Comments on Price Formation Enhancements:

Rules for Bidding above the Soft Offer Cap Issue Paper

Department of Market Monitoring

April 22, 2024

Summary

The ISO's Issue Paper explains the need to allow resources with daily limitations to bid above the $1,000/MWh soft offer cap when their intra-day opportunity costs exceed $1,000/MWh, and summarizes potential solutions for the ISO to consider implementing in summer 2024.

DMM agrees with the principle of resources being able to reflect their intra-day opportunity costs in incremental energy and default energy bids (DEBs). DMM also agrees with the ISO that designing DEBs that more accurately reflect intra-day opportunity costs will require careful consideration and calculation. DMM recognizes that this may be a longer-term solution and may not be feasible to develop and implement in a short time frame.

A number of short-term interim solutions have been proposed by stakeholders and are discussed in the Issue Paper. These solutions are categorized into three approaches: (1) adjusting the soft offer cap to allow resources to bid above $1,000/MWh when the hard offer cap is in effect, (2) leveraging existing tools to position resources in the bid stack and maintain day-ahead schedules, and (3) enhancing the existing cost-verification process.

DMM notes that the Issue Paper subsection entitled Market Monitor Recommendation does not fully reflect DMM's position on an appropriate short-term solution.[1] While the ISO has existing tools it can use, as discussed in Approach 2, DMM does not oppose a simplified short-term solution to allow resources with daily limitations to better reflect their intraday opportunity costs in bids and DEBs.[2]

When considering potential short-term solutions, DMM recommends the ISO consider a compromise between allowing resources with daily limitations to only bid over $1,000/MWh during hours where the $2,000/MWh hard bid cap is in effect versus being able to bid over $1,000/MWh all day. It is DMM's understanding that having bids or reference levels that exceed $1,000/MWh all day will trigger the $2,000/MWh bid cap to be in effect in all hours, which will scale penalties and reliability demand response bids to $2,000/MWh and allow certain resources to bid above the $1,000/MWh bid cap. However, limiting the ability to bid over $1,000/MWh to only the hours when $2,000/MWh bid cap is in effect would not allow resources with intra-day opportunity costs based on later hour prices to avoid inefficient dispatch by reflecting those costs in bids during earlier hours.

---

[1] *Rules for Bidding above the Soft Offer Cap Issue Paper*, California ISO, April 12, 2024, p 17: https://www.caiso.com/InitiativeDocuments/IssuePaper-StakeholderRecommendations-PriceFormationEnhancements-Rules-BiddingAboveSoftOfferCap.pdf

[2] *DMM Comments on Price Formation Enhancements Working Group Session 15*, Department of Market Monitoring, March 22, 2024: https://www.caiso.com/Documents/DMM-Comments-on-Price-Formation-Enhancements-Working-Group-15-Mar-21-2024.pdf

Recommended approach

DMM recommends an approach that allows bids and/or reference levels of resources with daily limitations to exceed $1,000/MWh in hours other than those where the hard bid cap in effect, in order to avoid inefficient dispatch of those resources, but not for all hours in the day. In general, DMM recommends limiting this bidding flexibility to hours when the intra-day opportunity costs exceed $1,000/MWh. This will typically be the hours leading up to the highest priced hours of the day when the hard bid cap is in effect, but not including the highest priced hours. This approach would balance the efficiency and reliability benefits of allowing higher priced bids in select hours earlier in the day, with the need to mitigate market power during the highest priced hours.

For storage, most of the storage fleet is comprised of four-hour duration batteries. Therefore, it may be appropriate to limit the ability of storage to submit bids above $1,000/MWh to a limited number of hours preceding the highest priced four hours of the day, where the hard bid cap is in effect and prices may exceed $1,000/MWh.

