

Market conditions, issues and performance during summer 2022 heat wave

Department of Market Monitoring

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Overview of presentation and discussion

- Overview of CAISO Department of Market Monitoring
- Review of September heat wave
 - Price formation
 - Bilateral market prices
 - CAISO/WEIM market bid caps
 - CAISO market and out-of-market imports
 - WEIM transfers and prices
 - WEIM resource sufficiency tests
 - CAISO market exports
- Questions and comments

Mission of independent market monitors

“Each independent system operator ... must include a mission statement ... that identifies the Market Monitoring Unit’s goals, including the protection of consumers and market participants by the identification and reporting of market design flaws and market power abuses.”

FERC Order 719

To provide independent oversight and analysis of the CAISO Markets for the protection of consumers and Market Participants by the identification and reporting of market design flaws, potential market rule violations, and market power abuses.

Department of Market Monitoring Mission Statement
CAISO Tariff, Appendix P

Core functions of independent market monitors (FERC Order 719)

1. Review and report on the performance of wholesale markets, including quarterly and annual reports.
2. Evaluate existing and proposed market rules, and provide recommendations.
3. Notify FERC Office of Enforcement when a market participant or the ISO has engaged in conduct that may require investigation.
4. Market monitors may also perform functions related to inputs for market power mitigation.
 - Bids used in mitigation, cost review, etc.

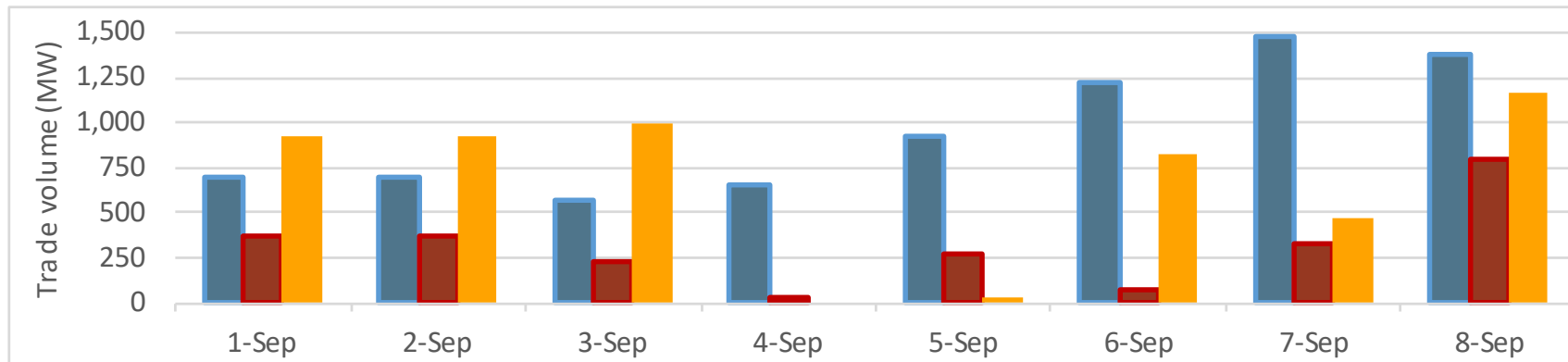
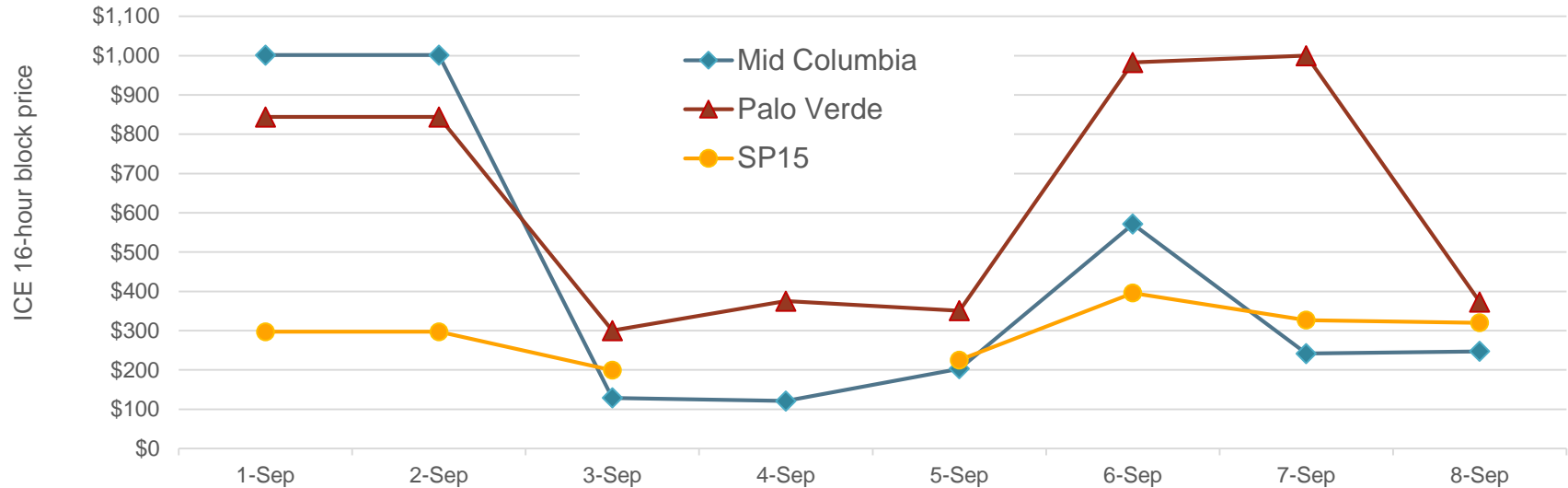
CAISO Department of Market Monitoring

- Independent from CAISO management, as required by FERC Order 719
 - DMM Oversight Committee consists of two CAISO Board members and Governing Body member as observer
- Internal business unit of the CAISO
 - 18 staff (economics, data analysis, engineering)
 - Access to all CAISO/WEIM market and operational data
 - Work closely with CAISO staff on market design and ongoing monitoring
- Communicate frequently with FERC, state PUCs, WEIM Governing Body, and interested stakeholders

WEIM Price Formation During Heatwave

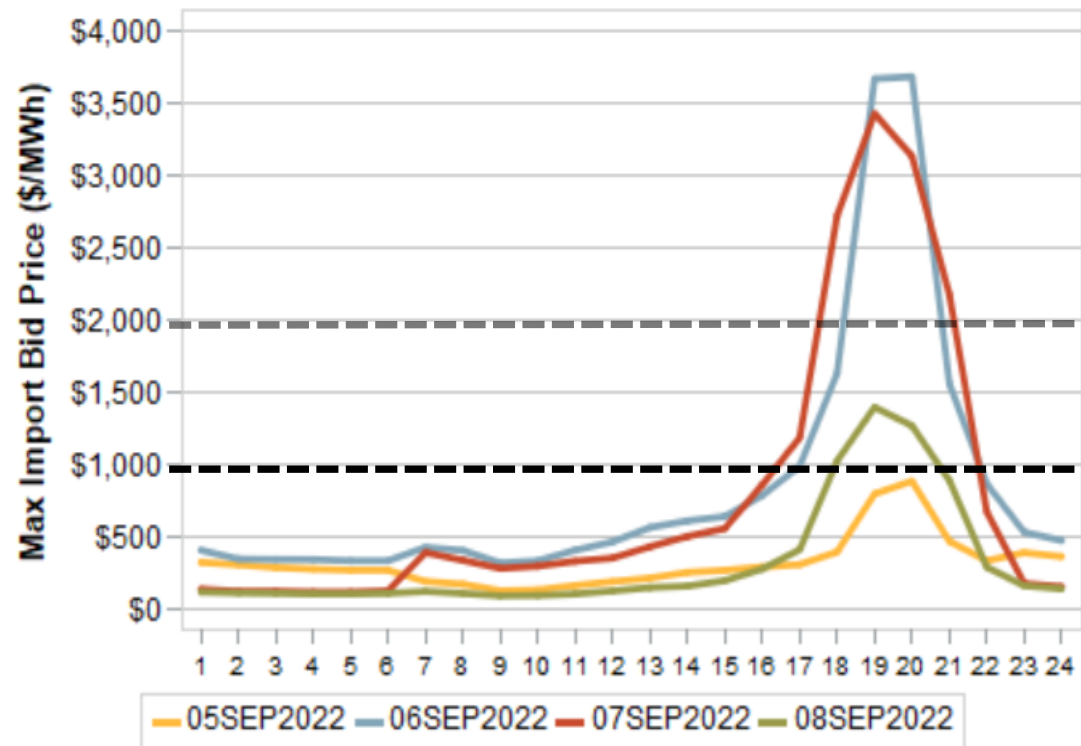
High bilateral market price indices at trading hubs outside CAISO triggered increase in CAISO bid cap and penalty price to \$2,000

ICE day-ahead prices and trade volume for 16-hour block (32-hour block on 9/1 and 9/2)

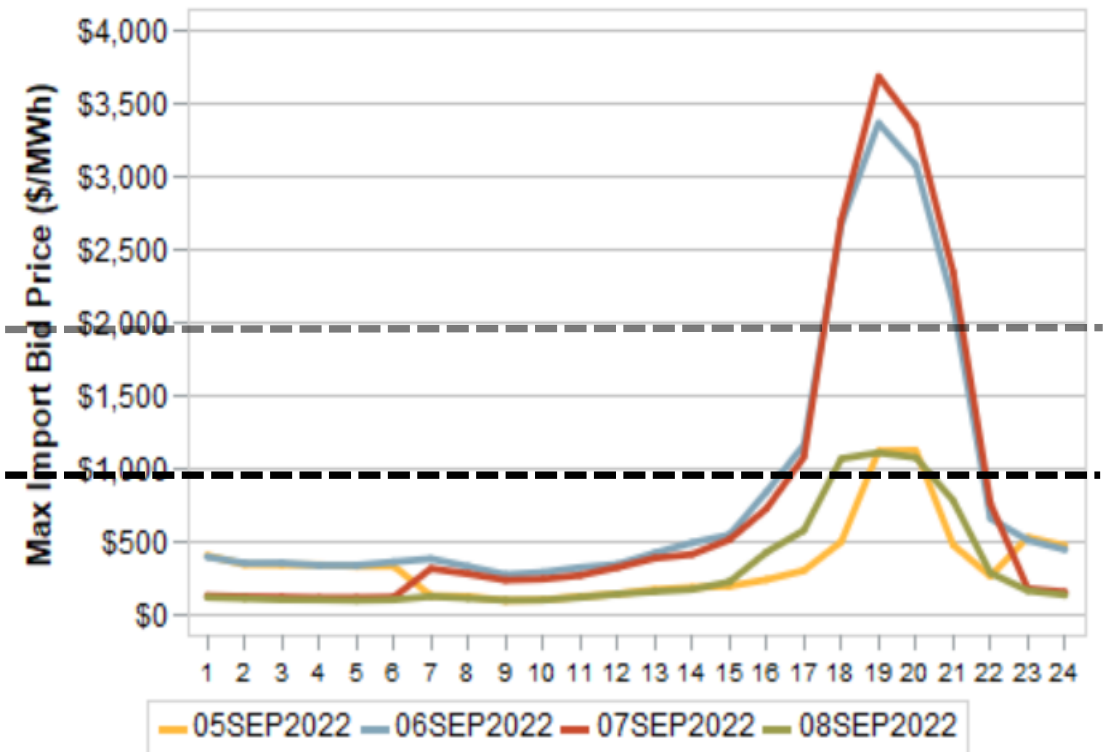


Bilateral market prices for 16 hour blocks are converted to hourly Maximum Import Bid Prices based on historical shape of real time prices

