



Memorandum

To: ISO Board of Governors and Western Energy Markets Governing Body

From: Eric Hildebrandt, Executive Director, Market Monitoring

Date: October 14, 2026

Re: Department of Market Monitoring update

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

EXECUTIVE SUMMARY

This memo summarizes a forthcoming report on battery storage resources in the California ISO and Western Energy Imbalance Market (WEIM) by the Department of Market Monitoring (DMM).¹ Highlights in the report include the following:

- Battery capacity in the combined ISO and WEIM footprint reached 25,700 MW by year-end 2025, representing a 42 percent increase from the prior year. This growth was most concentrated in California and the Desert Southwest Region.
- During the peak net load hours, batteries provided batteries supplied an average of 15 percent of California balancing areas' load, 11 percent for the Desert Southwest, 3 percent for the Intermountain West, and 1 percent for the Pacific Northwest.
- Batteries account for a significant portion of load during peak solar hours. From hours-ending 10 to 13, battery charging represented around 10 percent of load in the ISO and WEIM market footprint in 2025.
- Batteries provided 85 percent of the CAISO balancing area's regulation up and regulation down requirements in 2025. However, as the amount of battery capacity has increased in recent years, the percentage of total battery storage capacity being scheduled for ancillary services has decreased, with batteries providing more energy during the peak net load hours.
- Net market revenue for batteries in the CAISO balancing area decreased from an average of about \$53/kW-yr in 2024 to \$45/kW-yr in 2025. This decrease was driven largely by lower peak energy prices compared to 2024. This represents a continued downward trend in battery revenues, which total \$103/kW in 2022.
- Battery revenue from bid cost recovery payments have also continued to drop significantly. Batteries received \$6.3 million of real-time bid cost recovery payments in 2025, compared to \$18 million in 2023. Lower overall prices and a decrease in

¹ 2024 Special Report on Battery Storage, Department of Market Monitoring, May 29, 2025: <https://www.caiso.com/documents/2024-special-report-on-battery-storage-may-29-2025.pdf>

extreme real-time price spikes contribute to lower bid cost recovery payments for batteries. While bid cost recovery payments for batteries have dropped, DMM continues to recommend that the ISO further modify bid cost recovery rules to ensure that batteries have an incentive to bid in a manner that ensures their capacity is usually fully available during the most critical peak net load hours.

- Market power mitigation continues to have a very limited impact on the dispatch of batteries. However, DMM continues to recommend that enhancements to the default energy bids used in mitigation be made to ensure that bid mitigation effectively mitigates locational market power, but does not prevent most batteries from being fully charged during critical net load hours. The ISO is currently finalizing a proposal that would address this issue by allowing higher default energy bids in the hours prior to the peak net load hours.

BATTERY RESOURCE TRENDS

Battery capacity continues to grow rapidly throughout the CAISO and other WEIM areas. By the end of 2025, an additional 4,100 MW of battery capacity was added in the CAISO area, with about 3,500 MW was added in other WEIM balancing areas. As shown in Figure 1, most of the battery capacity in other WEIM areas occurred in the Desert Southwest. By the end of 2025, active battery capacity across the ISO market footprint totaled about 25,700 MW.

As shown in Figure 2, batteries now account for about 14 percent of nameplate generation capacity in both the California region and the Desert Southwest,. Batteries represent 5 percent of nameplate capacity in the Intermountain West, and 0.5 percent in the Pacific Northwest.

Figure 3 shows average energy schedules for all batteries in the WEIM footprint in the 5-minute market from 2022 to 2025. The average energy output from batteries peaked at about 9,100 MW during hour-ending 19 in 2025, compared to a peak of 5,700 MW in 2024. During hours-ending 18 to 22, batteries supplied an average of 15 percent of California balancing area load, 11 percent of load in the Desert Southwest, 3 percent in the Intermountain West, and 1 percent for the Pacific Northwest.