Figure 1 below shows the average resource capacity weighted average real-time bid price for CAISO batteries, SMEC prices across markets, and the maximum import bid price and bid cap for August 16, 2023. Figure 1 illustrates that real-time bid prices for batteries to discharge begin to fall most noticeably in hour 18, falling further each hour until reaching a minimum in hour 21. On this day, hours 18-21 are the four highest priced hours of the day when the hard bid cap is in effect. This pattern of resources' market bidding behavior illustrates the diminished intra-day opportunity cost during these hours, and provides support that it is not necessary or appropriate to allow bids or DEBs over $1,000/MWh during these highest priced four hours, even when the hard cap is in effect.

Figure 1. Prices, bid cap, and average resource capacity weighted average real-time storage bids August 16, 2023

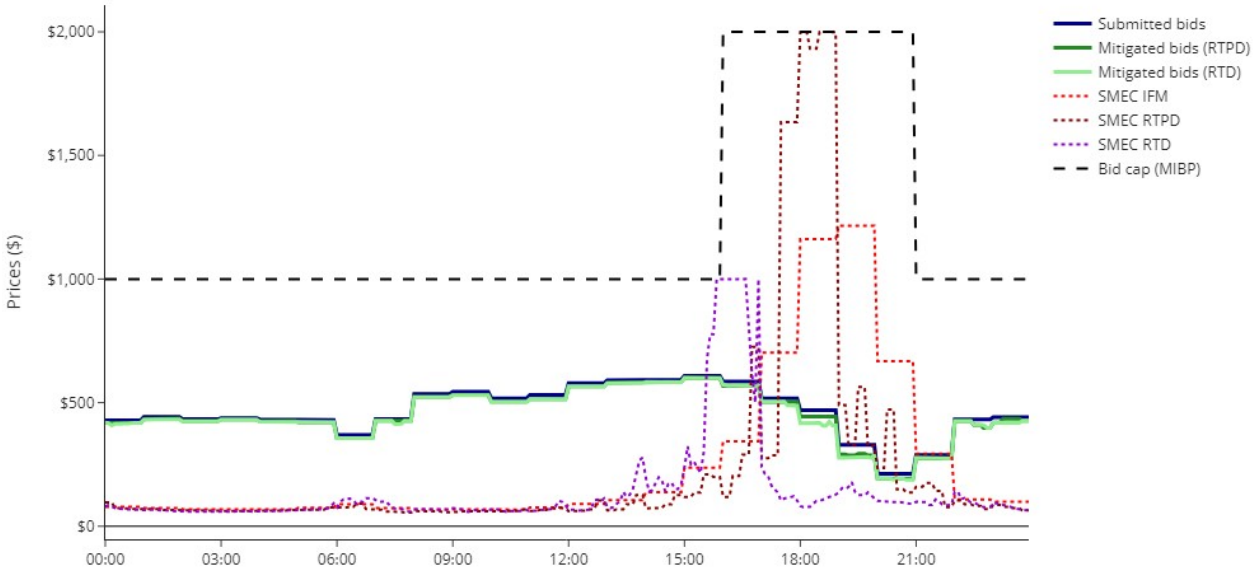
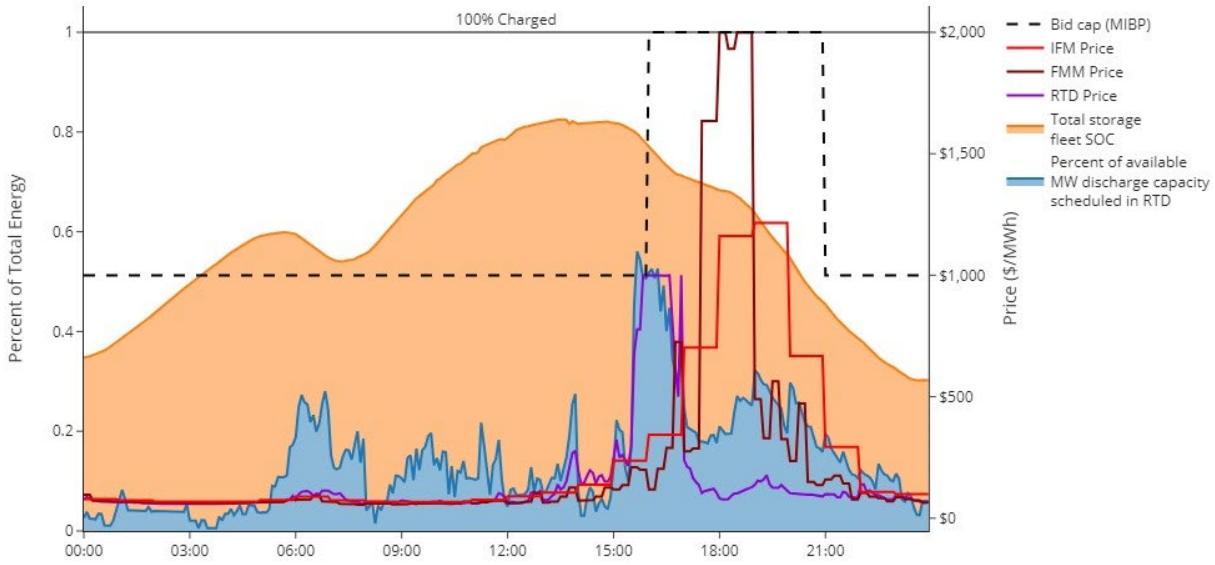


