



Memorandum

To: ISO Board of Governors and WEIM Governing Body
From: Eric Hildebrandt, Executive Director, Market Monitoring
Date: July 12, 2023
Re: Department of Market Monitoring report

This memorandum does not require ISO Board of Governors or WEIM Governing Body action.

EXECUTIVE SUMMARY

The Department of Market Monitoring (DMM) recently posted its *2022 Annual Report* and a separate special report on *Battery Storage Issues*.¹ The 2022 Annual report includes a summary of DMM's current recommendations on key market design initiatives. This memo highlights analysis and recommendations on two issues that are not within the scope of any current or planned ISO initiative.

- **Losses from the congestion revenue rights auction continue to be systematic and significant in the four years since changes implemented in 2019.** Losses from congestion revenue rights sold in the California ISO auction totaled \$118 million in 2022. These losses are borne by transmission ratepayers who pay for the full cost of the transmission system through the transmission access charge (TAC). Changes to the auction implemented in 2019 have reduced, but not eliminated, these losses. Transmission ratepayer losses have averaged about \$63 million per year from 2019 to 2022, compared to average losses of \$86 million per year in the ten years before these changes. DMM continues to recommend that the ISO consider further measures to reduce losses from congestion revenue rights, including an auction based on willing sellers and buyers.
- **Bid cost recovery payments for batteries are increasing significantly more than the total amount of battery capacity.** Bid cost recovery payments for batteries increased from about \$3.6 million in 2021 (or 2 percent of bid cost recovery payment) to over \$30 million (or 12 percent) in 2022. Revenues for batteries from bid cost recovery payments have increased from about \$3.60/kW in 2021 to almost \$10/kW in 2022. DMM continues to recommend that the ISO begin to develop revisions to

¹ *2022 Annual Report on Market Issues and Performance*, Department of Market Monitoring, July 11, 2023: <https://www.caiso.com/Documents/2022-Annual-Report-on-Market-Issues-and-Performance-Jul-11-2023.pdf>

2022 Special Report on Battery Storage, Department of Market Monitoring, July 7, 2023: <http://www.caiso.com/Documents/2022-Special-Report-on-Battery-Storage-Jul-7-2023.pdf>

bid cost recovery rules for storage resources to ensure market efficiency and to prevent potential gaming as soon as practicable.

CONGESTION REVENUE RIGHTS AUCTION

Background

Over the 10-year period from 2009 through 2018, payouts to non-load-serving entities purchasing congestion revenue rights in the ISO auction exceeded the auction revenues by about \$860 million, or \$86 million per year. If the ISO did not auction these congestion revenue rights, these congestion revenues would be credited back to transmission ratepayers who pay for the cost of the transmission system through the TAC. Thus, losses from congestion revenue rights sold in the auction represent direct revenue losses to transmission ratepayers. Most of these losses have resulted from profits received by purely financial entities that do not serve any load or schedule any generation in the ISO.

In response to the consistently large losses from sales of congestion revenue rights, the ISO instituted significant changes to the auction starting in the 2019 settlement year. These changes included (1) a reduction in the type and amount of congestion revenue rights sold in the ISO auction, and (2) a reduction in payments in some cases when congestion revenues are insufficient to cover payments owed to congestion revenue rights holders.

Although changes implemented in 2019 reduced ratepayer auction losses, these losses have continued to be very significant. As shown in Figure 1:

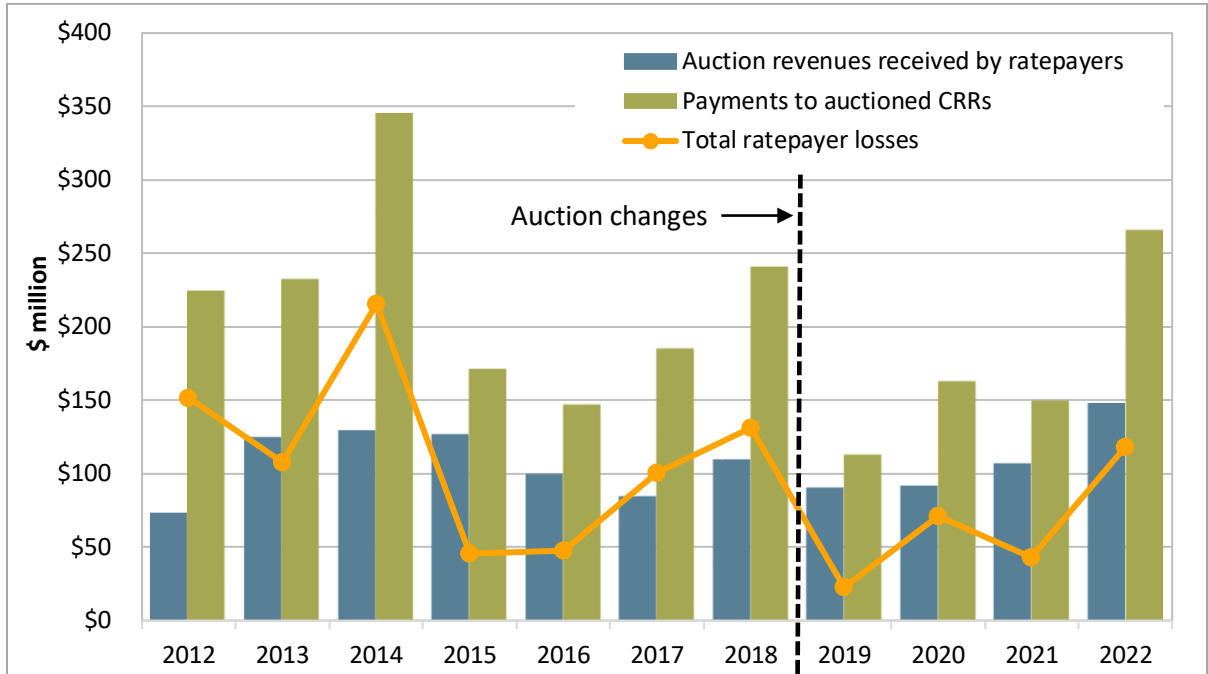
- In 2022, ratepayer losses from congestion revenue rights auctioned off by the ISO rose back up to \$118 million as energy and congestion were driven up by gas prices. Transmission ratepayers received only about 55 cents in auction revenues per dollar paid out to auctioned congestion revenue rights.
- In the four years after changes were implemented in 2019, ratepayer losses have averaged \$64 million per year, compared to \$86 million per year in the ten years before the changes. Transmission ratepayers have been paid an average of only 63 cents per dollar paid out to auctioned congestion revenue rights, compared to about 48 cents per dollar before the changes.

DMM continues to believe that since changes made by the ISO in 2019 do not address the fundamental market flaw underlying the congestion revenue rights auction design, these changes will not protect transmission ratepayers from further losses from the auction.² DMM continues to believe that the current auction is unnecessary and should be eliminated, with all congestion rents being returned to transmission ratepayers. If the ISO believes it is beneficial to the market to facilitate hedging, DMM believes the current auction format should be changed to a market for congestion revenue rights (or locational price swaps)

² Memorandum to ISO Board of Governors, *Re: Department of Market Monitoring comments on congestion revenue rights auction efficiency initiative*, June 18, 2018: <http://www.caiso.com/Documents/DecisiononCongestionRevenueRightsAuctionEfficiencyTrack1BProposal-DMMComments-Jun2018.pdf>

based only on bids submitted by entities willing to sell and buy congestion revenue rights.

Figure 1. Losses from congestion revenue rights auction (2012 - 2022)



ENERGY STORAGE RESOURCES

Background

Given the significant growth of battery capacity in the ISO market in recent years, DMM has included more detailed analysis of battery resources in its recently posted *2022 Annual Report* and a separate special report on *Battery Storage Issues*. Results in these reports include the following:

- Battery capacity has grown from about 500 MW in 2020 to about 4,200 MW in 2022 and almost 5,500 MW in 2023 (see Figure 2).
- Bid cost recovery payments for batteries increased from about \$3.6 million in 2021 (or 2 percent of bid cost recovery payment) to over \$30 million (or 12 percent) in 2022 (see Table 1).
- Bid cost recovery payments for these batteries increased from about \$3.60/kW in 2021 to almost \$10/kW in 2022 (see Figure 3).