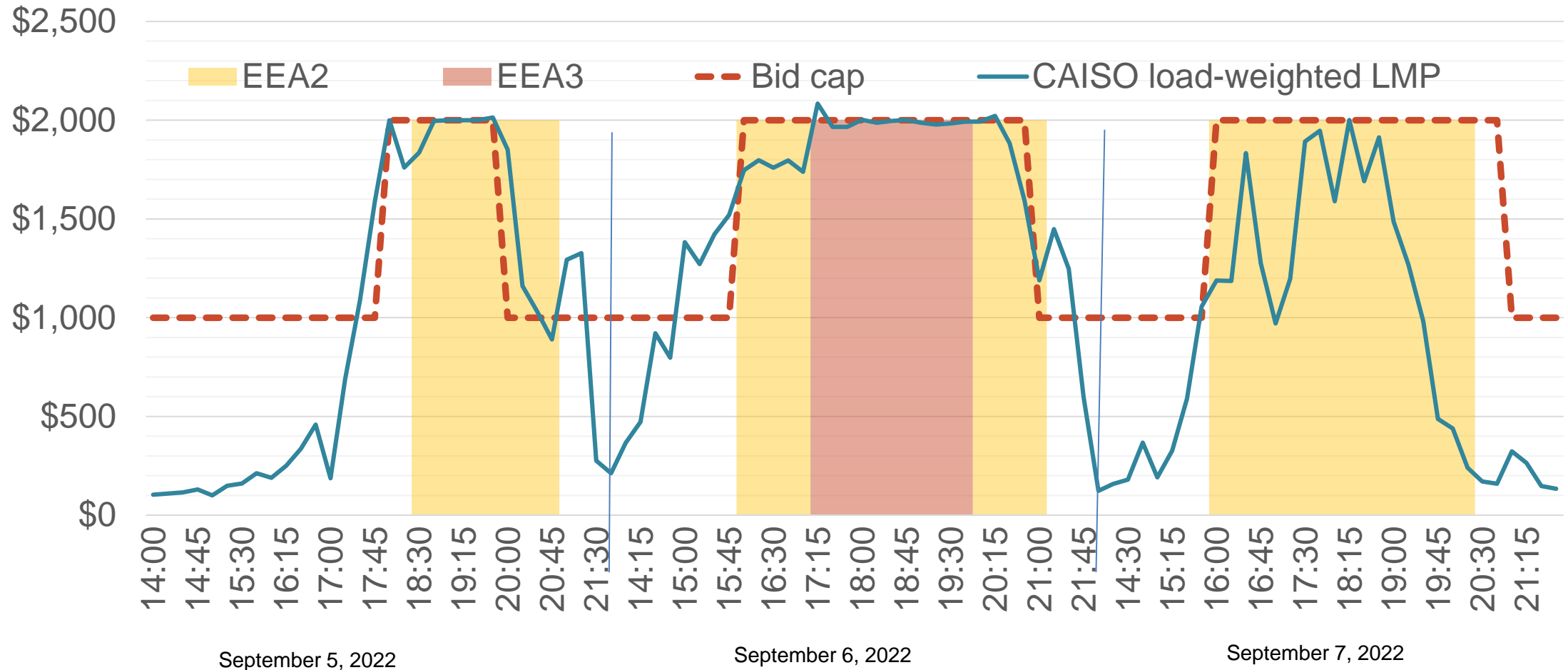
Day-ahead



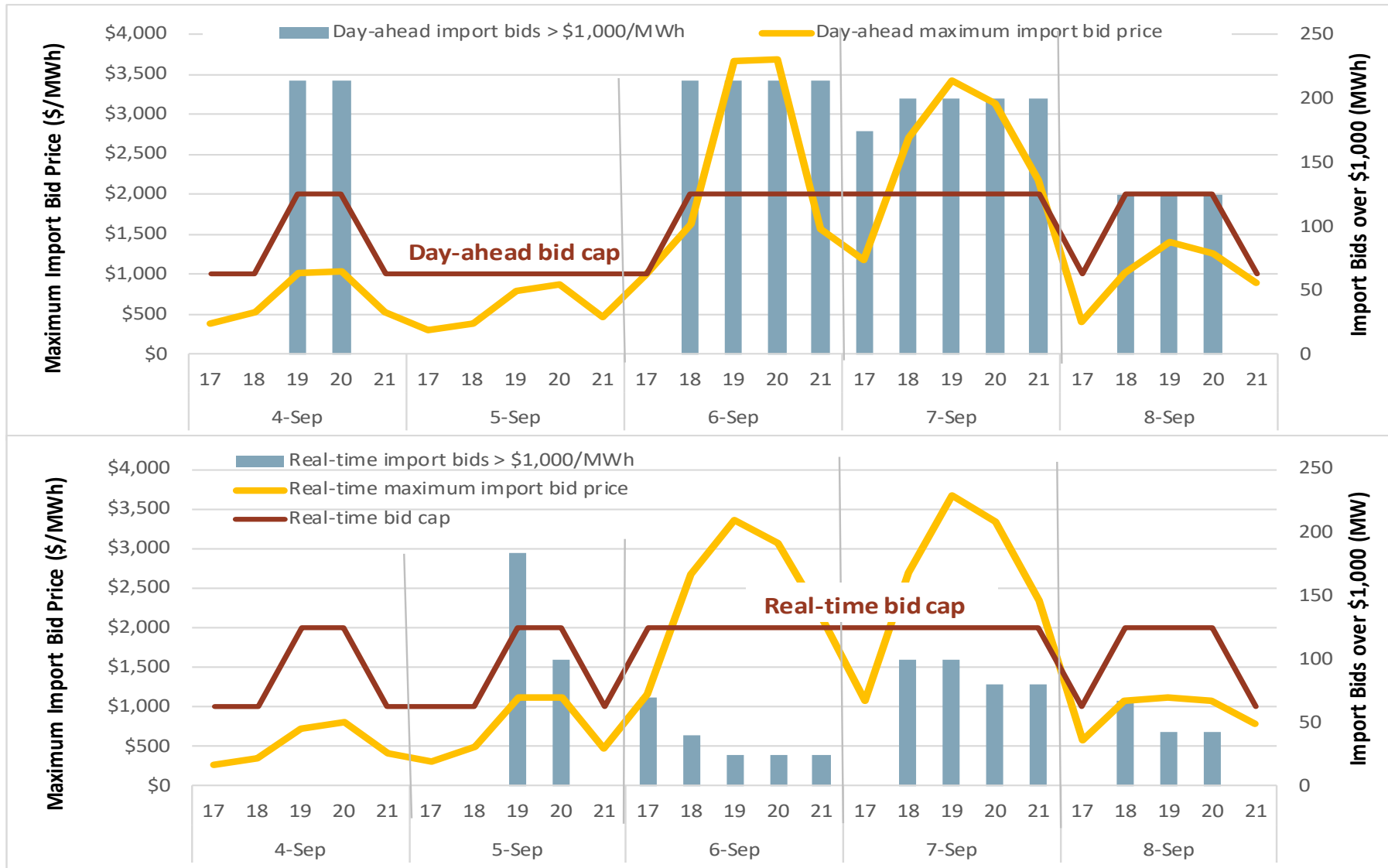
Real-time



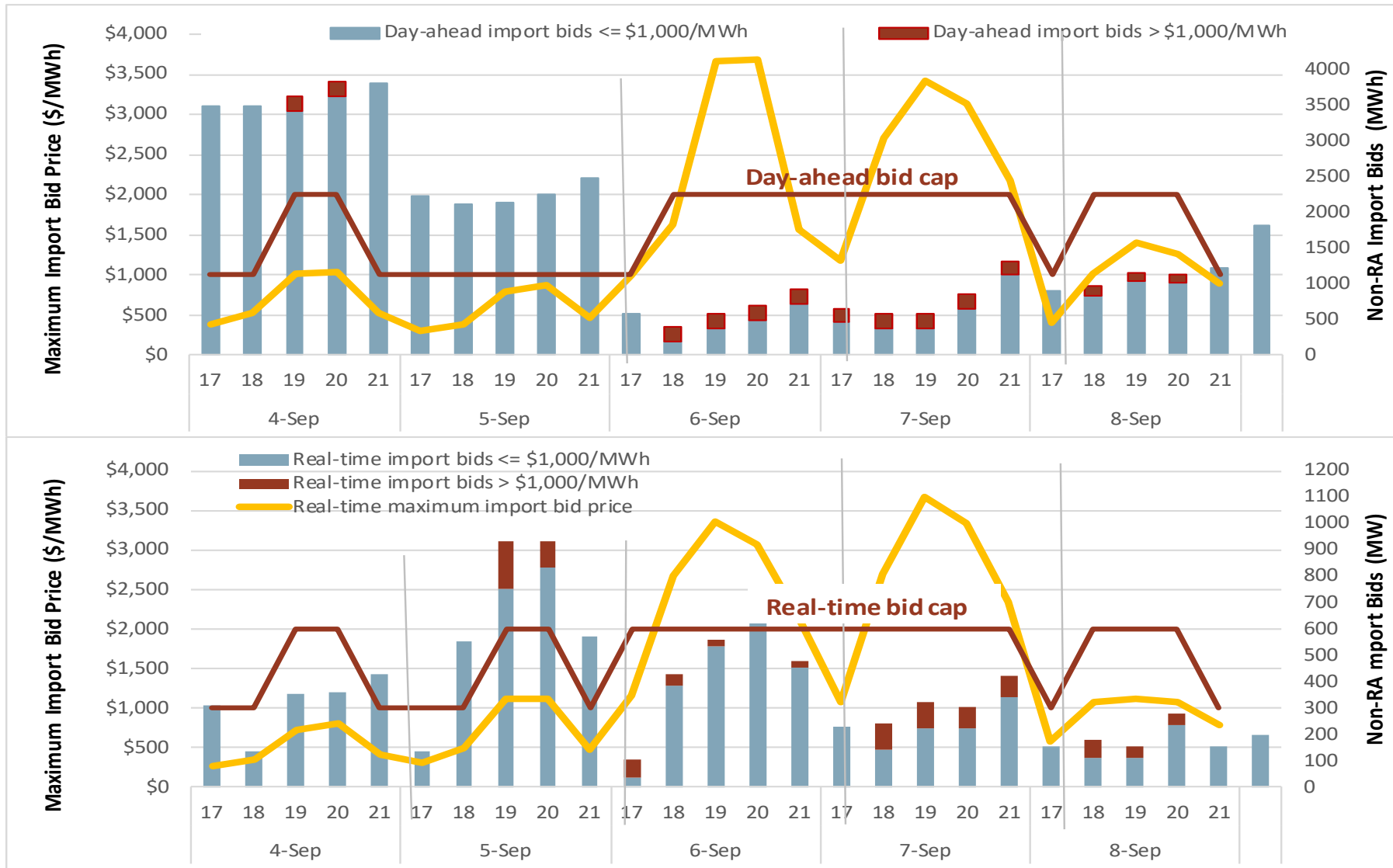
Hours with \$2,000/MWh bid cap closely matched hours when EEA2 and EEA3 were declared on September 5th to 7th



