



# 2018 Q2 Report

August 21, 2018

Amelia Blanke, Ph.D., Manager of Monitoring and Reporting

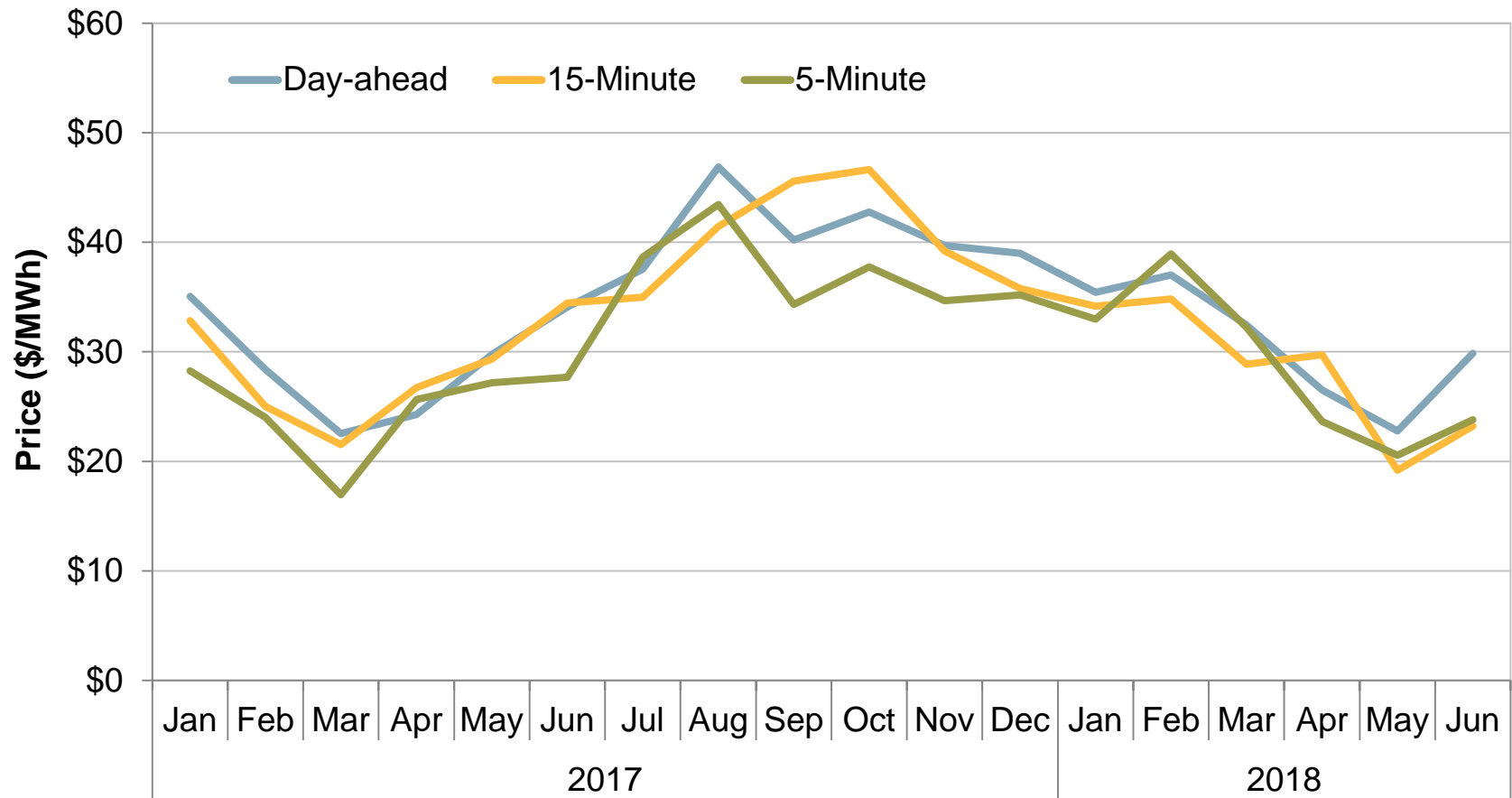
Department of Market Monitoring, California ISO

<http://www.caiso.com/Documents/2018SecondQuarterReportonMarketIssuesandPerformance.pdf>

<http://www.caiso.com/market/Pages/MarketMonitoring/AnnualQuarterlyIssuesPerformanceReports/Default.aspx>

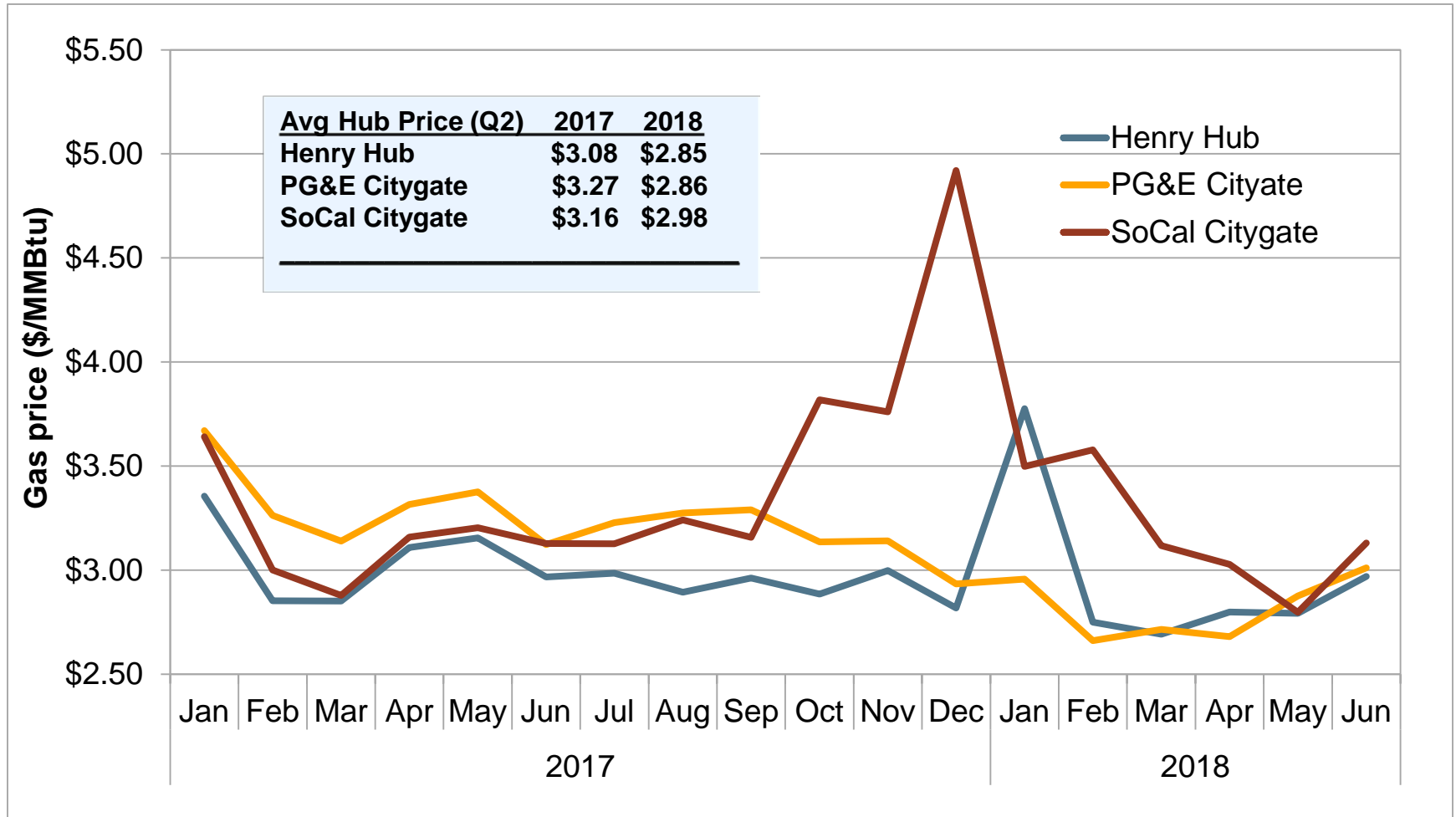
# Q2 prices decrease relative to Q1 and Q2 2017, driven by lower gas prices, higher renewable generation and moderate load

Average monthly prices (all hours) – system marginal energy price



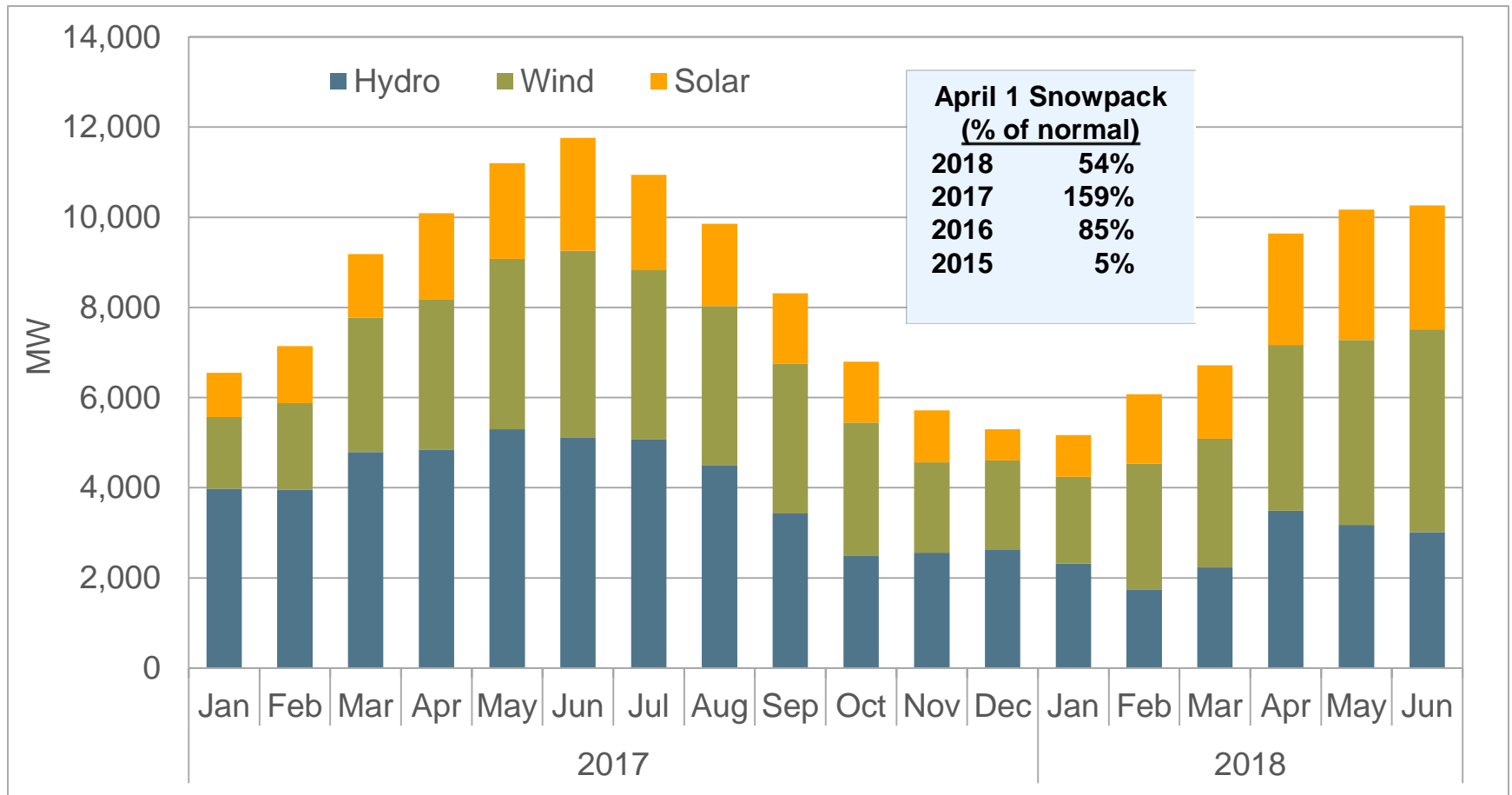
# Q2 gas prices decrease relative to Q2 2017

