



California ISO

# Market Performance and Planning Forum

Q1

Jan 27, 2026

CAISO PUBLIC

# Housekeeping



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The meeting is structured to stimulate dialogue and engage different perspectives.



Please engage in a respectful and professional manner.



Please keep comments brief and avoid repeating points already made so we can manage time and ensure everyone has an opportunity to participate.



You can access Closed Captioning and the Transparency Viewer using the controls located at the bottom of the Webex screen.

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If you are connected to audio through your computer or used the 'call me' option, select the raise hand icon located on the bottom of your screen.



If you are connected on the phone line only and not the Webex dial \*3 to be added to the raise hand queue.



Please remember to state your name and affiliation before making your comment.



You may also send question via chat to all panelists.



If you need technical assistance during the meeting, please send a chat to the event producer at Intellor Events.

# Paper & Presentation Material Posting Process



## **Working Groups:**

Materials may be posted less than two days prior to the meetings due to the short turn-around of the discussions.



## **Proposal Development:**

Papers are posted one week prior to the stakeholder meeting. Presentations are posted two days prior for stakeholder meetings.



# CAISO Policy Initiative Stakeholder Process



[Learn more in the Stakeholder Process Guide.](#)

# Objective: Enable dialogue on implementation planning and market performance issues

- Review key market performance topics
- Share updates to 2026-2027 release plans, resulting from stakeholders inputs





## Market Performance and Planning Forum

Agenda – Jan 27, 2026

9 a.m. – 2 p.m. Pacific Time (PST)

Time:	Topic:	Slide	Presenter:
09:00 – 09:05	Introduction, Agenda	1-6	Brenda Marquez, Stakeholder Affairs
09:05 – 12:00	Market quality and performance <ul style="list-style-type: none"><li>Review key market outcomes, current market enhancements and market issues tracked by the ISO.</li></ul>	8 – 102	Market Performance and Advanced Analytics
	<ul style="list-style-type: none"><li>Solar Rayborhood</li></ul>		Short Term Forecasting
12:00-01:00	Lunch Break	103	All
01:00-01:30	Policy Update	103-115	Market Policy Development
01:30-01:45	Release Update	116-120	Release Management
01:45-02:00	Next Steps and Energy Blog Matters	117	Brenda Marquez, Stakeholder Affairs



# Market Performance Update

# Agenda for Market Performance Update

1. Executive summary
2. Energy storage performance
3. Load conformance
4. Bid Cost Recovery
5. Congestion and congestion revenue rights
6. Prices and market costs
7. Resource sufficiency test and assistance program
8. Market disruptions
9. RTPD Enhancement to consider terminal condition
10. Market issues
11. Renewable persistence enhancement
12. Appendix. General metrics

# Executive Summary

## Market performance in post-summer conditions has been relatively quiet

- The increasing penetration of storage resources in the system is leading to evolving patterns
  - Storage resources have saturated the regulation market
  - The charging of storage resources in midday hours has led to load peaking earlier in the day
  - Storage resources are dispatched to meet both morning and evening peaks
- Storage resources accrued 2.8 percent of all the bid cost recovery, while gas resources accrued 96.7 percent for 2025 in the day-ahead market

# Market and process enhancements improve market efficiency

- Improvements to market processes have reduced CAISO's use of load conformance, lowering costs
- The ISO implemented on November 13 an enhancement to mitigate real-time market disruptions. The number of disruption observed after the enhancement has been minimal
- The ISO is pursuing an enhancement to commit long start units more efficiently
- The ISO is pursuing an enhancement for persistency forecasting of solar resources



# Transparency efforts help the market stay informed

- The MPPF is reporting on five market issues
  1. Market mitigation software incorrectly designated certain transmission constraints as non-competitive, leading to over mitigation in five-minute market.
  2. For a single trade day, a day ahead ISO nomogram was associated with the incorrect balancing authority, affecting three hours when the constraint was binding but the marginal congestion component was incorrect for SP-TIE transactions.
  3. New proposed BPM changes associated with off-grid charging indicators raise awareness of bidding obligations for co-located energy storage resources claimed for flexible resource adequacy.
  4. Certain instances of incorrect Default Energy Bids being used which did not affect market prices.
  5. Compromised telemetry on an energy storage resource affected the real-time demand forecast for a BAA, highlighting the critical nature of accurate data quality on forecast performance.

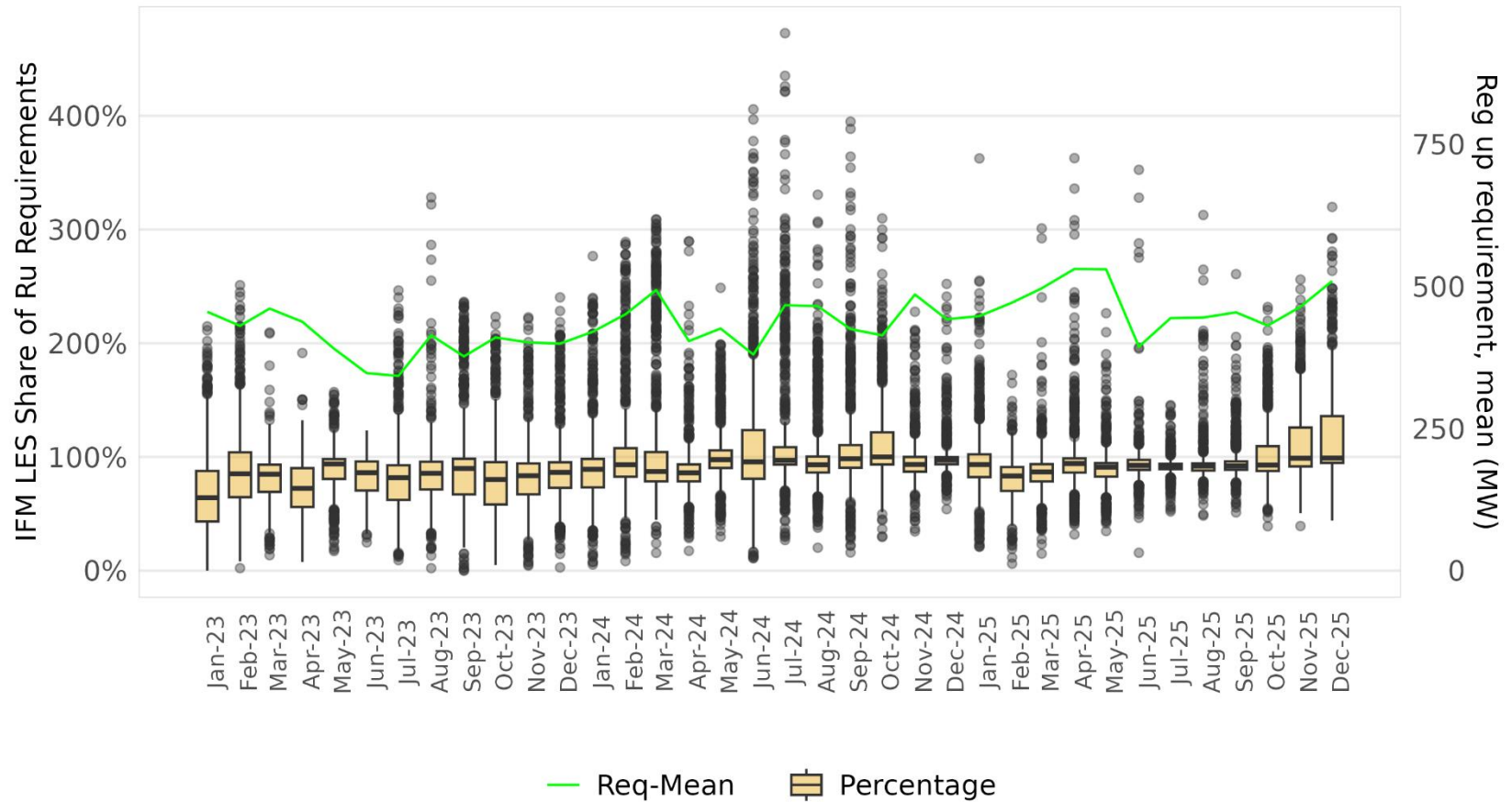
# Energy Storage Performance

## Market Performance and Advanced Analytics

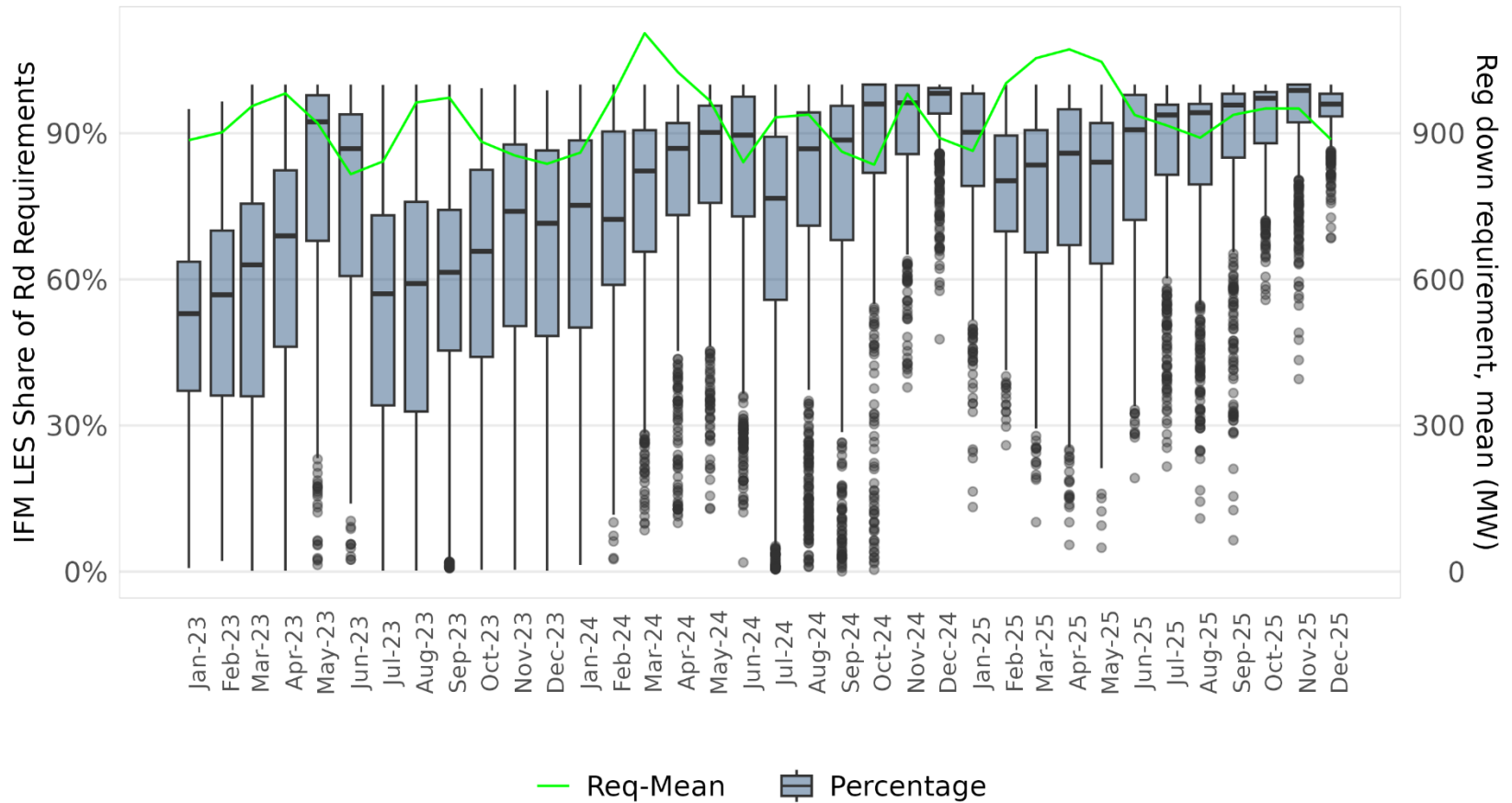
# Storage resource performance -Summary

- Storage resources have saturated the regulation market
- The charging of storage resources in midday hours has led load to peaks earlier in the day
- Storage resources are dispatched to meet both morning and evening peaks

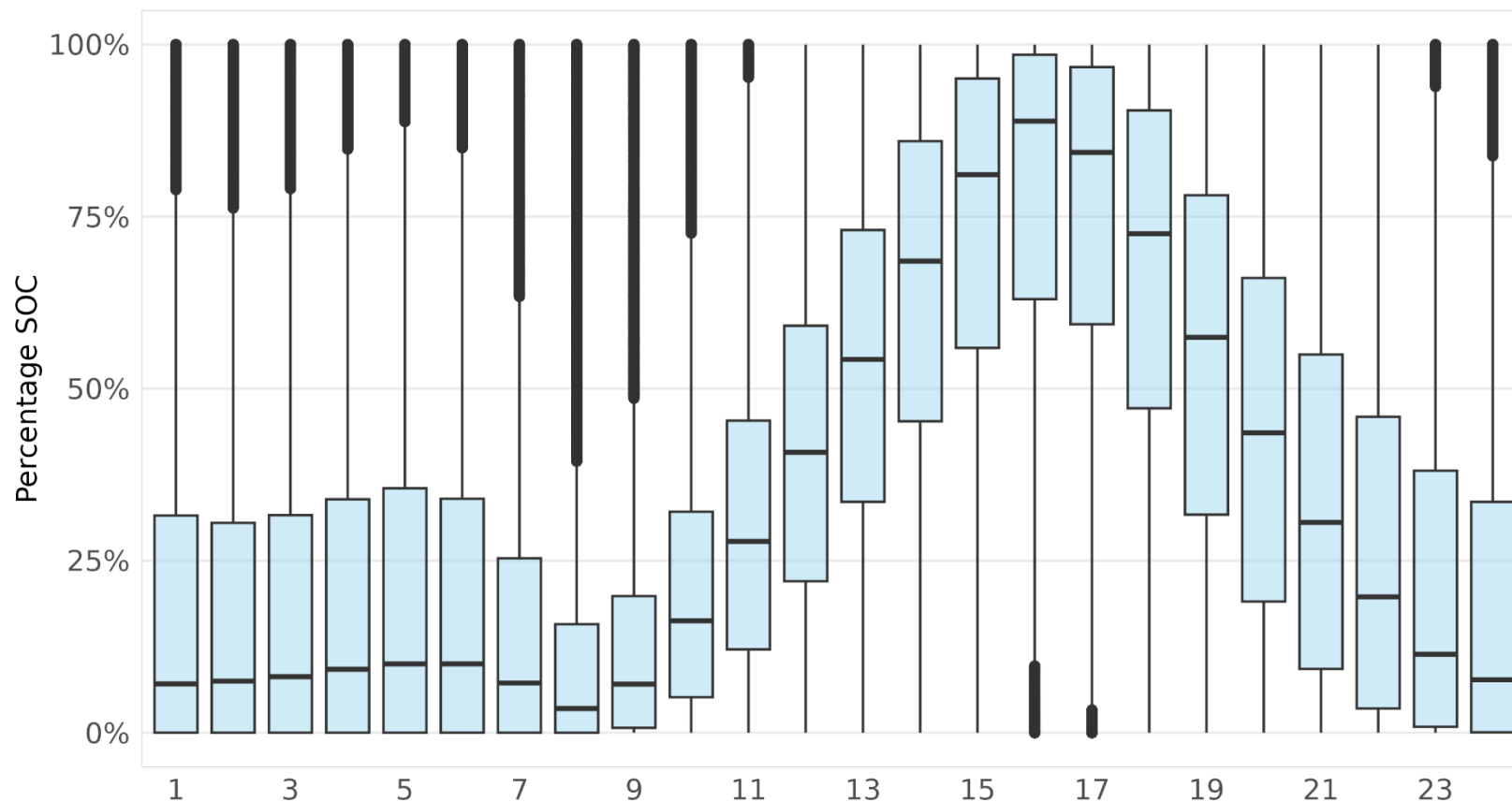
The market for upward regulation continues to be saturated by storage resources, which account for over 100 percent of the requirements



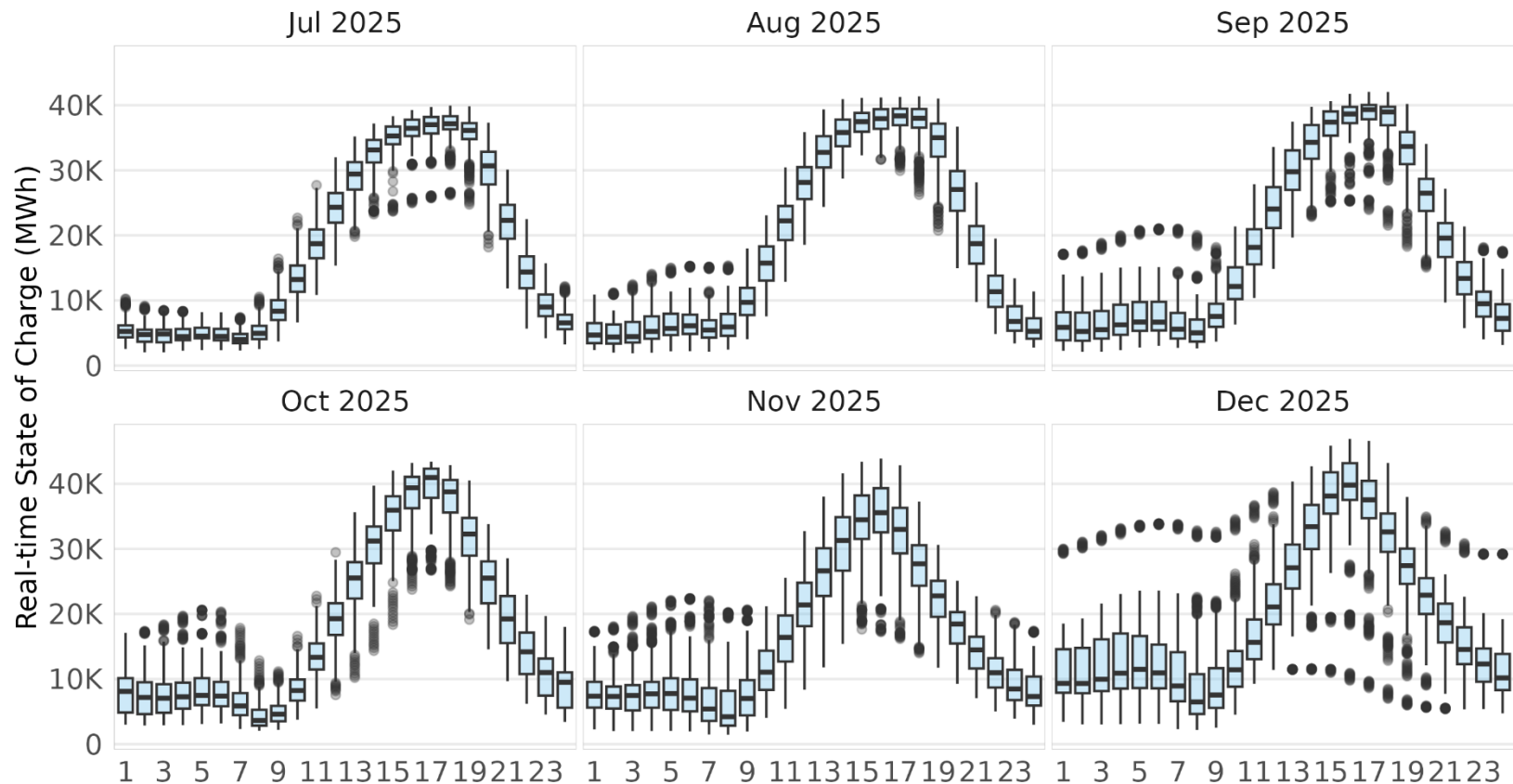
# Procurement of regulation down continues to be dominated by storage resources



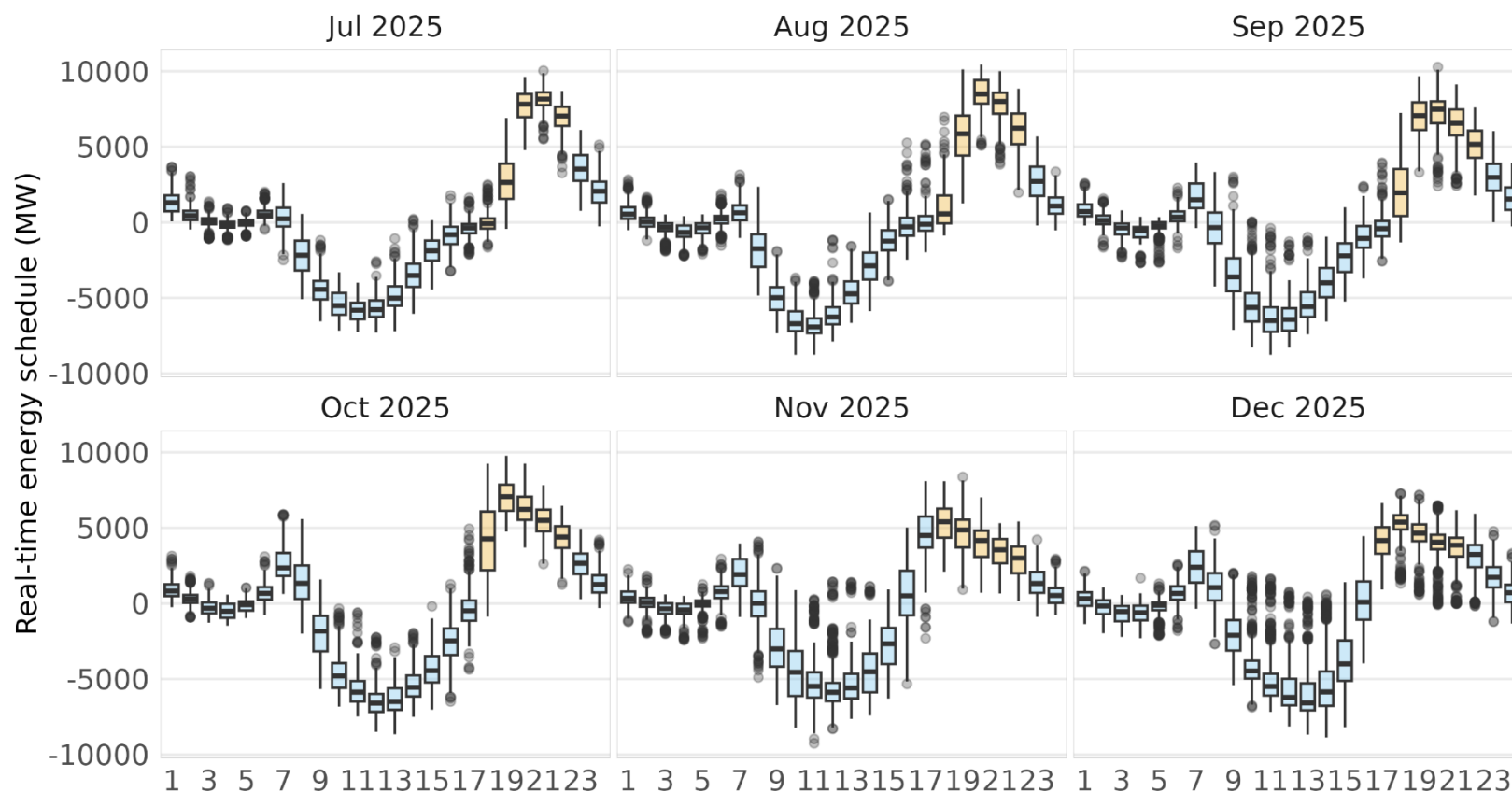
# Storage resources frequently have state of charge (SOC) below their full capacity in Q4 2025



# Real-Time State of charge for storage resources was in line with the day-ahead state of charge

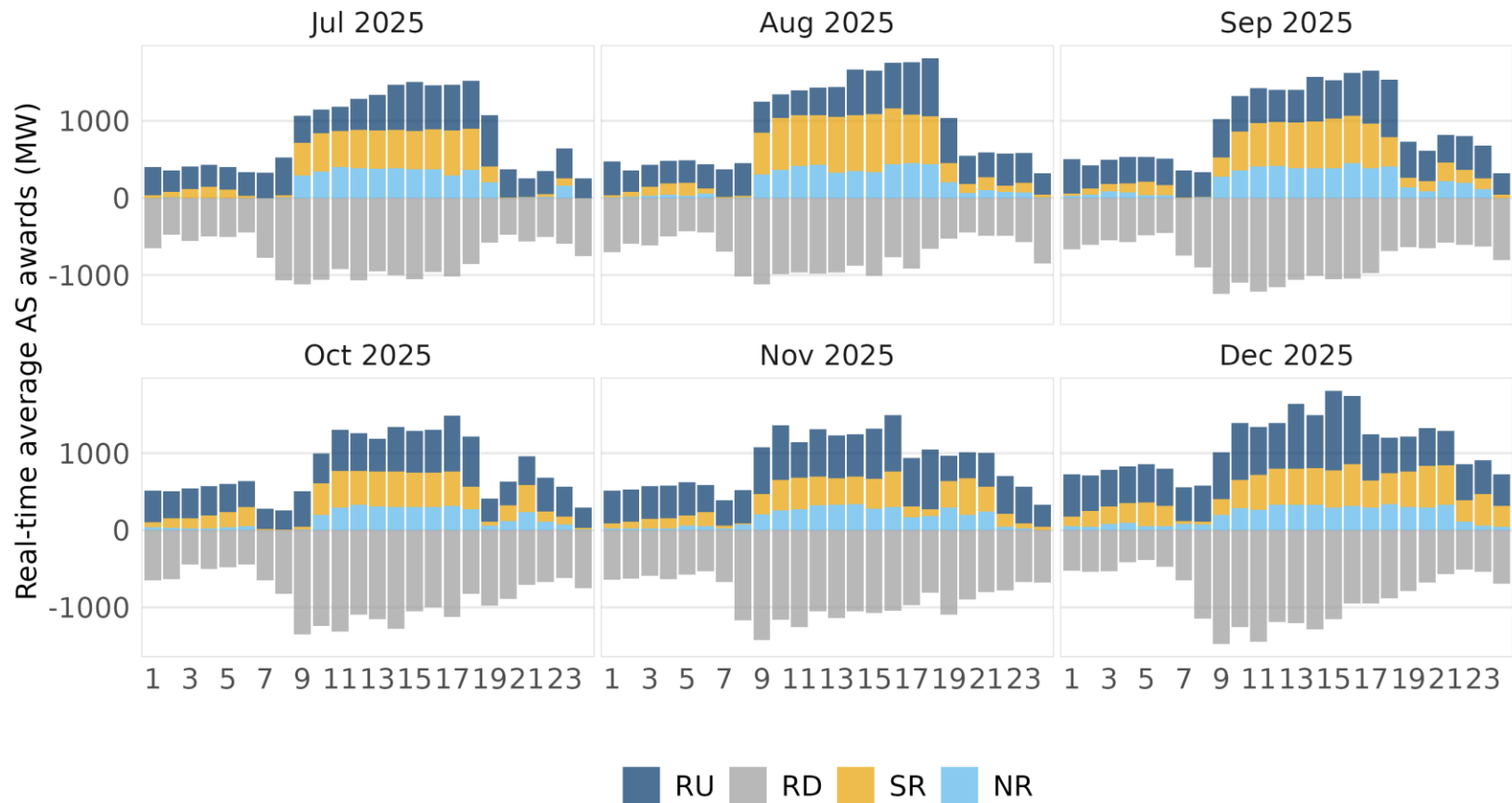


# Storage resources were consistently charging during solar hours and discharging during net load peaks in the real-time

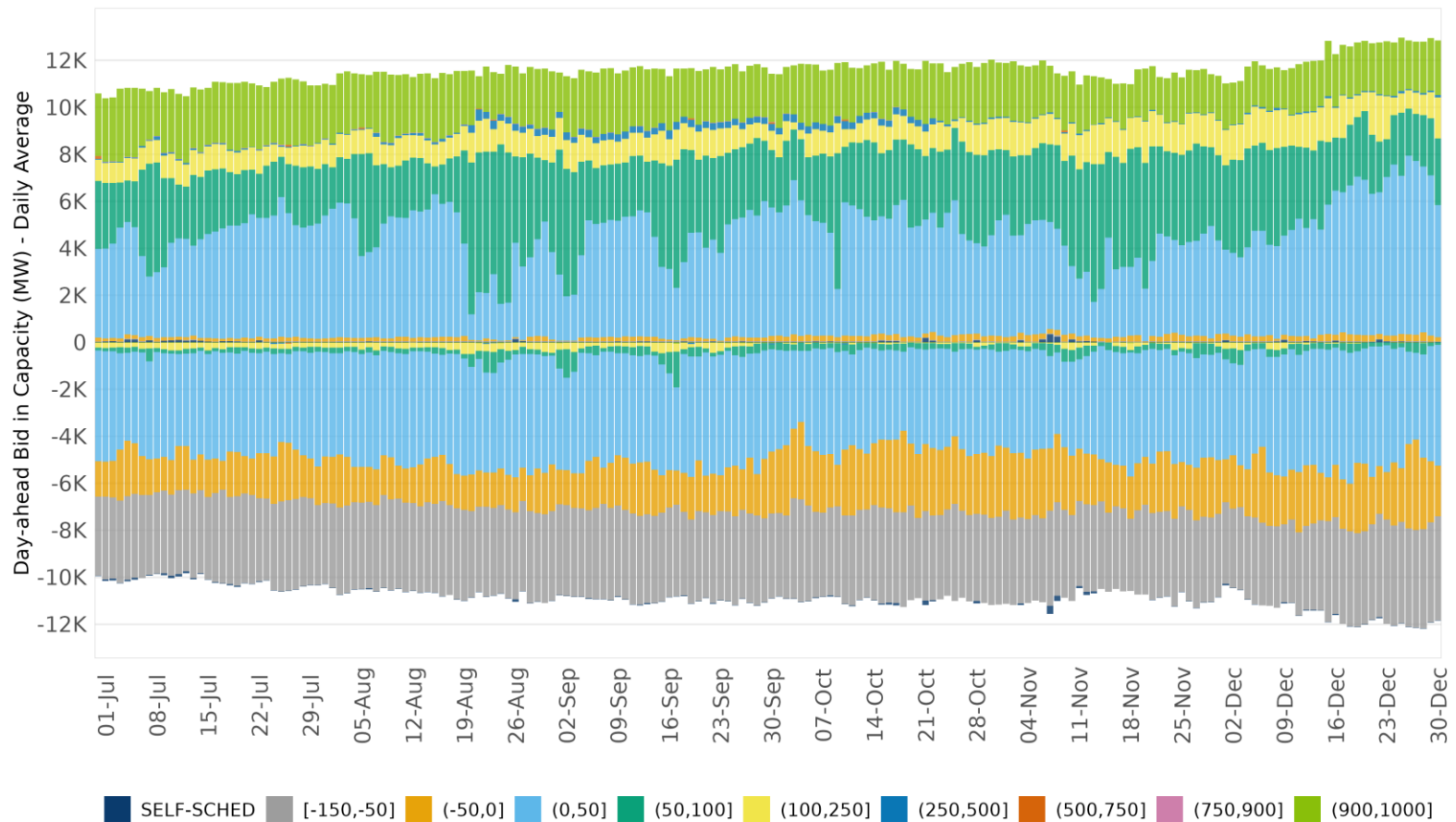




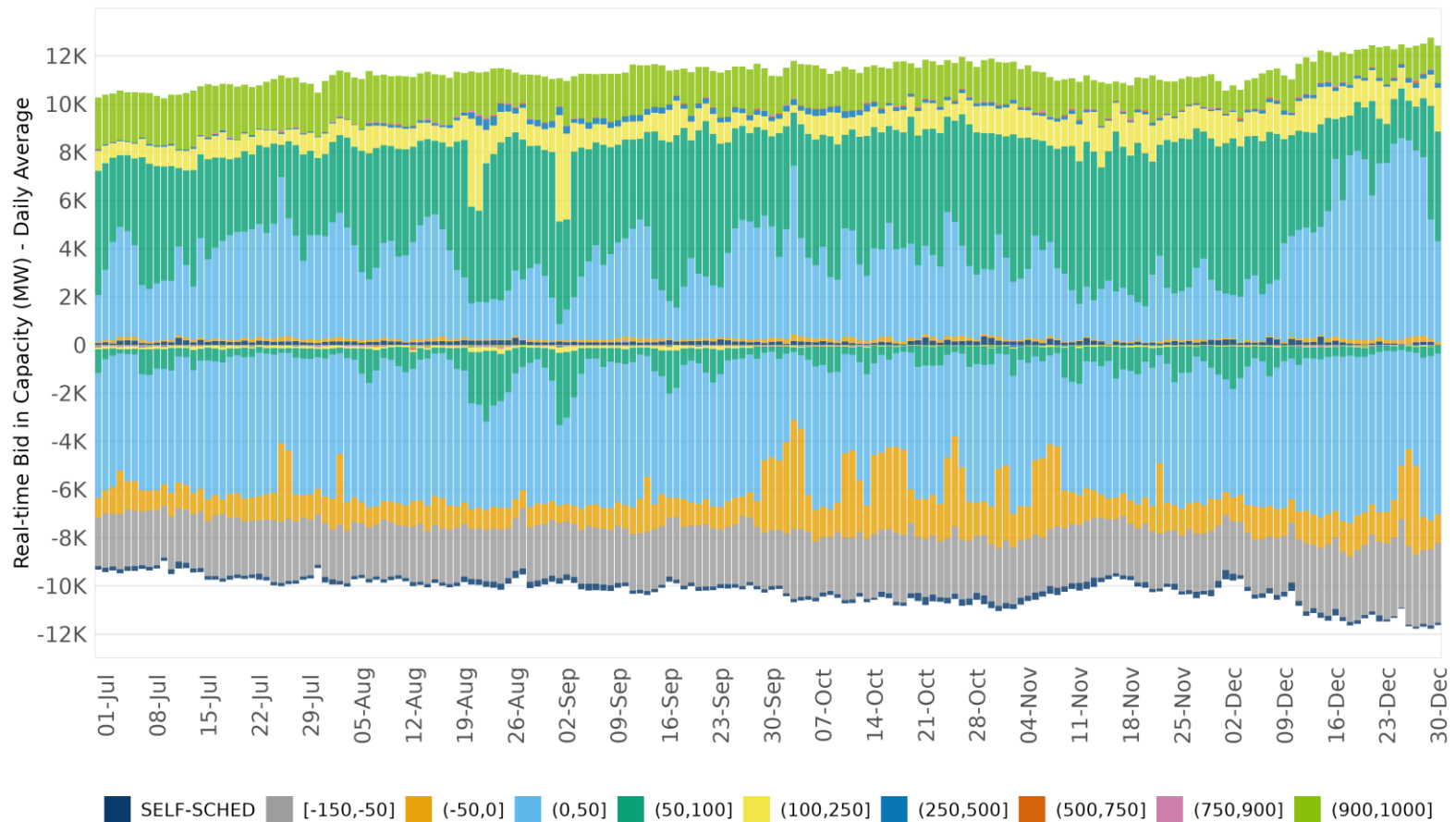
# Storage resources mostly supply regulation and have increased the provision of spinning reserves in the real-time in recent months



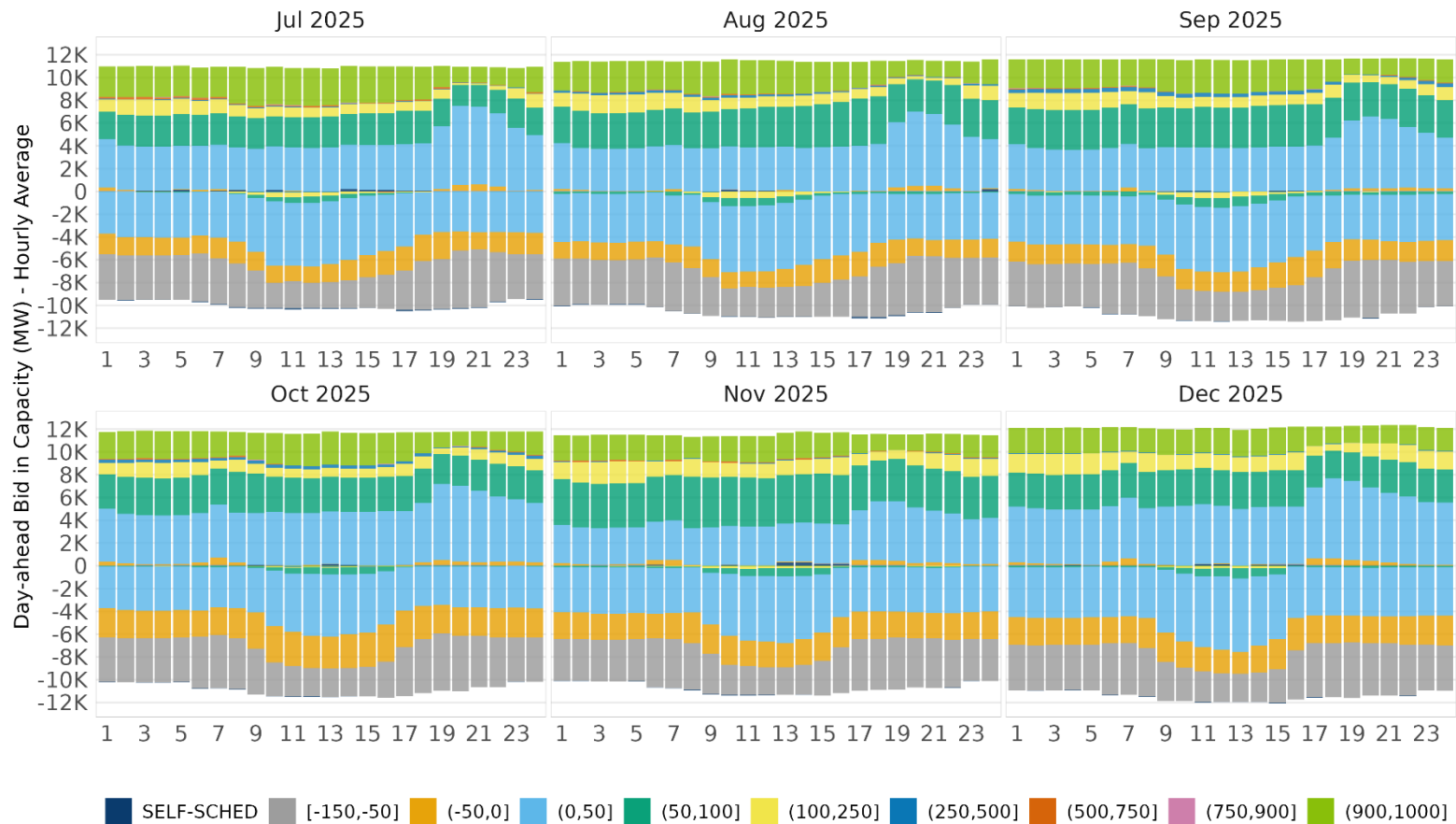
# Battery bid in capacity has increased steadily in the second half of 2025 in the day-ahead



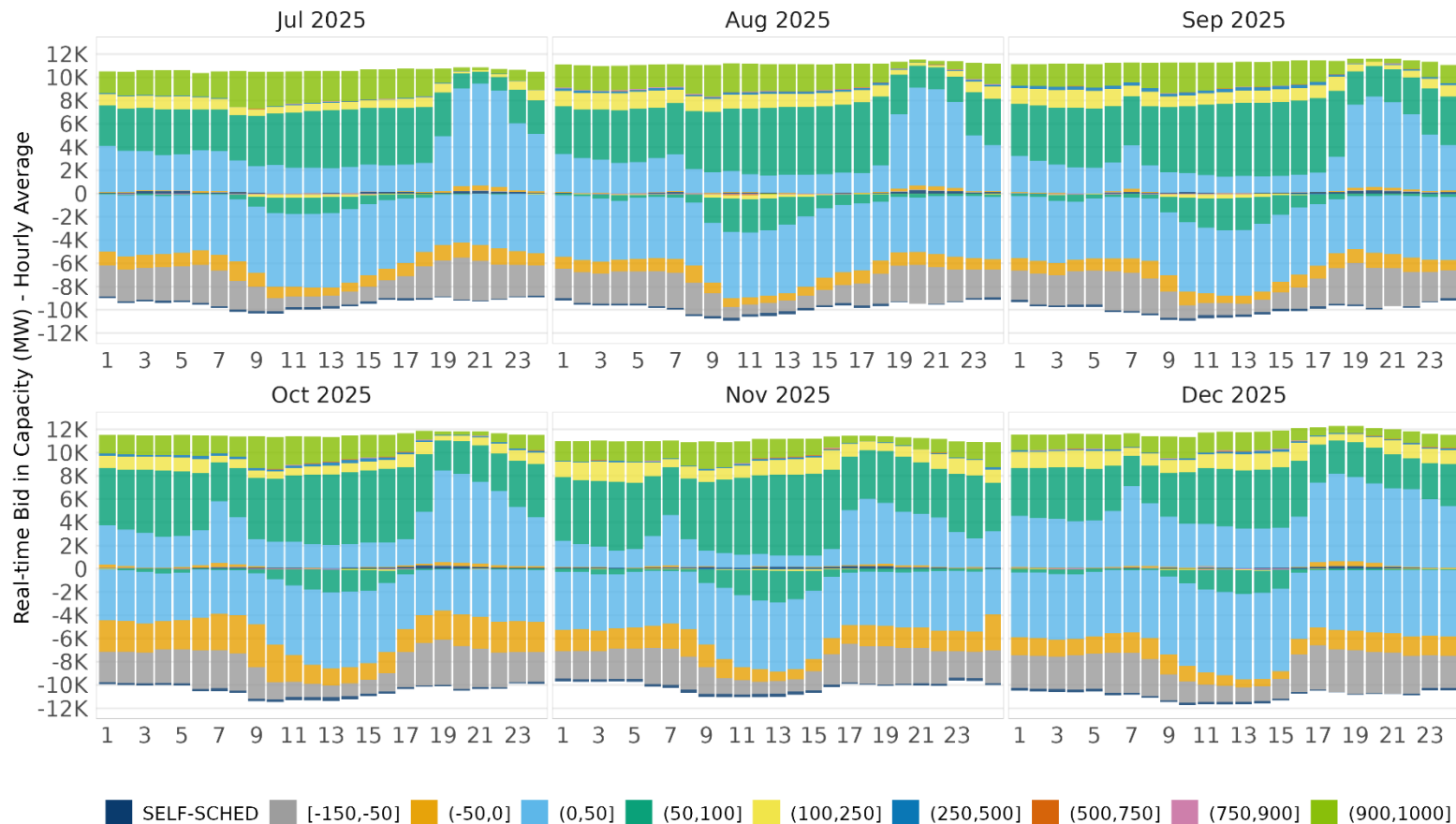
# Battery bid in capacity shows steady increase in second half of 2025 – Real time



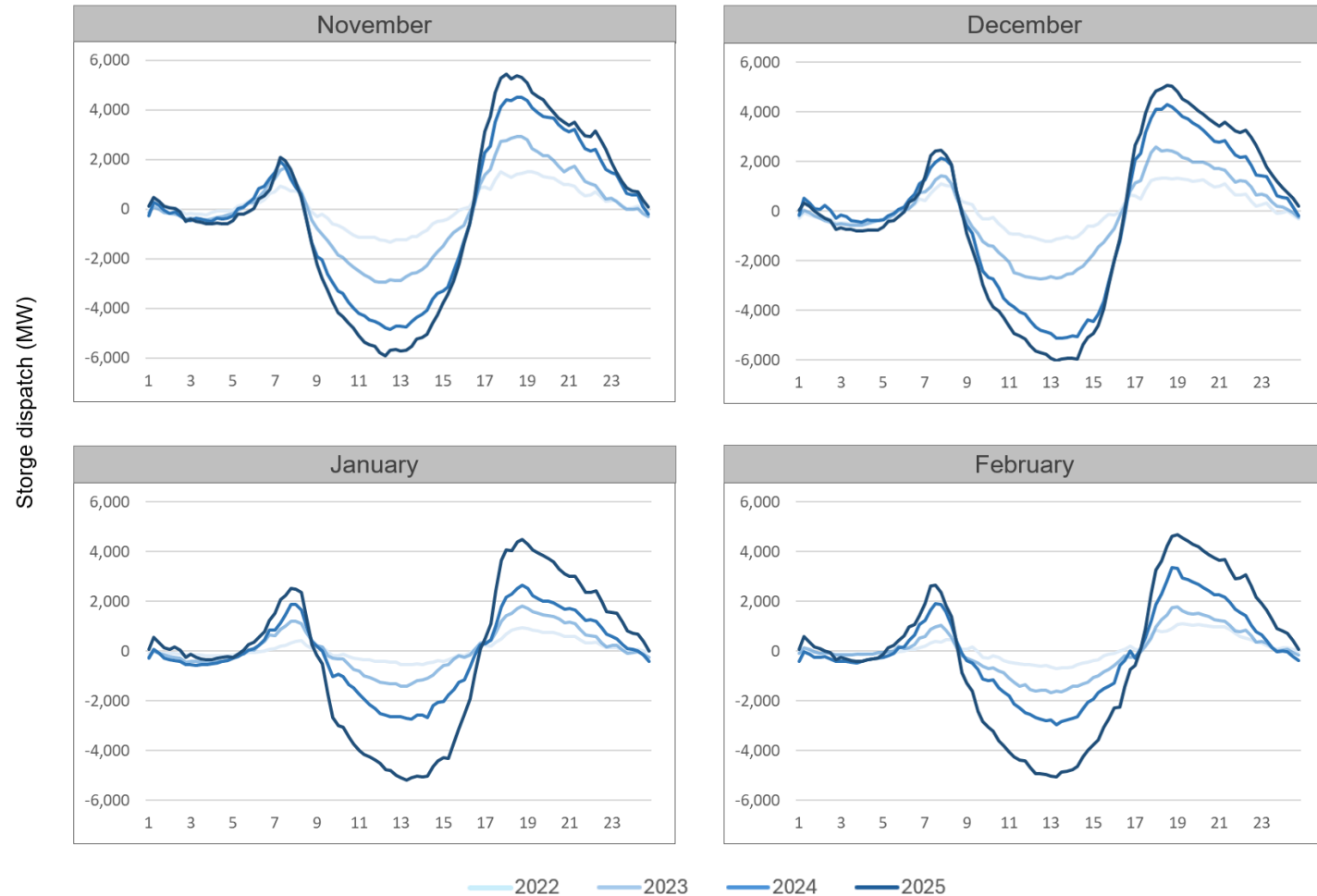
Batteries generally bid to charge during solar hours and discharge during the afternoon peak hours in the day-ahead.



# Real-time bids broadly align with the day-ahead bid set, while showing stronger positioning.

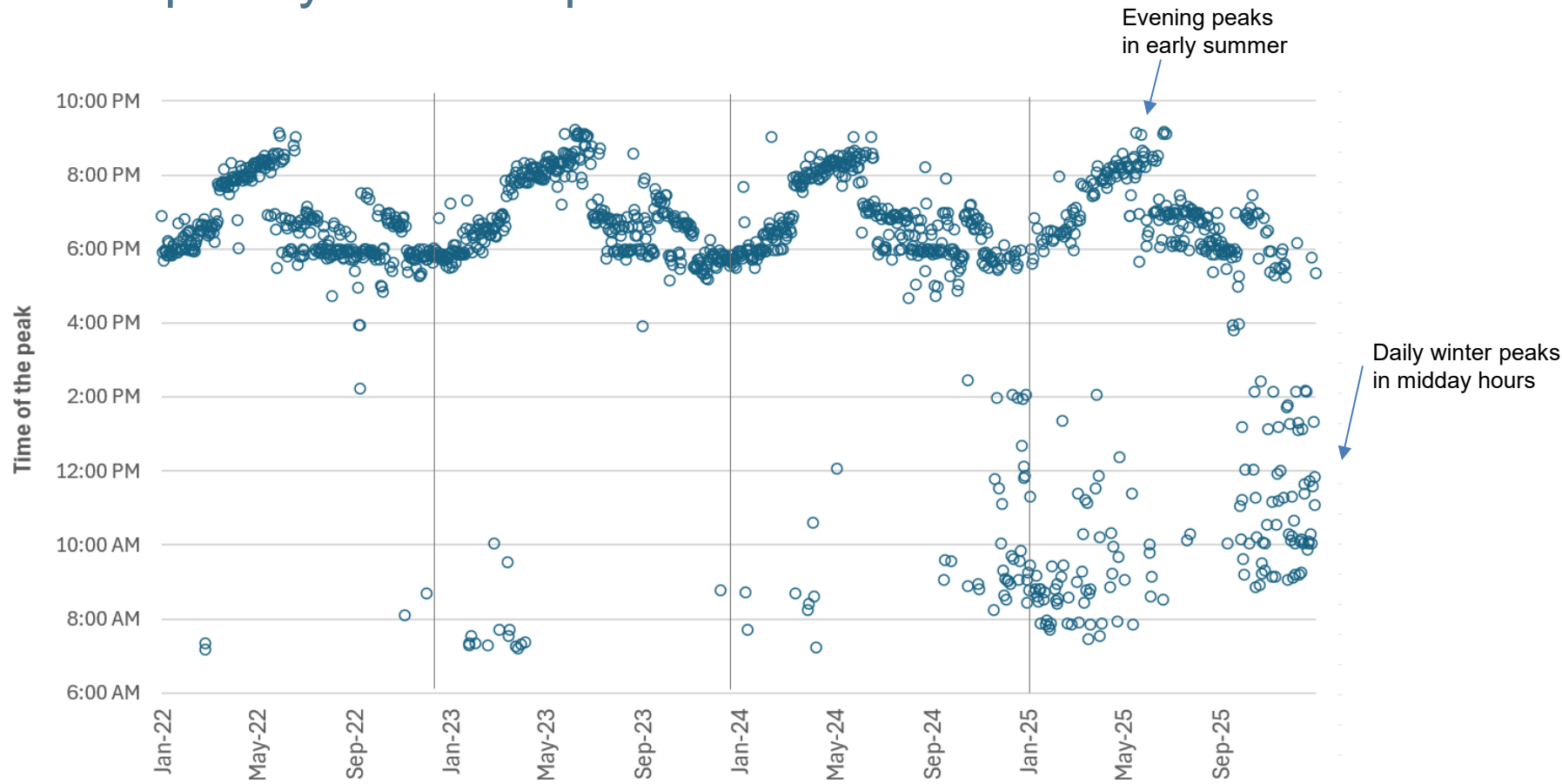


# Storage resources have significantly increased energy arbitrage from midday hours to peak hours



Storage resources are discharge to help meet both morning and evening peaks

The increasing level of additional demand imposed by charging is shifting the daily demand peak to midday hours more frequently in winter periods

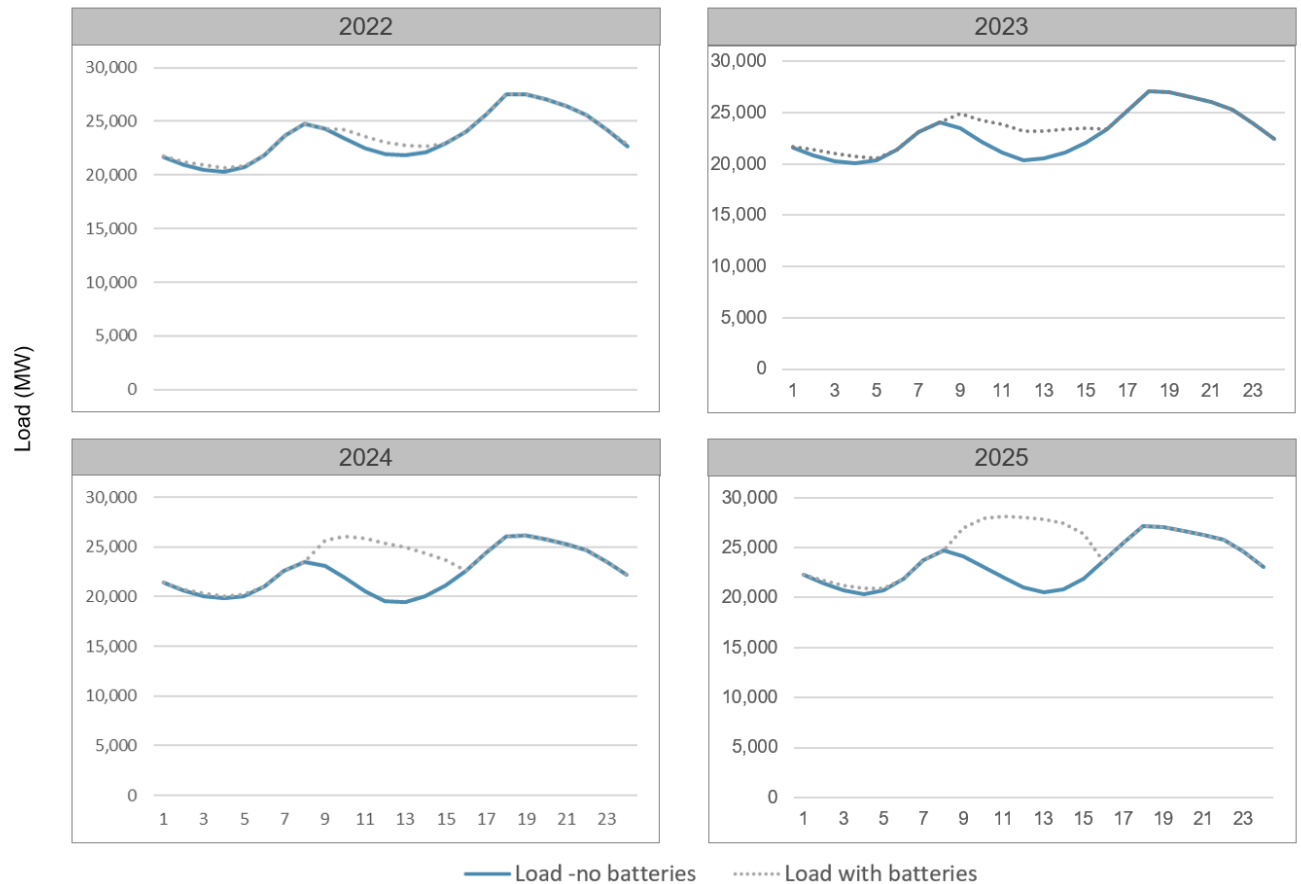


This profile reflects total load, which includes pump and charging of storage resources

The increasing level of additional demand imposed by charging is shifting the daily demand peak to midday hours more frequently in winter months

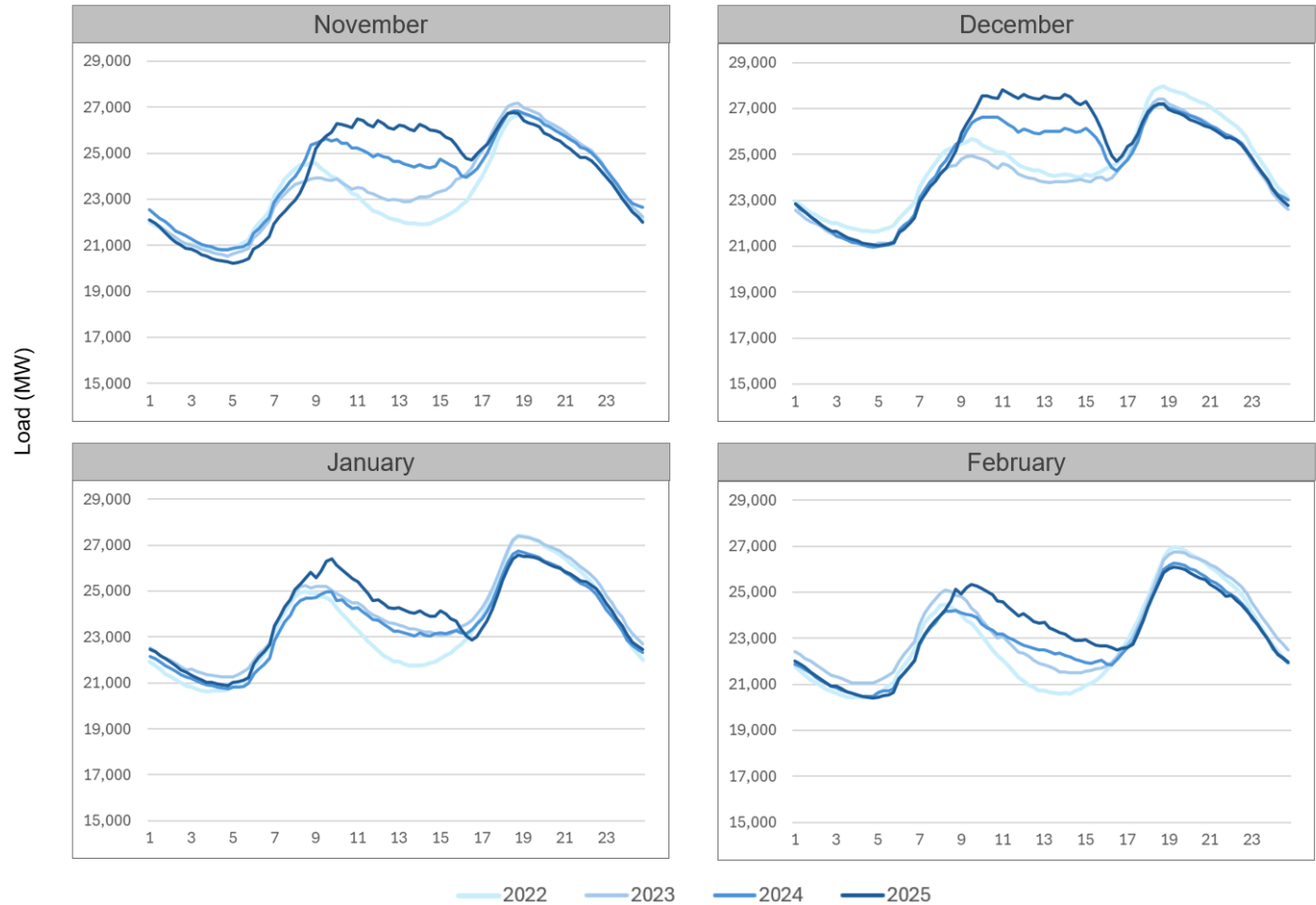
This profile reflects total load, which includes pump and charging of storage resources

This trend is based on a sample period of November



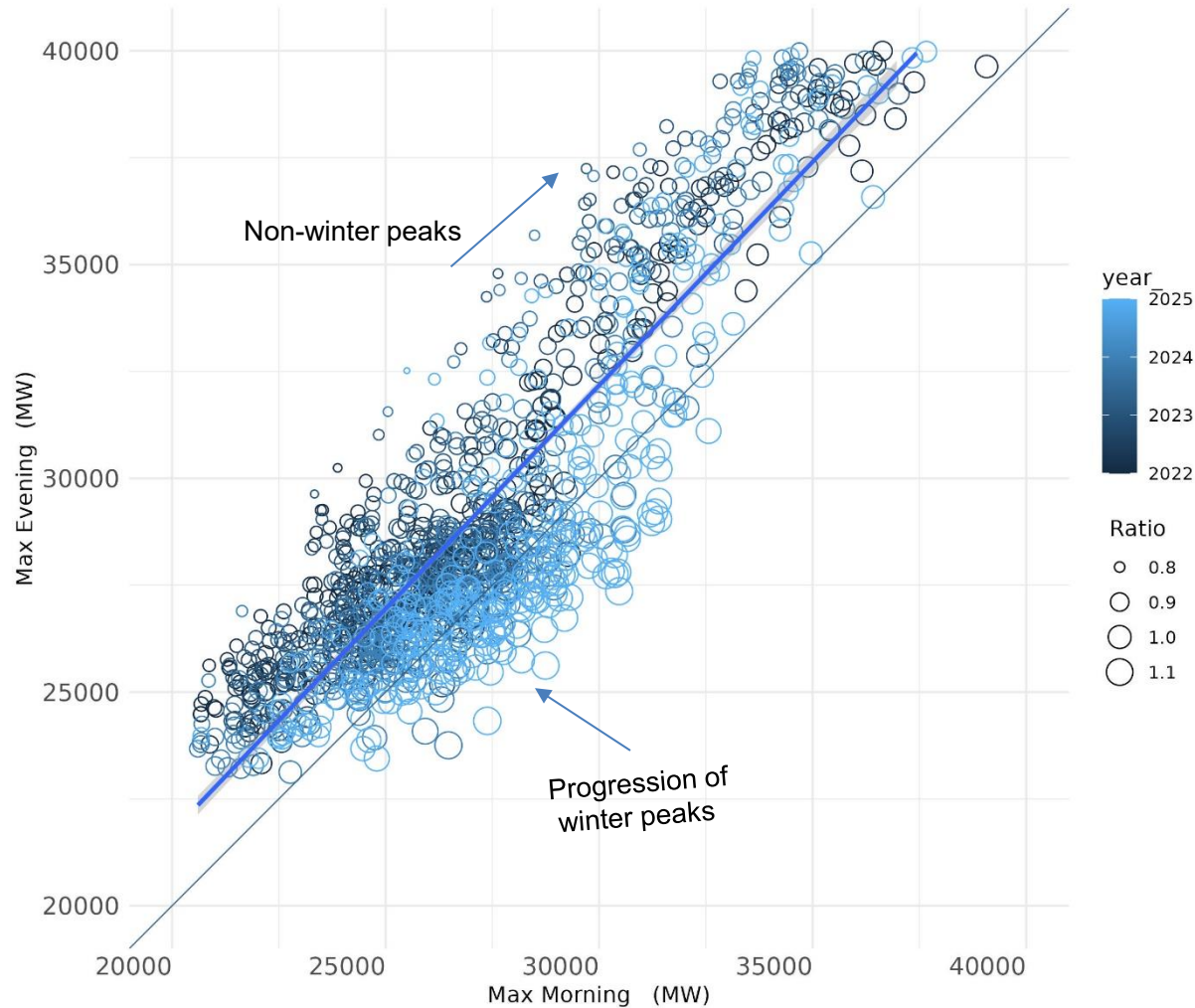


The increasing level of additional demand imposed by charging is shifting the daily demand peak to midday hours more frequently in winter months

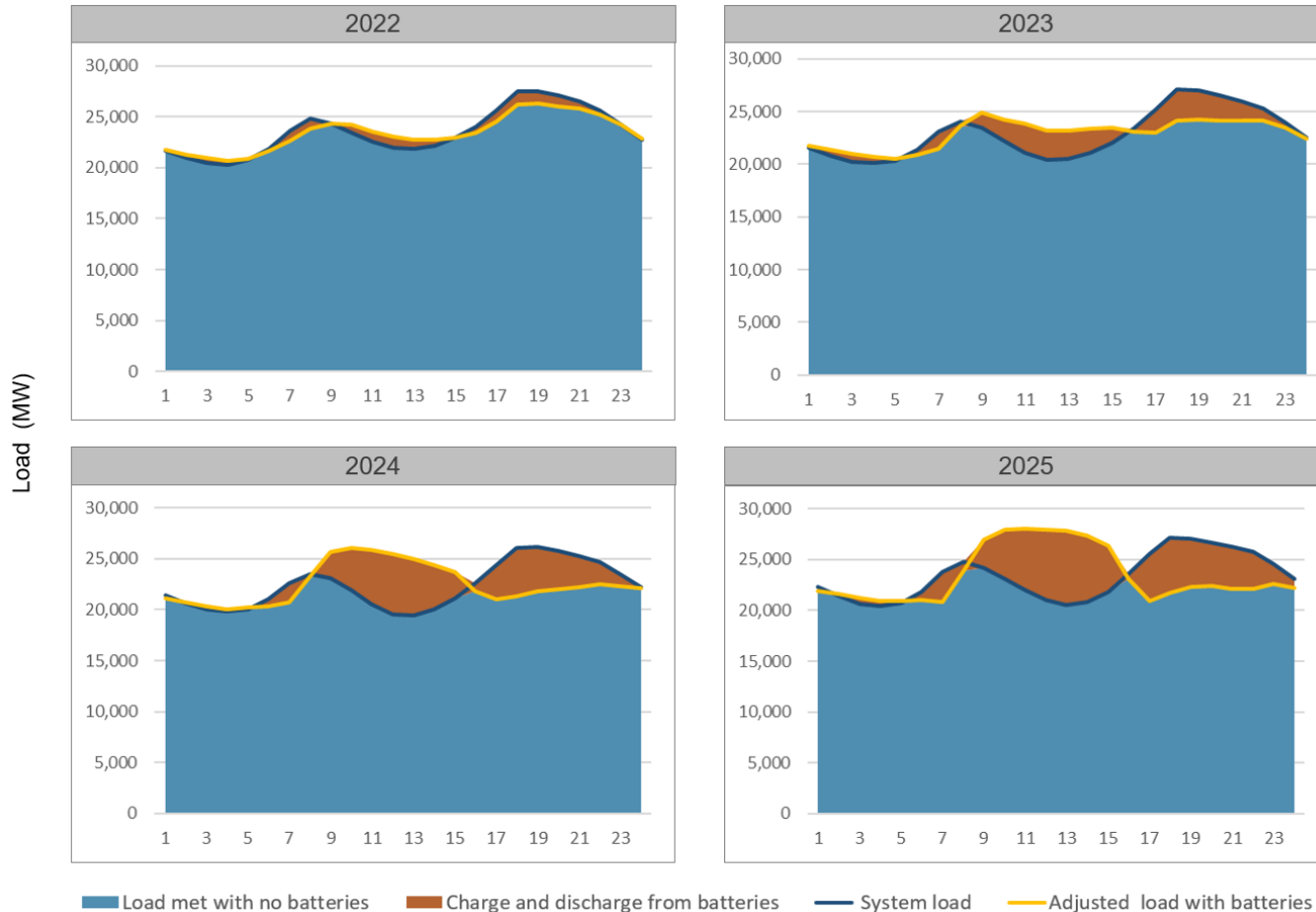


This profile reflects total load, which includes pump and charging of storage resources