Figure 1 further illustrates that while the average resource capacity weighted average bid price to discharge batteries is elevated in the range of $600/MWh leading up to the highest priced four hours, it does not approach the current soft offer cap of $1,000/MWh. This observation suggests that for some resources on this day, the bid offer cap was not the limiting factor. However, this observation should not be interpreted as evidence that it would be unnecessary to allow bids over $1,000/MWh in some of these hours. Storage resources are unlikely to face intra-day opportunity costs exceeding $1,000/MWh for many hours of the day, but may still face intra-day opportunity costs over $1000/MWh in a limited number of hours preceding the highest priced four hours of the day, and should have the ability to reflect these costs in bids and DEBs in those hours.

The bid price value in Figure 1 is an average value, and may reflect resources that elected to bid below $1,000/MWh for state of charge or other resource management purposes, such as attempting to maintain a day-ahead schedule in those hours. High bids that are below the $1,000/MWh bid cap may also reflect an expectation of significantly elevated peak hours prices, but an imperfect prediction of what those prices may be. Additionally, some bids may have been subject to mitigation. However, the minimal difference between the averages of mitigated and submitted bids, as shown in Figure 1, suggests that mitigation did not play a significant role in lowering real-time bid prices on this day.

Figure 2 below shows SMEC prices across markets, the percentage of available storage discharge capacity scheduled in RTD, and the aggregate state of charge across the CAISO battery fleet in each real-time interval on August 16, 2023. Figure 2 illustrates that a significant portion of available storage discharge capacity is dispatched on $1,000/MWh RTD prices in hour-ending 17. Additional storage discharge capacity that otherwise may have been scheduled in hour 17 was held back by exceptional dispatch. Although a review of real-time bids suggests that the $1,000/MWh bid cap was not a limiting factor for many resources on this day, the ability to submit bids above $1,000/MWh in this hour may have been a more accurate reflection of intra-day opportunity cost for some resources. The ability to reflect higher opportunity costs may have also reduced the need to rely on exceptional dispatch, and preserved a portion of battery capacity dispatched in hour 17 for later hours with prices above $1,000/MWh.

Figure 2: Prices, scheduled RTD discharge capacity, and aggregate state of charge
August 16, 2023



As for hydro, DMM and the ISO have limited visibility into the characteristics of hydro resources that have daily limitations, and whether they are able to replenish their generating capability at any point in the day, similar to battery recharging after an earlier discharge. Not all hydro resources have daily limitations that impose intra-day opportunity costs. This is a characteristic that will need to be more formally identified in a long-term policy.

The window of hours with increased bidding flexibility established for storage may not be appropriate for hydro, but it remains important to balance the risks of inaccurate estimation of the intra-day opportunity cost of the hydro resources that have daily limitations with the market impacts of having the hard bid cap in place throughout more hours in the day.