Monthly average natural gas prices



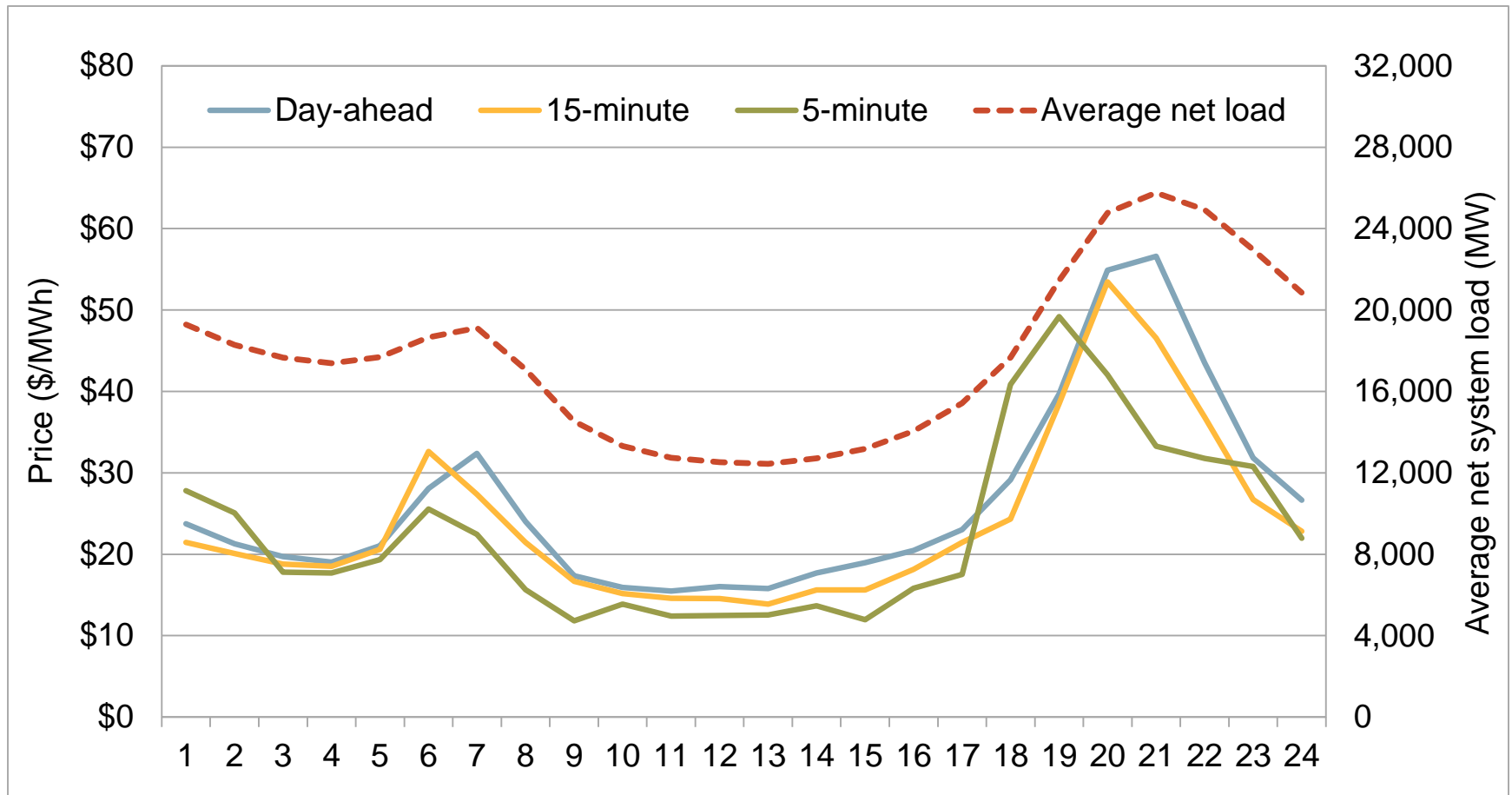
# Total renewable production up in Q2, although hydroelectric production down, solar doubles compared to Q1

Average hourly hydroelectric, wind, and solar generation by month



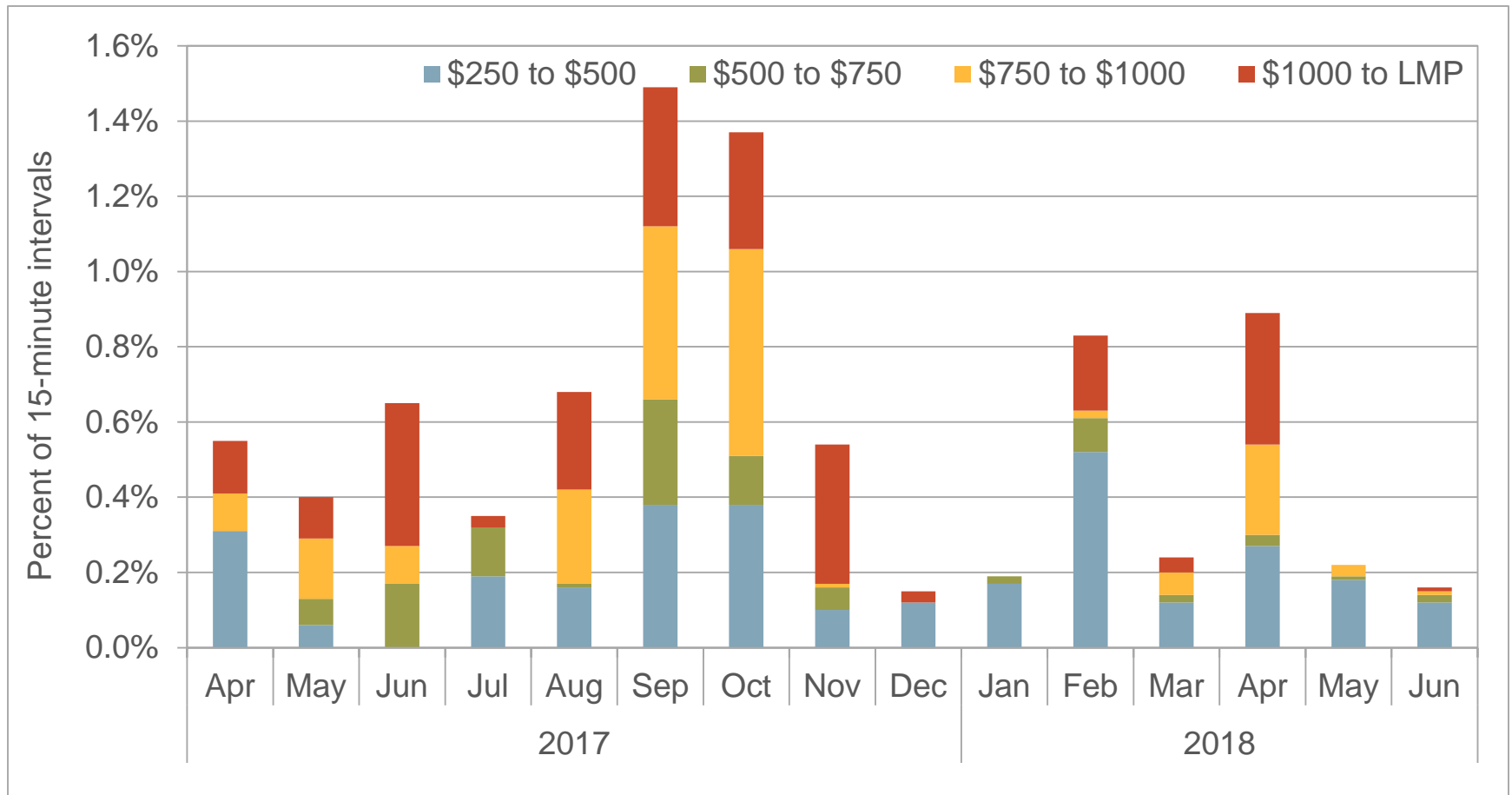
# Average net load decreases from Q1

Hourly system marginal energy prices

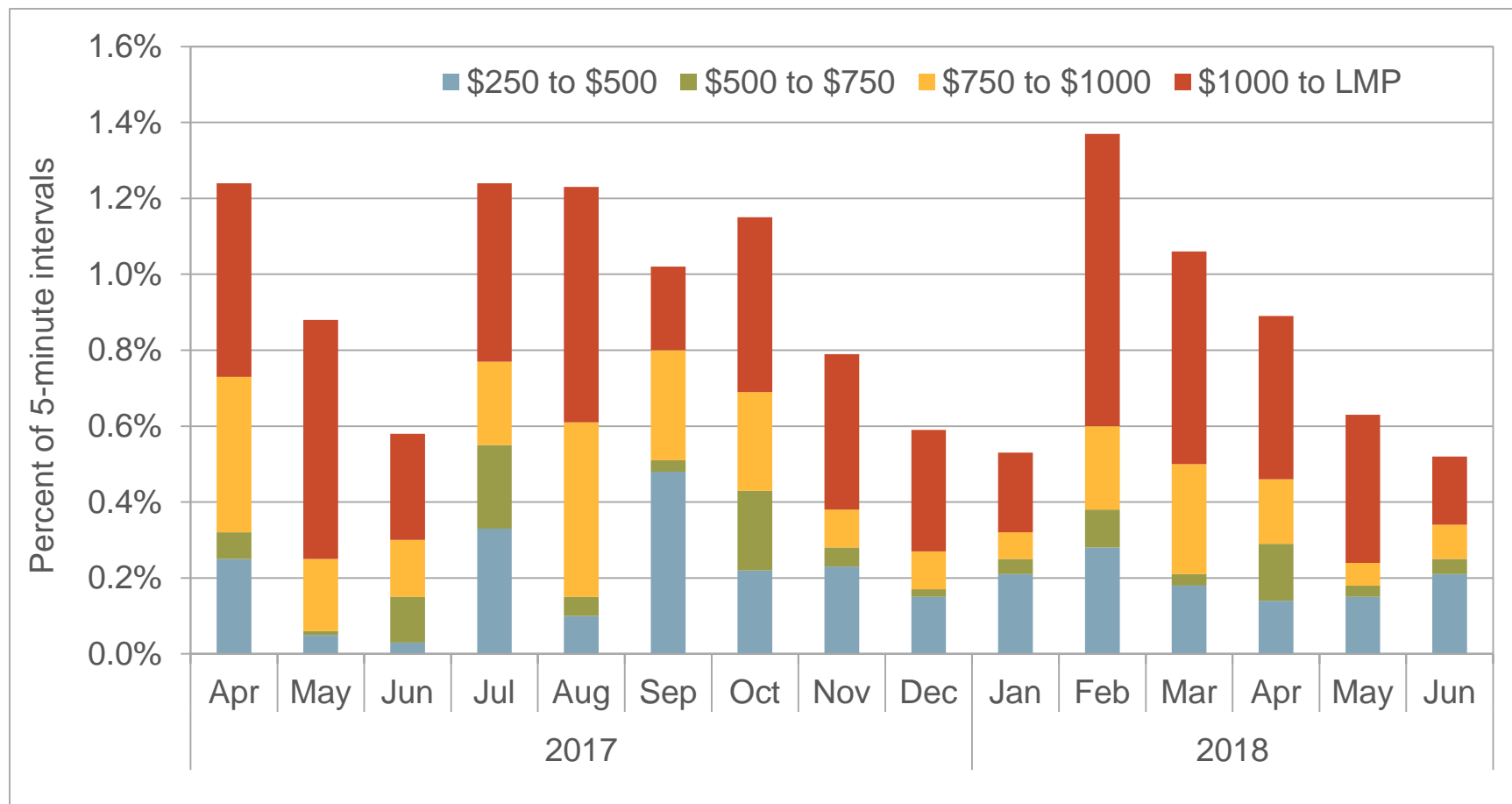


# Frequency of high 15-minute prices by month

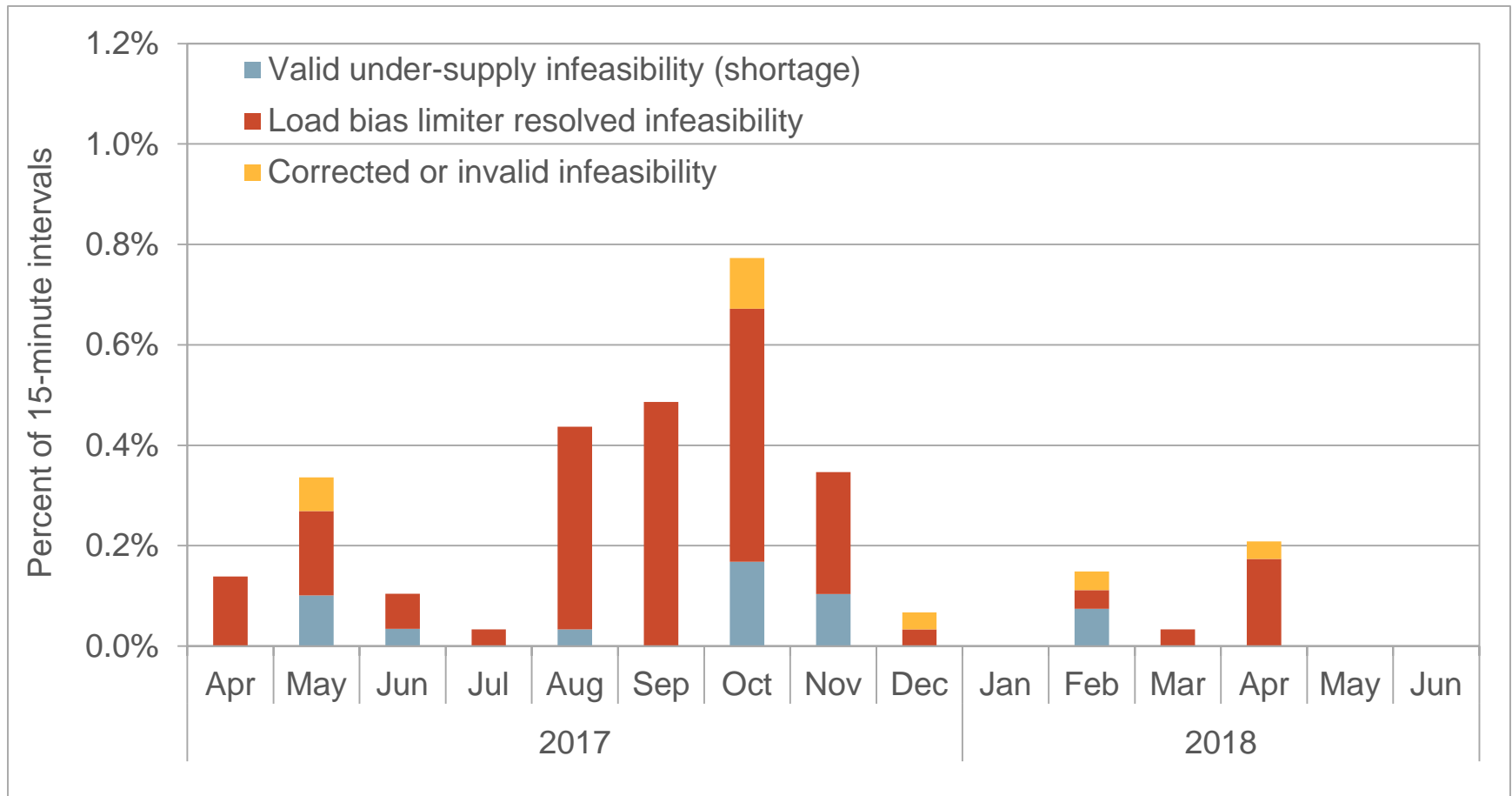
## Most high prices set by unmitigated high bids