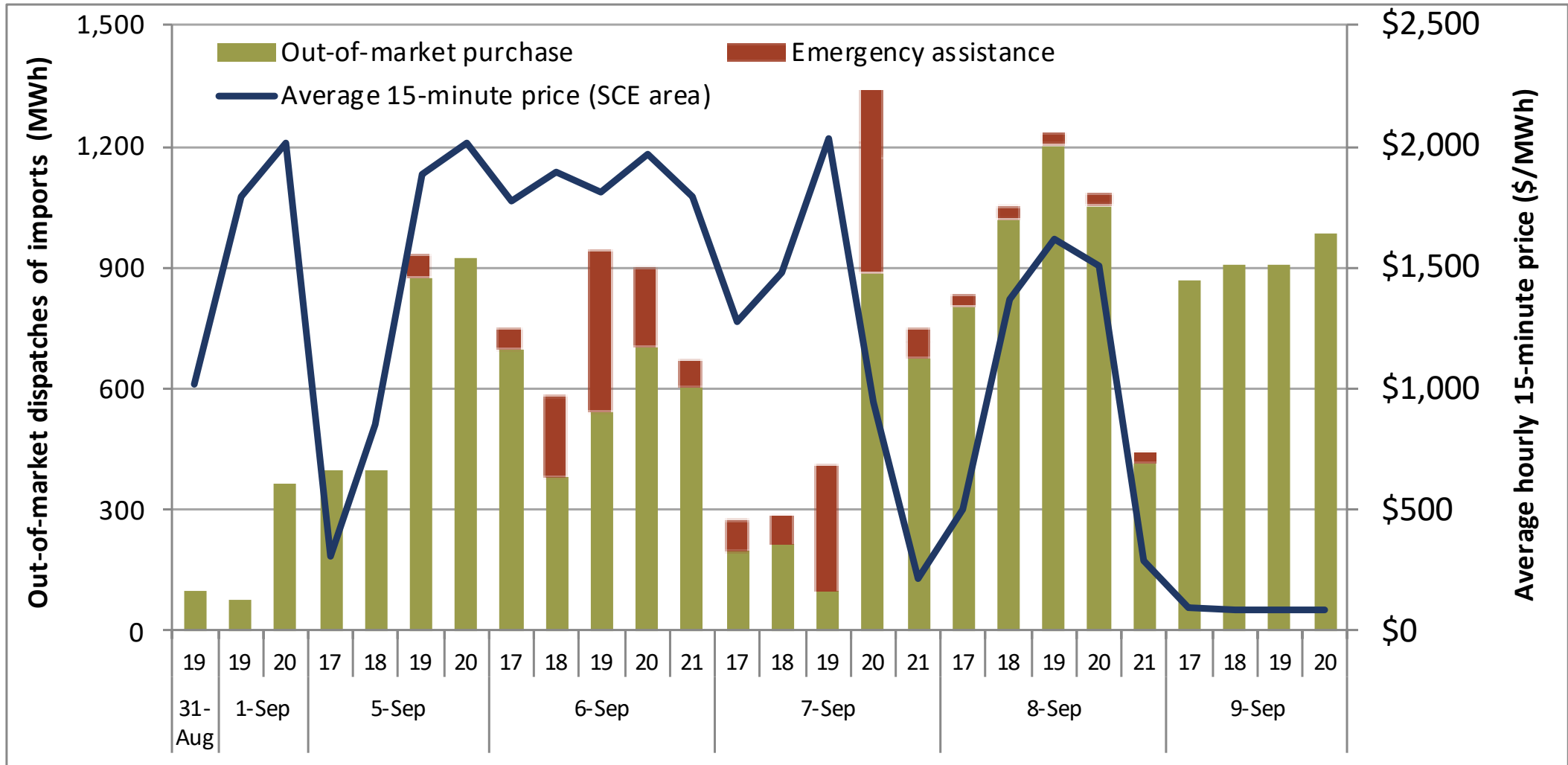
\$2,000 bid cap attracted limited quantity of additional imports into CAISO market



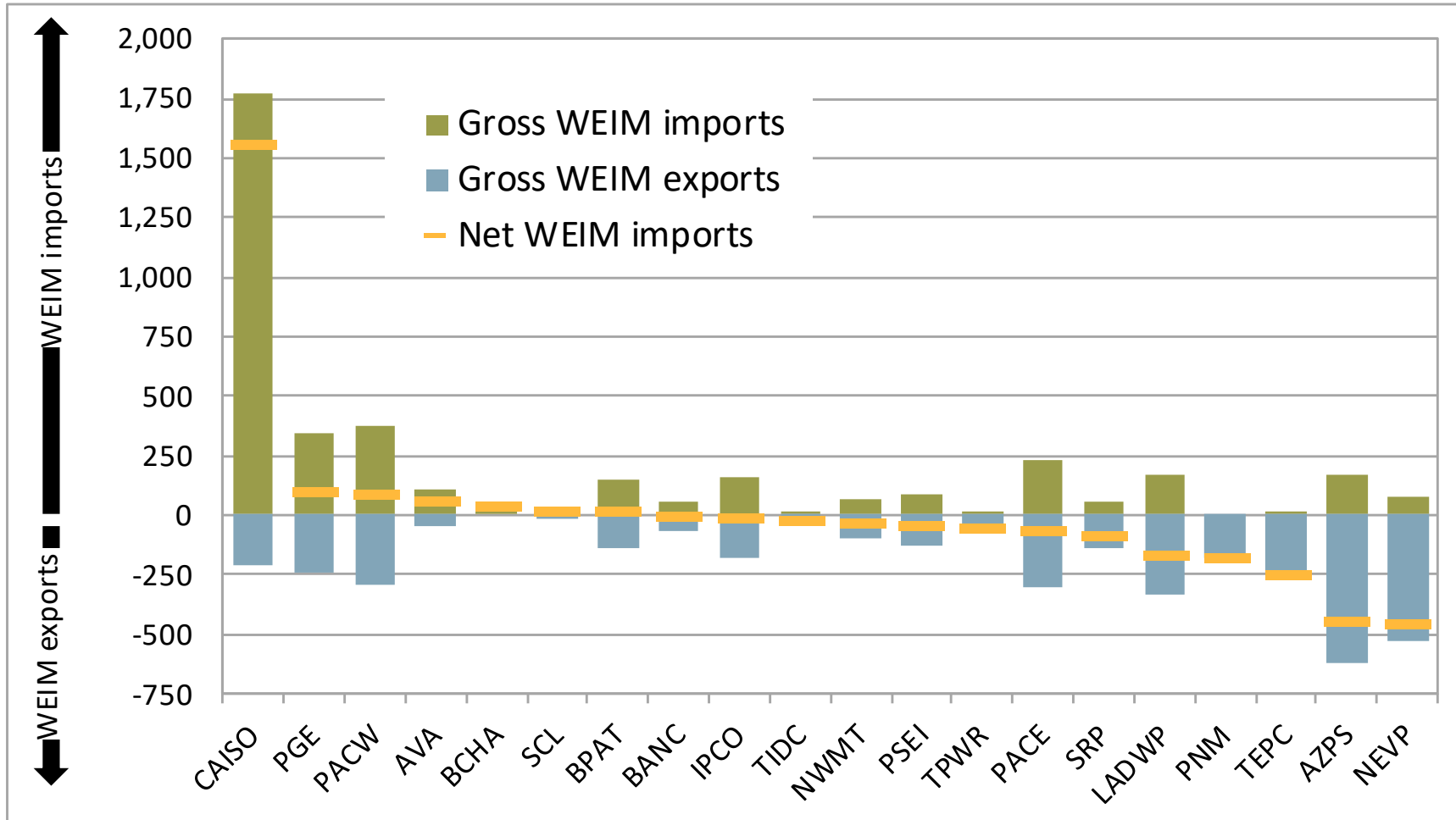
\$2,000 bid cap attracted limited quantity of additional imports into CAISO market



CAISO scheduled additional real-time imports through out-of-market and emergency energy purchases

