Comments on Congestion Revenue Rights Enhancements Straw Proposal on Auction Efficiency and Revenue Adequacy

Department of Market Monitoring

June 16, 2026

Summary

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on the *Congestion Revenue Rights Enhancements Straw Proposal on Auction Efficiency and Revenue Adequacy*.[1] These comments also include some data on congestion revenue rights that address questions raised on the ISO's proposal at the Market Surveillance Committee (MSC) meeting on June 12.

DMM does not believe that a single uniform reserve price for flow and one for counterflow congestion revenue rights (CRRs) will address the design flaws inherent in the CRR auction design. This approach could be significantly improved by creating path-specific reserve prices, although some concerns raised by stakeholders may persist with any approach based on path-specific reserve prices while maintaining an auction based on a transmission model.

A more effective and efficient way to implement reserve prices would be to put the reserve prices on the specific constraints enforced in the auction, rather than on all possible source-to-sink paths available in the auction. This constraint-based approach could allow reserve prices to be aligned with the underlying value and cost of the different CRRs the ISO offers in the auction, eliminate the concerns over restricting trades between willing counterparties, eliminate different prices for flow and counterflow across a path, and likely reduce transmission ratepayer losses in the auction.

While offering products at reserve prices with some relation to the costs of selling the product is a significant improvement over offering them below cost at $0, DMM is still highly skeptical that the ISO needs to intervene in the market to offer these contracts at all. And if intervention is desired, it should be targeted and limited to achieving the underlying purpose of intervening which is facilitating hedging in the ISO energy market. Therefore, DMM continues to recommend that the ISO develop a CRR auction design based on willing sellers, and that development of such an approach be the top priority for the congestion revenue rights enhancements initiative.

Comments on Straw Proposal

Path-specific reserve prices could more closely align with the costs than a single uniform reserve price

DMM continues to believe that it is not appropriate for the ISO to sell CRR products that clearly impose costs on transmission ratepayers with a zero dollar offer price. Setting a single reserve price for flow CRRs and a single reserve price for counterflow CRRs, as described by the ISO in the straw proposal, cannot represent the value or costs of all the various CRRs offered by the ISO, whose cost and value vary

[1] *Congestion Revenue Rights Enhancements Straw Proposal on Auction Efficiency and Revenue Adequacy*, California ISO, June 1, 2026: https://stakeholdercenter.caiso.com/InitiativeDocuments/Straw-Proposal-Auction-Efficiency-Revenue-Adequacy-CRR-Enhancements-2026-06-01.pdf

significantly. While this may be better than zero dollar offer prices, such a blunt reserve price seems unlikely to be very effective and would be susceptible to adverse selection.

Expanding the ISO's methodology from a single auction-wide price to path-specific prices would more closely align the minimum bid/reserve prices with the underlying value and cost of different CRR paths. This could reduce the adverse selection problems of a single reserve price (for flow CRRs) but some of the other concerns that stakeholders raised could persist. These concerns include (1) auction participants willing to trade with each other being unable to trade because their bids do not meet the minimum bid requirement and (2) prices for a CRR path in the flow direction being different than the counterflow direction.

Constraint-specific reserve prices

The concerns raised by stakeholders on the minimum bid/reserve price proposed by the ISO stem from the minimum price being applied to CRR source-to-sink paths while the actual products the ISO is offering into the auction are for specific constraints.

The products in the auction are defined by the constraints, the product prices are the constraint shadow prices, and the amount offered by the ISO is the constraint limit.[2] The source-to-sink CRR paths are a bundle of these products and the marginal costs of congestion (MCCs) are the bundled price of the underlying products—some of which could be purchased from the ISO through the constraint limits and some that could be purchased from other auction participants.

Placing the minimum price on the CRR path does not align with the constraint limits, which are the constraint defined products that the ISO offers in the auction. For example, a participant could bid to buy a CRR sourcing from A to B that is bought in full from another participant offering a CRR from B to A—without using any product purchased from the ISO. Placing a minimum bid price on this path would affect at what price the two participants can trade without being a reserve price on anything the ISO sold.