In winter periods, the daily peak of total demand is occurring in the morning hours due to contributions of charging from batteries

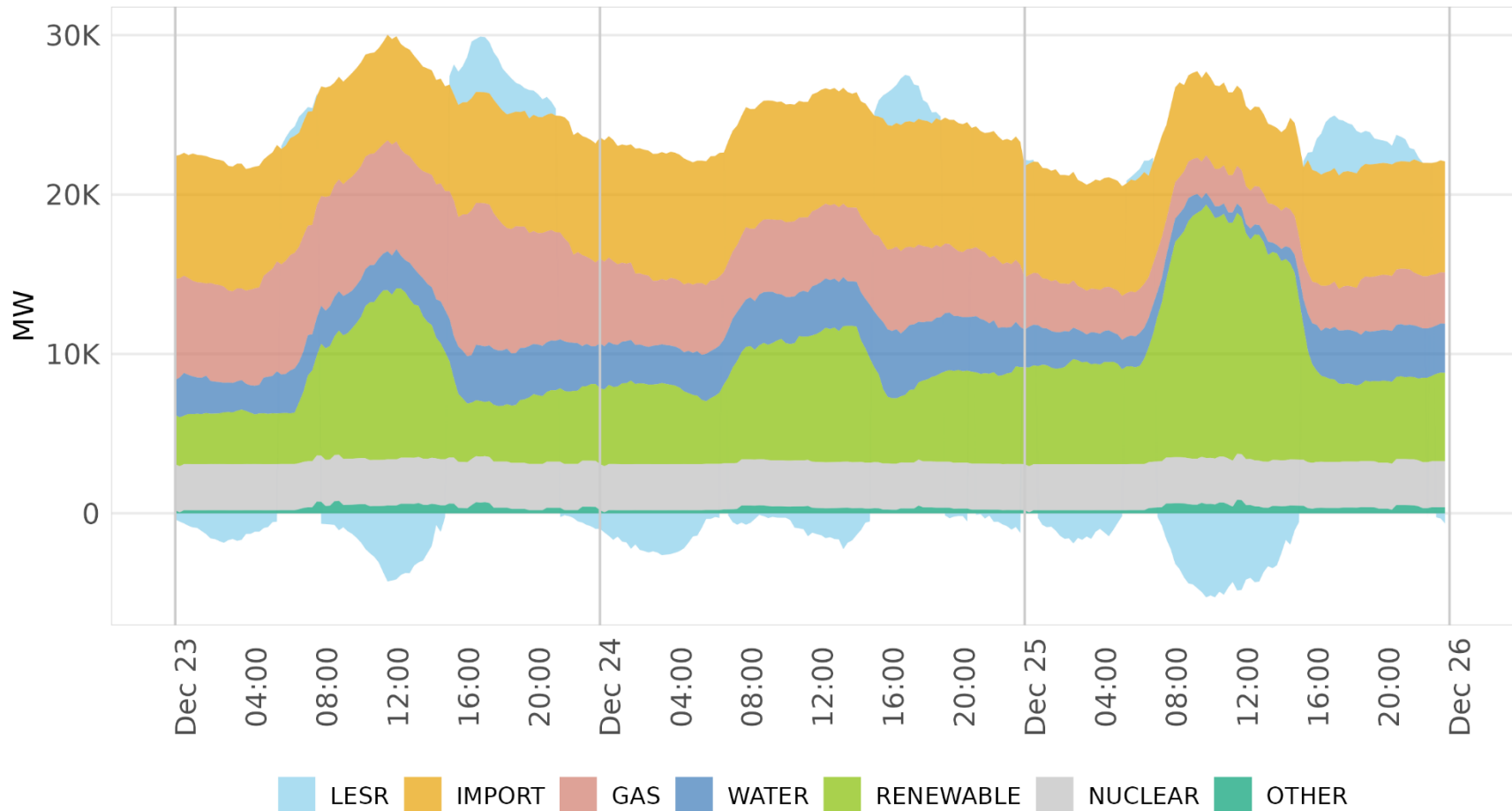


# Storage resources are helping to flatten the load that needs to be met with conventional resources

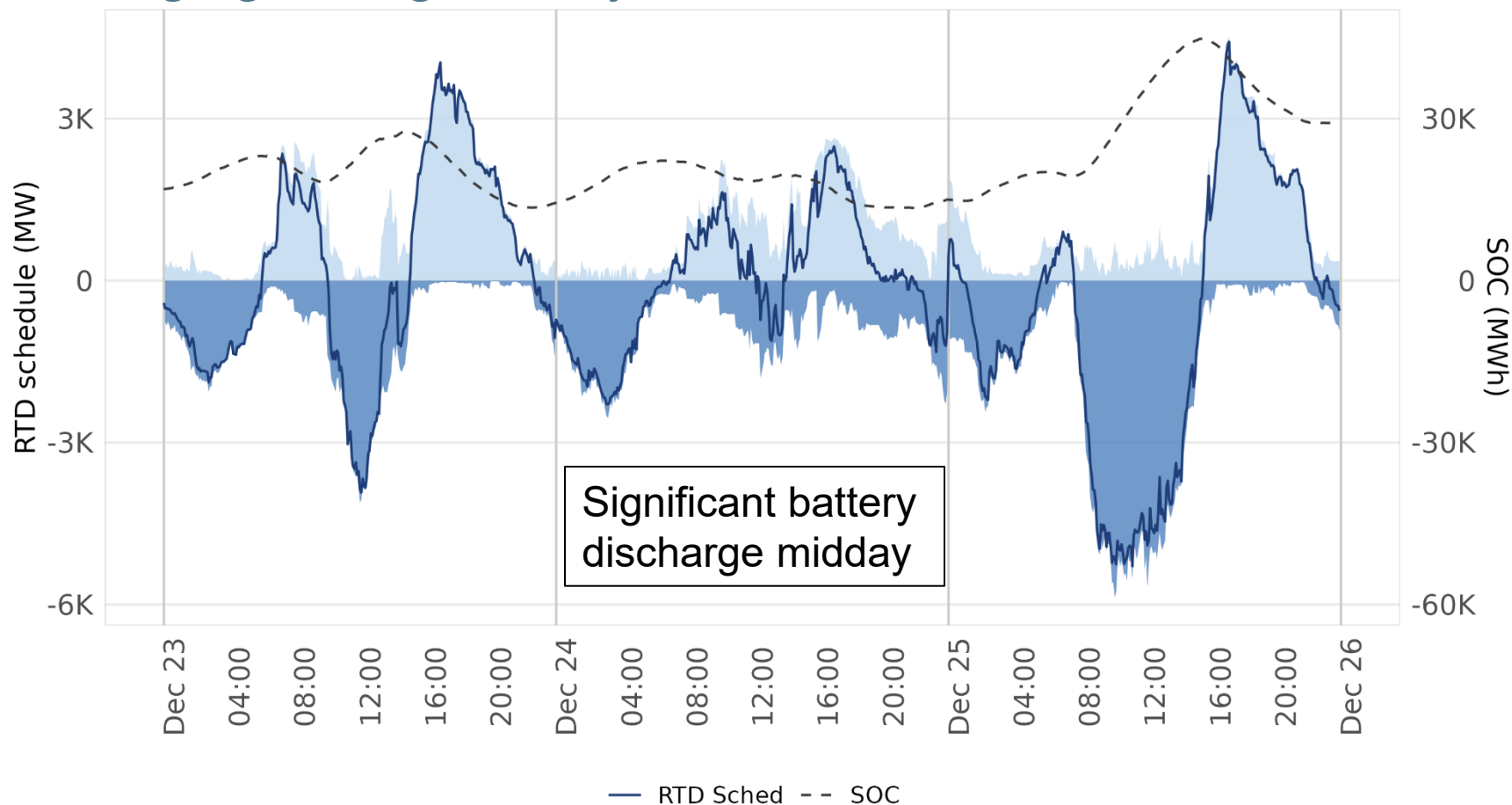


These trends are based on a sample periods of November

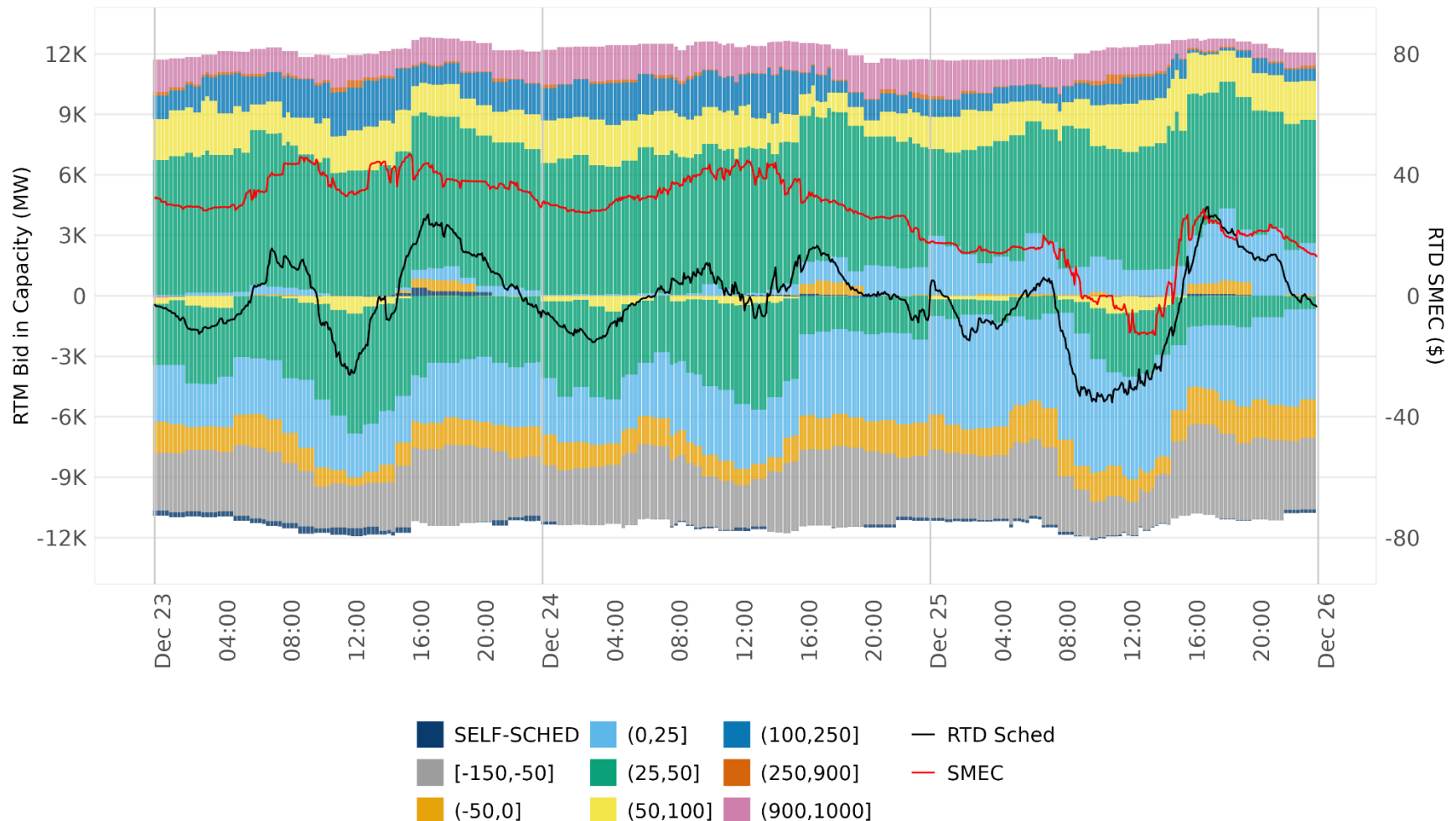
## Low VER output resulted in real-time price increases – Why? Natural gas supply and imports replace loss of VER supply



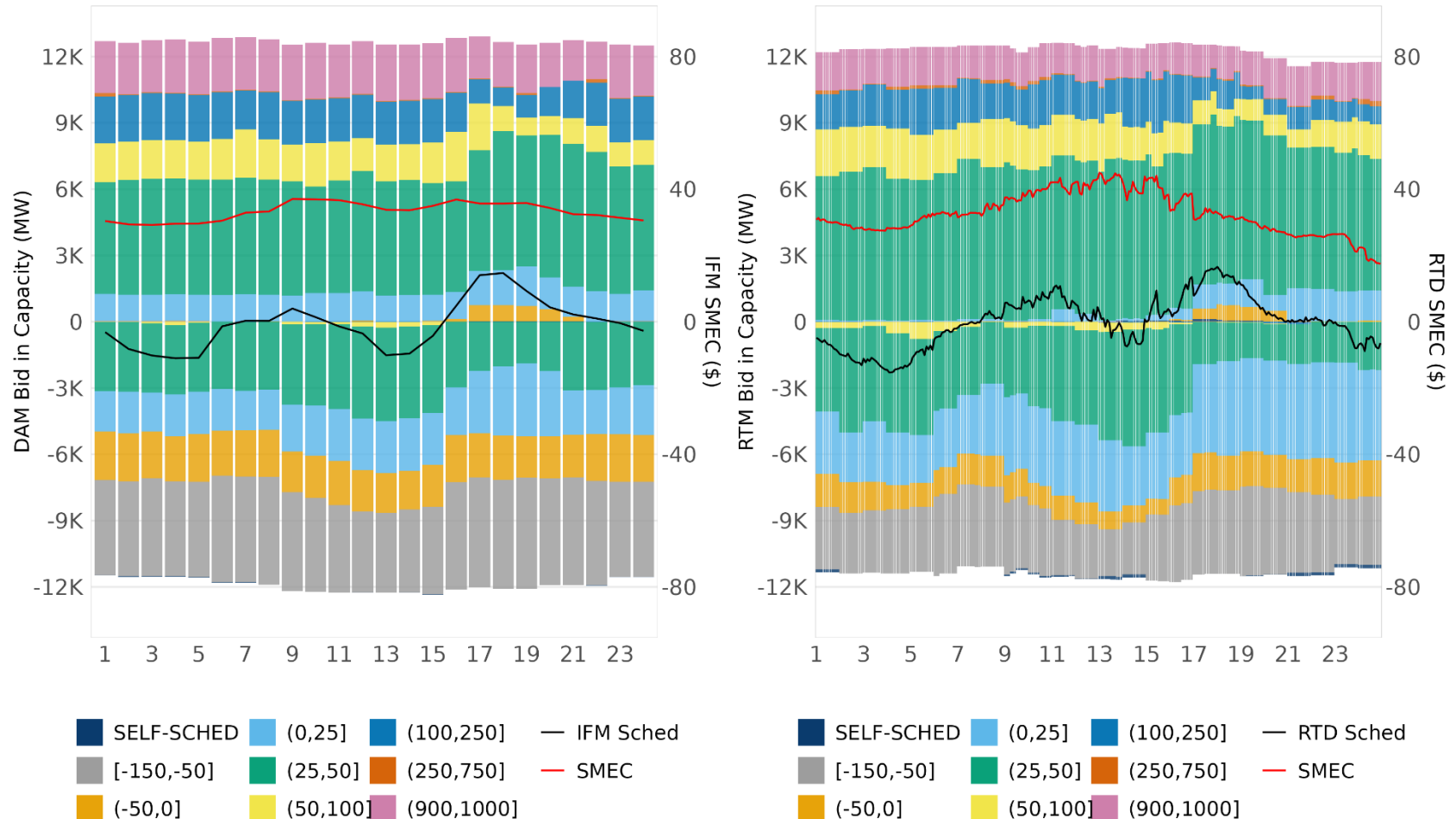
On Dec 24<sup>th</sup>, given higher midday clearing prices, batteries had minimum charging and indeed were economically discharging during midday hours



Low VER output resulted in real time price increases in the midday hours. Battery bids adapted to changing conditions.



On Dec 24<sup>th</sup>, real-time bids exhibit a slightly different profile relative to day-ahead projections, adapting to changing conditions



# Load Conformance

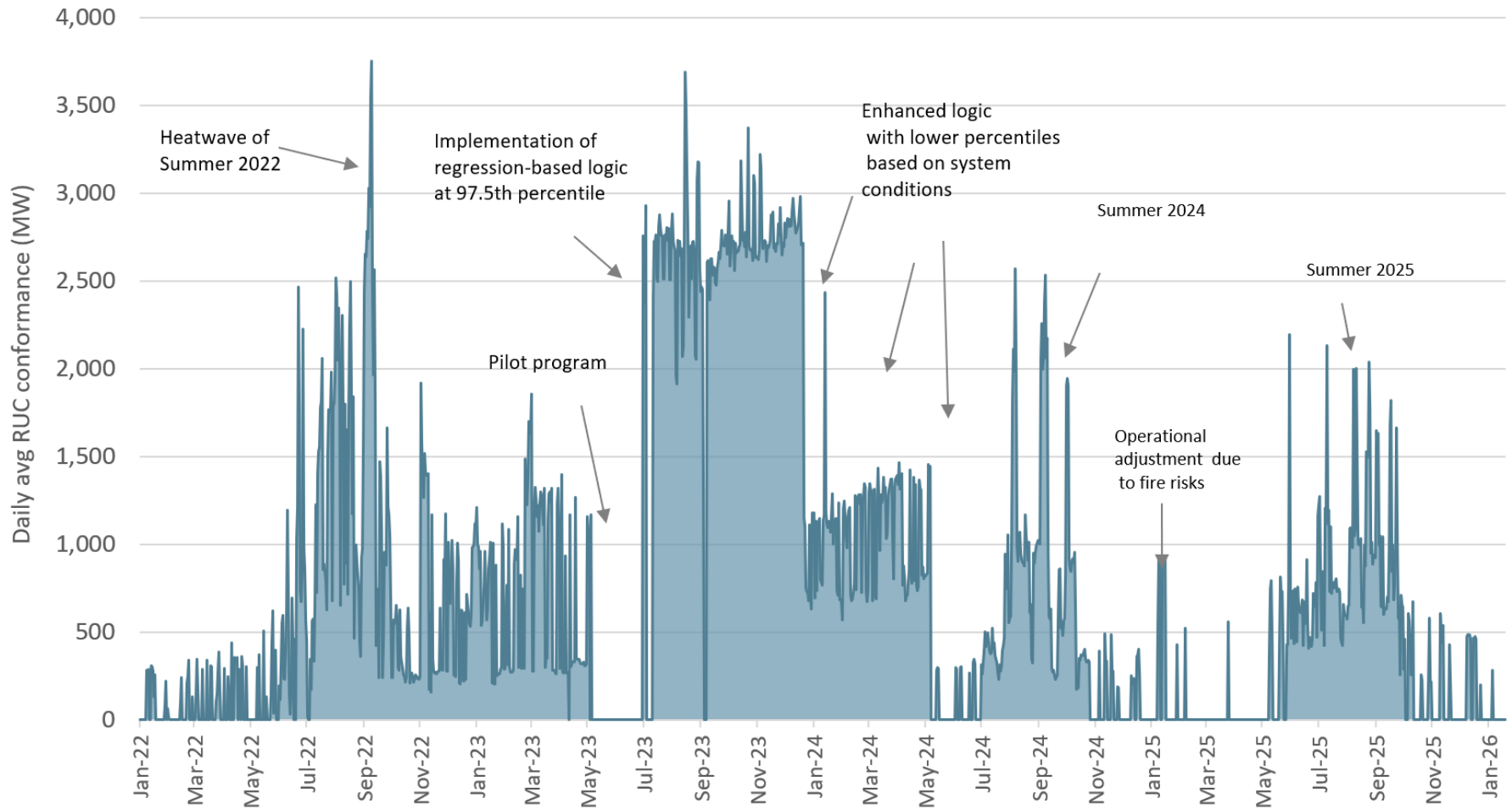
Market Performance and Advanced Analytics



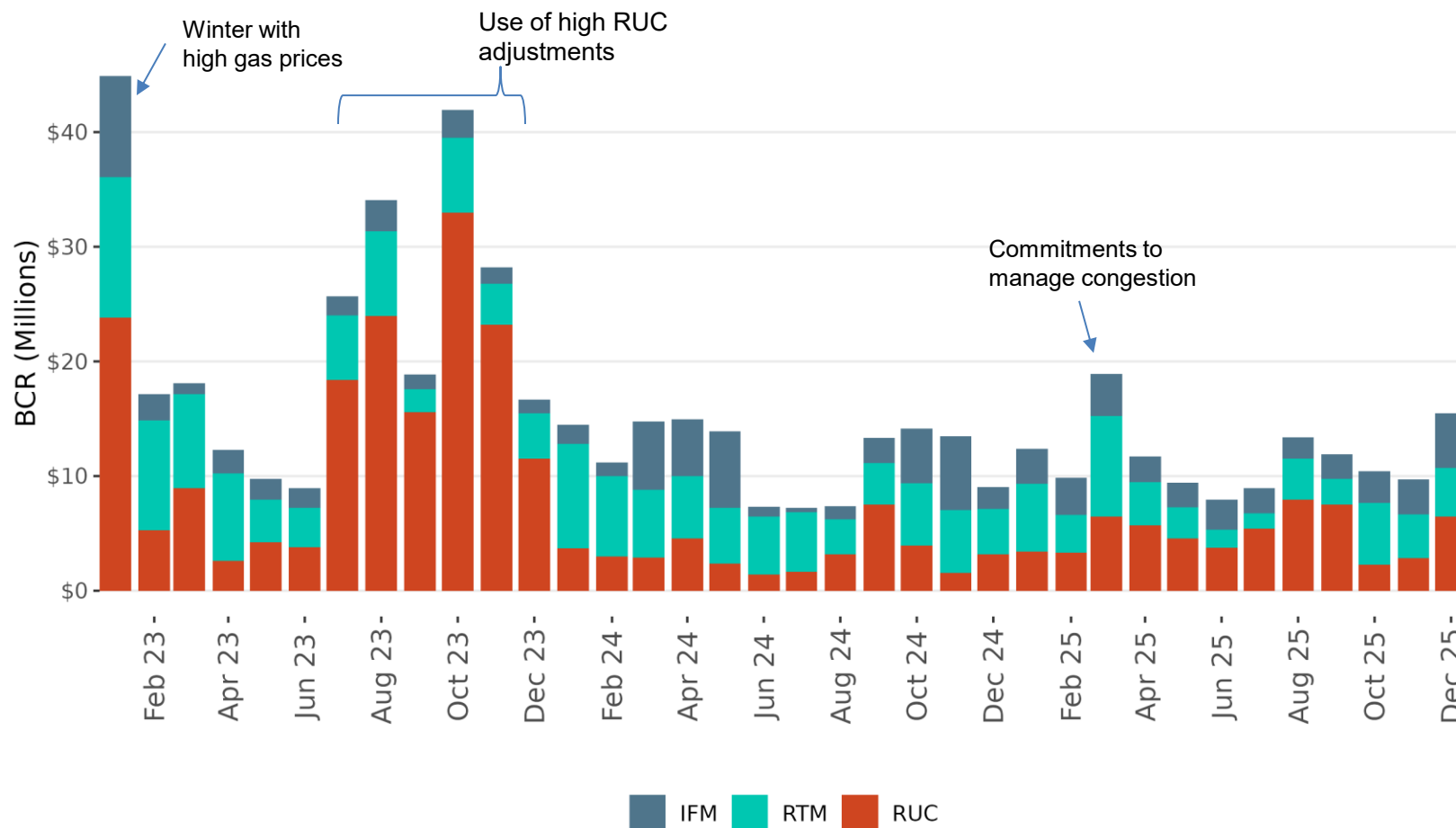
# Load Conformance

- Load conformance in the ISO markets is a ubiquitous practice
- The ISO has pursued enhancements to the process to reduce the use of load conformance in both day-ahead and real-time
- A pilot program started in late December shows promising results to further reduce the use of load conformance in real time

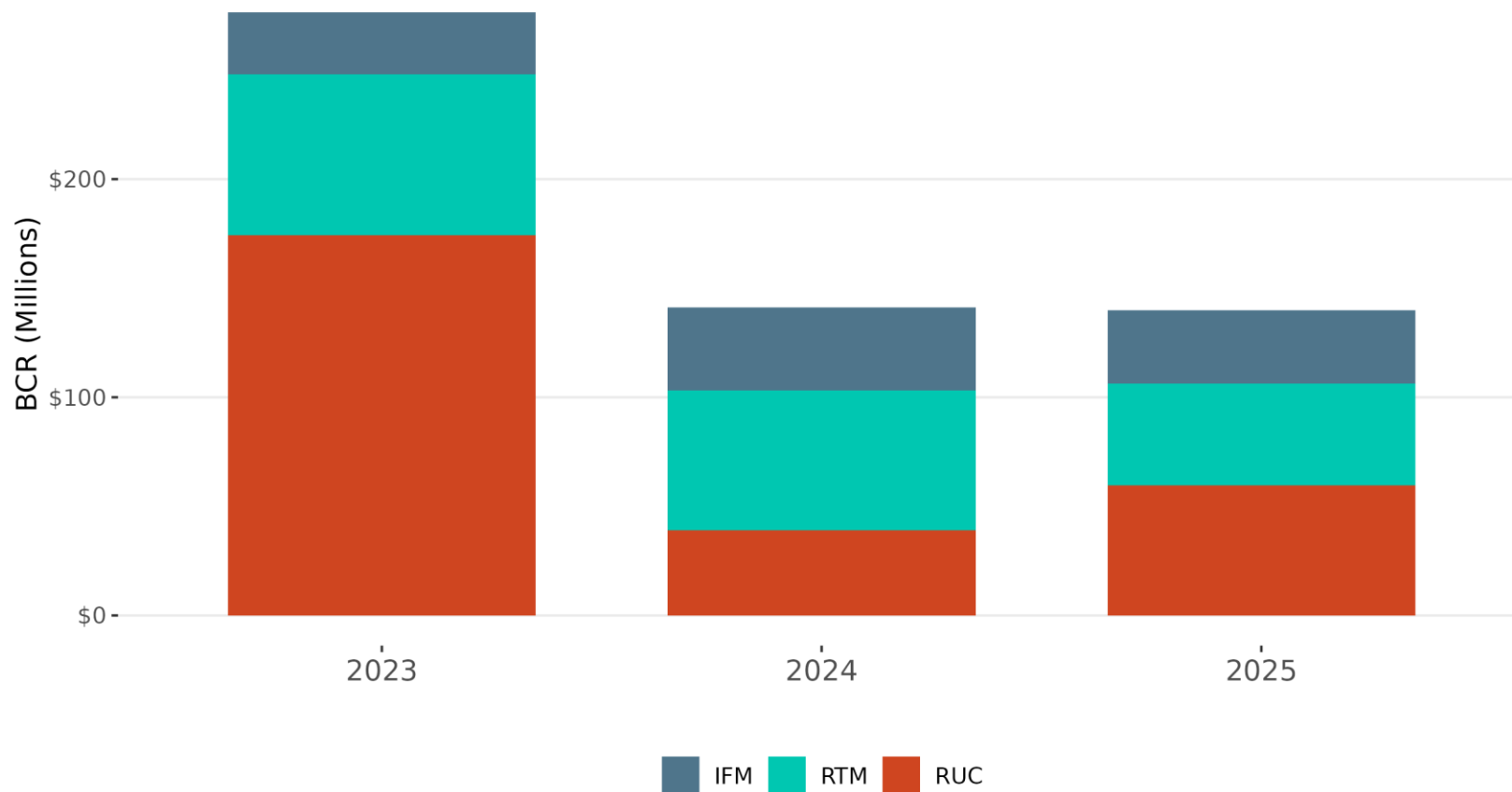
# Between October 2025 and January 2026 RUC adjustments were minimal



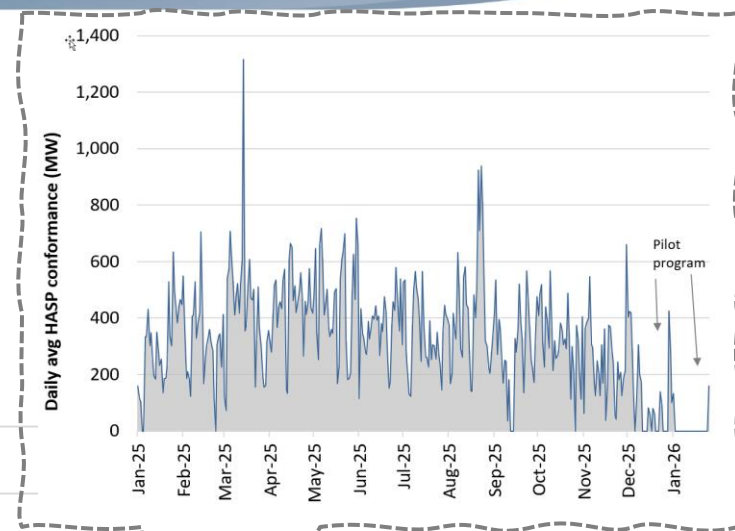
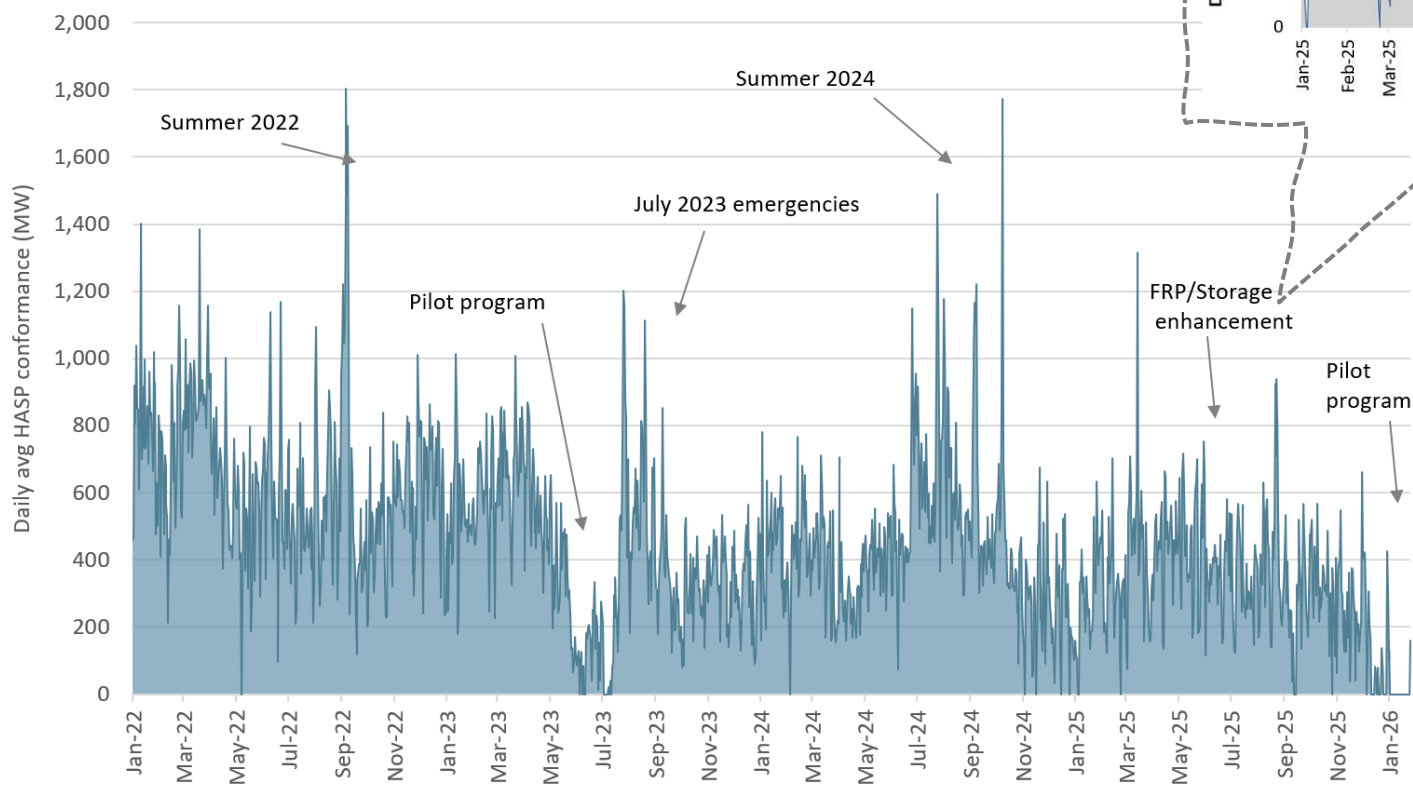
# Bid cost recovery in RUC remains within typical ranges since December 2023



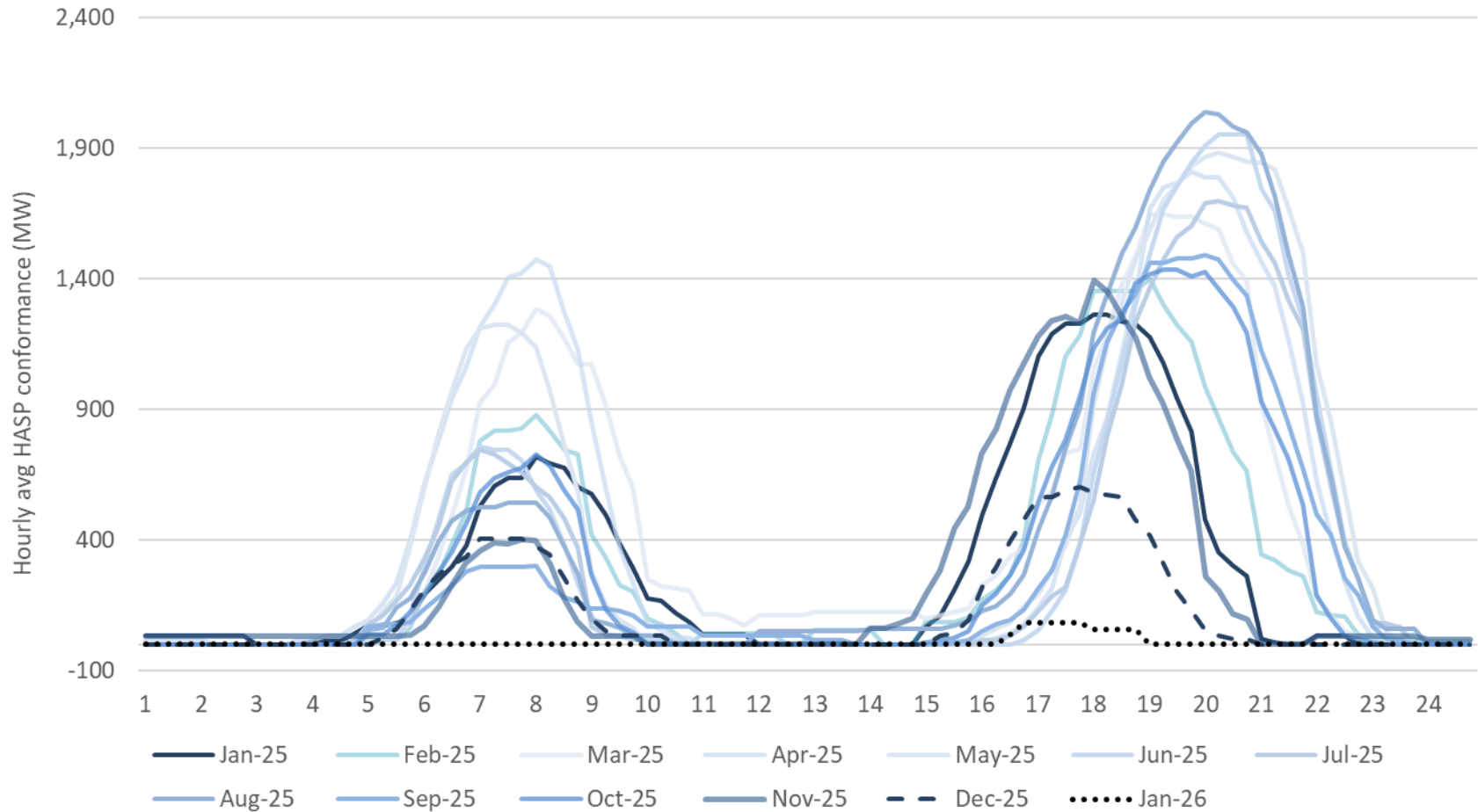
# Bid cost recovery in RUC remains within typical ranges since December 2023



ISO has been running a pilot program in December and January to tackle root causes for load conformance in real time



# Load conformance in HASP shows a significant reduction during the pilot trial (December 2025-January 2026)



# Bid Cost Recovery

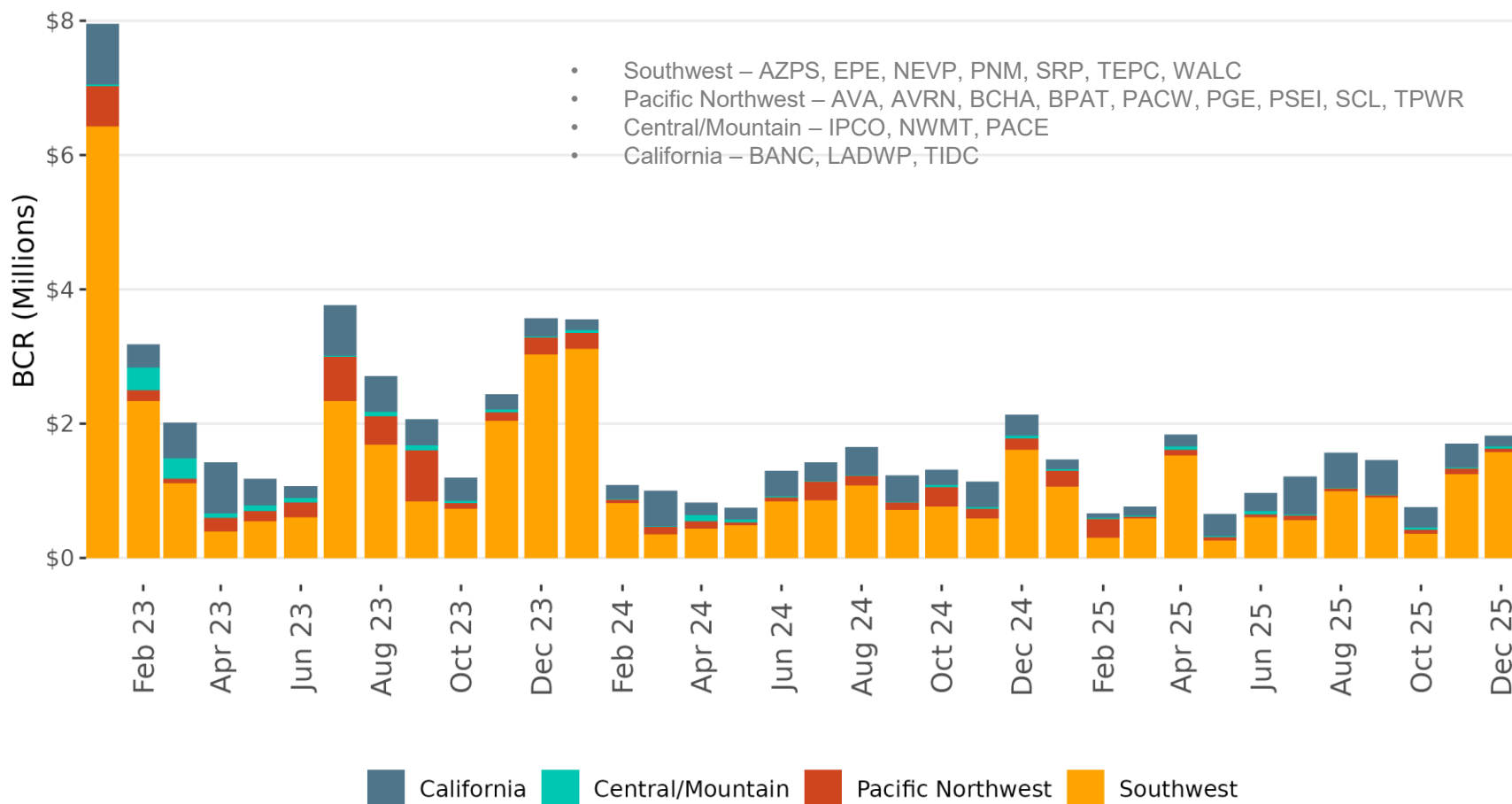
## Market Performance and Advanced Analytics

# Bid Cost Recovery

- Storage resources accrued 2.8 percent of all the bid cost recovery, while gas resources accrued 96.7 percent for 2025 in the IFM market
- Bid cost recovery in the RUC process remained low after improvements to the RUC adjustment process
- Southwestern areas accounted for 67 percent of total Bid Cost Recovery to all WEIM entities
- Gas and Storage resources make up 82% and 9.2% of CISO bid cost recovery respectively in the real-time for 2025

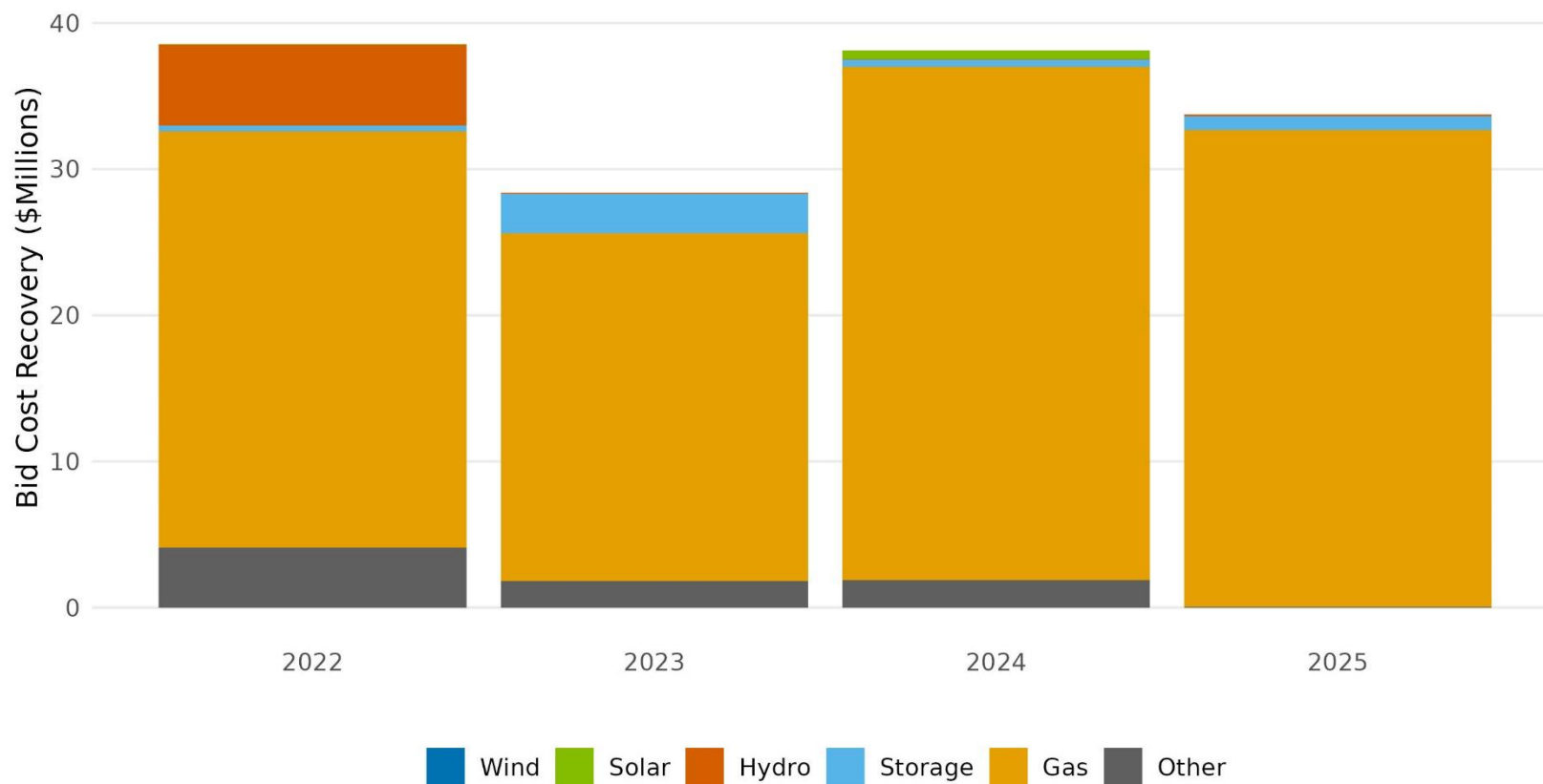


# Southwest WEIM entities has accrued about 67 percent of total Bid Cost Recovery to all WEIM entities



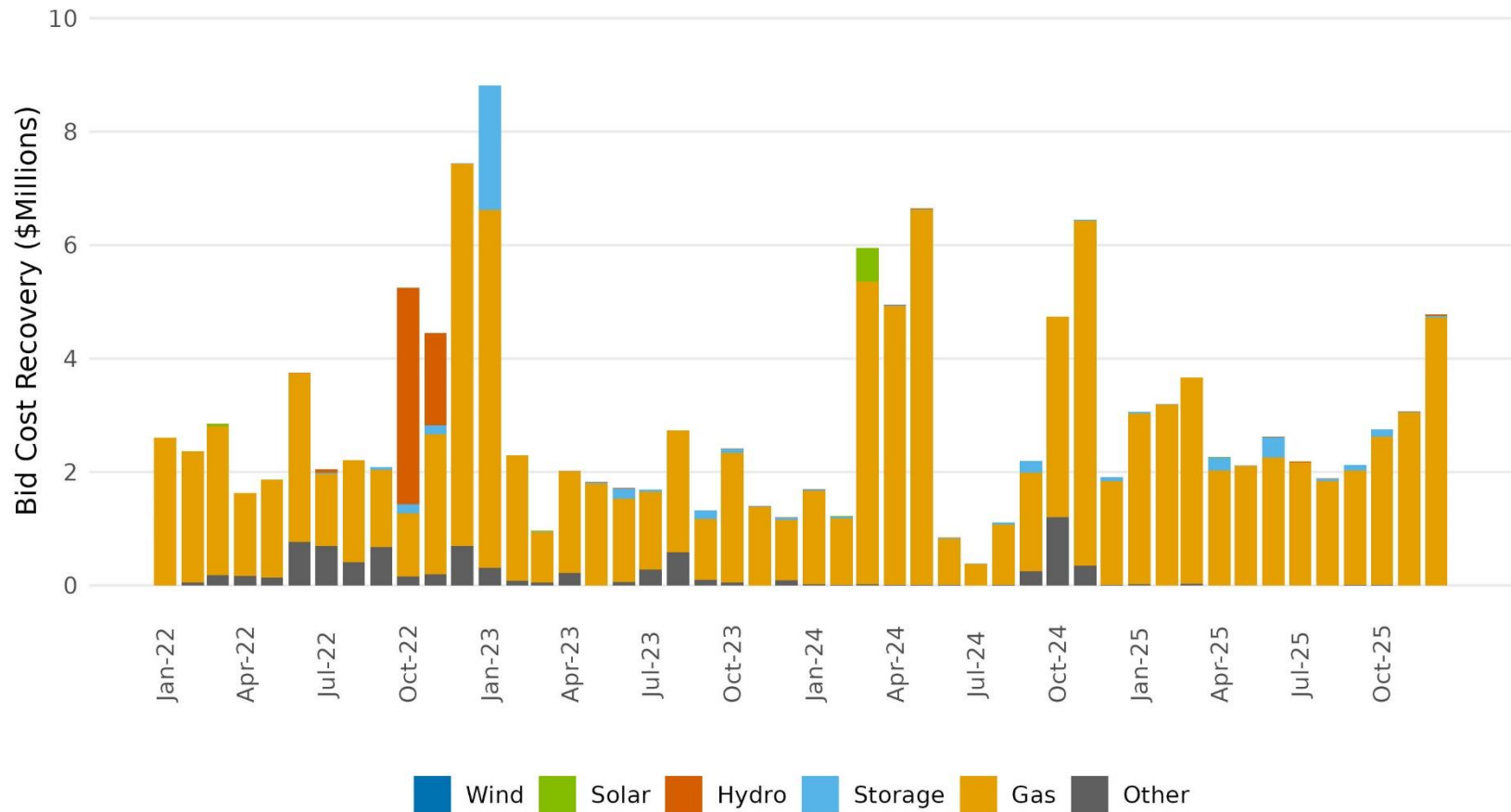
# ISO bid cost recovery by fuel type – IFM

Gas and Storage resources make up 96.7% and 2.8% of BCR respectively in the IFM for 2025



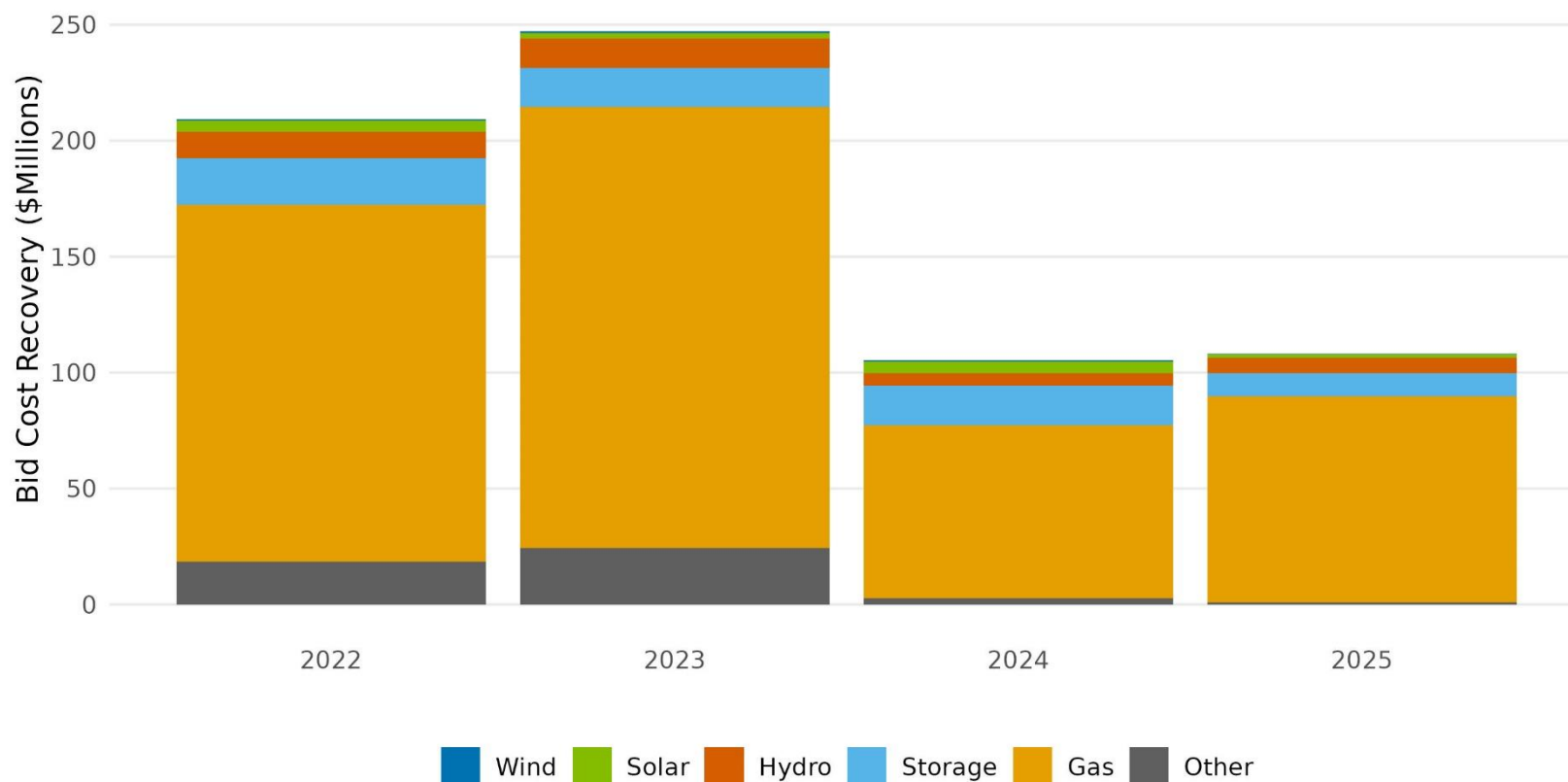
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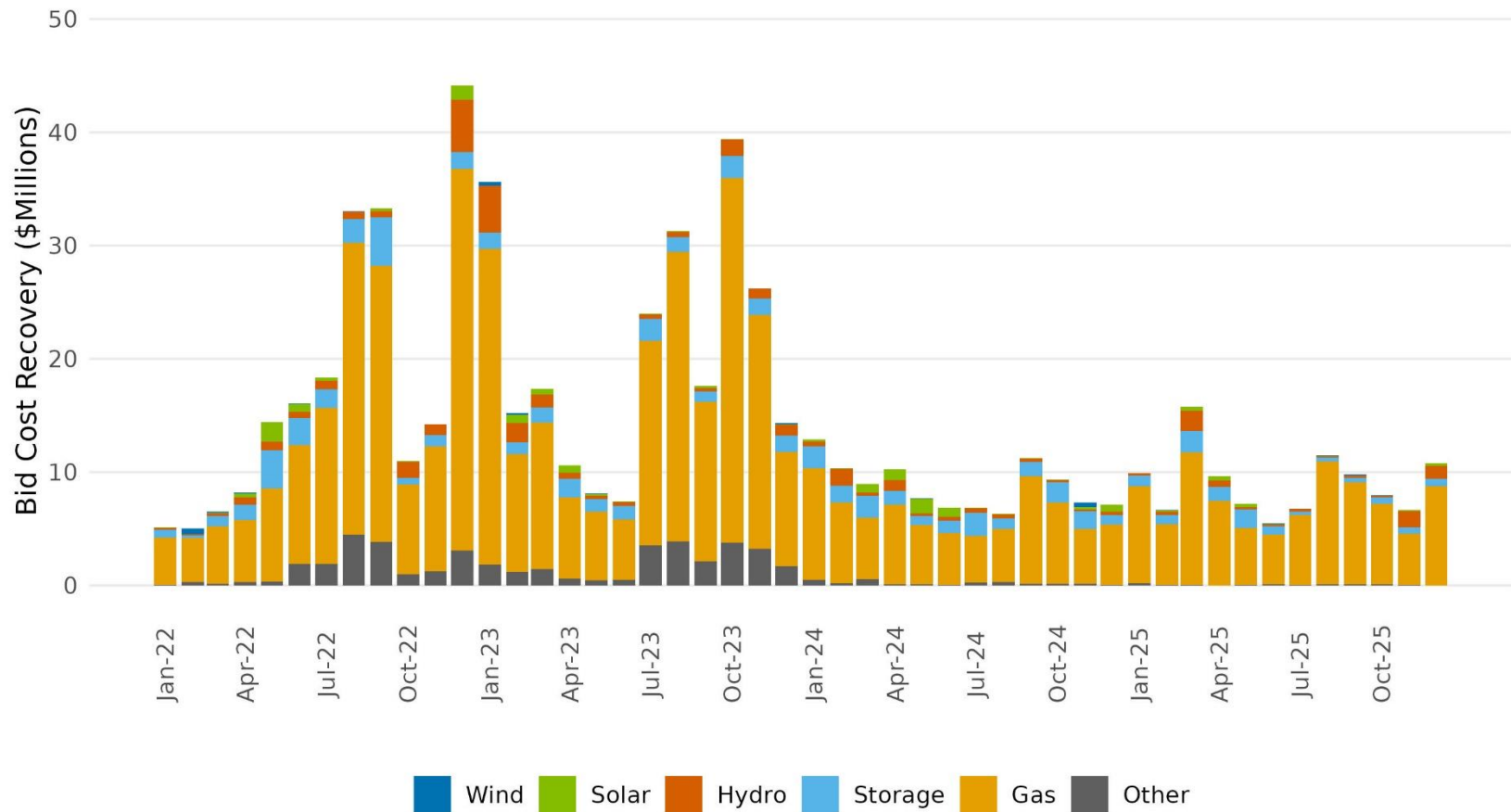
# ISO bid cost recovery by fuel type – RTM

Gas and Storage resources make up 82% and 9.2% of CISO BCR respectively in the RTM for 2025



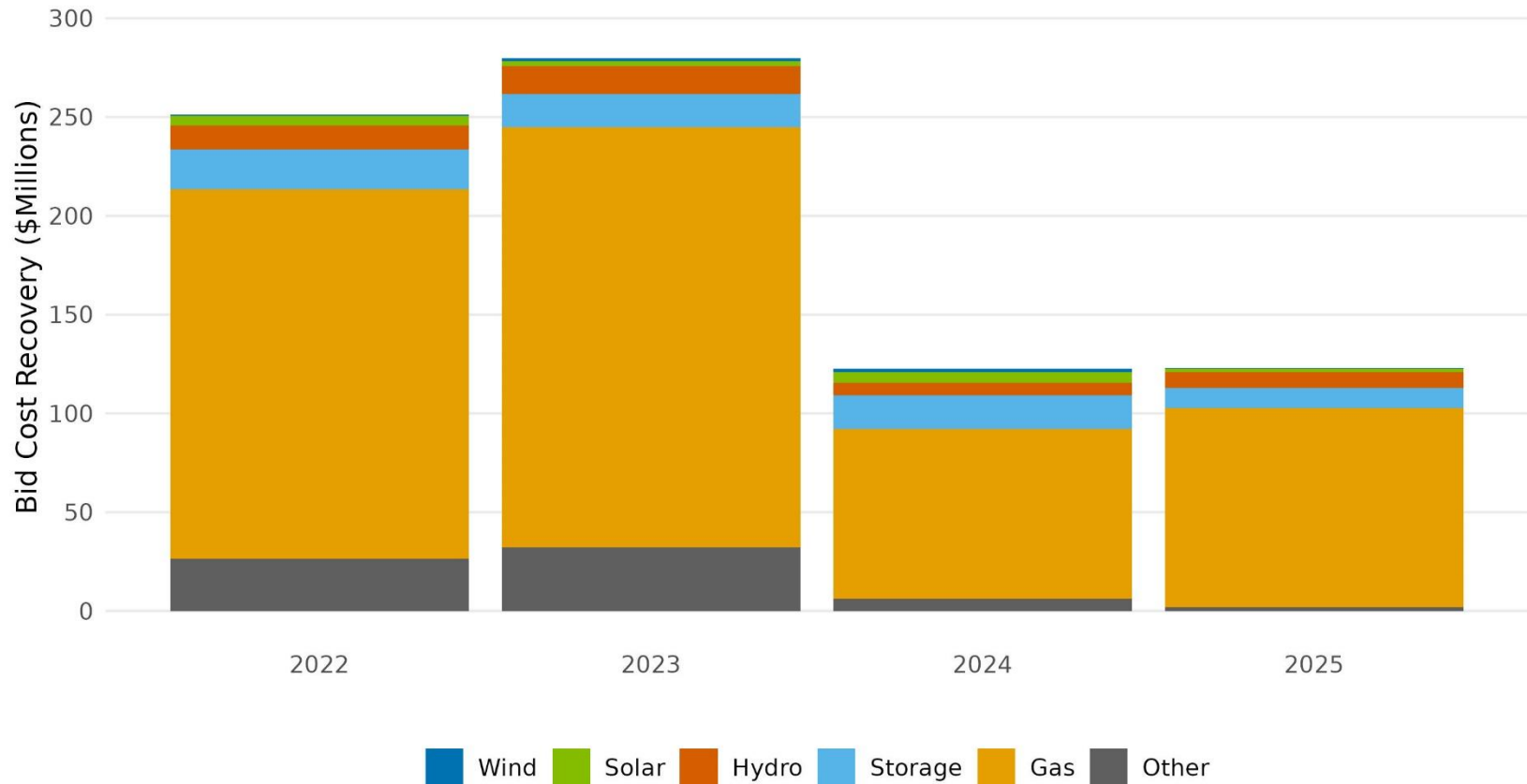
# ISO bid cost recovery by fuel type – RTM

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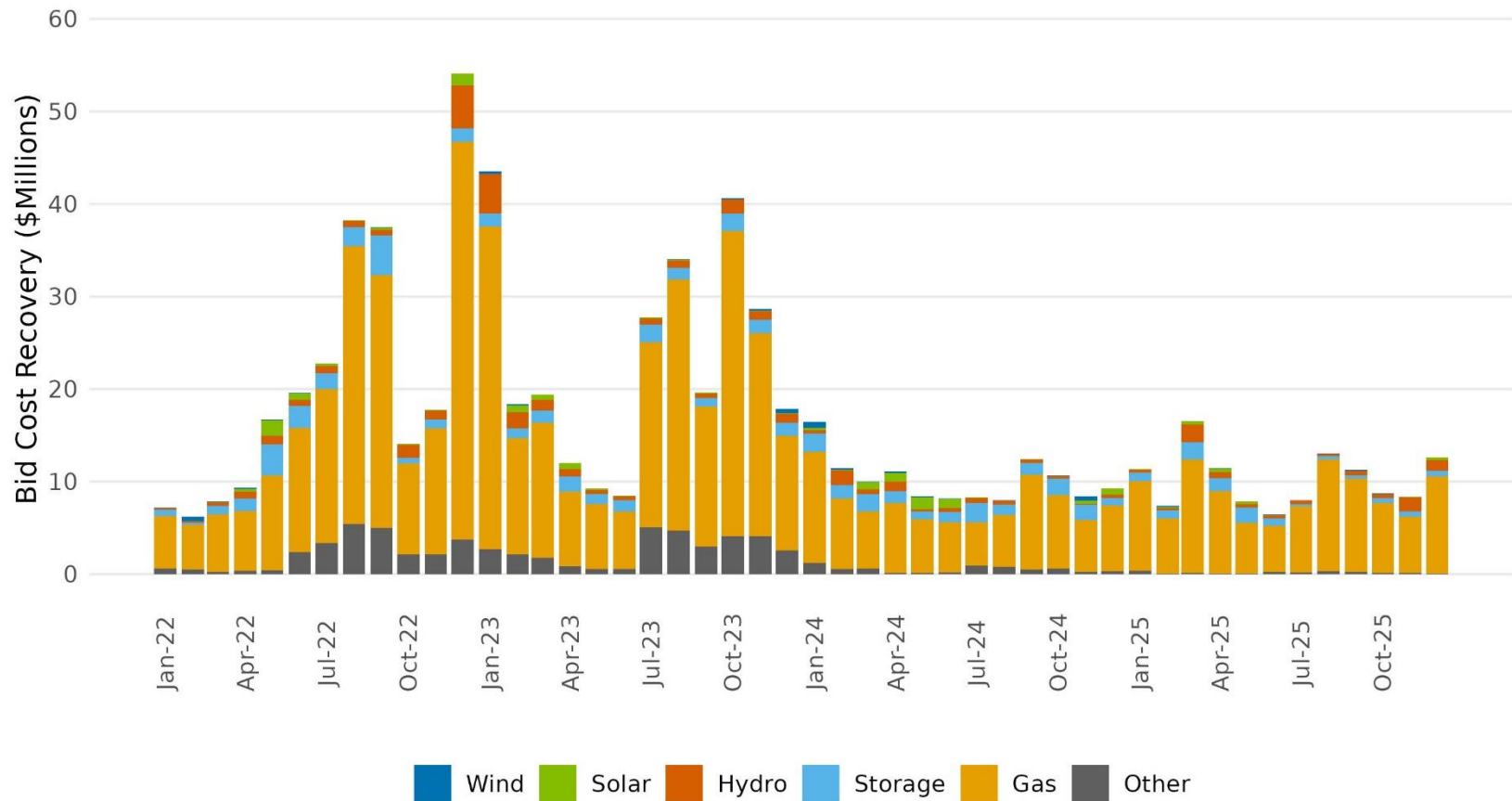
# EIM bid cost recovery by fuel type – RTM

