California ISO | WESTERN ENERGY MARKETS

Memorandum

To: Western Energy Markets Governing Body

From: Eric Hildebrandt, Executive Director, Market Monitoring

Date: June 11, 2026

Re: **Department of Market Monitoring report**

This memorandum does not require WEM Governing Body action.

EXECUTIVE SUMMARY

This memo provides a short summary by the Department of Market Monitoring (DMM) of May 2026 market performance and trends related to new day-ahead market features implemented as part of the extended day-ahead market (EDAM).

- During high solar production hours from hour 8 to 18, the California ISO (CAISO) balancing area exported an average of about 260 MW through EDAM to PacifiCorp East and PacifiCorp West. During non-solar hours, average net EDAM transfers between participating balancing areas was significantly lower.
- Prices for imbalance reserve have been low overall. For the CAISO and PacifiCorp East balancing areas, prices have been less than $5/MWh in more than 90 percent of hours.
- Imbalance reserve prices in PacifiCorp West were more frequently higher—above $5/MWh in more than 53 percent of hours.
- During May, payments for upward imbalance reserve were around $2.2 million while payments for downward imbalance reserve were around $1.6 million.
- Gas and solar resources made up around 43 percent and 20 percent of upward imbalance reserve schedules, respectively.
- Wind and solar resources combined made up around 81 percent of the downward imbalance reserve schedules.
- Failures of the extended day-ahead market resource sufficiency evaluation were very infrequent for all three balancing areas across the month of May.

- Average hourly reliability capacity up procured in the residual unit commitment process in May 2026 was around 1,500 MW, up from around 900 MW in May 2025.
- Average hourly reliability capacity down procured in May 2026 was around 470 MW.
- Since the implementation of the extended day-ahead market, no balancing area has applied any adjustments to their residual unit commitment load.
- Total residual unit commitment costs in May 2026 were around $13.5 million, only 14 percent above $11.8 million from May 2025 despite the addition of two balancing areas.
- Despite resource adequacy resources being able to bid above $0/MWh in May 2026, weighted average residual unit commitment prices were lower in May 2026 ($15/MWh) than in May 2025 ($17.50/MWh).
- The average hourly potential increase in residual unit commitment awards from local market power mitigation was less than 1 MW.
- Despite neither PacifiCorp East nor PacifiCorp West having virtual bidding at their nodes, load under-scheduling was not more prevalent in those balancing areas than in the CAISO balancing area.
- Greenhouse gas prices were significantly higher in the day-ahead market than in the real-time markets.

EXTENDED DAY-AHEAD MARKET TRENDS

Transfers and transfer limits

Figure 1 shows average net transfers between extended day-ahead market (EDAM) balancing areas during May. Figure 2 summarizes average transfer capacity made available to transfer energy between participating EDAM balancing areas in the day-ahead market during May.

- During high solar production hours from hour 8 to 18, the CAISO balancing area exported on average around 260 MW to PacifiCorp East and PacifiCorp West. During non-solar hours, average net EDAM transfers between participating balancing areas was significantly lower.
- EDAM transfer capacity was relatively limited, particularly between PacifiCorp West and the other balancing areas.[1]

[1] Transfer capacity from PacifiCorp East to PacifiCorp West is one-directional.

Figure 1. Average day-ahead market net EDAM transfers between balancing areas (May 2026)

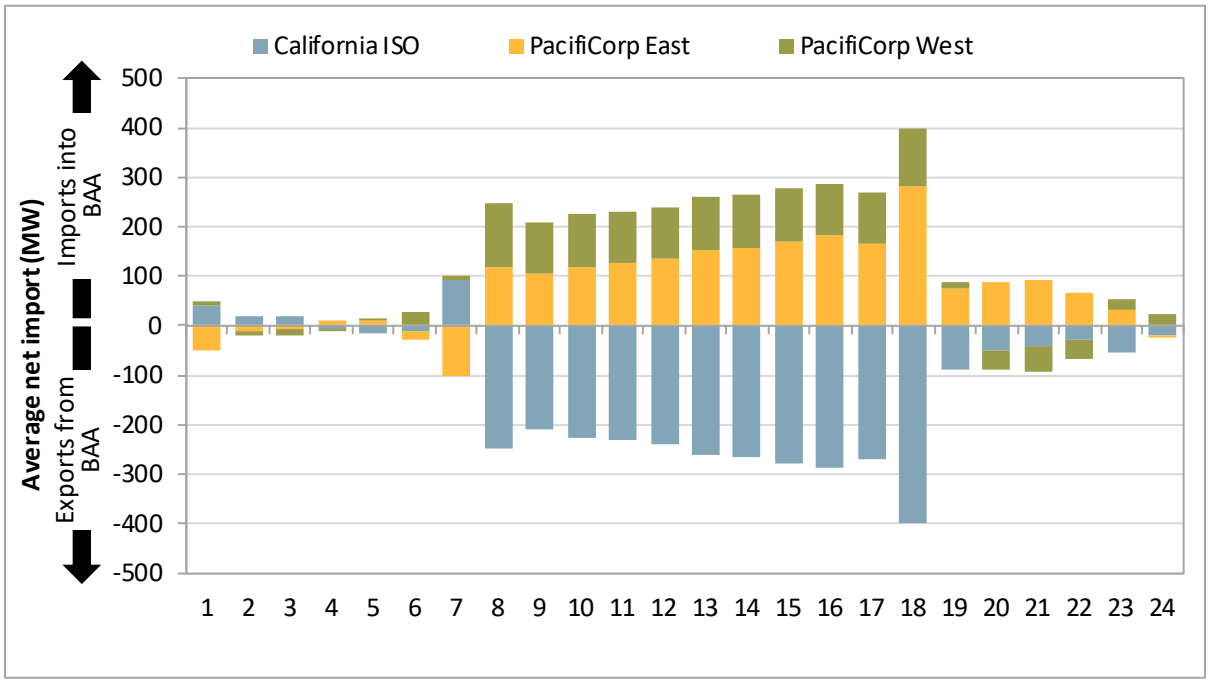
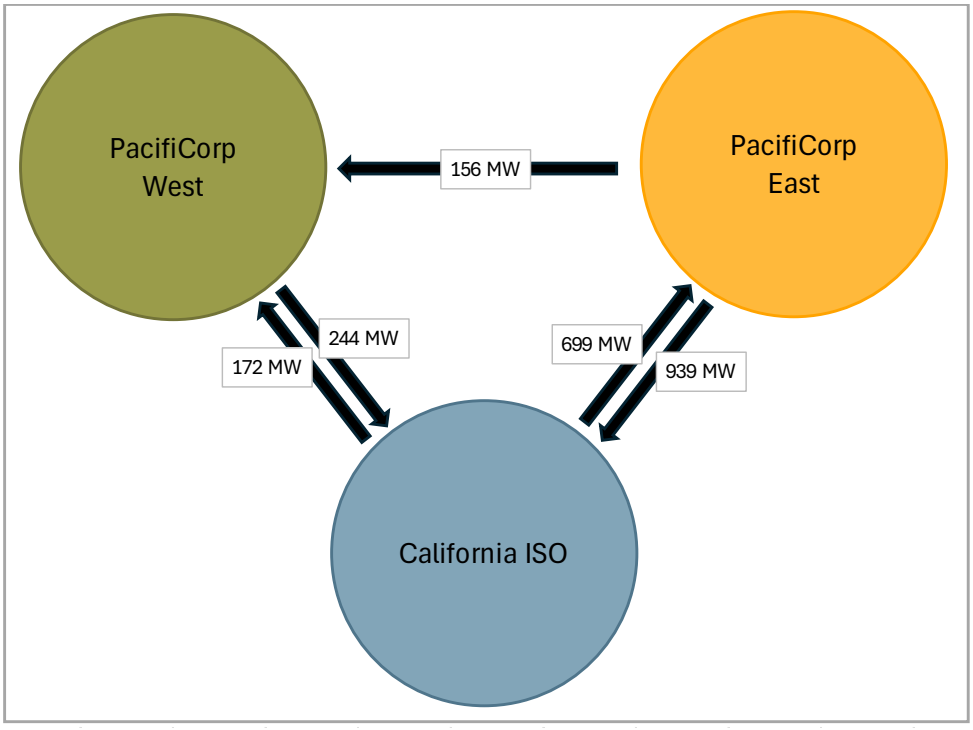