# Frequency of high 5-minute prices by month

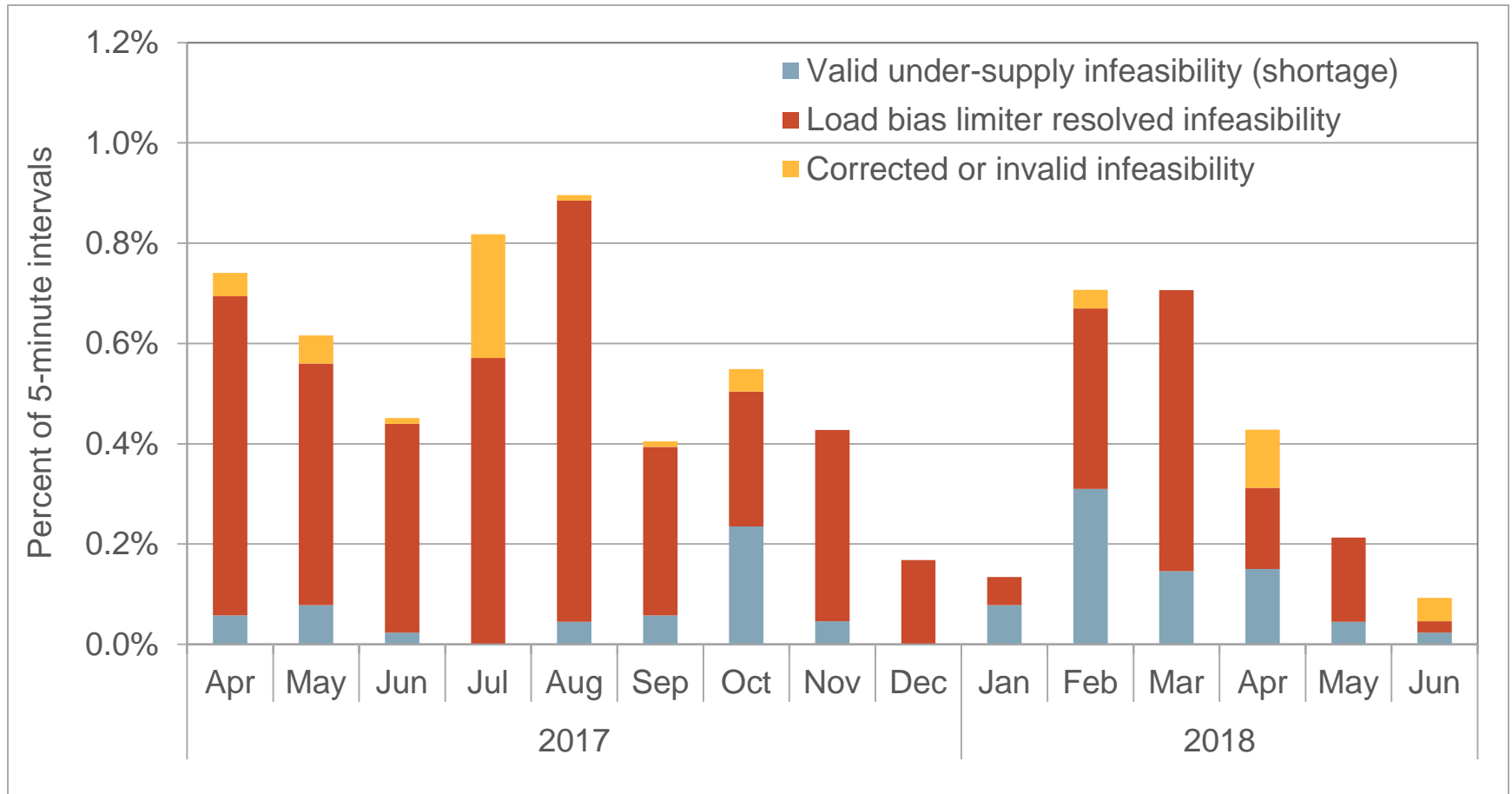


# Frequency of under-supply power balance constraint infeasibilities (15-minute market)

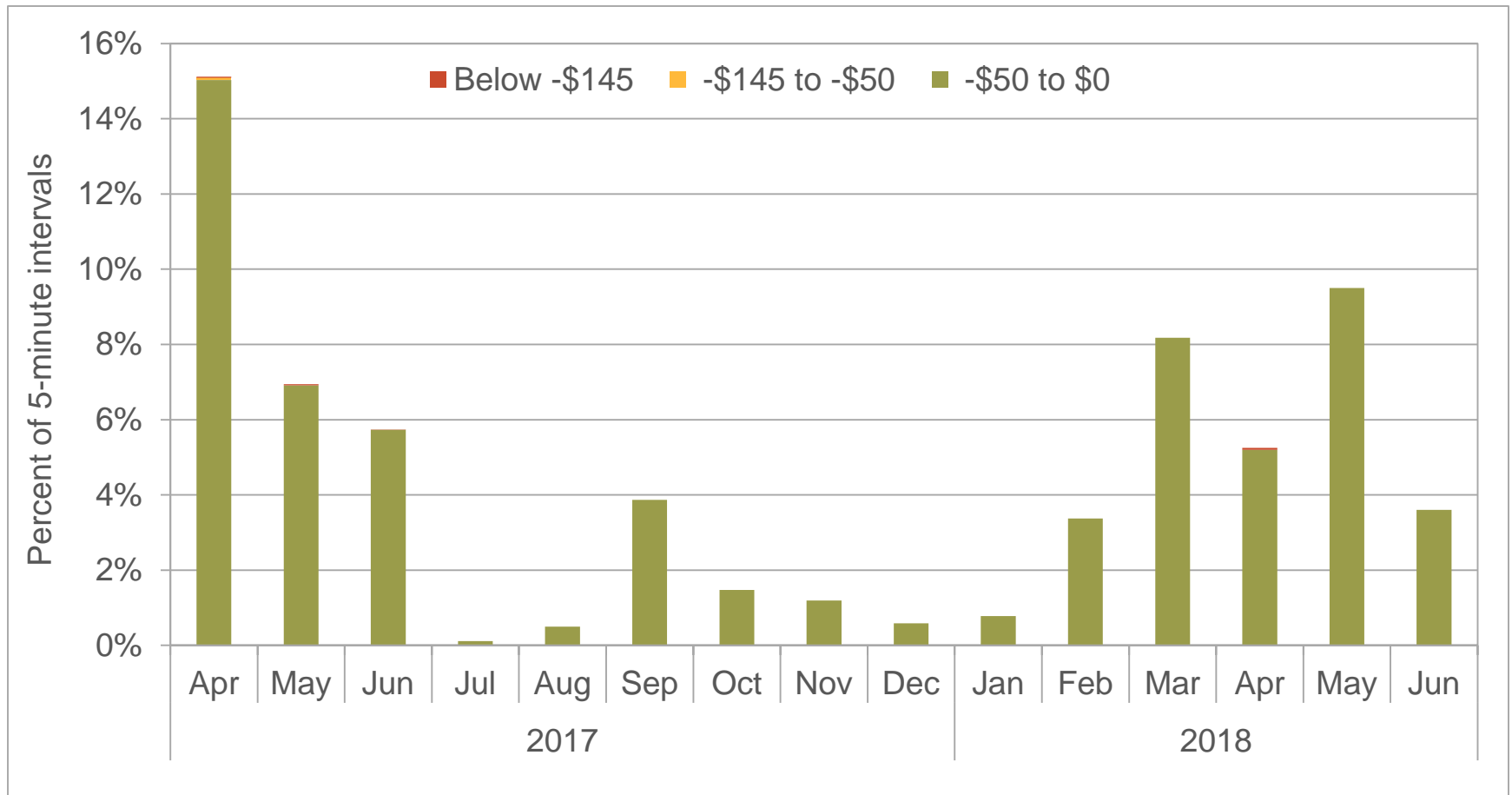




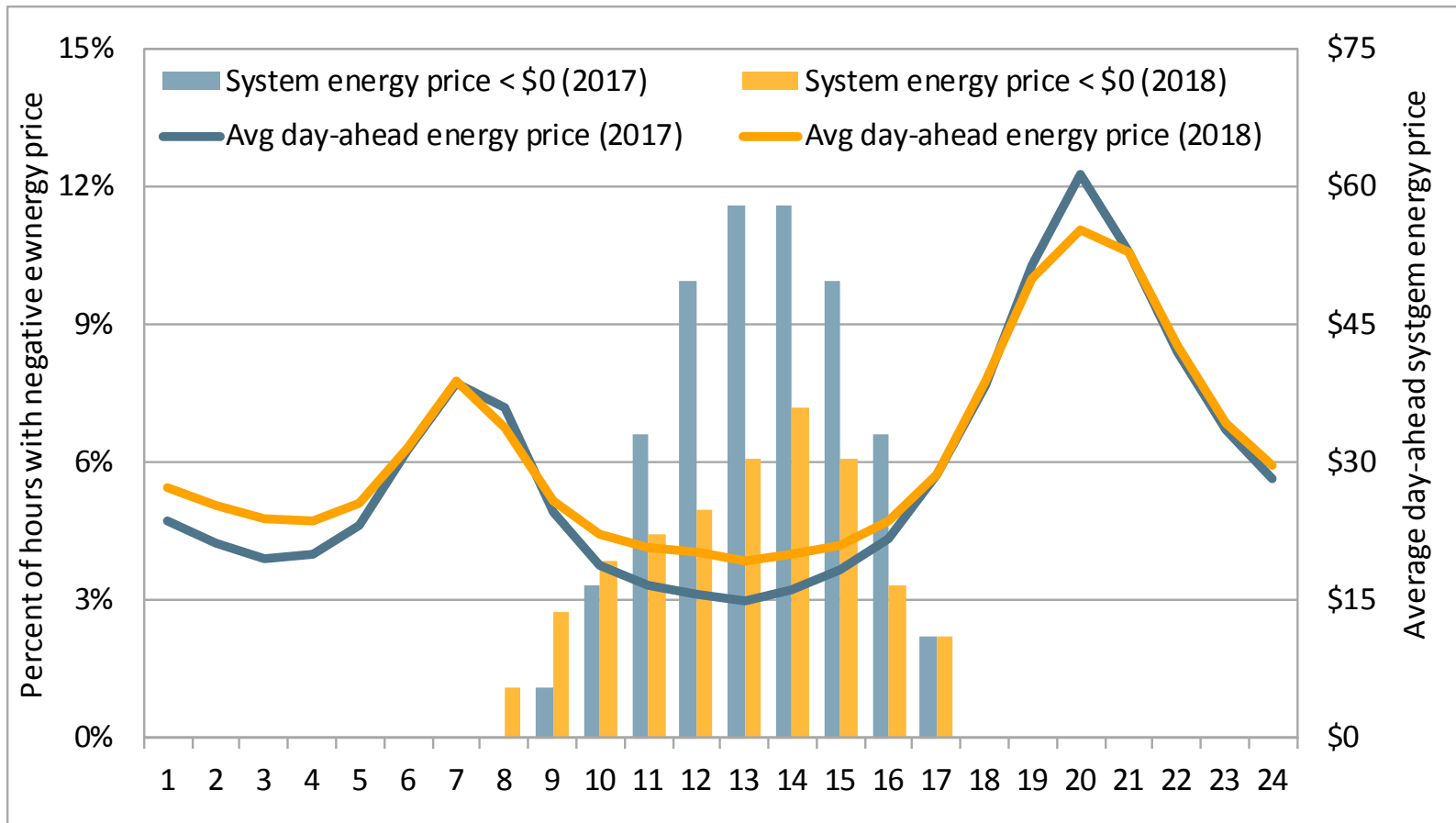
# Frequency of under-supply power balance constraint infeasibilities (5-minute market)