Thus, bid cost recovery payments for batteries have increased significantly more than the total amount of battery capacity has increased.

Figure 2. Battery storage resources (2017 - 2023)

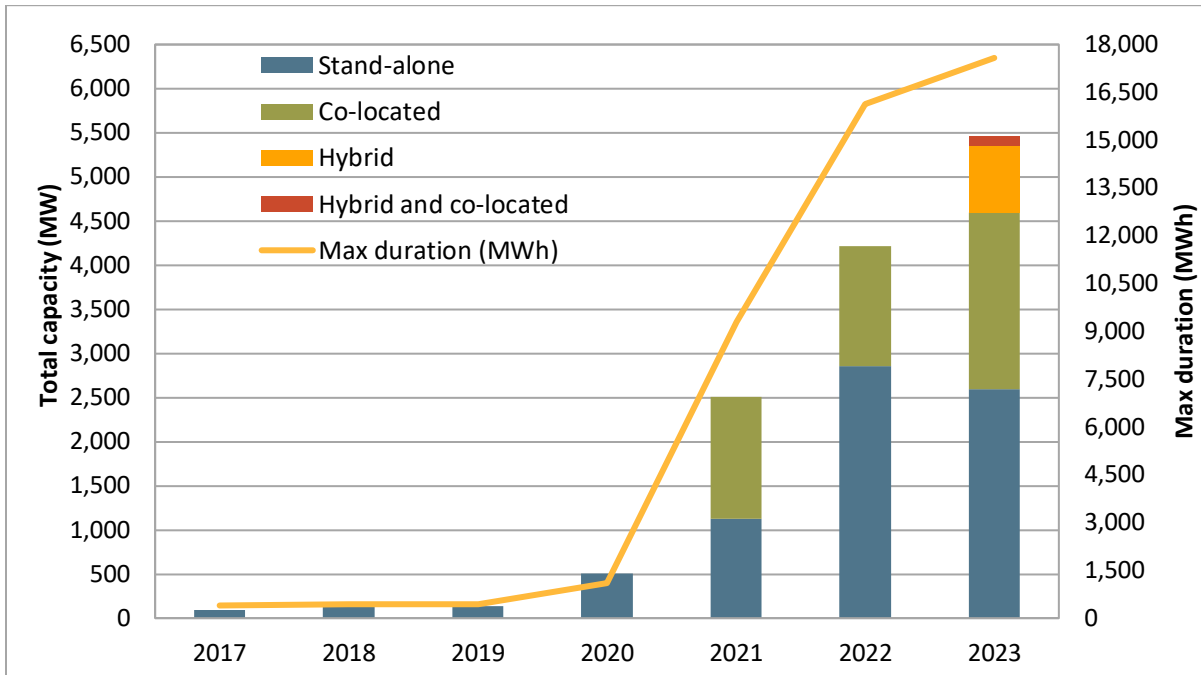
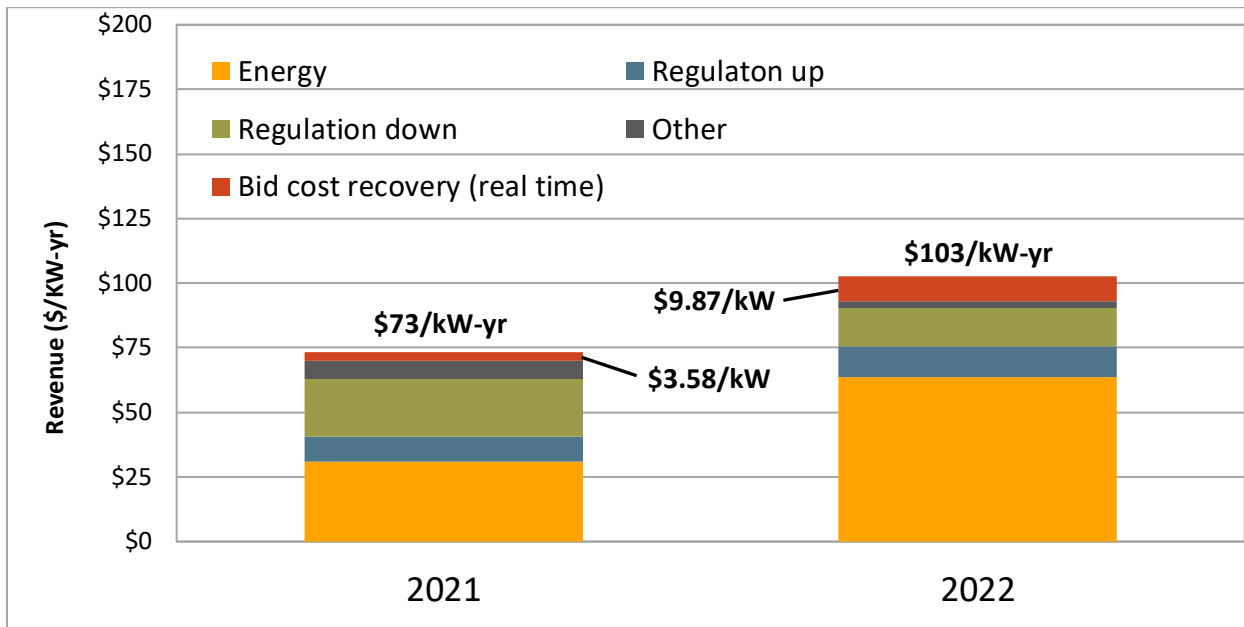