Figure 2. Average day-ahead market transfer limits between balancing areas (May 2026)



Imbalance reserves

Figure 3 shows average imbalance reserve requirements for each balancing area participating in the day-ahead market.

- The CAISO area accounted for roughly 70 percent of total imbalance reserve requirements.
- Total imbalance reserve requirements were highest in hours 7, 8, 18, and 19. These hours include the morning and evening solar ramp, which typically have the highest levels of uncertainty.

Figure 3. Imbalance reserve requirements by hour and balancing area (May 2026)

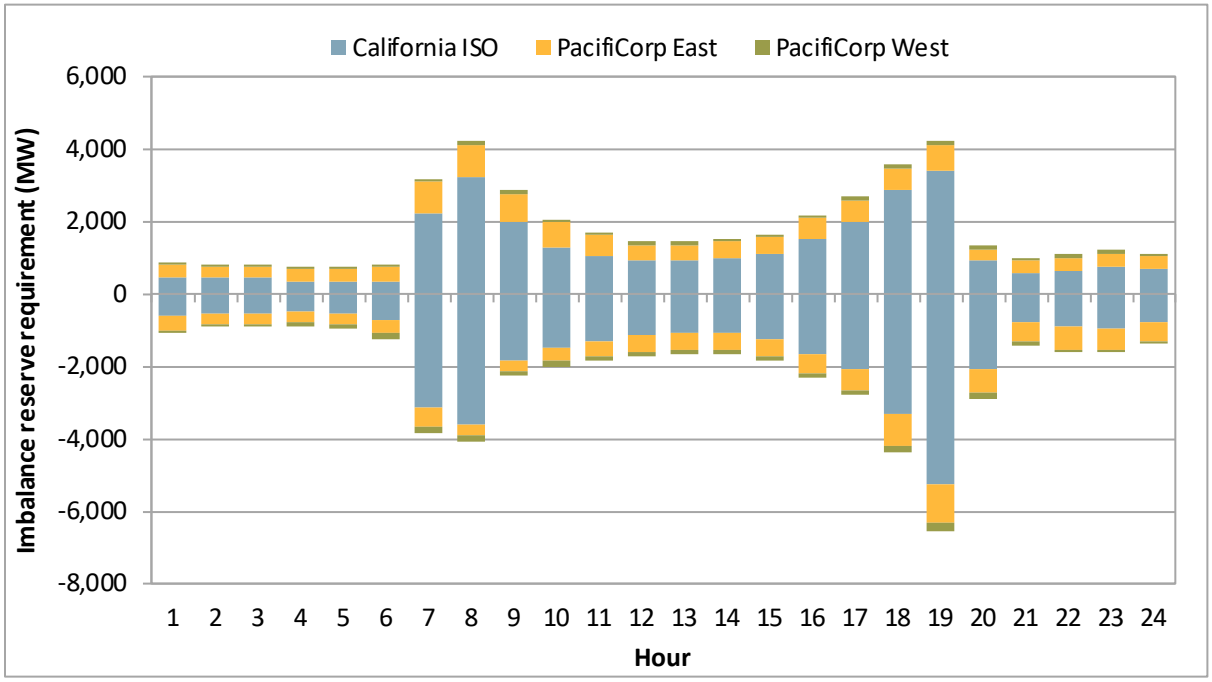


Figure 4 and Figure 5 summarize schedules for upward and downward imbalance reserve by fuel type. The black line shows the combined CAISO, PacifiCorp East, and PacifiCorp West imbalance reserve requirement.