Removing this misalignment by placing reserve prices on the specific constraints being offered would be a much more efficient and effective way to implement reserve prices. Constraint-specific reserve prices would:

- align with the product that the ISO offers in the auction (the constraint limits),
- not restrict what bid prices auction participants could submit,
- allow trades between market participants even if their bids are below the reserve price,
- not create a mismatch between path flow and counterflow prices,
- significantly reduce adverse selection problems,
- likely reduce transmission ratepayer losses in the CRR auction, and
- provide all entities the ability to procure CRRs being used as hedged at a reasonable cost that reflect the expected value of these hedges

The ISO could implement constraint-specific reserve prices similar to how it relaxes constraints for penalty prices in the energy markets. For each constraint, there could be a relaxation resource (R) that

[2] Assuming the transmission models are the same between the auction and day-ahead markets. Because the models are not the same, the actual amount offered by the ISO can exceed the limit.

only provides counterflow to one constraint. The relaxation resource R would enter the objective function as a choice variable with a bid equal to the reserve price (r) and a max bid quantity equal to the constraint limit. The constraint limit would then be set to zero. In this way, the ISO is still offering to sell up to the constraint limit but only if the reserve price is met.

As an example, consider a constraint with a 100 MW limit. The ISO calculates a reserve price of $2 per MW. The current auction would model:

$$\max \sum_i mw_i p_i$$

$$s.t. \sum_i mw_i SF_i^k \leq 100$$

Where bid quantities (mw_i) and price (p_i) are submitted by market participants and the shift factors (SF_i^k) map the bids to constraint flows.

Implementing the constraint-specific reserve price would change the model to:

$$\max \sum_i mw_i p_i - R^k * \$2$$

$$s.t. \sum_i mw_i SF_i^k - R^k \leq 0$$

$$where\ 0 \leq R^k \leq 100$$

Thus, the ISO still offers 100 MW of constraint k "capacity" but at a reserve price of $2 rather than $0.

A simple way that the ISO could calculate constraint-specific reserve prices would be to take the average—or some percentile—of historical prices, adjust for energy price changes (using prices from energy forward contracts for example), and potentially add a risk premium.[3]

Analysis of different bid/price limits

At the June 12 MSC meeting, there appeared to be a strong consensus that if the ISO is going to continue to consider an approach based on uniform bid/price levels, more analysis is needed to assess the impact of different bid/price limits that might be used under the ISO's proposed approach. The MSC

[3] The ISO could use a single relaxation resource per constraint contingency case combination, with reserve prices created specifically for that contingency case (allowing the reserve prices to stack, just as MCCs stack the shadow prices, which is appropriate with appropriate case-specific reserve prices). Alternatively, the ISO could use the same reserve price across all transmission contingencies and have the relaxation resource apply counterflow in all contingencies (such that the reserve prices do not stack across cases). When constraint limits are different across contingencies, then the relaxation resource can be broken out into multiple resources with the same reserve price and shift factors (SFs) set to release capacity across the different limits per continency. For example, if contingency cases a, b, and c have limits 10, 15, and 17 MW, then Ra would have bid max of 10 MW with SF=-1 for all cases, Rb would have bid max of 5 MW and SF=-1 for cases b and c, and Rc would have bid max of 2 MW and SF=-1 to only case c.

outlined an approach based on re-running the CRR auction model with different bid/price levels and assumptions.

If the ISO is going to continue to consider an approach based on uniform bid/price levels, DMM suggests that the ISO can leverage the data they have apparently already assembled to get a better understanding of how effective various minimum prices might be at reducing auction losses. The method described below uses existing data and does not account for all the changes in bidding and auction outcomes that implementing minimum prices could cause. Nor does this approach measure ratepayer losses directly. However, this relatively simple approach with existing data could provide a much better understanding of how various minimum prices could affect ratepayer losses.

Using the data already collected, the ISO could:

1) Take a data set that has the following for each positively priced CRR:
    a. CRR source/sink
    b. MW clearing auction
    c. Auction price
    d. Congestion revenues from CRR
    e. Net revenues (auction revenues – congestion payments)
2) Sort the CRRs by auction price (ascending).
3) Calculate the cumulative sum of net revenues/losses for all positively priced CRRs (based on order after sorting in ascending order of price).
4) The resulting data set would be an x-y chart of cumulative net CRR revenues/losses (x-axis) and CRR price (y-axis).
5) If the ISO picks any price on y-axis as the "minimum clearing price" and draws a horizontal line, this would intersect at the amount of losses from CRRs sold under that price. This could be viewed as a ballpark upper bookend of potential reduction in losses from any given minimum clearing price.
6) A variation of this simplified method could be to assume that all CRRs that cleared under any given minimum clearing price cleared at that minimum price. For this, the ISO would need to re-calculate the net revenues/losses, assuming CRRs that cleared at prices less than this minimum price instead cleared at this minimum clearing price.
7) A third variation could be to assume that only CRRs that cleared at prices less than this minimum price would clear if they were still profitable for buyers at this new minimum price.