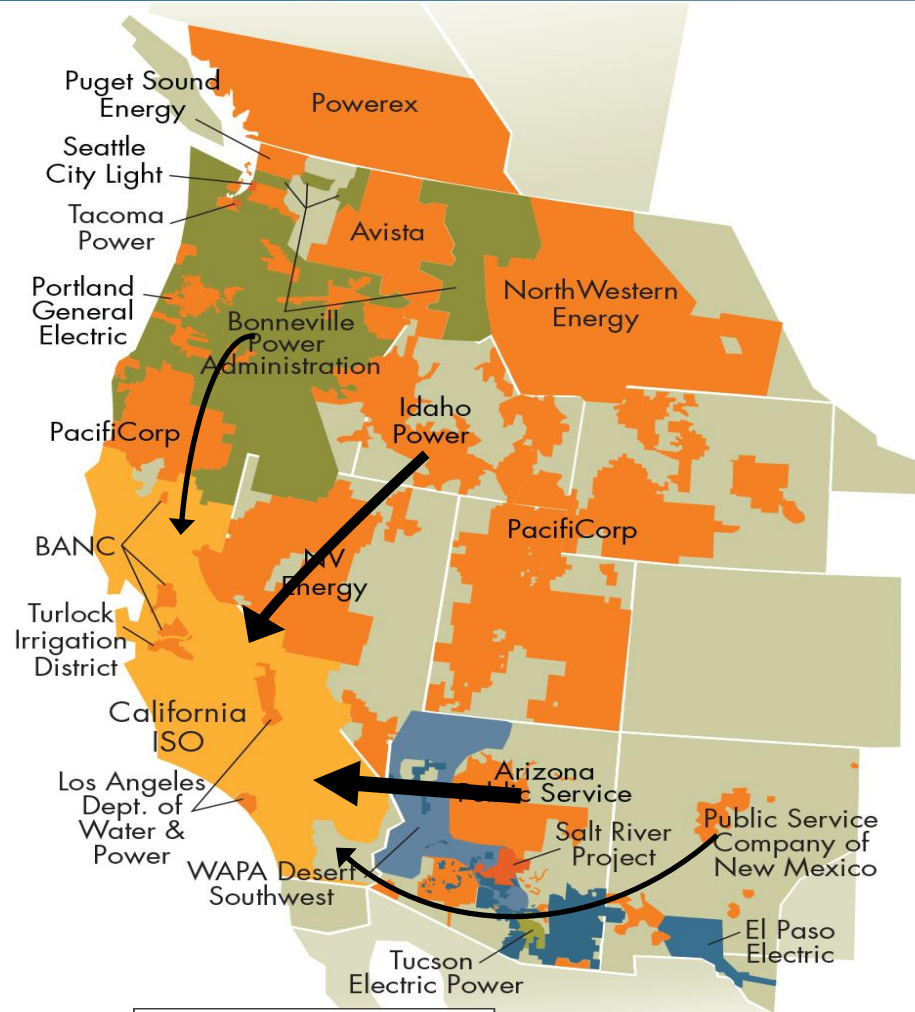


Most WEIM areas were net exporters in net peak hours during heat wave -- with CAISO accounting for most imports



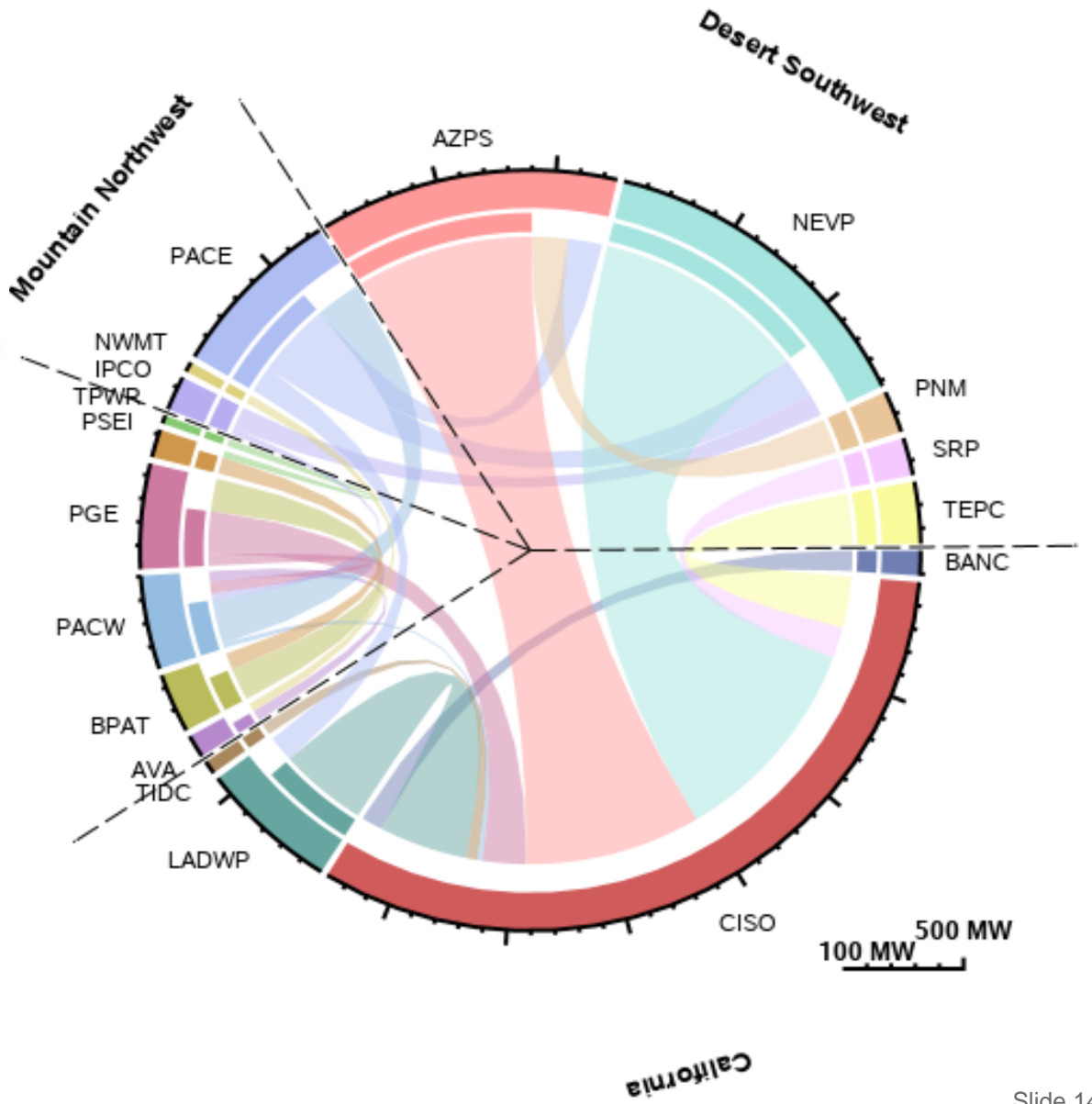
Average 5-minute transfers (Hours 17-22, September 5-6)

Average 15-minute WEIM transfers (peak hours Sept. 5-6)

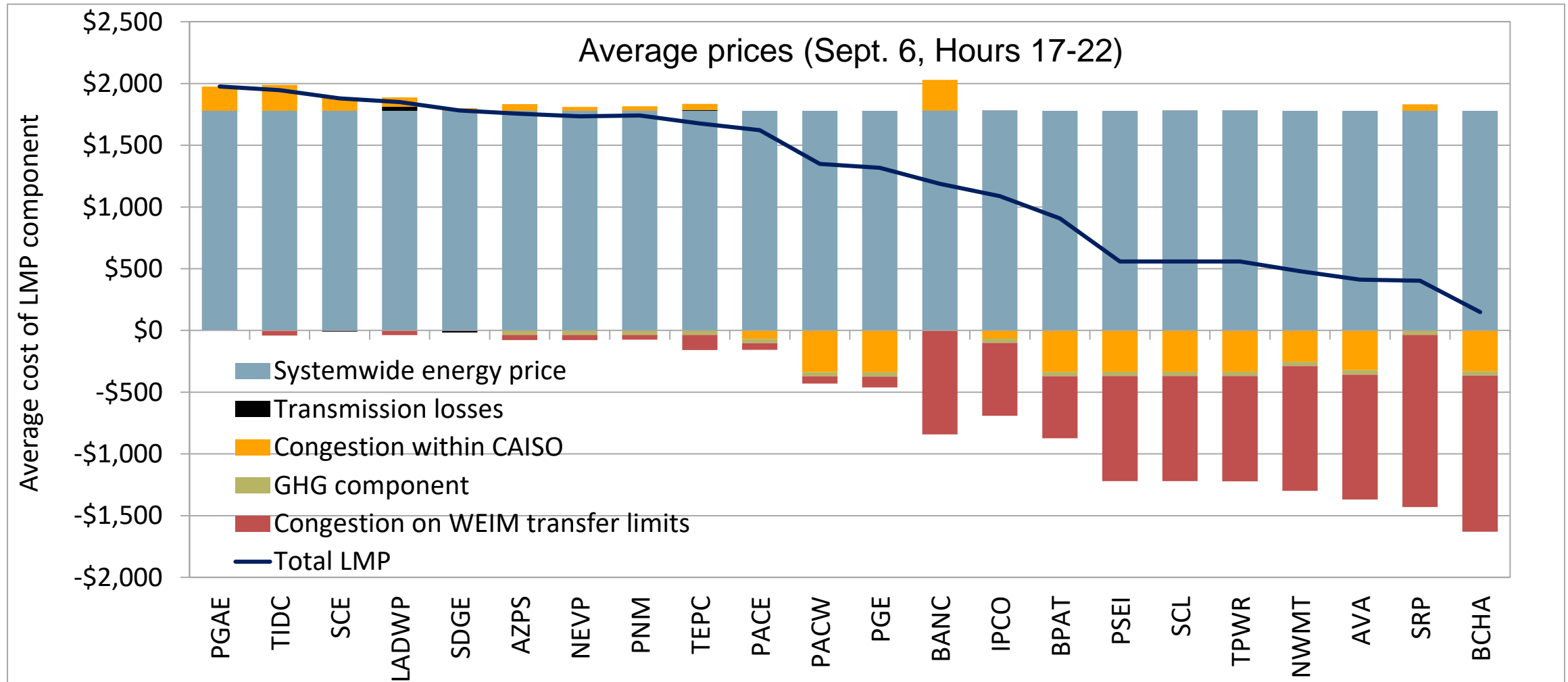


- Market Operator
- California ISO
- WEIM entity
- Active participant
- Planned entry 2022
- Planned entry 2023