- For upward imbalance reserves, gas resources made up around 43 percent of the schedules. Solar resources made up around 20 percent of upward imbalance reserve schedules. These are from solar resources that were decrementally dispatched below forecast to provide energy, but which can provide upward reserve capacity up to forecasts.
- Wind and solar resources combined made up around 81 percent of the downward imbalance reserve schedules.

Figure 4. Average upward imbalance reserve procurement by fuel type (May 2026)

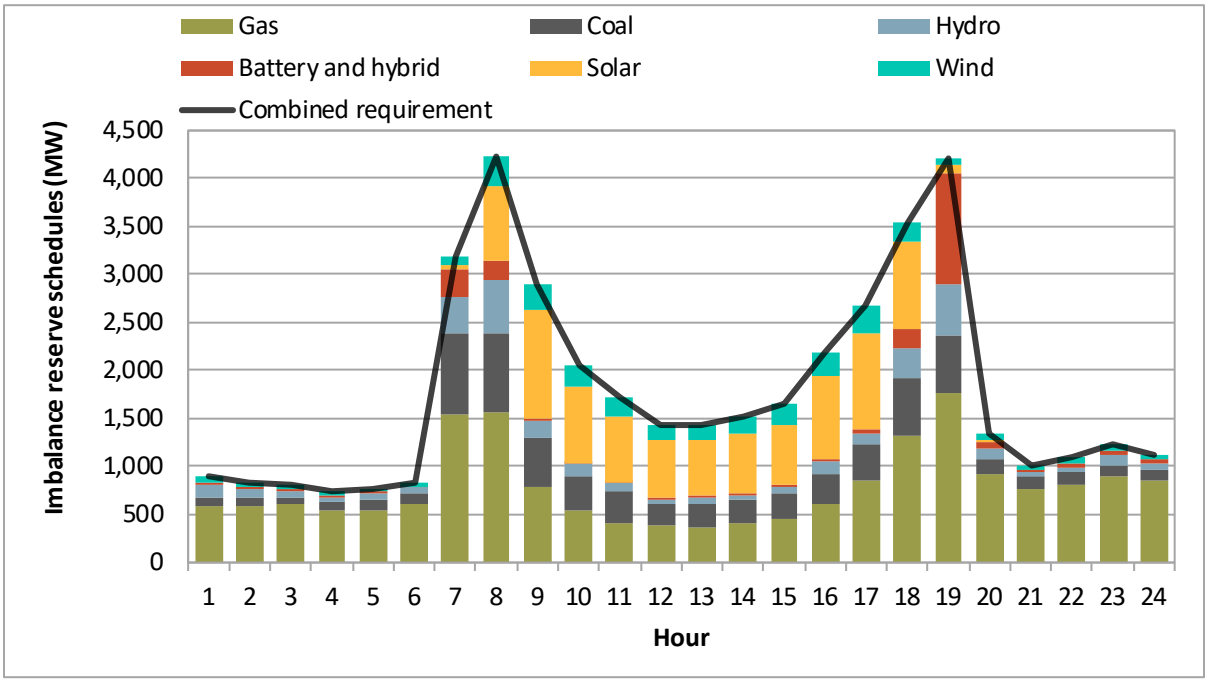


Figure 5. Average downward imbalance reserve procurement by fuel type (May 2026)

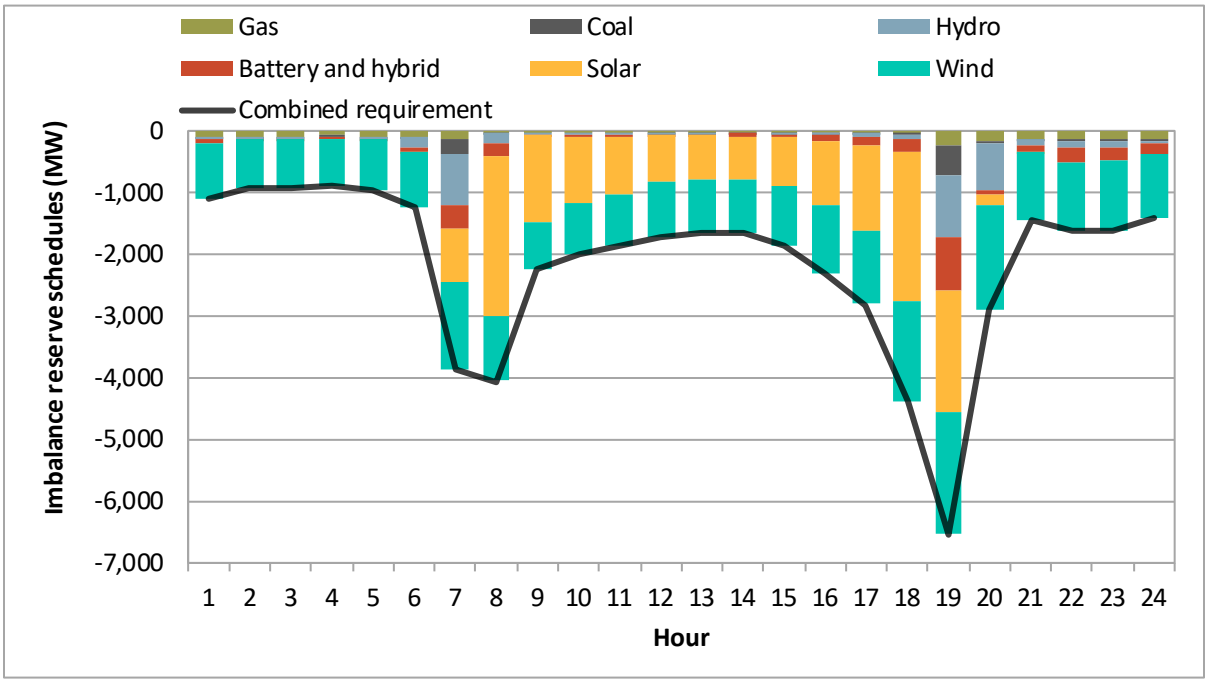
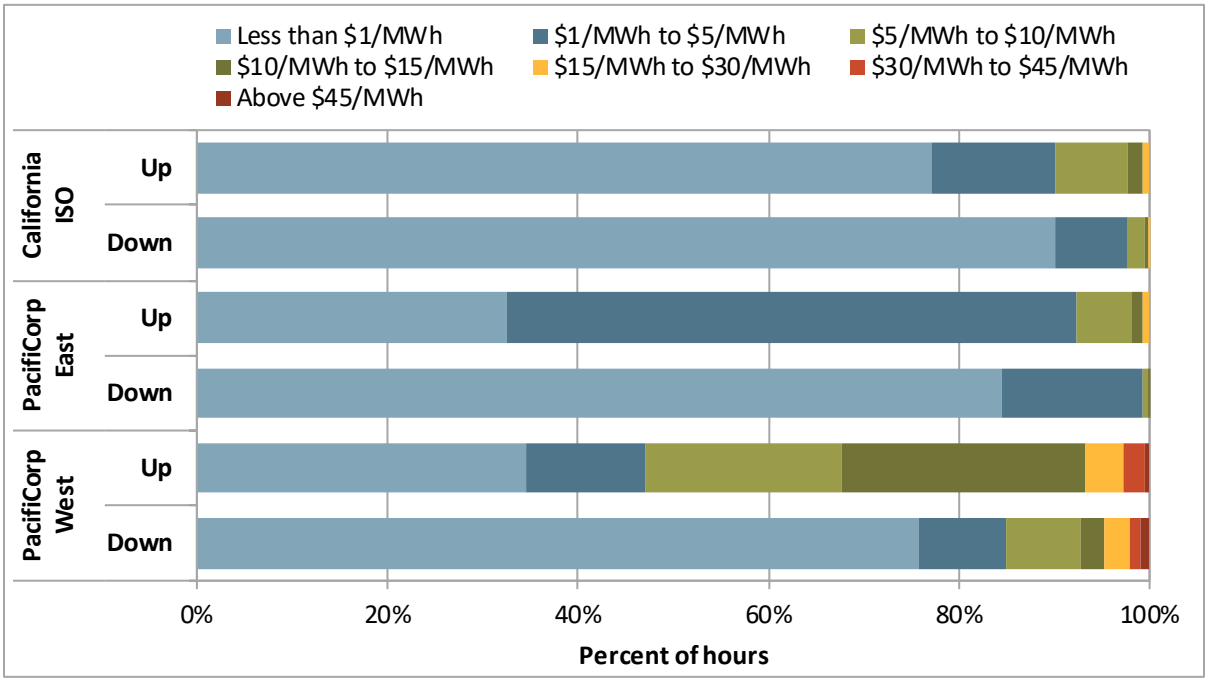


