



Informal Comments of the California Energy Storage Alliance on the Minimum Charge Requirement Proposal

Initiative: Resource Adequacy enhancements

Summary of Comments

The California Energy Storage Alliance (CESA) appreciates the work of the ISO to support viable markets for energy storage resources. CESA also recognizes the ISO's commitment to collaborate with stakeholders and provide opportunities for feedback. In these informal comments, CESA focuses on issues related to the minimum charge requirement (MCR) proposal, per the conversation CESA and the CAISO RA Enhancements team held October 19, 2020. CESA's comments can be summarized as follows:

- **CESA continues to oppose the MCR proposal as currently drafted within the RA Enhancements initiative:** CESA considers a blanket application of the MCR would have a chilling effect on energy storage investment in California. To mitigate this risk, CESA recommends the modifications below.
 - **The ISO should clarify the MCR proposal shall be an interim solution:** CESA recommends the ISO clarifies in the RA Enhancements Initiative that the MCR will be an interim measure applicable only to storage assets that are shown for RA.
 - **The MCR must not be binding for all days:** The ISO should incorporate a clear trigger condition to make the MCR binding only during exceptional circumstances, and only to the minimum quantity of stored MWh necessary on a given day (if it is necessary at all given the balance of the non-storage dispatchable generation available that day). CESA proposes this trigger be incorporated, with a dead-band, after the initial day-ahead market (DAM), integrated forward market (FM), and residual unit commitment (RUC) runs. In addition, CESA recommends the real-time (RT) market also includes a "true-up" process to dynamically reassess if the MCR constraint is needed.
 - **The ISO should modify the MCR proposal for it to be applicable to the minimum number of intervals:** CESA recommends that the ISO instead only apply MCR for the minimum number of periods a particular asset would need to charge in order to reach the state-of-charge (SOC) needed for its DA-derived and MCR-bound dispatch.
 - **The MCR proposal must be modified to include clear and fair settlement rules:** Currently, the MCR proposal does not establish how resources with an MCR constraint would be compensated and settled in the RT market. The inclusion of these rules is essential to provide certainty to asset owners.
 - **The ISO shall track MCR use in a manner consistent to exceptional dispatch (ED):** For the purposes of future product development and monitoring the performance of the market, CESA recommends the ISO track and regularly report the quantities, conditions and factors that contribute to MCR usage.

I. Scope and application of the MCR proposal.

As stated in previous formal comments and conversations with the ISO, CESA is concerned with the ISO's continued consideration of a permanent MCR within this initiative. While understanding of the CAISO's intent, CESA has clearly stated that a blanket application of this proposal will: (1) seriously hinder market participation; (2) increase reliability risks by constraining flexible RA supply; and, (3) potentially discriminate against storage resources while running afoul of CAISO principles of competition and efficient market-oriented policy. The result could have a chilling effect on energy storage investment in California. In order to minimize the risks of this proposal, it is fundamental to clarify the scope of this proposal. Moreover, the ISO must consider limiting the application of MCR; both in terms of the days when it might be binding, and in terms of intervals within the RT market. In this section, CESA puts forth three recommendations to accomplish this.

First, with regards to the scope of the MCR proposal, the ISO should clarify the MCR would be solely applicable to storage assets shown for RA. During the conversation CESA and ISO staff had on October 19, 2020, ISO staff noted that this proposal would only apply to storage assets set to provide RA. This clarification is necessary in the next iteration of the RA Enhancements Straw Proposal. Furthermore, as CESA has stated previously, the ISO should consider the MCR proposal as a transition mechanism to a market that better understands and operates storage resources. As CESA understands, the MCR proposal has been designed to mitigate risks posed by the lack of experience with storage assets, paired with a market optimization software that is unable to capture the economic tradeoffs storage operators must take into account as the RT market unfolds. As a result, and in order to minimize the chances of reliability issues, the ISO has opted to adopt an out-of-market solution to ensure storage assets operate as needed in the context of the RA program. While CESA understands the reliability-related concerns of the ISO, it is important to highlight that the challenges currently faced should instead be solved with appropriate price signals and could be eventually solved by technological upgrades and increased utilization and familiarization with storage resources. Thus, it is prudent and reasonable to catalogue the MCR as an interim solution while operators become more comfortable with new assets and the technology employed in current RT market optimizations is enhanced.