Gas and Storage resources make up 81.8% and 8.4% of EIM BCR respectively for 2025



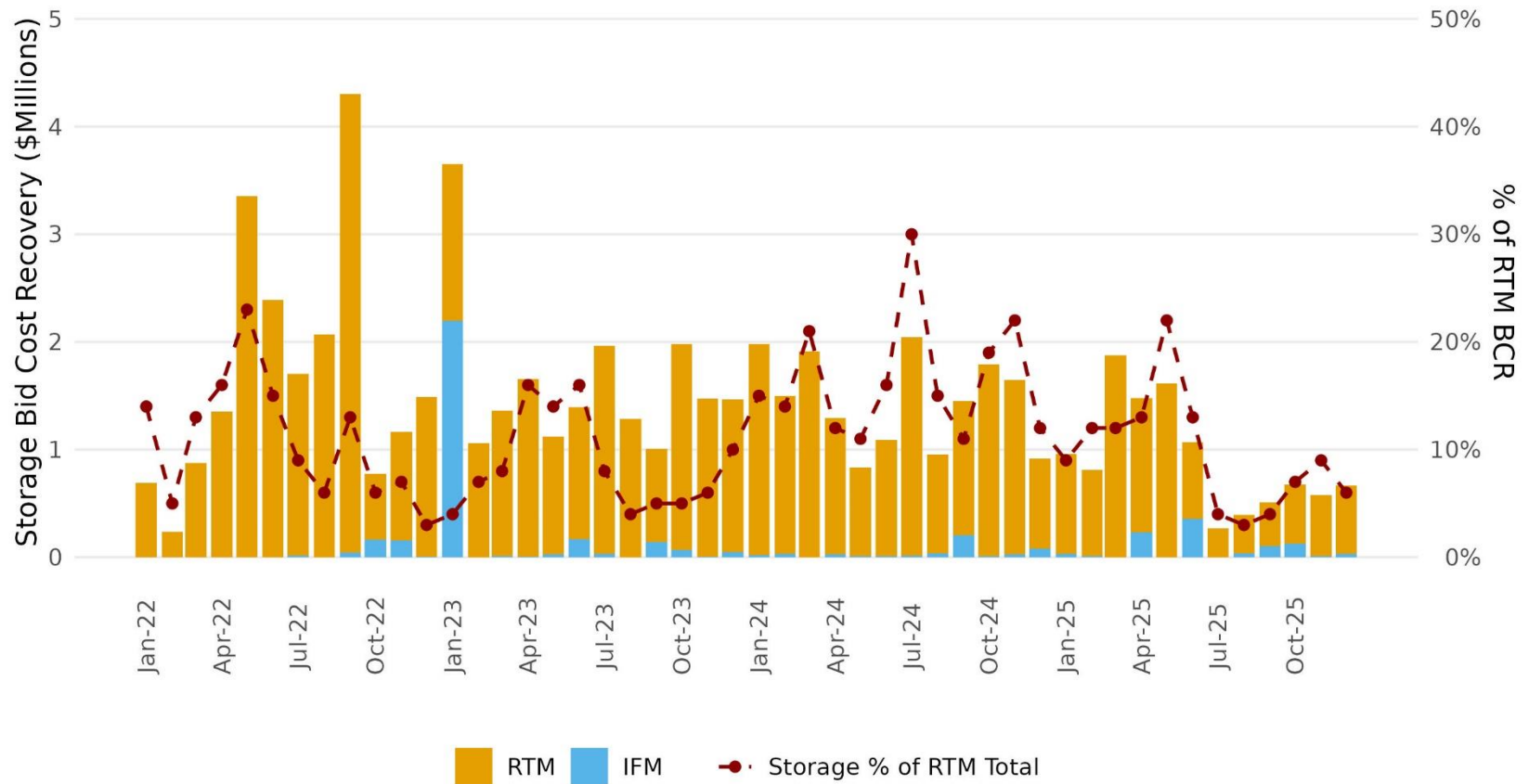
# EIM bid cost recovery by fuel type

Gas and Storage resources make up 81.8% and 8.4% of EIM BCR respectively for 2025



# ISO bid cost recovery– storage resources

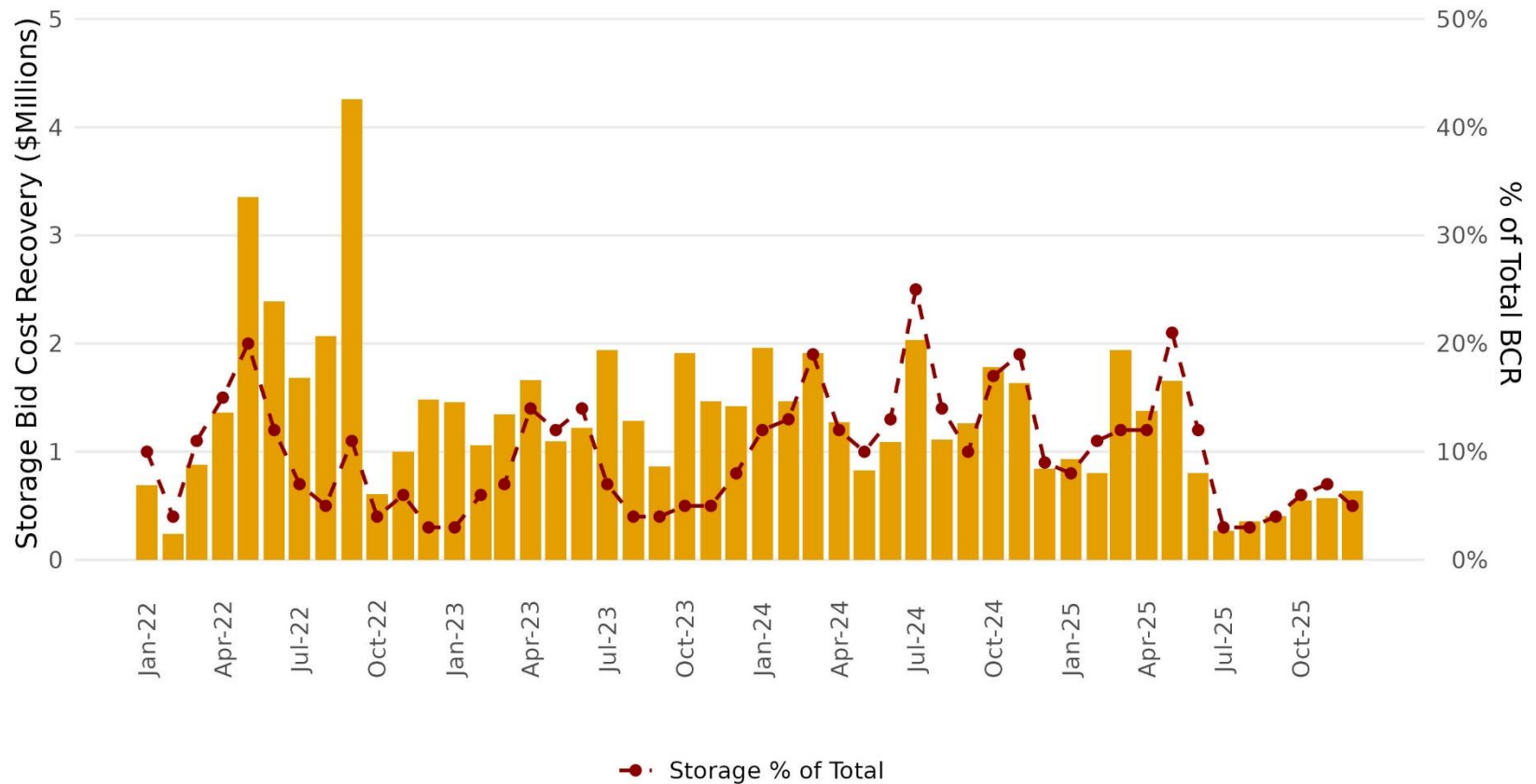
Storage resources make up 9.2% of RTM BCR for CISO in 2025





# EIM bid cost recovery – storage resources

Storage resources make up 8.4% of RTM BCR across the entire EIM for 2025



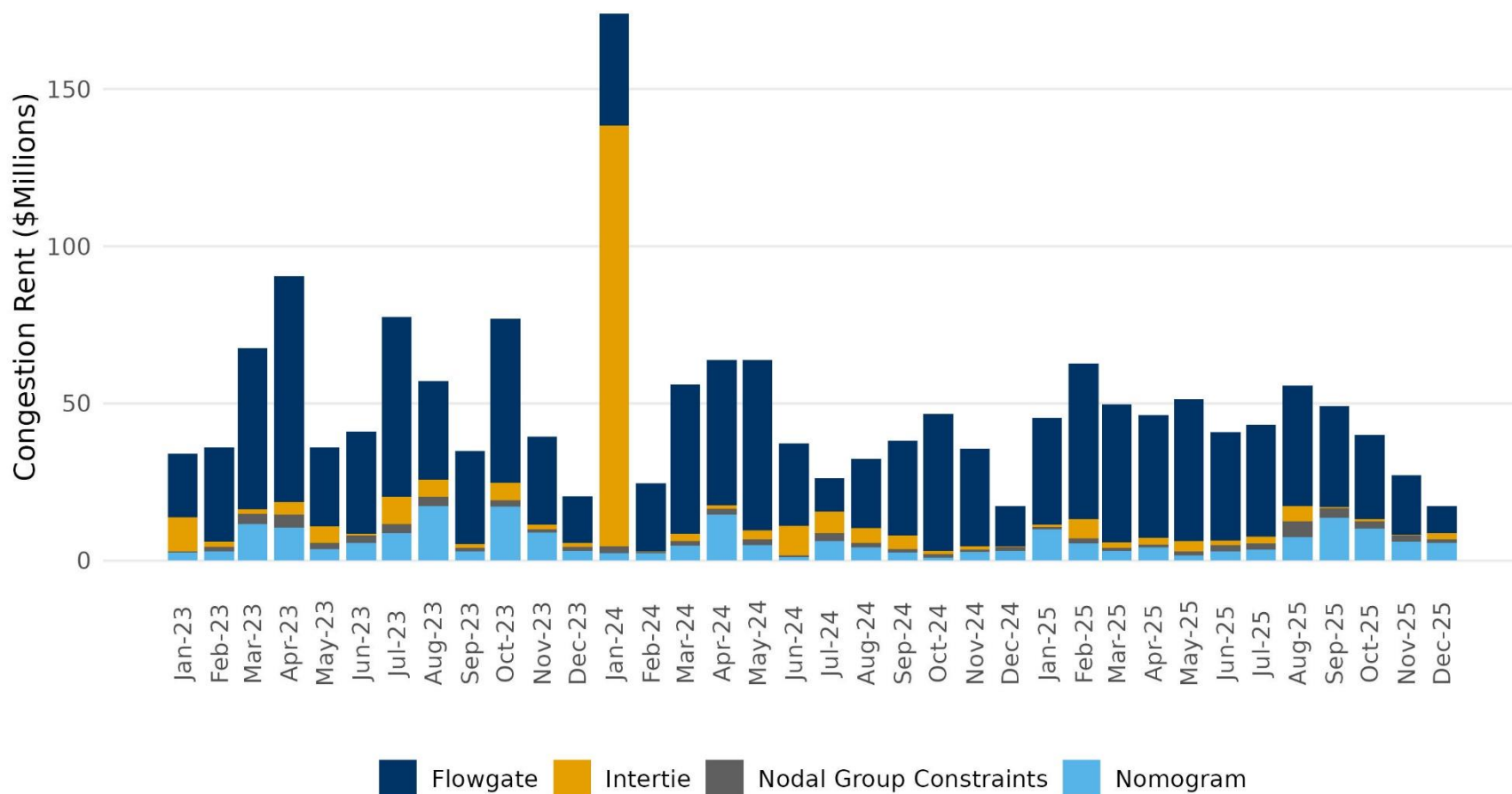
# Congestion and Congestion revenue rights

## Market Performance and Advanced Analytics

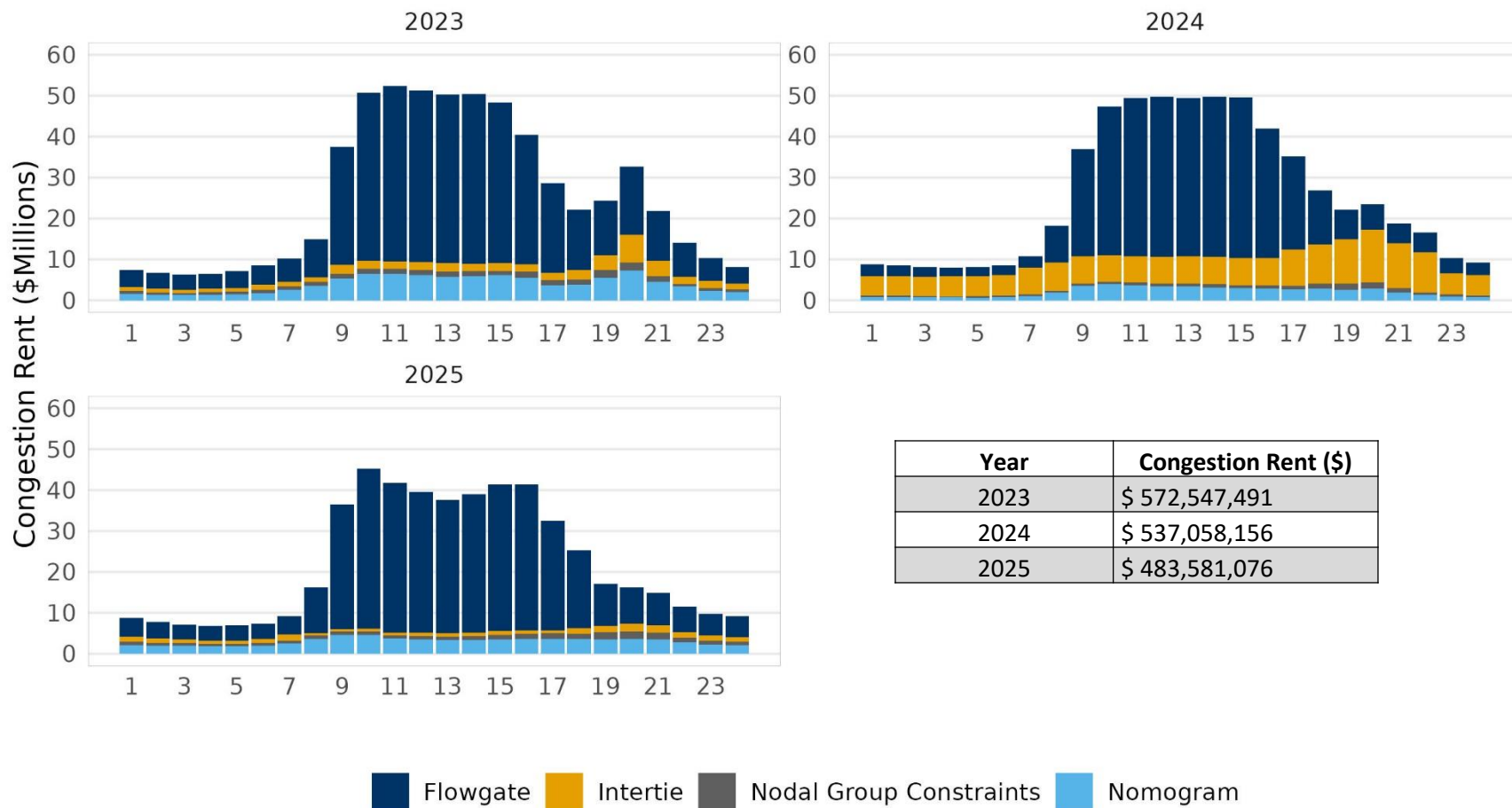
# Congestion and CRRs

- Congestion in the day-ahead market reached minimal levels in Q4 2025
- Majority of congestion accrued during peak solar hours
- 2025 saw the lowest total of congestion rents since 2023
- Pro-rata funding for congestion revenue rights continues to provide surplus to load consistently

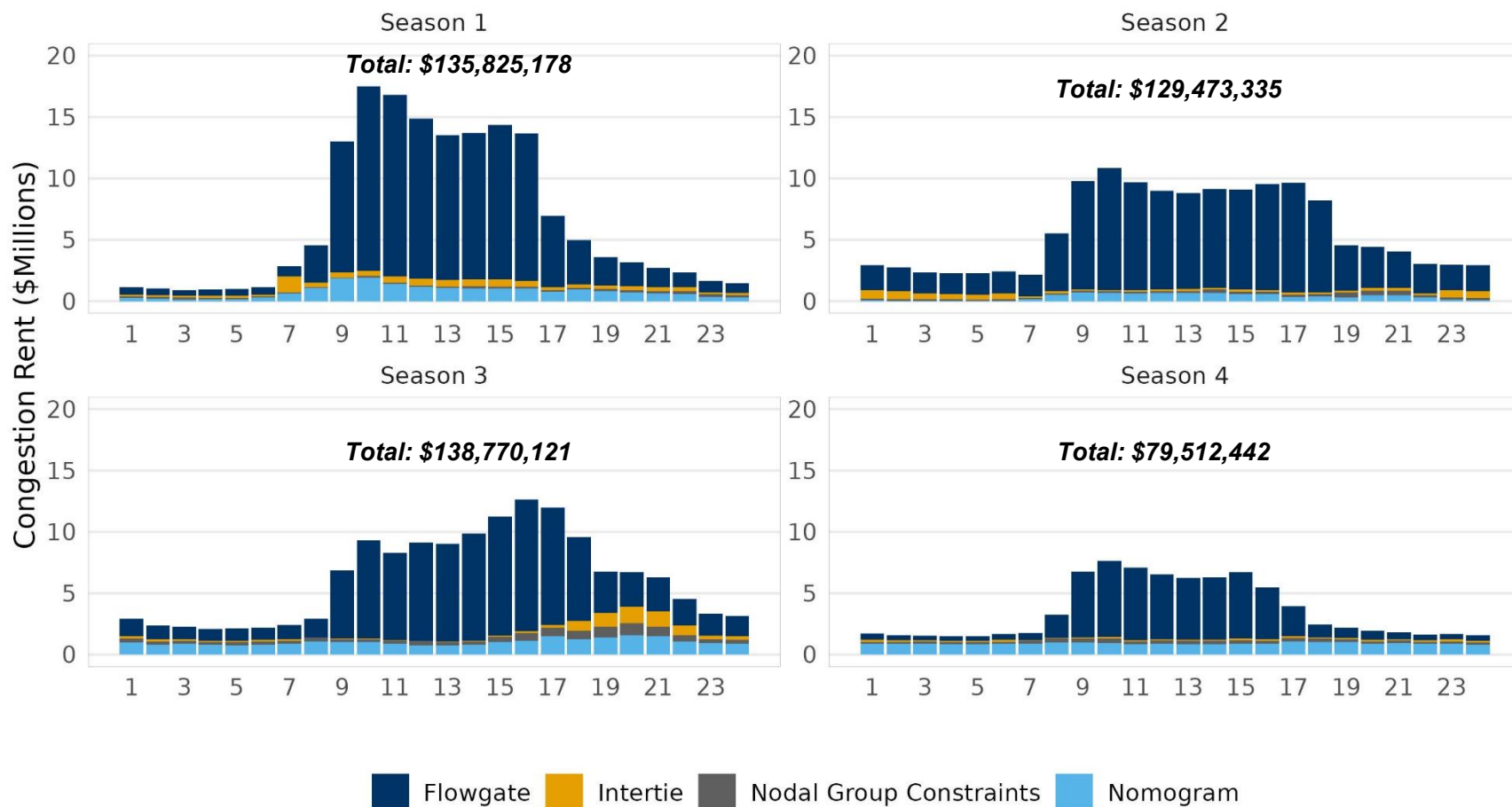
# Congestion rents are lower through Q4 and in-line with previous years



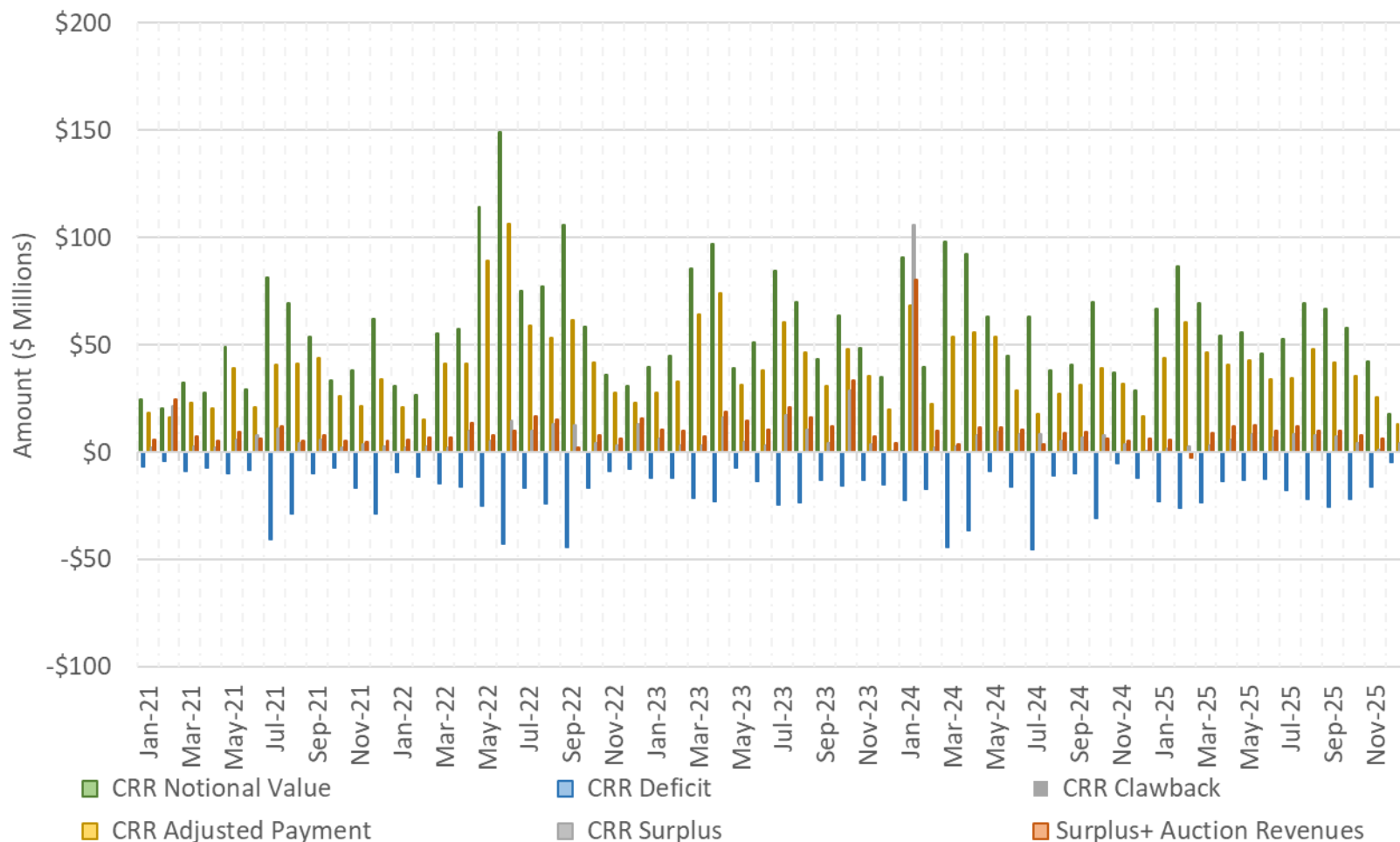
# Congestion rents overall are lower in 2025 in comparison to past years



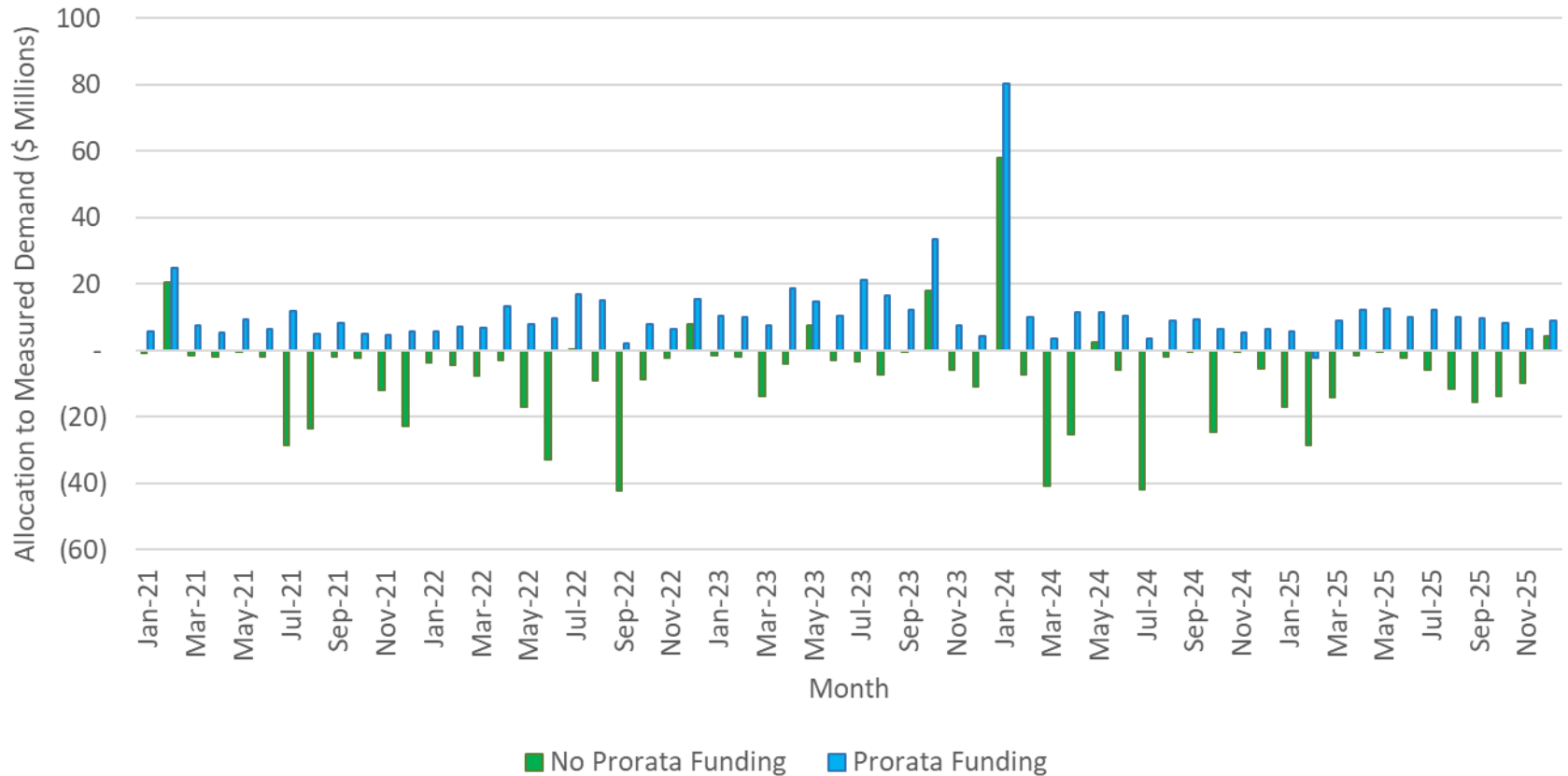
# Season 4 saw the lowest congestion rents, totaling just over \$79M



# Quarter four CRR deficits were consistent with the levels seen throughout 2025



# Pro-rata funding continues to provide surplus to load consistently





# Gas and Power index prices, and market costs

## Market Performance and Advanced Analytics

# Gas and Power index prices, and market costs

**Summary:** Due to a calm post-summer and limited gas price volatility, prices in the CAISO BAA and WEIM were stable throughout the end of the year. As a result, total wholesale electricity costs in 2025 were lower than prior years

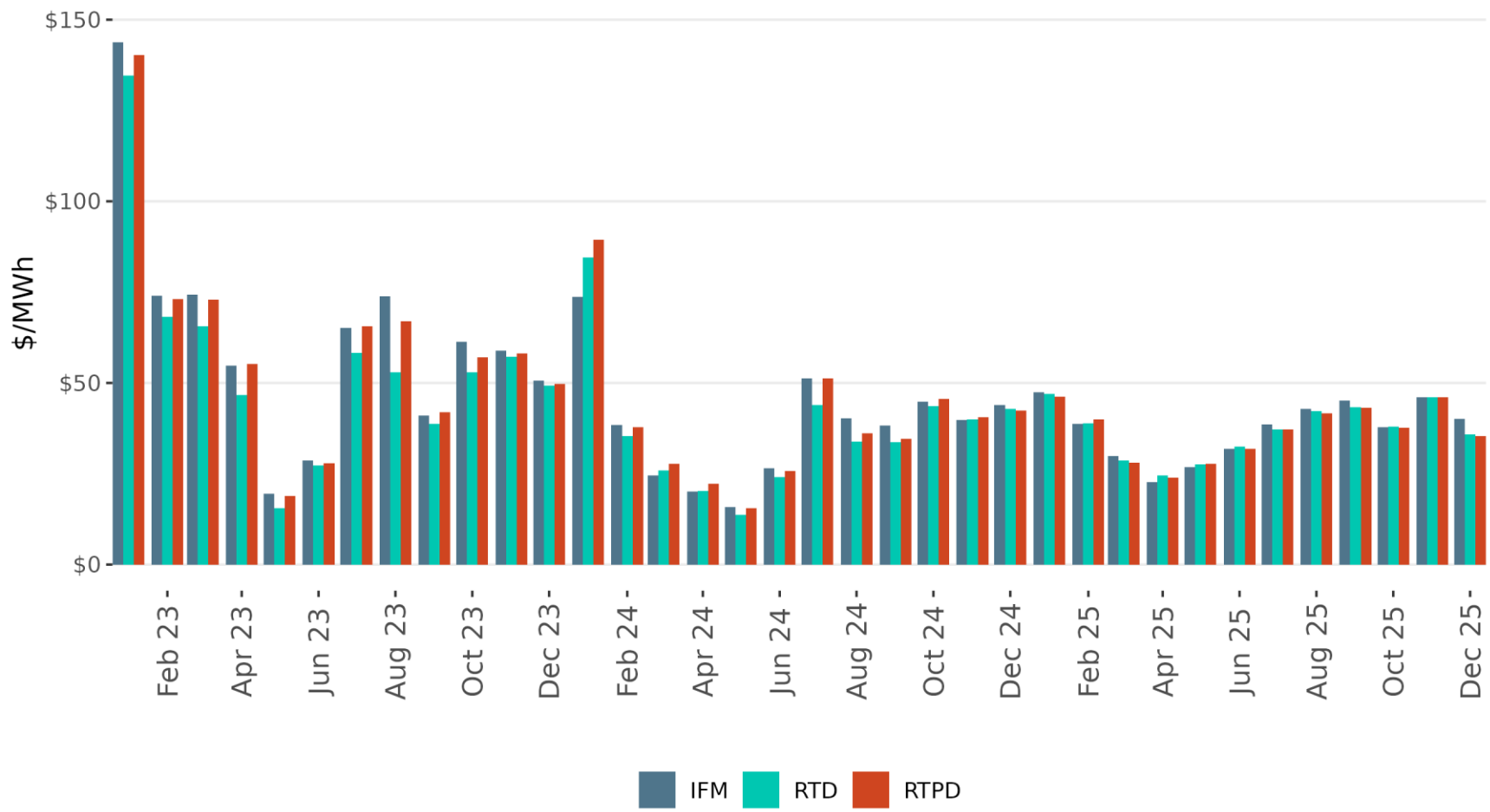
2025: \$8.46 billion

2024: \$9.15 billion

2023: \$14.5 billion

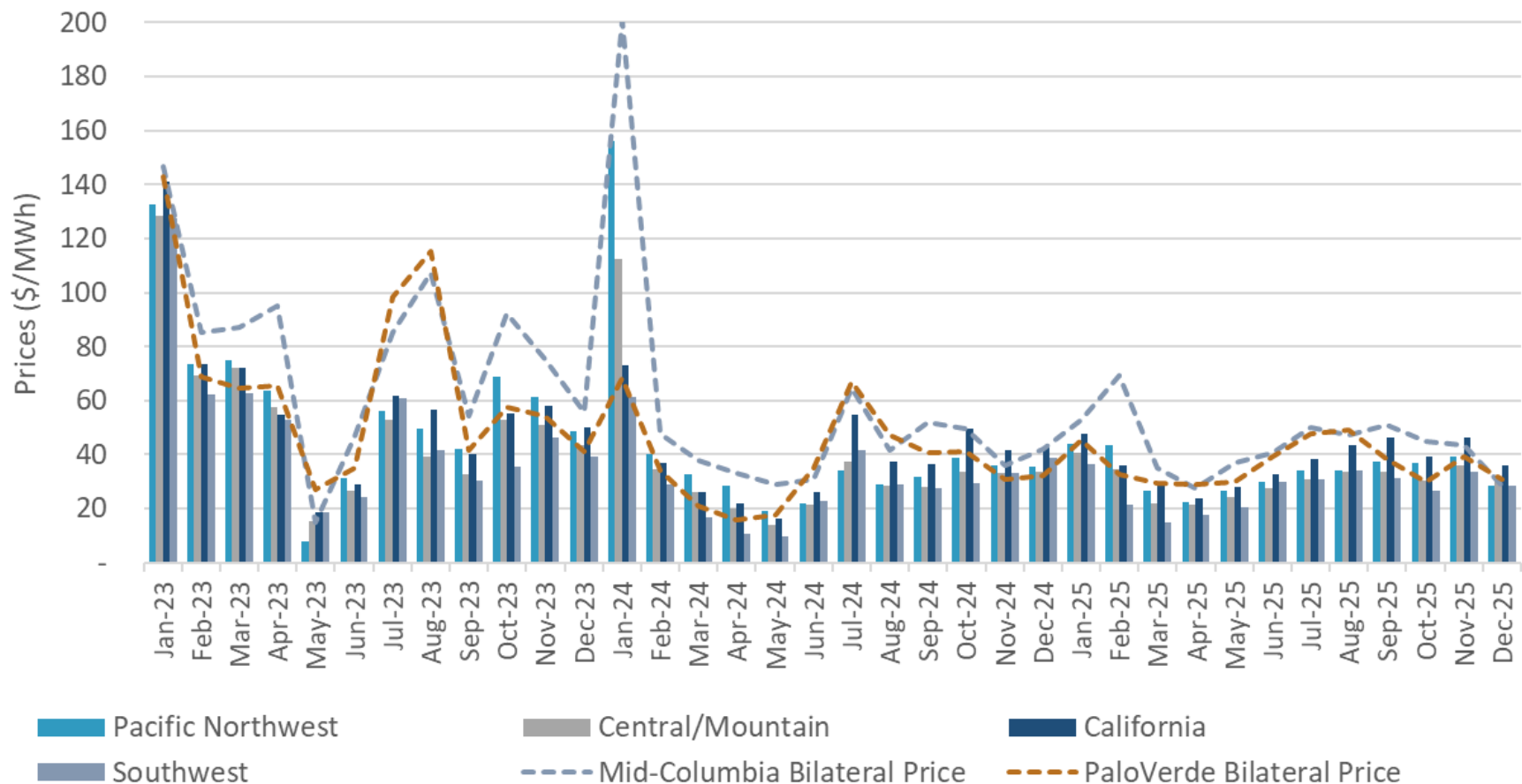
**Next Steps:** ISO staff continuously monitor Western bilateral markets and forward prices and provide updates on their impact to CAISO markets to stakeholders

# Prices remain stable across markets and below \$50 through Q4 of 2025

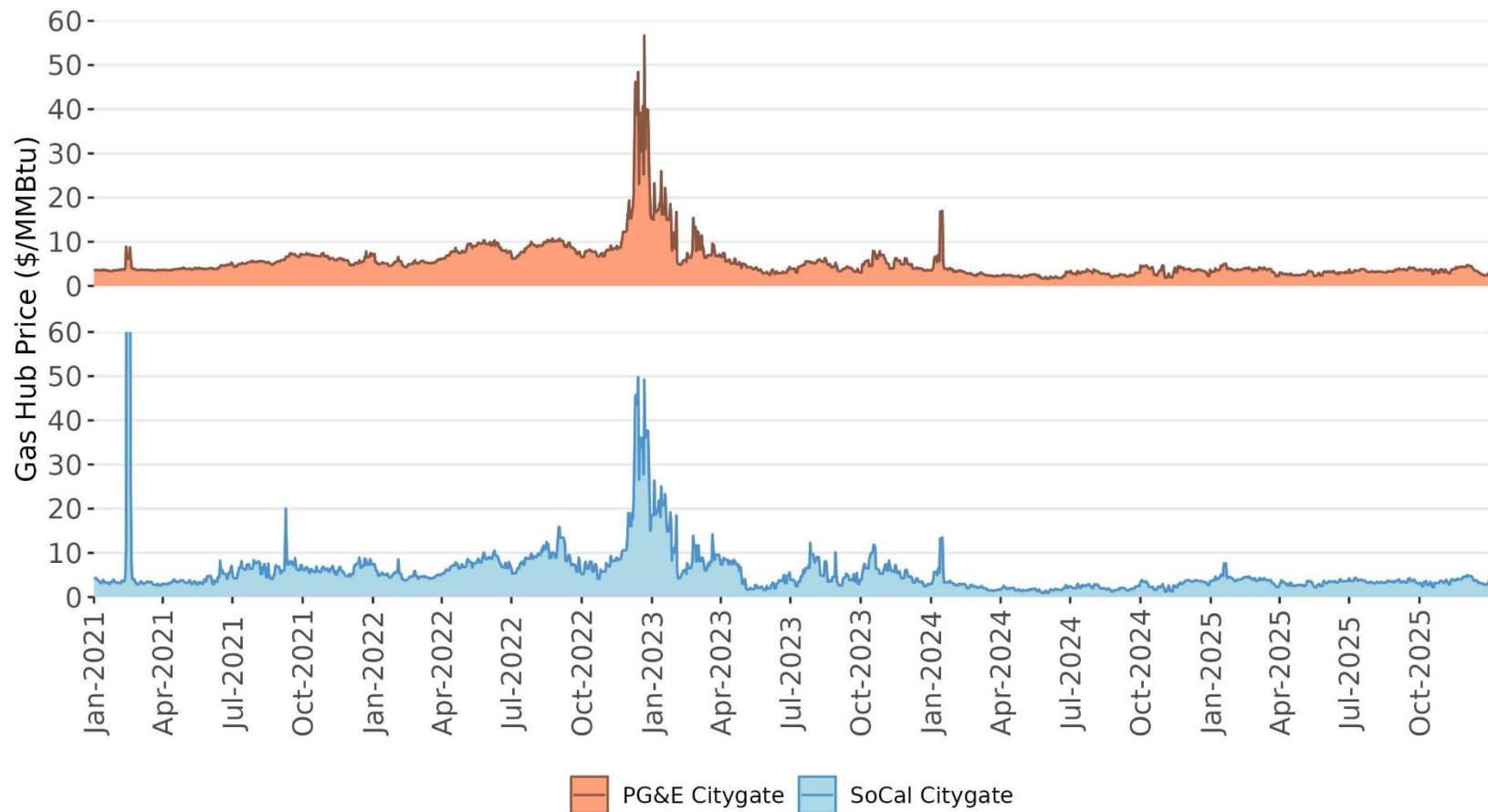


Note: Metric Based on System Marginal Energy Component (SMEC)

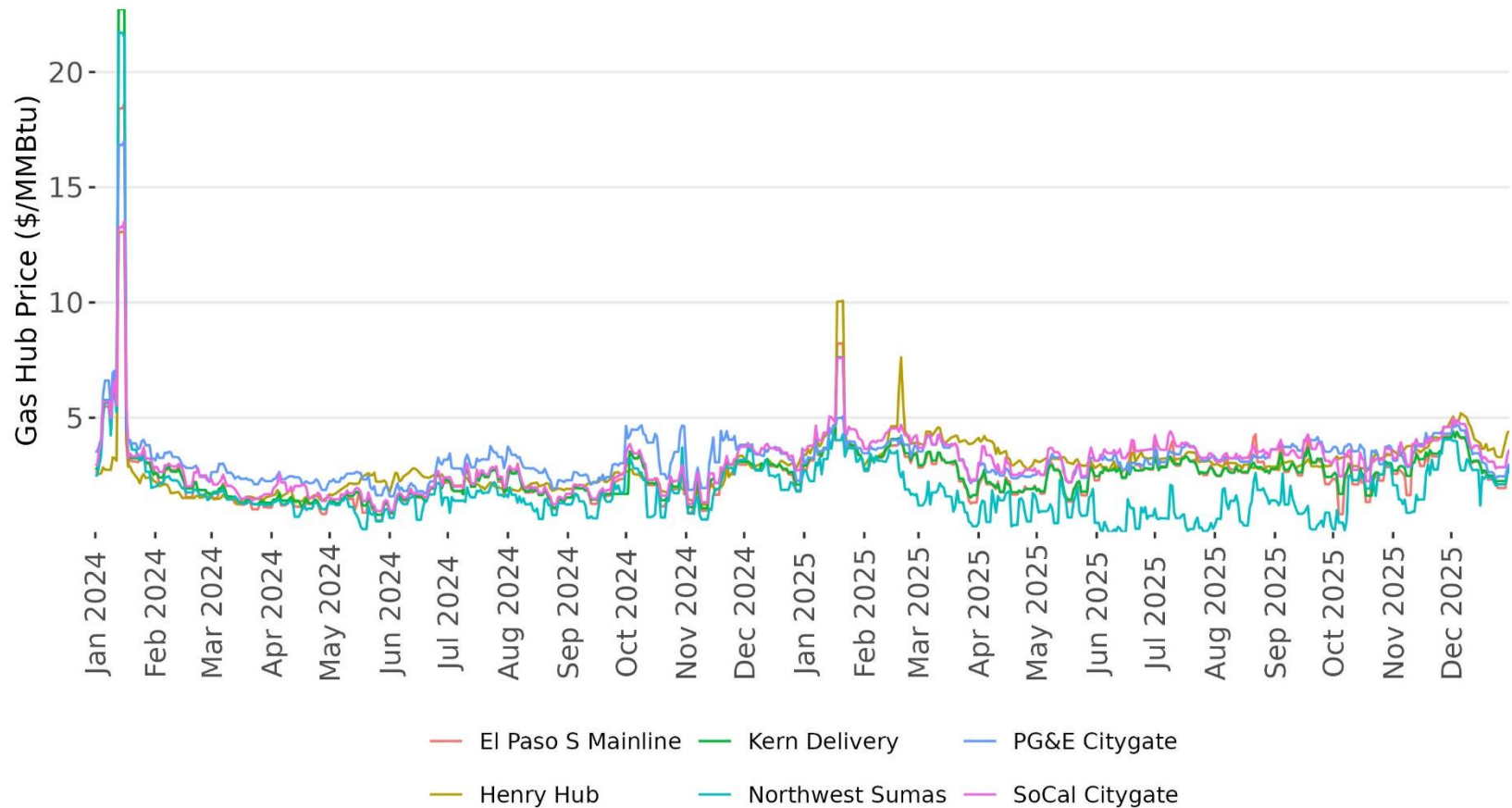
# Real-time prices in the western energy imbalance market remain stable



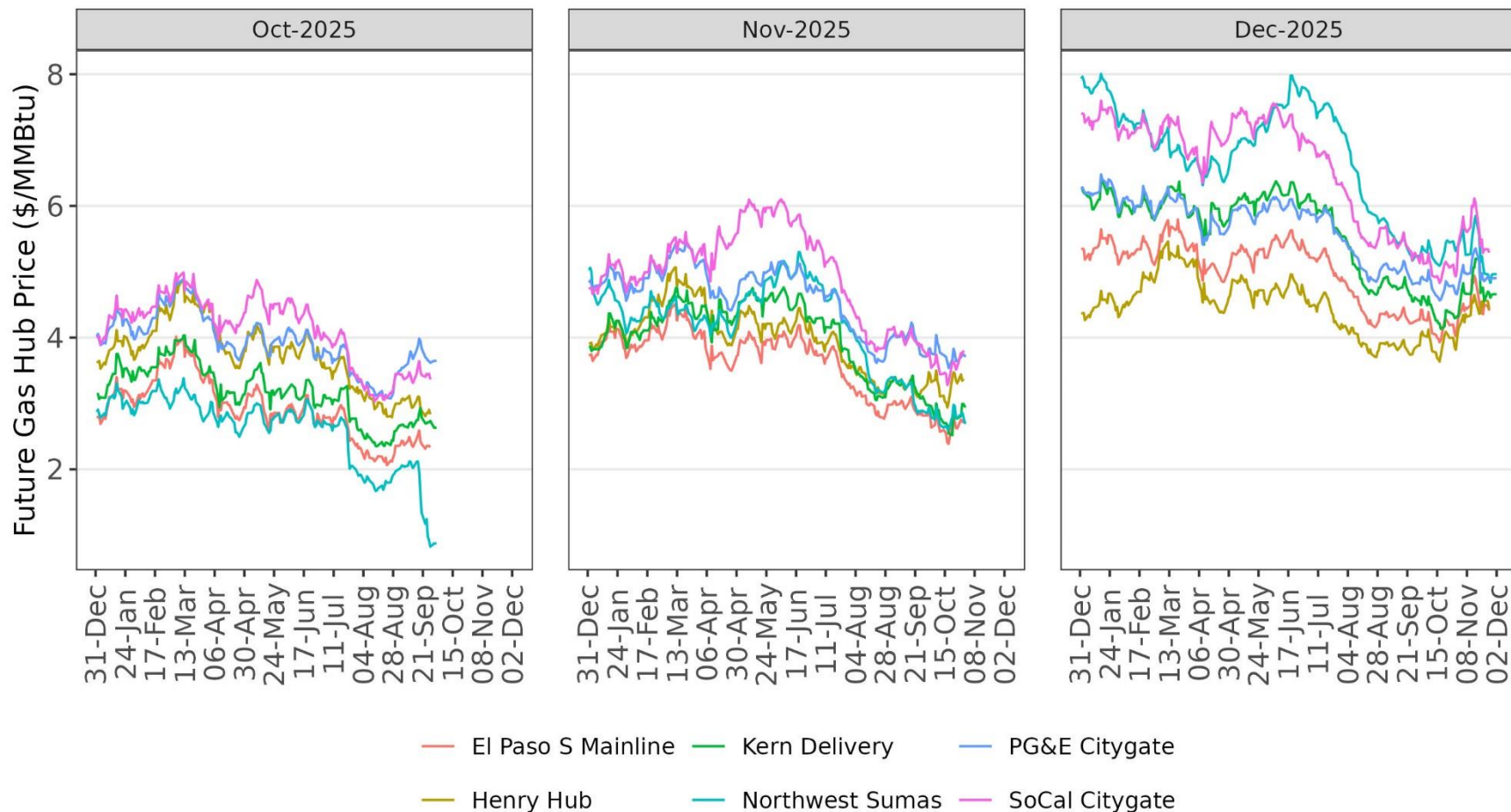
# California next-day gas prices were slightly higher compared to 2024 but relatively stable compared to 2021-2023



# Western next-day gas prices for major hubs returned to closely following each other in October after NW Sumas deviated over the summer months

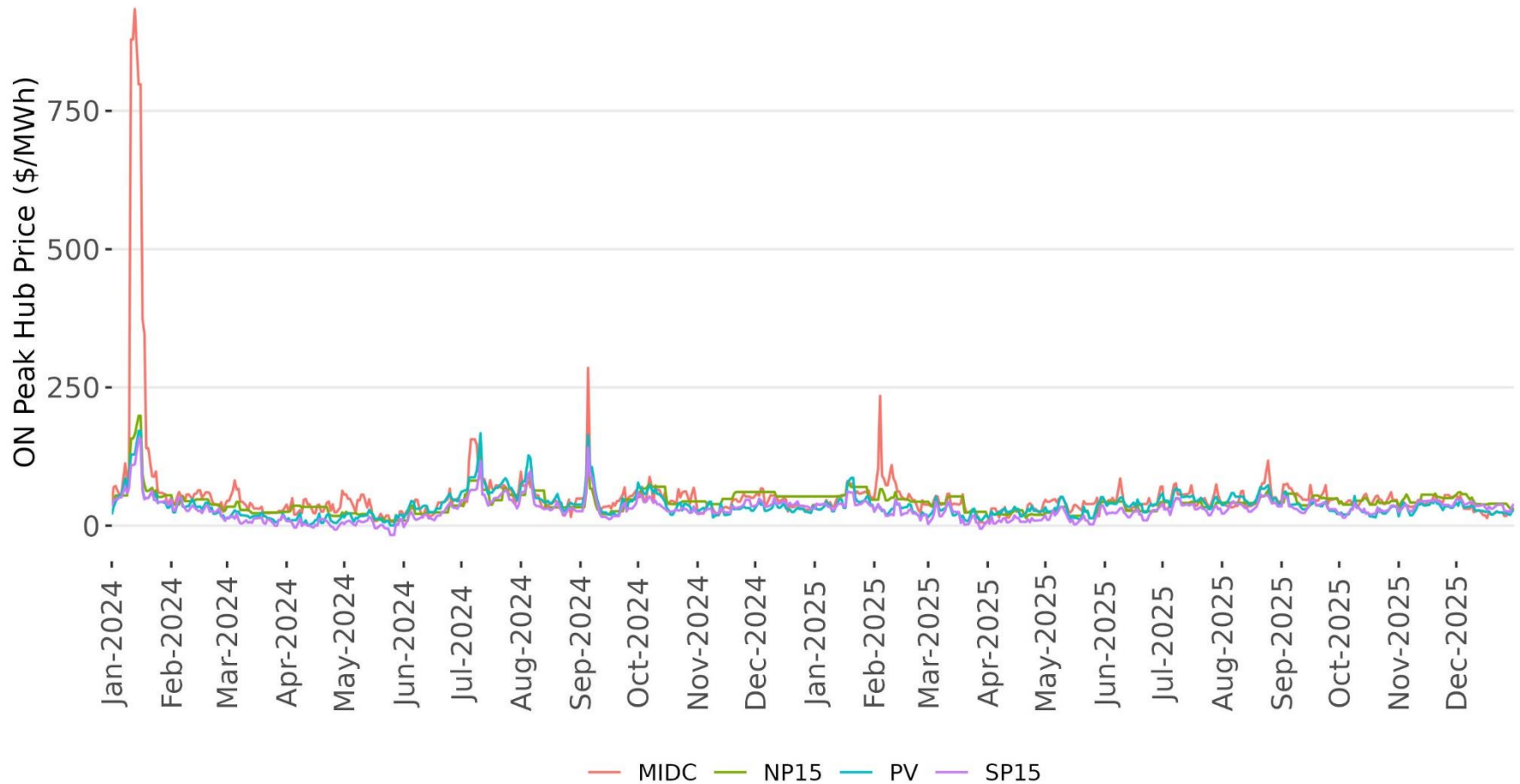


Future gas prices for October to December 2025 started declining in July and then rose slightly in late summer. December prices continued rising



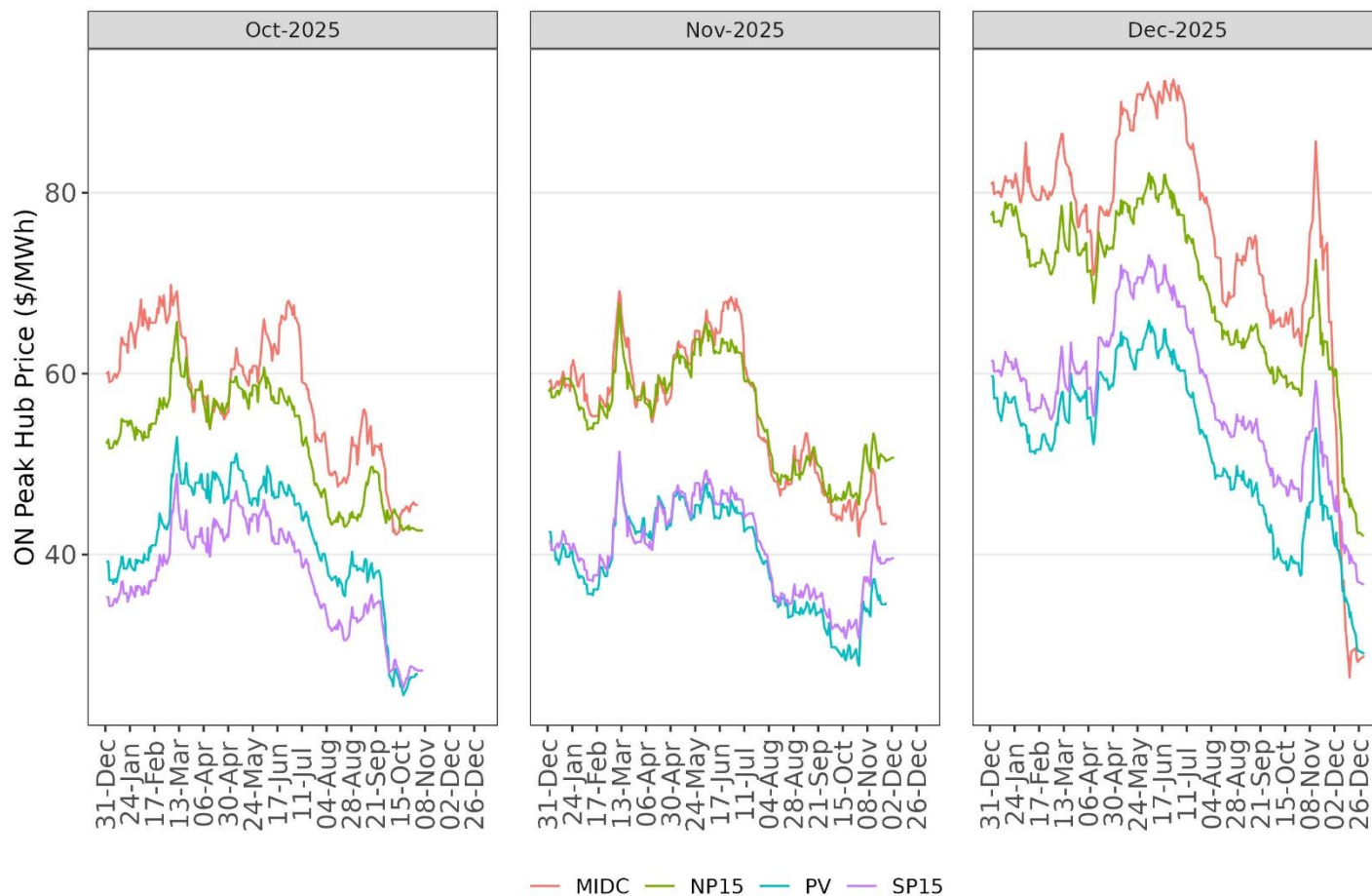


# Next-day on-peak bilateral power prices remained below \$85/MWh for September through December

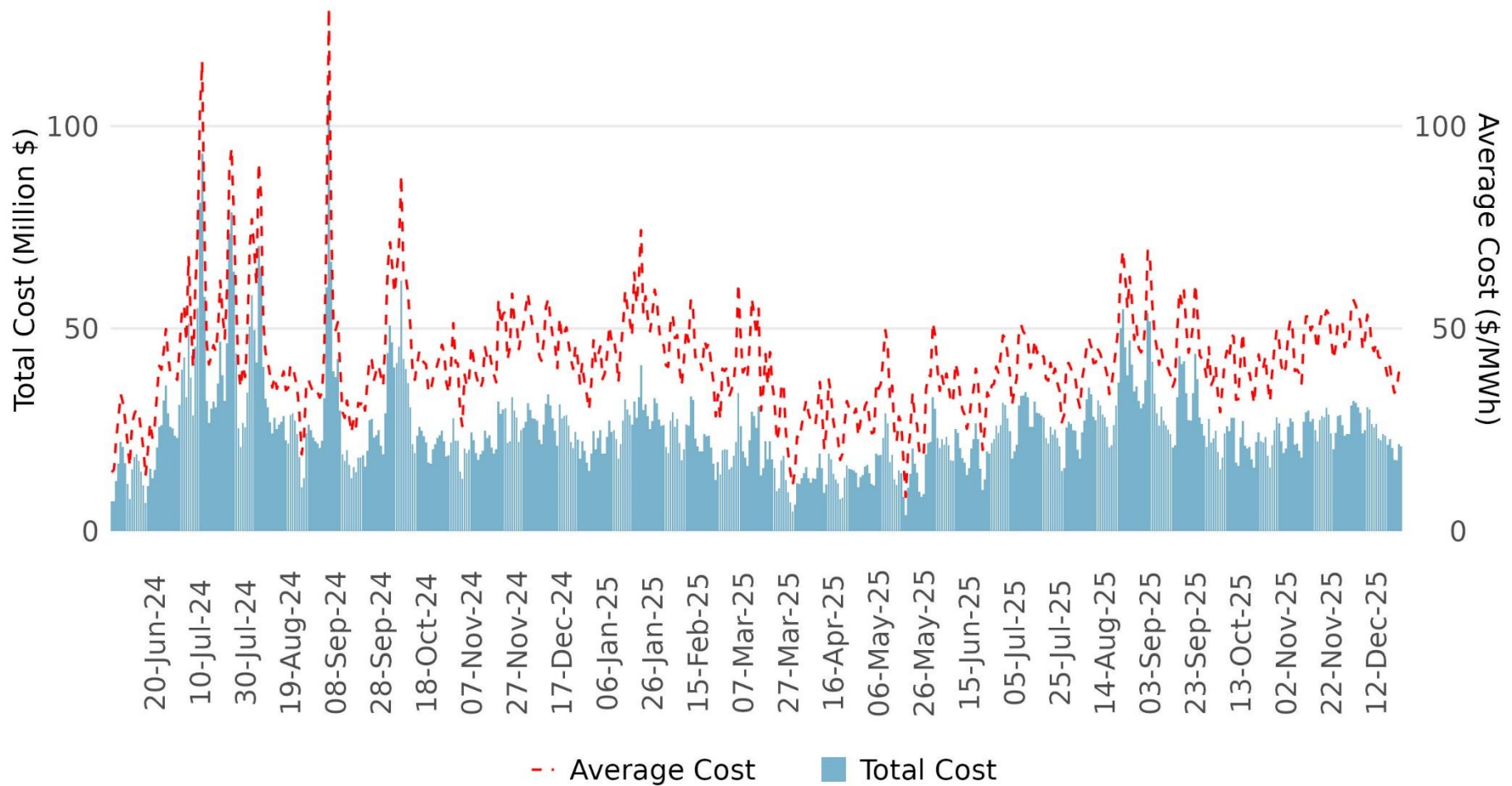




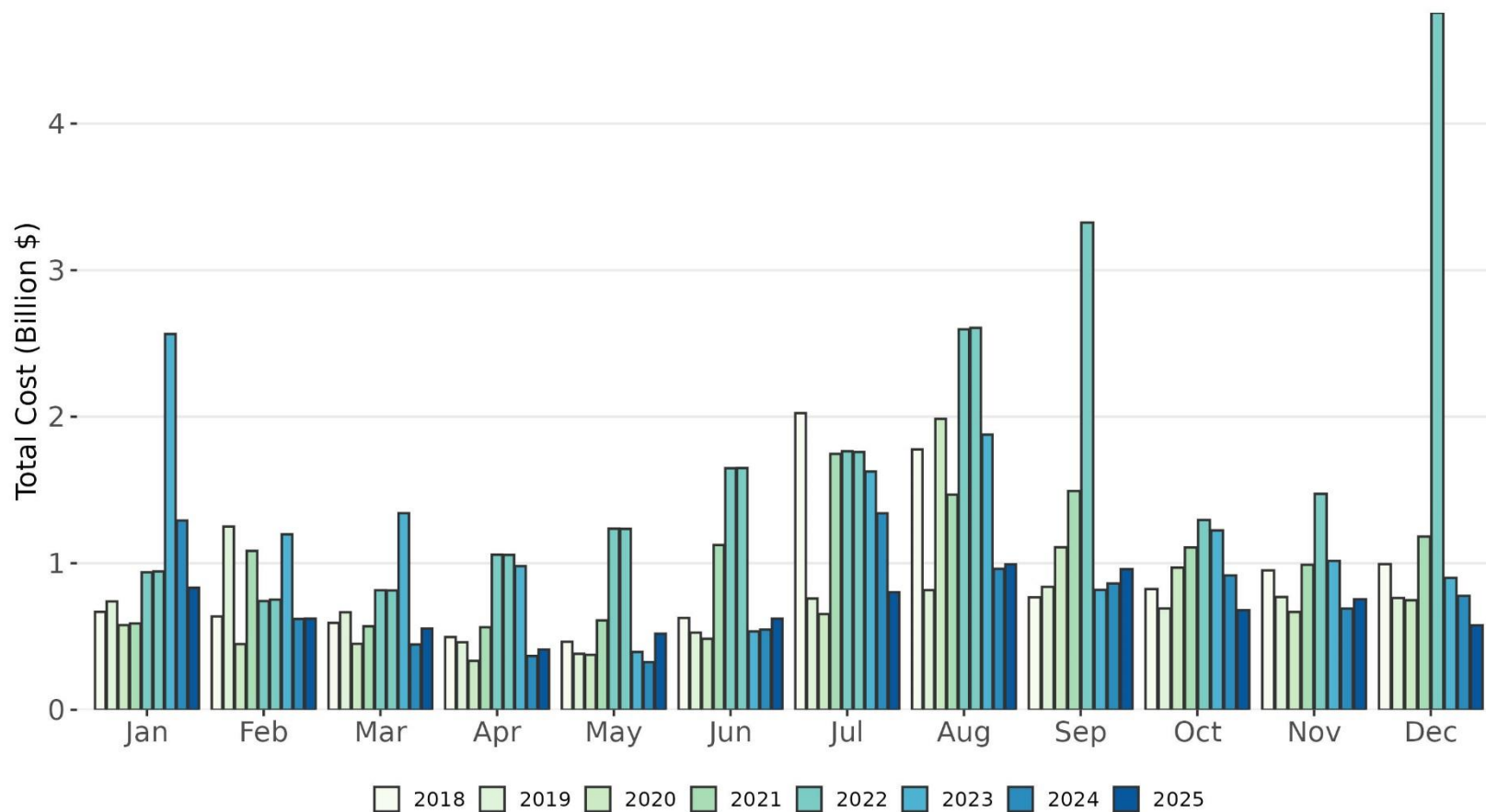
Future on-peak power prices for delivery in October, November, and December showed price separation between Mid Columbia and Palo Verde.