Figure 6 summarizes the frequency of imbalance reserve prices by price range.[2] Figure 7 shows total daily payments for imbalance reserve.[3]

- Prices for imbalance reserve have been low overall. For the CAISO and PacifiCorp East balancing areas, prices have been less than $5/MWh in more than 90 percent of hours.
- Imbalance reserve prices in PacifiCorp West were more frequently higher—above $5/MWh in more than 53 percent of hours.
- During May, payments for upward imbalance reserve were around $2.2 million while payments for downward imbalance reserve were around $1.6 million—or around $3.8 million combined.

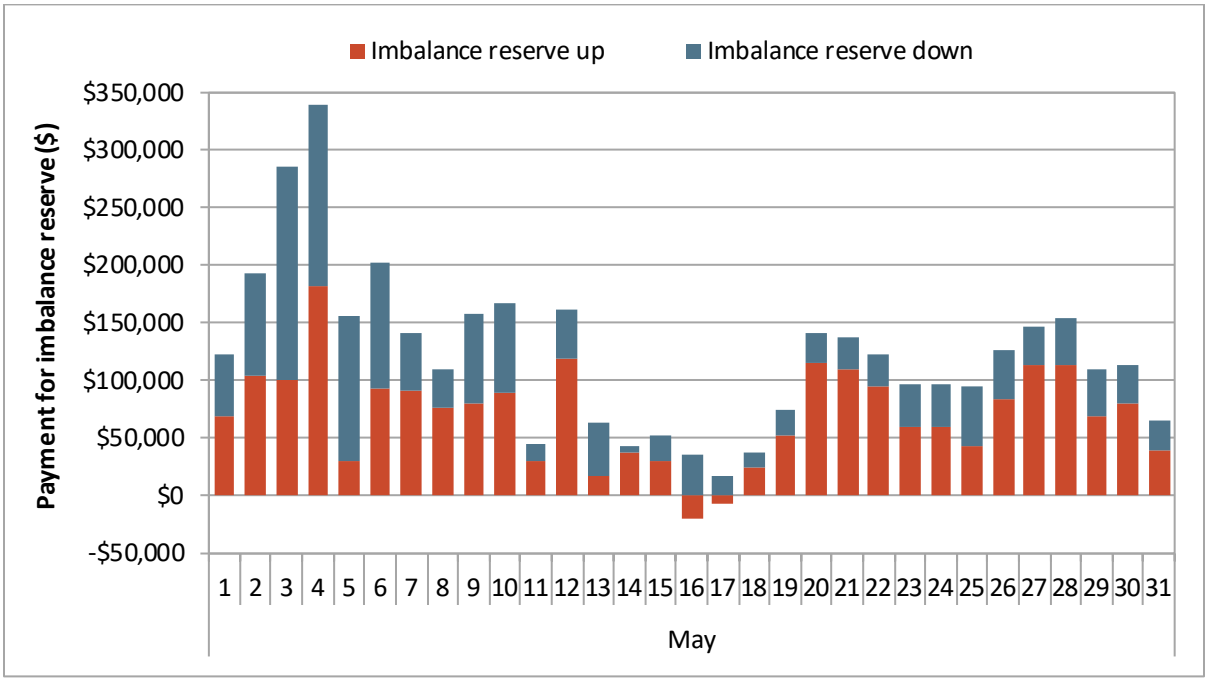
Figure 6. Frequency of imbalance reserve prices by price range (May 2026)



[2] This figure summarizes the shadow price on each balancing area's constraint for procuring imbalance reserve up or down, and does not consider prices that may exist at the nodal level that are the result of internal congestion.