Figure 4 compares battery charging for all batteries in the WEIM footprint in the 5-minute market with average 5-minute market load by region in 2025. From hours-ending 10 to 13 in 2025, battery charging represented around 10 percent of load in the WEIM footprint.

Figure 1. Active battery capacity by balancing area (2025)

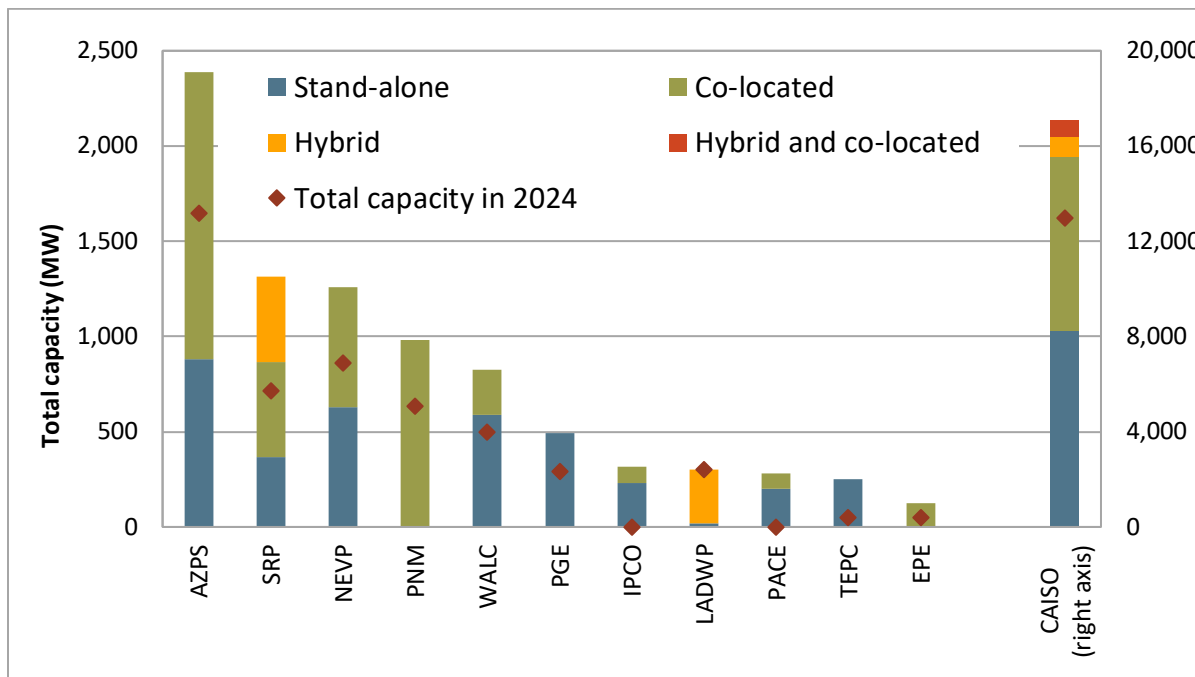