# Daily market costs reached the highest level in 2025 on January 21

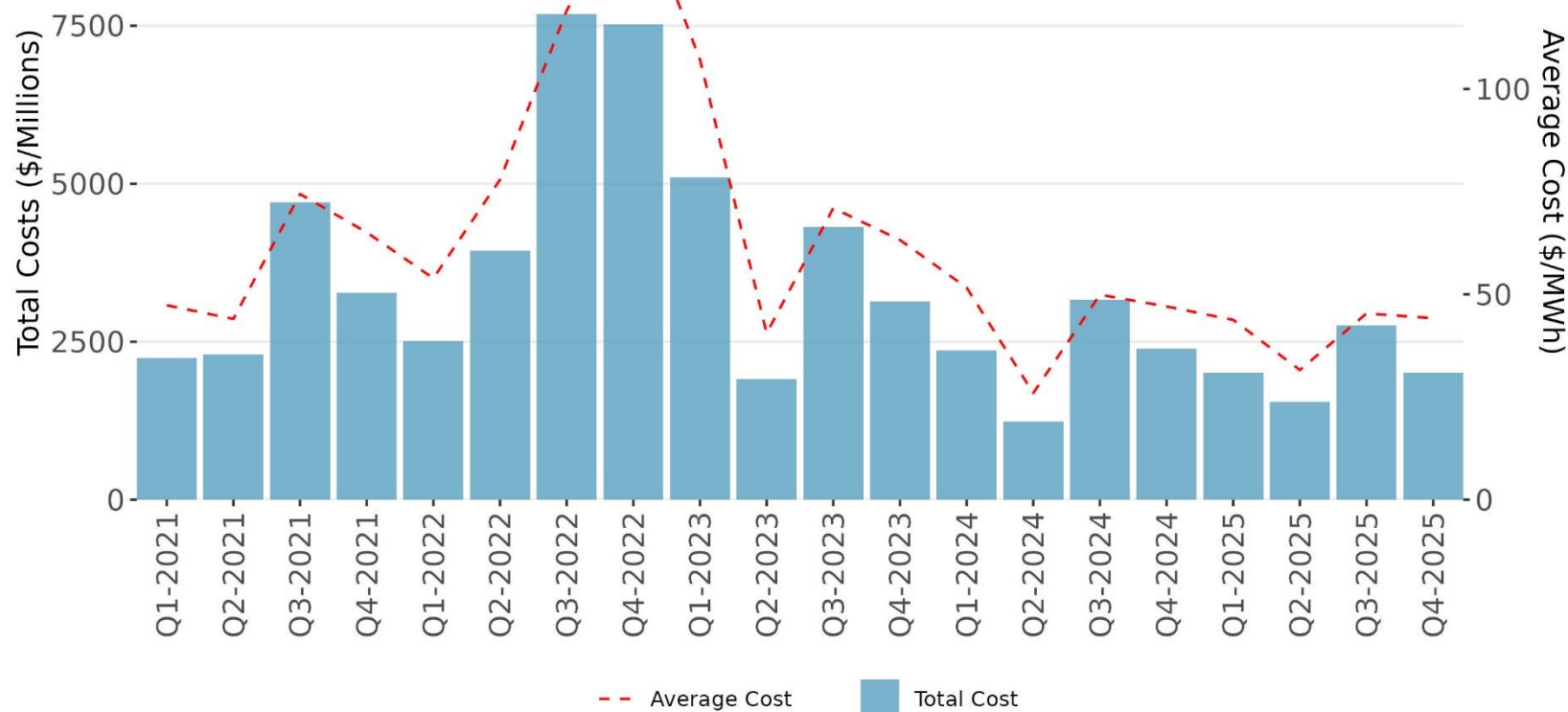


Monthly totals for October and December 2025 were lower than previous year, but higher for November



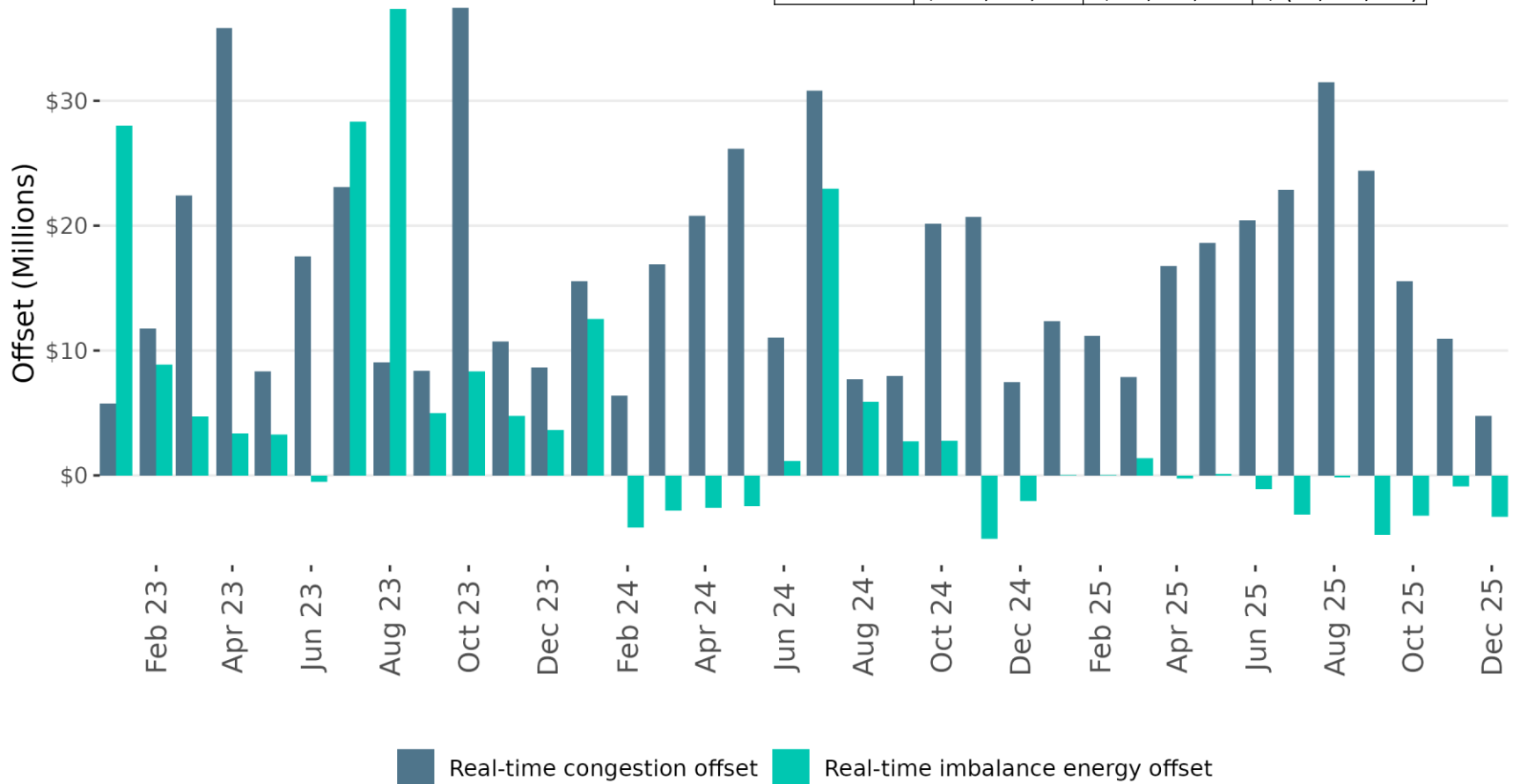
# Except for Q2, 2025 total costs were lower than 2024 total costs

Costs	2022	2023	2024	2025
Total Wholesale Electricity (\$billions)	21.67	14.48	9.15	8.46
Average per MWh (\$/MWh)	98.09	69.08	42.57	40.52



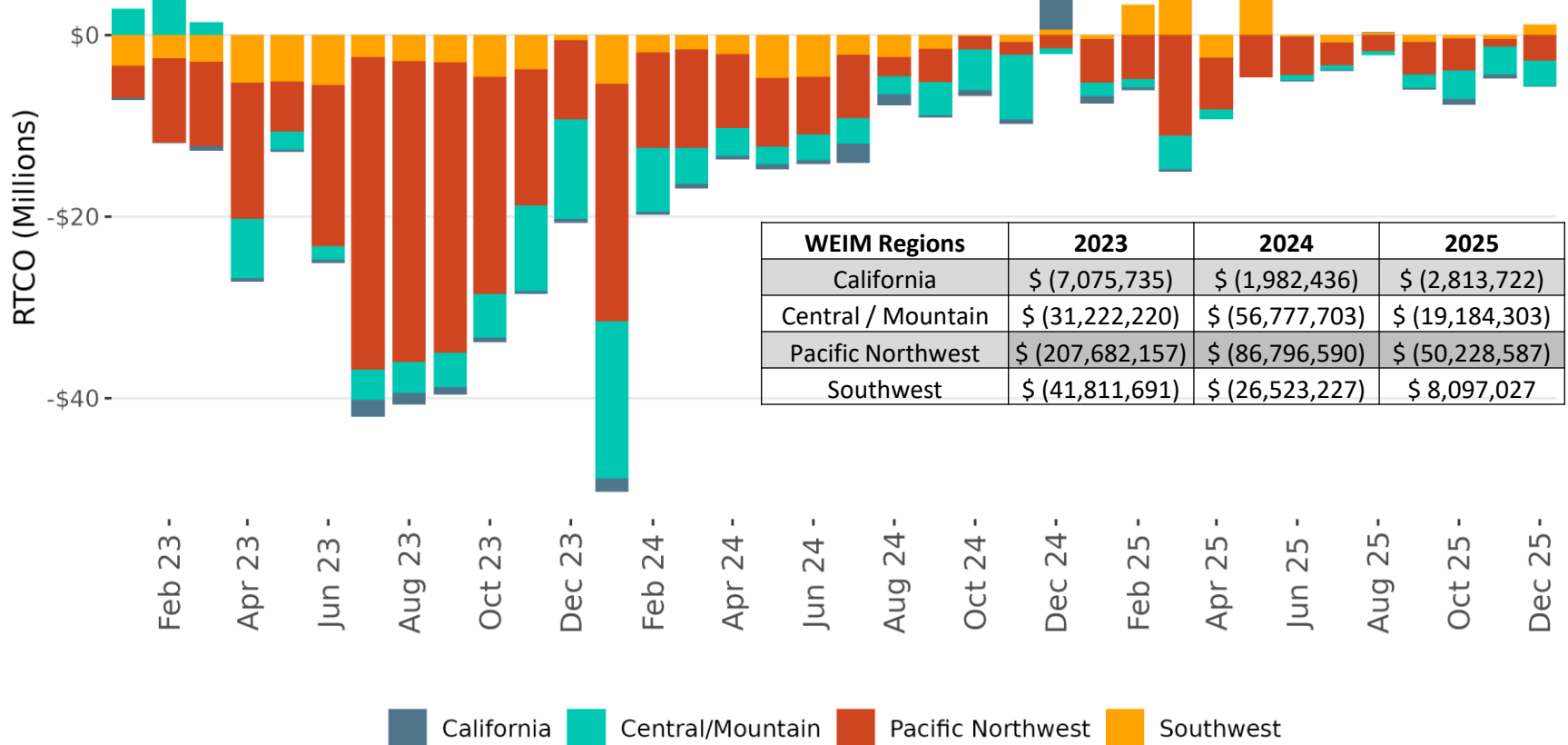
# ISO area real-time congestion offset costs have decreased coming out of Summer

Costs	2023	2024	2025
RTCO	\$ 198,950,051	\$ 191,689,015	\$ 197,228,761
RTIEO	\$ 135,142,157	\$ 28,920,357	\$ (15,211,091)



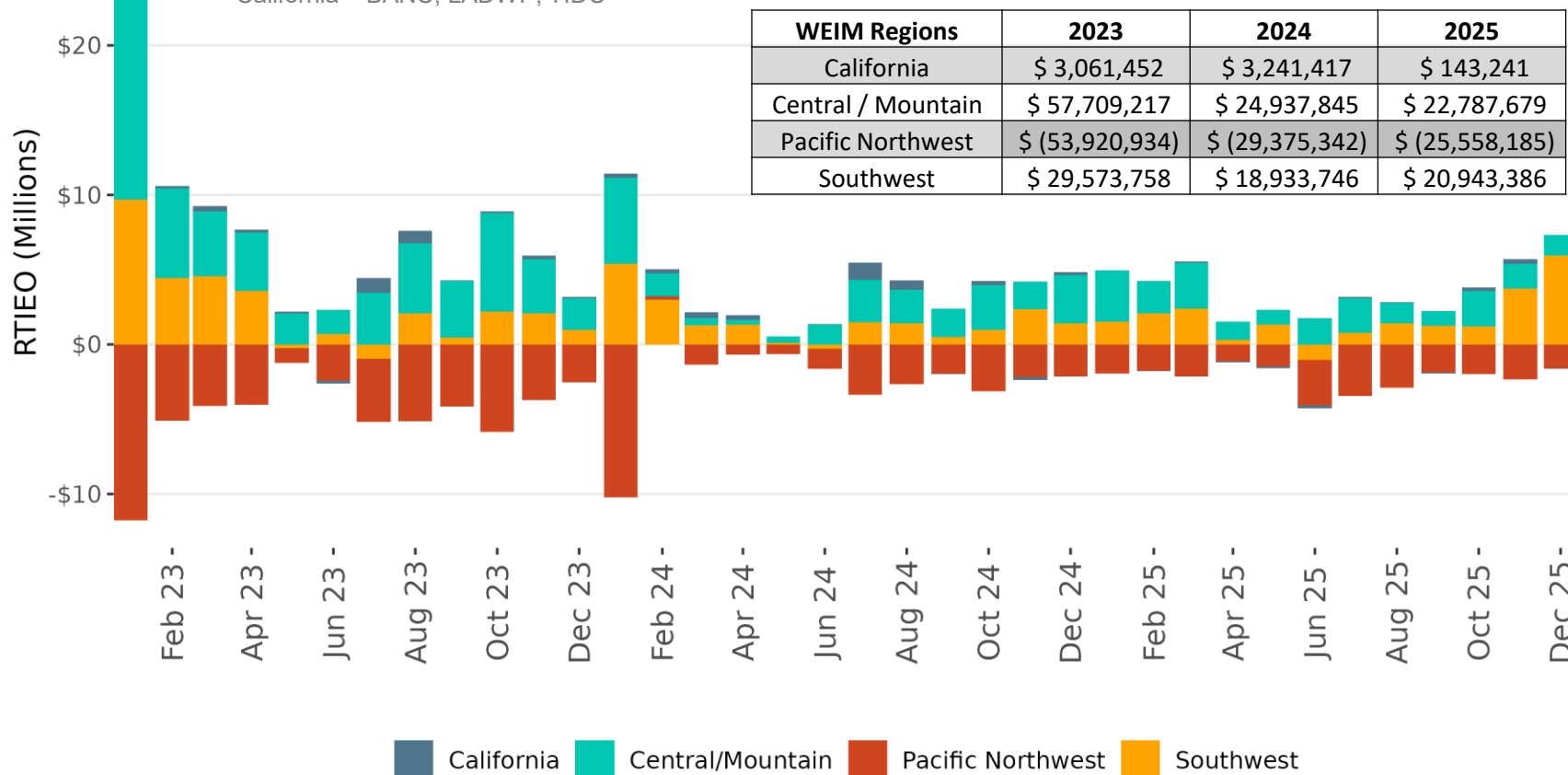
# Areas in the Pacific Northwest are allocated about 66 percent of the total net real-time congestion offset

- Southwest – AZPS, EPE, NEVP, PNM, SRP, TEPC, WALC
- Pacific Northwest – AVA, AVRN, BCHA, BPAT, PACW, PGE, PSEI, SCL, TPWR
- Central/Mountain – IPCO, NWMT, PACE
- California – BANC, LADWP, TIDC



# Real time imbalance energy offset costs have been low since January 2024

- Southwest – AZPS, EPE, NEVP, PNM, SRP, TEPC, WALC
- Pacific Northwest – AVA, AVRN, BCHA, BPAT, PACW, PGE, PSEI, SCL, TPWR
- Central/Mountain – IPCO, NWMT, PACE
- California – BANC, LADWP, TIDC

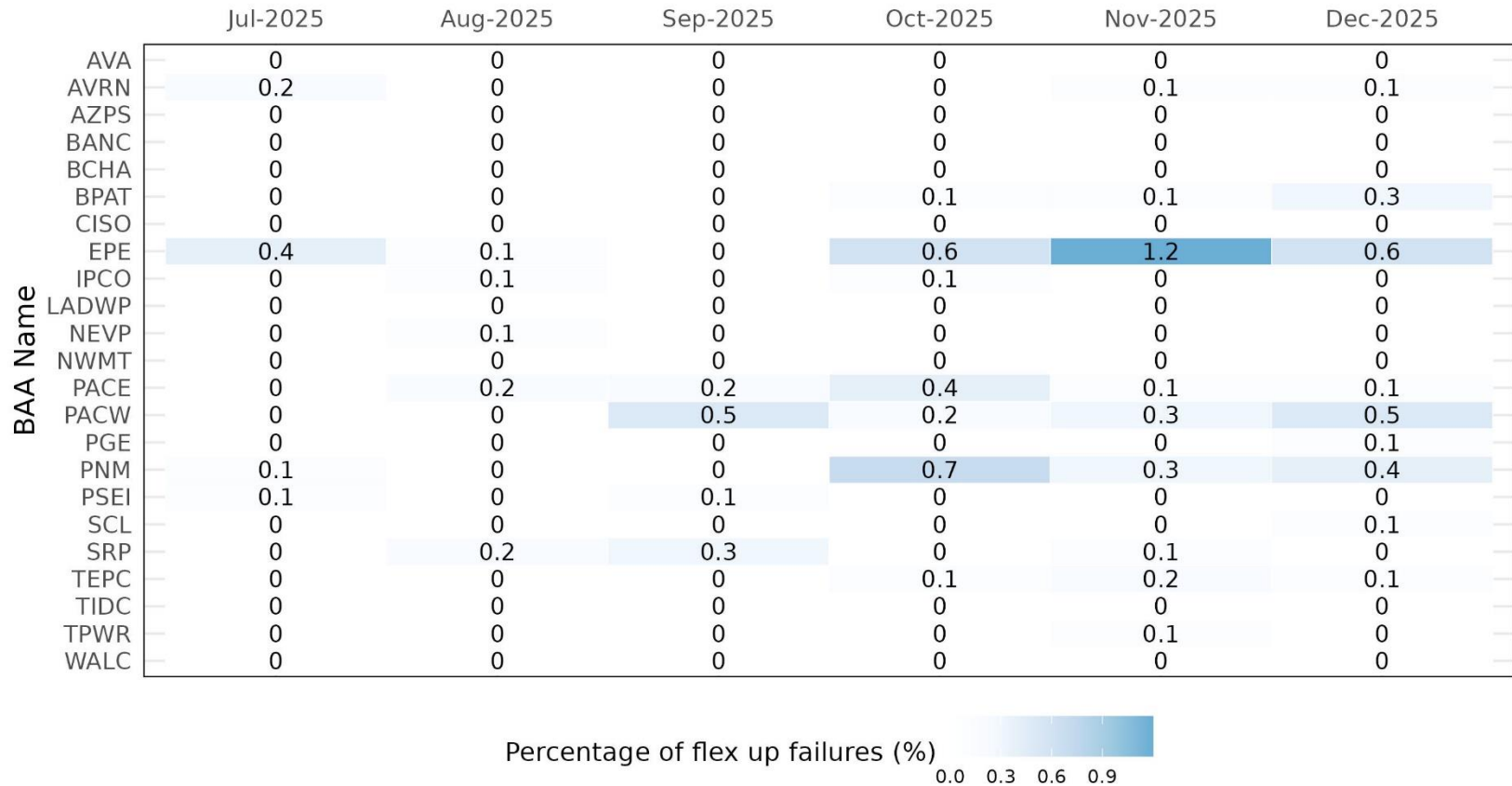


# WEIM Resource Sufficiency evaluation performance

Market Performance and Advanced Analytics



# Flexible ramp up failures for the last 6 months are low, with the highest value at 1.2%



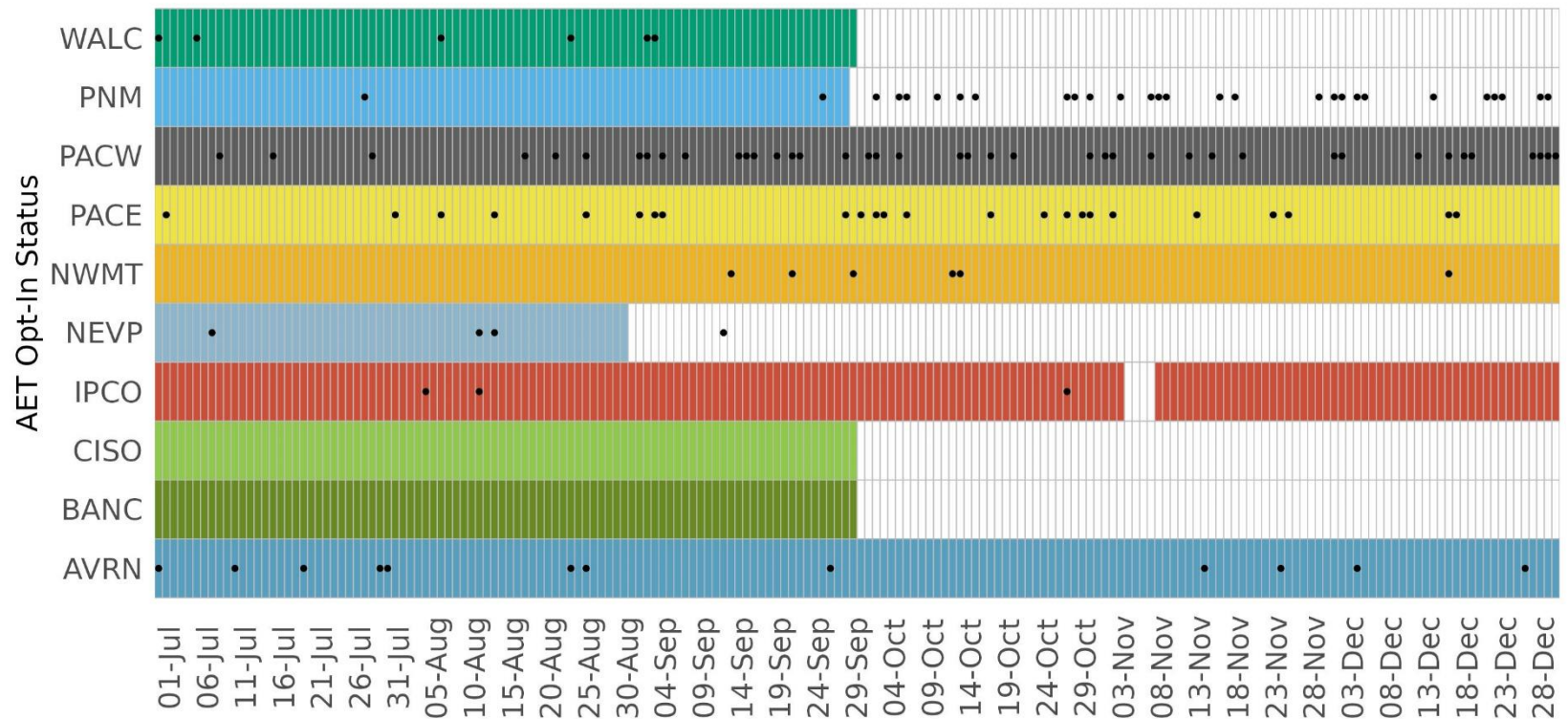
# Flexible ramp down failures for the last 6 months are low, with the highest value at 2.2%

		Jul-2025	Aug-2025	Sep-2025	Oct-2025	Nov-2025	Dec-2025
BAA Name	AVA	0	0.1	0	0	0	0
	AVRN	0	0	0	0	0	0
	AZPS	0	0	0	0.1	0	0.1
	BANC	0	0	0	0	0	0
	BCHA	0	0	0	0	0	0
	BPAT	0.1	0	0.2	0.1	0	0.2
	CISO	0	0	0	0	0	0
	EPE	0	0	0	0.8	1	2.2
	IPCO	0	0	0	0	0	0
	LADWP	0	0	0	0.2	0	0.1
	NEVP	0	0	0	0	0	0
	NWMT	0	0	0.1	0.2	0	0.8
	PACE	0	0.4	0	0	0	0
	PACW	0.1	0.1	0	0	0.5	0
	PGE	0	0	0	0	0	0
	PNM	0	0	0	0	0	0
	PSEI	0	0	0	0	0	0
	SCL	0.3	0	0	0.1	0	0
	SRP	0	0	0	0	0	0
	TEPC	0	0	0	0	0	0
	TIDC	0.3	0.1	0	0	0	0
	TPWR	0.3	0	0	0	0.1	0
	WALC	0	0	0	0	0.7	1.5

Percentage of flex down failures (%)

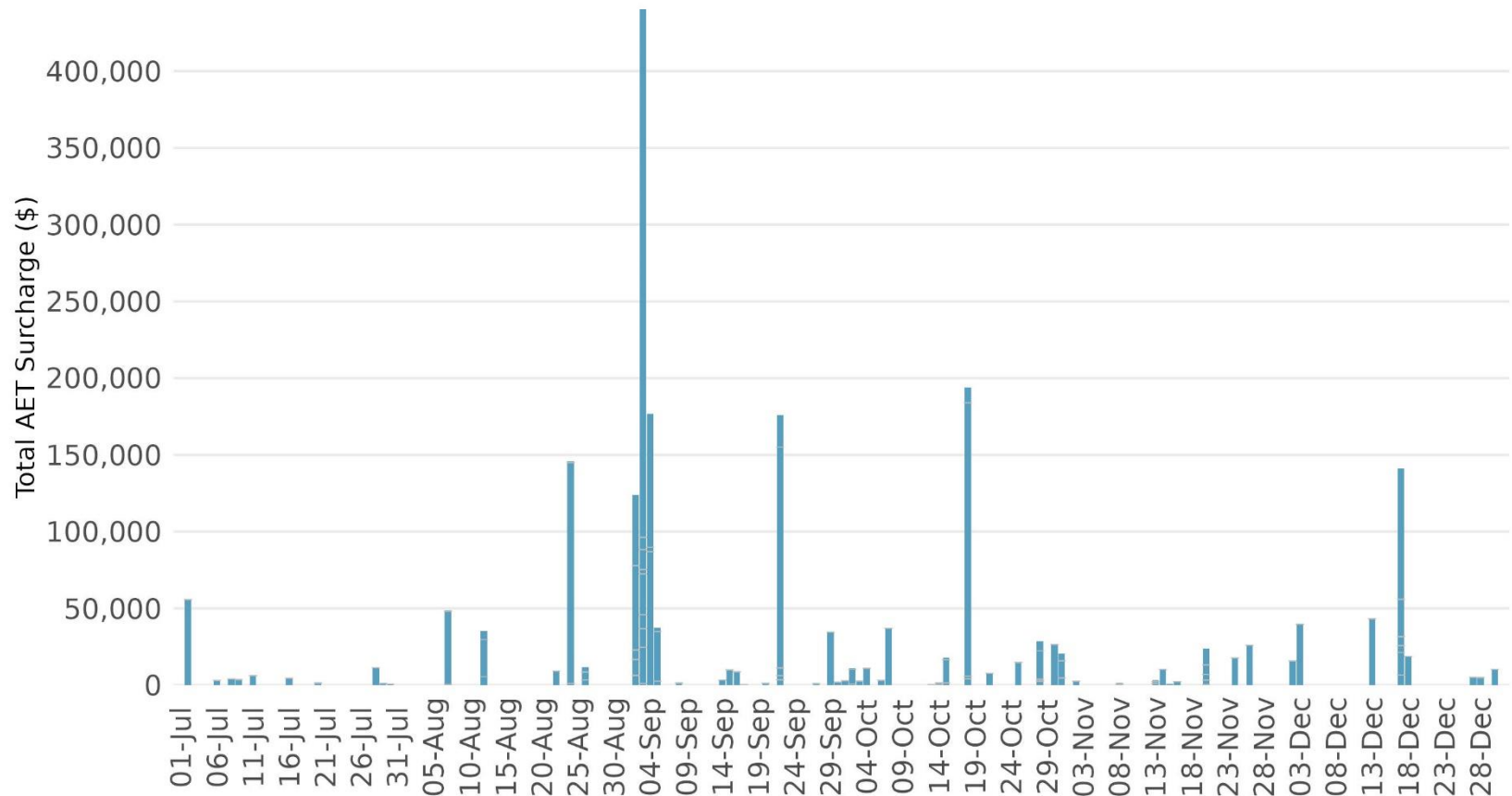
0.0 0.5 1.0 1.5 2.0

# 5 WEIM balancing areas opted-in for the assistance energy transfer (AET) for the last quarter of the year



- RSE Failure

The total AET surcharge assessed in the last quarter was \$748K, lower than the previous quarter (Q3) at \$1.36 million



# Market Disruptions

## Market Performance and Advanced Analytics

# Enhancement to mitigate for market disruptions

**Action taken:** CAISO has implemented a market enhancement to mitigate for market disruptions observed in the real-time market

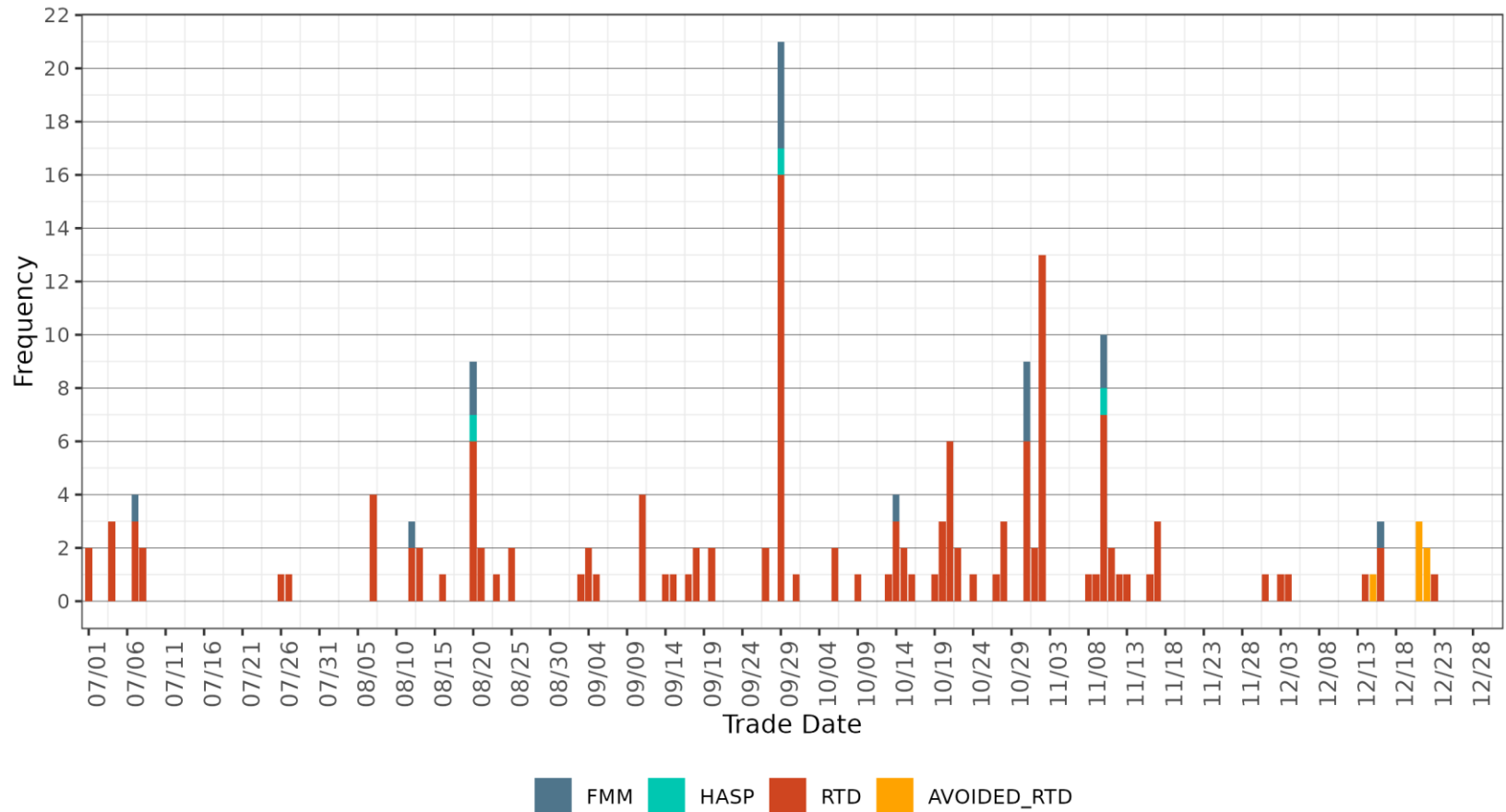
**Impact:** Reduced market disruptions in real-time and reduced accompanying manual actions taken in real time

**Next Steps:** CAISO will continue to monitor the frequency of market disruptions in the real time market

## A software enhancement has eliminated the practice of excluding resources from participating in the real-time market

- As part of the market clearing process, the CAISO implemented a software enhancement to identify infeasible constraints and the magnitude of the infeasibility
- The market then finds a solution by clearing schedules and awards for all resources by relaxing it by the amount of the infeasibility
- The resource with the infeasible constraint gets an optimal dispatch
- Although infrequent and potentially minor, there may be instances where the resource with relaxed constraint cannot meet dispatch

# Market disruption frequency dropped after software enhancements were implemented; there were six avoided market disruptions in RTD





# RTPD Enhancement to Consider the Terminal Condition

Operations, and Market Performance and Advanced Analytics

# What is the Terminal Condition?

- A specific operational scenario considering the Minimum Down Time (MDT) involving only long-start resources (cycle time > 255 minutes) with Day Ahead awards, where there is a gap in the DA schedule.

BAA	Name	PMin	PMax	U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13	U14	U15	U16	U17	U18	U19	U20	U21
				[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]
CISO	BUCKBL_2_PL1X3	125.00	493.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CISO	COLUSA_2_PL1X3	110.31	641.00	310.70	311.00	311.00	295.00	295.00	307.70	311.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	175.18	229.90	275.75	325.25	484.40	534.50	610.60
PACE	CURRCRK_7_UNITS	15.00	530.00	339.20	425.00	291.31	293.65	327.00	290.86	201.45	142.45	141.74	141.16	140.70	191.55	402.52	401.09	399.62	399.62	402.52	363.68	414.44	418.75	420.81
PACE	DAVEJOHN_7_UNIT 3	10.00	223.00	100.00	110.00	100.00	100.00	100.00	110.00	110.00	110.00	110.00	110.00	110.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00
PACE	DAVEJOHN_7_UNIT 4	10.00	330.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00	260.00
CISO	DELTA_2_PL1X4	231.00	880.00	545.00	545.00	545.00	545.00	510.00	510.00	312.50	245.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	245.00	312.50	510.00	545.00	793.00	836.00
PACE	DYNAMO_7_UNITS	15.00	602.00	483.00	483.00	434.37	441.00	444.83	483.00	483.00	361.00	410.47	483.00	483.00	483.00	481.00	479.00	478.00	477.00	475.00	477.00	390.98	397.19	483.00
CISO	GATWAY_2_PL1X3	133.00	585.00	529.90	538.30	539.60	540.20	524.81	472.41	455.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	194.00	253.90	267.69	431.90	472.41	501.00
PACW	HERMISTO_7_UNIT 3	15.00	252.00	212.00	213.00	213.00	214.00	214.00	214.00	213.00	213.00	171.48	171.38	209.00	207.00	206.00	205.00	204.00	204.00	203.00	203.00	204.00	204.00	205.00
CISO	HIDSRT_2_UNITS	200.00	850.00	804.00	806.00	807.00	783.00	784.00	786.00	787.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	782.00	785.00	786.00	788.00

Red is Gap between DA Awards, Green is MDT

- Should RTD economically retain the resource online beyond its DA schedule (or the Generation Dispatcher blocks the shutdown for evaluation) into its MDT:
  - The Terminal Condition occurs: The resource must remain online until its next scheduled DA start.

# The ISO is exploring an enhancement of the logic for managing Terminal Condition

1. Only for DA Long Start resources (resources with cycle time >255 minutes)
  - i. Where the period between DA awards is equal to their min down time
2. The market will treat the above RTPD shutdown as binding;
  - i. RTD will not keep the resource online
  - ii. A new Terminal Condition Reason code will be displayed on the Unit Start-up/Shutdown UI for operator awareness
  - iii. Should the Gen Dispatcher require the resource to stay online:
    - a. An ED will be required (normal ED process).
3. All other DA long start awards are treated the same as today, not binding RTPD and no Terminal Condition UI message

# Benefits of the Software Enhancement

- Eliminates undesired Terminal Conditions
- Reduces participants' concerns about resource dispatches and potential disputes
- Improves operator awareness
- Provides ability to override should conditions require the resource online
- The ISO will initiate a BPM process change to implement this enhancement

# Market Issues

## Market Performance and Advanced Analytics Short Term Forecasting

## Issue 1: RTD Mitigation in intervals 11-12

- The ISO discovered a software issue where the RTD market incorrectly designated certain transmission constraints as non-competitive in intervals 11-12 due to a bid processing issue.
- This issue may have led to over-mitigation of some resources in the RTD market.
- The issue was present from March 2021 to September 2025.

# Issue 1: RTD Mitigation in intervals 11-12

For the five-year period during which this issue existed, the potential impact is limited

Year	Total Constraints with RTD Intervals Possibly Over-Mitigated	Highest percentage of RTD intervals flagged
2021	99	0.48%
2022	125	1.22%
2023	103	0.50%
2024	88	0.43%
2025	92	2.03%
2021-2025	299	0.35%

The table summarizes

- i) the number of constraints that may have been incorrectly designated as non-competitive, and
- ii) for the constraint with the greatest impact, the percentage of RTD intervals flagged with the issue

## Issue 2: July 7, 2025 LMP MCC Issue

- In the day-ahead market for trade date July 7, 2025 the ISO associated an ISO nomogram with the incorrect Balancing Authority.
- The OMS\_17906124\_TL50005\_NG was active and binding with a shadow price in three hours on July 7, 2025 (HE 9, 17, 18) but the Marginal Component for Congestion (MCC) for SP-Tie transactions did not accurately reflect the nomogram congestion.
- Internal Resource LMPs were not impacted and accurately reflected the nomogram congestion.



## Issue 2: July 7, 2025 LMP MCC Issue

- The issue impacted day-ahead energy settlements (CC6011) for Intertie Resources and the overall impact for the three hours is that Intertie transactions should have received a lower charge for energy:

HE	Current CC 6011 Charges	Revised CC 6011 Charges	Difference
9	(\$44,404.00)	(\$42,257.48)	\$2,146.52
17	(\$131,124.00)	(\$134,130.07)	(\$3,006.07)
18	(\$139,787.00)	(\$128,763.19)	\$11,023.81
Grand Total	(\$315,315.00)	(\$305,150.74)	\$10,164.26

- The issue was discovered after the expiration of the price correction time horizon; therefore, LMPs could not be corrected, and the current charges will remain in place.

## Issue 3: Bidding expectations for Co-located resources using the Off-Grid Charging Indicator

- Co-located storage resources providing flexible (flex) resource adequacy (RA) can also use the off grid charging indicator (OGCI).
- The OGCI prevents resources from receiving market awards to charge from the grid and only allows for charging market awards up to the generation of the co-located generation resource.
- Storage resources are able to provide flex RA for their charging and discharging ranges, thus they are able to provide flex RA for up to twice the value of their  $P_{max}$ .
- If the OGCI is active, the market does not have access to their charging range unless the co-located generation resource is generating.
  - This is not captured in RAIM penalties.

## Issue 3: Bidding for Co-located resources using the Off-Grid Charging Indicator (OGCI)

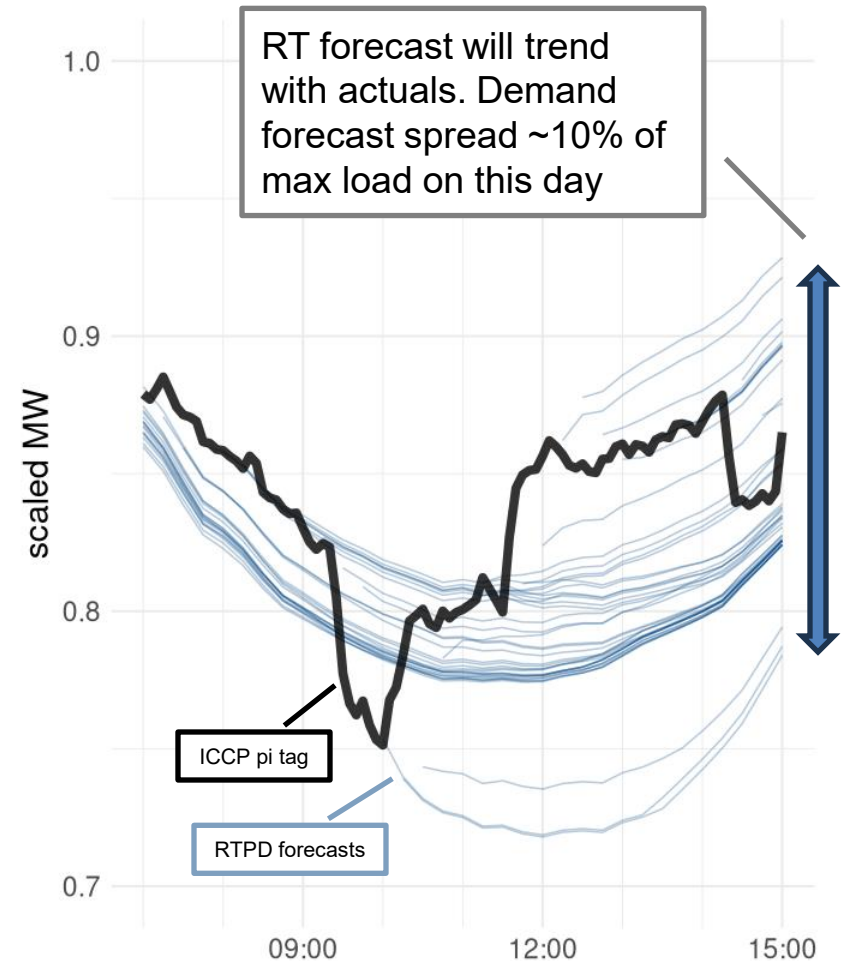
- PRR 1658 submitted for Market Operations BPM will state Co-located storage resources using the OGCI hourly biddable parameter should be aware of the obligation under tariff section 37.3.1 for resources to submit feasible bids
- PRR 1659 submitted for the Reliability Requirements BPM to clarify submitting accurate flex RA
- Storage resources receiving EFC based on their charging range should be mindful of how charging limitations can impact their ability to meet the must-offer obligation for a given category of flexible RA.

## Issue 4: Incorrect use of Default Energy Bids

- From Sep 22-Oct 2, 2024, two resources were missing the distillate index for a negotiated DEB and a \$2000 DEB was inserted.
- From Jun 9 – Jul 31, 2025, a WEIM Storage resource selected the Storage DEB which is currently not available to WEIM resources.
- From Dec 12-19, 2025, eight WEIM resources had inactive negotiated DEBs active in Production.
- In all instances, the incorrect DEBS were not used for dispatch and did not impact market prices. There are no corrective actions.

# Issue 5: BAA Data Input Errors Impact to Forecasting

- Forecast data quality is critical to maintaining forecast accuracy
- Compromised telemetry quality most directly impacts:
  - Real time load forecasts
  - Uncertainty products (IR, FRP) if issues persist
- Examples of recent errors:
  - New or existing market-participating battery resource had telemetry that was incorrectly incorporated into BAA-level load
  - New (post-COD) co-located resource generation lowering load



# Renewable Persistence Enhancement: Solar Rayborhood

## Short Term Forecasting

# Background

- RTD Renewable Persistence forecast has been activated for both wind and solar resources since 2018 for CAISO BAA and WEIM entities
- Solar persistence requires reference curves for activation;
  - Prerequisite of reference curves is 1 year of settlement quality metering data
- The ISO has been exploring a potential new option to extend the benefit of persistence forecast to relatively new solar resources in WEIM as well as in the ISO
- The Solar Rayborhood method utilizes an existing solar unit which has an established reference curve as the surrogate

# Rayborhood Resource Qualifications

1. Similar Unit type to requested resource, the sizes may be different
    - Similarity includes, but is not limited to, technology type, resource management, and equipment installation
  2. Within 50 miles
  3. Has existing reference curves in the ISO
- 
1. Not a Hybrid resource type



# Rayborhood Simulation Result Outcomes

Time Period Analyzed October 2025 through November 9, 2025

Resource	Pmax	mape_alfs	mape_rbh	Rayborhood(dist_miles)
Res_id1	3.00	3.04%	2.41%	12.66
Res_id2	2.56	8.48%	2.04%	12.66
Res_id3	5.00	2.62%	2.17%	12.66
Res_id4	179.00	1.15%	0.79%	8.61
Res_id5	3.00	2.66%	1.87%	5.45
Res_id6	2.37	6.76%	4.69%	5.45
Res_id7	300.00	1.60%	1.00%	4.56
Res_id8	2.25	5.20%	2.51%	4.52
Res_id9	3.00	2.61%	2.13%	4.46
Res_id10	3.00	10.80%	7.58%	4.22
Res_id11	58.00	1.78%	1.20%	2.49
Res_id12	70.00	1.76%	1.26%	2.49
Res_id13	19.90	1.74%	1.31%	2.37
Res_id14	11.90	1.81%	1.29%	2.37

Resource	Pmax	mape_alfs	mape_rbh	Rayborhood(dist_miles)
Res_id1	300.00	1.60%	1.00%	4.56
Res_id2	300.00	1.68%	1.04%	1.21
Res_id3	200.00	2.10%	1.25%	1.35
Res_id4	200.00	4.50%	1.35%	0.77
Res_id5	179.00	1.15%	0.79%	8.61
Res_id6	150.00	1.30%	0.95%	1.11
Res_id7	150.00	1.69%	0.85%	0.00
Res_id8	132.10	1.04%	0.77%	2.15
Res_id9	131.00	1.40%	0.91%	0.01
Res_id10	125.00	1.18%	0.87%	0.35
Res_id11	125.00	1.01%	0.90%	0.35
Res_id12	120.00	1.78%	1.06%	0.68
Res_id13	113.50	4.78%	1.82%	0.93
Res_id14	100.00	5.28%	1.53%	0.77

# Next Steps and Timeline

Task Item	Estimated Timeline
Draft BPM Changes	December 2025 – January 2026
Submit BPM Changes into PRR Process	January 2026
Following BPM Approval and Publication Implement for Tried and Requested Rayborhood Resources	March 2026

1. **Submit Proposed Revision Request (PRR)**
2. **Comments period**  
Upon ISO acceptance, PRR becomes public and 10-business day comment period starts
3. **Stakeholder meeting**  
PRR details and comments reviewed and discussed
4. **Recommendation**  
ISO recommendation issued on PRR
5. **Comments on recommendation**  
10-business day comment period open on recommendation
6. **Stakeholder meeting on recommendation**  
PRR recommendation and comments reviewed
7. **Final decision\***  
BPM updated or not updated

# Lunch Break

Resume back at 1:00pm

# Policy Update

Market Policy Development

# Congestion revenue rights enhancements

- The scoping phase of the initiative has concluded and policy development has begun, focusing on key challenges identified:
  - Improving revenue adequacy and auction efficiency
  - Updating how CRR products are defined, especially the Time of Use periods, to better align with evolving hedging needs
- Recent initiative activity:
  - December 12: Published Issue Paper and Straw Proposal on CRR Product Definition
  - January 14: Published Issue Paper on Revenue Adequacy and Auction Efficiency Enhancements
  - January 21: Stakeholder meeting to discuss both papers, with comments due February 4
- CRR policy development will continue to account for any relevant outcomes from the ongoing EDAM Congestion Revenue Allocation initiative
- Proposed decisional classification: CAISO Board of Governors

# Demand and distributed energy market integration

- Transitioning from scoping phase to policy development in 2026. We are anticipating publishing an issue paper in 2026.
- The scope is informed by the problem statements and prioritization identified by the DDEMI working group.
  - Key areas of focus will result in:
    - Developing and/or enhancing market models to support demand-side bidding and exporting from distributed resources
    - Updating performance evaluation methodologies
    - Streamlining and simplifying participation
    - Accommodating large load demand flexibility
- Discussion Paper posted on Nov 26, 2025
- Proposed decisional classification: TBD

# EDAM congestion revenue allocation

- Phase 2 of the initiative focuses on development of along-term durable congestion revenue allocation design and potential near-term enhancements.
- This phase of the initiative kicked off on December 11<sup>th</sup> through a stakeholder working group.
- Initial working groups are focused on development of principles to guide consideration of design options.
- Continued development of analysis based on EDAM market simulation and parallel operations data evaluating impacts of phase 1 of the congestion revenue allocation design.

# Storage design & modeling

- Scope of the initiative has been organized into four topic groups:
  - Outage management
  - Uplift, mitigation & default energy bids
  - State-of-Charge management
  - Mixed-fuel & distribution-level resources
- An updated Discussion and Issue Paper on Uplift & Default Energy Bids was posted December 12
  - Builds upon prior initiatives and stakeholder engagement to outline problem statements, guiding principles, and conceptual policy recommendations
  - Examines the relationship between storage uplift and market design, assesses the risks and feasibility of policy recommendations, and explores frameworks for long-term enhancements to bid cost recovery and default energy bid rules
- Targeting upcoming papers on Mixed-Fuel and Distribution-Level Resources and Outage Management



# Price Formation Enhancements Initiative

- CAISO presented PFE to the WEM Governing Body as a "spotlight briefing" during their general session on October 28, 2025
  - With an accompanying stakeholder presentation by Vitol
- In November 2025, the CAISO held two stakeholder working group sessions dedicated to comprehensive scarcity pricing design
- Market power mitigation and scarcity pricing was the topic of the Market Surveillance Committee general session meeting on January 16, 2026
- Decisional classification: Primary Authority of WEM Governing Body

# Resource adequacy policy development

Track 1 and Track 3A approved by ISO Board of Governors

## Track 1: Modeling & Default Rules

- Loss of load expectation modeling
- Updated default planning reserve margin and default counting rules

## Track 2: Outage and Substitution & Availability and Performance Incentives

- Updating outage and substitution processes
- Reforming availability and performance incentives

## Track 3: Visibility and Backstop Reform

- Increase the ISO's visibility into available backstop capacity (3A)
- Increase transparency to stakeholders on backstop decision making
- Update the current backstop product
- Create longer-term solutions for the ISO Balancing Authority Area around curing deficiencies and assigning costs related to the EDAM resource sufficiency evaluation

# Gas Resource Management

- Approved by WEM Governing Body December 16, 2025
  - Changes to the multi-day ahead advisory market runs to improve fuel procurement forecasts available during gas nomination timelines
  - Additional options for cost inputs, fuel cost adjustments, and recovery
  - Considerations for managing a resource's gas system limitations
- Developing proposed tariff modifications in preparation for a filing at FERC
- Developing proposed BPM modifications to reflect process changes that do not require new tariff authority

# Commitment cost bidding flexibility

- The *commitment cost and default energy bid* policy was approved in 2018 but the changes relating to commitment costs bidding flexibility and mitigation were never implemented
  - The policy provides an expanded ability for resources to bid in their commitment costs, paired with a new test for market power associated with those commitment cost offers
- Evaluating the implementation feasibility of the approved design and will look to share results with stakeholders in late Q1 2026

# 2026 Market Policy Catalog & Roadmap Process

- Final 2025 Policy [Roadmap](#) and Final 2025 Policy [Catalog](#) published
- **January 15:** Catalog submissions template posted [via ISO commenting tool](#)
- **January 15 – March 2:** ISO accepting catalog submissions for new market policy initiatives from all stakeholders
- **March & April:** Stakeholder prioritization workshops for catalog submissions + RIF Roundtable
  - Clarify purpose of submissions
  - Develop understanding of breadth of stakeholder support for individual submissions
  - Identify logical groupings of submissions
- **May:** Stakeholders submit prioritization rankings

# 2026 Policy Calendar

		2026			
		Q1	Q2	Q3	Q4
Commitment Cost Bidding Flexibility		Public dialogue: next steps			
Congestion Revenue Rights Enhancements		Policy development			Decision
Demand and Distributed Energy Market Integration		Policy development		Decision	Implementation
EDAM Congestion Revenue Allocation		Policy development			Decision
EDAM Enhancements		As needed			
Finance Enhancements		Policy development			
Gas Resource Management				Implementation	
Greenhouse Gas Coordination				Implementation	
Price Formation Enhancements					
	Scarcity pricing & market power mitigation	Policy development			Decision
	Fast start pricing	Postponed			

# 2026 Policy Calendar (cont.)

		2026			
		Q1	Q2	Q3	Q4
<b>Resource Adequacy Modeling and Program Design</b>					
	Track 1: Modeling and default rules		<b>Implementation</b>		
	Track 2: Outage & substitution and availability and incentive mechanisms	<b>Policy development</b>		<b>Decision</b>	
	Track 3a: Resource visibility				<b>Implementation</b>
	Track 3b: Backstop reform and long-term EDAM RSE solutions				<b>Policy development</b>
<b>Storage Design and Modeling</b>					
	Topic group 1: Outage management enhancements	<b>Policy development</b>		<b>Implementation</b>	
	Topic group 2: Uplift & default energy bids	<b>Policy development</b>		<b>Decision</b>	
	Topic group 3: State-of-charge management	<b>Policy development</b>			
	Topic group 4: Mixed-fuel & distribution-level resources	<b>Policy development</b>			
<b>WEIM Resource Sufficiency Evaluation Enhancements</b>		<b>Postponed</b>			

# Release Update

Release Management



# Release Overview

**Spring 2026** Day-Ahead Market Enhancements (DAME)  
Extended Day-Ahead Market Enhancements (EDAM)  
EDAM ISO BAA Participation Rules  
EDAM - PacifiCorp  
WEIM - Power Watch  
WEIM - Black Hills Energy

**Fall 2026** EDAM - PGE

**2026** FERC 881 Track 2  
FERC 881 Track 3  
Transmission Service & Market Scheduling Priorities - Phase 2  
FERC Order 2023 Generator Interconnection Life Cycle  
Subscriber PTO Model  
Transmission Exchange Agreement Renegotiation

## Spring 2026

- DAME + EDAM + EDAM ISO BAA PR + EDAM PAC
  - Market Simulation in MAP-Stage now thru 1/30/26
    - DAME Configurable Parameters Analysis
  - Parallel Operations in Stage starts 2/2/26 for TD 2/3/26 thru 4/30/26
    - DAME Configurable Parameters Analysis
  - Production Activation TD 5/1/26
- WEIM Power Watch + WEIM Black Hills Energy
  - Market Simulation in MAP-Stage now thru 1/30/26
  - Parallel Operations starts TD 2/18/26
  - Production Activation TD 5/6/26

## Fall 2026

- EDAM PGE
  - Market Simulation in MAP-Stage now thru 5/31/26
  - Parallel Operations in Stage starts 6/1/26 thru 9/15/26
  - Production Activation TD 10/1/26

2026

FERC 881 Track 2

FERC 881 Track 3

Transmission Service & Market Scheduling Priorities - Phase 2

FERC Order 2023 Generator Interconnection Life Cycle

Subscriber PTO Model

Transmission Exchange Agreement Renegotiation

# Next Forum:

***April 29, 2026***

*\*Tentative until confirmed though a in the ISO's Daily Briefing*

## For reference

Visit user group webpage for more information:

<https://www.caiso.com/meetings-events/topics/market-performance-and-planning-forum>

If you have any questions, please contact Brenda Marquez at [bmarquez@caiso.com](mailto:bmarquez@caiso.com) or [isostakeholderaffairs@caiso.com](mailto:isostakeholderaffairs@caiso.com)

# BPM change management: Definitions and Acronyms

## BPM Declassified as BPM

- The California ISO announces the declassification of the Definitions and Acronyms Business Practice Manual (BPM) with updated link on how to find ISO definitions and acronyms.

The Definitions and Acronyms BPM previously served as a consolidated reference for all definitions and acronyms in the ISO Tariff and other BPMs.

A link to the ISO glossary is now available in the [BPM Library](#), where you can find the most current definitions and acronyms formerly included in the Definitions and Acronyms BPM. Definitions and acronyms will also remain accessible within the individual BPMs.

For more information about the BPM Change Management process, please visit the [BPM webpage](#) on the ISO website.

- [Glossary | California ISO](#)

# ENERGY matters

The California ISO's blog highlights its most recent news releases, and includes information about ISO issues, reports, and initiatives.



*Energy Matters* blog provides timely insights into ISO grid and market operations as well as other industry-related news.

[CAISO.com > About > Newsroom > Energy Matters Blog](https://www.caiso.com/About/Newsroom/EnergyMattersBlog)



Story | Inside the California ISO

## Evolving Stakeholder Processes for Greater Collaboration

By Joanne Serina, Allie Mace

01/14/2026



Story | Markets

## Extended Day-Ahead Market – Virtual Town Hall

01/08/2026



Story | Leadership

## ISO 2025 Year in Review: Powering forward on reliability, shared progress, and a new framework for independent market governance

By Elliot Mainzer

12/04/2025

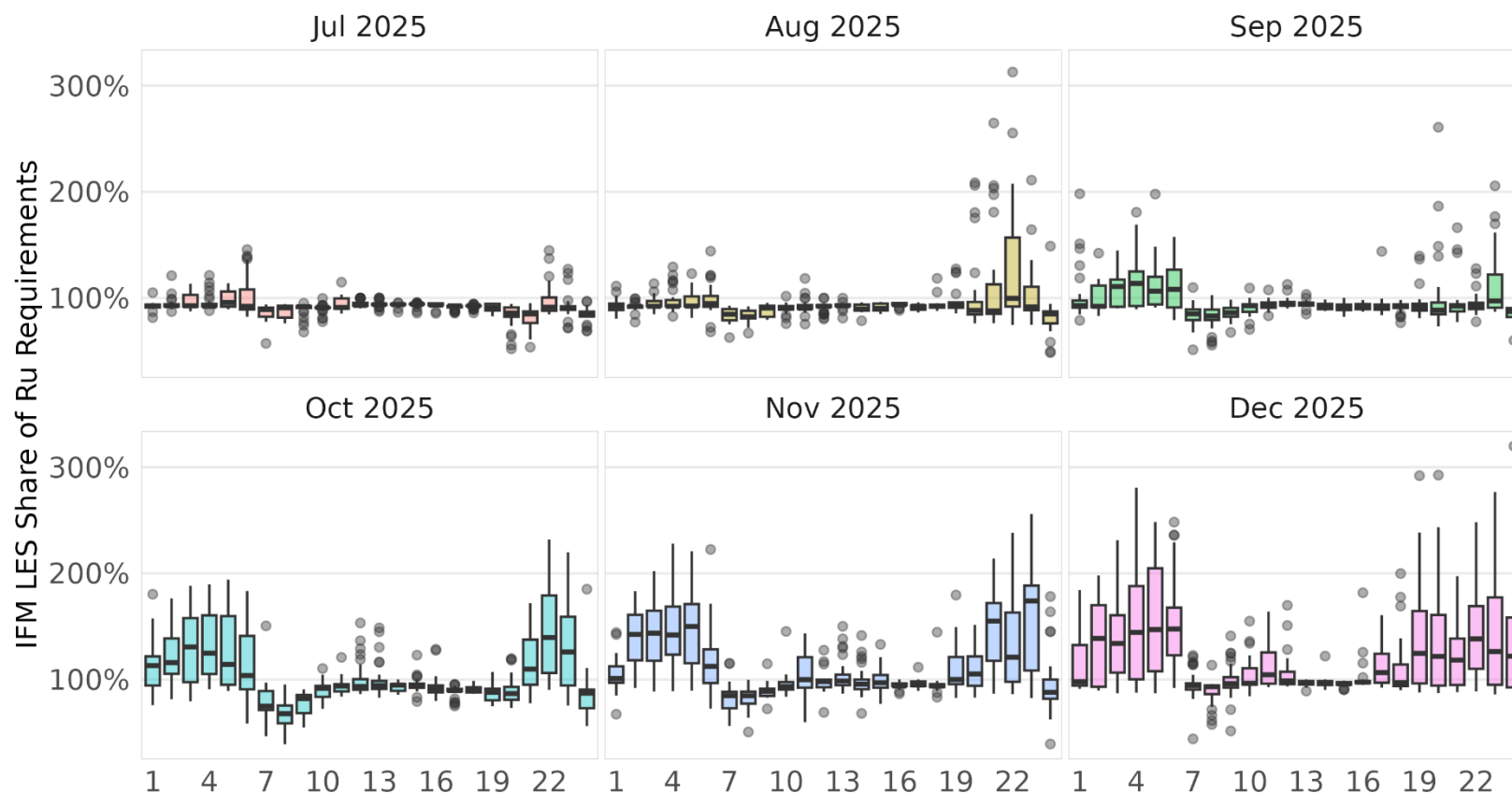


# Appendix

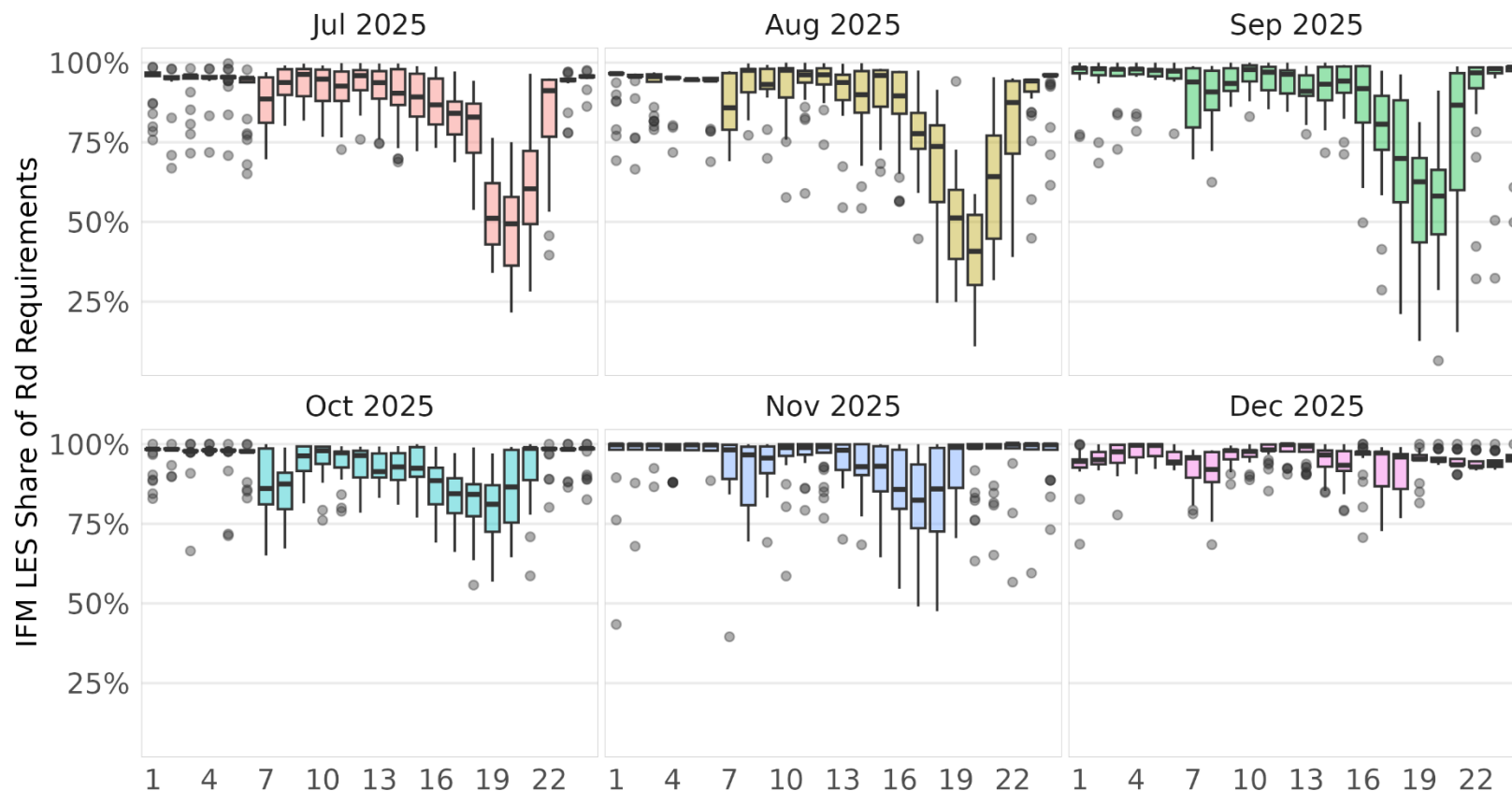
## General Metrics

# Energy Storage Performance

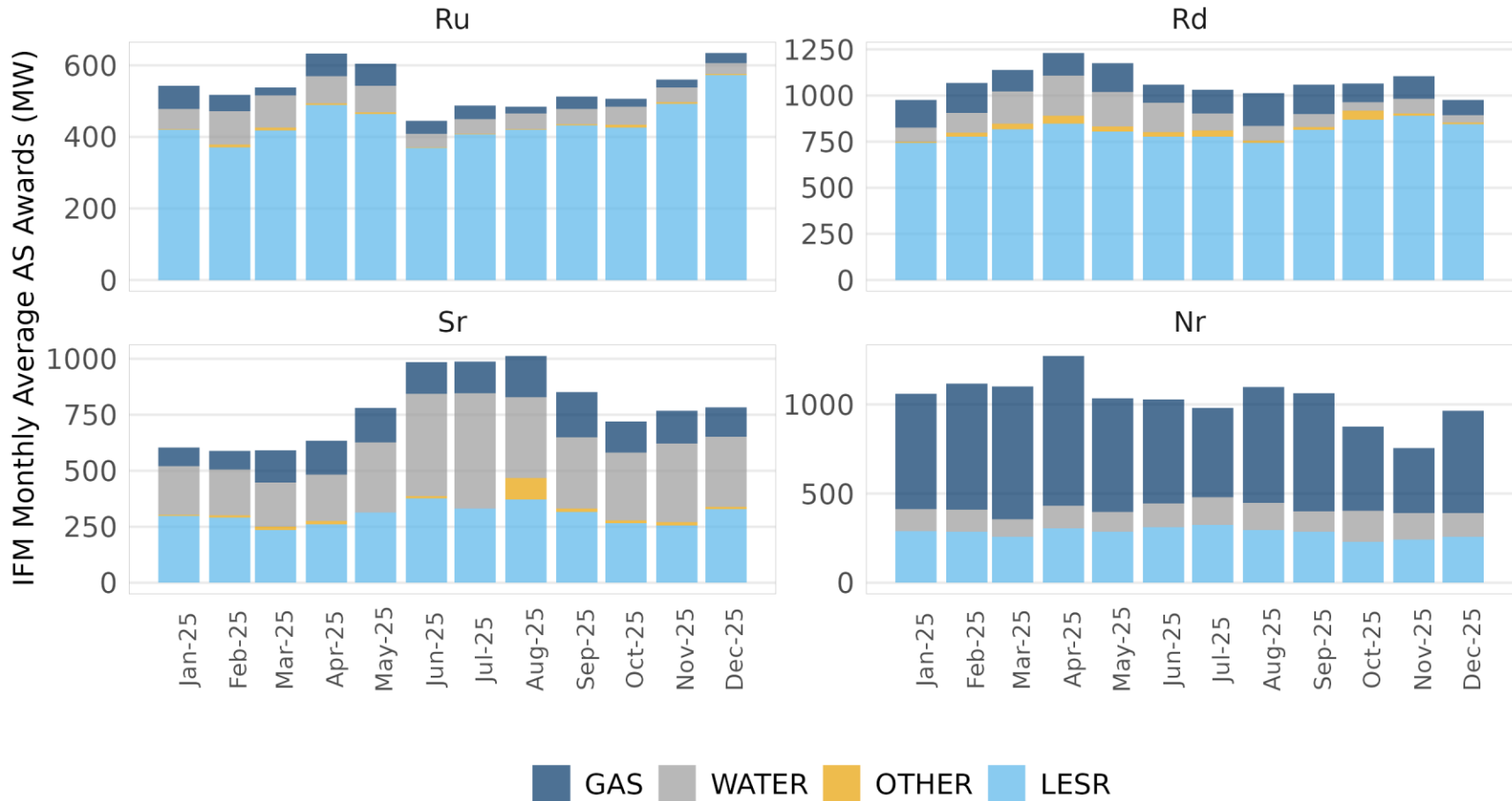
# The hourly profile of the LESR percentage share of the Ru requirement increases in Q4 2025