[3] This information is based on settlement values available at the time of drafting. Settlement information is subject to updates that can occur within the settlements timeline.

Figure 7. Total daily payments for imbalance reserve by direction (May 2026)



Day-ahead resource sufficiency evaluation failures

Failures of the extended day-ahead market resource sufficiency evaluation were very infrequent for all three balancing areas across the month of May.

On May 4, PacifiCorp West failed the upward evaluation for eight hours and the downward evaluation for one hour. Each of these hours failed due to a shortage of imbalance reserves. There were no other failures for any balancing area during the month.

Residual unit commitment procurement and operator adjustments

Figure 8 shows average hourly residual unit commitment procurement by balancing area from May 2025 through May 2026. Prior to May 2026, all residual unit commitment procurement was for the CAISO balancing area, and the light gray bars show procurement from resource adequacy capacity, while the dark gray bars show procurement from non-resource adequacy capacity. Beginning in May 2026, values include both reliability capacity up (shown as positive) and reliability capacity down (shown as negative) across all balancing areas participating in the day-ahead market.

Figure 9 shows the average hourly residual unit commitment operator adjustments on each day of 2025 (red) and each day of 2026 through May (blue). Operators in each day-ahead market balancing area can adjust their area's residual unit commitment target load requirement to ensure there is sufficient capacity with real-time must-offer obligations to account for uncertainty that may materialize between the day-ahead and

real-time markets. The imbalance reserve product is intended to address much of this same uncertainty.

- Average hourly reliability capacity up procured in May 2026 was around 1,500 MW, up from around 900 MW in May 2025 and 1,100 MW average upward capacity procured over the 12 months prior to May 2026.
- Average hourly reliability capacity down procured in May 2026 was around 470 MW.
- The CAISO balancing area procured the large majority of reliability capacity in May, accounting for 93 percent of reliability capacity up and 98 percent of reliability capacity down.
- PacifiCorp East procured 6 percent of reliability capacity up and 2 percent of reliability capacity down. PacifiCorp West procured 1 percent of reliability capacity up and 1 percent of reliability capacity down.
- Since the implementation of the extended day-ahead market, no balancing area has applied any adjustments to their residual unit commitment load. During May 2025, the CAISO balancing area applied an adjustment on 14 days.

Figure 8. Average hourly residual unit commitment procurement by balancing area

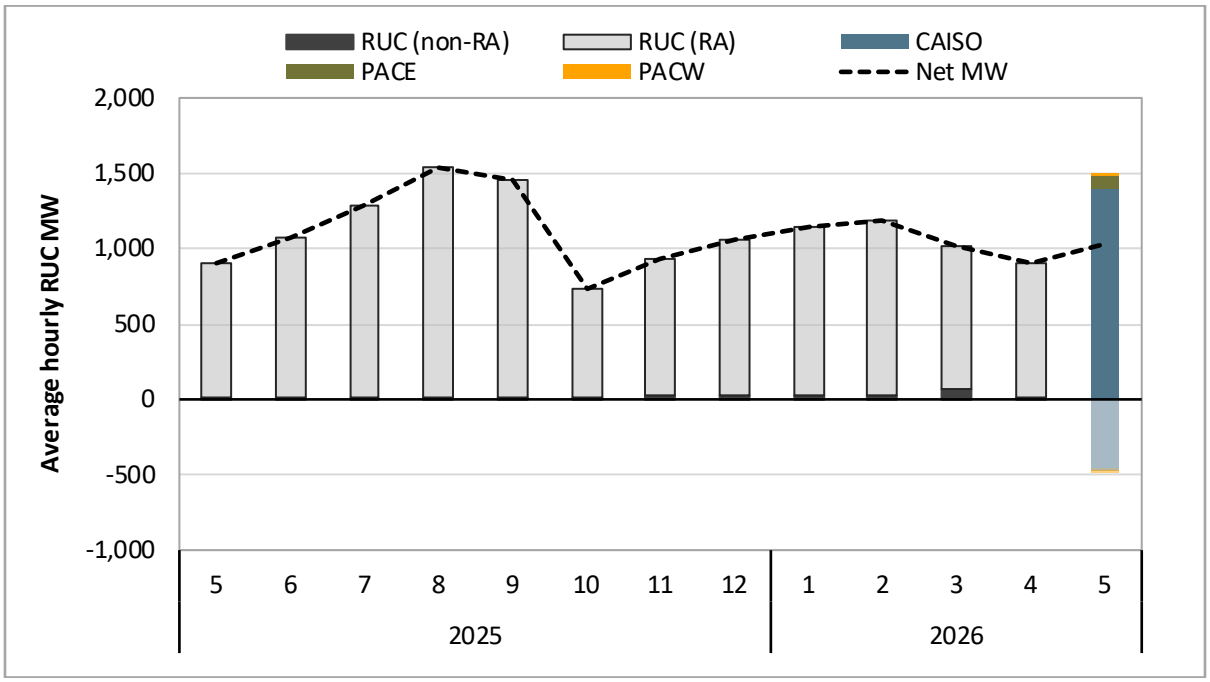
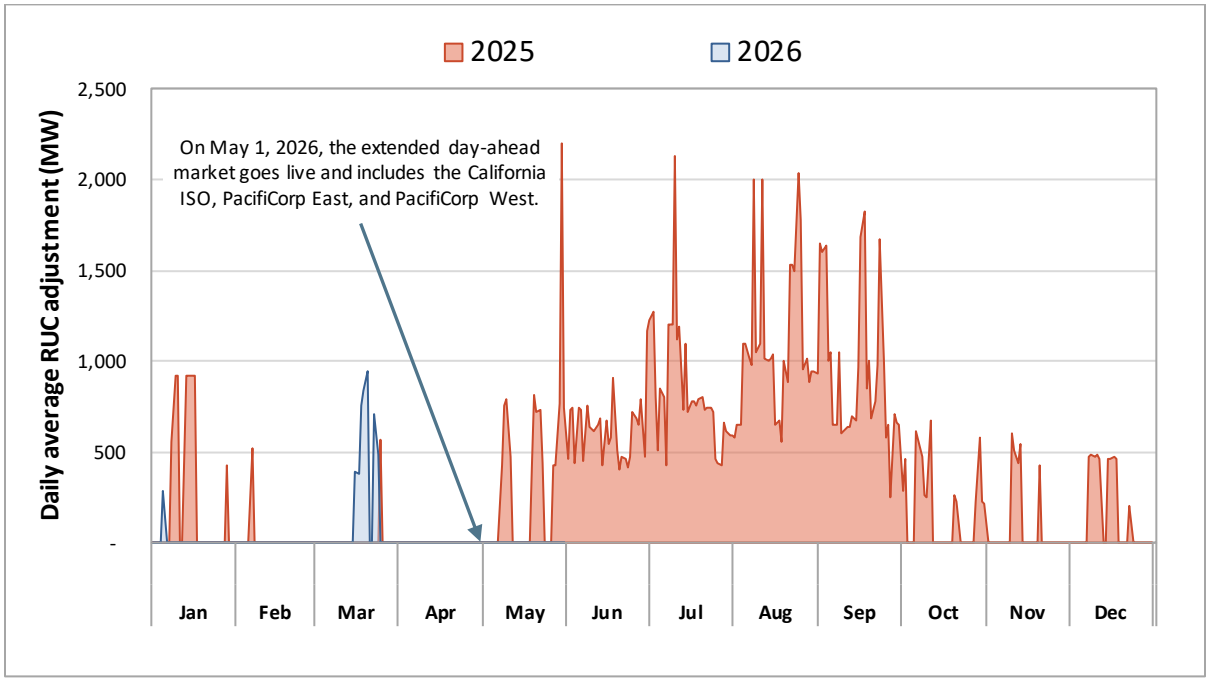