Map boundaries are approximate and for illustrative purposes only.
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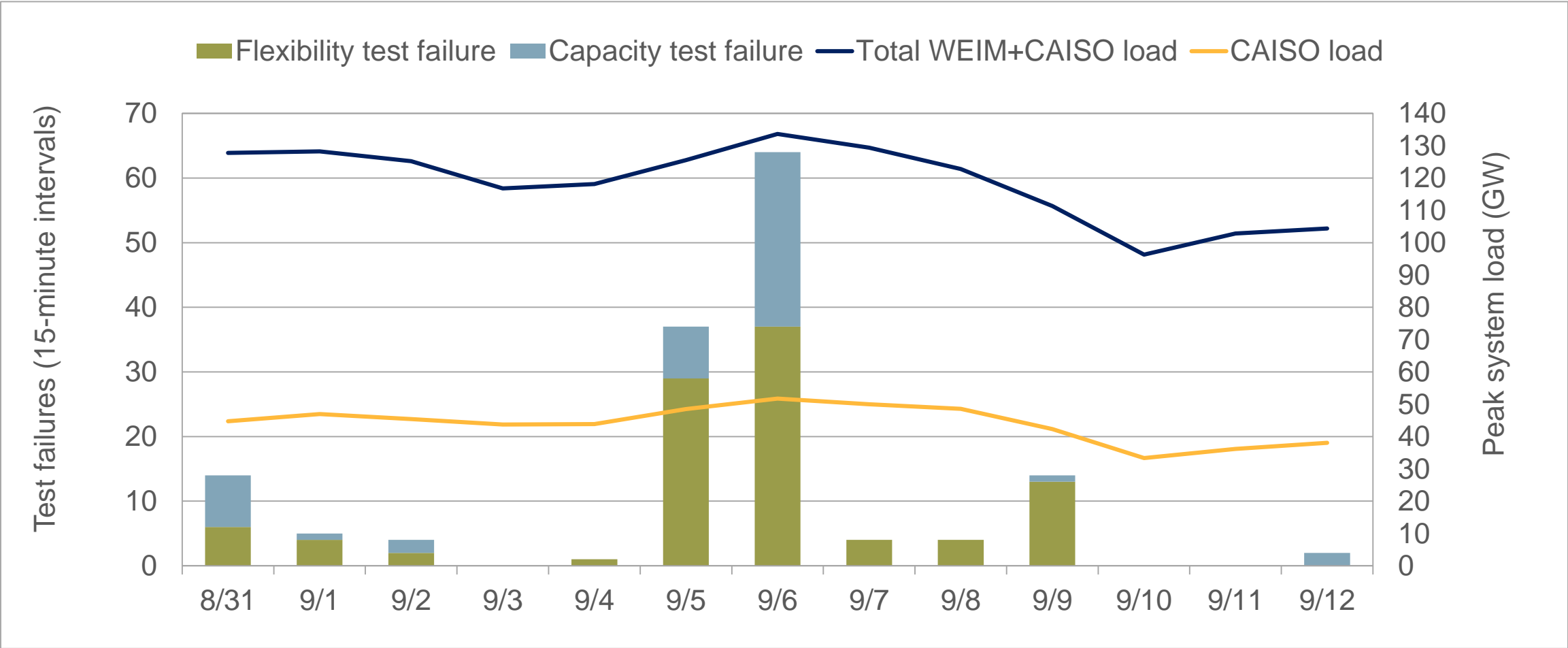


Average prices for WEIM transfers into CAISO exceeded \$1,700/MWh during net peak hours on September 6

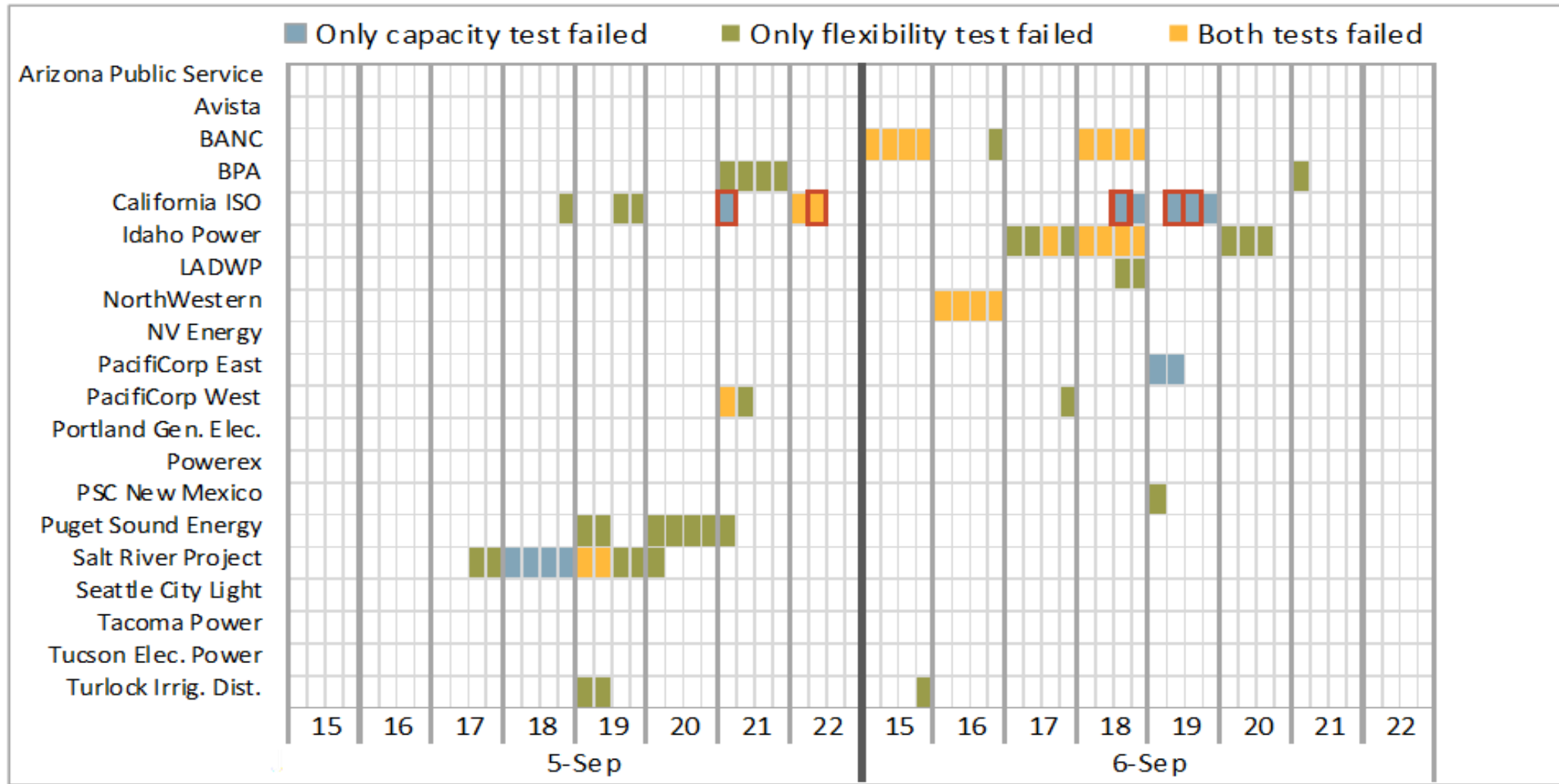


WEIM Resource Sufficiency Tests

Regional demand reached historically high levels and caused numerous areas to declare emergencies and fail WEIM resource sufficiency tests