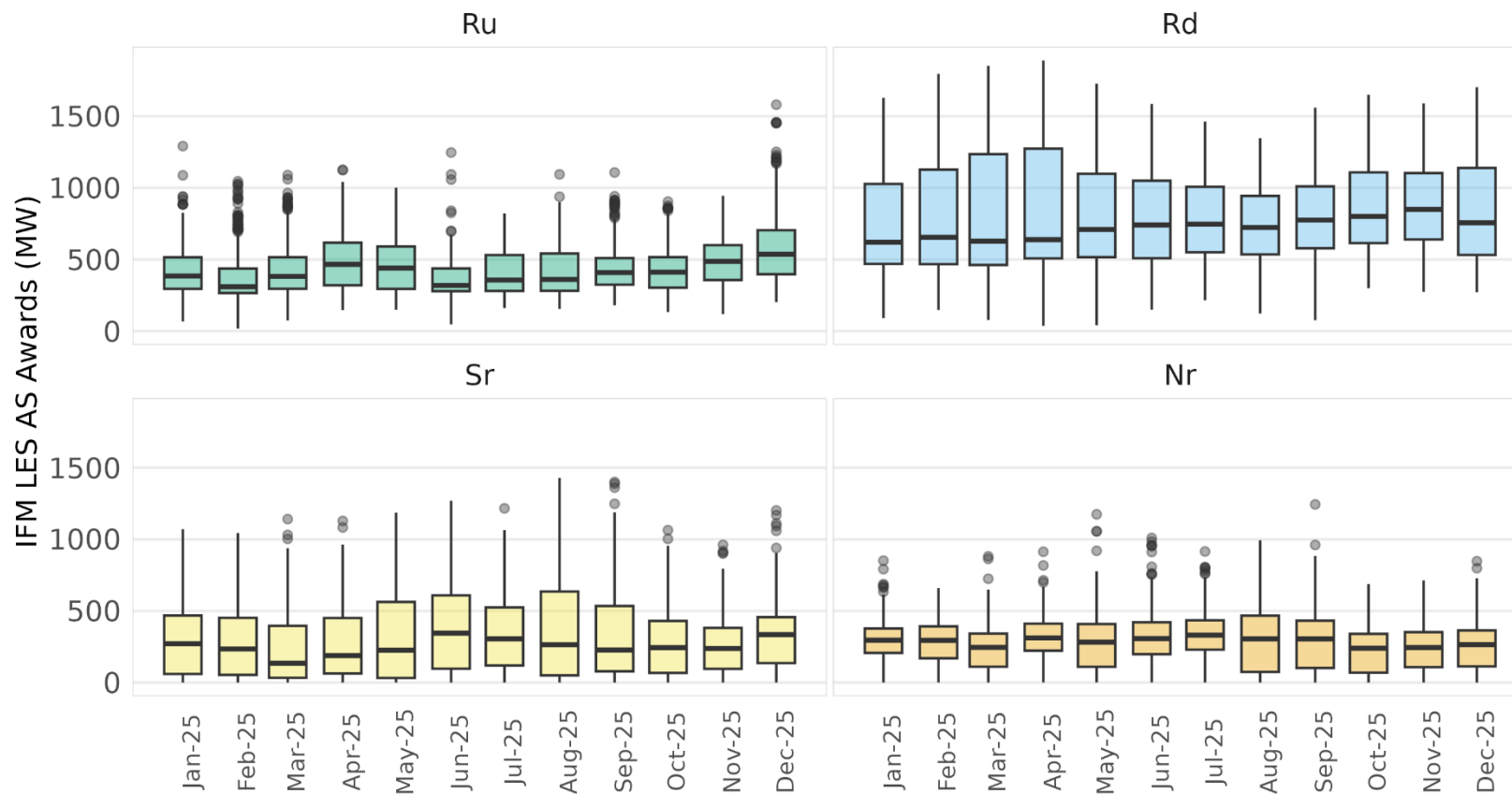
# The hourly profile of the LESR percentage share of the Rd requirement increases in Q4 2025



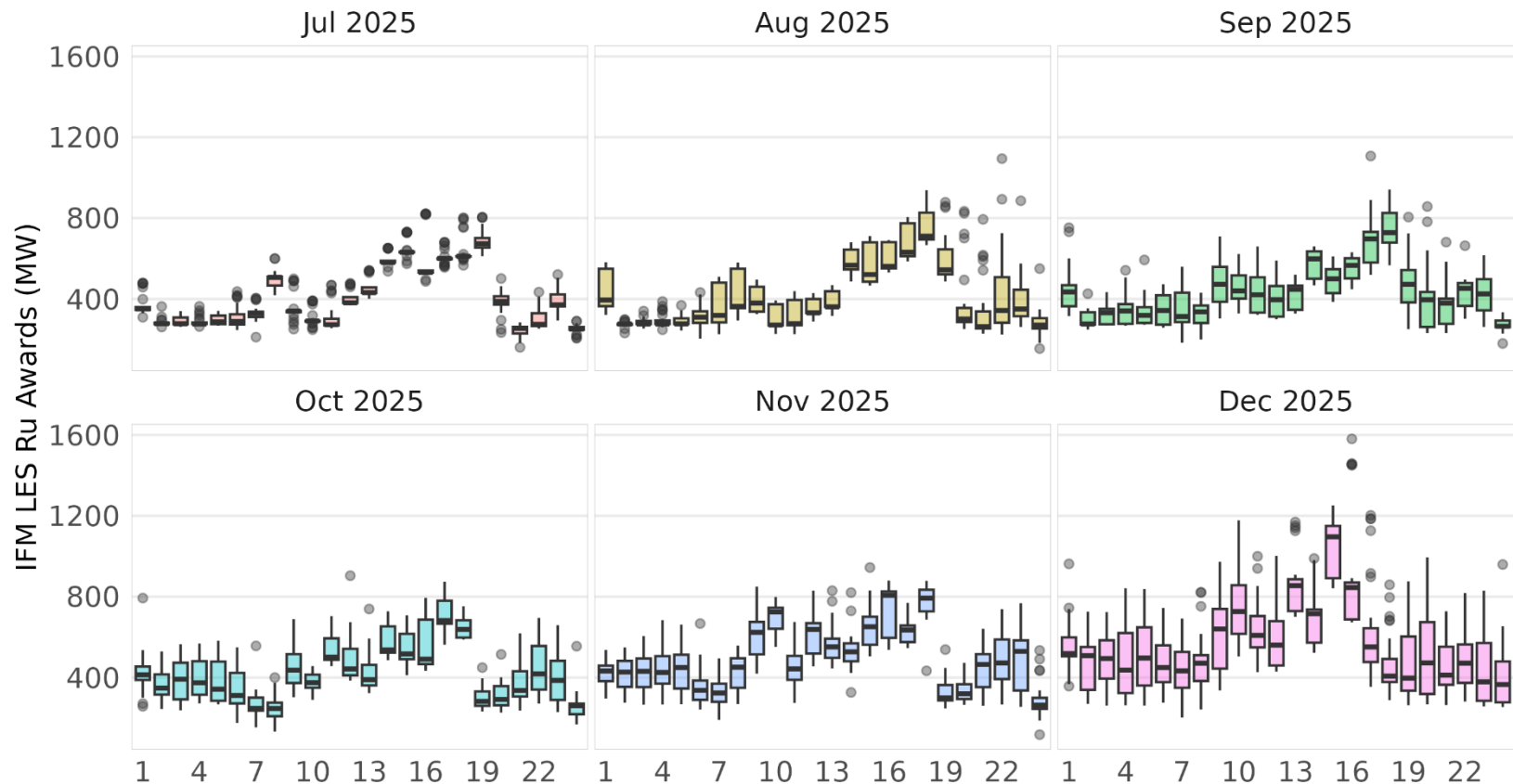
# Monthly average IFM AS awards for storage shows slight reduction in Sr/Nr and increase in Ru/Rd in Q4 2025.



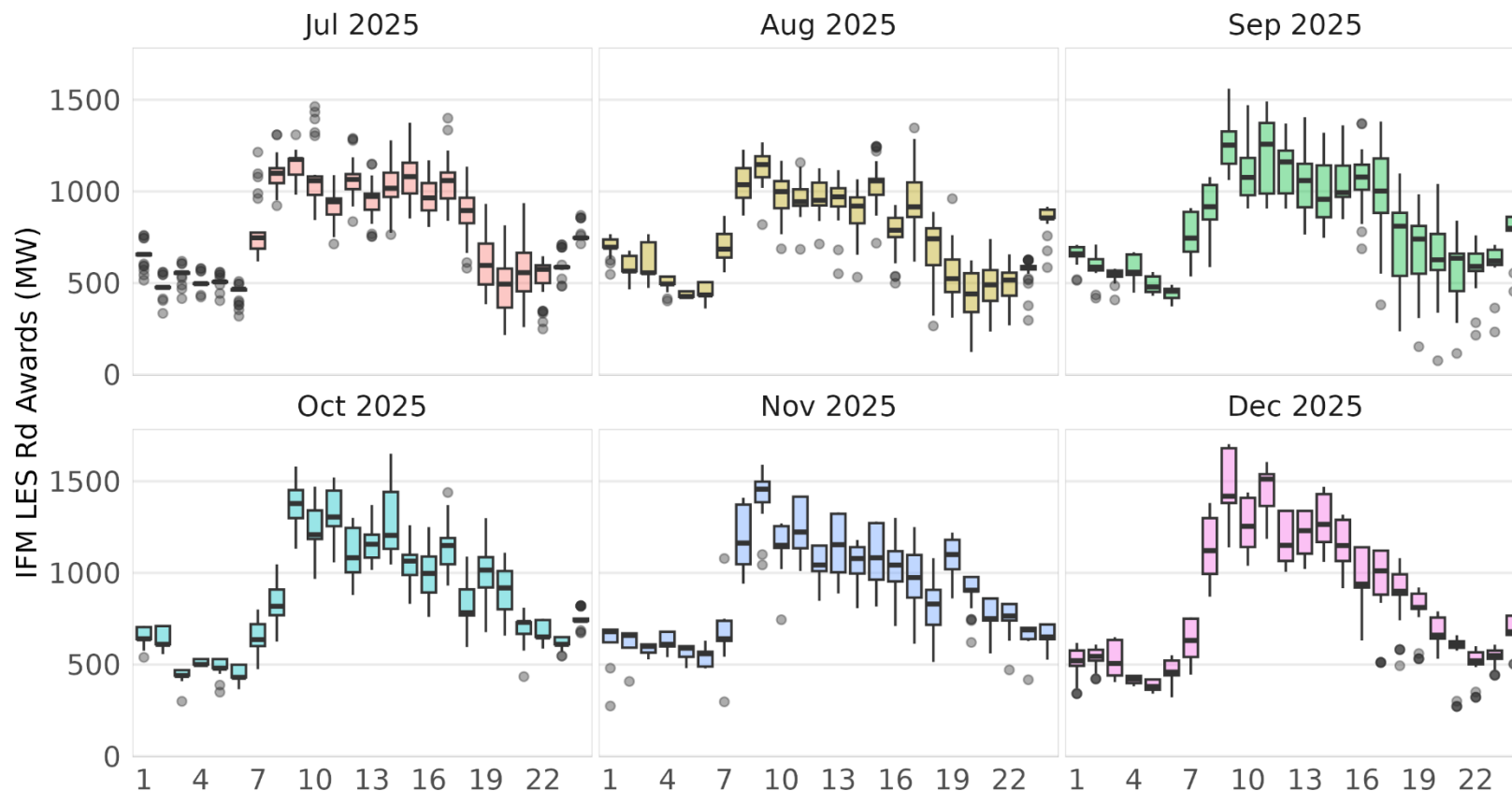
# Monthly IFM AS market awards show no significant change in pattern



# Regulation up awards in the day-ahead market have seen a slight increase in Dec 2025

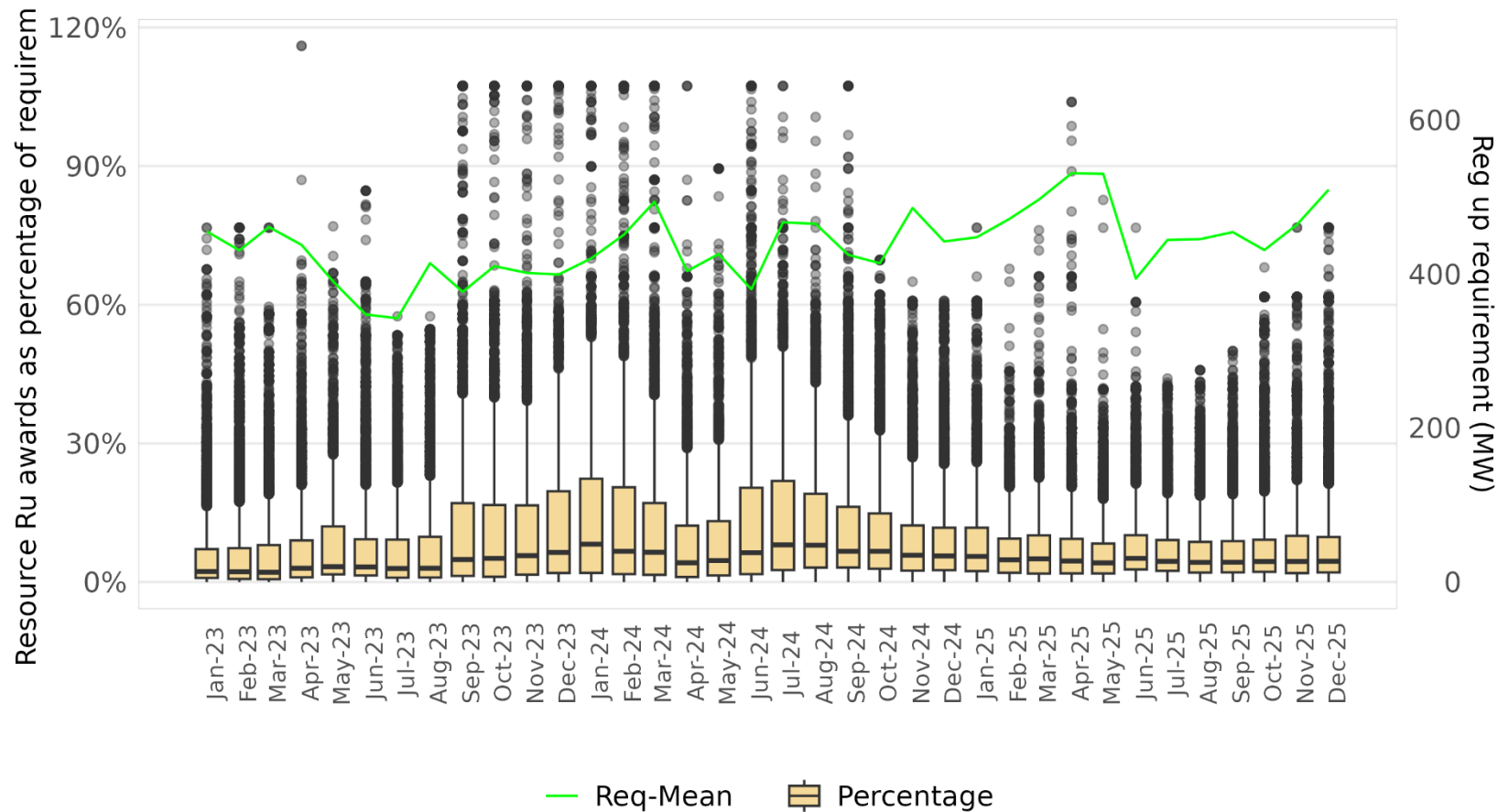


# Regulation down awards in the day-ahead market have not seen a material change in trend

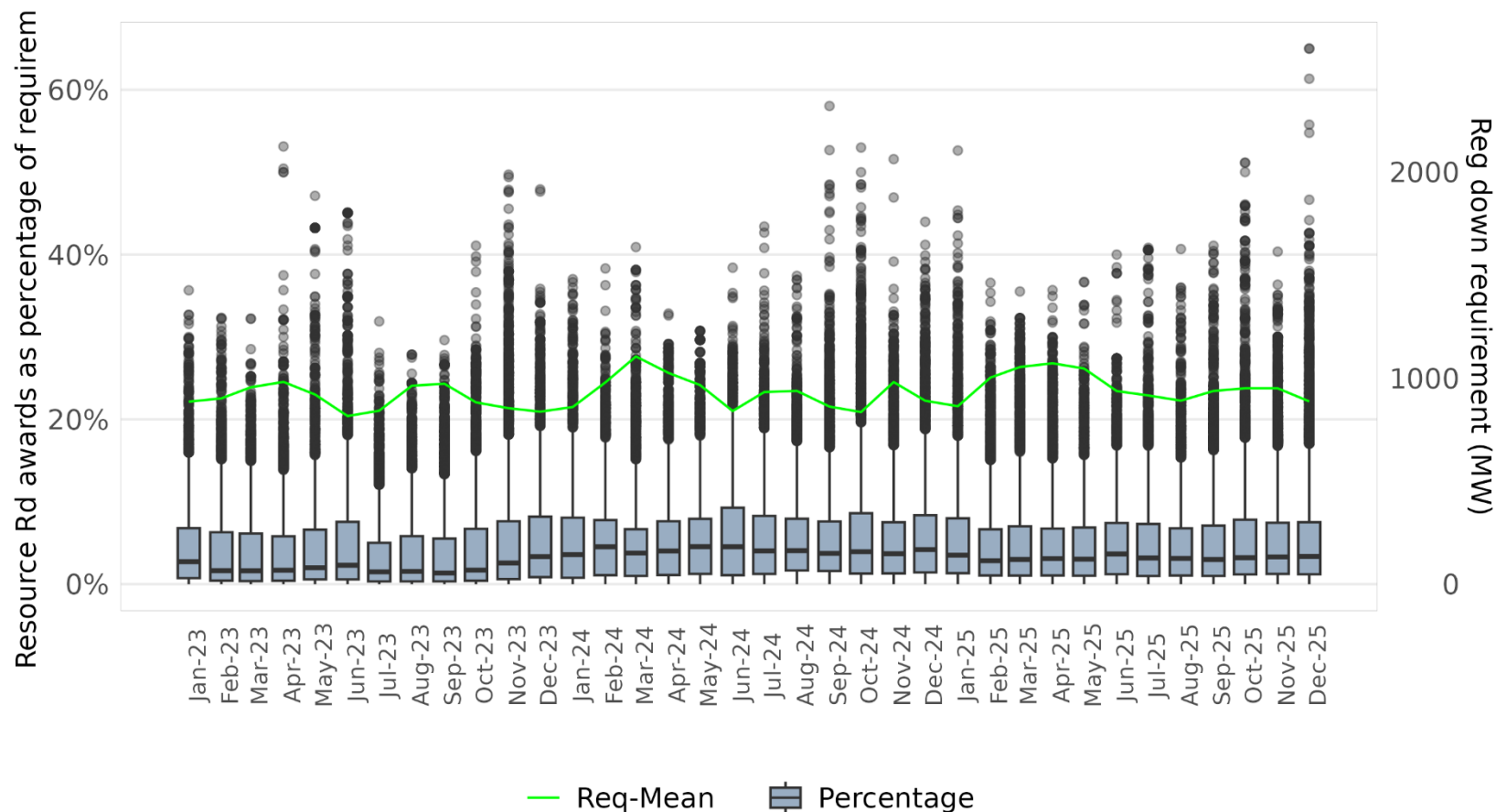




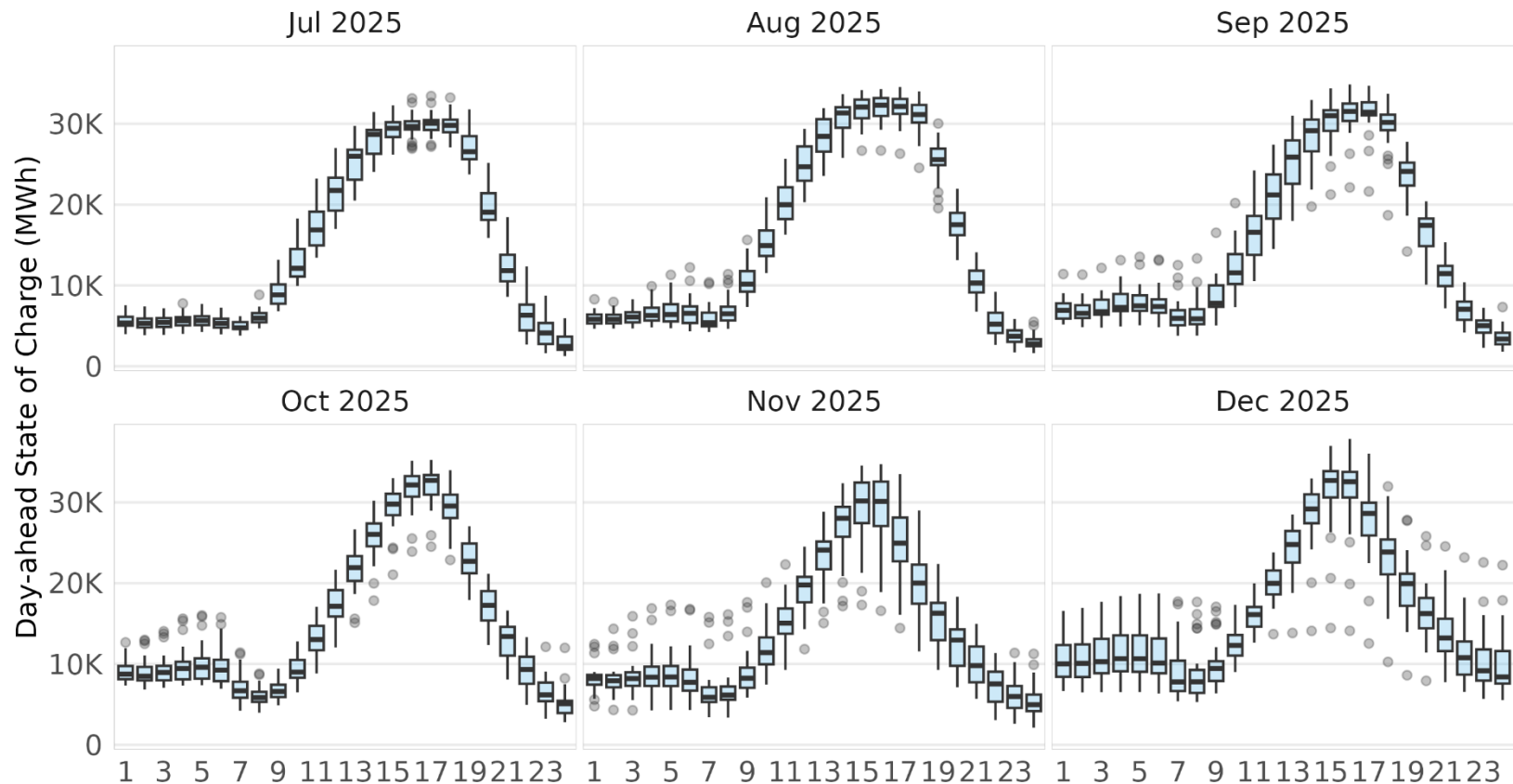
# The relative size of Regulation award on individual resources tends to be within typical ranges



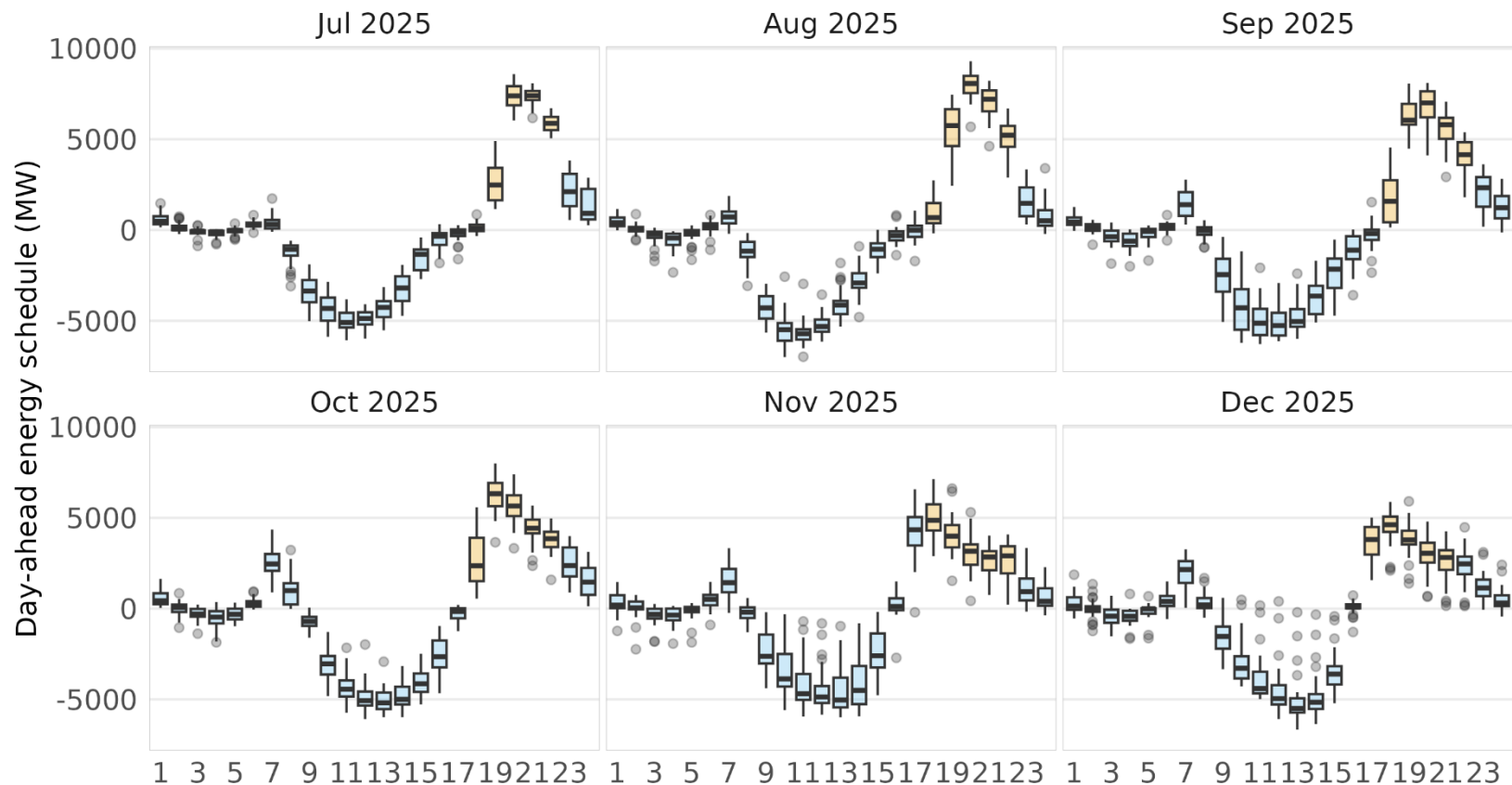
# Resource Rd awards as percentage of Rd requirement sees not notable change in pattern with enhancements



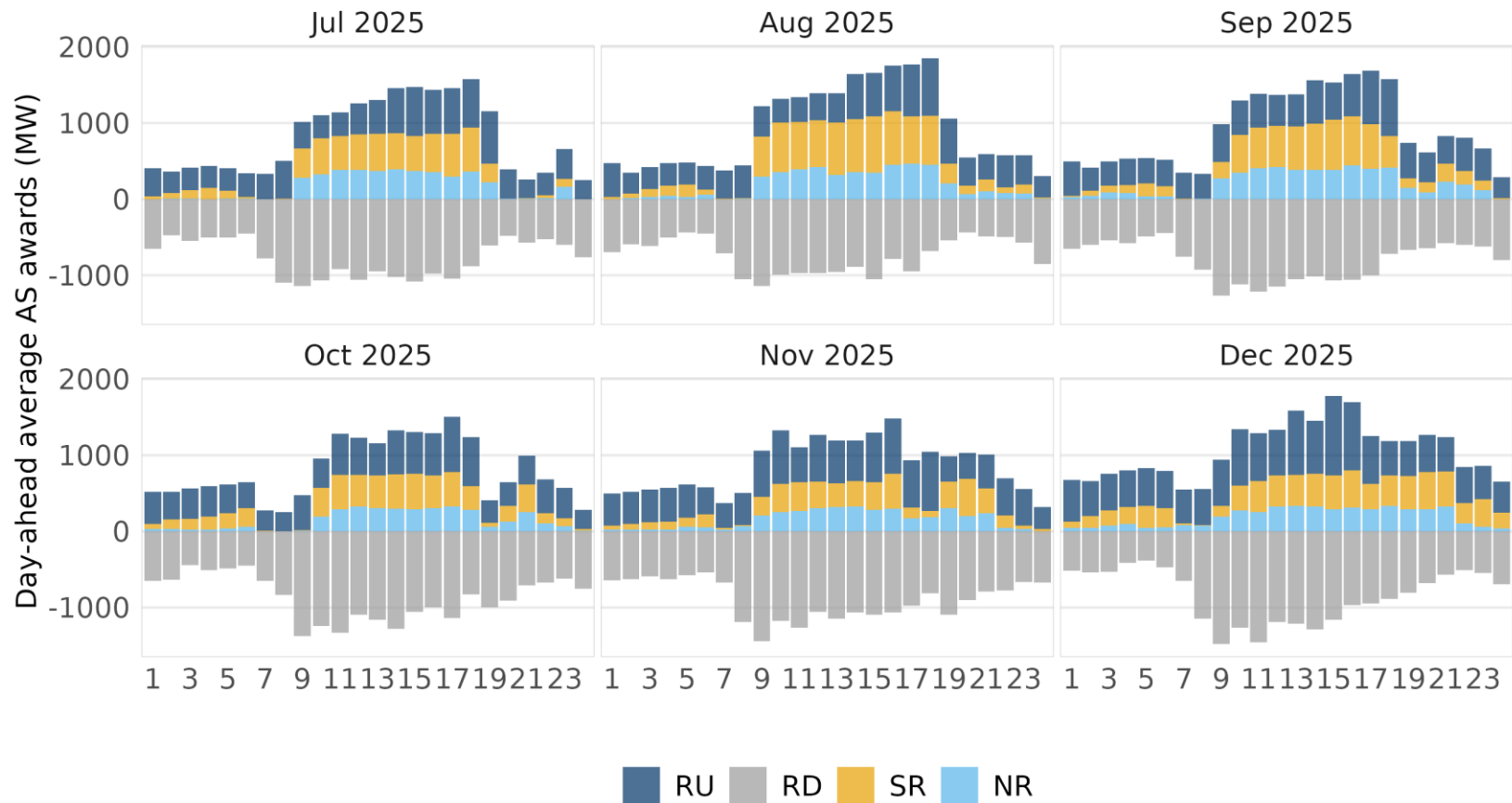
# Day-Ahead state of charge for storage resources is typically achieved between hour ending 16 and 17



Storage resources were consistently charging during solar hours and discharging during net load peaks. Day-ahead

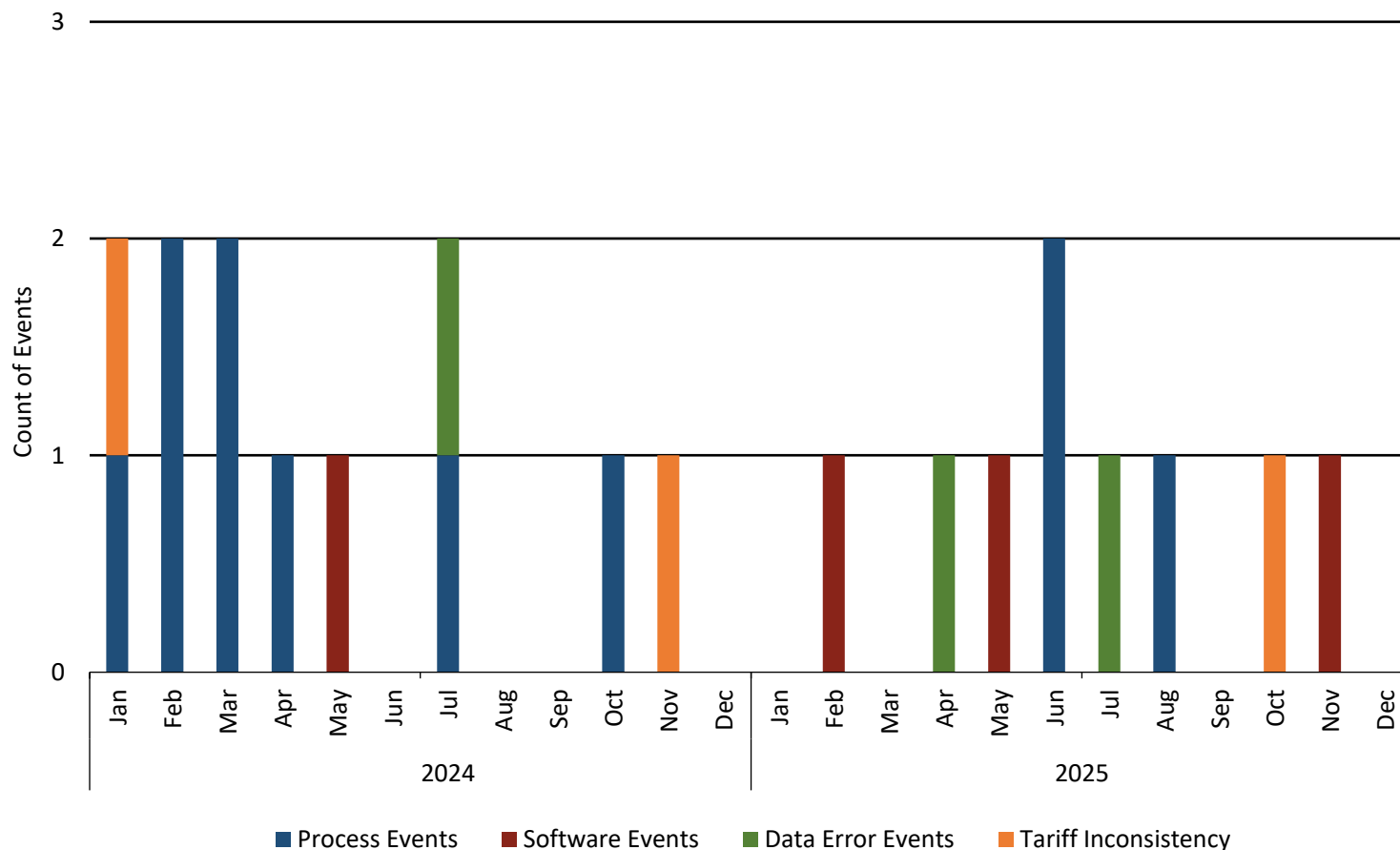


Storage resources procure mostly regulation while in recent months they have also increased the provision of Spinning reserves. Day-ahead

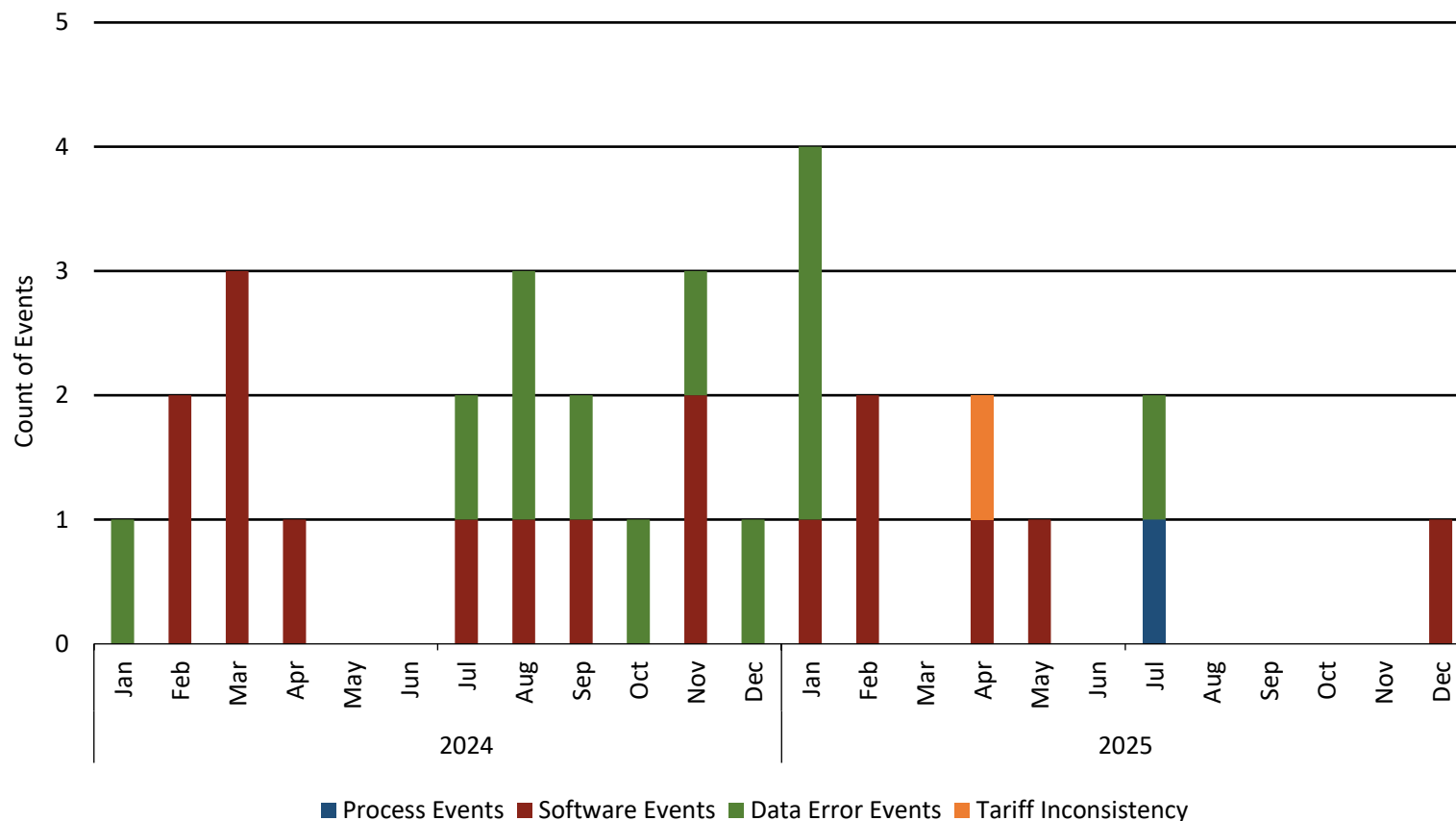


# Price Corrections

# CAISO price correction events remain low



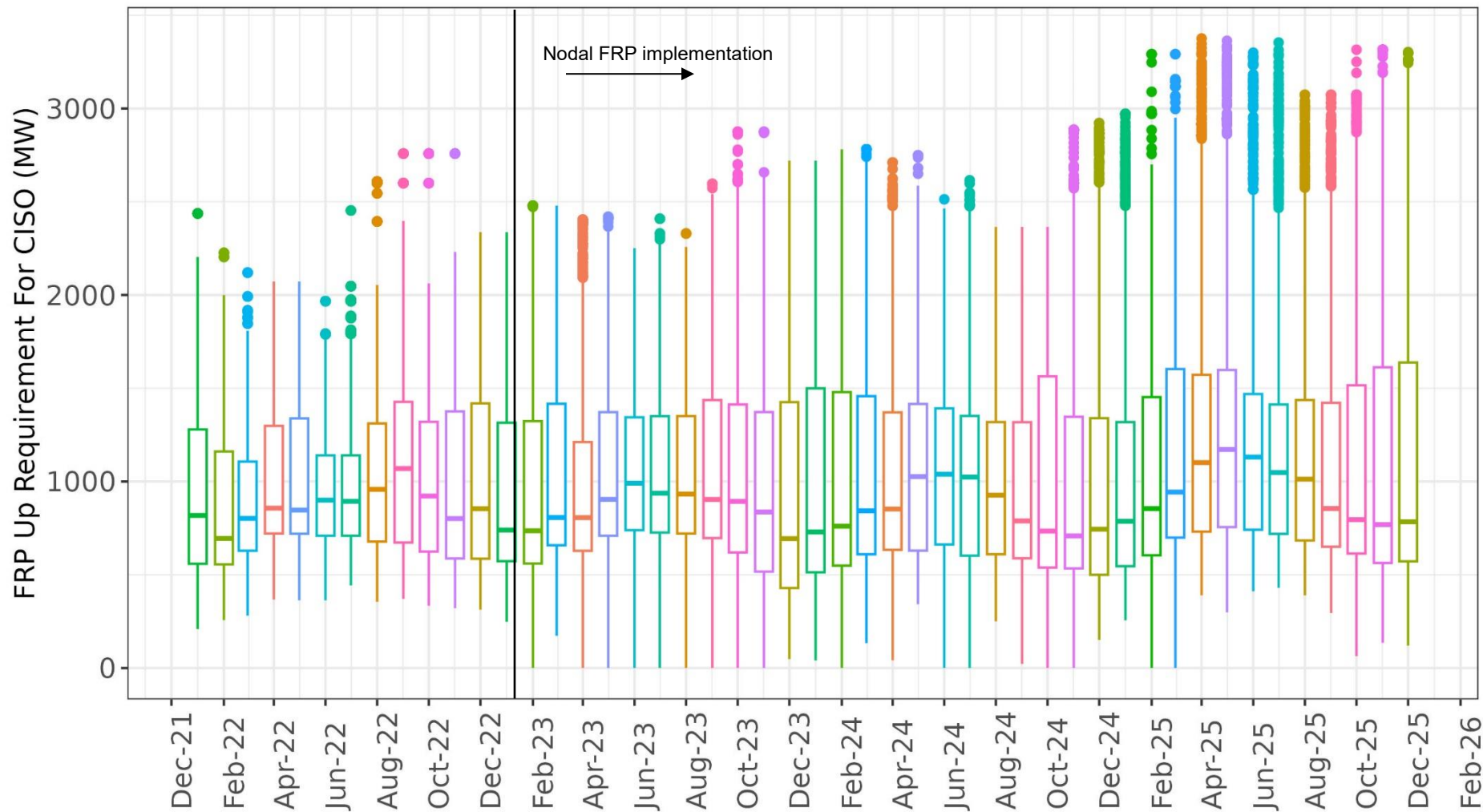
## WEIM-related price correction events remain low



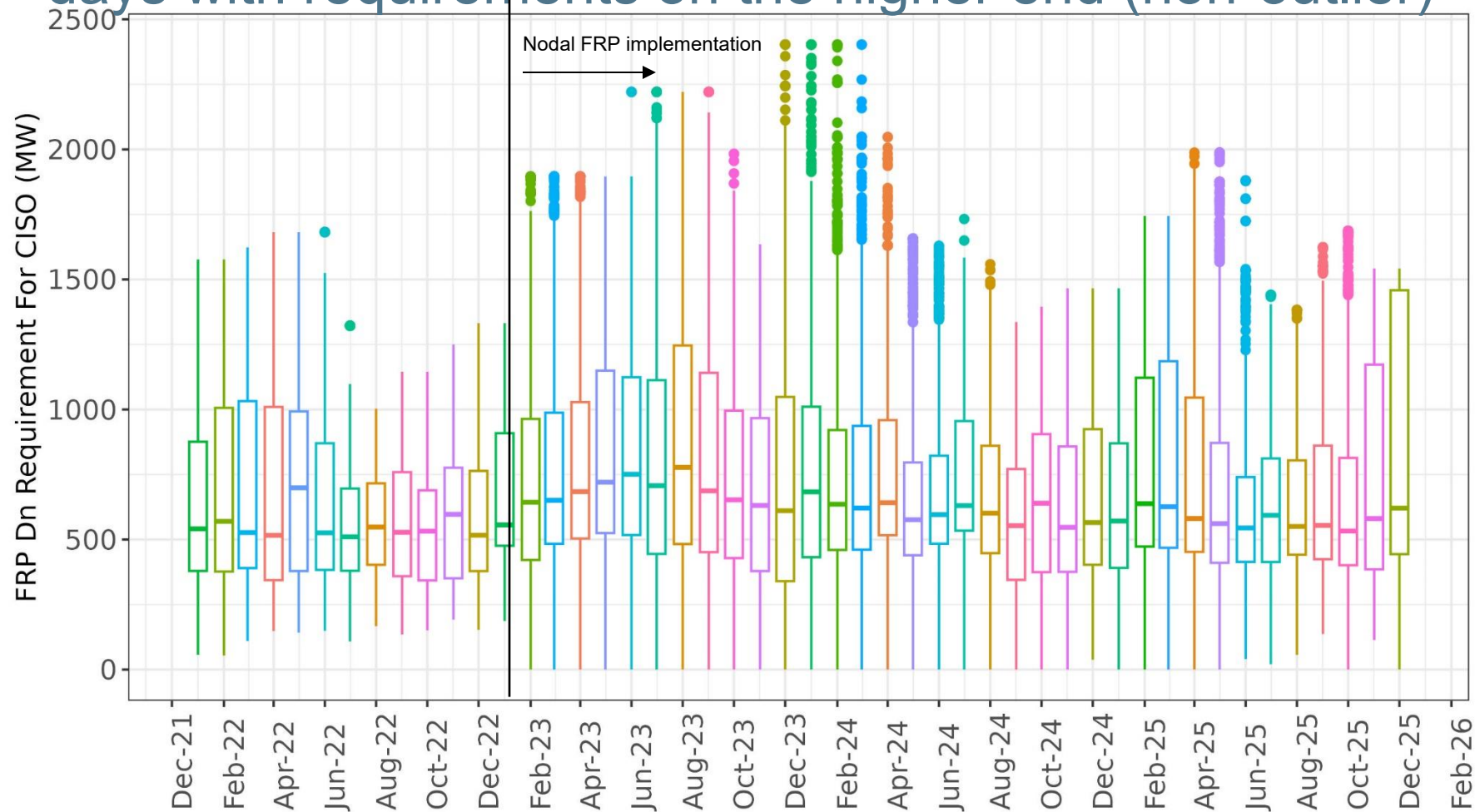


# Flexible Ramping Product

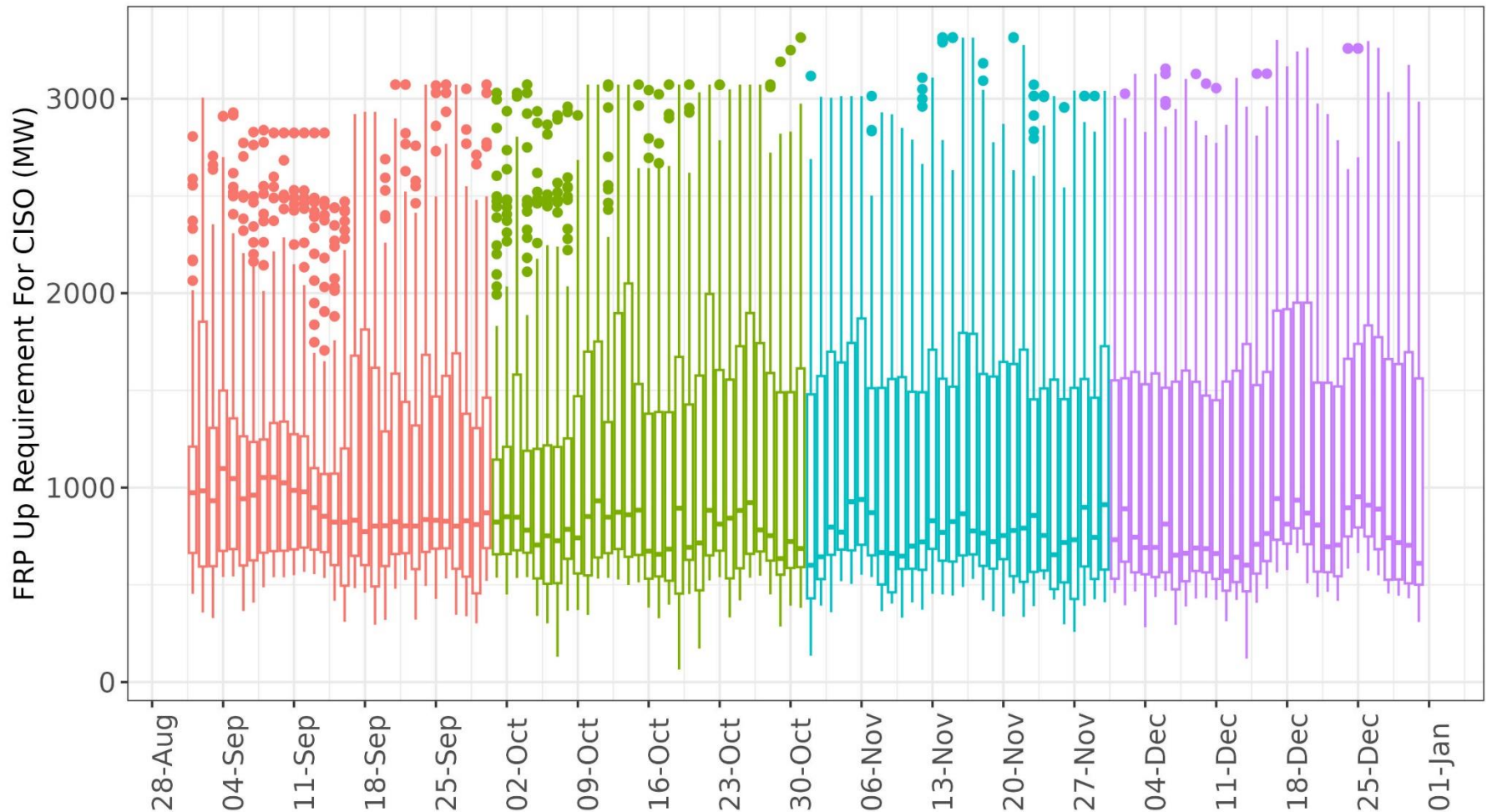
# FRP Up Requirement for CAISO area remain within typical ranges but there were more outliers in 2025



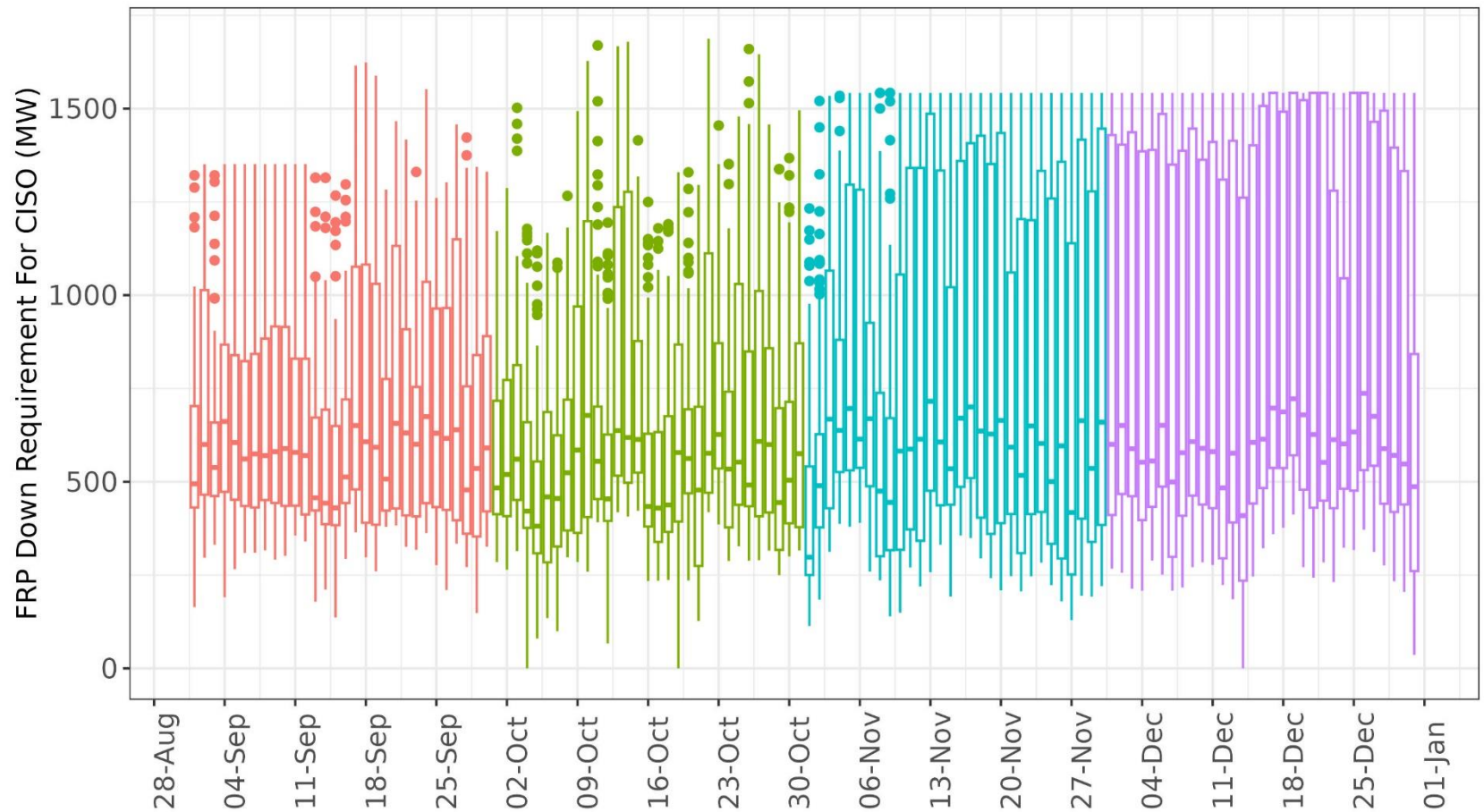
Ranges are typical for FRP Down Requirement for CAISO area but November and December had more days with requirements on the higher end (non-outlier)



# Daily distribution of FRP Up requirement in the last 4 months for CAISO area saw decreases in outliers

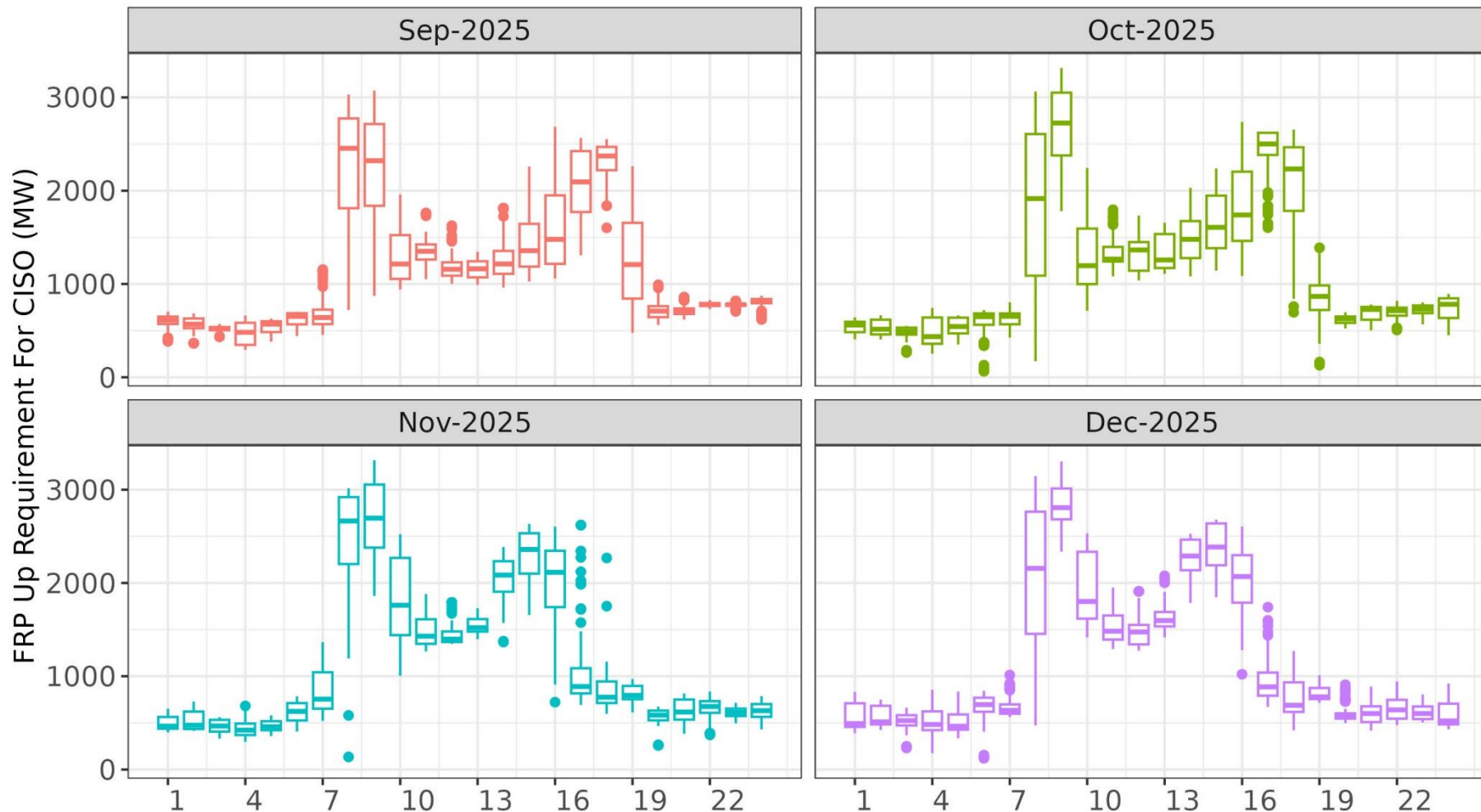


The daily distribution of FRP Down requirement for CAISO area became more skewed in the upward direction in November and December

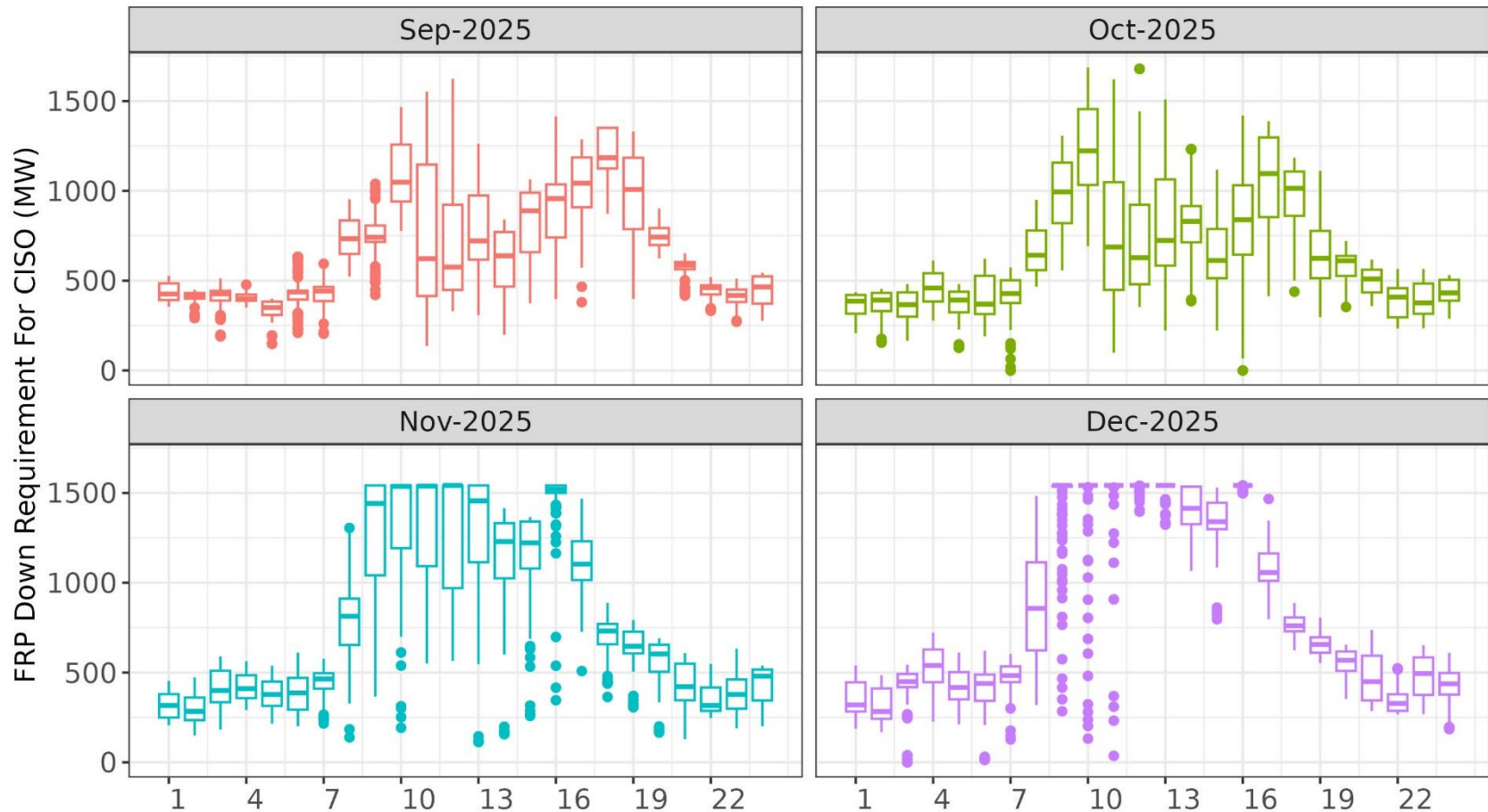




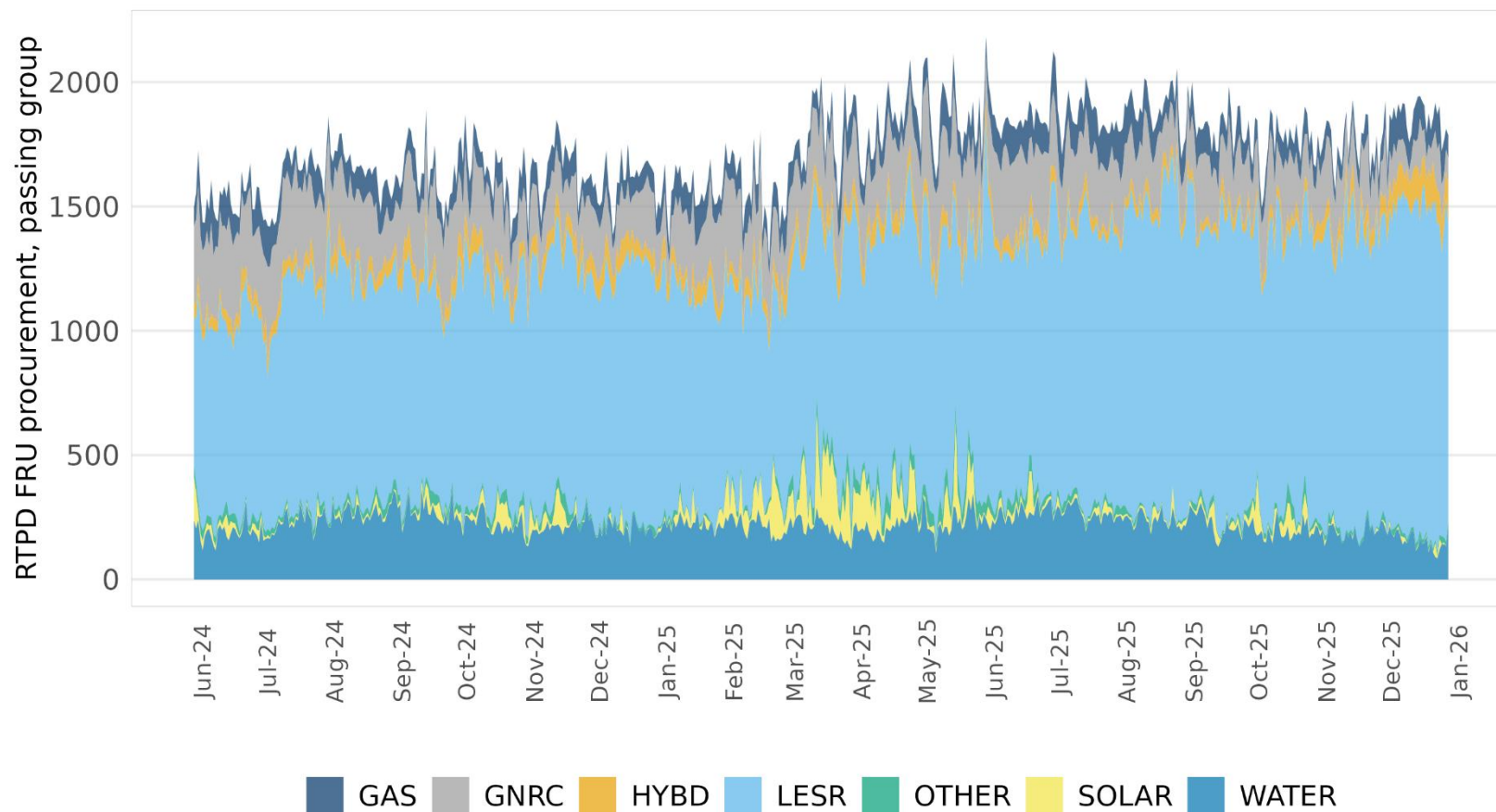
# The hourly profile of upward FRP tends to follow a pattern of morning and evening peaks