Figure 9. Residual unit commitment adjustments (Jan 2025 – May 2026)



Residual unit commitment costs

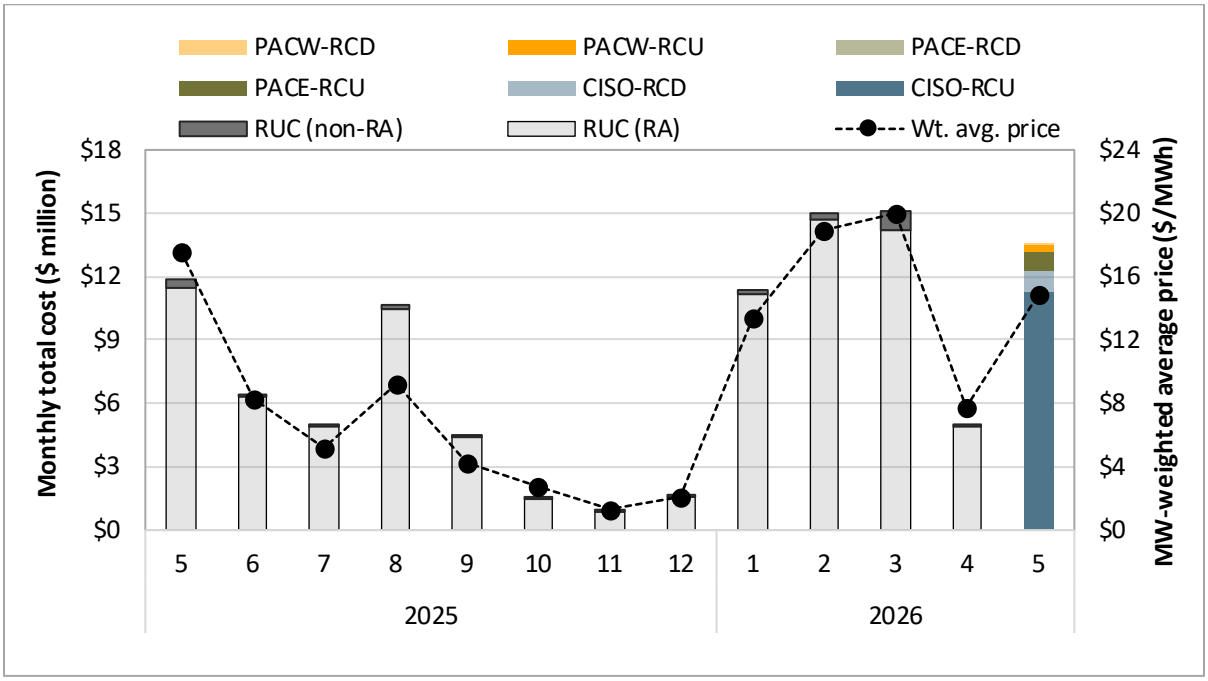
Figure 10 shows monthly total residual unit commitment costs and weighted average residual unit commitment prices from May 2025 through May 2026. Costs reflect each resource's residual unit commitment award multiplied by each resource's locational marginal price. Prior to May 2026, all resource adequacy capacity in the CAISO balancing area had to submit $0/MWh bids into the residual unit commitment process, and this capacity would not receive payments for any awards they received. The light gray bars prior to May 2026 show payments that would have been made to resource adequacy capacity had that capacity received the locational marginal price for its awards. The dark gray bars prior to May 2026 show payments made to non-resource adequacy capacity.

Beginning in May 2026, resource adequacy capacity can bid above $0/MWh, but the payments made to resource adequacy capacity may be credited back to load serving entities upon mutual agreement between the resource and load serving entity. DMM is in the process of verifying its data on which resource adequacy capacity has entered into this agreement, so May 2026 shows costs by balancing area, without differentiating the costs that may be redirected from generators to load serving entities.