Figure 2. Total nameplate capacity by region as of April 1, 2026

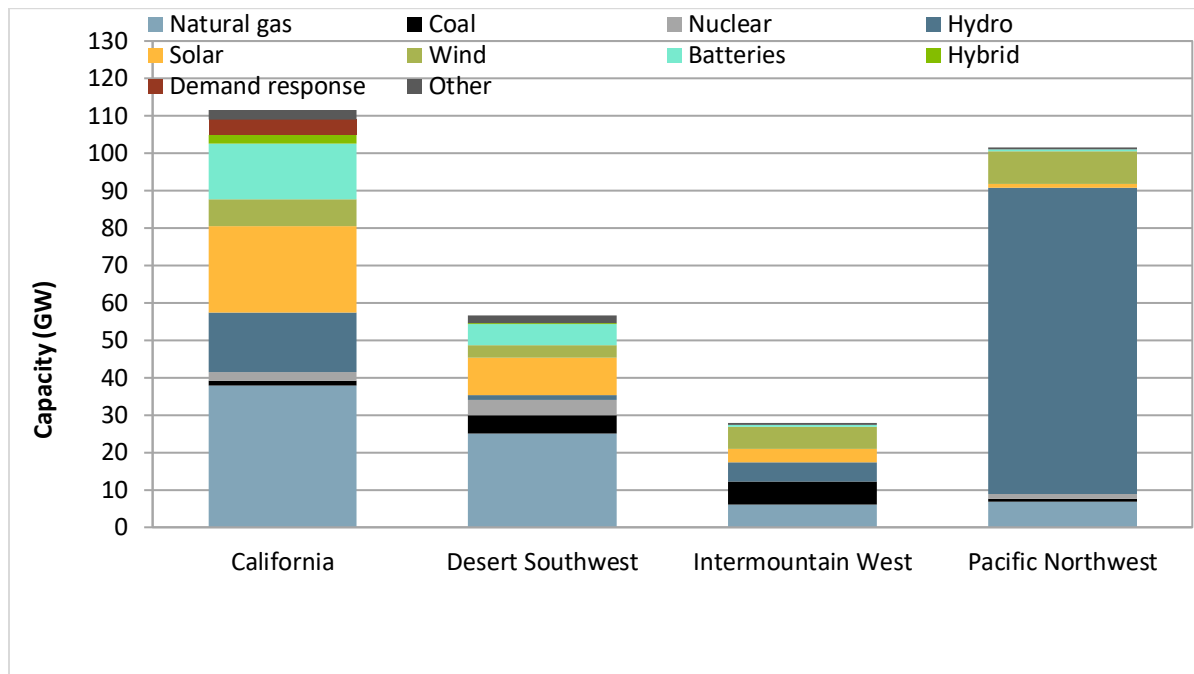
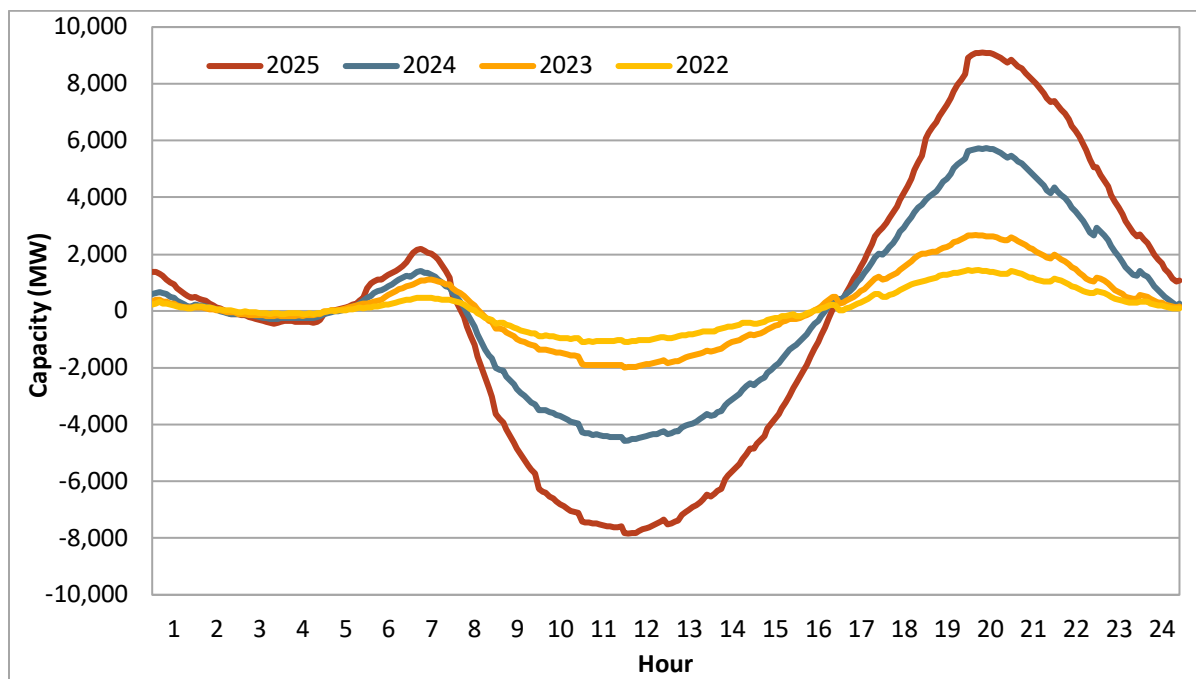
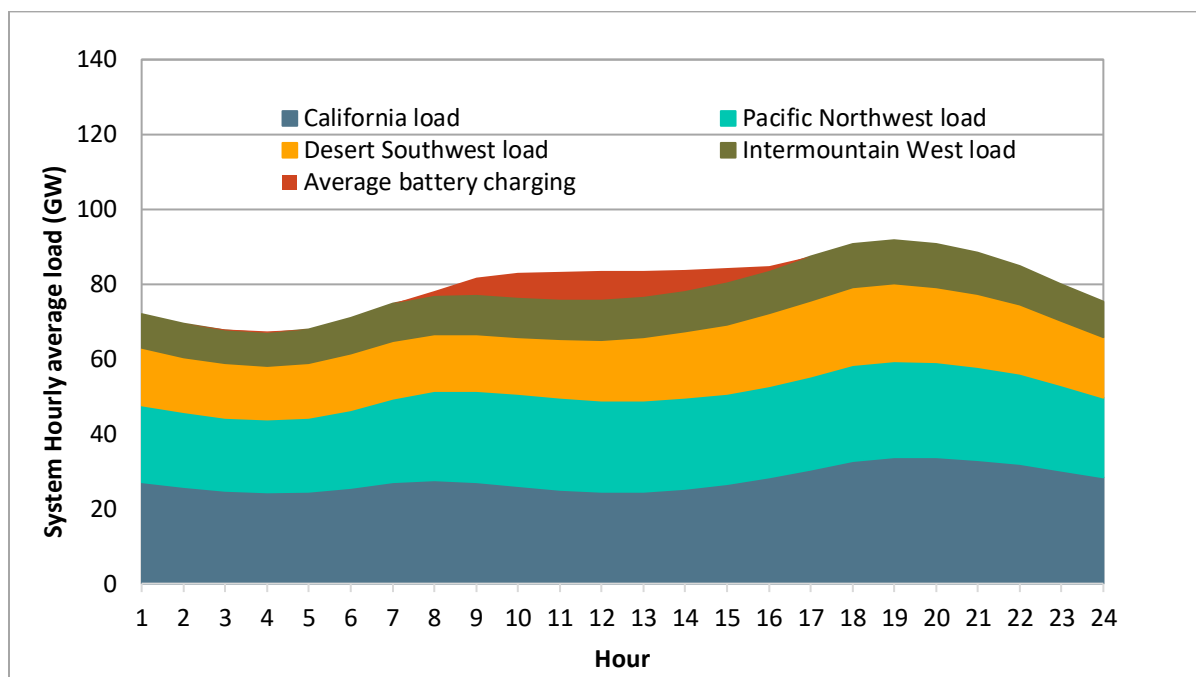