While not perfect, data analysis such as this could provide a better understanding into how different minimum prices might affect auction losses.

Comments on MSC Meeting

The following sections provide data that address several questions raised on the ISO's proposal at the Market Surveillance Committee (MSC) meeting on June 12.

Allocated CRRs are revenue adequate

One question that arose at the June 12 MSC meeting was how much additional transmission capacity was actually available in the auction after accounting for CRRs allocated to load serving entities (LSEs). While the ISO has not released data on this question in terms of transmission capacity, this issue can be addressed by examining congestion revenues that are generated in the day-ahead market relative to congestion revenues that would be needed to fully fund allocated versus auctioned CRRs.

Figure 1 compares total day-ahead congestion revenues to the notational value of all CRRs allocated to LSEs by quarter since Q3 2020. These notational values include congestion revenues that would be needed to fully fund allocated CRRs that were sold by LSEs in the auction. As shown in Figure 2, LSEs have consistently sold about one fourth (24 percent) of allocated CRRs (as measured by the notational value of CRRs) in the auction.

As shown in Figure 1, since Q3 2020 total day-ahead congestion revenues have exceeded the notional value of all allocated CRRs over most quarters with an average surplus of about 16 percent since Q3 2020. On an annual basis, congestion revenues have exceeded the nominal value of all allocated CRRs each year since 2020.[4]

These data show that when CRRs sold in the auction are viewed on an incremental basis, these CRRs account for all of the overall revenue inadequacy and most or all deficit offsets incurred by both LSEs and non-LSEs. If CRRs were not sold by the ISO at a loss, then revenues would be adequate to fully fund allocated CRRs without the need for any deficit offsets.

[4] DMM does not have data on potential revenue adequacy on a constraint-by-constraint basis under a scenario that compares congestion revenues to the nominal allocated CRRs only (excluding CRRs sold by the ISO).