- Total residual unit commitment costs in May 2026 were around $13.5 million, only 14 percent above the $11.8 million from May 2025 despite the addition of two balancing areas.

- In the year prior to May 2026, total residual unit commitment costs averaged about $7.4 million per month, with 98 percent associated with resource adequacy capacity.
- The majority of May 2026 costs were for CAISO balancing area reliability capacity up payments (84 percent), followed by CAISO reliability capacity down (7 percent), PacifiCorp East reliability capacity up (7 percent), and PacifiCorp West reliability capacity up (2 percent).
- Despite resource adequacy resources being able to bid above $0/MWh in May 2026, weighted average residual unit commitment prices were lower in May 2026 ($15/MWh) than in May 2025 ($17.50/MWh)

Figure 10. Monthly residual unit commitment costs and weighted average prices

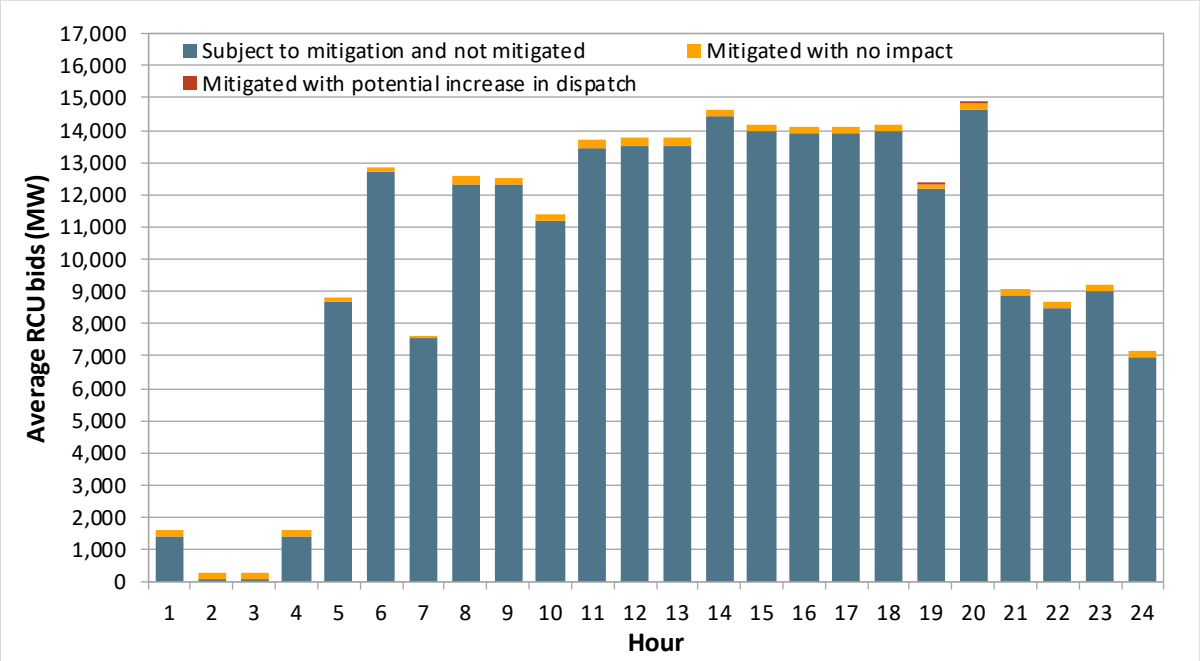


Residual unit commitment local market power mitigation

Figure 11 shows the average hourly reliability capacity up bids in May 2026 that were subject to local market power mitigation but were not mitigated (blue bars), bids that were actually mitigated but the mitigation did not result in any increase in awards (yellow bars), and mitigated bids that potentially resulted in increased awards (red bars). Reliability capacity down bids are not subject to local market power mitigation.

- About 90 percent of the bids subject to mitigation were due to every resource in PacifiCorp East being subject to potential mitigation when EDAM transfer congestion was into PacifiCorp East from the CAISO balancing area in the residual unit commitment local market power mitigation run.
- Only 200 MW per hour of bids subject to residual unit commitment mitigation ended up being mitigated in May.
- The average hourly potential increase in residual unit commitment awards from local market power mitigation was less than 1 MW.

Figure 11. Average reliability capacity up bids considered for mitigation (May 2026)