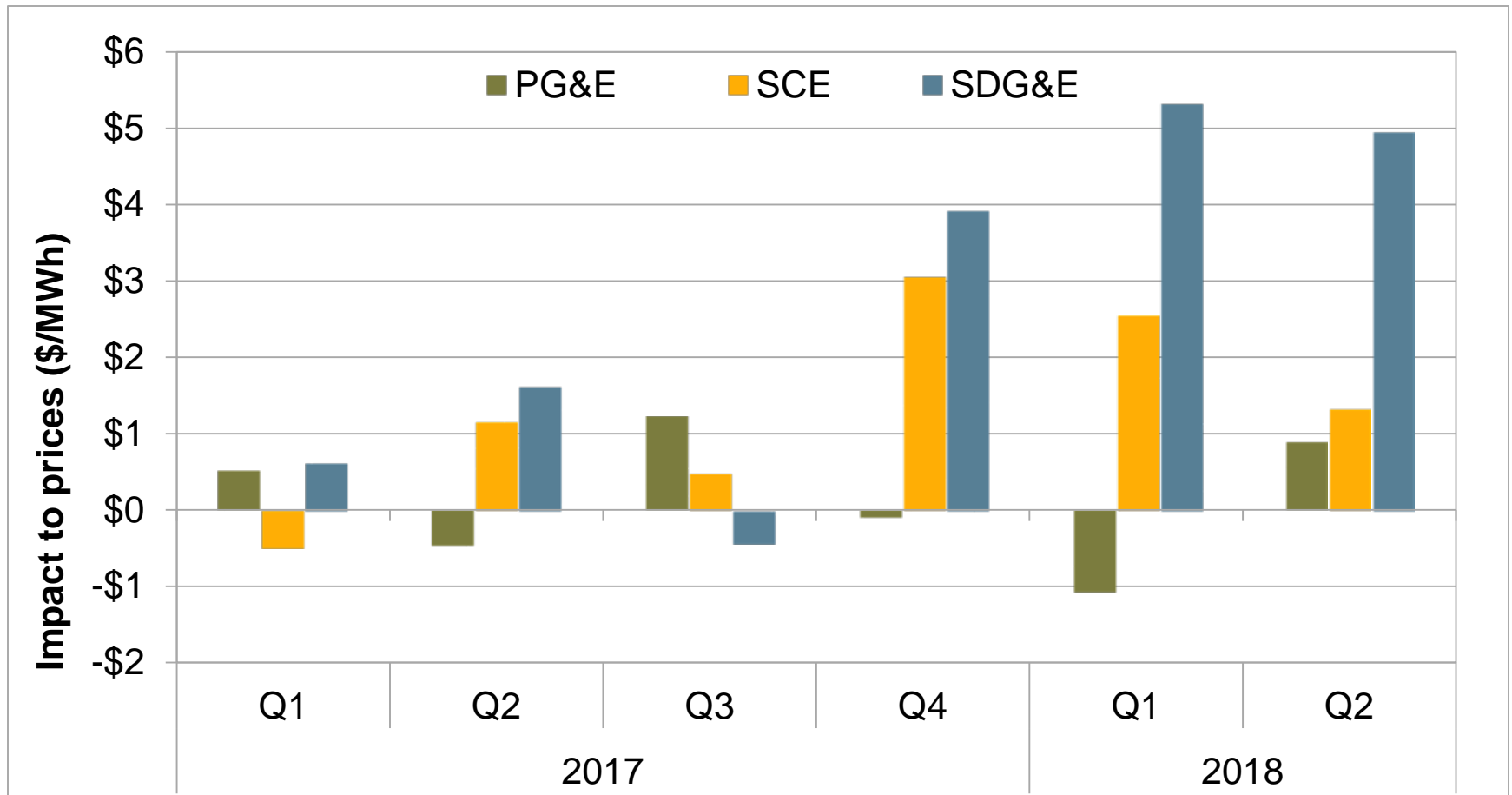
# Frequency of negative 5-minute prices by month



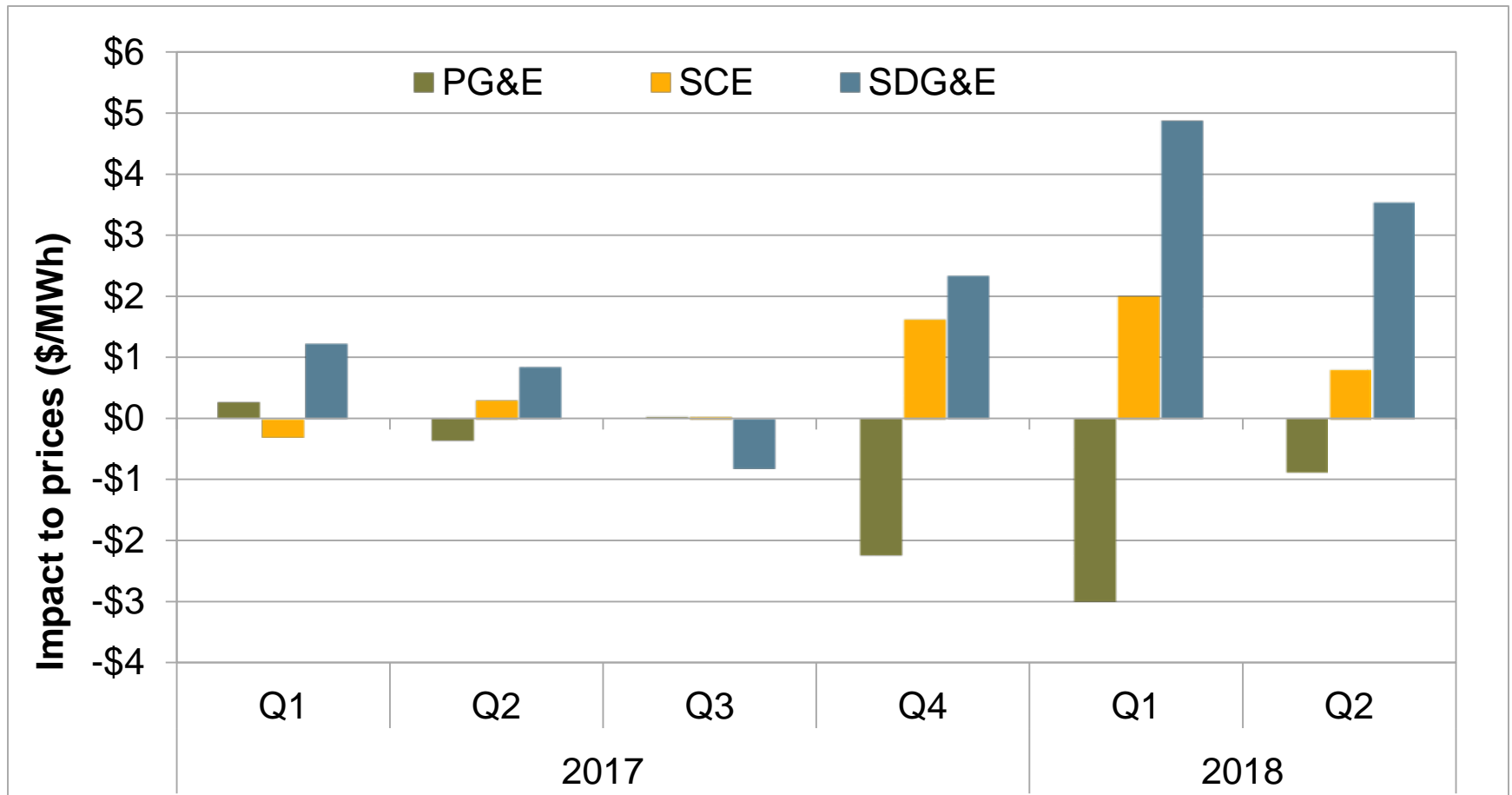
# Negative day-ahead prices lower in 2018 than in Q1-Q2 2017



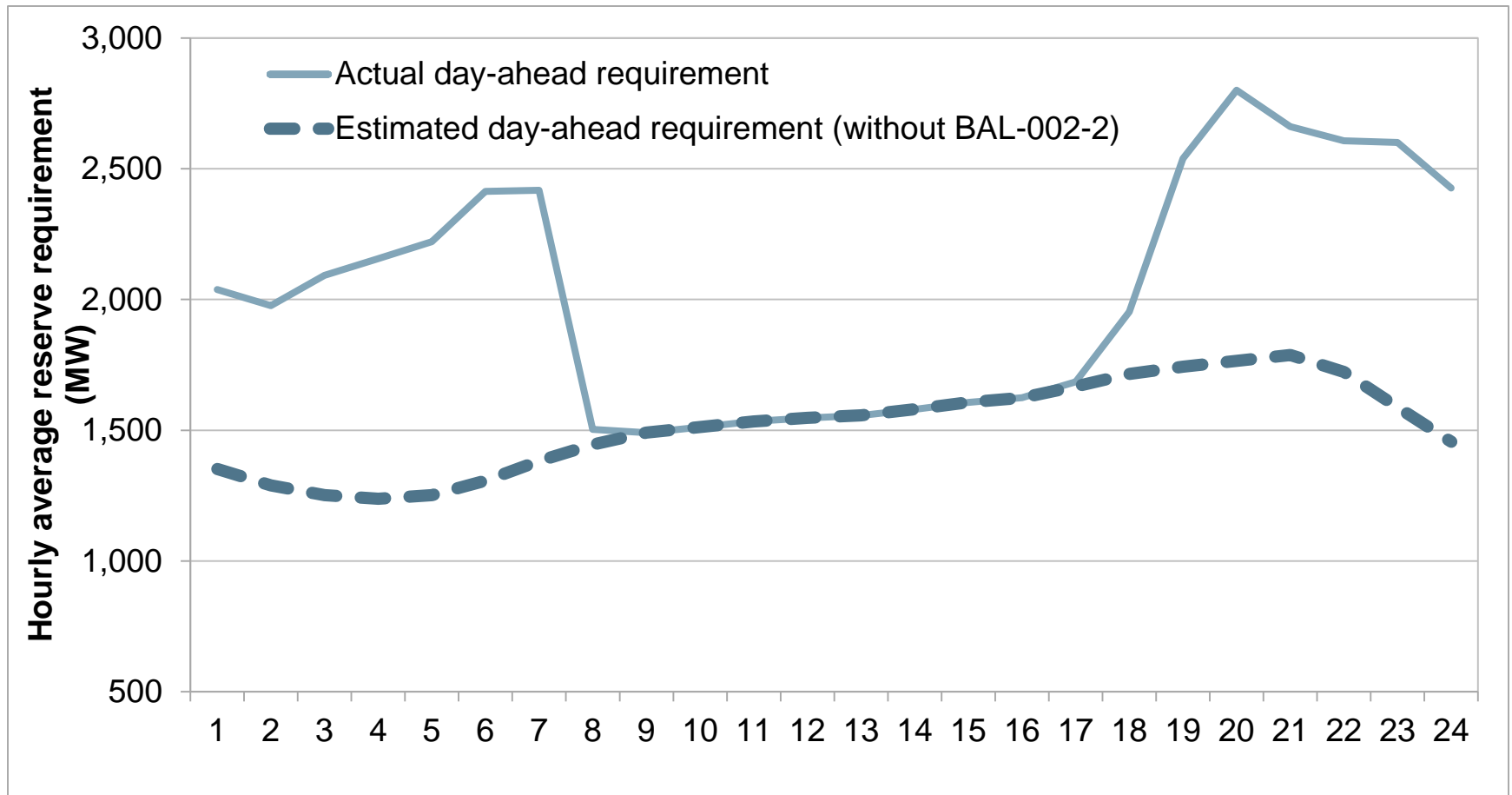
# Impact of congestion on 15-minute prices



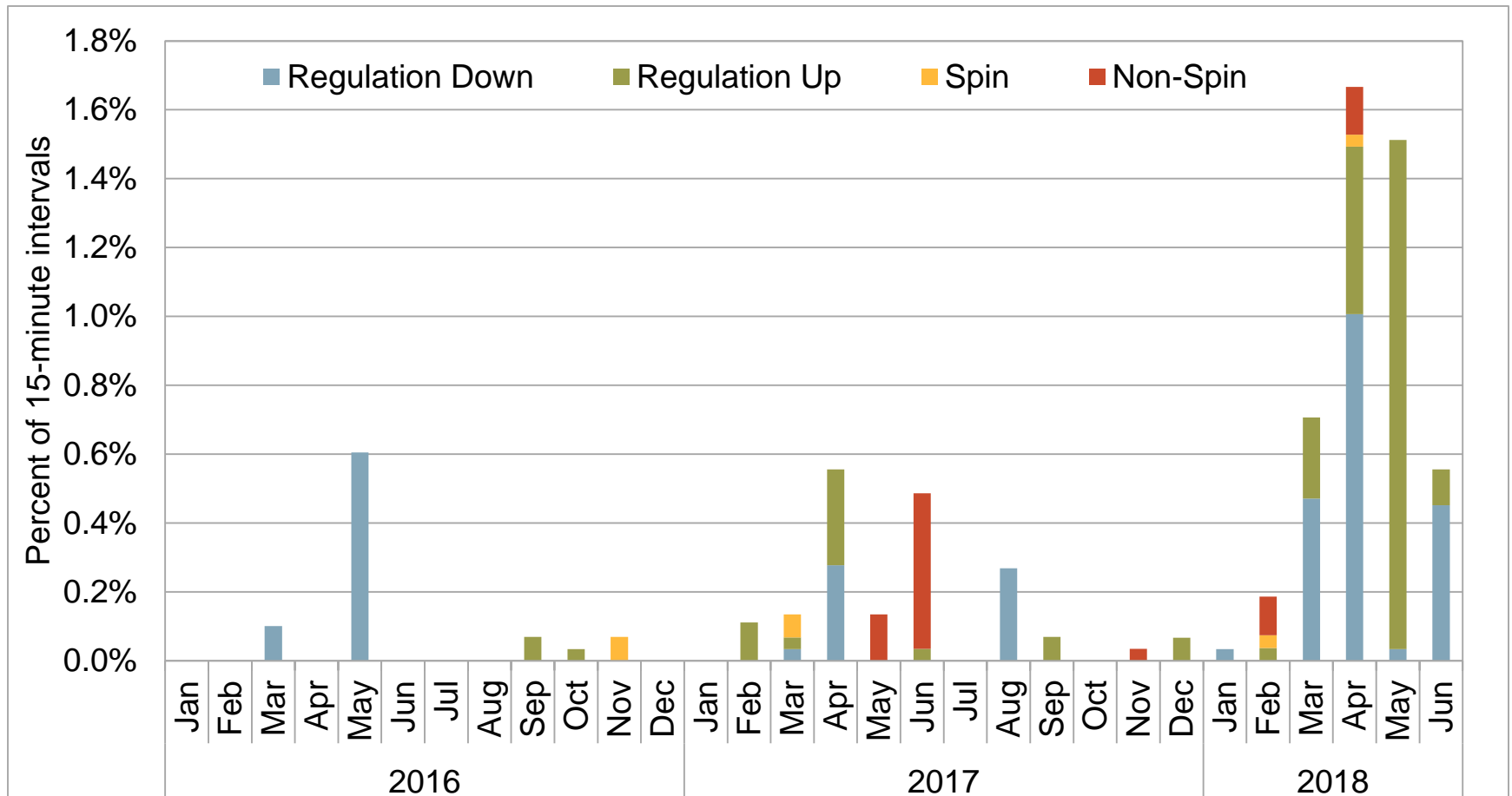
# Impact of congestion on day-ahead prices