Table 1. Bid cost recovery payments in 2021 and 2022 (million \$)

	2021		2022	
Batteries	\$3.6	2%	\$30.3	12%
Gas: Once-through-cooling	\$56.4	36%	\$63.1	25%
Gas: Combined Cycle	\$56.1	36%	\$77.6	31%
Gas Turbine: Fast Start	\$18.0	12%	\$32.0	13%
Gas Turbine: Non Fast start	\$4.6	3%	\$11.6	5%
Other (reciprocating engines, etc)	\$6.7	4%	\$16.0	6%
QF/CHP/Must-take	\$6.6	4%	\$19.6	8%
Reliability must-run	\$2.5	2%	\$2.3	1%
Hydro	\$1.6	1%	\$1.9	1%
Total	\$155		\$252	

Figure 3. Average annual revenue for batteries with a full year of operation



Bid cost recovery rules

Current bid cost recovery rules were primarily designed for traditional gas generating units, which have significant start-up and minimum load costs, minimum run times, and various other physical operating constraints. While batteries do have some special operating constraints, they are not subject to the various costs and constraints of gas units around which bid cost recovery rules have been designed.

In September 2022, the ISO filed with FERC to eliminate one large cause of inefficient bid cost recovery payments to storage resources identified by DMM.³ However, DMM has continued to observe market outcomes that support the need to revise bid cost recovery rules for energy storage resources. DMM continues to recommend that the ISO develop more general revisions to bid cost recovery rules for storage resources as soon as practicable.

DMM has specifically noted that bid cost recovery should be modified to mitigate inefficiencies and potential gaming opportunities that may result from differences between the state of charge of batteries in real time versus in the resources’ day-ahead schedule. More generally, new rules are also needed to address bid cost recovery payments resulting from a range of actions that can be taken by battery operators to constrain a battery’s state of charge or otherwise force uneconomic dispatch.

³ California Independent System Operator Corporation, FERC Docket No. ER22-2881, *Tariff Amendment to Prevent Unwarranted Bid Cost Recovery Payments to Storage Resources*, September 19, 2022: <http://www.caiso.com/Documents/Sep19-2022-TariffAmendment-EnergyStorageBidCostRecovery-ER22-2881.pdf>