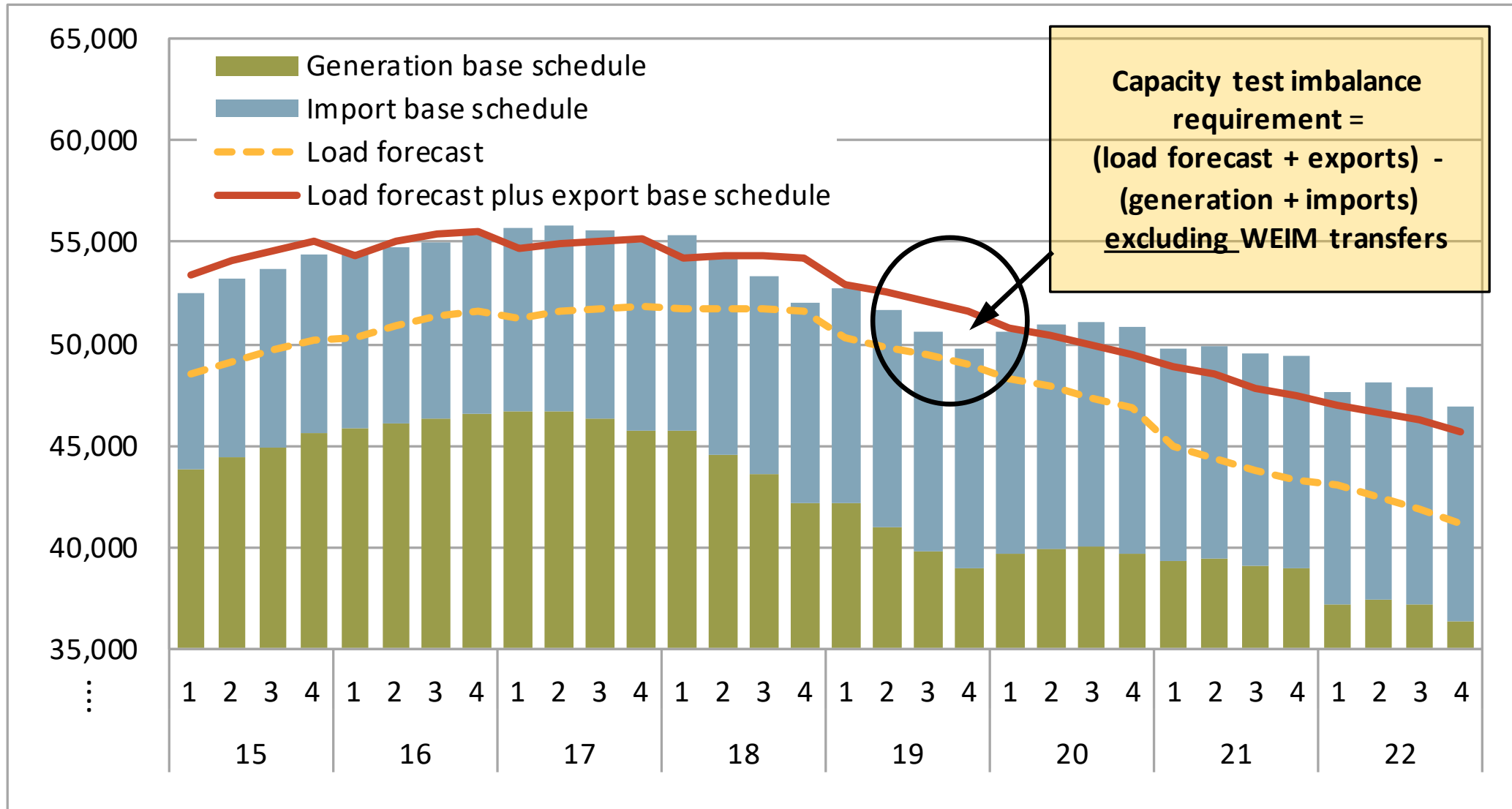


On September 5-6, 12 different BAAs failed resource sufficiency test

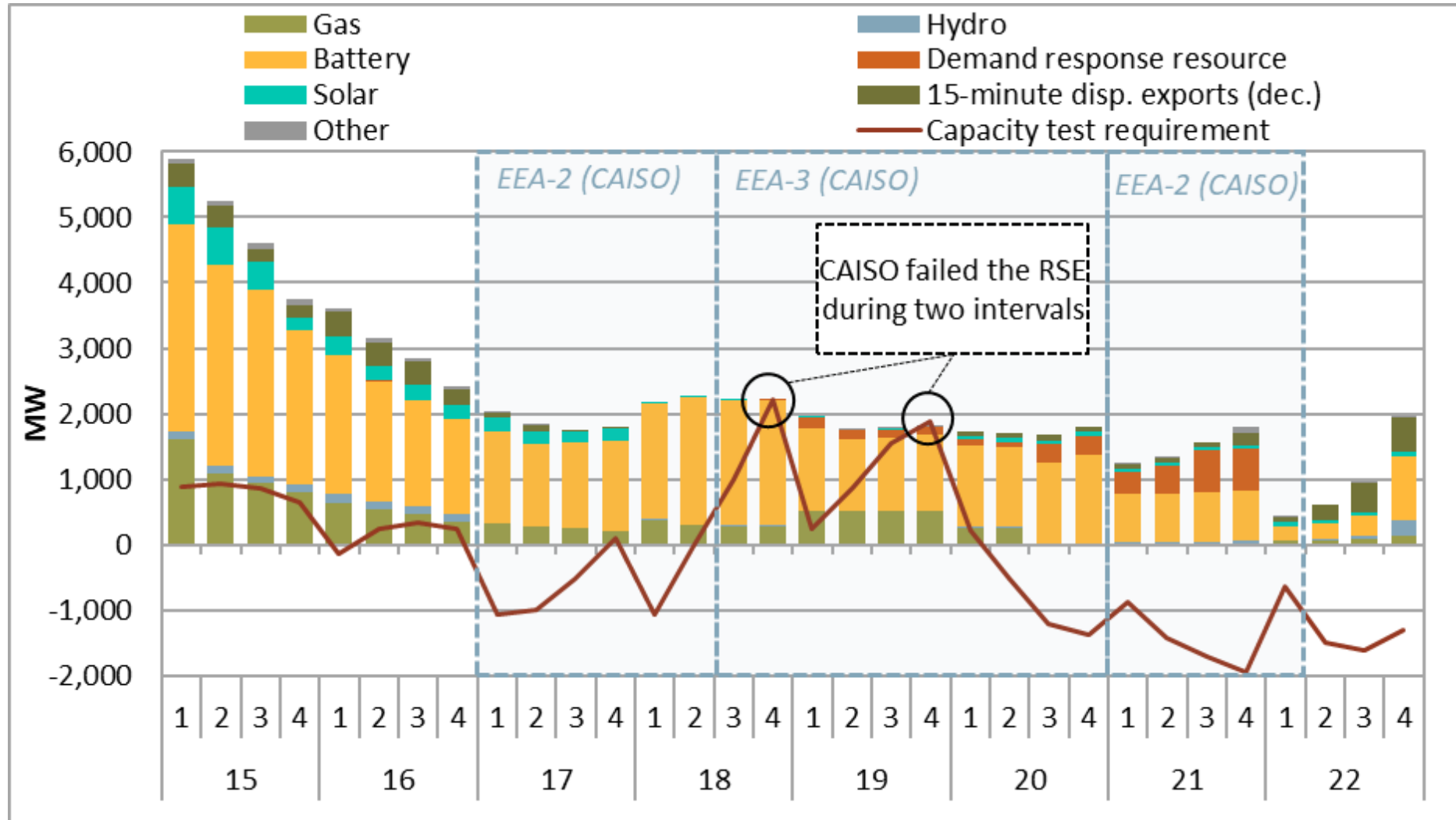


Red boxes indicate intervals when CAISO should have failed capacity test if available battery capacity was correctly calculated.

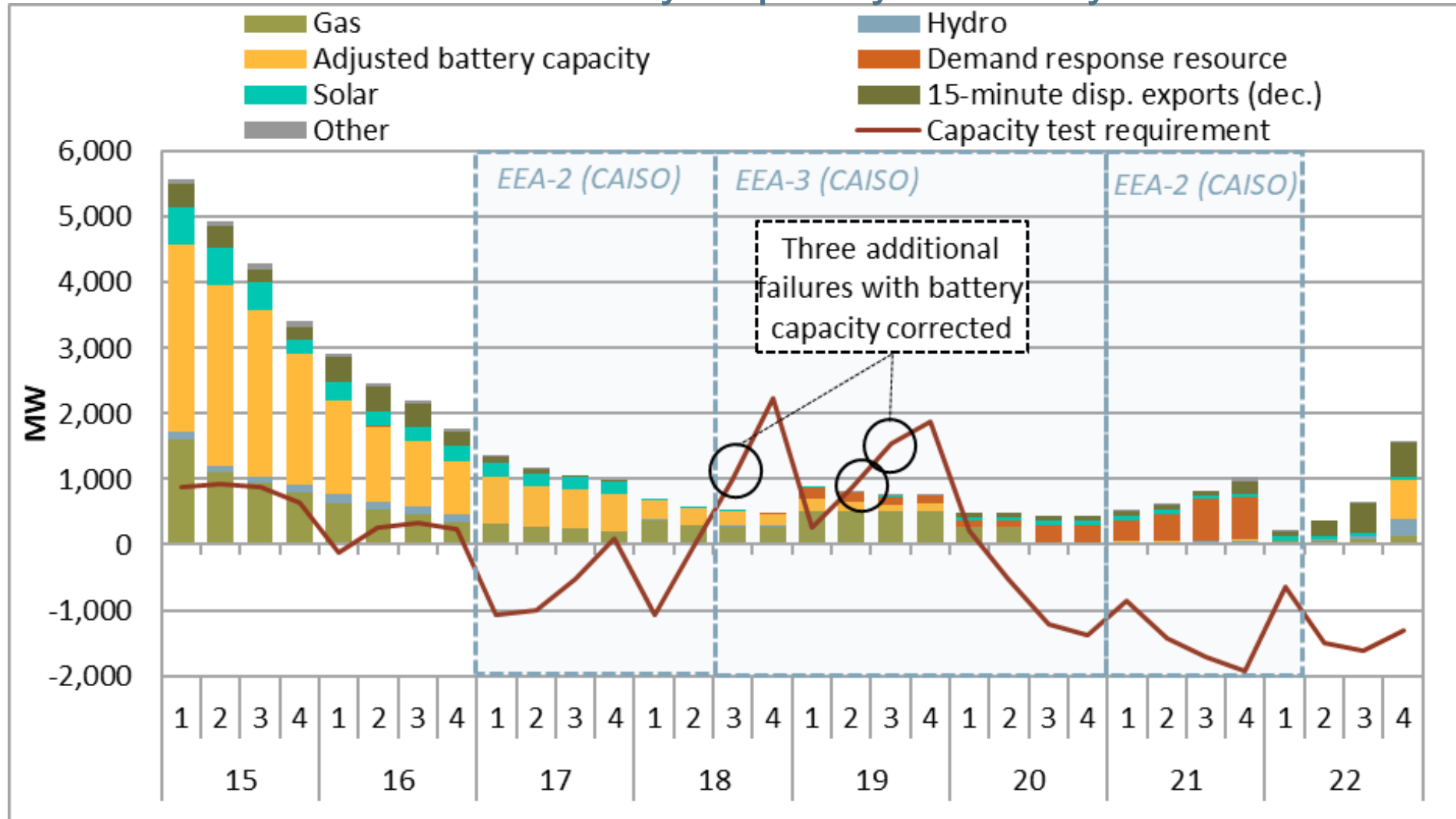
Capacity test requirements (CAISO, Sept. 6)



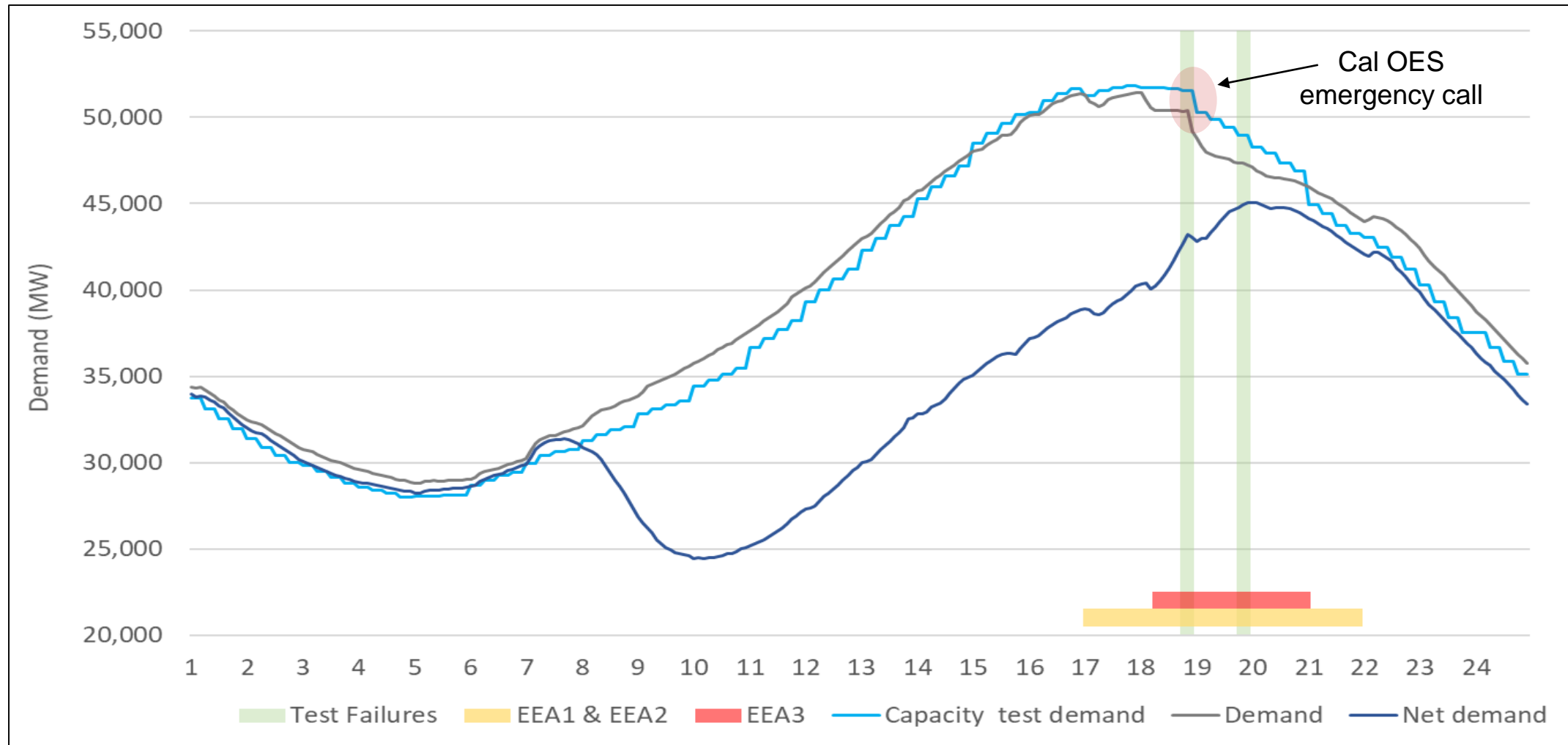
CAISO failed the resource sufficiency evaluation during two intervals on September 6