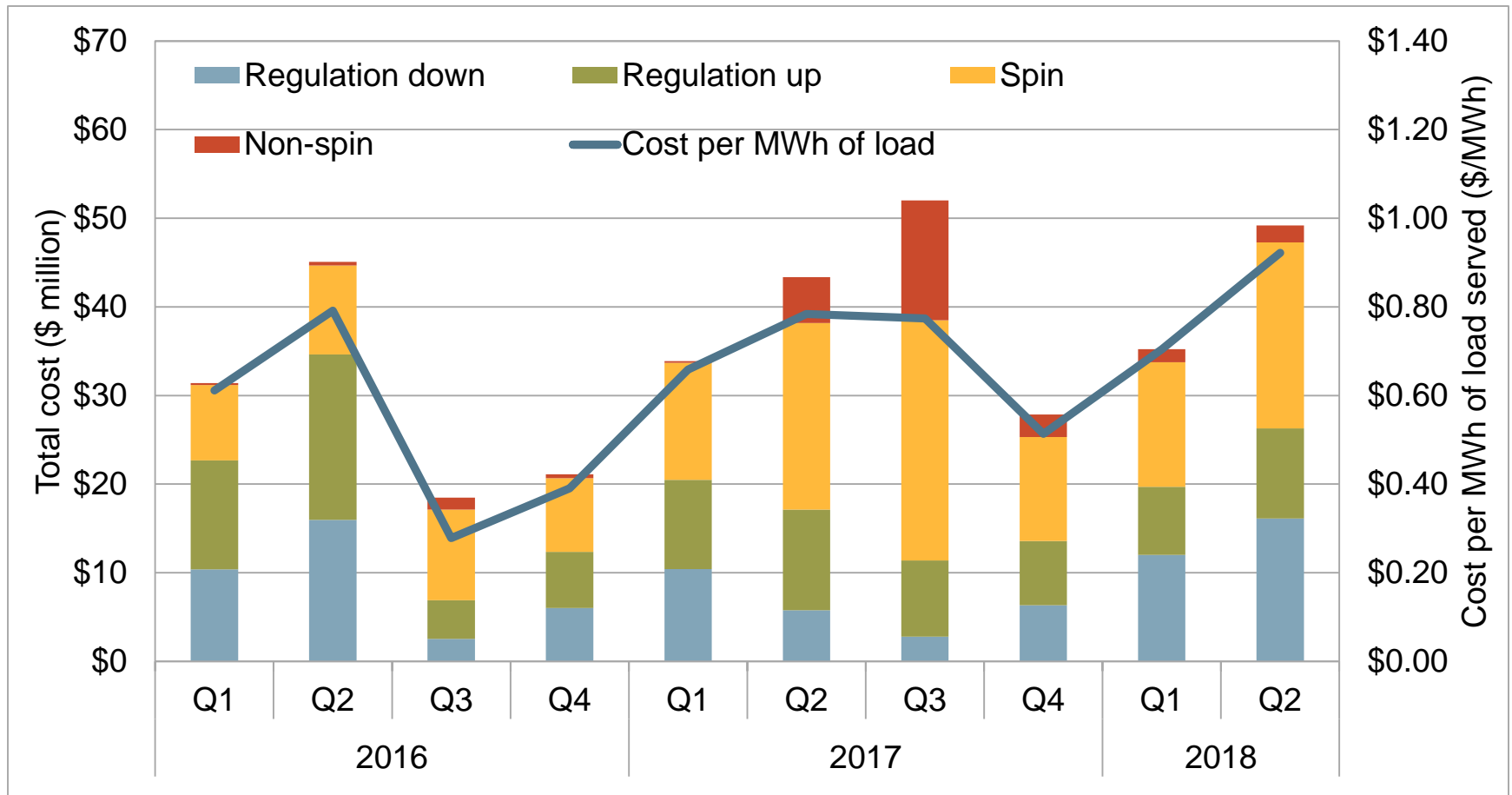
# Hourly average operating reserve requirement (Q2)



# Frequency of ancillary service scarcities (15-minute market)

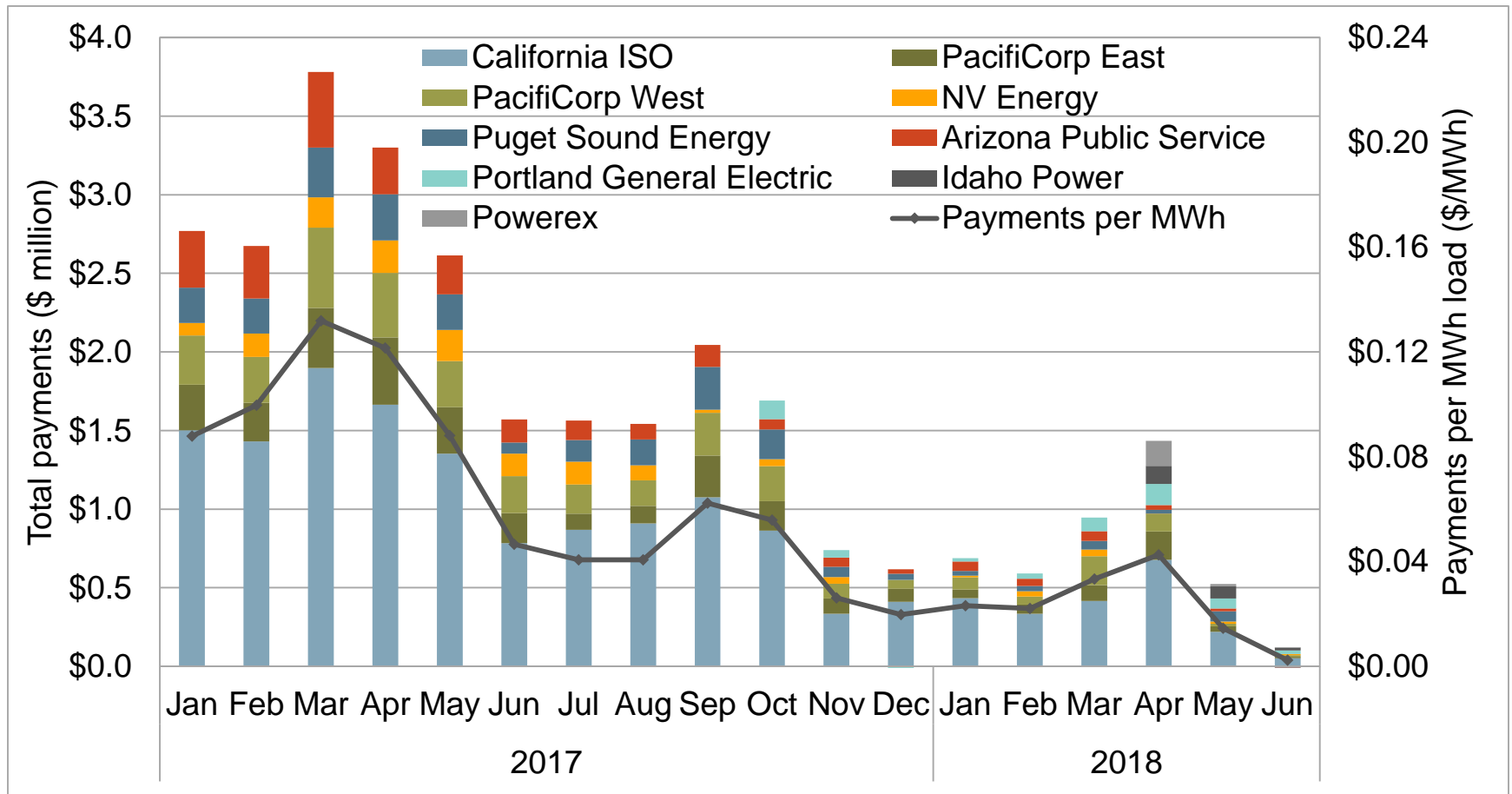


# Ancillary service cost by product

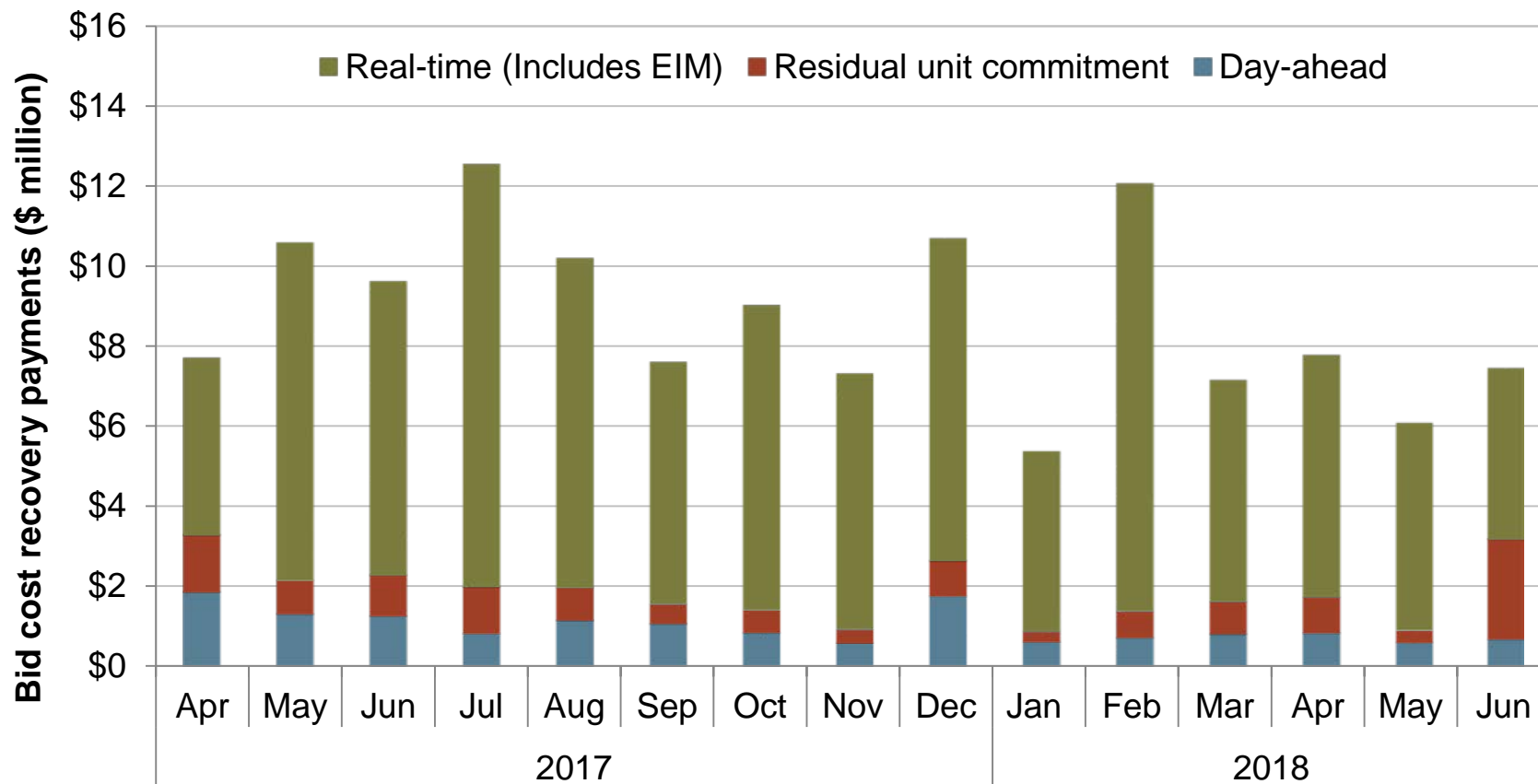




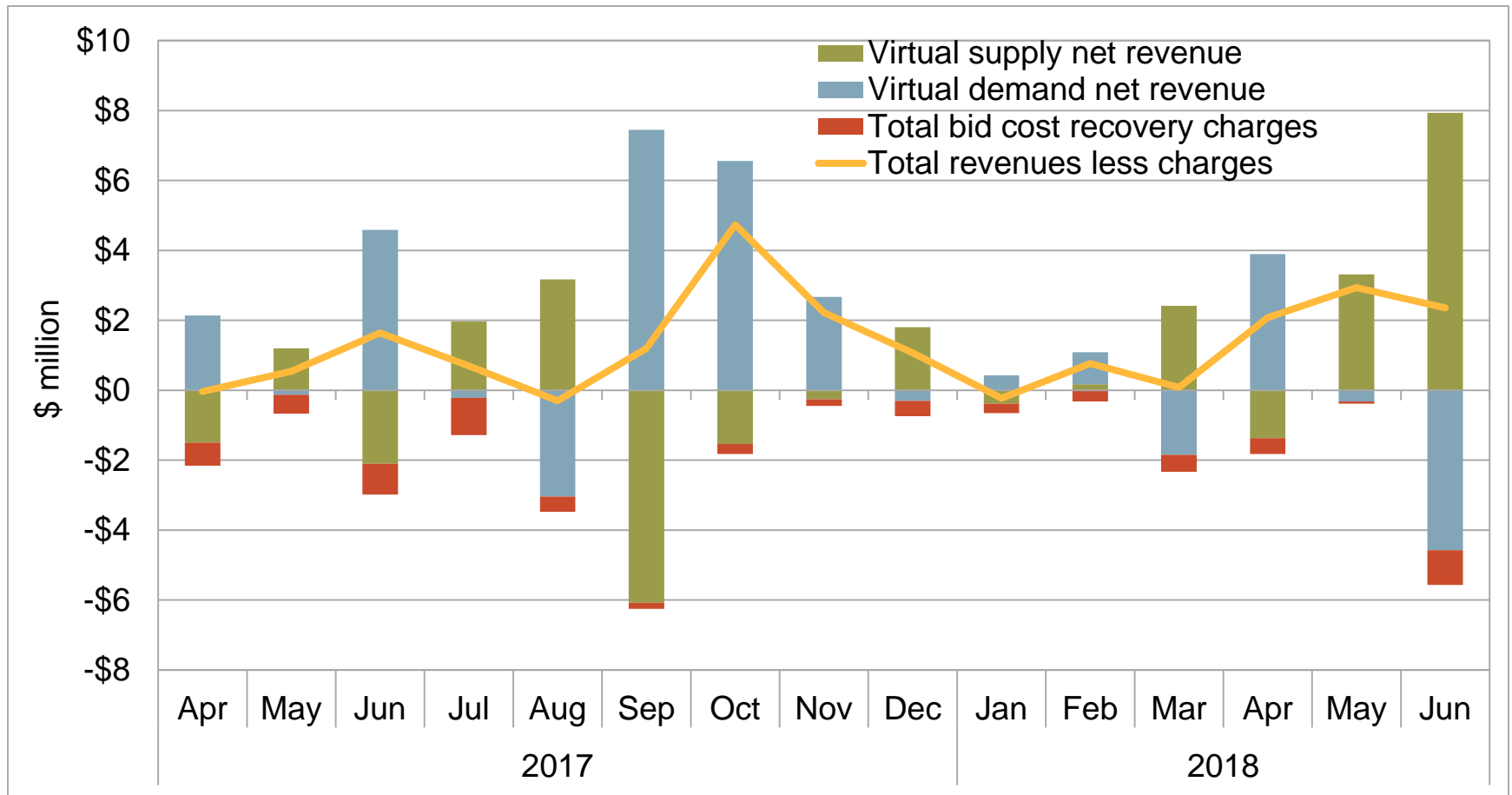
# Monthly flexible ramping payments by balancing area