Second, it is necessary to limit the quantities of storage and number of days with a binding MCR constraint in order to mitigate the financial effects this proposal would have on storage resources. To do so, a viable trigger condition must be determined by conducting data analysis to identify the factors and conditions that contribute to the need for an MCR-like solution. According to the ISO's presentation to the Market Surveillance Committee (MSC) on October 9, 2020, a trigger could be derived from the 1-in-2 year daily forecasts developed by the California Energy Commission (CEC). Under this methodology, said forecasts would be used to evaluate if storage capacity will be critical to serve peak load by comparing the expected peak to the amount of non-storage capacity expected. If load exceeds 90% of non-storage capacity, according to this proposal, the MCR would be imposed for the following day. During the call CESA held with the ISO staff on October 19, 2020, the ISO staff noted that their proposed use of CEC forecasts might not be adequate and they might, instead, rely on their own DA forecasts to perform this calculation.

CESA is not opposed to a methodology that would allow the MCR to be applicable to a subset of days: those with genuinely exceptional conditions. Nevertheless, CESA is currently unable to support the ISO's specific approach as the ISO has not conducted the necessary data analysis to provide an estimate of how often the MCR would be triggered under this assumption. Regardless of the methodology applied, it is important that the trigger condition is activated exceptionally rather than routinely. That being said, CESA would be open to consider an approach similar to the one described by the ISO if two modifications are included. First, the MCR trigger should not be a set-

point percentage, but one with a dead-band. For this purpose, CESA recommends a 5% dead-band: 87.5-92.5%, under the example of the ISO.¹ Second, CESA recommends the ISO incorporates this trigger after the initial DAM, IFM, and RUC runs, once initial unit commitment has been established, and applies the MCR to the minimum number of MWh necessary based on this calculation. CESA considers this is necessary as the results of the DAM are the best-suited to provide the ISO a clear picture of the available capacity to serve peak load in the following day. If the assessment of the trigger condition was done before the DAM run, the ISO could potentially trigger the MCR prematurely. As a result, DAM results are essential to increase the likelihood the analysis needed to determine if the MCR is necessary yields realistic, as opposed to overly conservative, results.

II. Minimizing the number of MCR-bound intervals in the RT market.

In previous comments and conversations, CESA has pointed out that, even if an MCR-like restriction was necessary to support system reliability, it is unclear if such a restriction would be needed for all intervals prior to a scheduled DA dispatch. This very issue was raised by Dr. Scott Harvey during the ISO's presentation of the MCR proposal before the MSC on October 19, 2020. During the CESA-CAISO October 19 call, ISO staff mentioned they were open to recommendations on how to minimize the number of RT intervals that would be affected by an application of the MCR. In order to accomplish this, CESA offers two recommendations.

First, considering the CAISO would define a clear trigger condition for the MCR based on some information available in the DA timeframe regarding load and capacity, it is reasonable to request the ISO to incorporate a true-up process of this same data within the RT market. Essentially, this recommendation consists of running the analysis employed in the DA timeframe as the RT market unfolds, in order to dynamically reassess if the MCR condition is necessary. In the case of a day when the DA process has determined the MCR is needed, the true-up mechanism would try and detect if the expected peak load drops below 87.5% of the non-storage capacity committed. If said threshold is broken, the MCR constraint would be lifted. Alternatively, even if the DA process did not result in the application of the MCR, if the true-up process detects that the expected peak load will be at or above 92.5% of the non-storage capacity committed, the MCR would become binding. This process could alleviate the consequences of MCR usage and ensure the efficient utilization of assets available to the ISO.

Second, considering the ISO is already contemplating modifying the MCR proposal to apply only to the intervals between the lowest priced interval (presumably using DA prices) and the storage asset's discharge DA award, CESA recommends that the ISO instead only apply MCR for the minimum number of periods a particular asset would need to charge in order to reach the SOC needed for its DA-derived dispatch. Under the ISO's proposal, if the MCR is triggered and the DA market suggests the lowest priced hour occurs, for example, at 3 AM, resources would be set to charge at HE 04 and hold that charge until, usually, 6 PM. This would result in resources effectively missing out most of the RT market participation. Given this challenge, the ISO should instead enforce charge related to the MCR in the intervals close to the evening DA award. Thus, CESA recommends that the ISO trigger the MCR when a resource is below the SOC needed to comply with a DA schedule within 2 hours of said schedule. CESA believes this approach is feasible given the information the ISO has regarding storage assets and the balance of other dispatchable generation available. Currently, the ISO has visibility of the storage resources' ramp rates, SOCs, and deliverability factors. These variables, in conjunction, enable the ISO to only trigger the MCR when assets are below their SOC and the DA schedule is visible to the RT optimization algorithm. In addition, the ISO should calculate the energy required for the period that would trigger the MCR

¹ Note this figure is based solely on the methodology shared by the ISO during the MSC call, it does not try to prescribe the solution.

restriction and allocate charging responsibilities in a pro rata basis to all storage assets deemed as unable to comply with their DA schedules. This approach, rather than a blanket application of the MCR for all resources, would enable the ISO to allow the market to self-correct instead of potentially transition from a situation of tight supply to one of unnecessarily increased demand.