Figure 3. Average 5-minute energy schedules for all batteries in WEIM (2025)**Figure 4. Average battery charging and other load by region (2025)**

Battery scheduling and dispatch

Most battery capacity in the CAISO area is bid and scheduled in the day-ahead market, and can then be re-dispatched based on bids submitted in the day-ahead market. Figure 5 shows average hourly real-time (15-minute market) schedules of all battery storage resources in the CAISO balancing area in 2025. Batteries provide a significant portion of the ancillary services procured for the CAISO area. In 2025, batteries provided nearly 85 percent of the CAISO balancing area's regulation.

Batteries in other WEIM areas are scheduled prior to real-time by resource owners through base schedules. Batteries participating in the WEIM have similar schedules to batteries in the CAISO balancing area, but do not have ancillary service schedules, since ancillary services are not procured through the market in WEIM balancing areas.

As shown in Figure 6, average energy scheduled from batteries in these other WEIM areas during hour ending 20 increased from about 1,100 MW in 2024 to almost 3,000 MW in 2025. Although economic bids are submitted for most of this capacity in real-time, batteries in other WEIM areas do not tend to get dispatched significantly from base schedules based on bids submitted in the real-time market.

Because batteries outside of the CAISO balancing area operate mainly to meet base schedules and do not participate in day-ahead energy or ancillary service markets, the analysis of market revenue in the following section is based only on batteries in the CAISO balancing area.

Battery revenues

As shown in Figure 5, net market revenue for batteries in the ISO balancing area dropped from \$53/kW-yr in 2024 to \$45/kW-yr in 2025, continuing a longer term trend of lower net market revenues. This drop is driven largely by lower peak energy prices and decreased revenues from ancillary services as the amount of battery capacity has increased.

Battery revenue from bid cost recovery payments have also continued to drop significantly. Lower overall prices and a decrease in extreme real-time price spikes may have contributed to lower bid cost recovery payments for batteries. The ISO implemented also changes in bid cost recovery rules for batteries in 2025. These changes were focused on bid cost recovery deriving from real-time energy bid costs. However, DMM analysis prior to those market design changes showed that most of real-time bid cost recovery paid to batteries was the result of real-time revenue losses incurred by buying back infeasible day-ahead schedules at elevated real-time prices.²

While bid cost recovery payments for batteries have dropped, DMM continues to recommend that the ISO modify bid cost recovery rules for batteries. Current bid cost recovery rules significantly decrease the incentive for batteries to bid in a manner that ensures their capacity is usually fully available during the most critical peak net load hours. In addition to increasing bid cost recovery payments and related gaming opportunities, this

² *Analysis of battery bid cost recovery and bid mitigation issues*, Department of Market Monitoring, September 11, 2024: <https://www.caiso.com/documents/presentation-battery-bid-cost-recovery-and-mitigation-data-dmm-sep-11-2024.pdf>

can result in batteries being discharged prior to the peak net load hours, when battery capacity is needed most.

Figure 5. Average hourly battery schedules in CAISO area (2025)