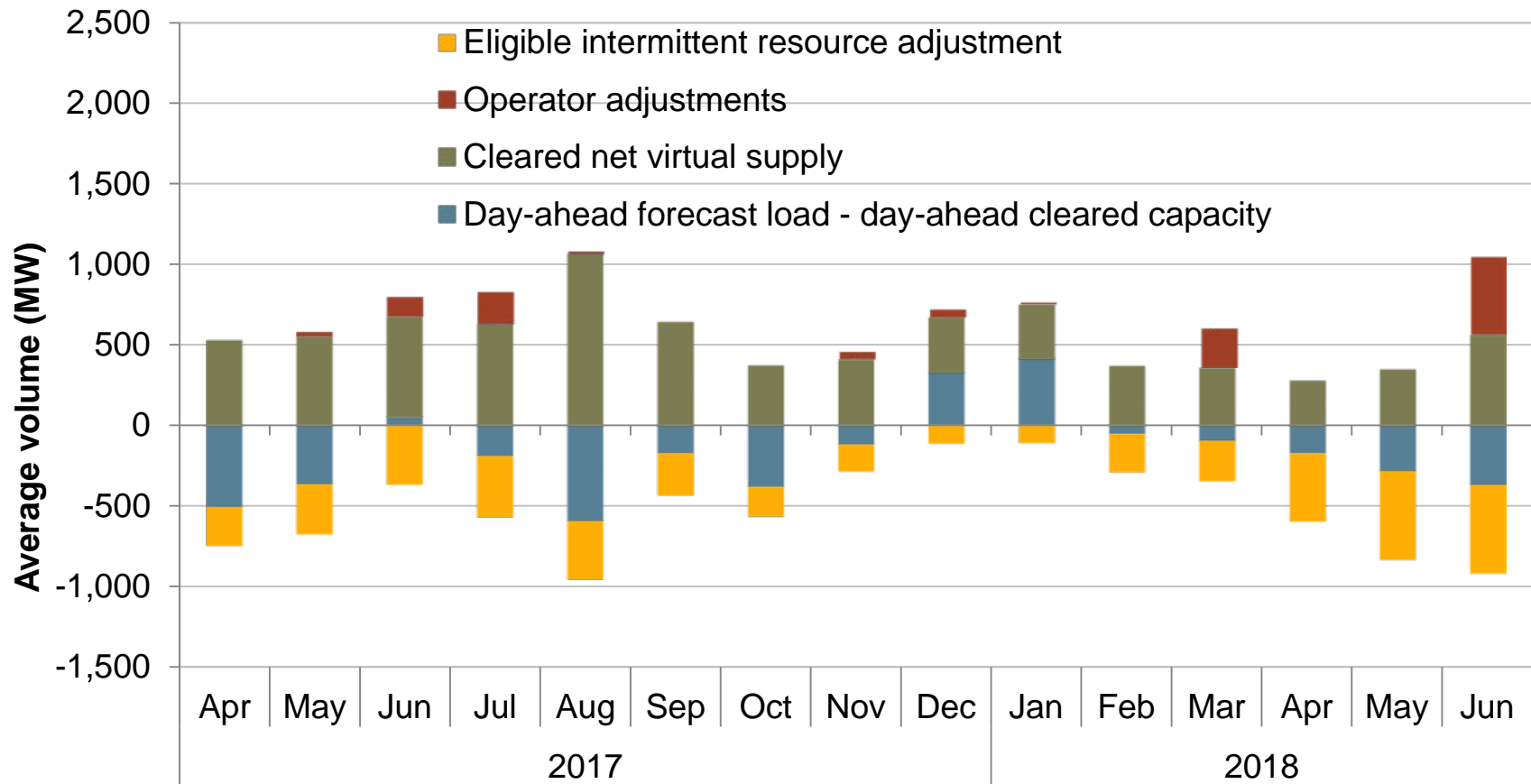
# Monthly bid cost recovery payments, Q2 = \$21 million.



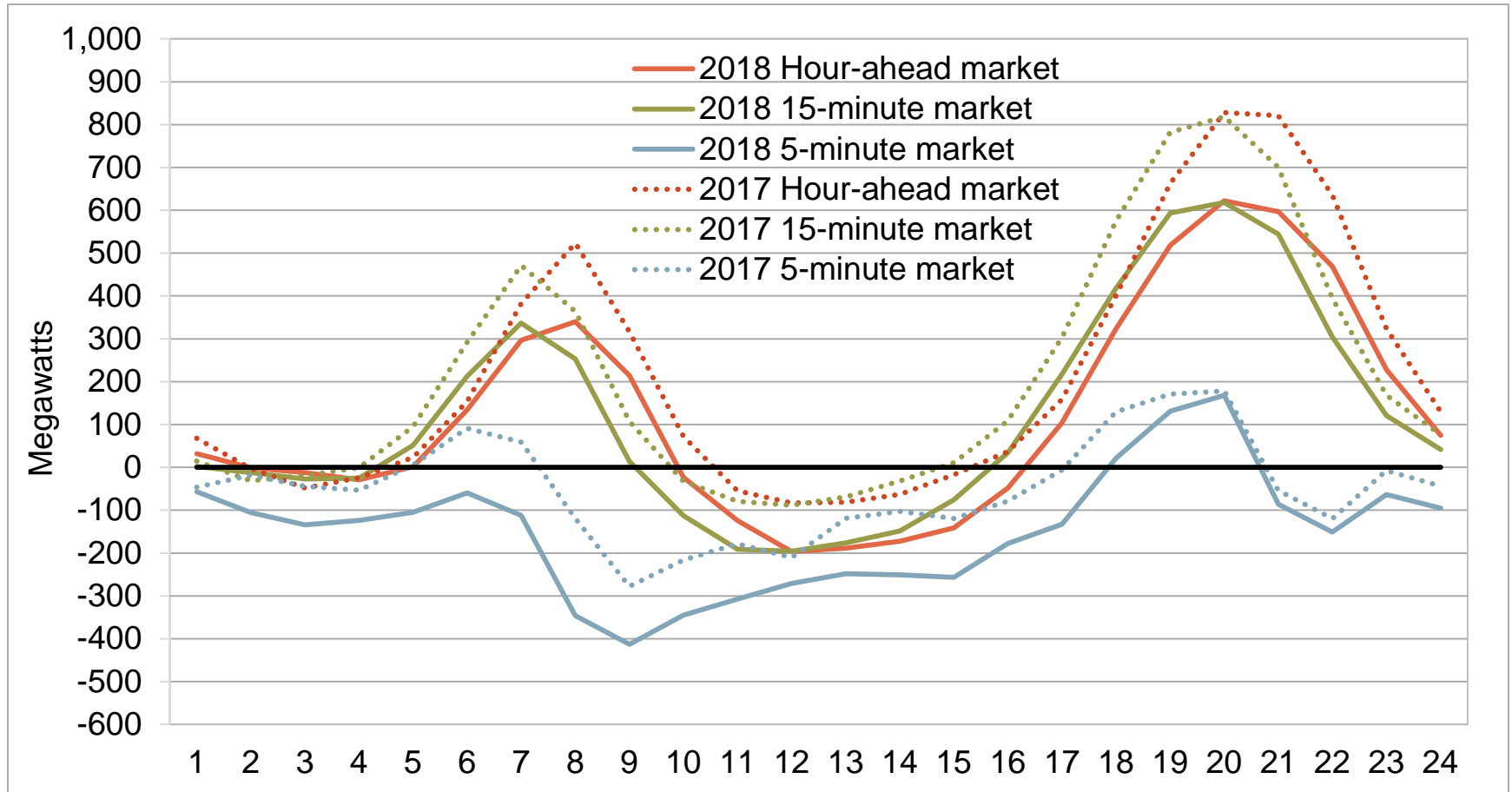
# Convergence bidding volumes and revenues by participant type, total revenue \$7.4 million



