAM co-optimization process, relying instead on such reserves being systemically acquired out of market, through the subsequent RUC, exceptional dispatch and hour-ahead scheduling process load biasing mechanisms. While improperly suppressing energy prices and lowering purchase costs for buyers, this inefficient outcome also results in higher than necessary production costs since the determination of which physical resources are dispatched for energy versus traditional

[1] Based on data provided in the Annual Report[s] on Market Issues and Performance published by the Department of Market Monitoring for 2014 through 2018 (*available at* http://www.caiso.com/market/Pages/MarketMonitoring/AnnualQuarterlyReports/Default.aspx) the revenues to virtual supply actually exceeded $157 million; virtual demand experienced a net loss over the same period.

[2] *See, e.g., New York Indep. Sys. Operator, Inc.,* 97 FERC ¶ 61,091 at 61,473 (2001).

operating reserves versus upward imbalance reserves is not co-optimized through a single day-ahead procurement process.

Option 1 fails to address this DAM design inefficiency. While Option 1 includes the procurement of a pre-determined quantity of upward imbalance reserves, it fails to ensure sufficient total capacity (*i.e.*, the sum of physical energy, contingency reserves, regulating reserve up, and imbalance reserve up) is procured through the DAM co-optimized procurement process. As a result, it, too, will drive the need for continued, predictable and systemic, post-DAM procurement of physical supply. This inefficiency is further discussed in Appendix A and Appendix B.

As the CAISO further explores changes to the DAM design, and especially if this effort is in the context of a potential regional DAM, it will be critical for such a design to be firmly directed toward the objective of minimizing total production costs; that is, to maximizing market efficiency. This will necessarily require that CAISO avoid introducing or perpetuating market design inefficiencies that inhibit a properly functioning market with efficient outcomes and benefits for all participants.

Next Steps - In The Context Of An Upcoming EDAM Stakeholder Process

Powerex appreciates the extensive effort and engagement of the CAISO with stakeholders over the course of this initiative. Since the time this process was launched in February 2018, CAISO has provided valuable information regarding the challenges faced by its operators to reliably balance load and supply in the face of large (and growing) levels of variable energy resource penetration. CAISO staff have engaged extensively with stakeholders to explore potential design concepts, which are necessarily complex, technically challenging, and take time to understand. Even after nearly 18 months of work and much progress, it is clear that developing a robust and efficient day-ahead market design will require significant additional time and effort.

The likely timeline for this stakeholder process must be recognized as overlapping with the anticipated timeline of another major initiative with important implications for the design of the DAM. Namely, CAISO has recently stated publicly that it anticipates initiating a stakeholder process this fall related to developing an EDAM that will proceed in an expedited fashion with this initiative.[3] Once launched, it would be inefficient to have two separate stakeholder processes exploring major changes to the design of the DAM. Furthermore, a process to identify a market design that is workable and equitable for entities across a multi-state footprint—each with different priorities, interests, and circumstances—will need to be conducted in a manner that recognizes that market design choices that might be preferable for the CAISO BAA (and California's stakeholders) may differ materially from what is workable and equitable for a broader regional market.

For these reasons, if CAISO and interested entities initiate a stakeholder process related to a potential EDAM, Powerex requests that CAISO terminate this process and explore the enhancements contemplated to date in this process in the context of EDAM discussions.

[3] *See* Memorandum from Steve Berberich, President and Chief Executive Officer, to ISO Board of Governors at 2 (July 17, 2019) ("Pending Board and EIM Governing Body consultation, the ISO is targeting beginning a regional day-ahead market stakeholder process this fall."), *available at:* http://www.caiso.com/Documents/CEOReport-Jul2019.pdf.