Default energy bids

The Issue Paper discusses two approaches that focus on allowing resources to bid over $1,000/MWh in certain scenarios. Approach 1 describes potential policy changes that adjust the bid cap without changing default energy bids (DEBs) used in market power mitigation. Approach 3 details possible ways to enhance the cost verification process through adapting the reasonableness threshold for reference level requests for storage resources, and the DEB calculation for hydro resources.

Ideally, resources with daily limitations and intra-day opportunity costs should be able to reflect their costs in DEBs so that bids are not mitigated below cost. Intra-day opportunity costs for some resources can change on an hourly basis. However, DMM understands it is unlikely the ISO will be able to implement a new hourly DEB for storage and hydro resources in such a short time frame. DMM cautions

against using a new static DEB calculation for these resources that would exceed $1,000/MWh all day due to intra-day opportunity costs that may only exceed $1,000/MWh in a handful of hours. If this type of DEB exceeds $1,000/MWh, the hard bid cap would be in effect all day due to a resource whose cost only exceeded $1,000/MWh in certain hours.

DMM would support changing the reasonableness threshold to allow storage and hydro resources to submit reference level change requests above $1,000/MWh, when their intra-day opportunity costs exceed $1,000/MWh, if the reasonableness threshold and related bidding flexibility could be changed for a subset of hours rather than the entire day.

Additional comments on how DMM's recommendations could be applied to several approaches summarized in the Issues Paper are provided below.

Approach 1

Currently, internal generators need to provide cost-justification, through a reference level change request, in order to bid over $1,000/MWh even when the hard bid cap is in effect. One proposed solution to improve bidding flexibility is to allow resources to bid over $1,000/MWh without also changing the DEB to reflect costs over $1000/MWh. DMM's understanding is that the bid cap would be raised for all internal resources, rather than only resources with daily limitations that have intra-day opportunity costs. DMM believes it is inappropriate to allow resources without intra-day opportunity costs to bid above $1,000/MWh without a corresponding DEB over $1,000/MWh because they would have no cost-justification for bidding above the soft bid cap.

By not changing DEBs, this solution may not allow resources with market power to reflect their full intra-day opportunity costs if their bids are mitigated to their DEB, and DEBs are still capped at $1,000/MWh. However, by not changing the DEBs, this solution avoids the potentially serious consequences of having inaccurately high DEBs for the full operating day.

There are two different proposals for how to implement this potential solution – only allowing resources to bid over $1,000/MWh whenever the hard bid cap is in effect, or allowing resources to bid up to a higher bid cap across the full operating day.

Only allowing resources to bid over $1,000/MWh in the hours that the hard bid cap is in effect does not solve the issue of inefficiently dispatching resources too early in the operating day. Resources with daily limitations face high intra-day opportunity costs during hours in which prices are lower than the highest priced hours of the day, depending on their ability to recharge before reaching those highest priced hours. These resources risk being dispatched too early, when prices and system needs are lower than the highest priced hours, if they are unable to reflect this intra-day opportunity cost in bids in those lower-priced hours.

The other proposal is to allow the bid caps to be a higher static value for the full operating day. This solution addresses the issue of inefficient early dispatch, but may have other serious consequences. DMM's understanding is that allowing the bid cap to exceed $1,000/MWh in hours where the hard bid cap is not in effect will essentially cause the hard bid cap to become in effect in those hours. If some resources are bidding over $1,000/MWh, then penalty prices will need to be scaled to the $2,000/MWh bid cap. DMM's understanding is that the other effects of the $2,000/MWh bid cap would also be in effect. This would include reliability demand response bids being scaled up, and hard offer cap resources

such as imports being able to bid up to $2,000/MWh. However, DMM would appreciate the ISO's confirmation that all of the effects of the $2,000/MWh bid cap would be in place if resources are able to bid above $1,000/MWh as a result of a higher soft offer cap.