The hourly profile of downward FRP tends to have higher values in midday hours; In November and December the requirement frequently hit the cap of 1542 MW for CISO

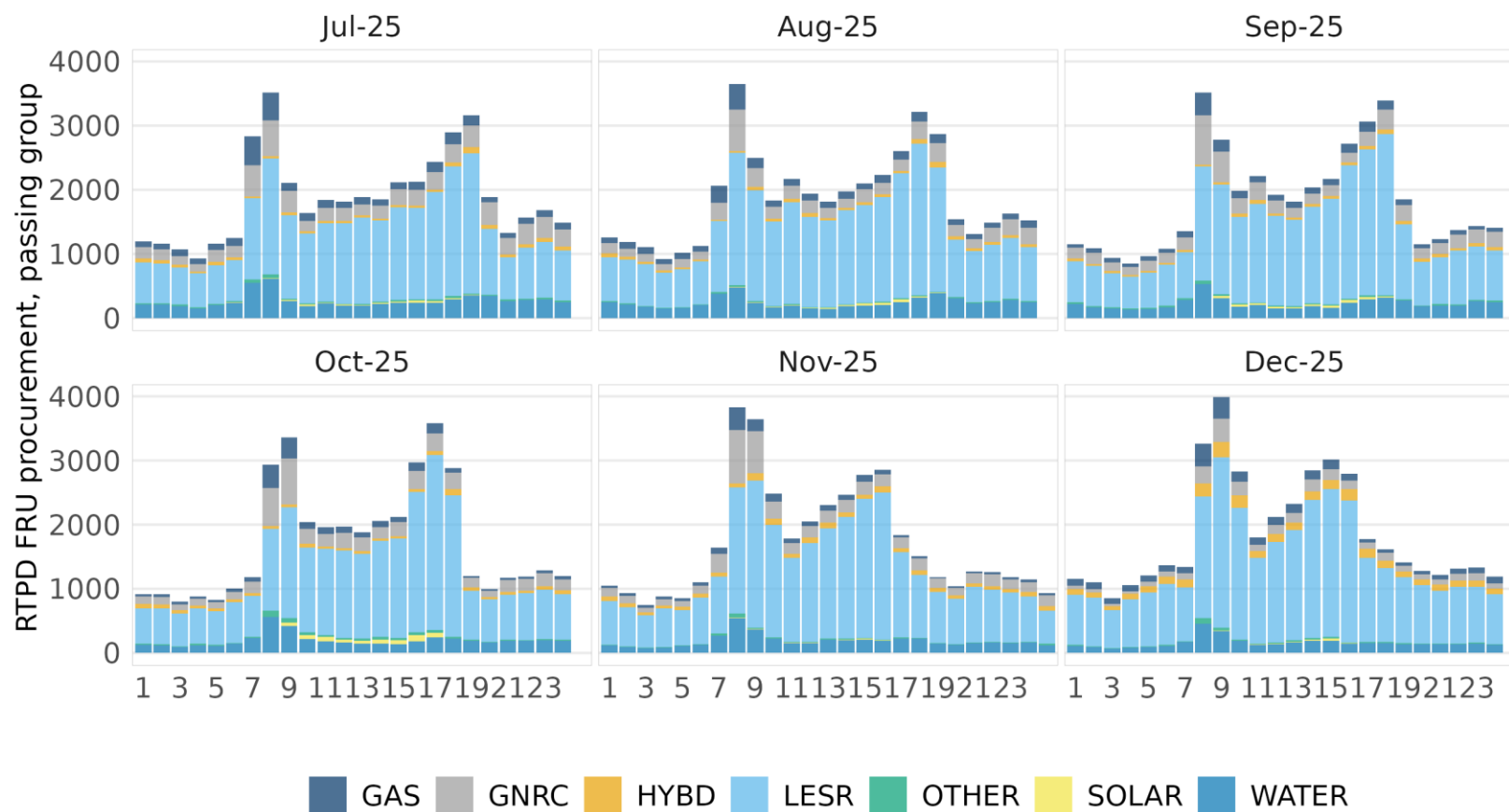


Upward FRP procurement is supported by various types of technologies with the main share coming from storage resources

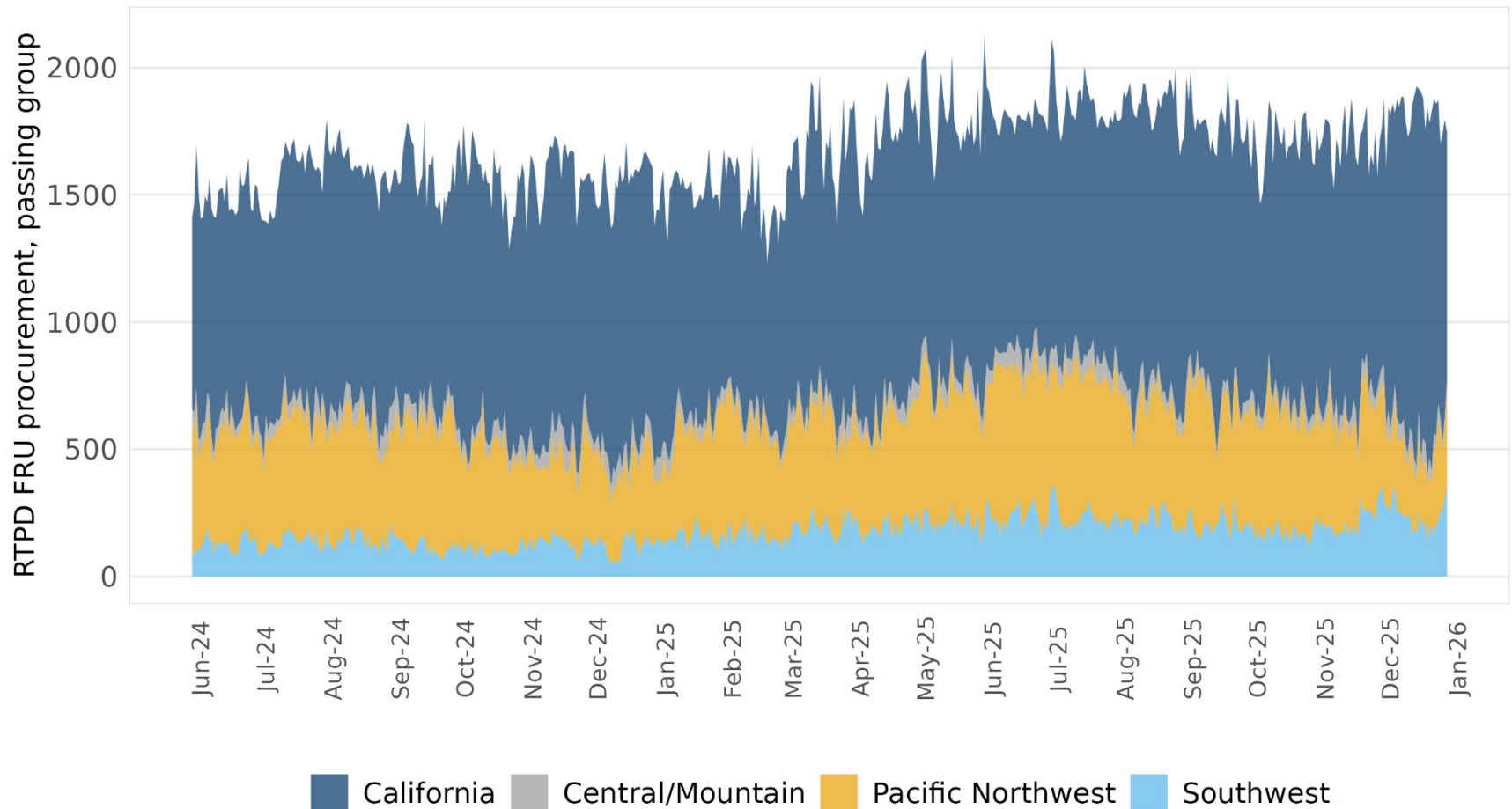




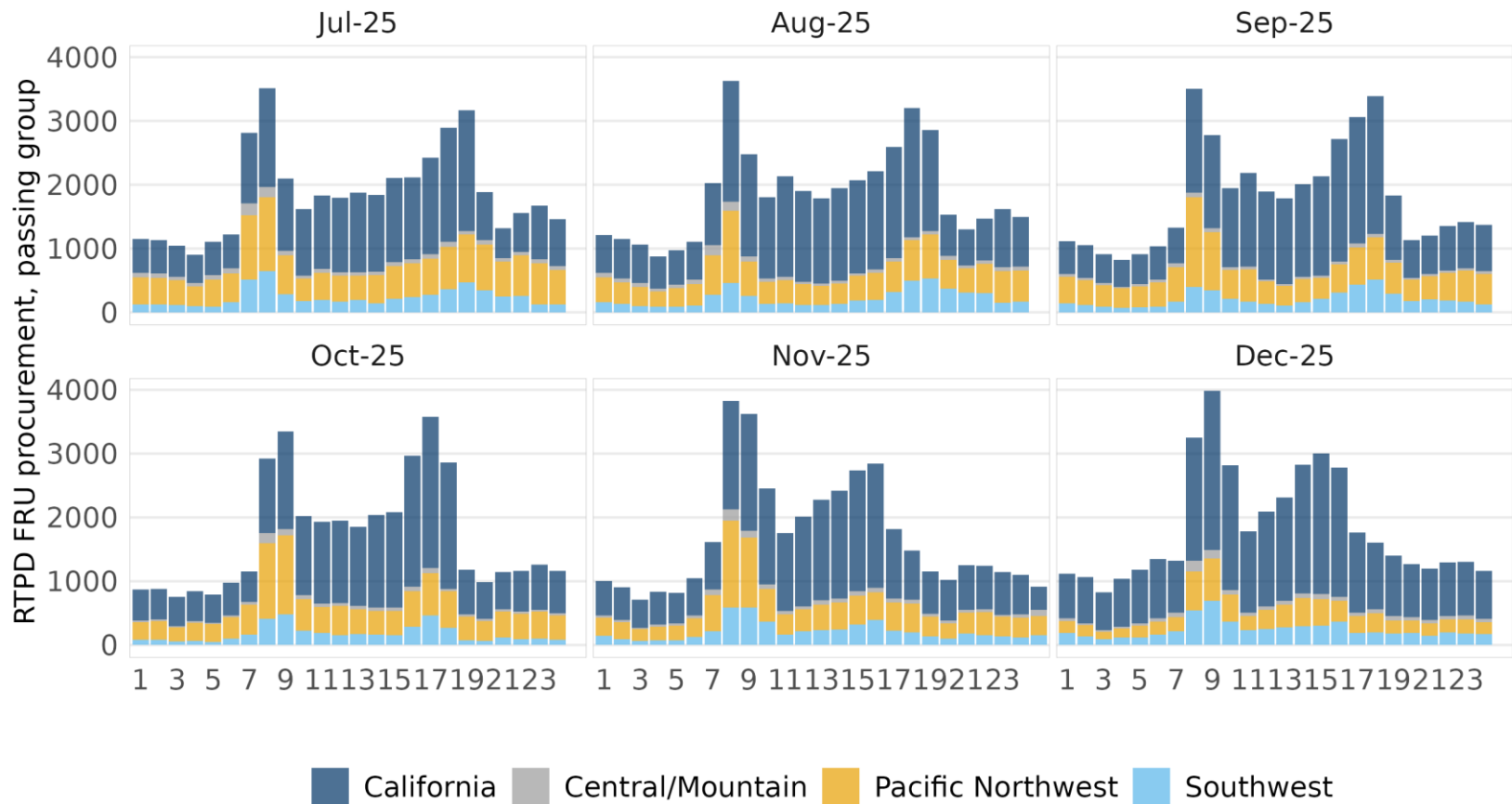
# Storage resources tend to support upward FRP procurement throughout the day



# Upward FRP is largely procured from areas in the Pacific Northwest and California

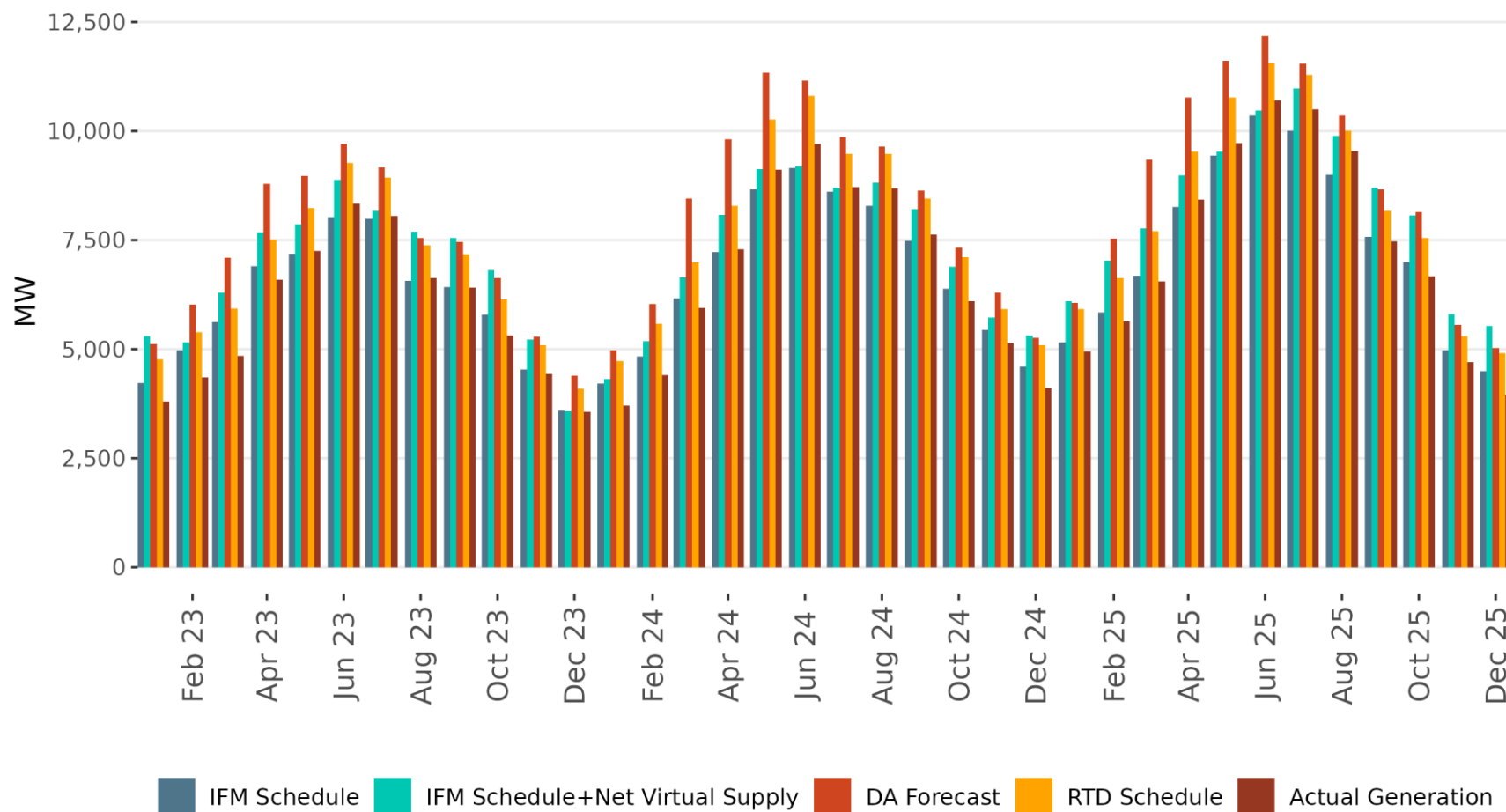


# Upward FRP procurement from CAISO area is largely occurring in the peak hours

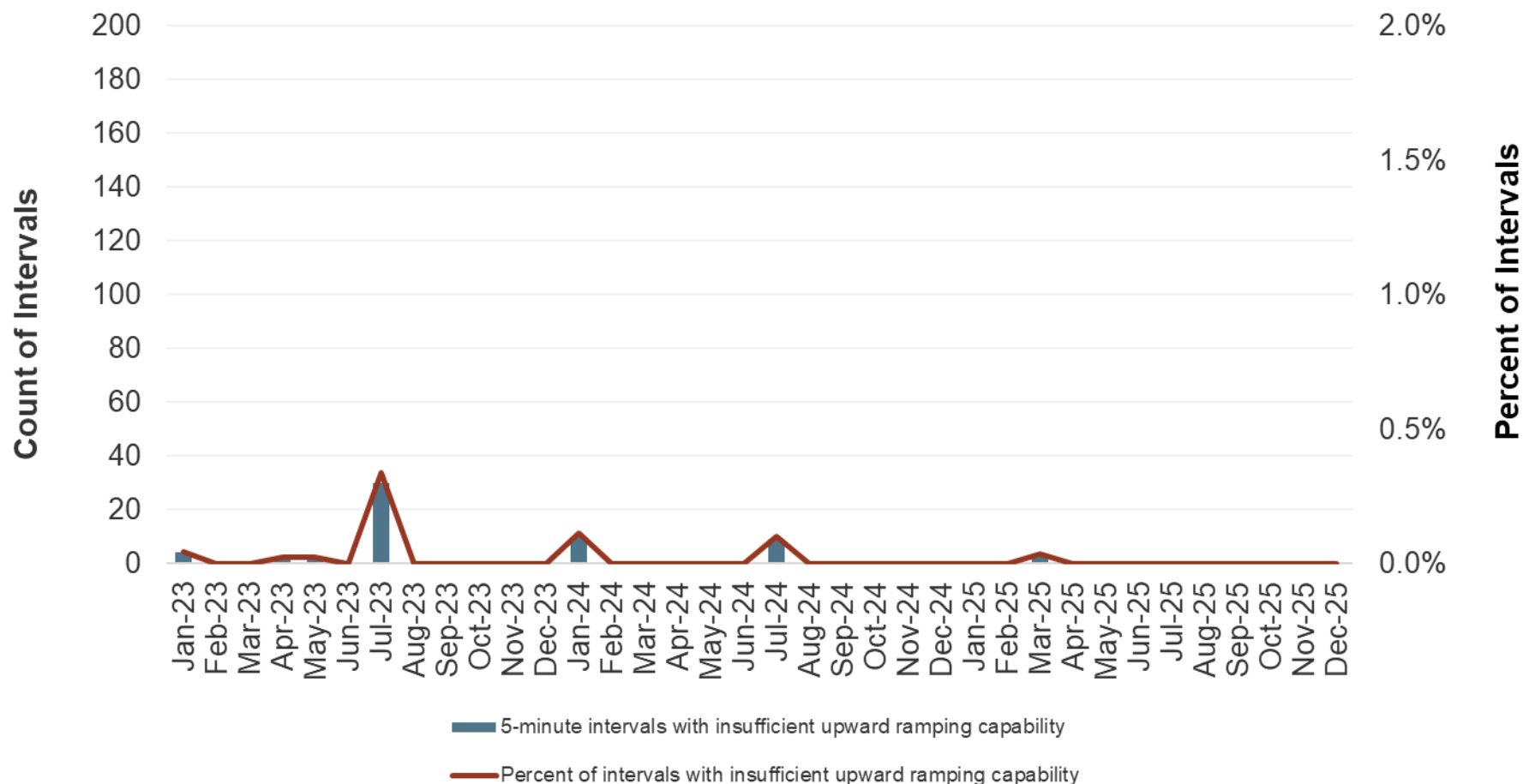


## Miscellaneous market metrics

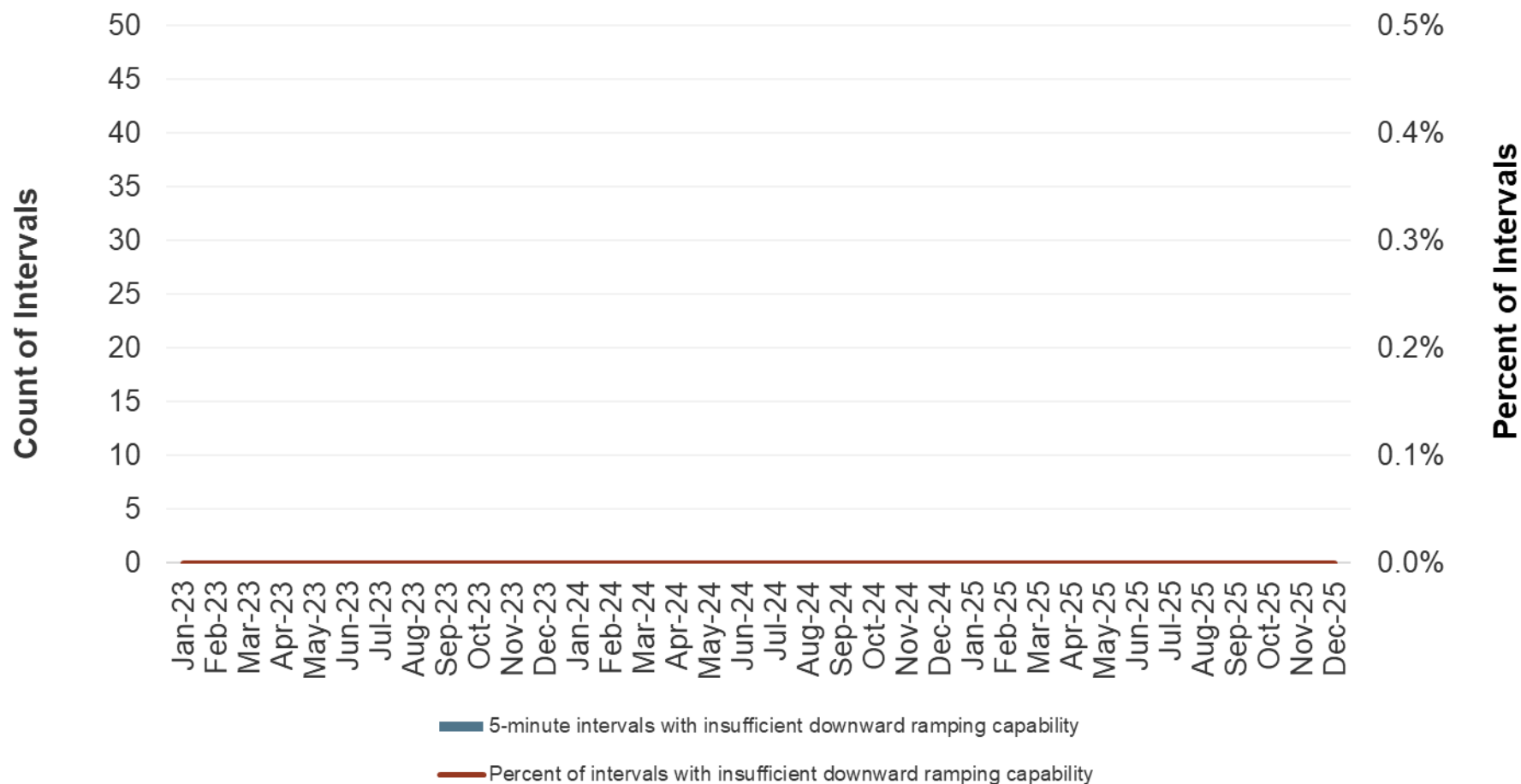
# ISO total monthly VERS schedules and forecasts compared to actuals



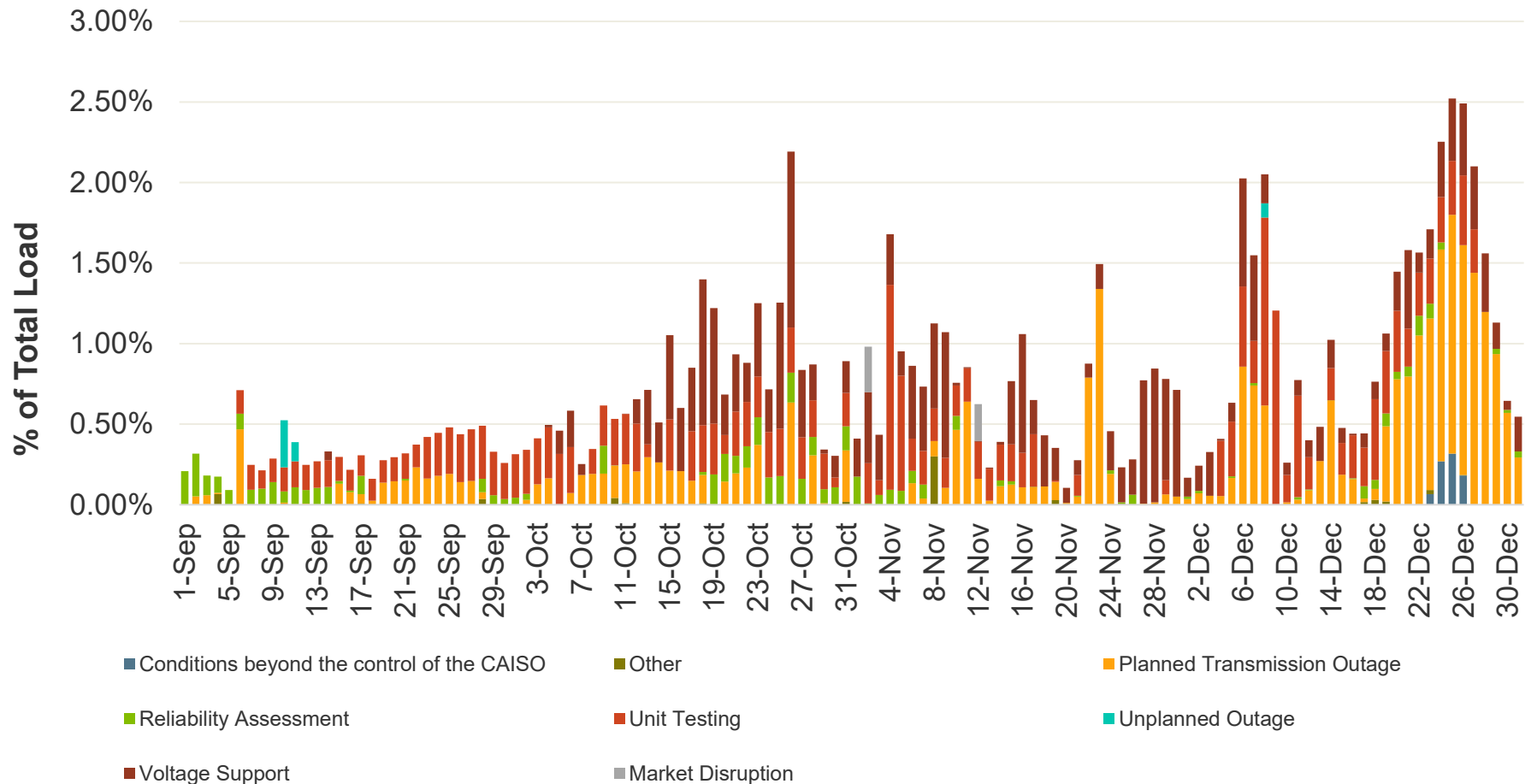
# Insufficient upward ramping capacity in ISO real-time stayed at low levels



# Insufficient downward ramping capacity in real-time remained low

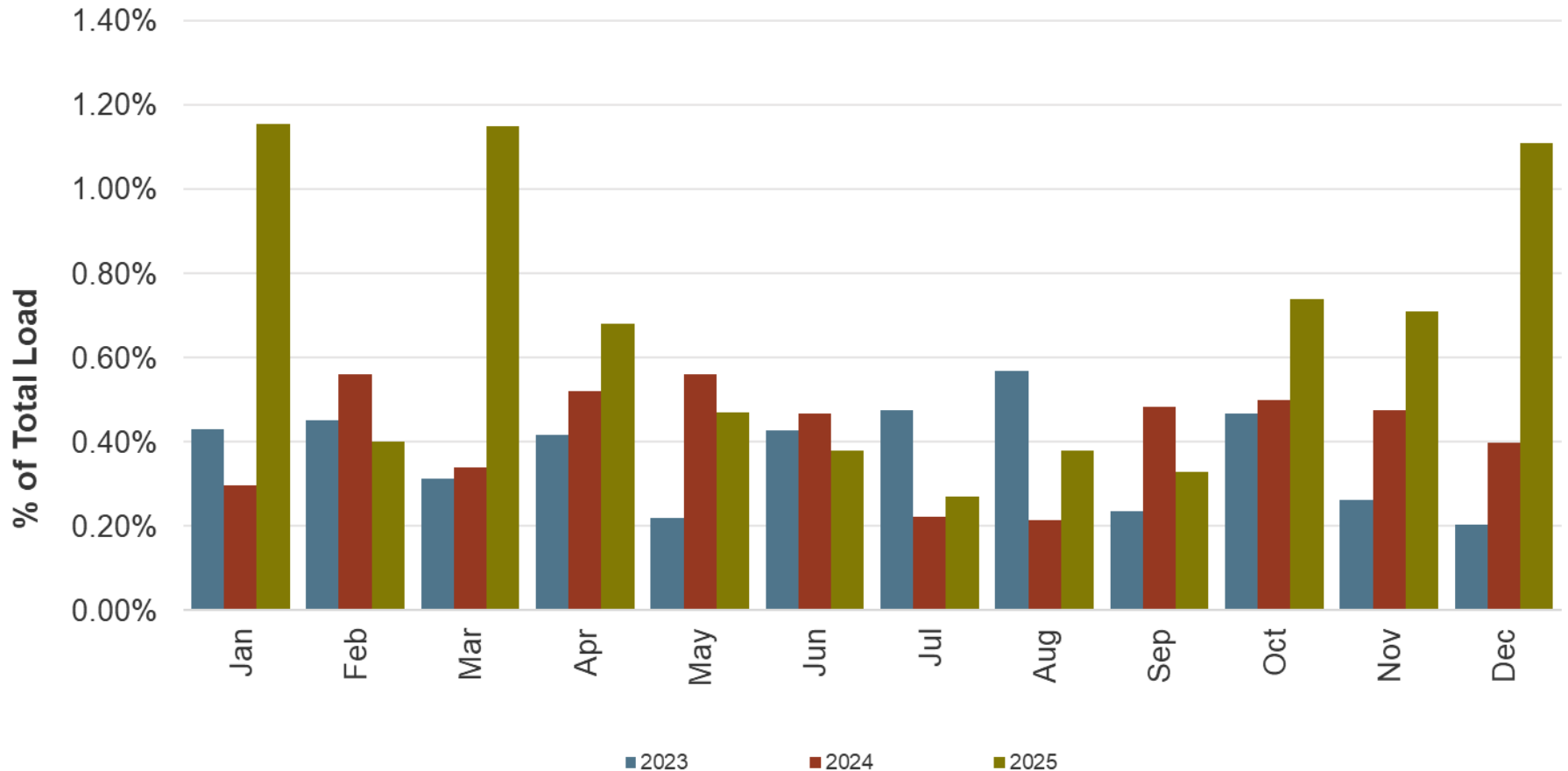


# Exceptional dispatches volume is driven by a variety of reasons





# Exceptional dispatch volume in the ISO area for Q4 2025 was higher than previous years



## Forecasting metrics

# Takeaways from STF metrics

## Highlights:

- Real-time accuracy on high load days generally trended well across the WEIM in 2025.
- CAISO DA demand forecast error was relatively high toward the end of 2025. Peak loads tended to be lower than previous years and DA demand forecasts mostly over-predicted peak.
- FRP coverage is near target.

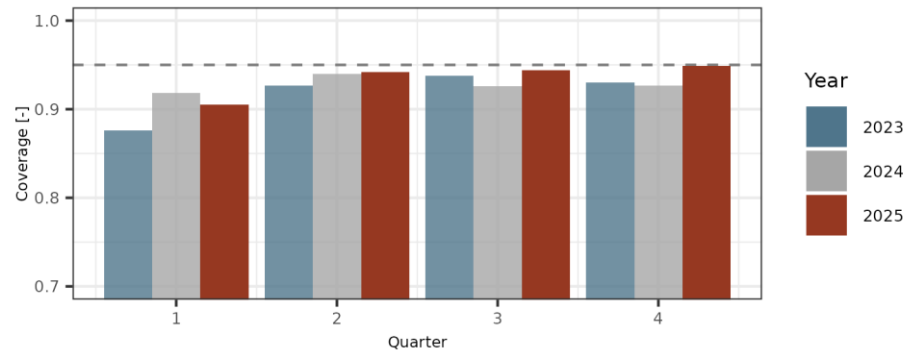
## Areas for additional monitoring:

- Capacity-weighted VER forecast metrics generally trend well, but we are working to address MW error, especially in solar ramps.
- Data quality is important to creation of demand forecast and uncertainty products. We are working with entities to review.

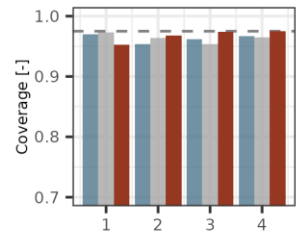
# FRP Requirements

## EIM AREA

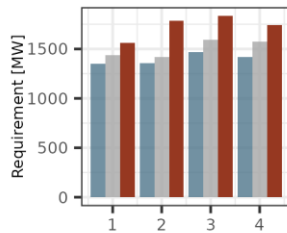
Coverage



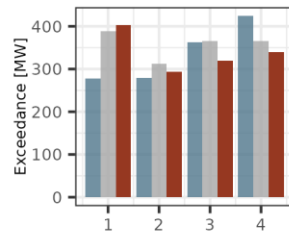
FRU Coverage



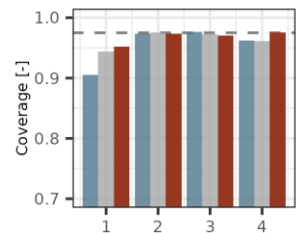
FRU Requirement



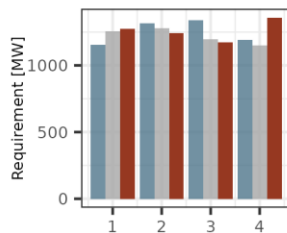
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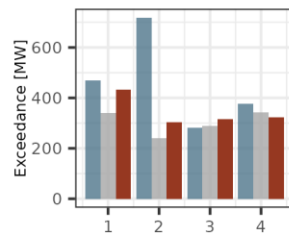
FRD Coverage



FRD Requirement



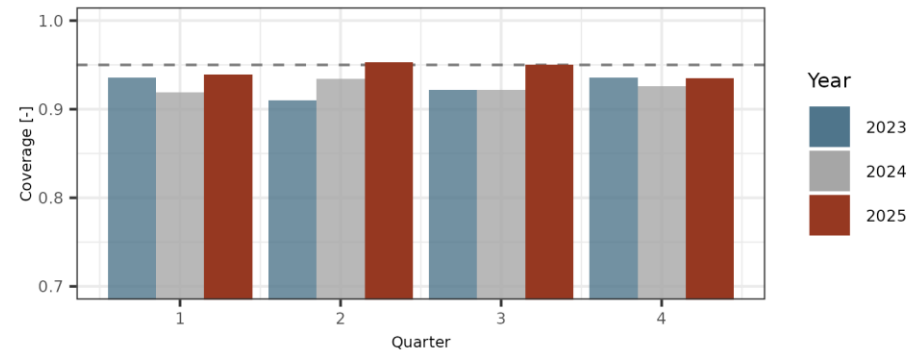
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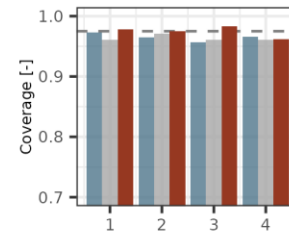
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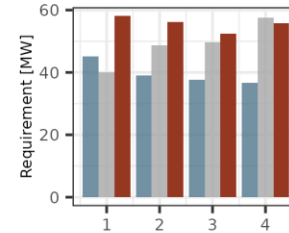
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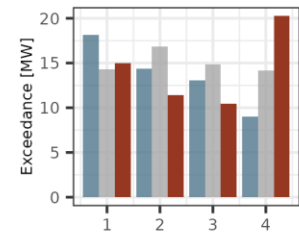
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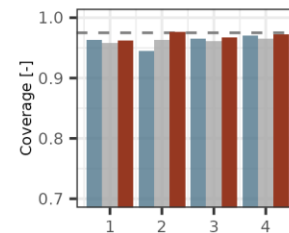
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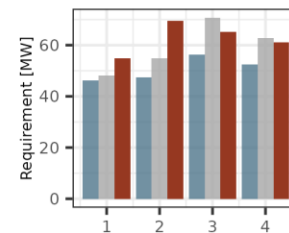
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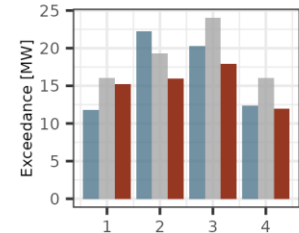
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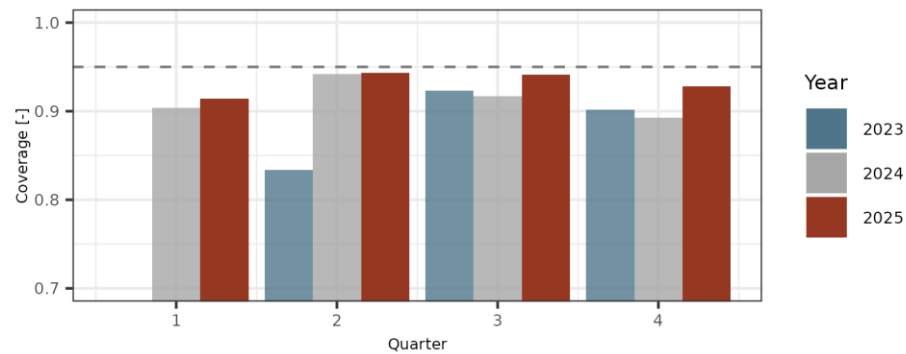
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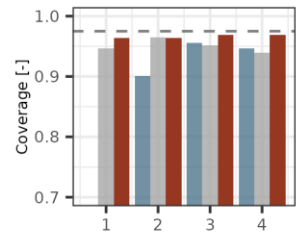
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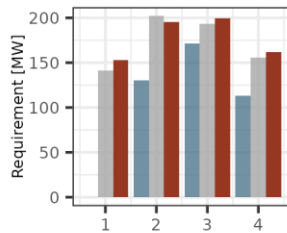
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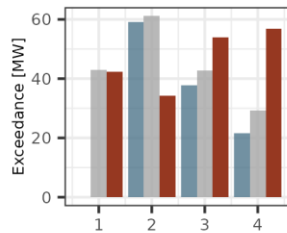
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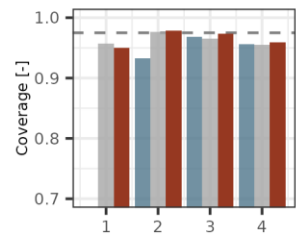
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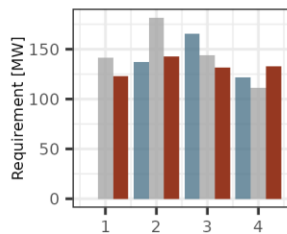
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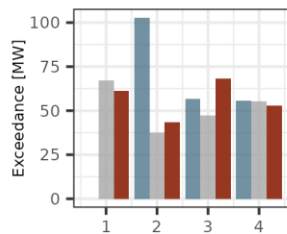
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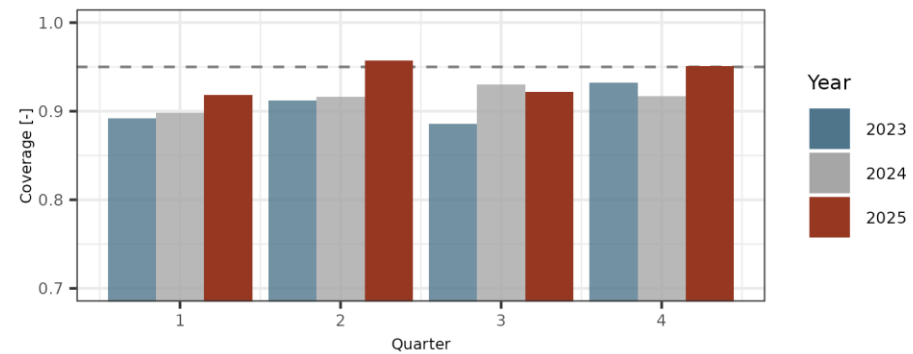
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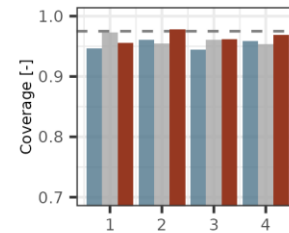
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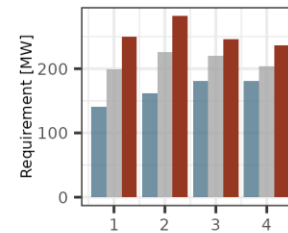
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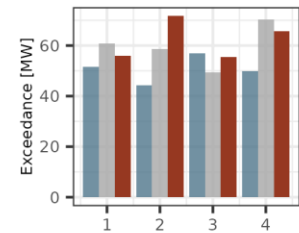
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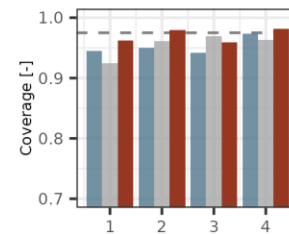
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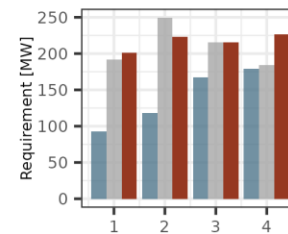
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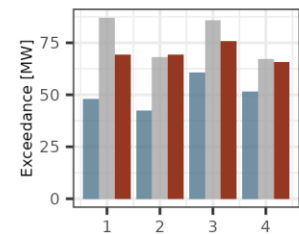
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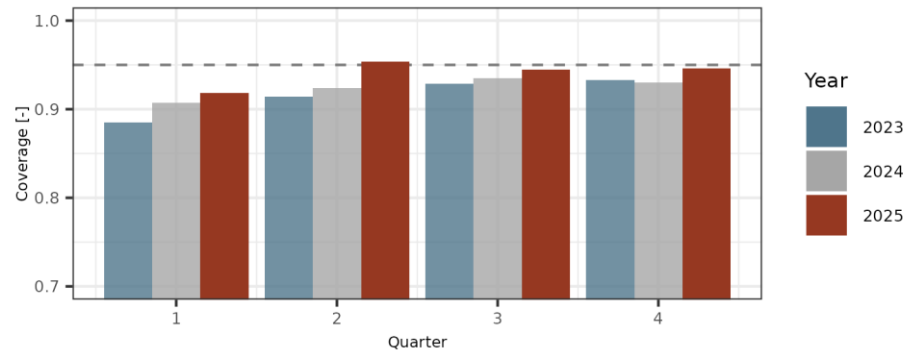
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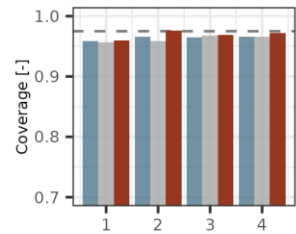
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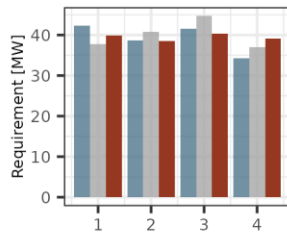
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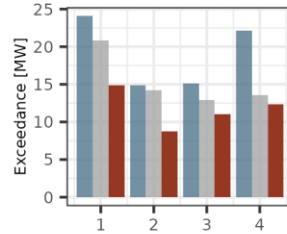
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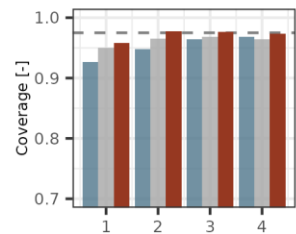
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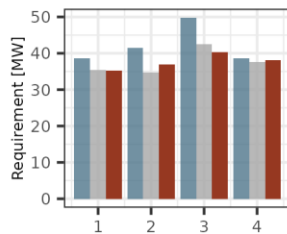
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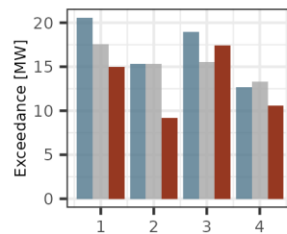
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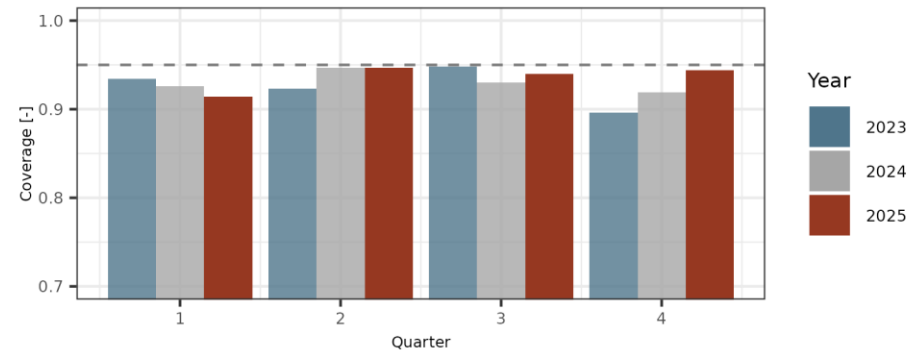
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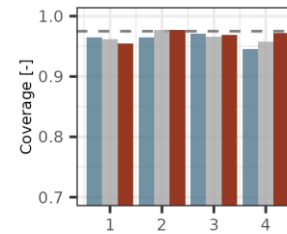
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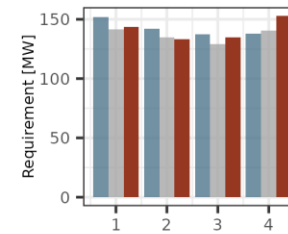
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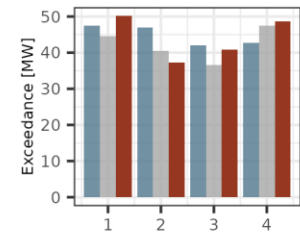
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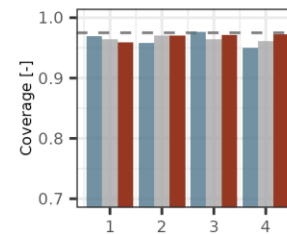
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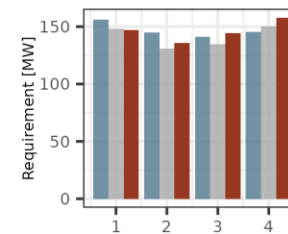
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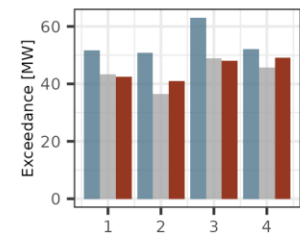
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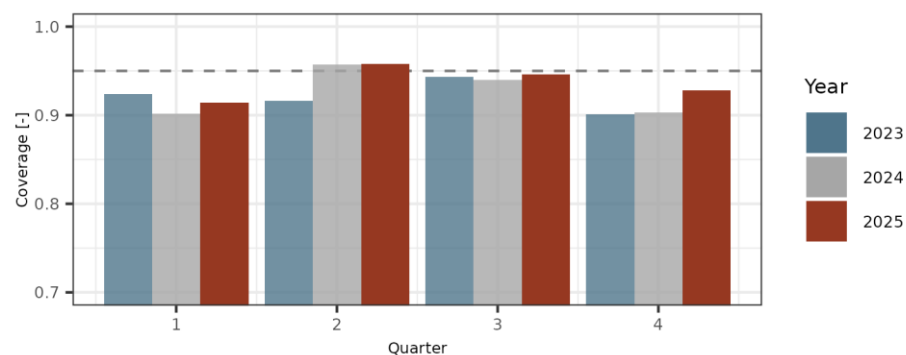
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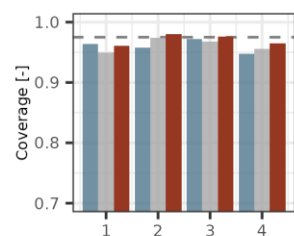
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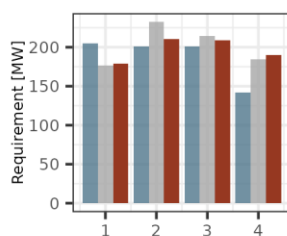
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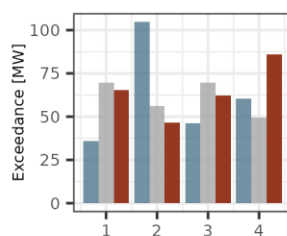
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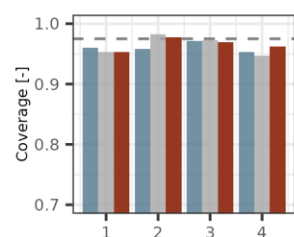
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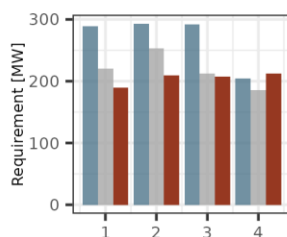
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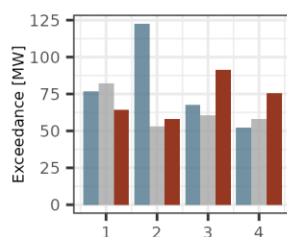
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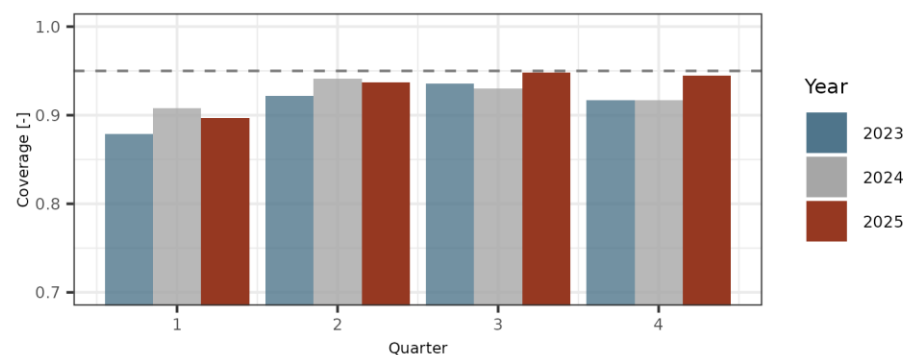
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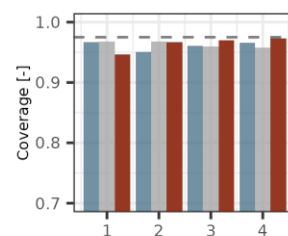
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## CAISO

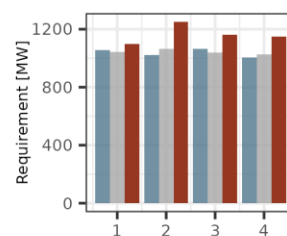
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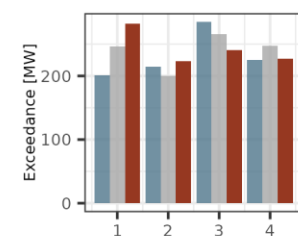
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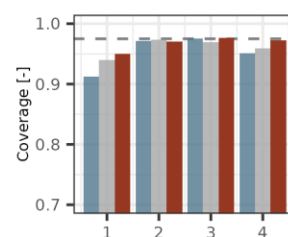
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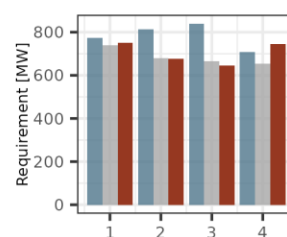
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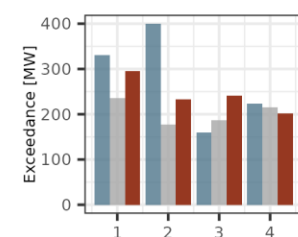
FRD Coverage



FRD Requirement



FRD Exceedance

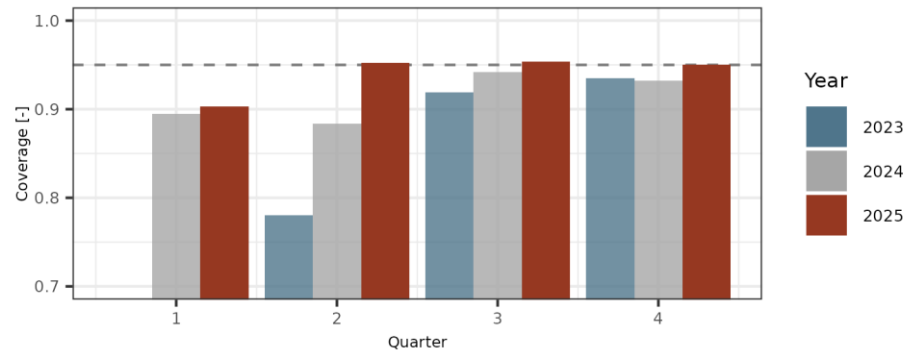


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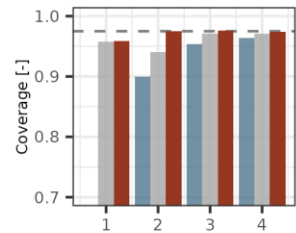


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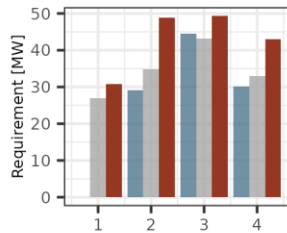
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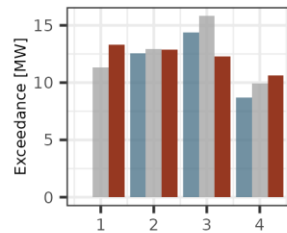
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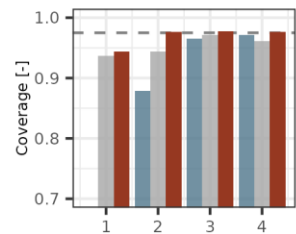
FRU Requirement



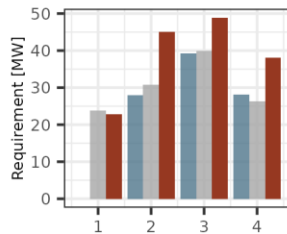
FRU Exceedance



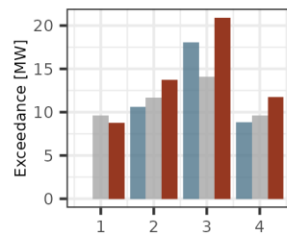
FRD Coverage



FRD Requirement



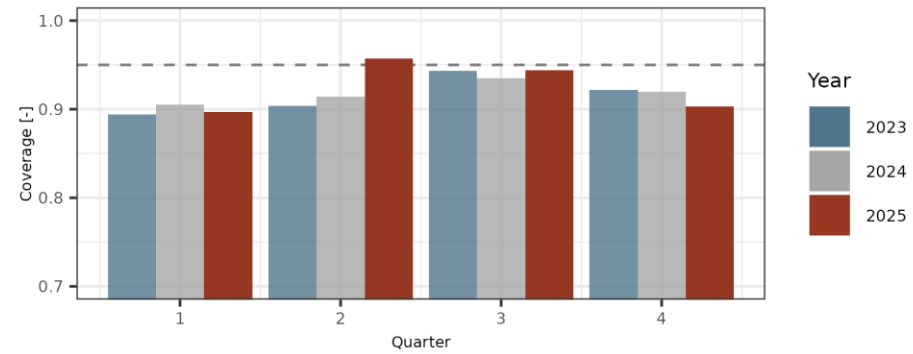
FRD Exceedance



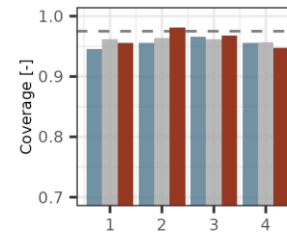
Data current to 2025-12-31

## IPCO

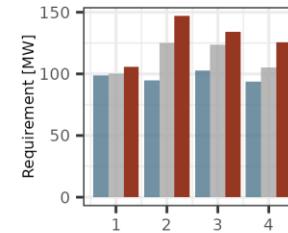
Coverage



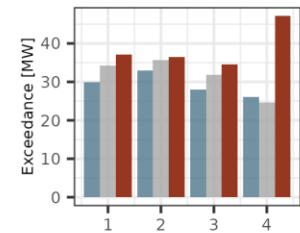
FRU Coverage



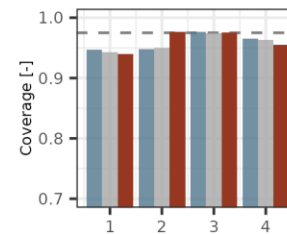
FRU Requirement



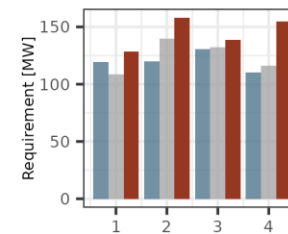
FRU Exceedance



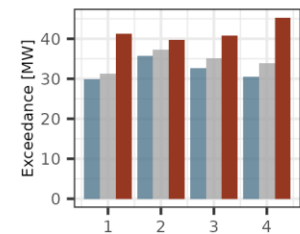
FRD Coverage



FRD Requirement



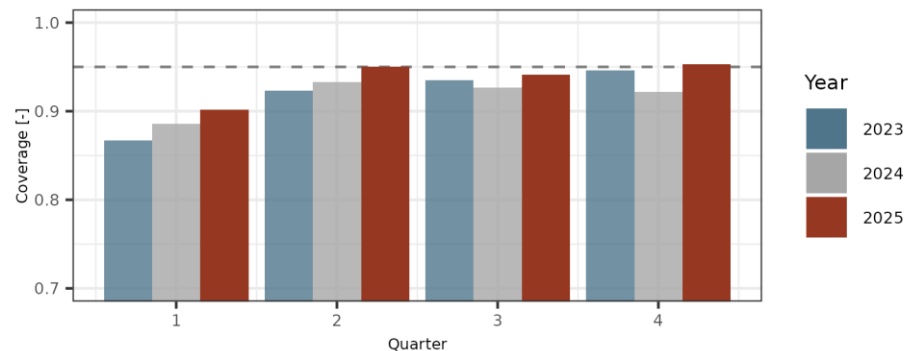
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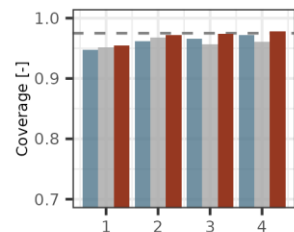
Data current to 2025-12-31

## LADWP

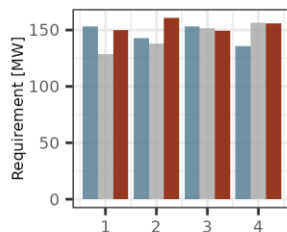
Coverage



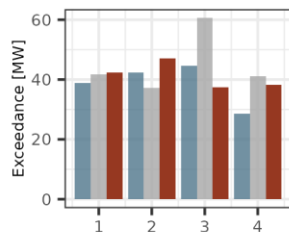
FRU Coverage



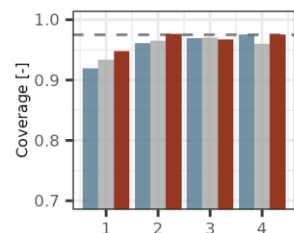
FRU Requirement



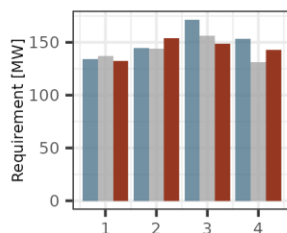
FRU Exceedance



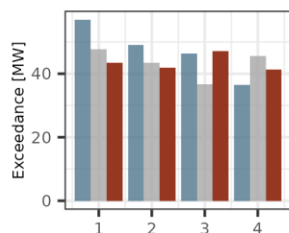
FRD Coverage



FRD Requirement



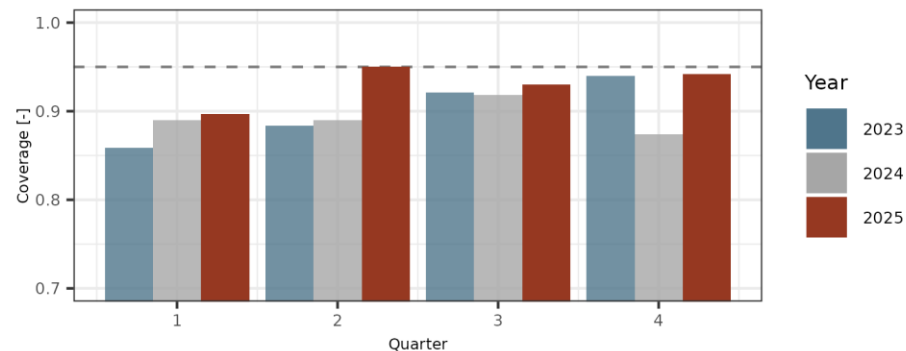
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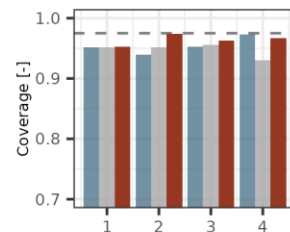
Data current to 2025-12-31