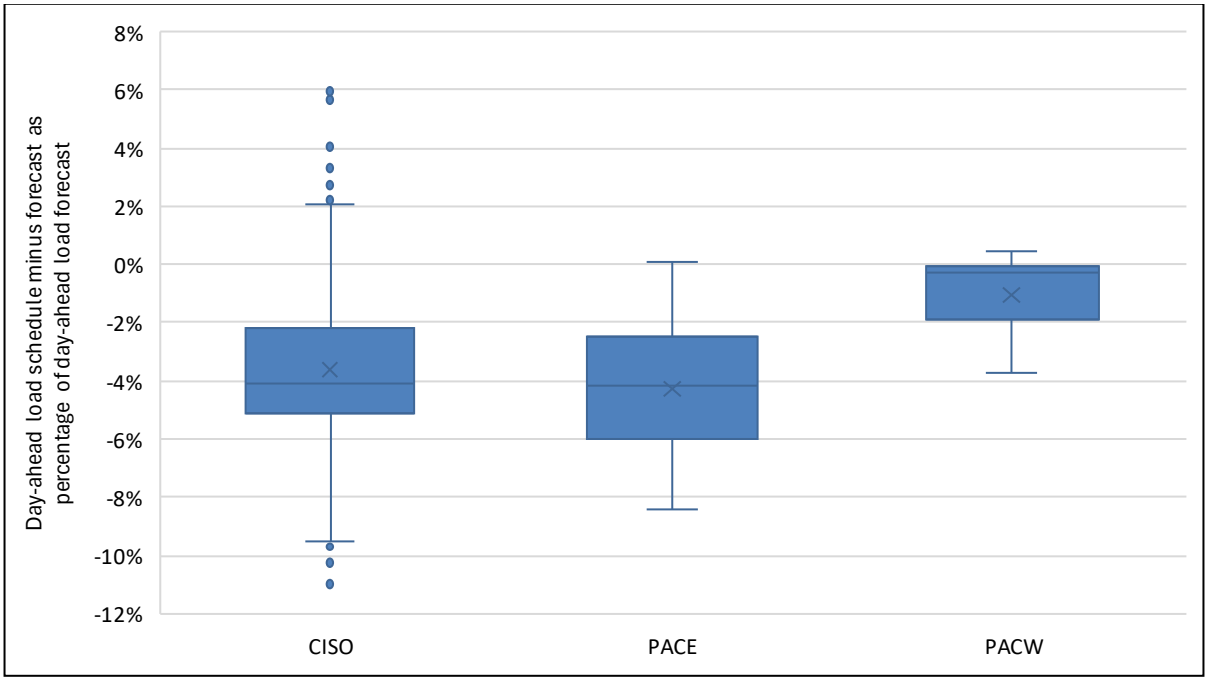


Load scheduling

Figure 12 shows each balancing area's May 2026 distribution of the amount by which load scheduled less than the day-ahead load forecast, as a percentage of that day-ahead load forecast. The box plots show each balancing area's minimum value, first quartile, median, third quartile, and maximum value, along with the interquartile range and any outliers. Virtual demand can decrease incentives for load serving entities to under-schedule their day-ahead market load forecast. This is because virtual demand can converge day-ahead prices with expected real-time prices even if load serving entities schedule less than their day-ahead forecast. There is no virtual bidding at nodes in PacifiCorp East or PacifiCorp West.

- Despite neither PacifiCorp East nor PacifiCorp West having virtual bidding at their nodes, load under-scheduling was not more prevalent in those balancing areas than in the CAISO balancing area.

Figure 12. Distribution of day-ahead load under-scheduling as a percentage of day-ahead load forecast (May 2026)



Greenhouse gas attributions

Figure 13 shows the average hourly quantity of schedules outside of California attributed as serving California load for greenhouse gas accounting purposes. Figure 13 also shows weighted average greenhouse gas constraint prices across all markets in May 2026. Figure 14 shows the cleared greenhouse gas quantity in the day-ahead market by fuel type in May 2026.

- In all markets, greenhouse gas attribution and prices were lower during the mid-day solar hours than during morning and evening non-solar hours.
- Greenhouse gas prices were significantly higher in the day-ahead market than in the real-time markets.
- A majority of the greenhouse gas quantity attributed as serving California load in the day-ahead market was from coal resources in PacifiCorp East.

Figure 13. Average hourly greenhouse gas price and cleared quantity (May 2026)

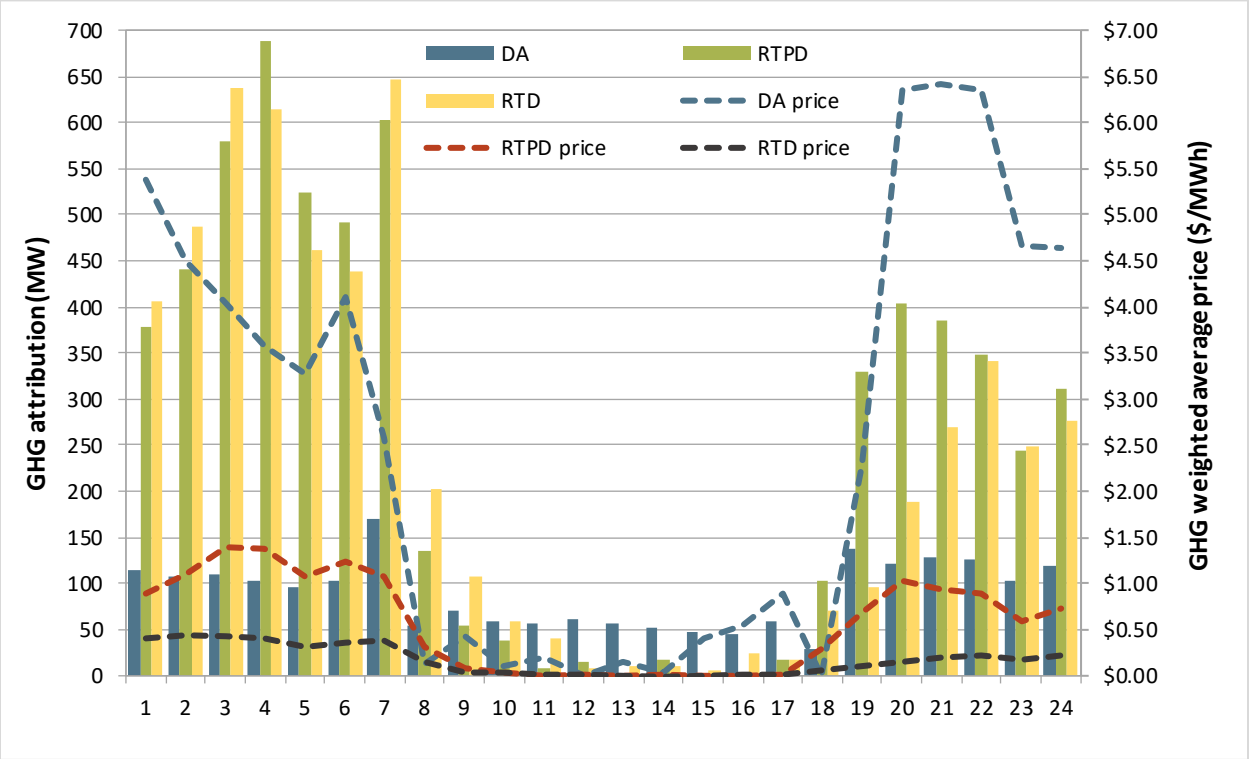


Figure 14. Day-ahead market average hourly greenhouse gas cleared quantity by fuel type (May 2026)