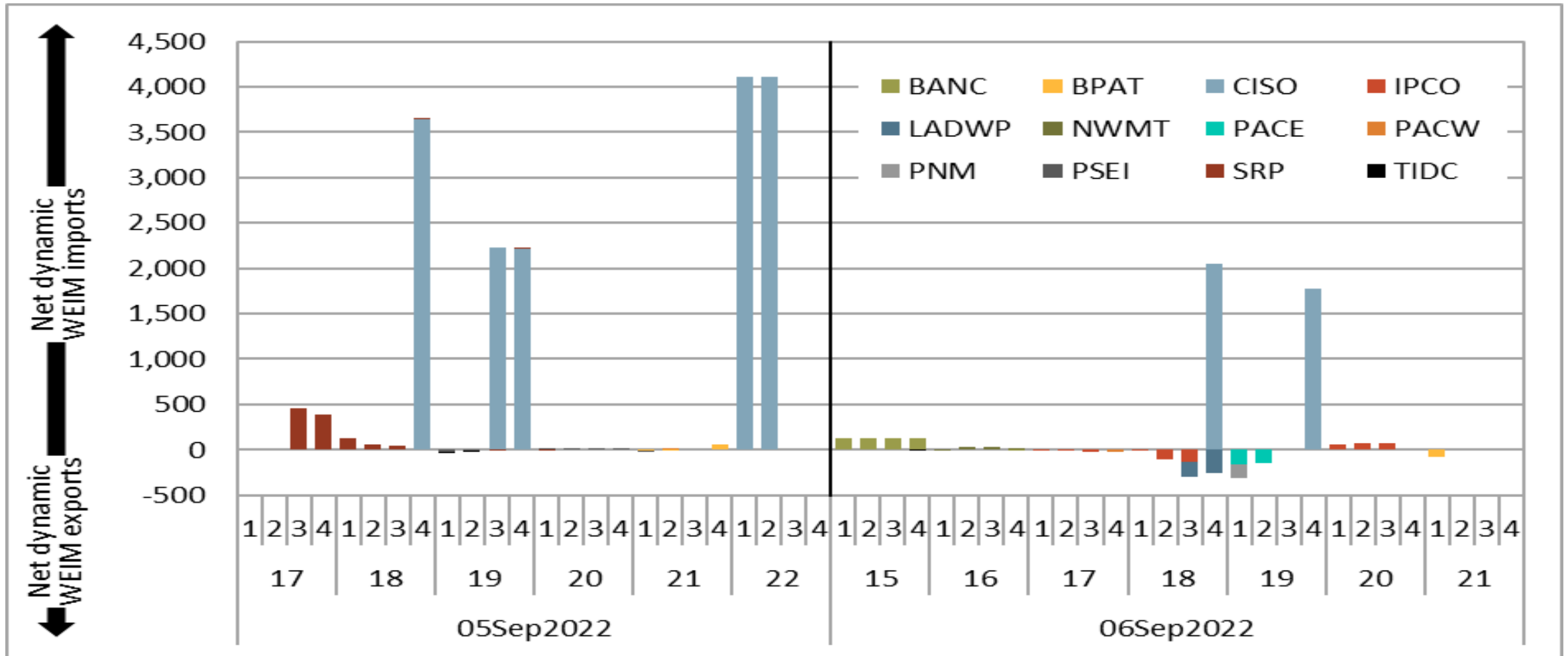
CAISO would have failed in three additional 15-minute intervals on September 6 with available battery capacity correctly calculated



Extraordinary levels of demand response and voluntary conservation caused CAISO load to drop well below forecast used in capacity test



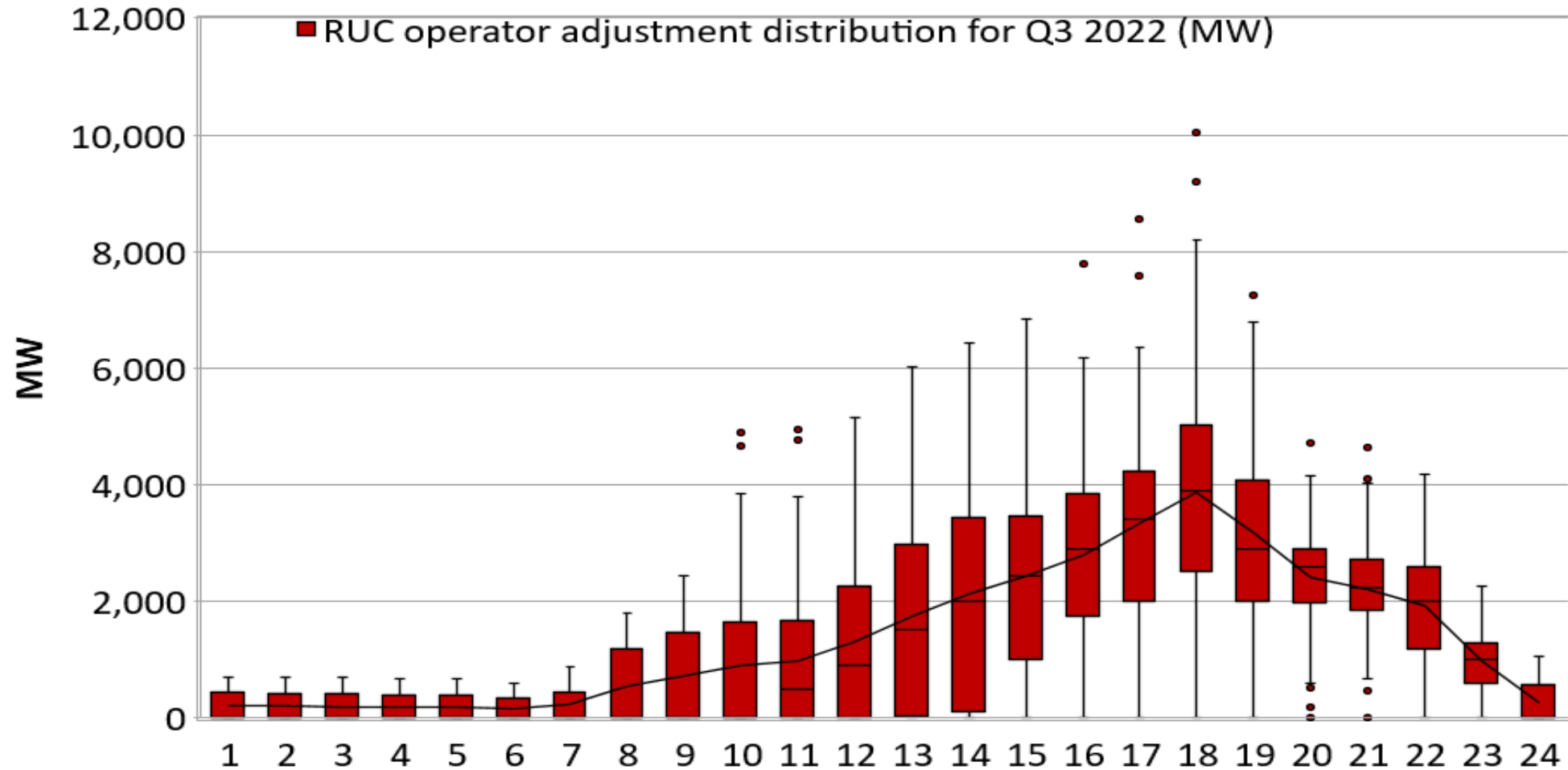
WEIM transfers following resource sufficiency evaluation failures (September 5-6, 2022)