DMM believes it is important to allow resources to bid above $1,000/MWh in the hours proceeding those with the hard bid cap in place, as their intra-day opportunity costs may exceed $1,000/MWh even though the $2,000/MWh bid cap is not in effect. Without this ability, resources with daily limitations may be unable to fully reflect intra-day opportunity costs in bids and may be dispatched too early in the day. However, based on the characteristics of many resources with daily limitations, which are able to re-charge, the intra-day opportunity costs are unlikely to exceed $1,000/MWh throughout the entire day if there are only a few hours where the hard bid cap is in place.

DMM believes an ideal solution would modify both the DEB and bid cap to allow reflection of higher intra-day opportunity cost. However, should the ISO choose to adopt an approach like Approach 1 that does not modify the DEB, DMM suggests the ISO consider a compromise between the two proposed implementations of Approach 1. With this approach, the ISO could raise the bid cap for a limited number of hours preceding the highest priced four hours when the hard bid cap is in effect. This approach explicitly incorporates the four hour discharge capability of most of the ISO's battery fleet.

While this solution may not perfectly reflect the daily limitations and re-charging abilities of all storage and hydro resources, it could allow resources to better reflect intra-day opportunity costs, without triggering the effects of the $2,000/MWh bid cap across the entire day. By allowing bids to prevent early dispatch before peak hours, this approach could help resources preserve their day-ahead schedules. In addition, because the higher bids are not allowed for the full day, this approach would also be less likely to exacerbate bid cost recovery payments to storage resources resulting from higher bids in other hours.

Approach 3

There are a number of proposed solutions that focus on allowing bids over $1,000/MWh by improving the cost-verification process. This includes removing the $1,000/MWh cap from DEBs, a new calculation for the reasonableness threshold for storage resources, and adapting the hydro DEB to account for the short-term opportunity cost for hydro.

In theory, DMM supports removing the $1,000/MWh cap from DEBs, given those DEB calculations are accurate cost-estimates for the resource. However, it is important to highlight that DEBs which are designed to reflect intraday opportunity-costs should be hourly, so the correct DEBs for resources with daily limitations should not be static across the day. DMM believes it is inappropriate to have a static DEB over $1,000/MWh for all hours of the day when it is for a resource whose cost, such as intra-day opportunity cost, does not exceed $1,000/MWh for the entire day. A DEB over $1,000/MWh triggers the hard bid cap to be in effect, which scales penalties and reliability demand response bids to $2,000/MWh and allows certain other resources to bid higher than the $1,000/MWh soft cap.

DMM understands the merit of updating the reasonableness threshold for storage resources to allow these resources to submit automated requests whenever their intra-day opportunity cost may exceed their DEB and/or $1,000/MWh. DMM would support this solution if the reasonableness thresholds could be updated only during certain hours, rather than across the entire day.

Similar to the compromise on Approach 1 discussed above, DMM recommends a compromise that allows the reasonableness threshold to exceed $1,000/MWh during a limited window of hours leading up to the four highest price hours during which the hard bid cap in effect. The appropriate number of hours preceding the highest priced hours to allow the increased reasonableness threshold should be determined by balancing the risk of resources not being able to reflect their intra-day opportunity costs in all hours, with the impacts of the hard bid cap being triggered when no resource is facing intra-day opportunity costs over $1,000/MWh.

As for updating the hydro DEB, DMM has similar concerns. Assuming this is a static DEB calculation, this implies that a hydro DEB may exceed $1,000/MWh across all hours when there is a single hour where the hard bid cap is in effect, triggering the hard bid cap to be in effect for the entire day. It may be preferable to consider an approach similar to that discussed above for storage resources, where the reasonableness threshold is instead raised during certain hours rather than throughout the entire day.

By defining new calculations for reasonableness thresholds for storage and hydro resources for a certain number of hours on days when the hard bid cap is in effect, this approach ensures resources will have the ability to reflect their intra-day opportunity costs even when subject to mitigation. In addition, by only adapting the reasonableness threshold for storage and hydro resources, this approach focuses specifically on the resources that have daily limitations and thus have intra-day opportunity costs.