III. The MCR proposal must be modified to include clear and fair settlement rules.

Currently, the MCR proposal does not establish how resources with an MCR constraint would be compensated and settled in the RT market. The inclusion of these rules is essential to provide certainty to asset owners. To do so, CESA recommends basing settlement on the ED construct. ED represents a viable starting point for the consideration of settlement rules. With these comments, CESA does not intend to prescribe the settlement solution, but to offer potential examples the ISO might consider in establishing MCR settlement. In this case, CESA considers the settlement prices for resource i on interval t could be derived as follows:

For charging:

$$\text{Settlement Price}_{i,t} = \text{MIN}(\text{FMM or RTD LMP}_{i,t}, \text{Energy Bid}_{i,t}, \text{DEB if mitigated}_{i,t})$$

For discharging:

$$\text{Settlement Price}_{i,t} = \text{MAX}(\text{FMM or RTD LMP}_{i,t}, \text{Energy Bid}_{i,t}, \text{DEB if mitigated}_{i,t})$$

This definition of settlement, while useful and viable as it is applicable for ED, is not fully equipped for MCR use as it cannot integrate the opportunity costs faced by a storage asset that has been subjected to forego market revenues in order to ensure later, potentially uneconomic, dispatch. Considering the ISO's efforts in the DA Market Enhancements (DAME) initiative, it is important to mention that, eventually, the DA market will co-optimize energy, ancillary services (AS), and imbalance reserve awards. As a result, the main revenue stream affected by the application of the MCR would be RT energy revenues. Thus, CESA recommends the ISO focus its attention within the RA Enhancements initiative to develop means to account for RT energy opportunity costs within the MCR construct. Given the complexity of estimating different counterfactual operating scenarios, focusing on RT energy arbitrage would enable a viable opportunity cost framework. To initiate this conversation, CESA suggested in previous comments that the ISO should consider its work on storage opportunity costs within the ESDER initiative. For the development of default energy bids (DEBs) for storage, the ISO simplified opportunity costs as the assumption that a resource would deplete its total charge during the period (hour) with the 4th highest price per the DA market. Since the MCR methodology currently does not capture potential RT energy revenues and in order to maintain simplicity, CESA recommends the ISO consider a methodology similar to that of ESDER. In this potential methodology, the opportunity cost proxy could be defined as:

$$\begin{aligned} \text{Opportunity Cost} = & \\ & (\text{highest priced hour} * P_{\text{max}} * 1 \text{ hour}) + (\text{second highest priced hour} * P_{\text{max}} * 1 \text{ hour}) + \\ & (\text{third highest priced hour} * P_{\text{max}} * 1 \text{ hour}) + (\text{fourth highest priced hour} * P_{\text{max}} * 1 \text{ hour}) \end{aligned}$$

This definition would allow the ISO to compare the net revenue associated with settlement via the formulae described above to that assumption of complete discharge during a 4-hour period priced as the four highest priced hours. Thus, the ISO should pay the resource the maximum of either the settlement amount or the opportunity cost:

$$\text{Compensation over MCR use} = \text{MAX}[(Q * \text{Settlement Price}), (\text{Opportunity Cost})]$$

IV. The ISO shall track MCR use in a manner consistent to exceptional dispatch (ED).

As mentioned in this and previous comments, CESA considers the ISO should be clear in the fact that MCR shall be an interim solution. In order to understand its use and inform future product development and policy modifications, CESA believes the ISO should track the conditions and factors that contribute to MCR usage.

Tracking MCR use would disincentivize excessive reliance on this constraint and to continue the development of future market products. Under this approach, the ISO must record the circumstances that have led to the use of the MCR, as done for ED per section 34.11 of the ISO Tariff. Moreover, on the fifteenth day of each month, the CAISO shall file with the Commission and post to the CAISO Website an initial report concerning the use of MCR that occurred in the month two months prior to the month in which the report is filed. The report shall identify the frequency, volume, costs, causes, and degree of mitigation of MCR during such period to the extent such data are available. These recommendations are consistent to the current treatment of ED, per section 34.11.4 of the ISO Tariff.