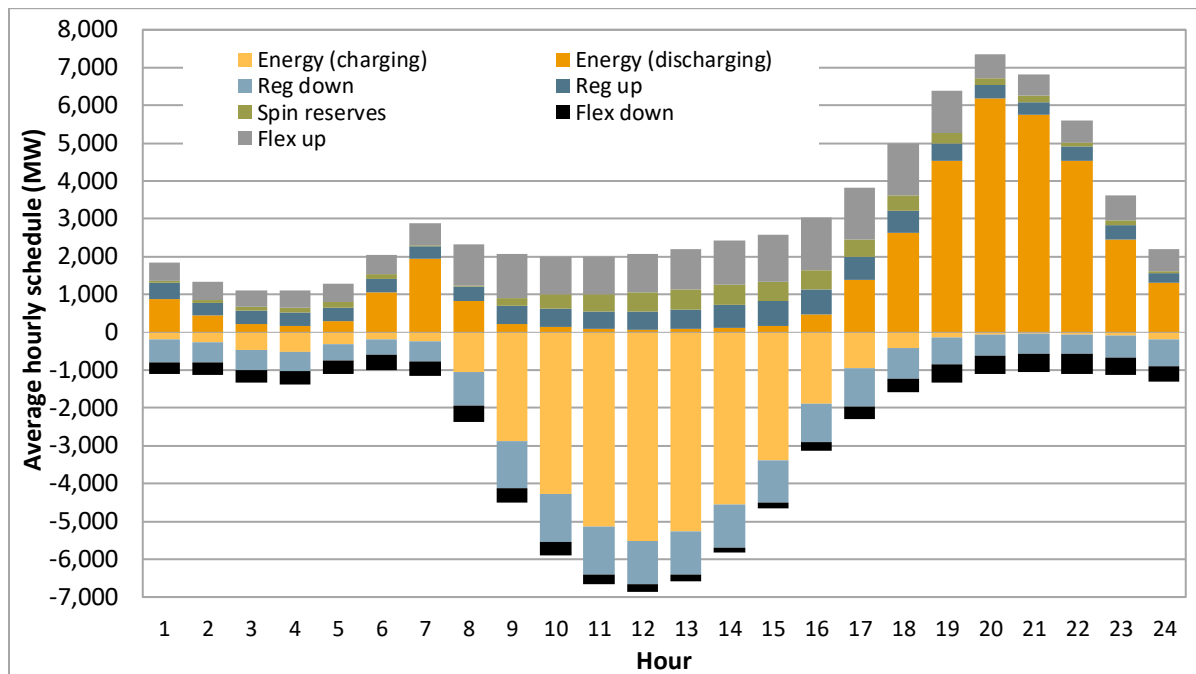


Figure 6. Average schedules of batteries in other WEIM balancing areas (2024-2025)

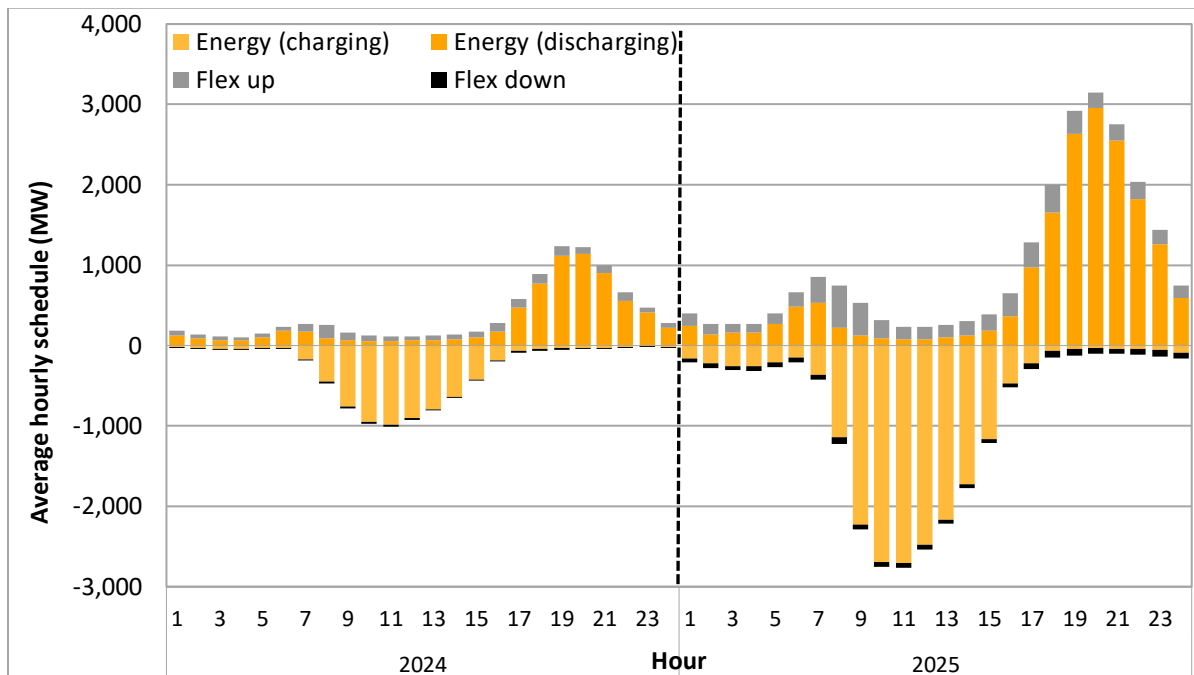


Figure 7. Average market revenue for batteries with a full year of operation