## NVE

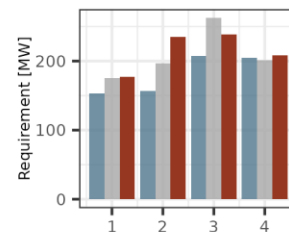
Coverage



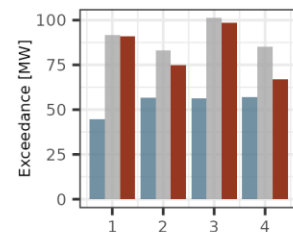
FRU Coverage



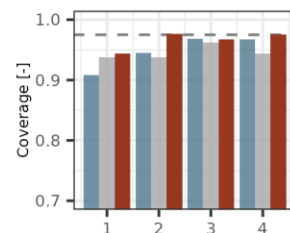
FRU Requirement



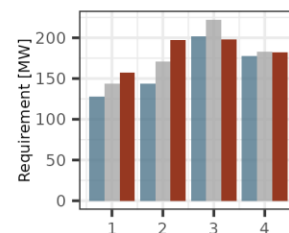
FRU Exceedance



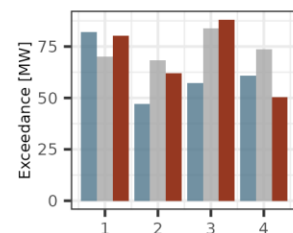
FRD Coverage



FRD Requirement



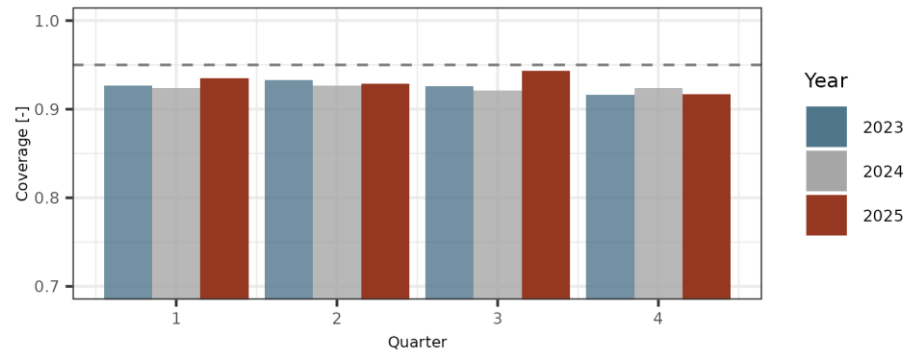
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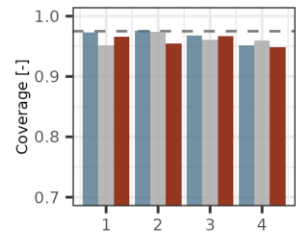
Data current to 2025-12-31

## NWMT

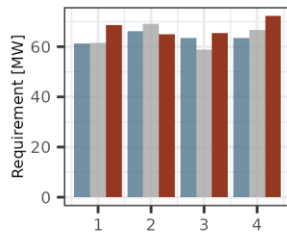
Coverage



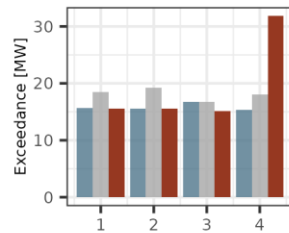
FRU Coverage



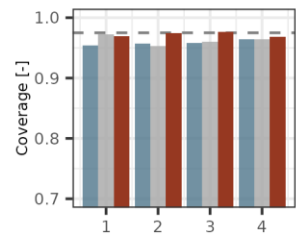
FRU Requirement



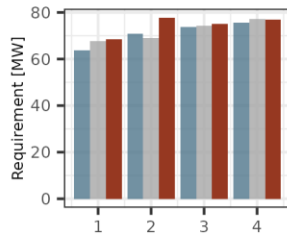
FRU Exceedance



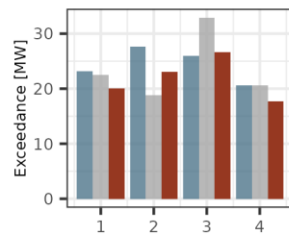
FRD Coverage



FRD Requirement



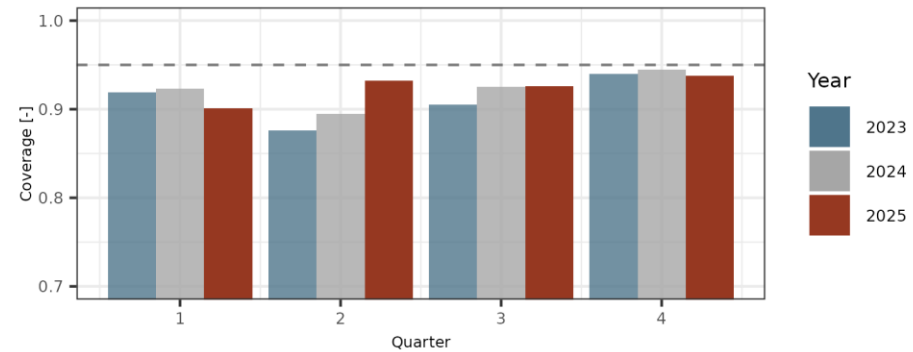
FRD Exceedance



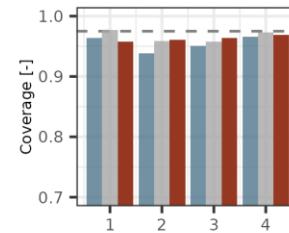
Data current to 2025-12-31

## PACE

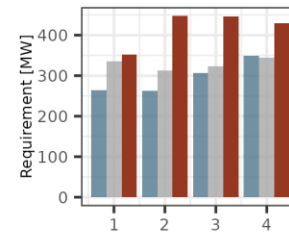
Coverage



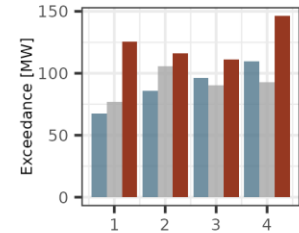
FRU Coverage



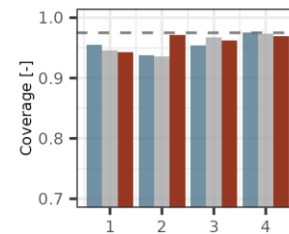
FRU Requirement



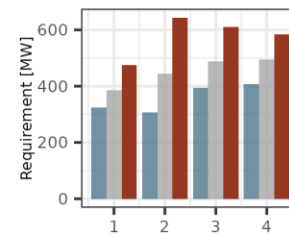
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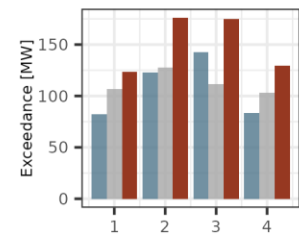
FRD Coverage



FRD Requirement



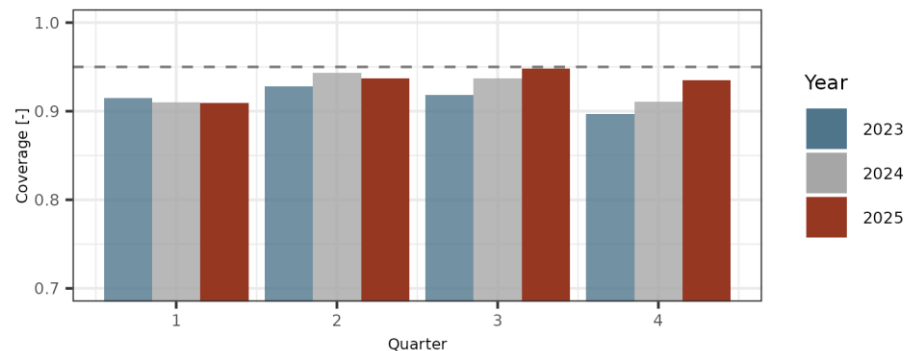
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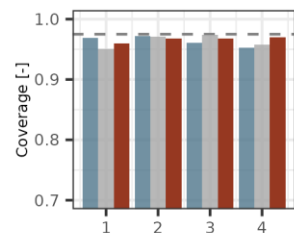
Data current to 2025-12-31

## PACW

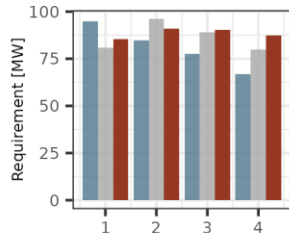
Coverage



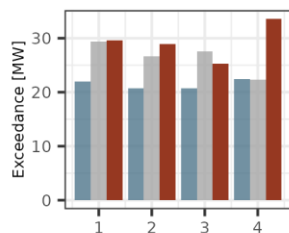
FRU Coverage



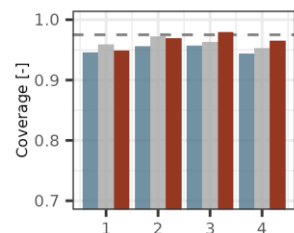
FRU Requirement



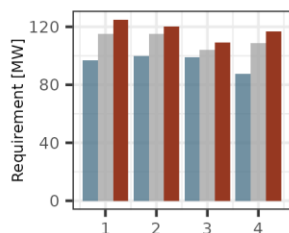
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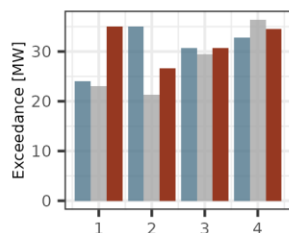
FRD Coverage



FRD Requirement



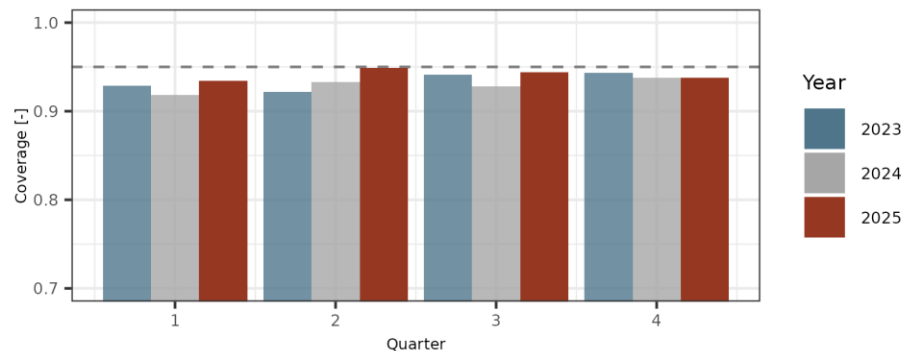
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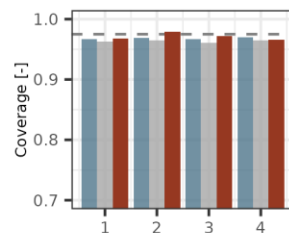
Data current to 2025-12-31

## PGE

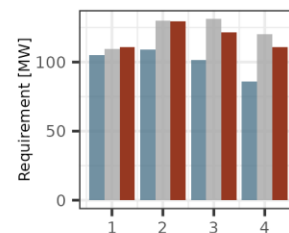
Coverage



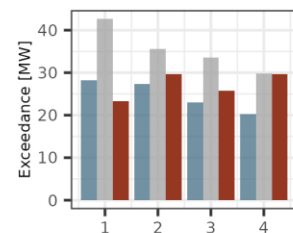
FRU Coverage



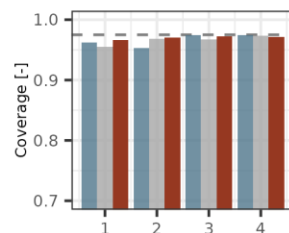
FRU Requirement



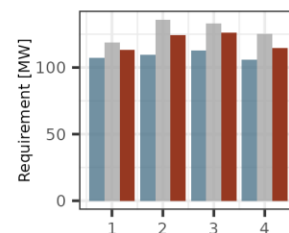
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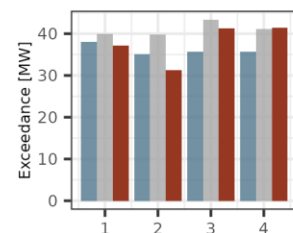
FRD Coverage



FRD Requirement



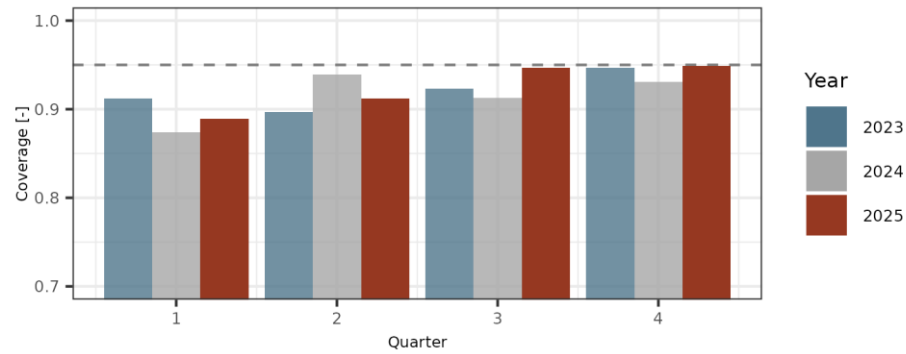
FRD Exceedance



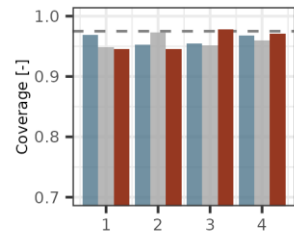
Data current to 2025-12-31

## PNM

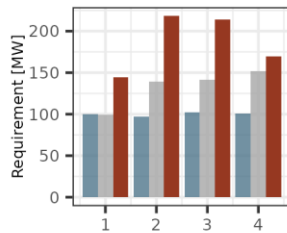
Coverage



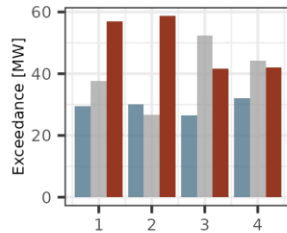
FRU Coverage



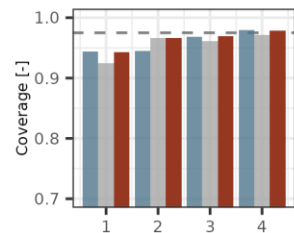
FRU Requirement



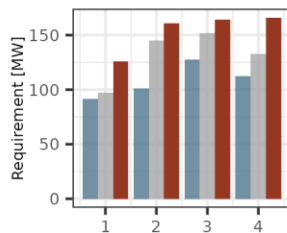
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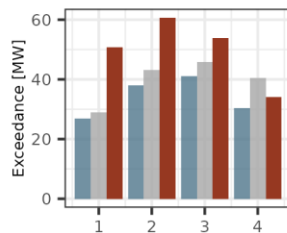
FRD Coverage



FRD Requirement



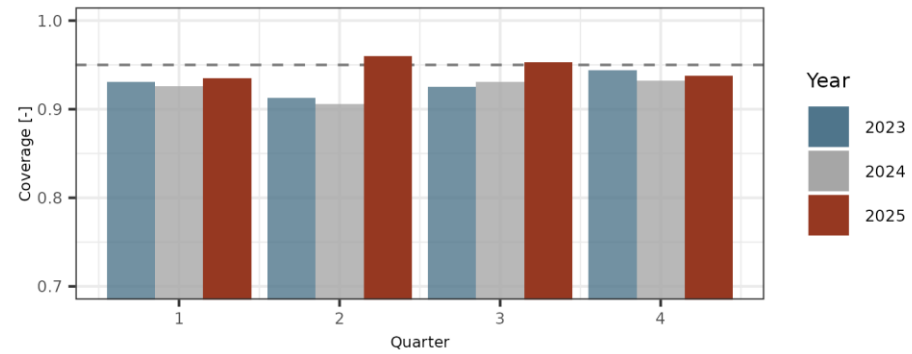
FRD Exceedance



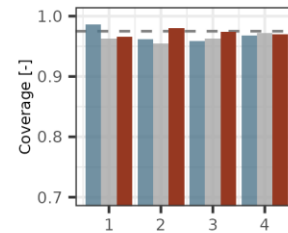
Data current to 2025-12-31

## PSE

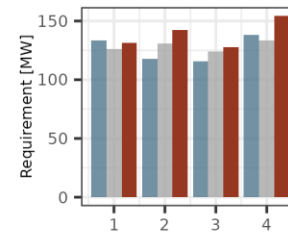
Coverage



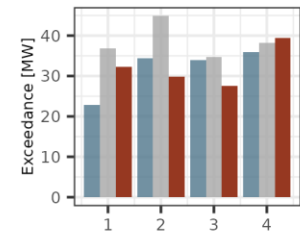
FRU Coverage



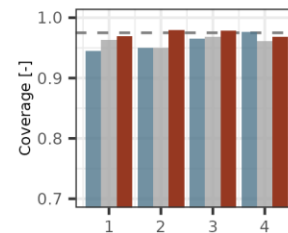
FRU Requirement



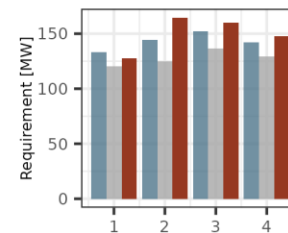
FRU Exceedance



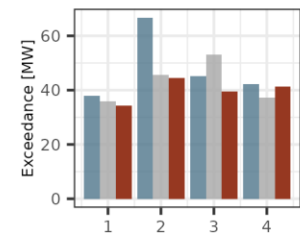
FRD Coverage



FRD Requirement



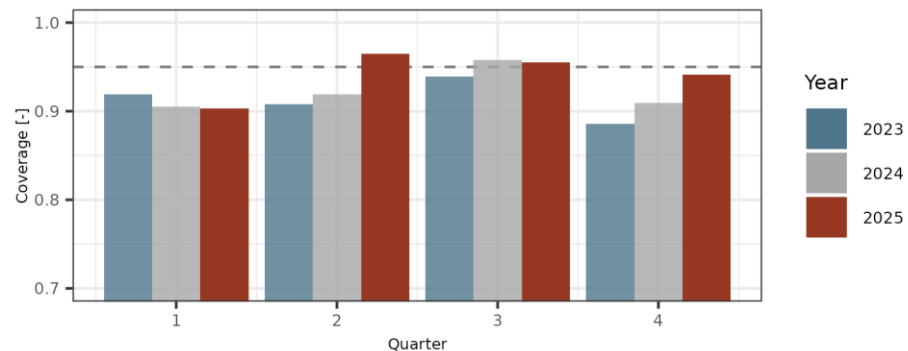
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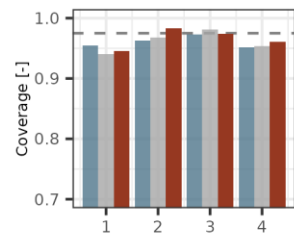
Data current to 2025-12-31

## SCL

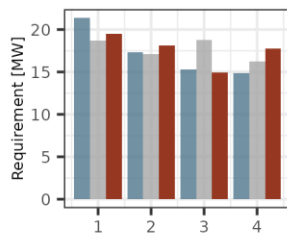
Coverage



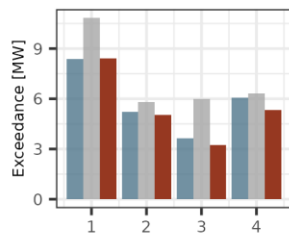
FRU Coverage



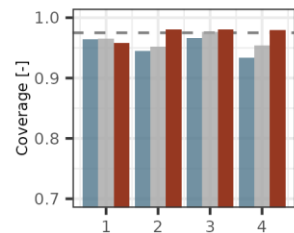
FRU Requirement



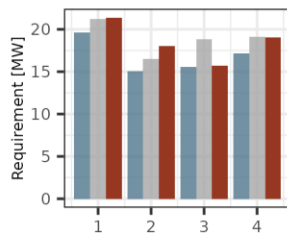
FRU Exceedance



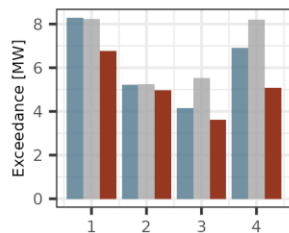
FRD Coverage



FRD Requirement



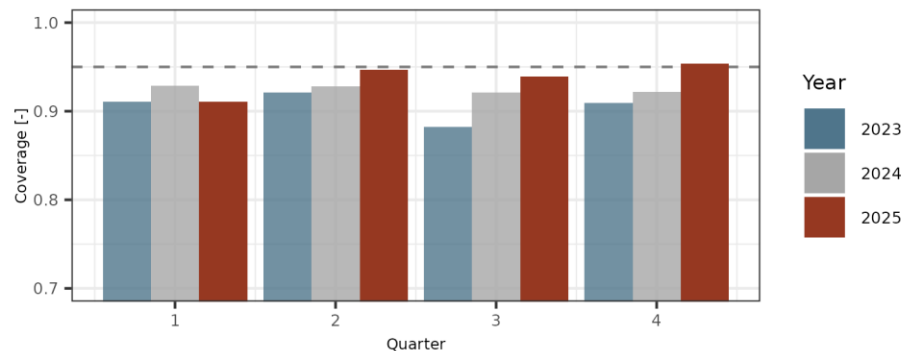
FRD Exceedance



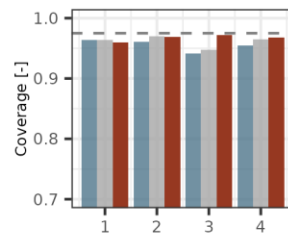
Data current to 2025-12-31

## SRP

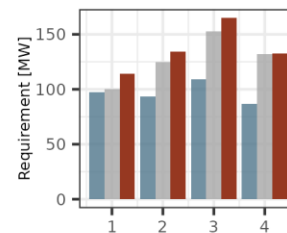
Coverage



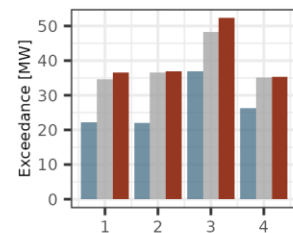
FRU Coverage



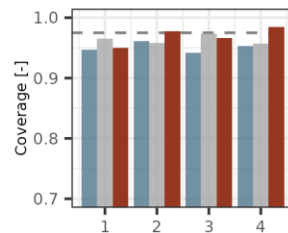
FRU Requirement



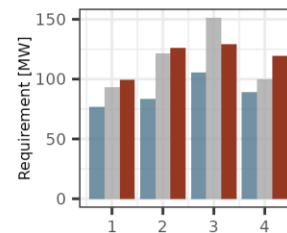
FRU Exceedance



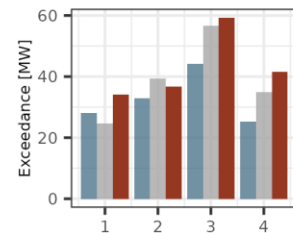
FRD Coverage



FRD Requirement



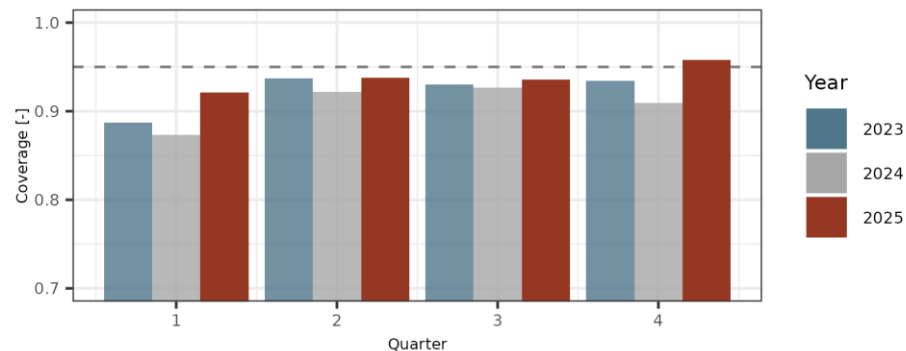
FRD Exceedance



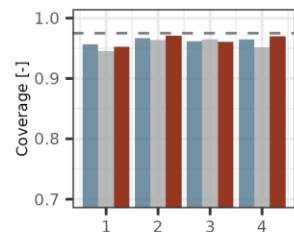
Data current to 2025-12-31

## TEP

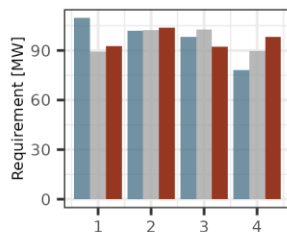
Coverage



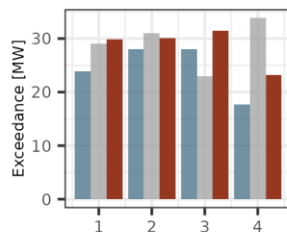
FRU Coverage



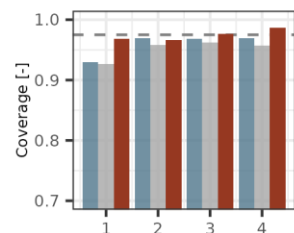
FRU Requirement



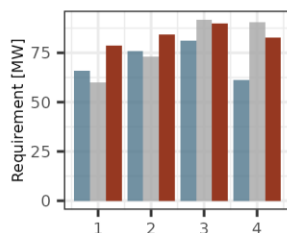
FRU Exceedance



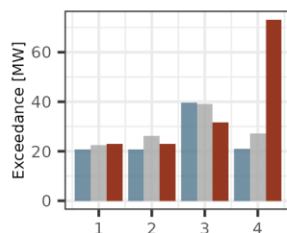
FRD Coverage



FRD Requirement



FRD Exceedance

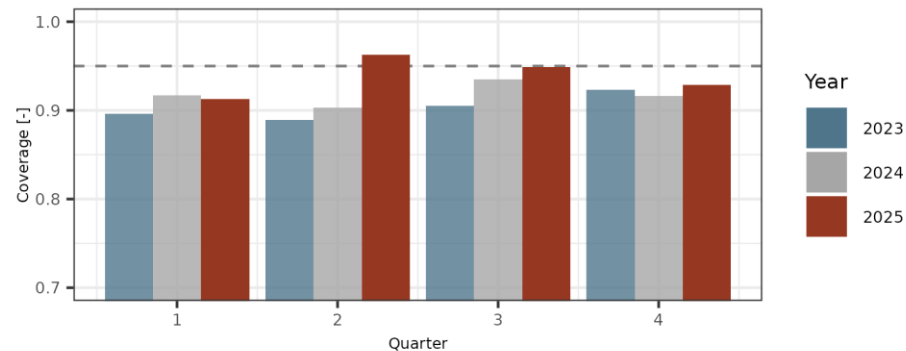


Data current to 2025-12-31

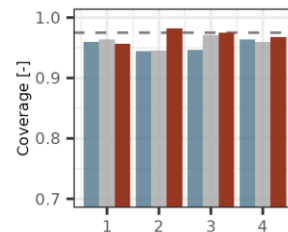
\* FRD requirement and exceedance is impacted by VER submission issue. Forecasting is reviewing for potential discard.

## TID

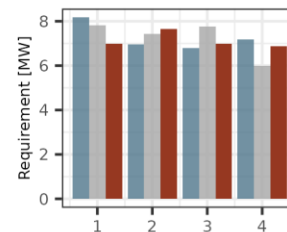
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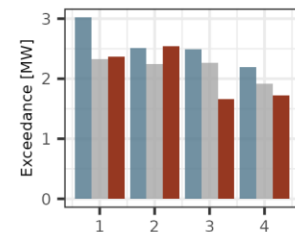
FRU Coverage



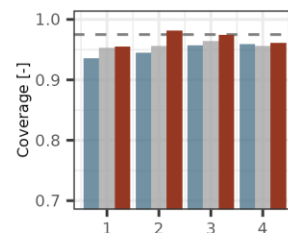
FRU Requirement



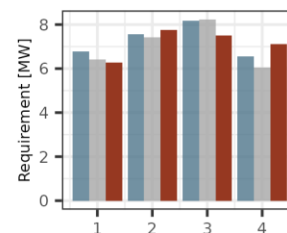
FRU Exceedance



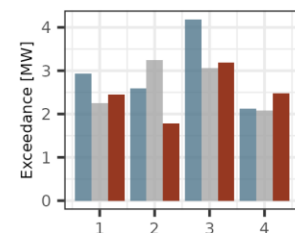
FRD Coverage



FRD Requirement

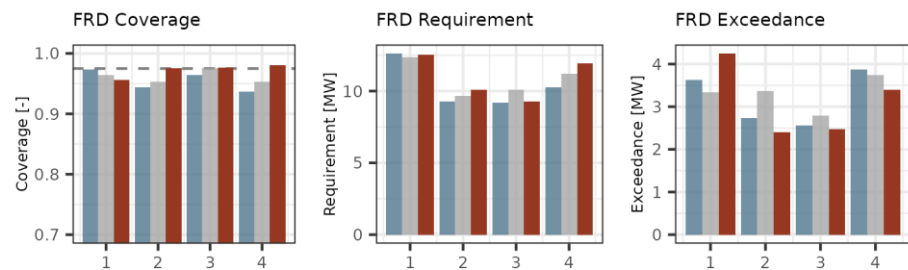
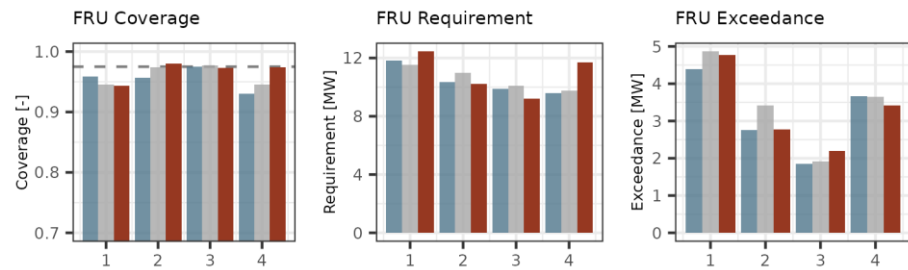
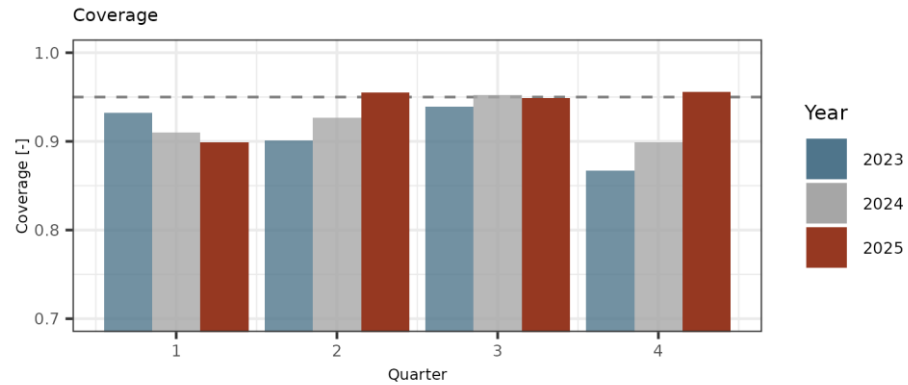


FRD Exceedance



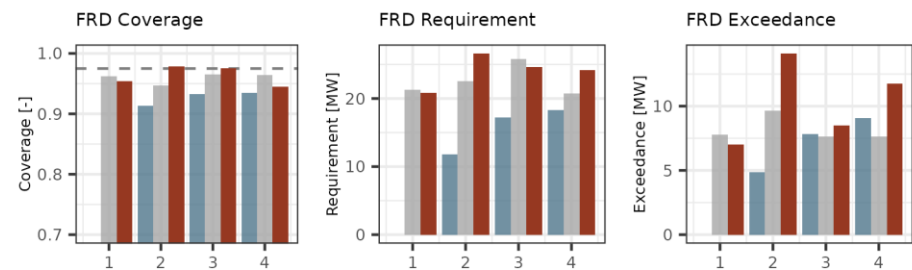
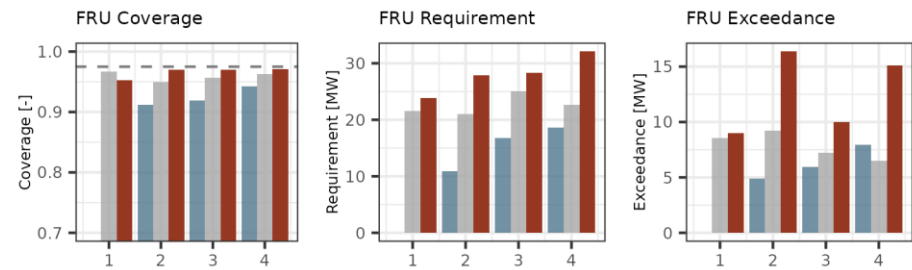
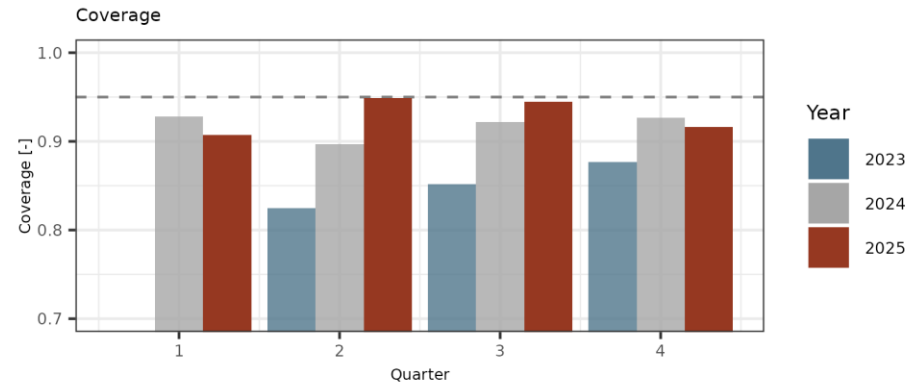
Data current to 2025-12-31

## TPWR



Data current to 2025-12-31

## WALC



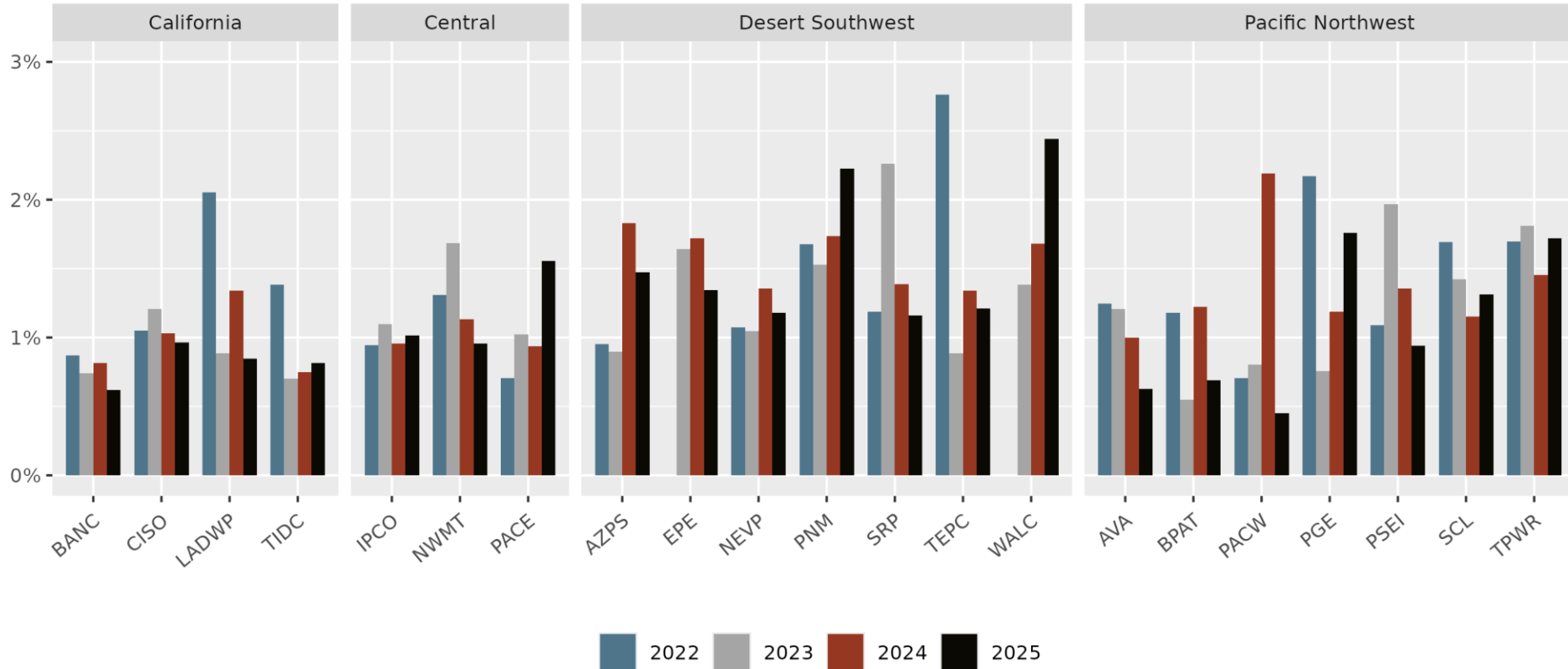
Data current to 2025-12-31



# Demand Forecasting

# 2025 accuracy on highest load days

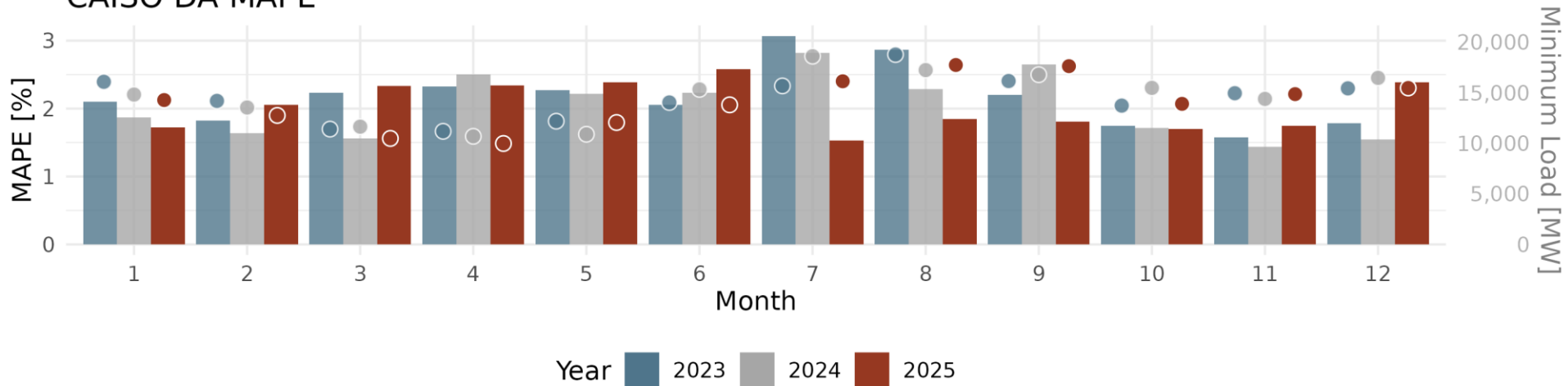
T-60 Accuracy During Peak Hour  
Average for 10 highest load days



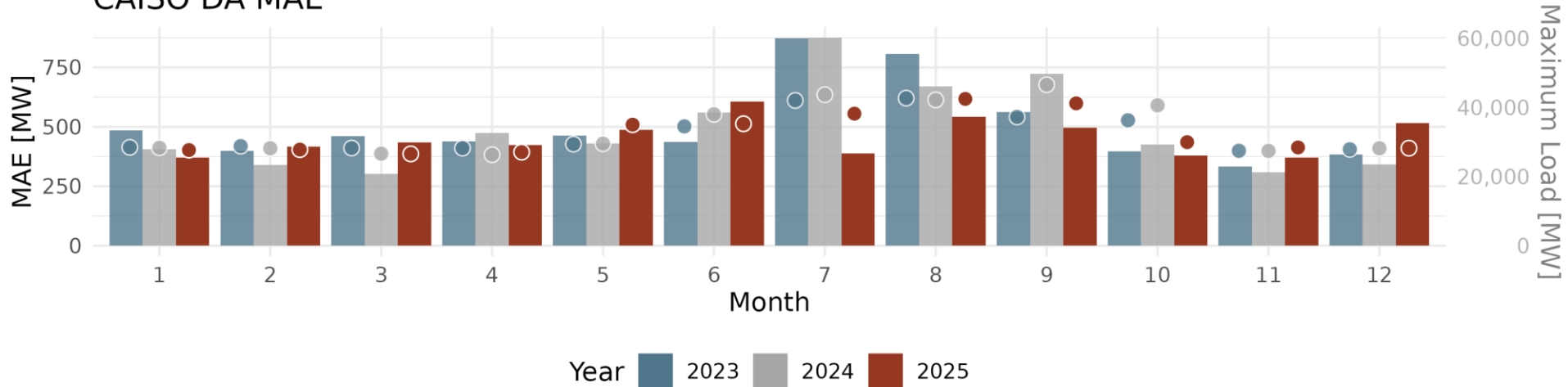
Sample current through 2025-12-31

Minor change from graph presented in Q3 2025. Most regions did not see higher peak loads Oct through Dec.

## CAISO DA MAPE



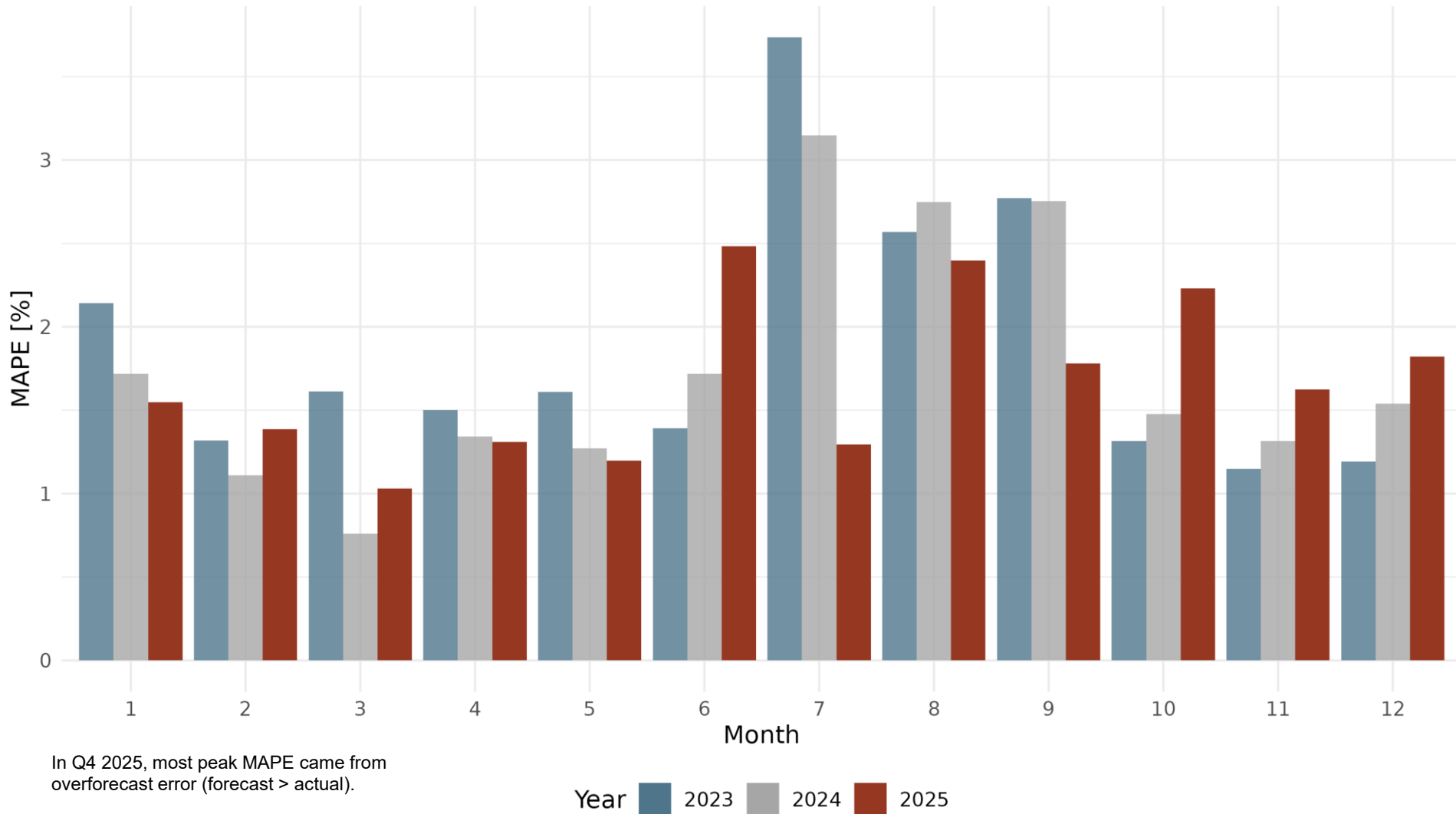
## CAISO DA MAE

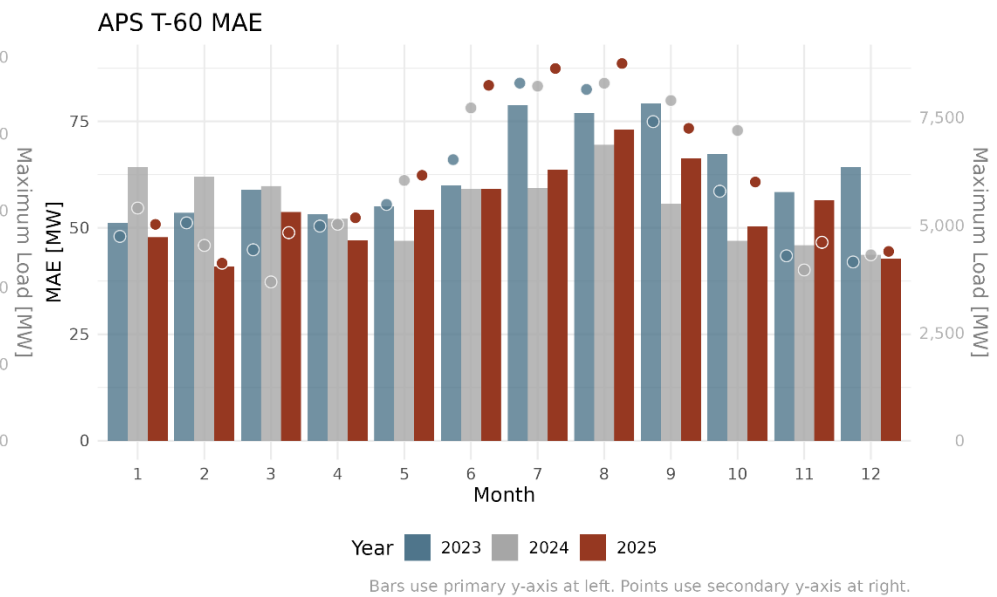
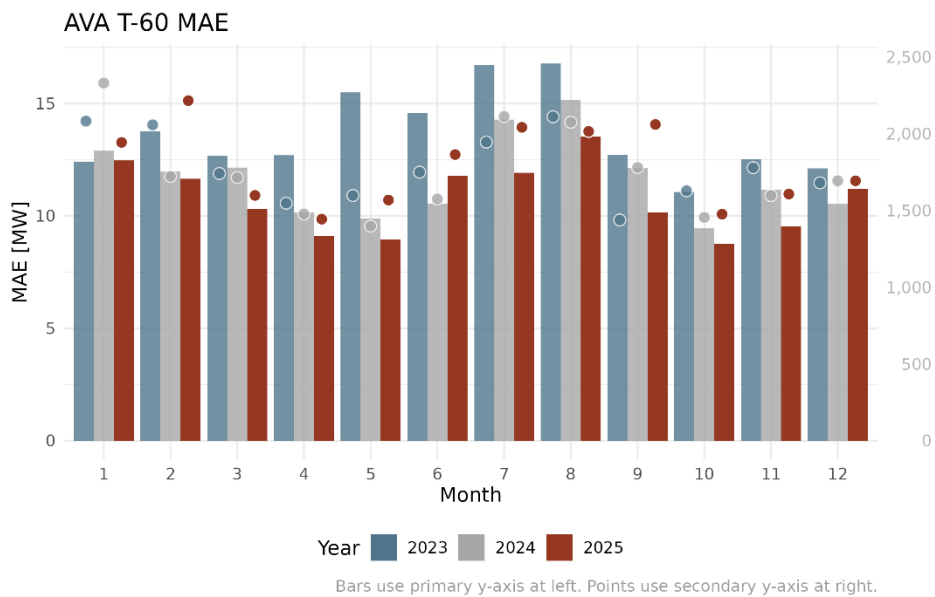
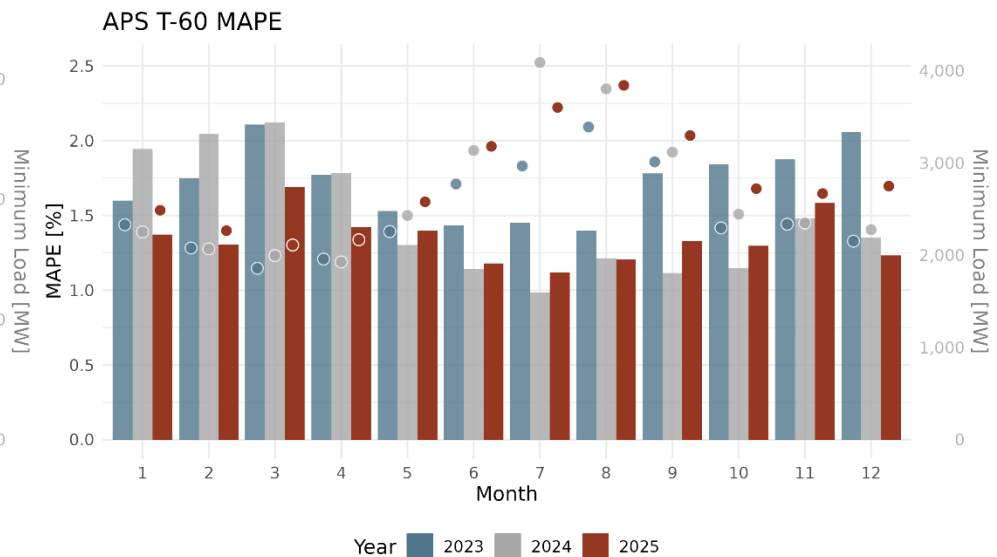
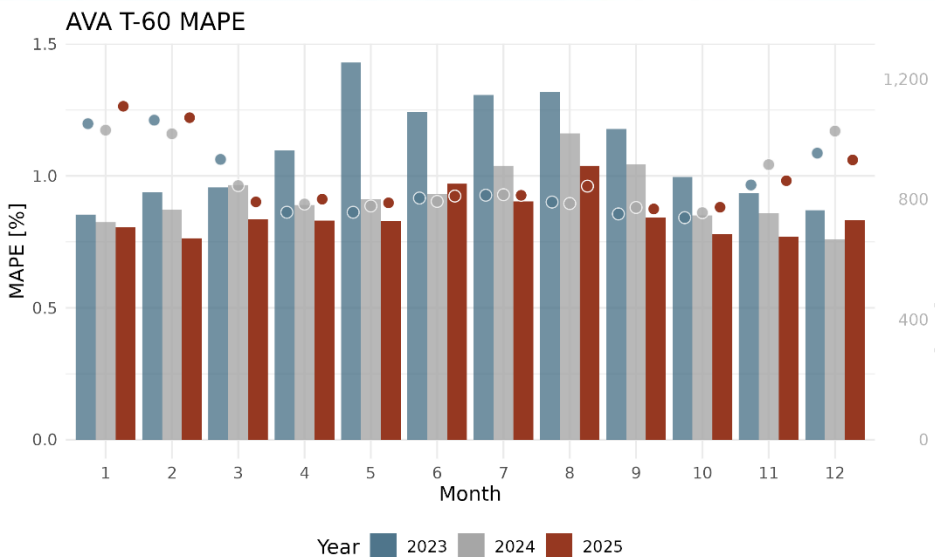


MAPE =  $\frac{\text{abs}(\text{Forecast} - \text{Actual})}{\text{Actual}}$   
 MAE =  $\text{abs}(\text{Forecast} - \text{Actual})$

Bars use primary y-axis at left. Points use secondary y-axis at right.

## CAISO DA Peak Forecast

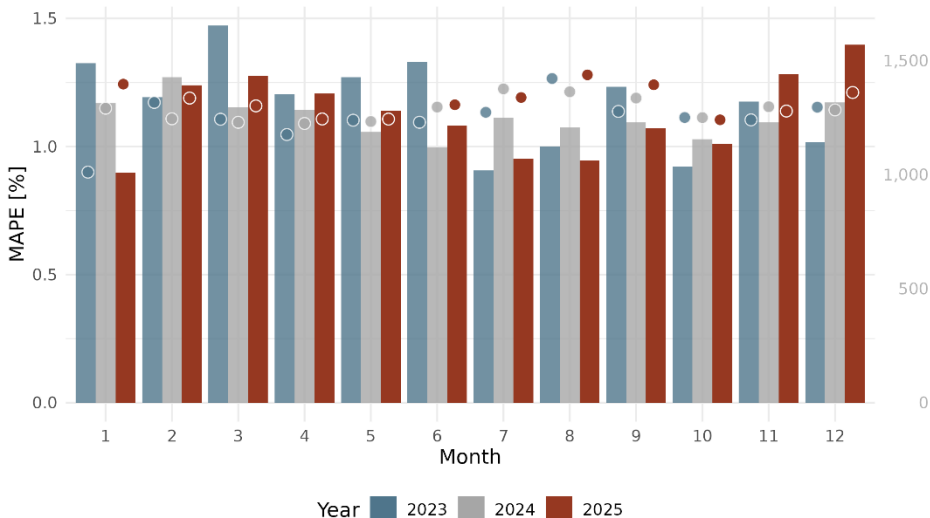




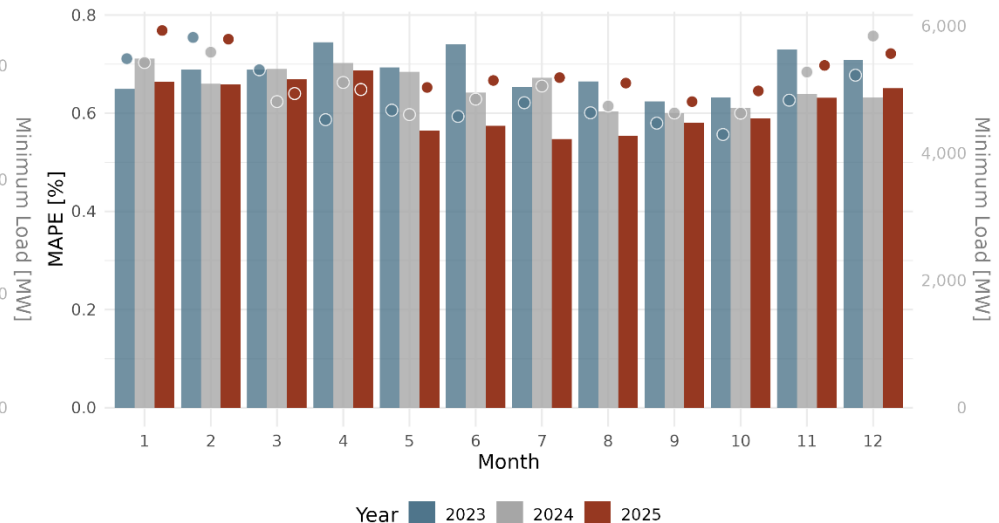
Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

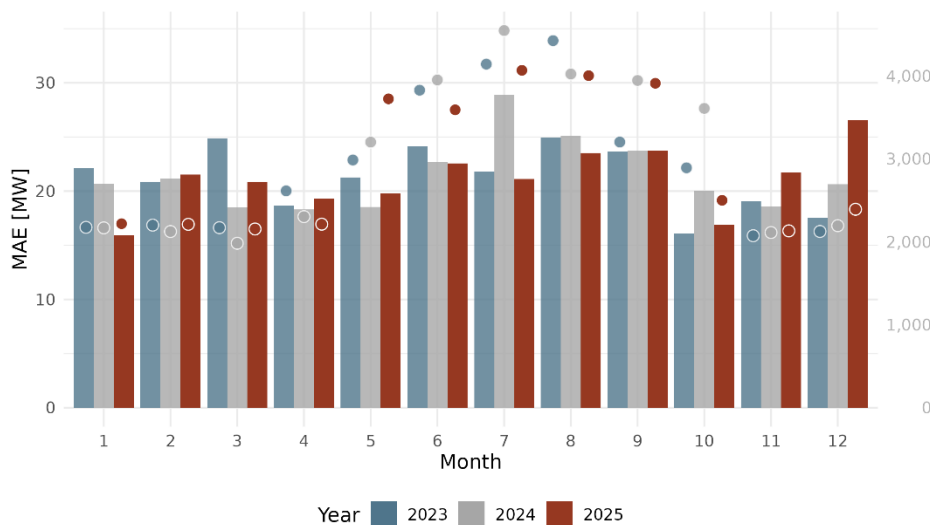
### BANC T-60 MAPE



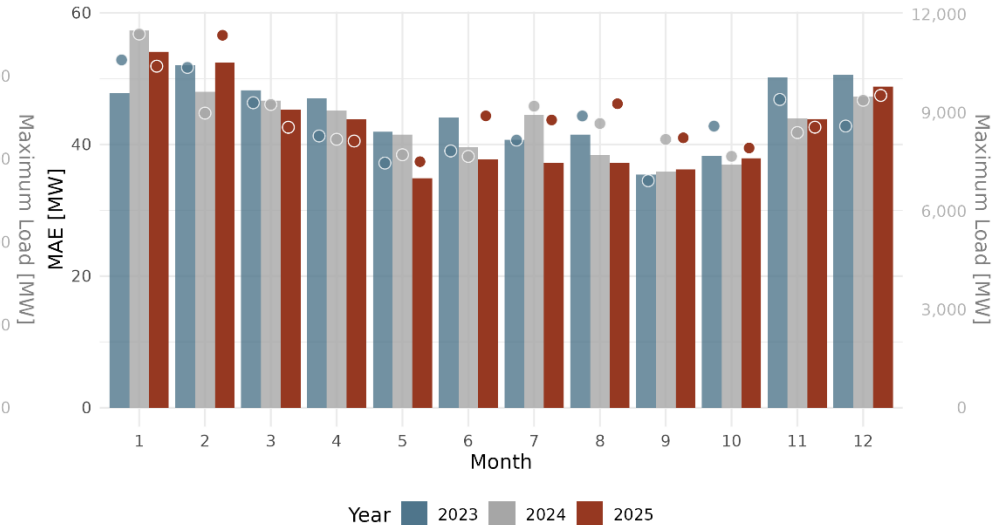
### BPA T-60 MAPE



### BANC T-60 MAE



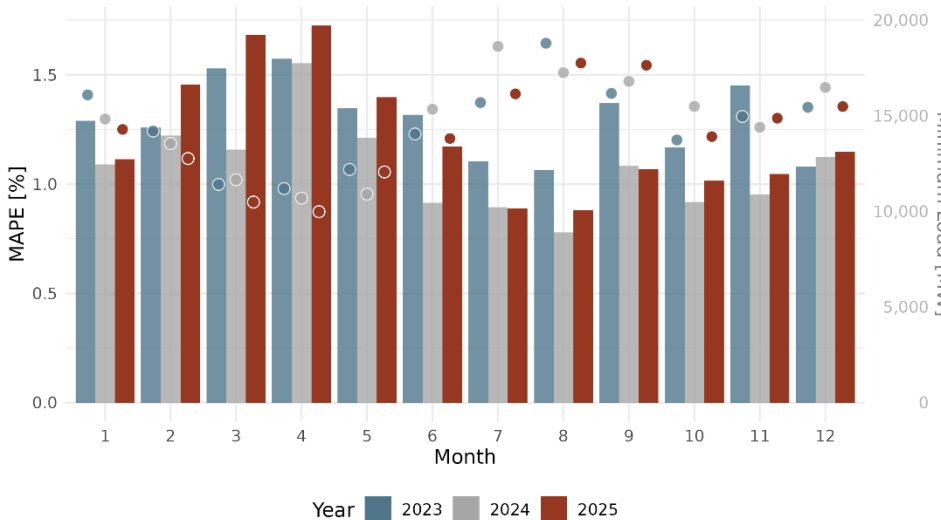
### BPA T-60 MAE



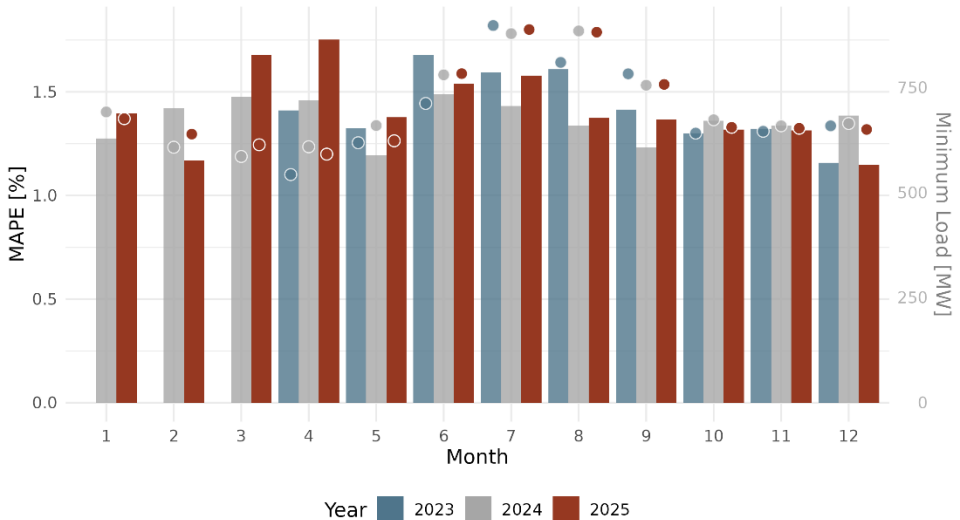
Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

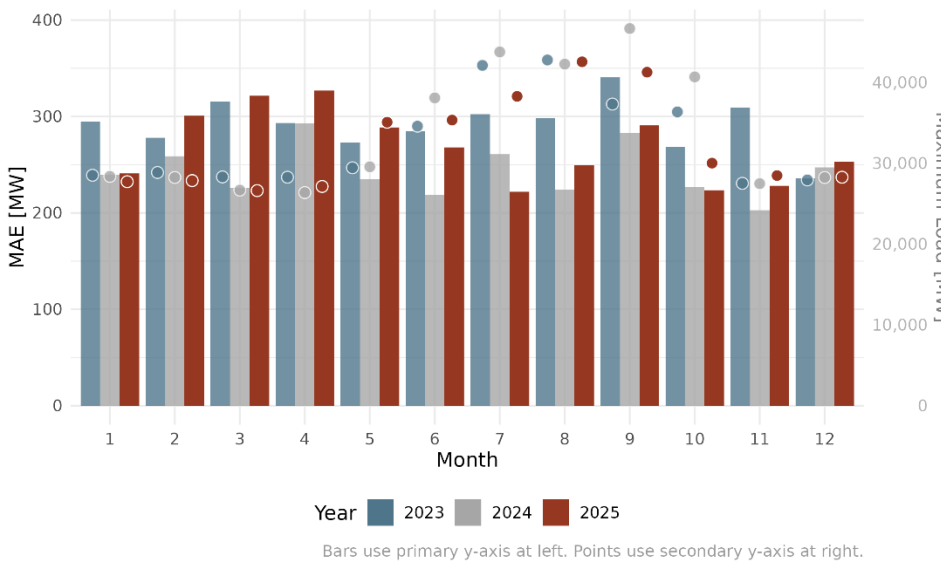
CAISO HASP MAPE



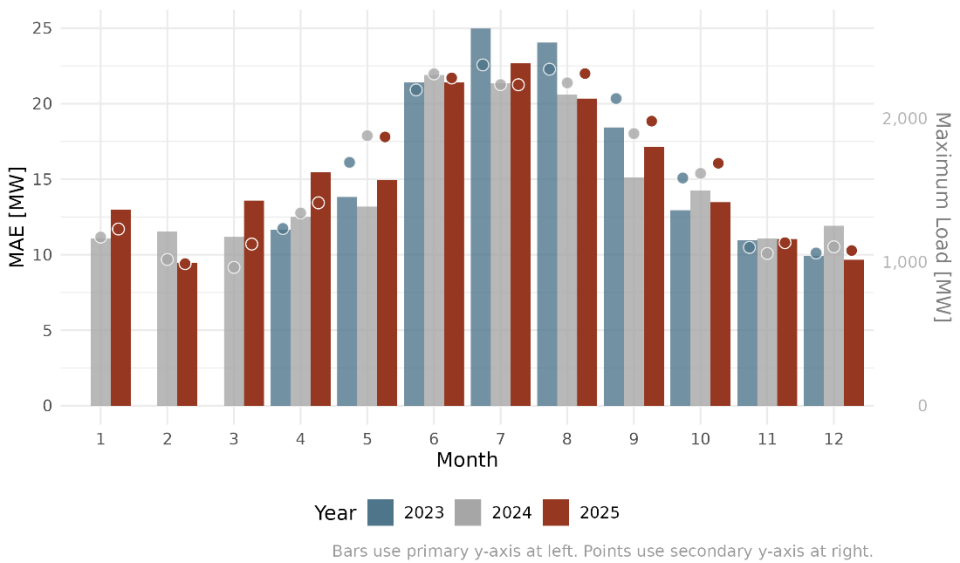
EPE T-60 MAPE



CAISO HASP MAE



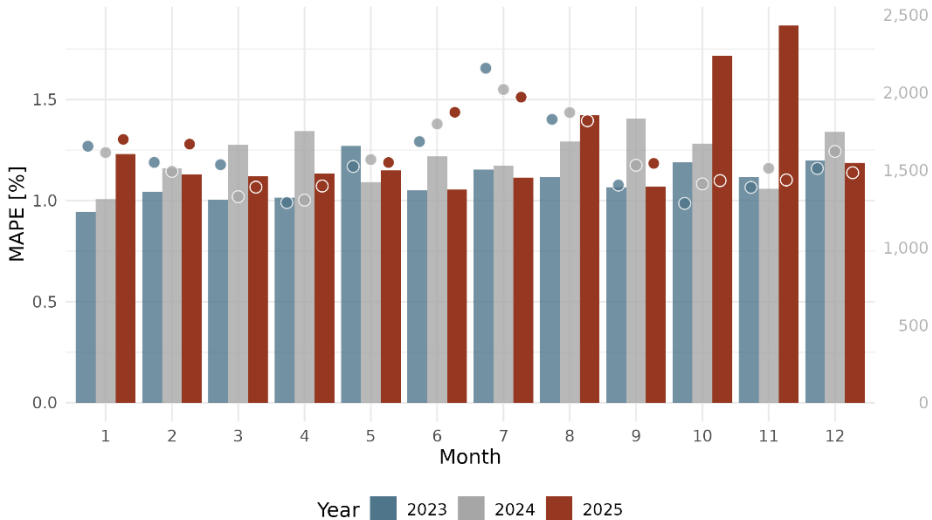
EPE T-60 MAE



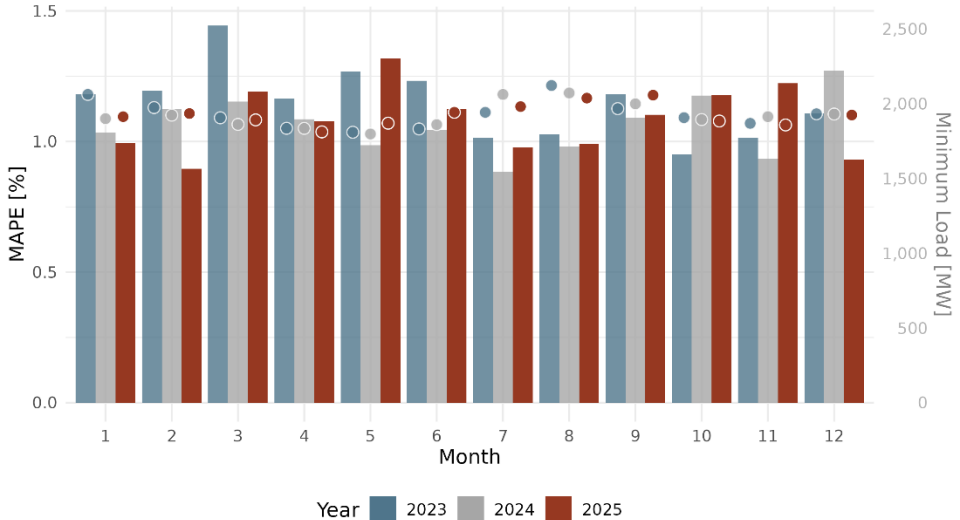
Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