# Determinants of residual unit commitment procurement

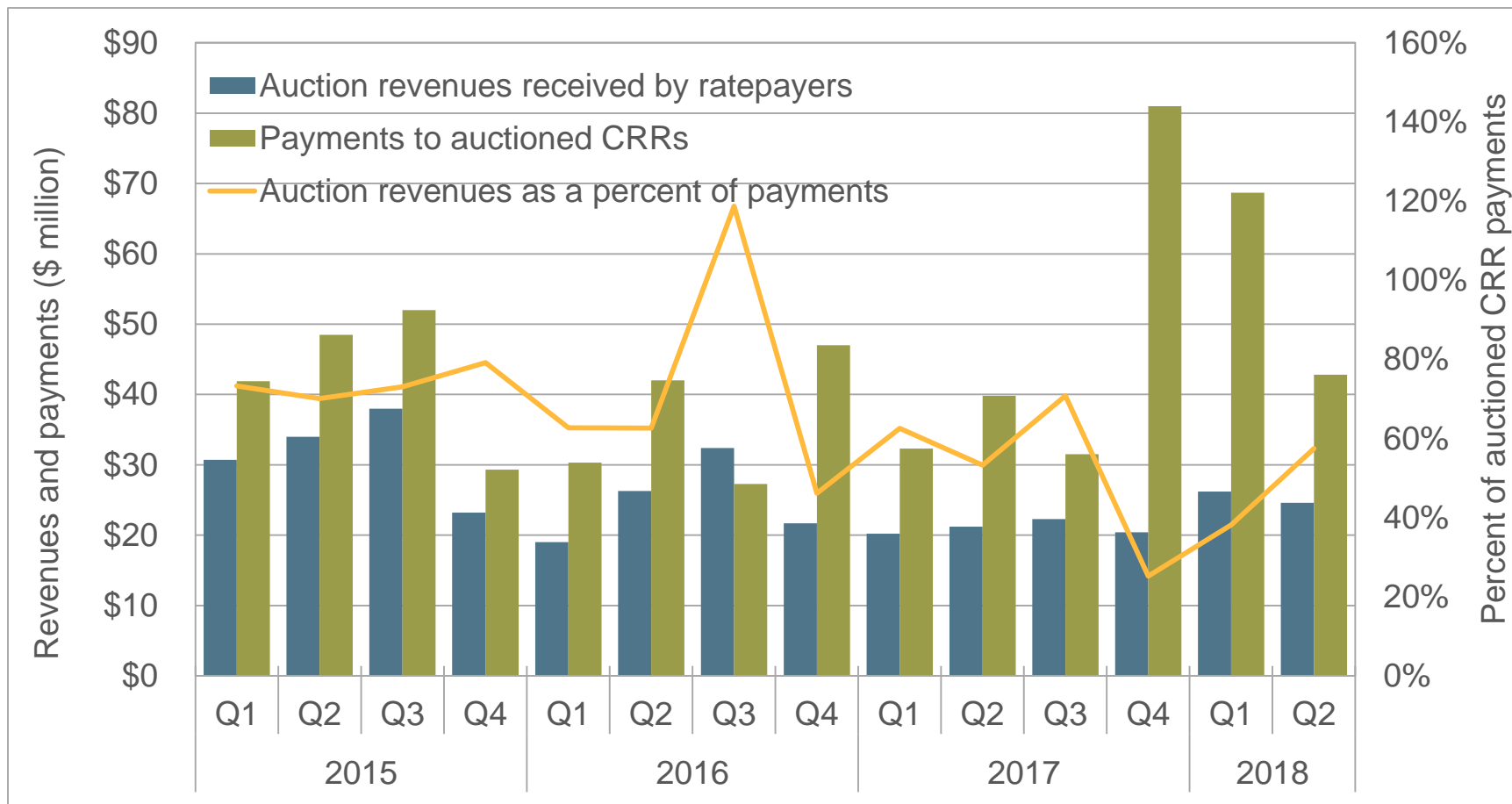


# Average hourly load adjustment (Q2 2018 – Q2 2017)

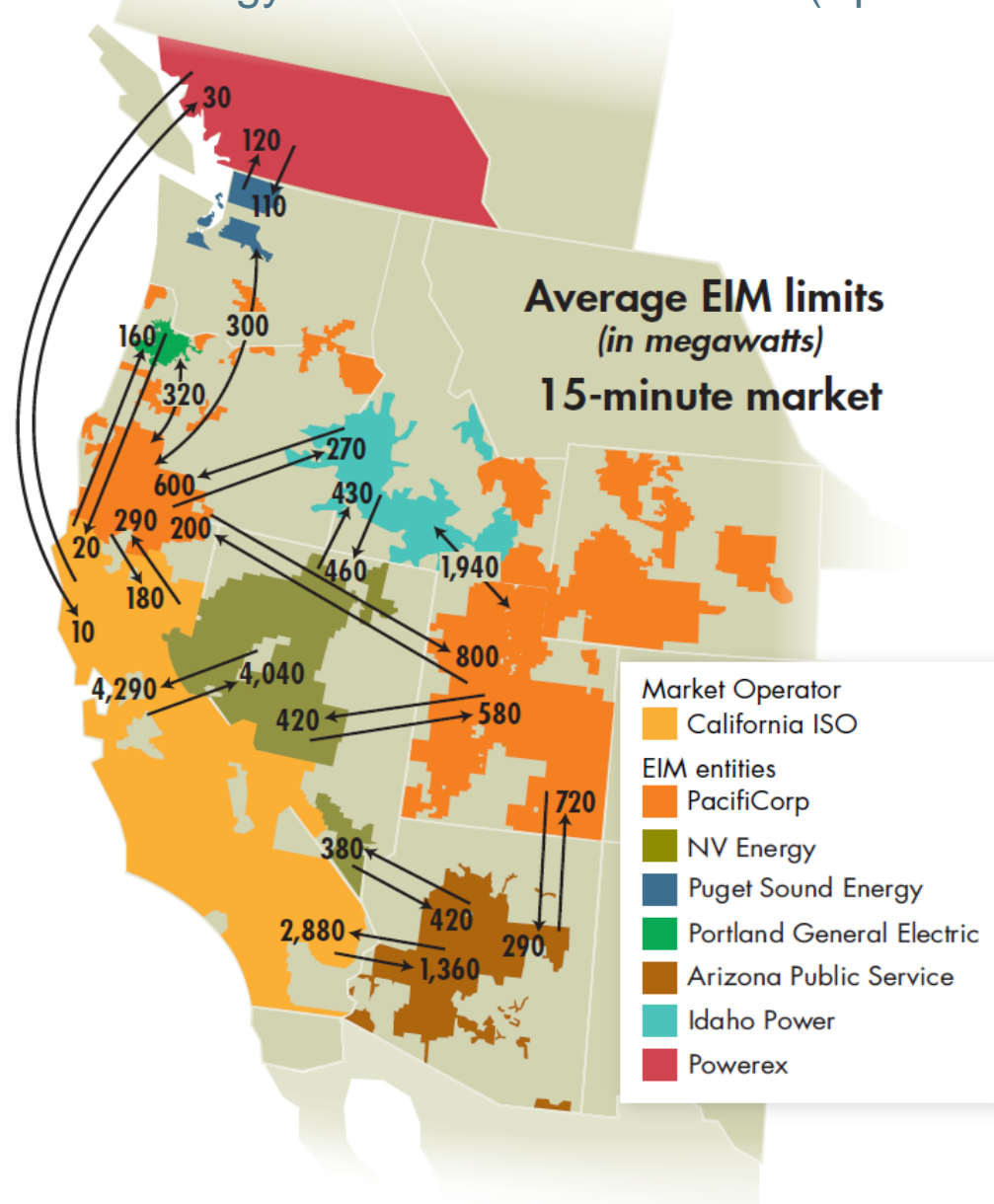


# Auction revenues and payments to non-load-serving entities

Q2 payments \$18 million over cost in auction, for \$61 million in first half CRR auction reform measures passed by Board



# Average 15-minute market energy imbalance market limits (April 4 – June 30)

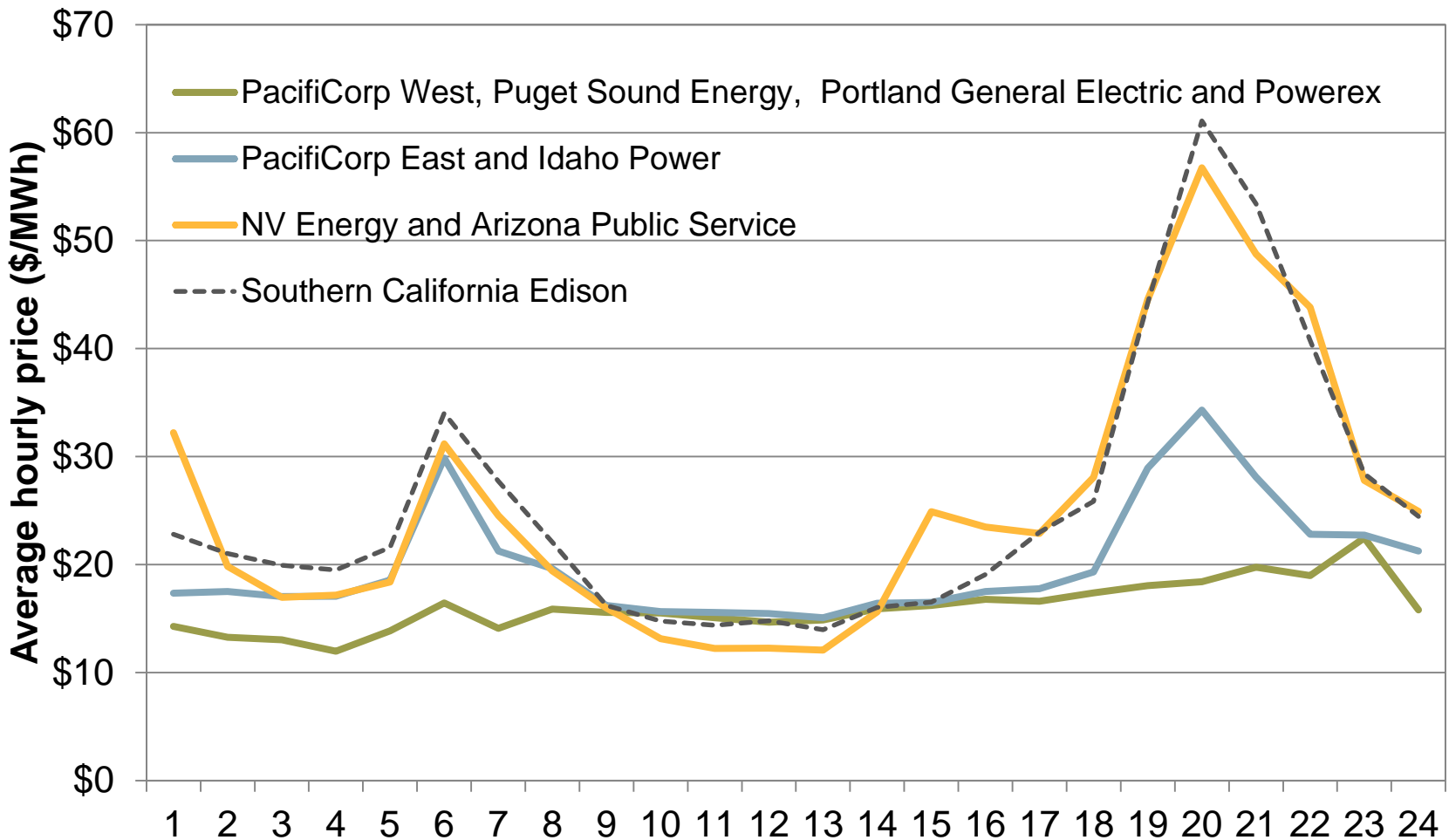


# Frequency of congestion in the energy imbalance market (April 4 – June 30)

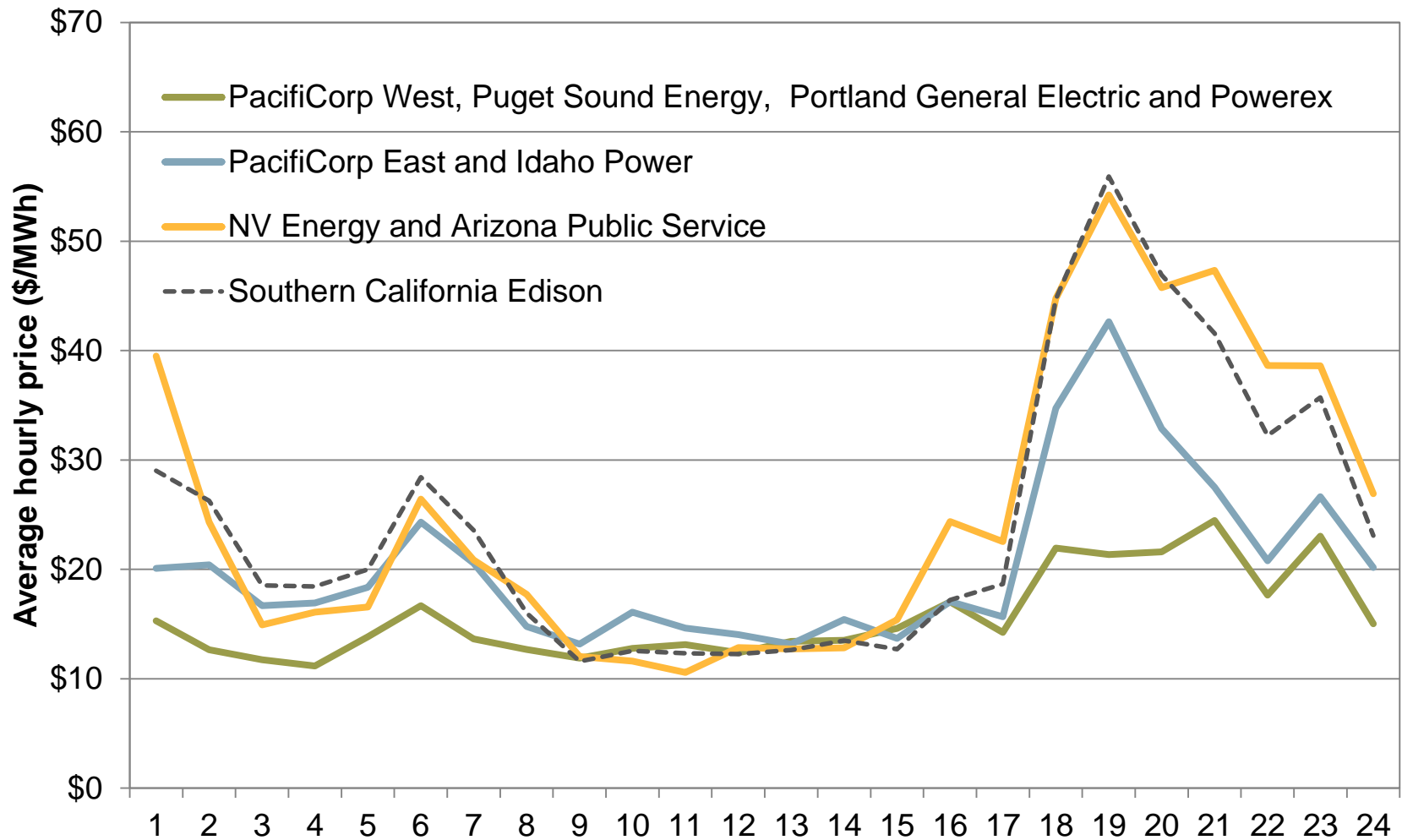
	15-minute market		5-minute market	
	Congested toward ISO	Congested from ISO	Congested toward ISO	Congested from ISO
NV Energy	2%	2%	2%	2%
Arizona Public Service	2%	4%	1%	5%
PacifiCorp East	8%	6%	4%	8%
Idaho Power	9%	8%	5%	10%
PacifiCorp West	32%	5%	27%	11%
Portland General Electric	34%	5%	29%	11%
Puget Sound Energy	34%	7%	29%	11%
Powerex	39%	28%	26%	22%



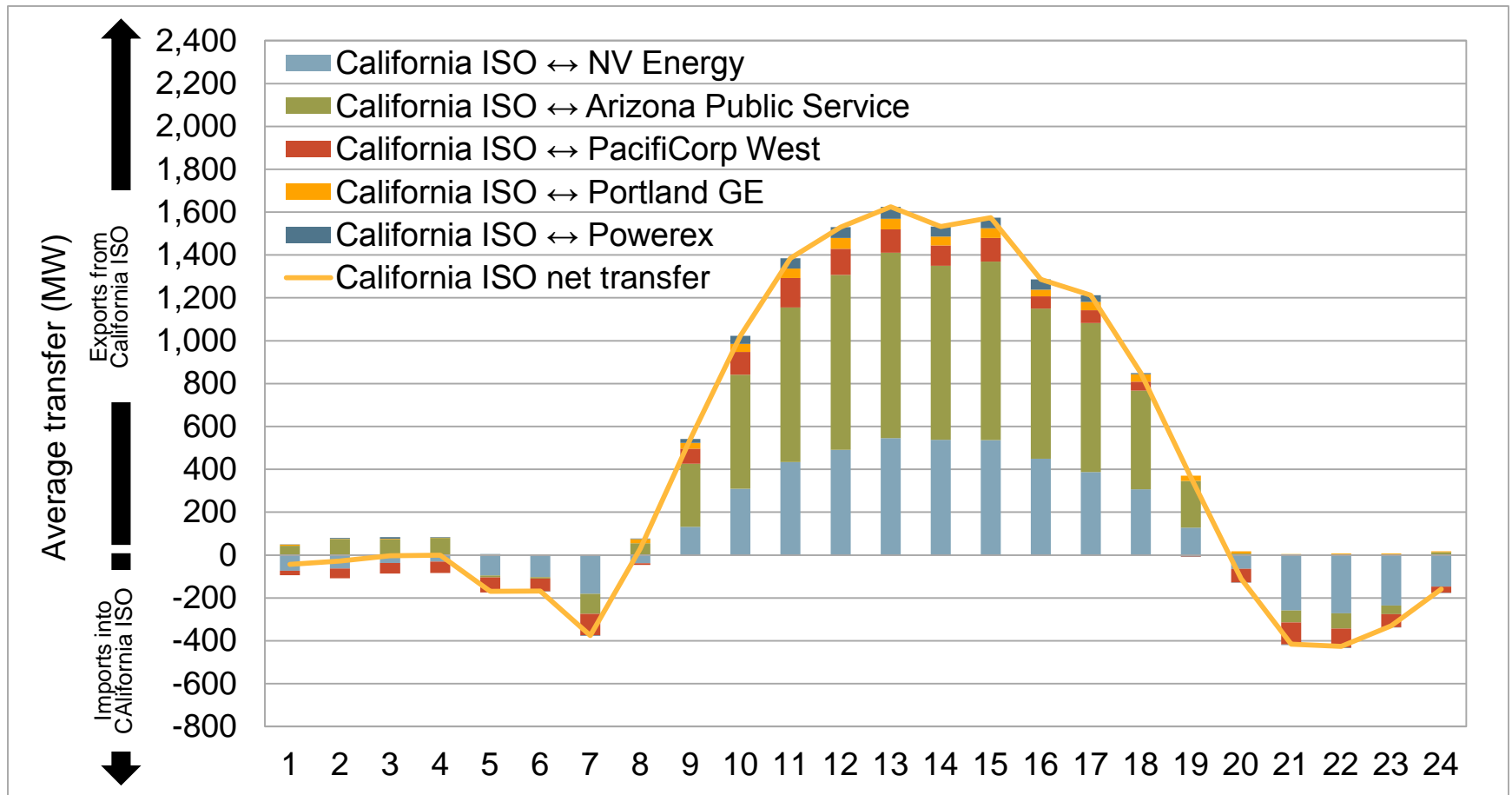
# Hourly 15-minute market prices (April 4 – June 30)