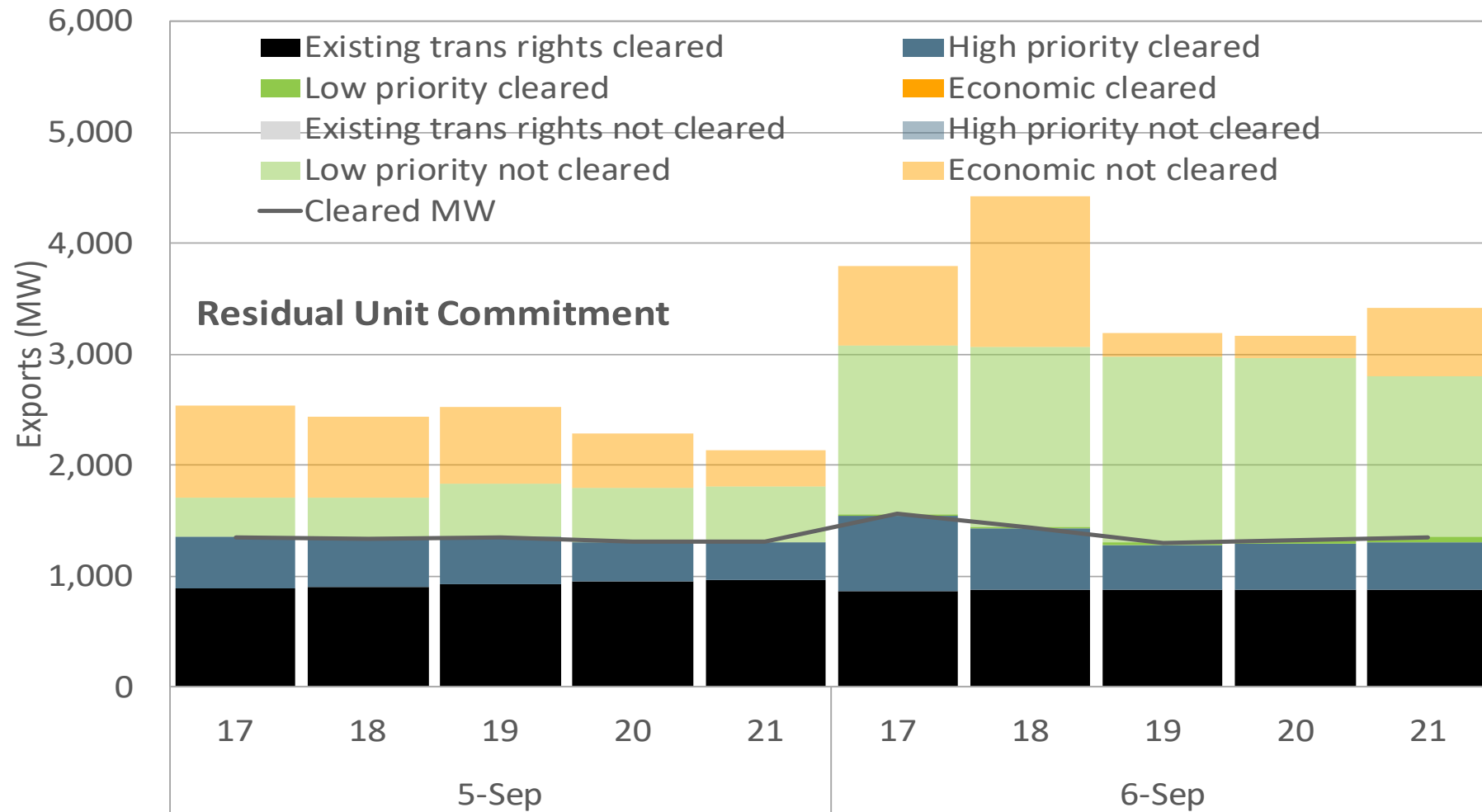
15-minute market

CAISO Exports and Scheduling Procedures

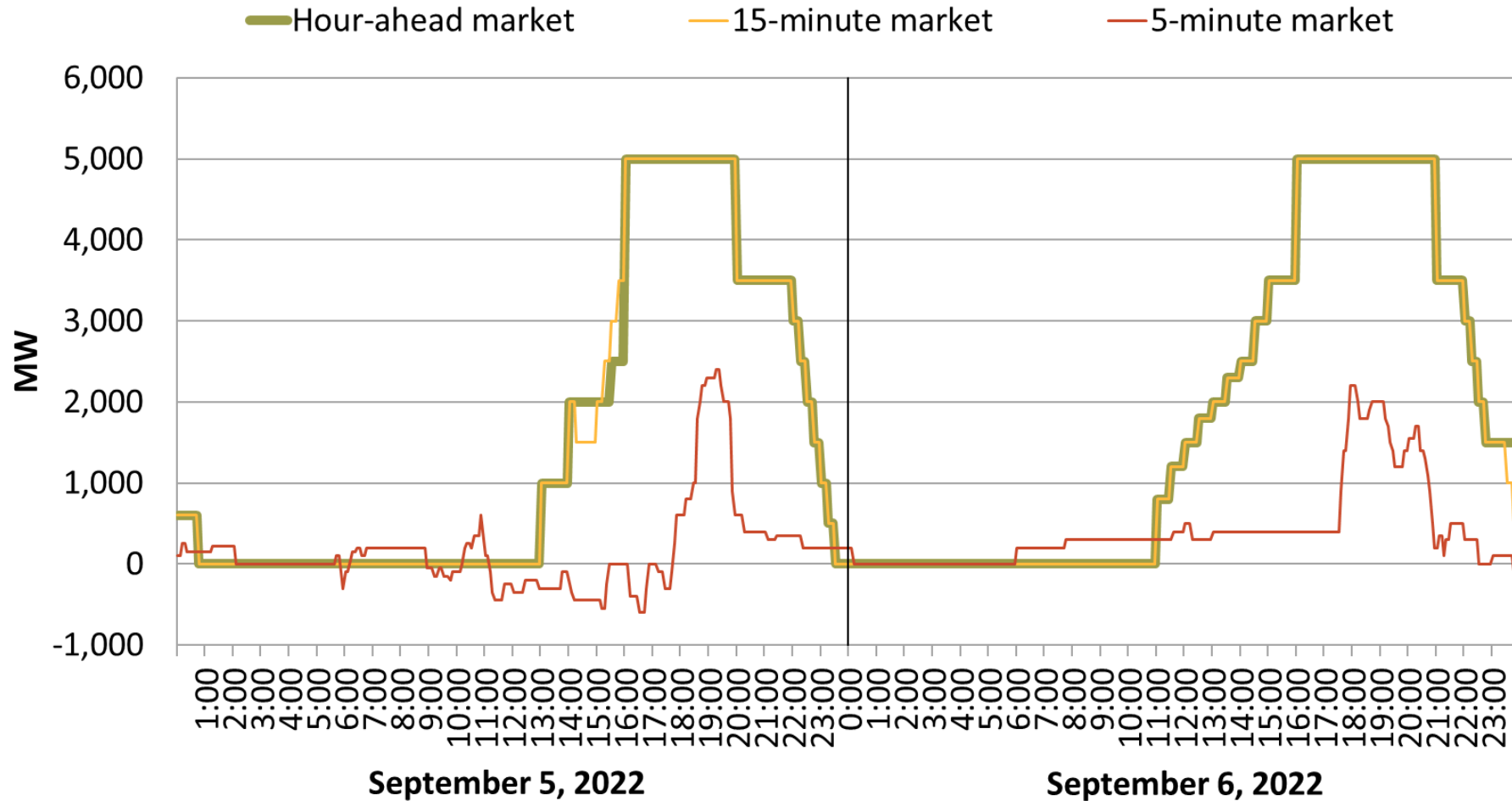
Operators increased RUC requirement significantly, causing some IFM exports to not clear the RUC process



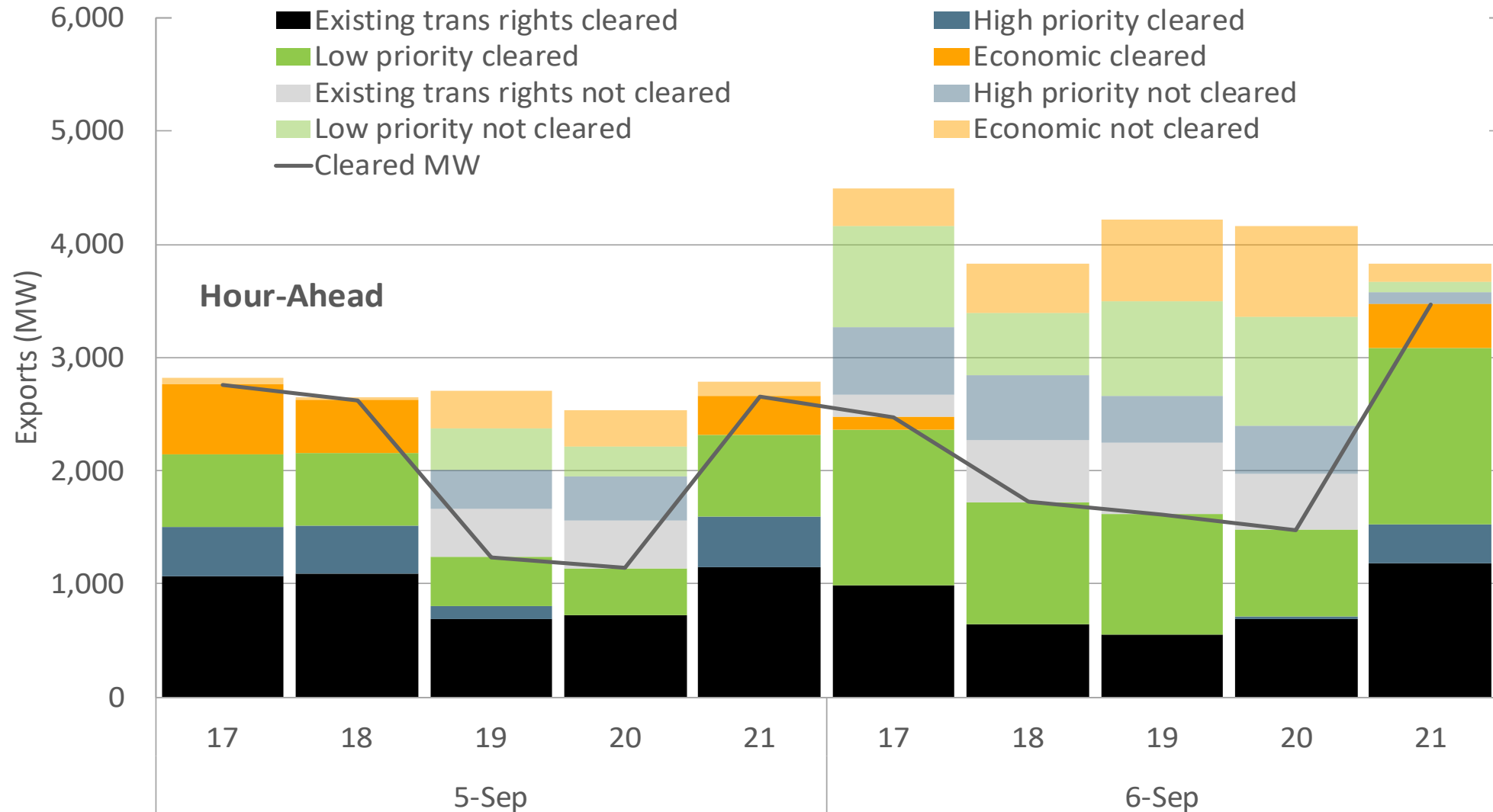
IFM schedules that did not receive RUC awards were primarily low priority self schedules and economic bids that cleared in IFM



Very high load bias in HASP and 15-minute market also prevented some exports from clearing in real-time market



HASP curtailed high priority exports while scheduling low priority exports



For more information

- Department of Market Monitoring webpage
 - <http://www.aiso.com/market/Pages/MarketMonitoring/Default.aspx>
- CAISO Tariff, Appendix P
 - http://www.aiso.com/Documents/AppendixP_CAISODepartmentOfMarketMonitoring_as_of_Apr1_2017.pdf
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