Figure 1. Allocated CRRs have been revenue adequate overall

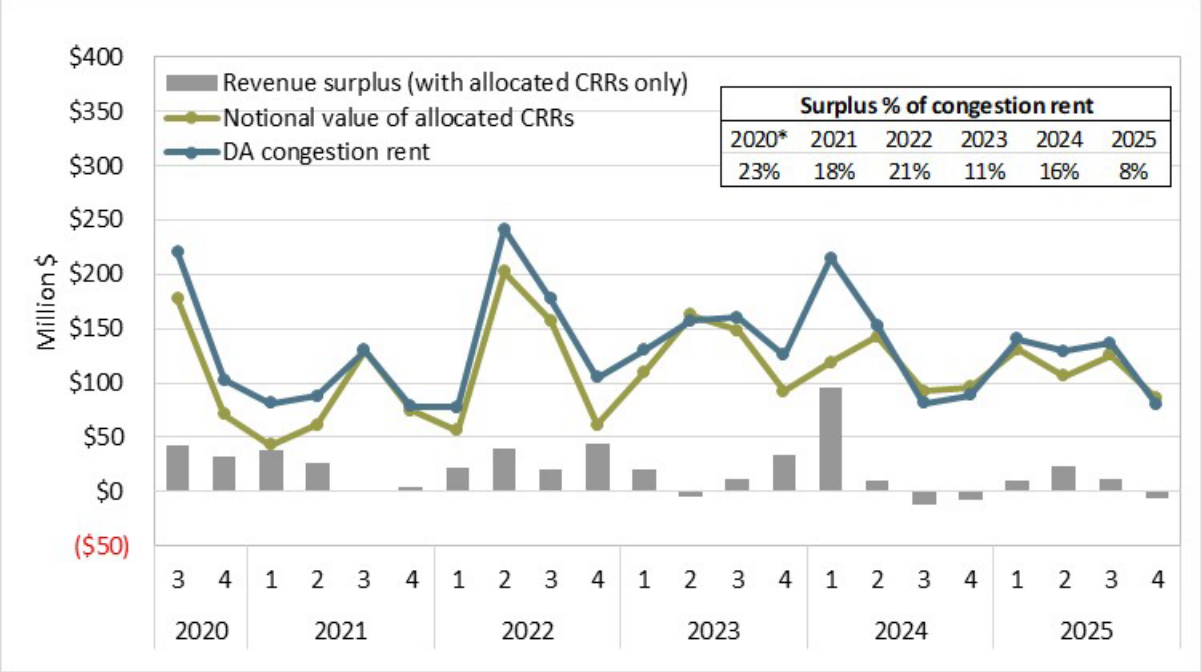
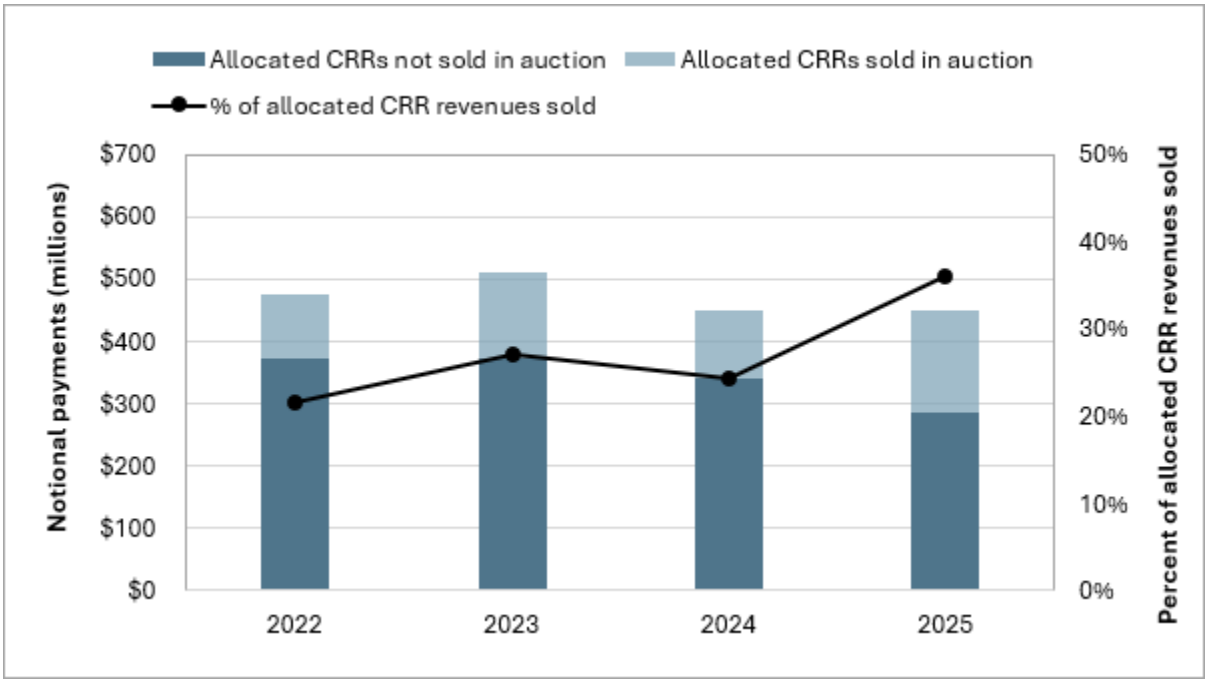


Figure 2. LSEs sell about one-fourth of allocated CRRs in the auction



Deficit offsets

Another question that arose at the June 12 MSC meeting was the extent to which financial entities may disproportionately contribute to deficit offsets by targeting CRRs associated with transmission constraints that tend to be most revenue inadequate. DMM believes that there is some evidence of this based on DMM's calculations of deficit offsets by participant type, as summarized below:

- Revenue inadequacy deficit offsets for load serving entities and generators have been about 25 percent of the notional value of their CRRs (the value of the CRRs if fully funded).
- Deficit offsets have been about 29 percent of notional value for marketers and 33 percent for financial entities.

This highlights that the CRRs procured by marketers and financial entities in the auction are creating more shortfalls than CRRs acquired by LSEs and generators. Marketers and financial entities account for about 27 percent and 63 percent of non-LSE notional auction revenues, respectively, for a total of about 91 percent. Thus, the CRRs acquired in the auction acquired by these entities are the primary driver of CRR revenue inadequacy.