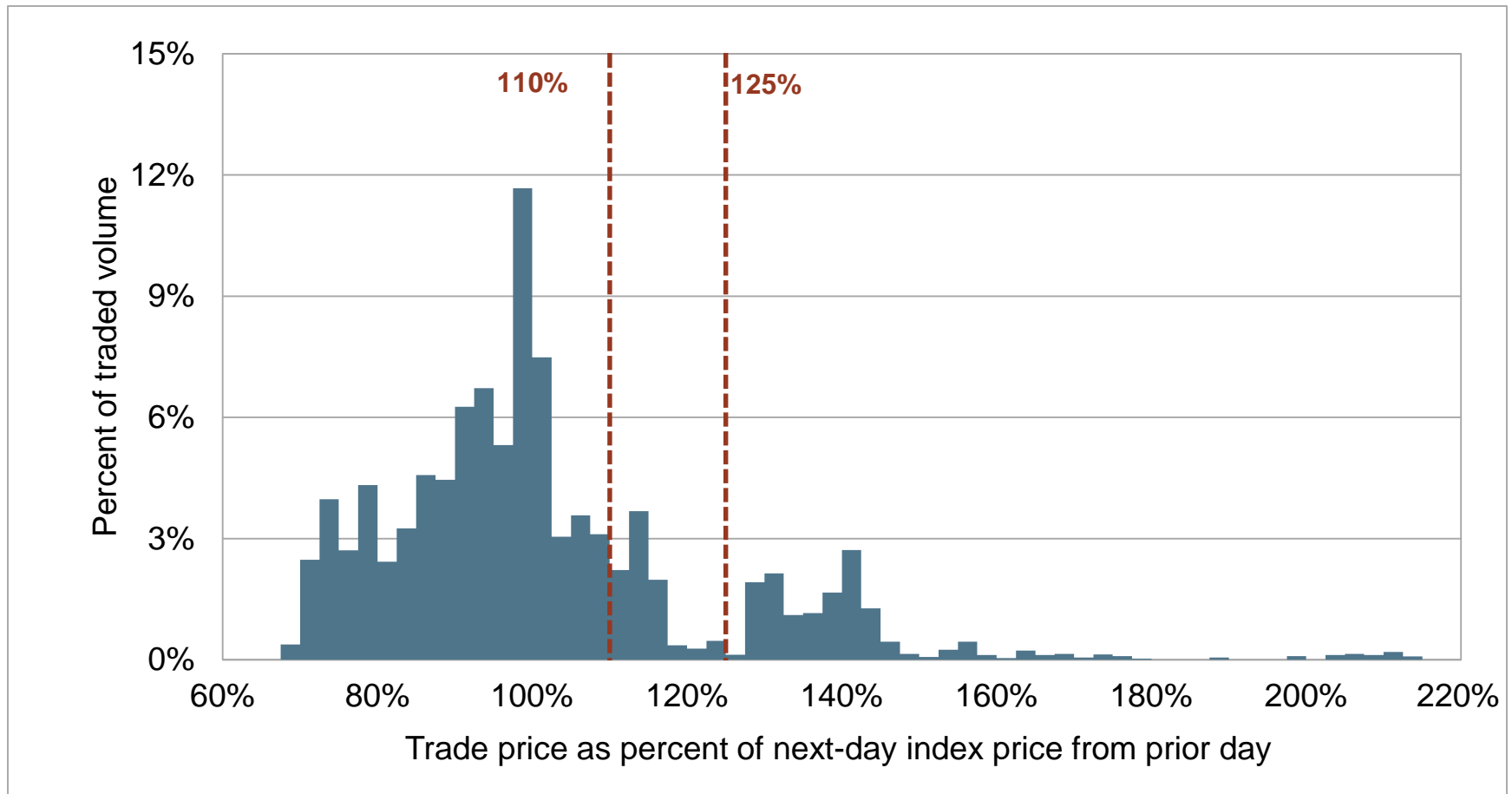
# Hourly 5-minute market prices (April 4 – June 30)



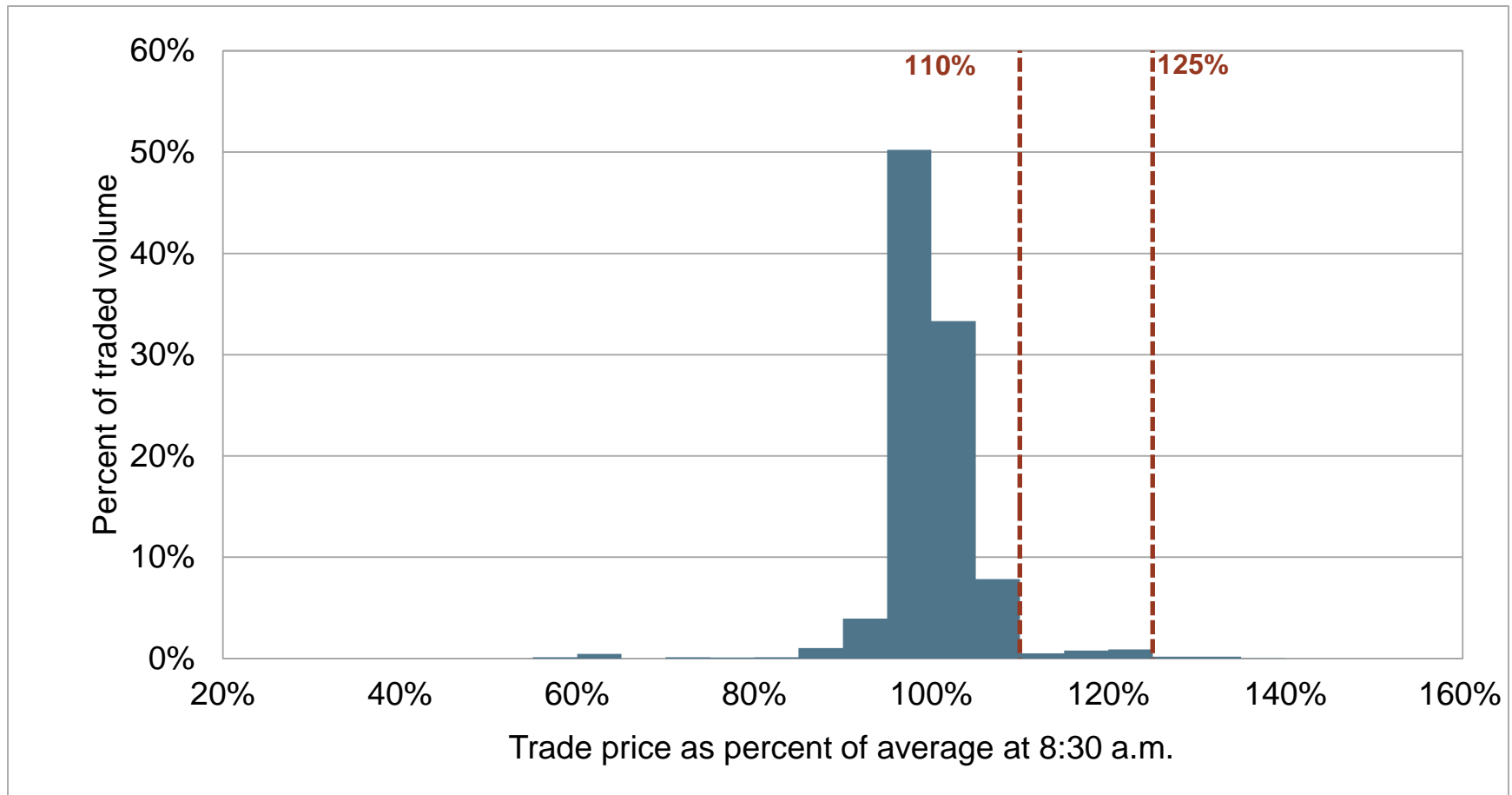
# California ISO – average hourly 15-minute market transfer (April 4 – June 30)



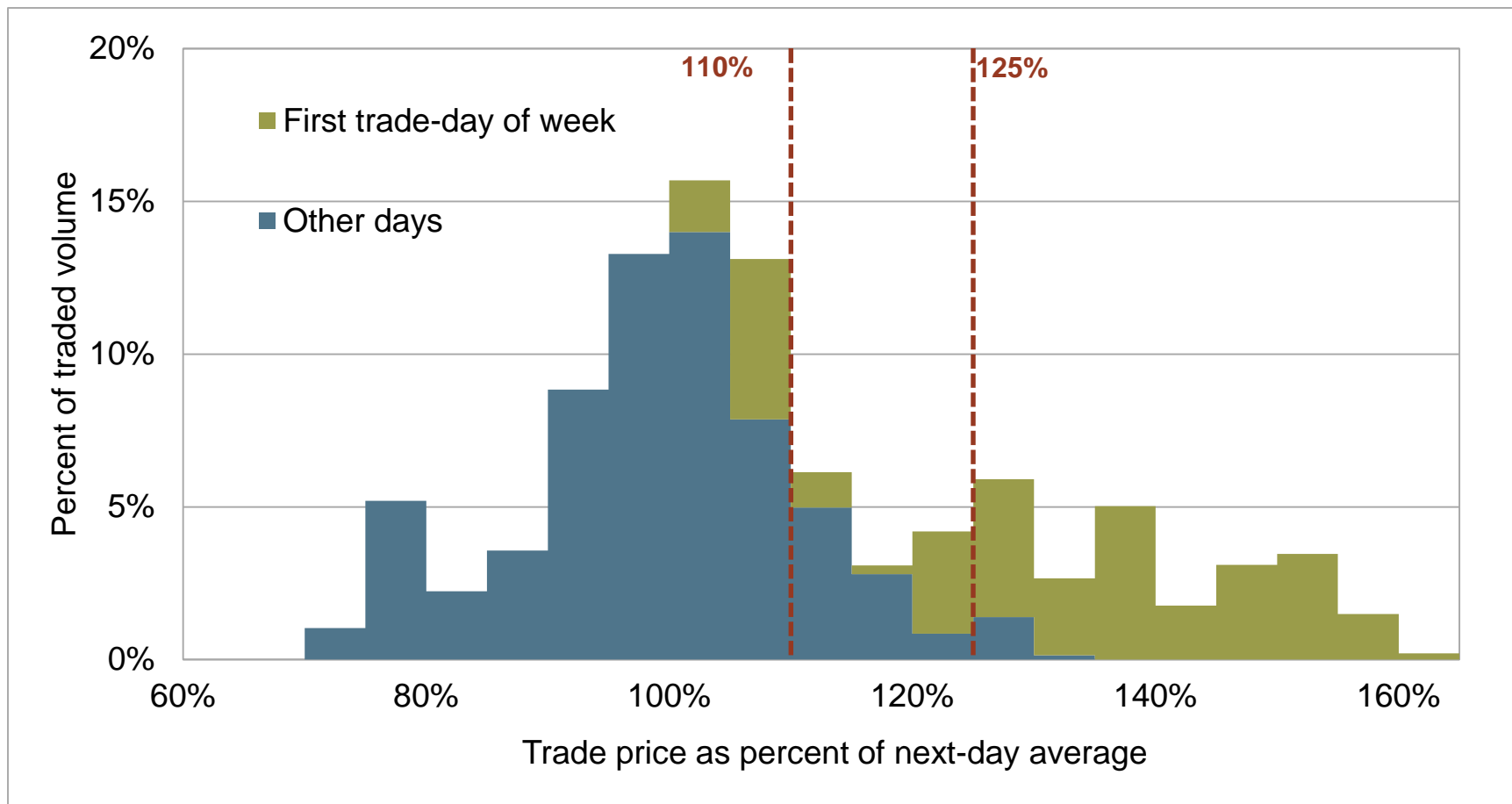
# Next-day trade prices compared to next-day index from prior day (April - June)



# Next-day trade prices compared to updated next-day average price (Q2)



# Same-day trade prices compared to next-day index (April – June)



# Same-day prices as a percent of updated same-day averages (April – June)