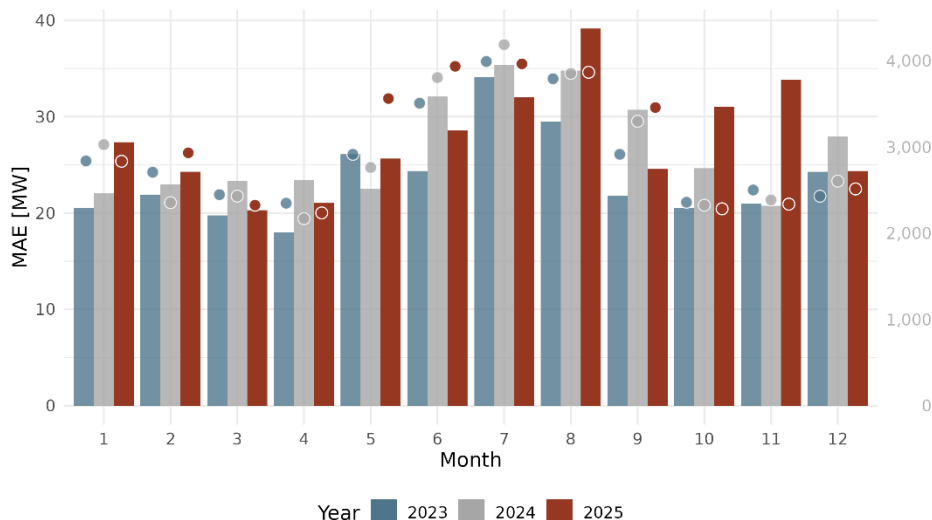
IPCO T-60 MAPE



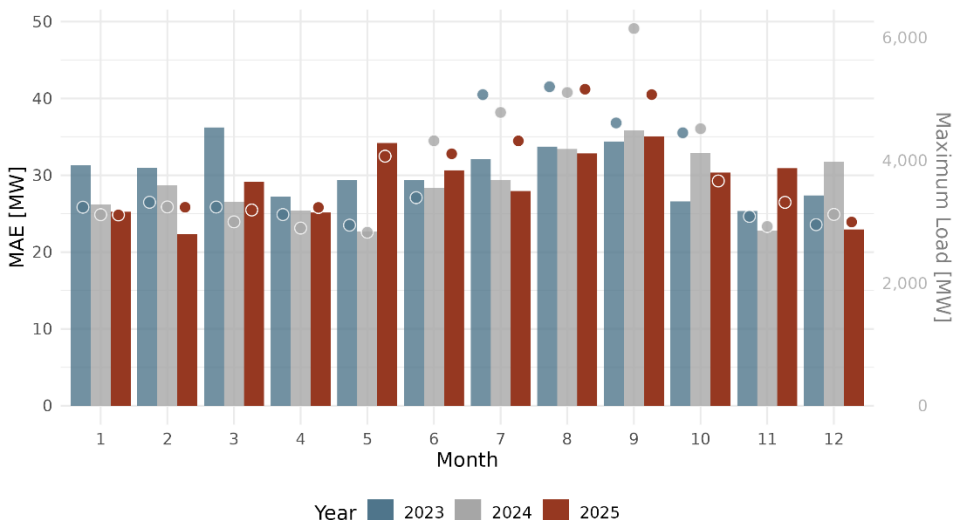
LADWP T-60 MAPE



IPCO T-60 MAE



LADWP T-60 MAE

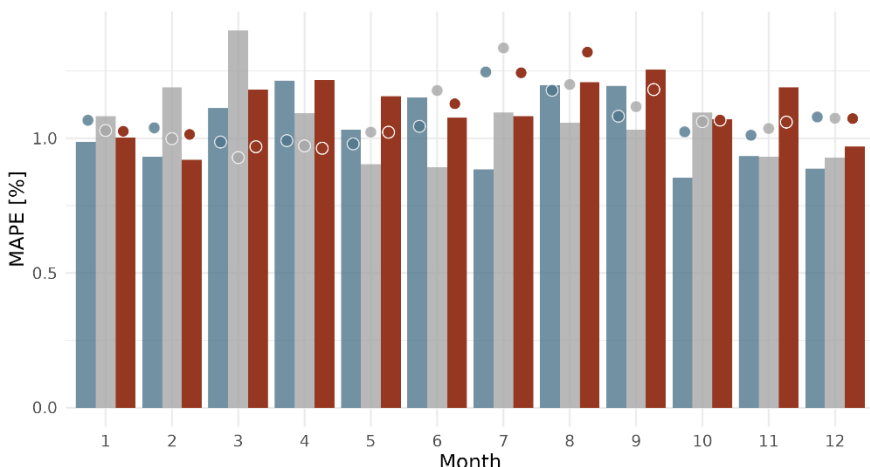


Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

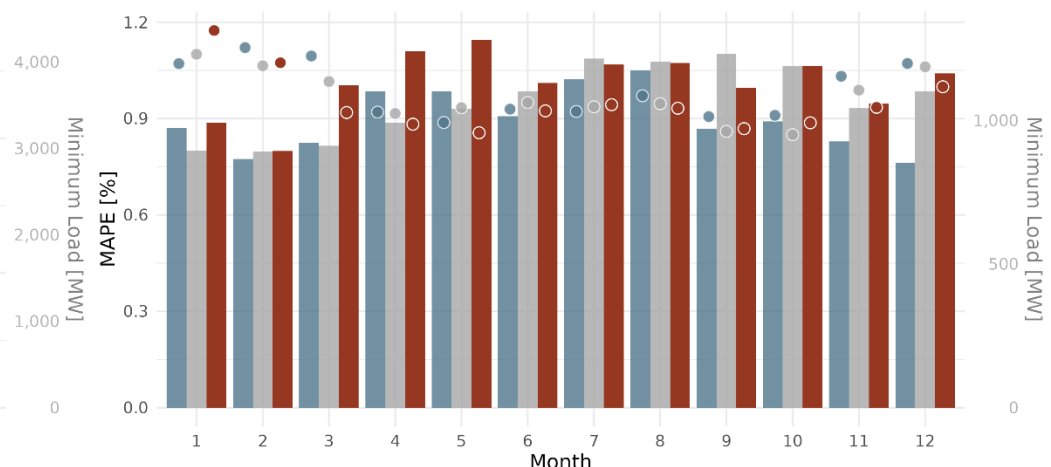


### NVE T-60 MAPE



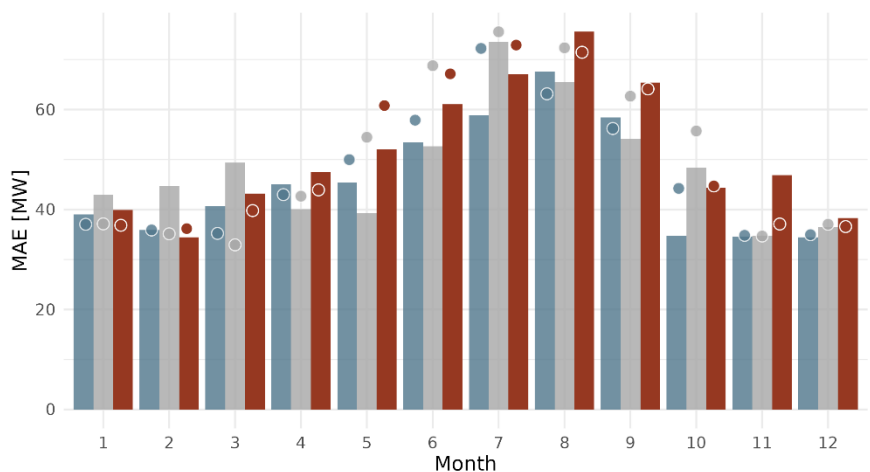
Year 2023 2024 2025

### NWMT T-60 MAPE



Year 2023 2024 2025

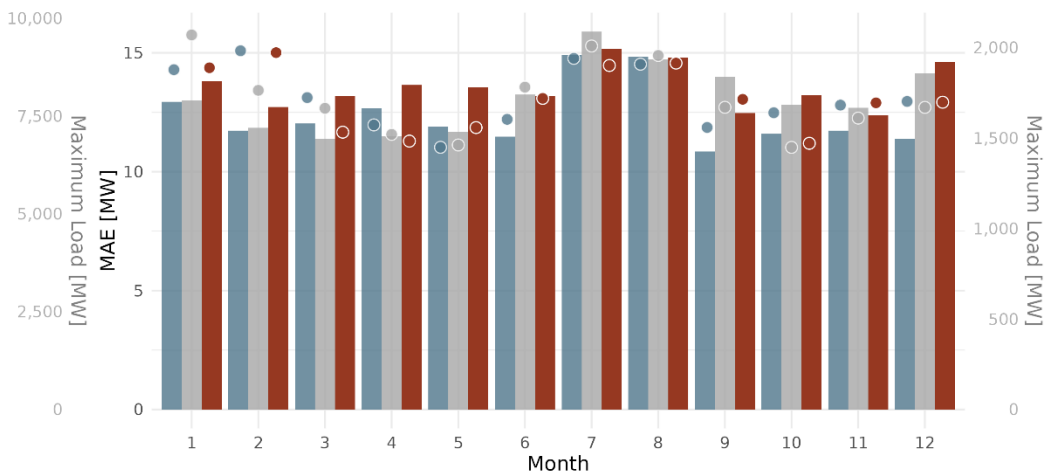
### NVE T-60 MAE



Year 2023 2024 2025

Bars use primary y-axis at left. Points use secondary y-axis at right.

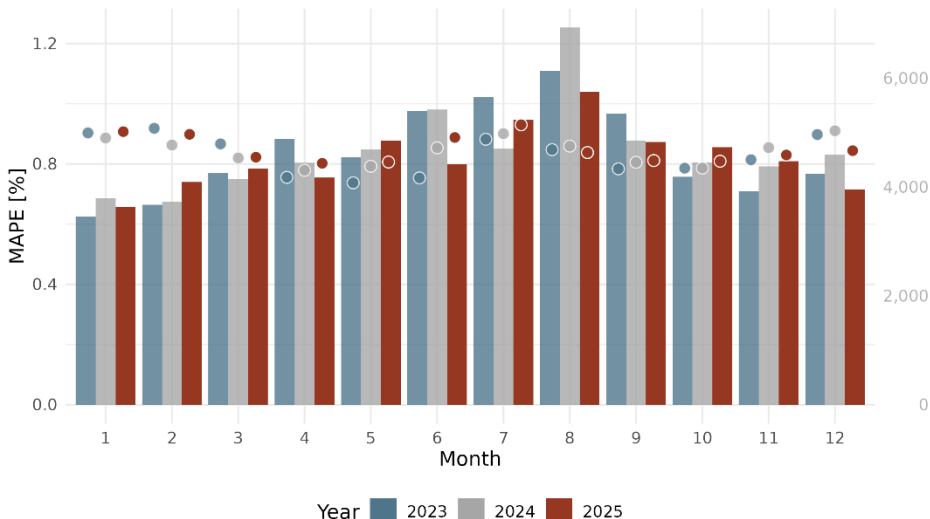
### NWMT T-60 MAE



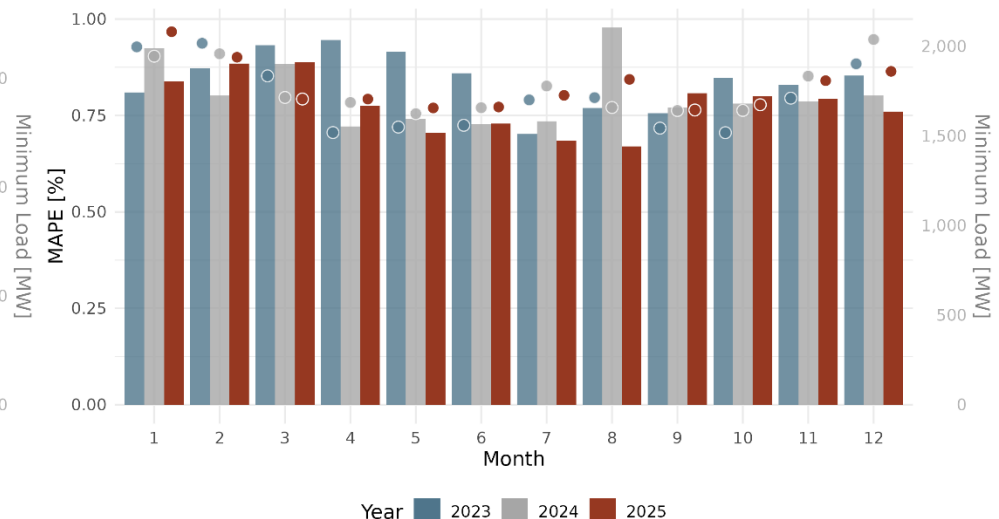
Year 2023 2024 2025

Bars use primary y-axis at left. Points use secondary y-axis at right.

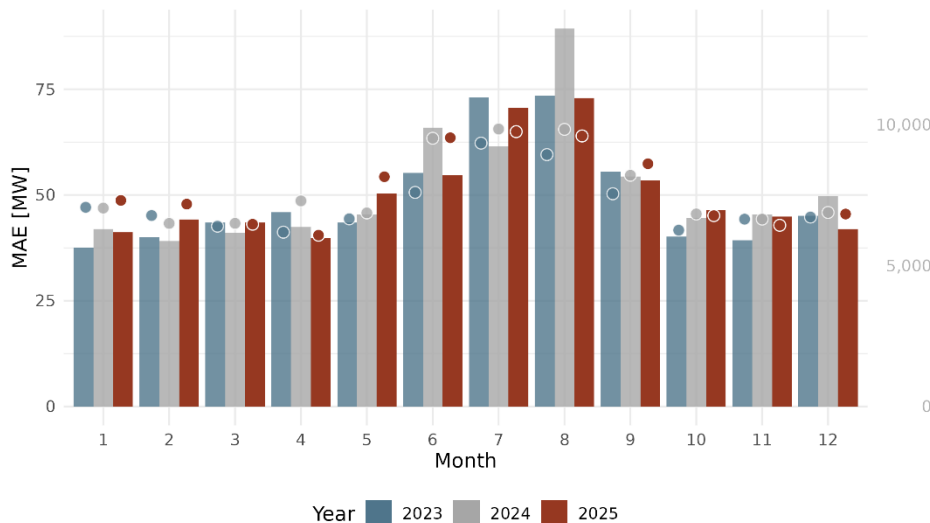
### PACE T-60 MAPE



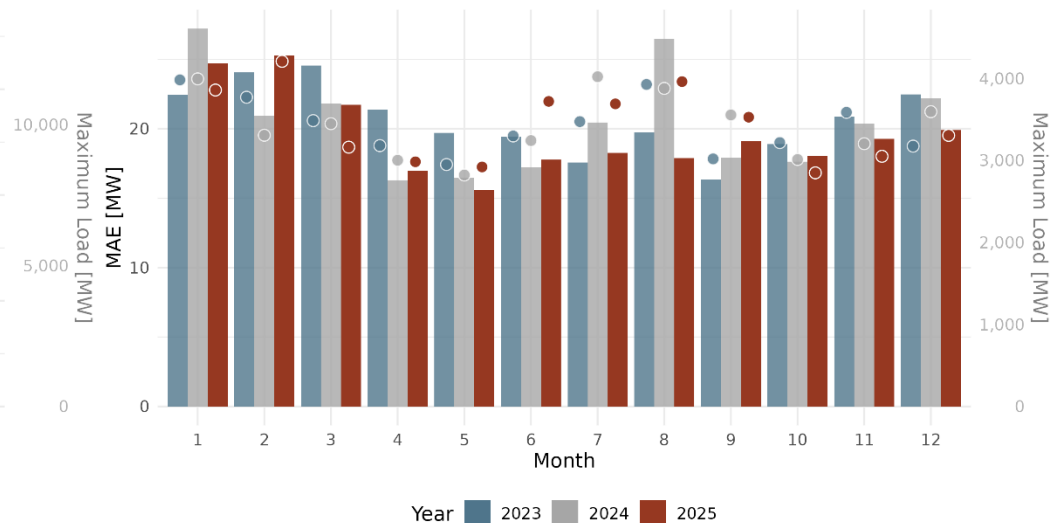
### PACW T-60 MAPE



### PACE T-60 MAE



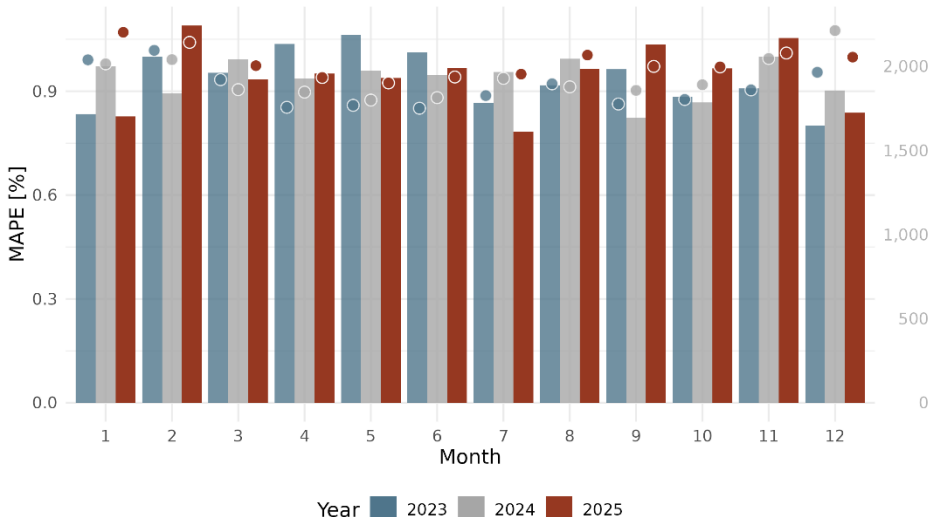
### PACW T-60 MAE



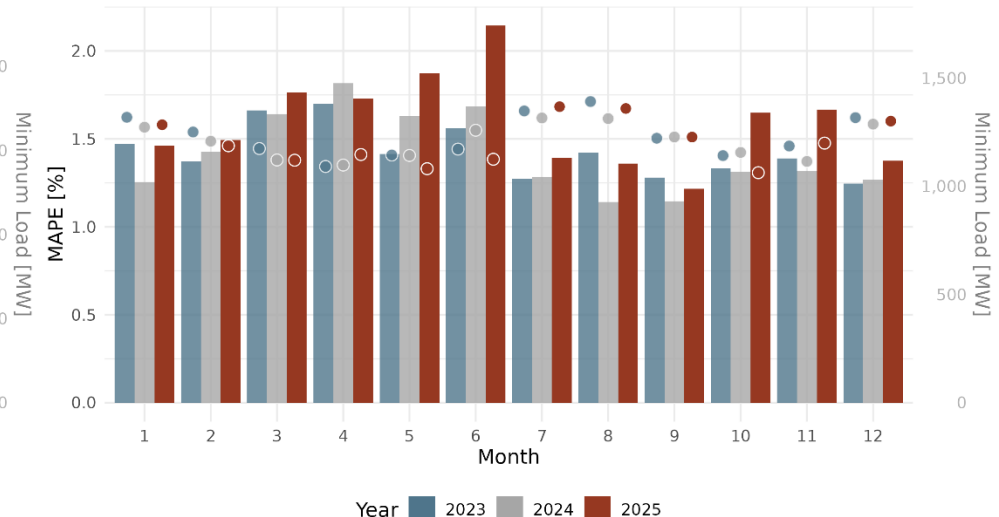
Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

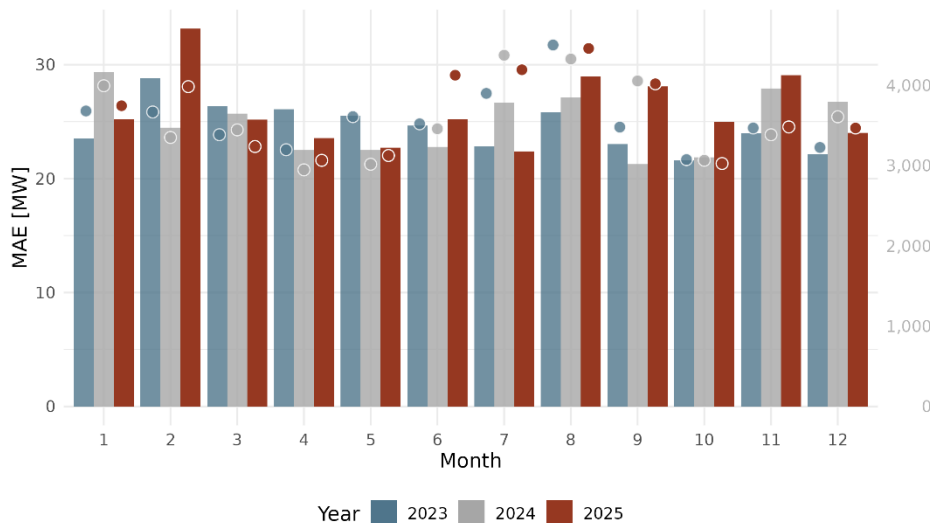
PGE T-60 MAPE



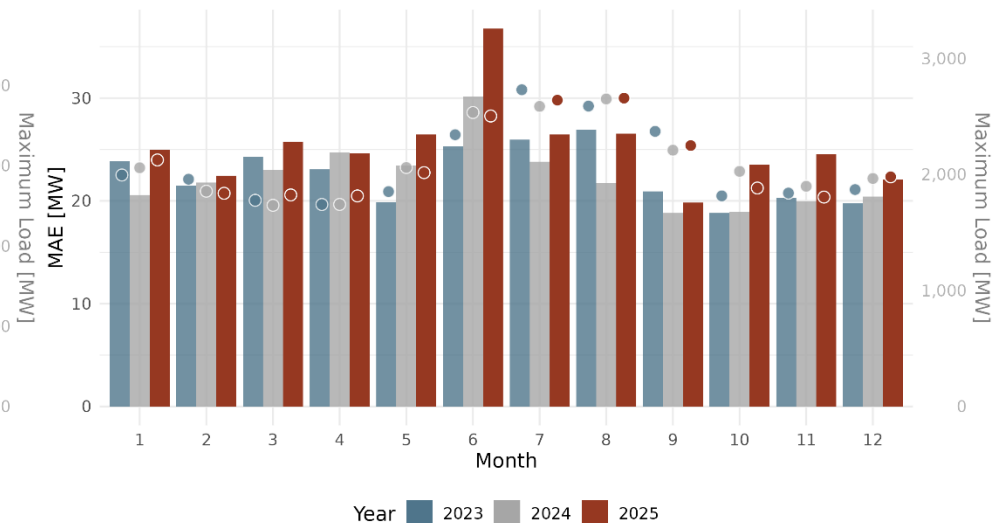
PNM T-60 MAPE



PGE T-60 MAE



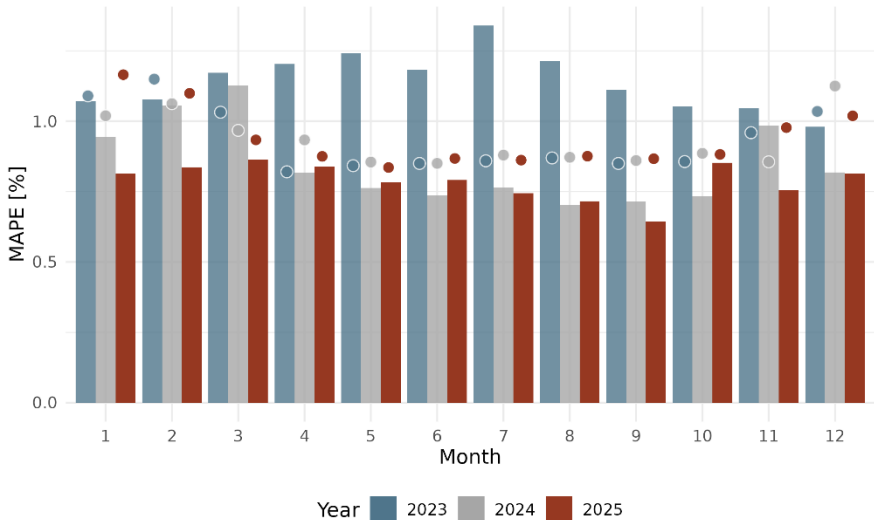
PNM T-60 MAE



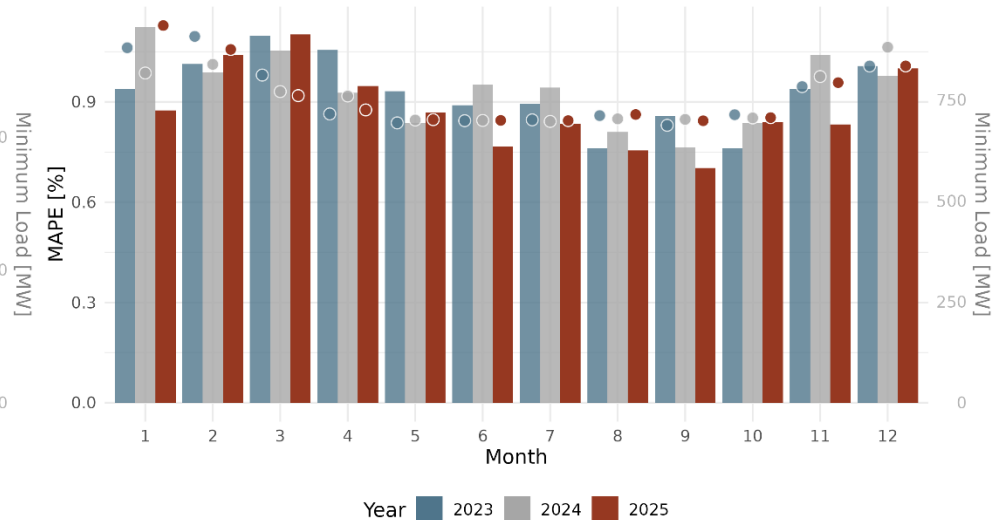
Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

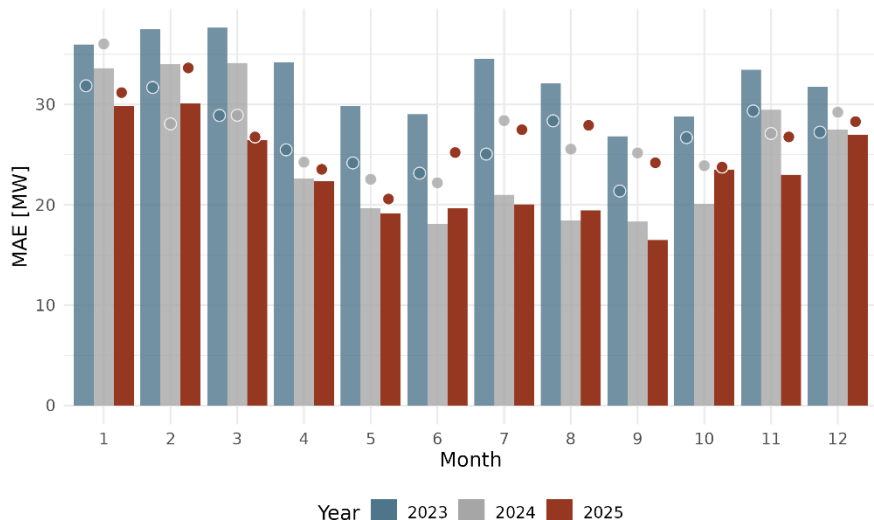
PSE T-60 MAPE



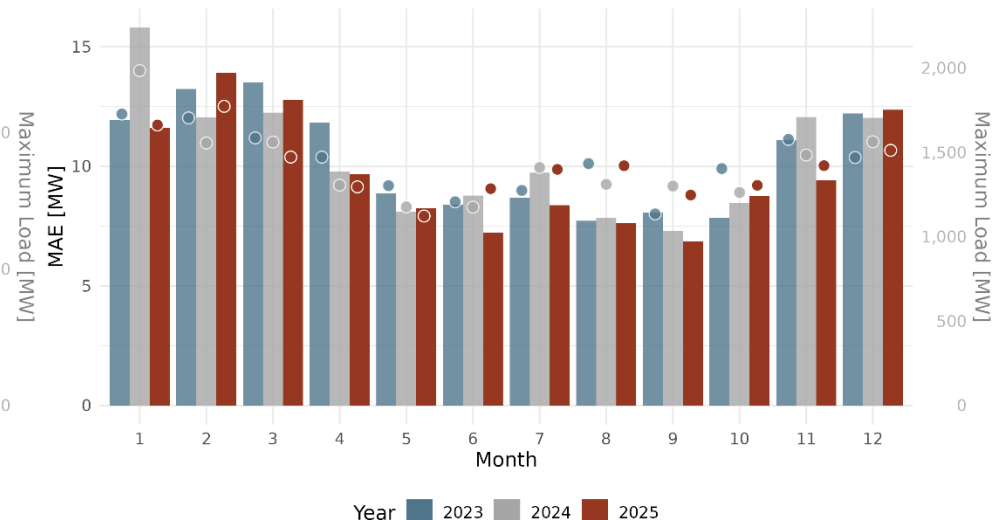
SCL T-60 MAPE



PSE T-60 MAE



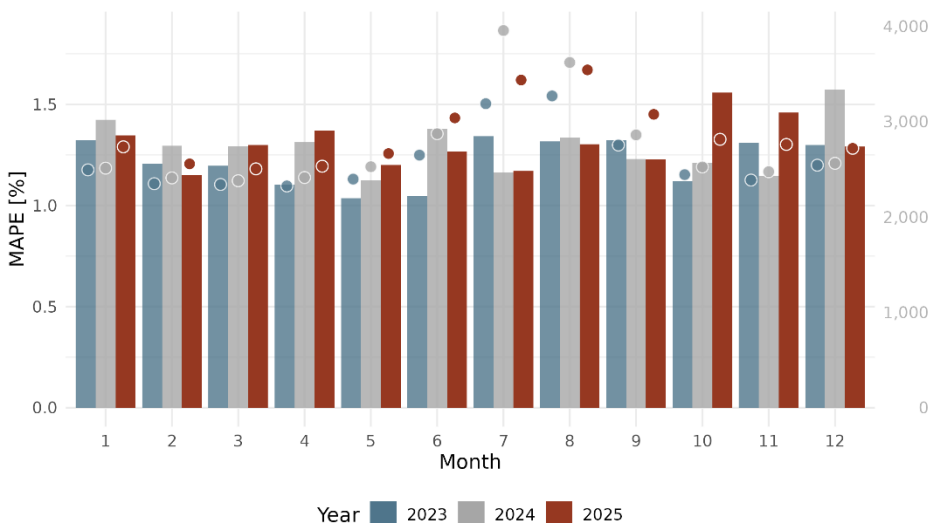
SCL T-60 MAE



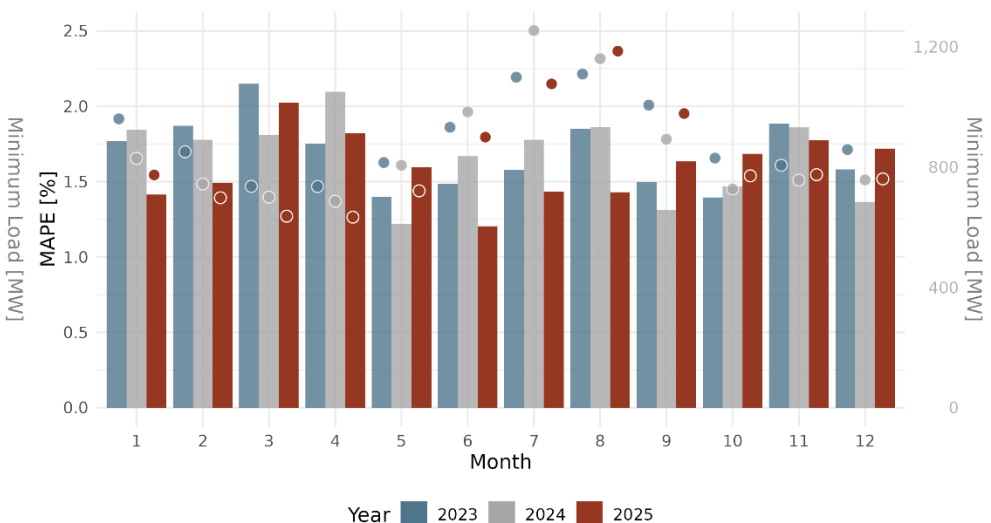
Bars use primary y-axis at left. Points use secondary y-axis at right.

Bars use primary y-axis at left. Points use secondary y-axis at right.

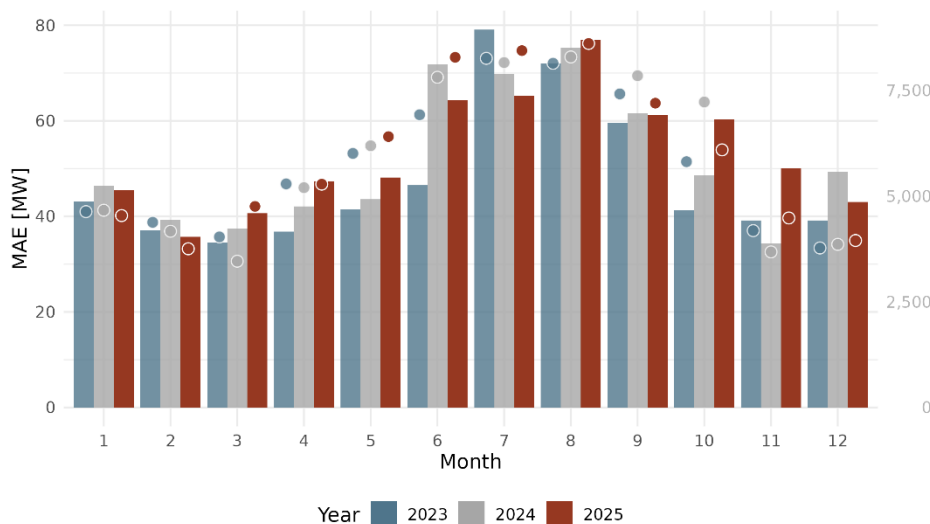
SRP T-60 MAPE



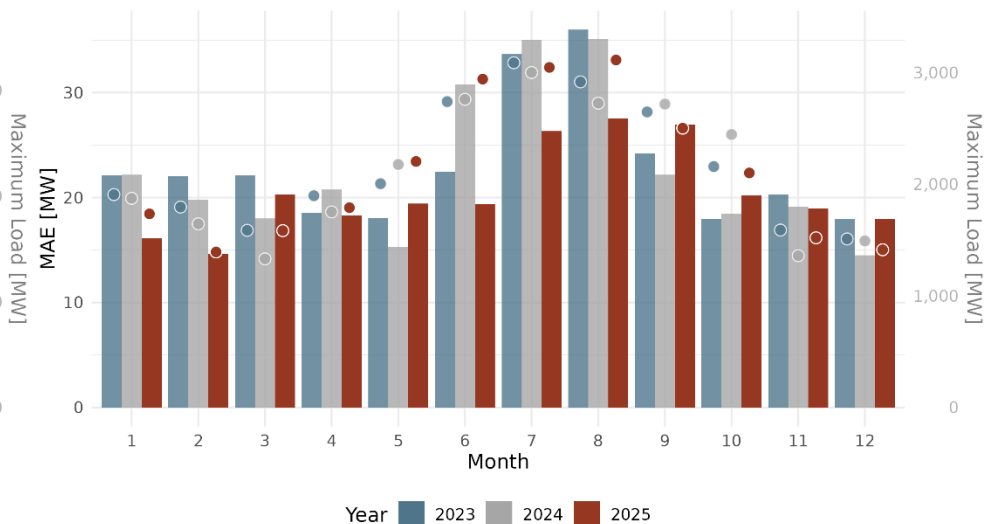
TEP T-60 MAPE



SRP T-60 MAE



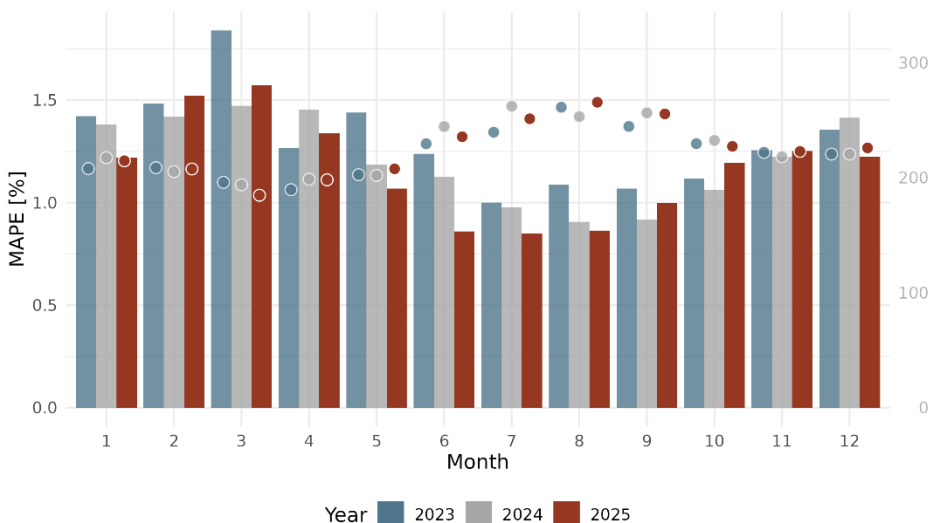
TEP T-60 MAE



Bars use primary y-axis at left. Points use secondary y-axis at right.

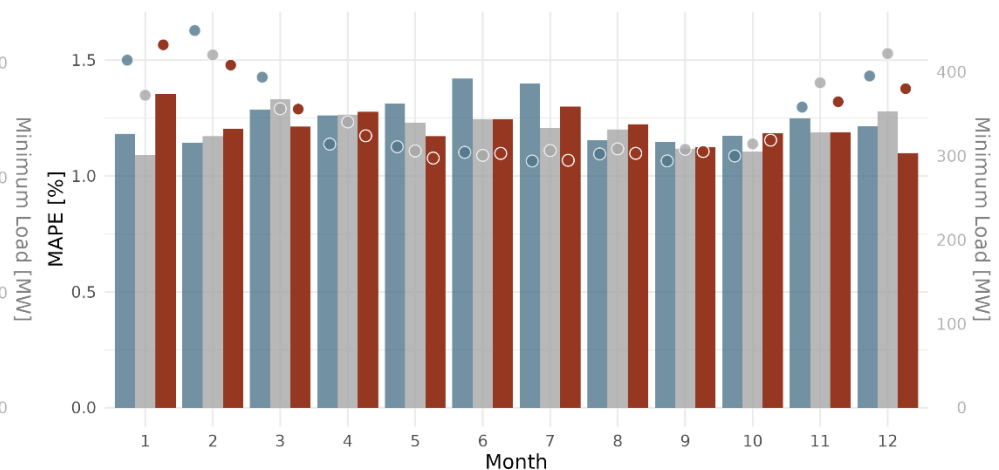
Bars use primary y-axis at left. Points use secondary y-axis at right.

TID T-60 MAPE



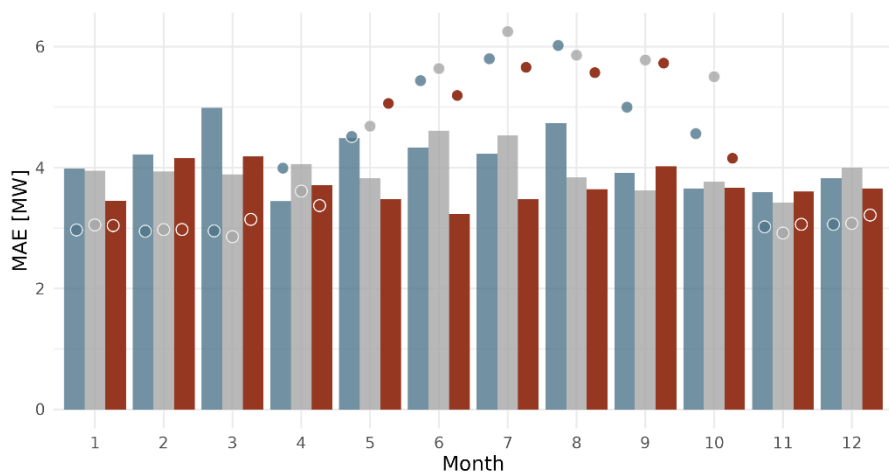
Year 2023 2024 2025

TPWR T-60 MAPE



Year 2023 2024 2025

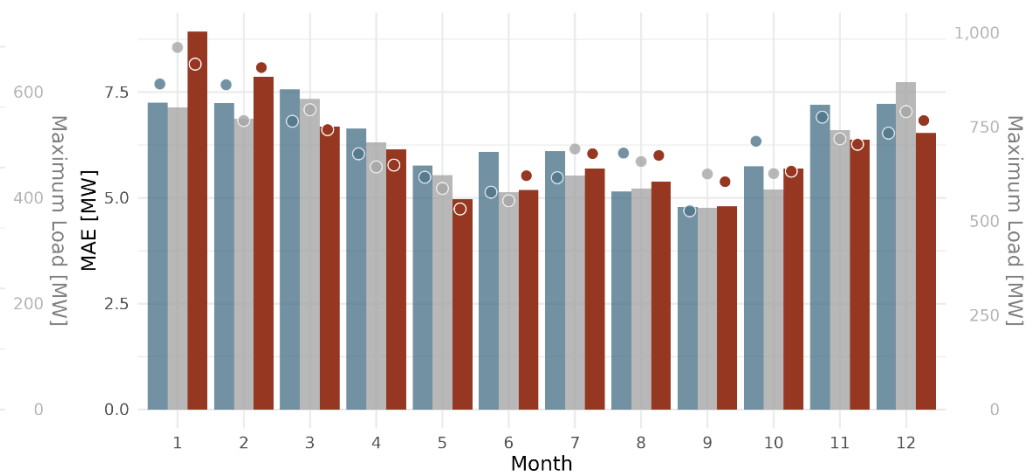
TID T-60 MAE



Year 2023 2024 2025

Bars use primary y-axis at left. Points use secondary y-axis at right.

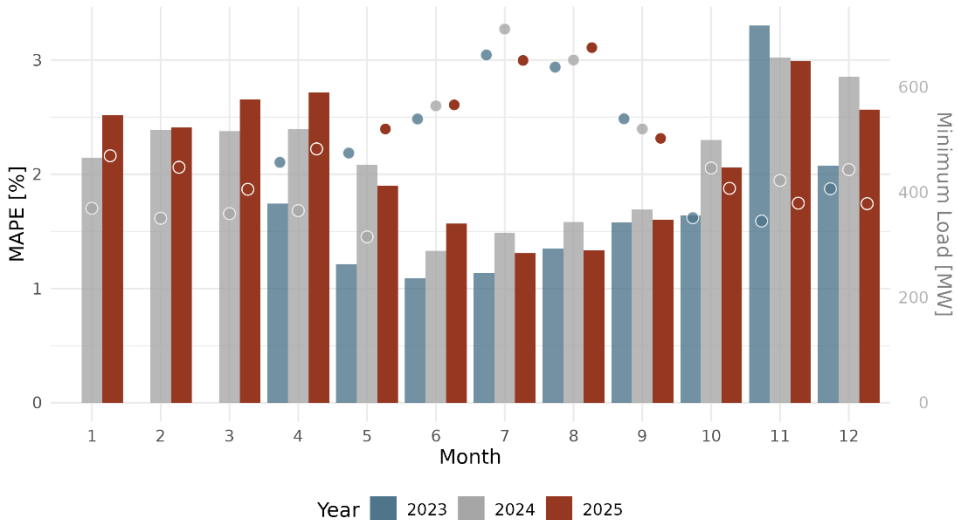
TPWR T-60 MAE



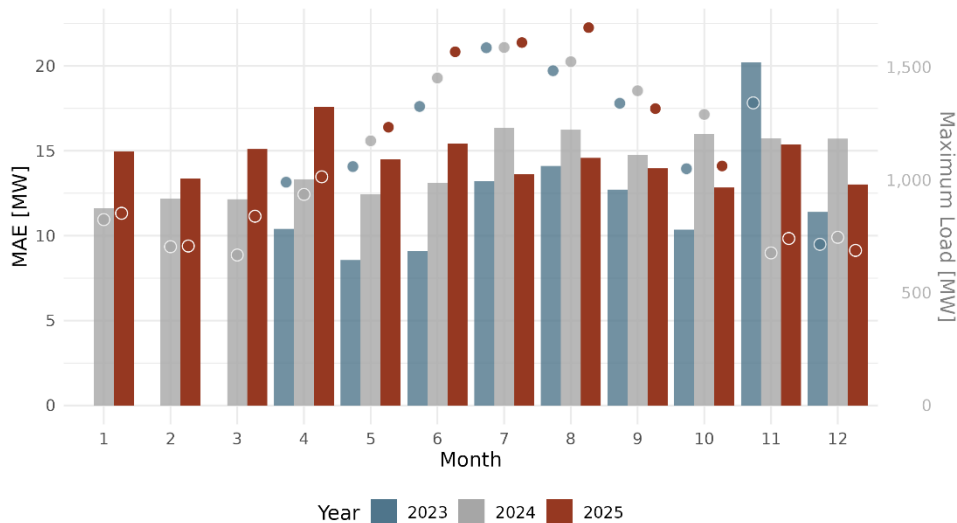
Year 2023 2024 2025

Bars use primary y-axis at left. Points use secondary y-axis at right.

WALC T-60 MAPE



WALC T-60 MAE

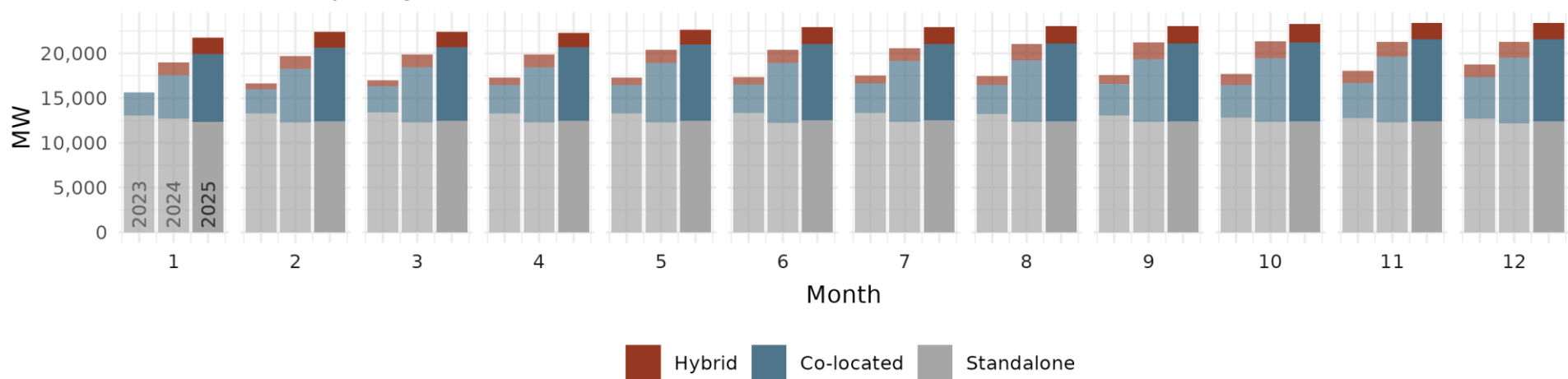


Bars use primary y-axis at left. Points use secondary y-axis at right.

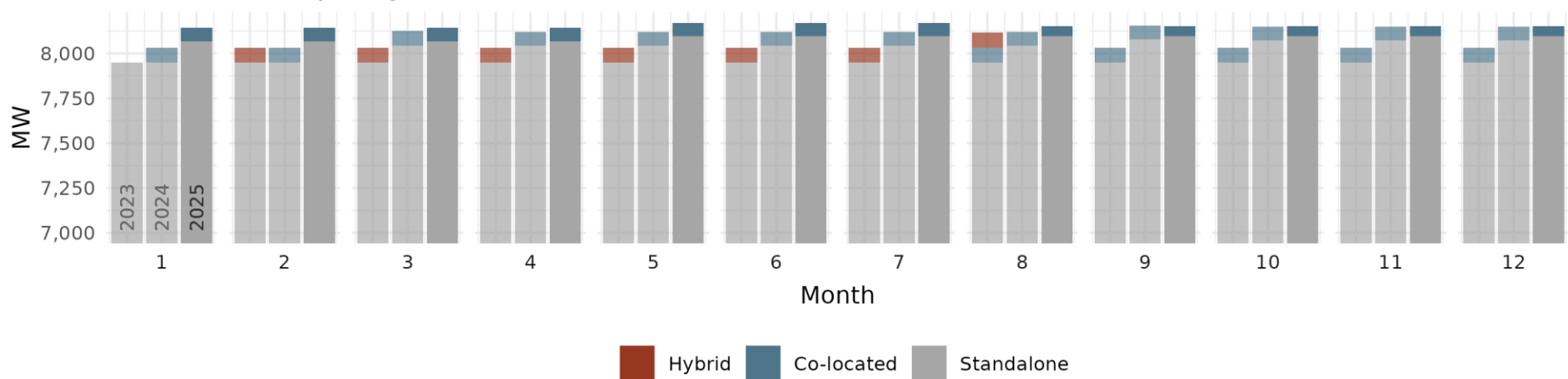
# Renewable Forecasting



## CAISO solar capacity

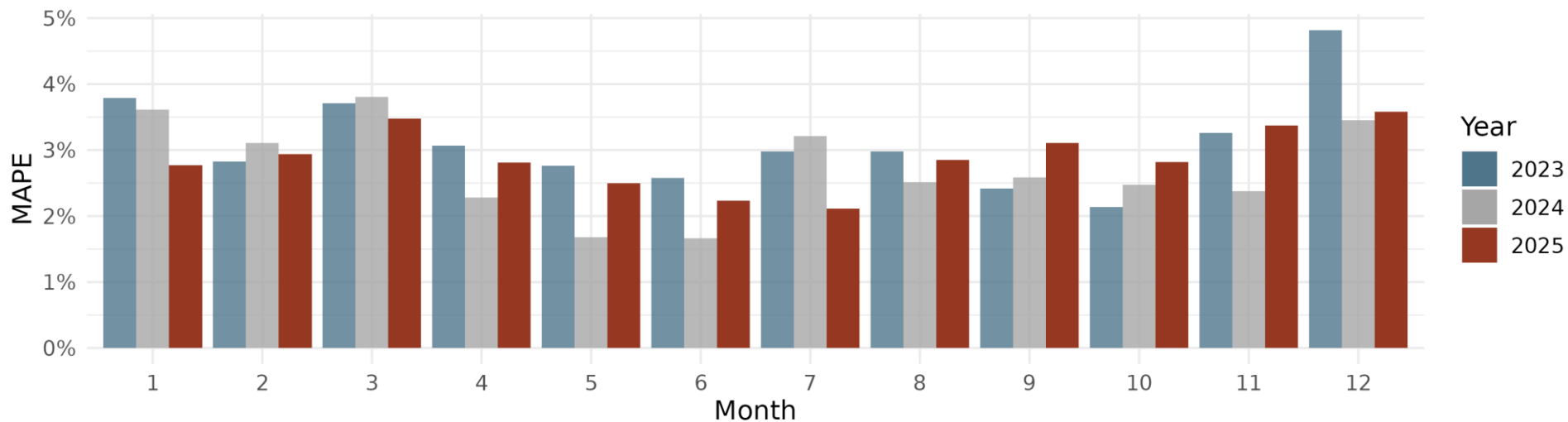


## CAISO wind capacity

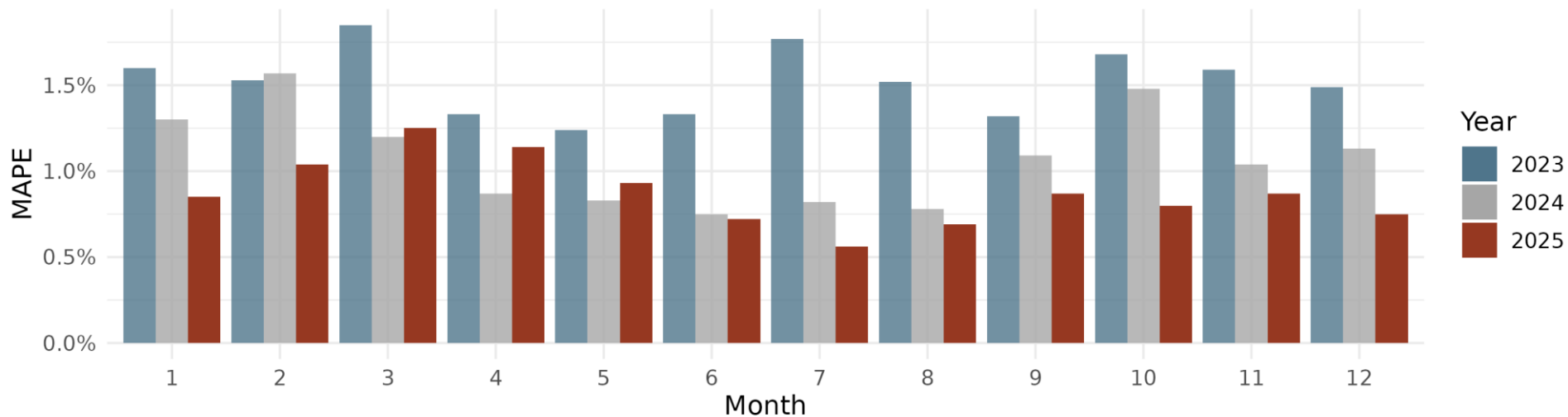


Note, the y-axis uses a non-zero baseline.

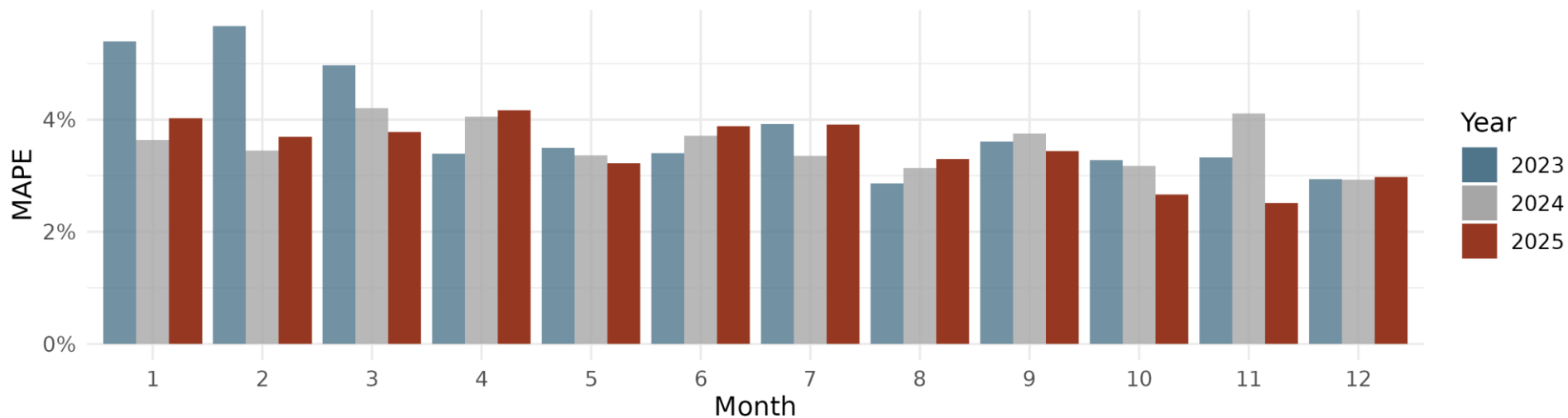
## DA solar forecast



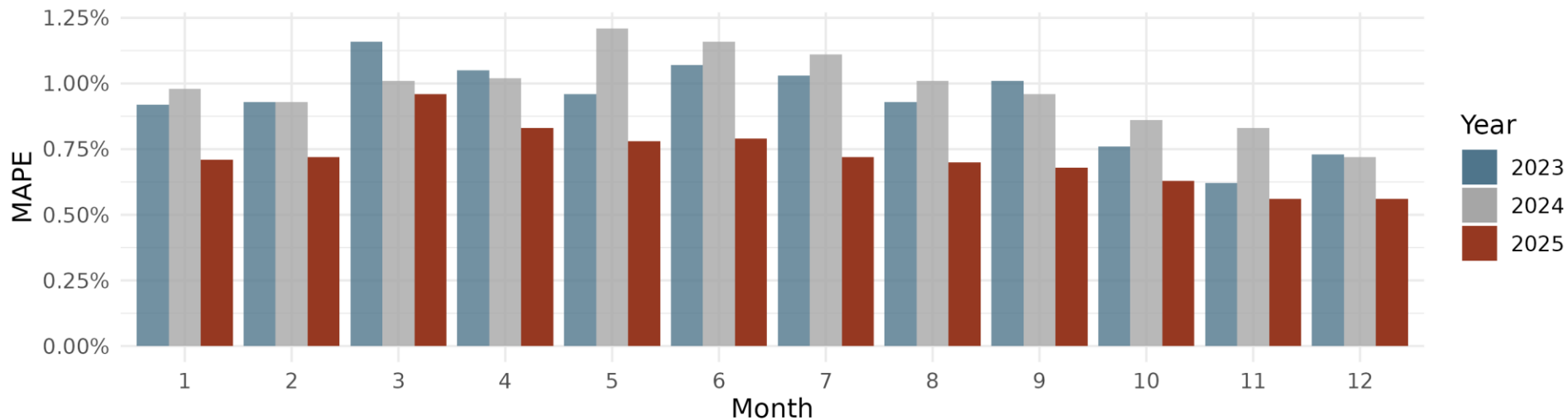
## RTD solar forecast



## DA wind forecast

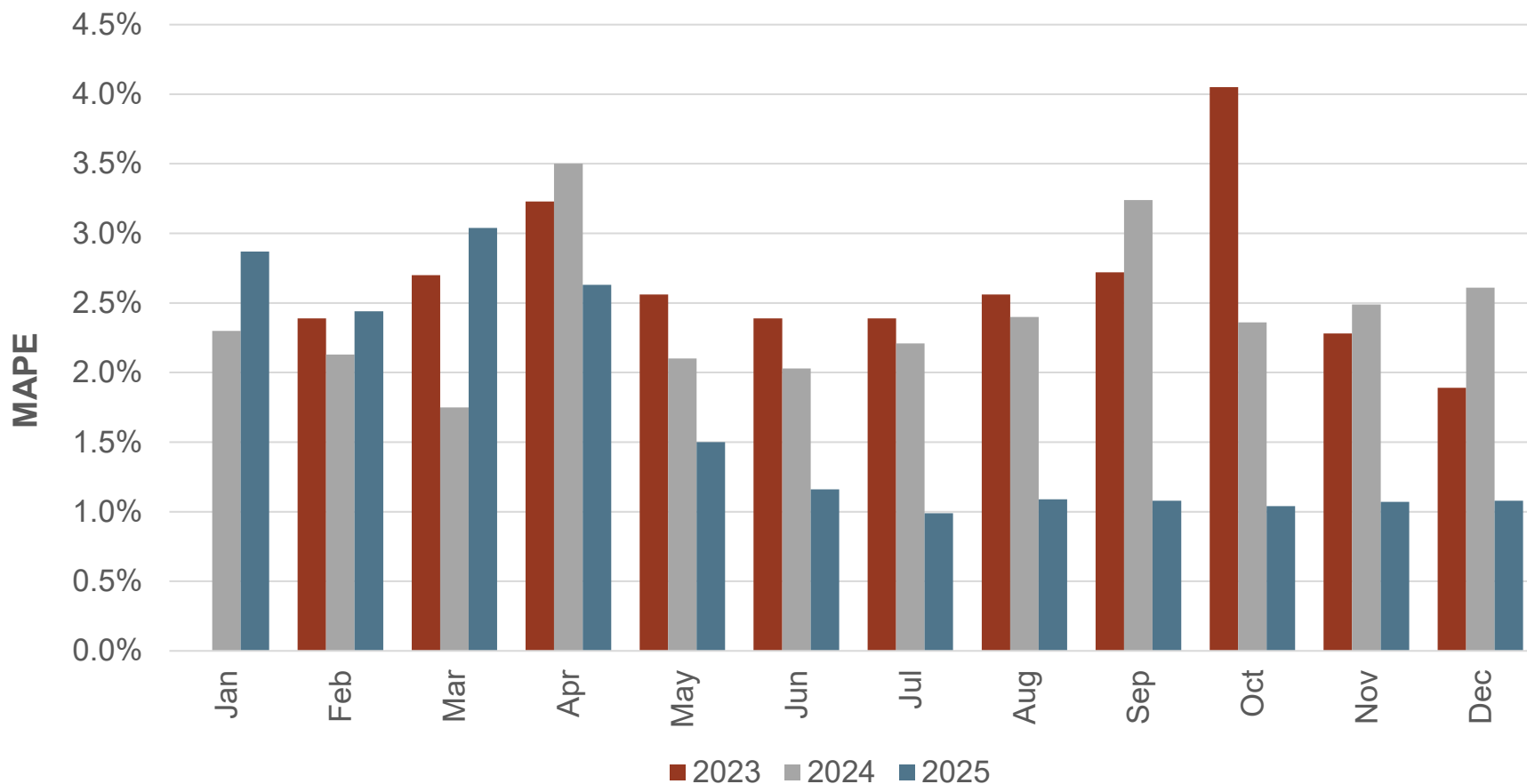


## RTD wind forecast



# Real Time Solar Hybrid Performance

\*Comparison of DOT to MW Production



\*MAPE =  $\text{abs}(\text{DOT} - \text{Actual}) / \text{Capacity}$