

Quarterly Report for Q2 2023: Selected findings

August 15, 2023

Presentation outline

- Scope of this presentation
- Energy market
 - Market power and offer behaviour
 - Carbon emissions
 - Long lead time
- Power system
 - Transmission congestion and pool price formation
 - Wind and solar constrained down generation
- Operating reserve markets
- Forward market
- Retail market
- Micro-generation update

Scope of this presentation

- This presentation provides a selection of findings contained in the MSA's Quarterly Report for Q2 2023
 - Only selected figures are included here
 - Readers are referred to the Quarterly Report itself for discussion of the figures
- All content in this presentation was copied directly from the Quarterly Report and no additional information, including by exclusion of any material, is provided here.

Energy market

Figure 1: Average pool price and spark spread by month (January 2018 to June 2023)

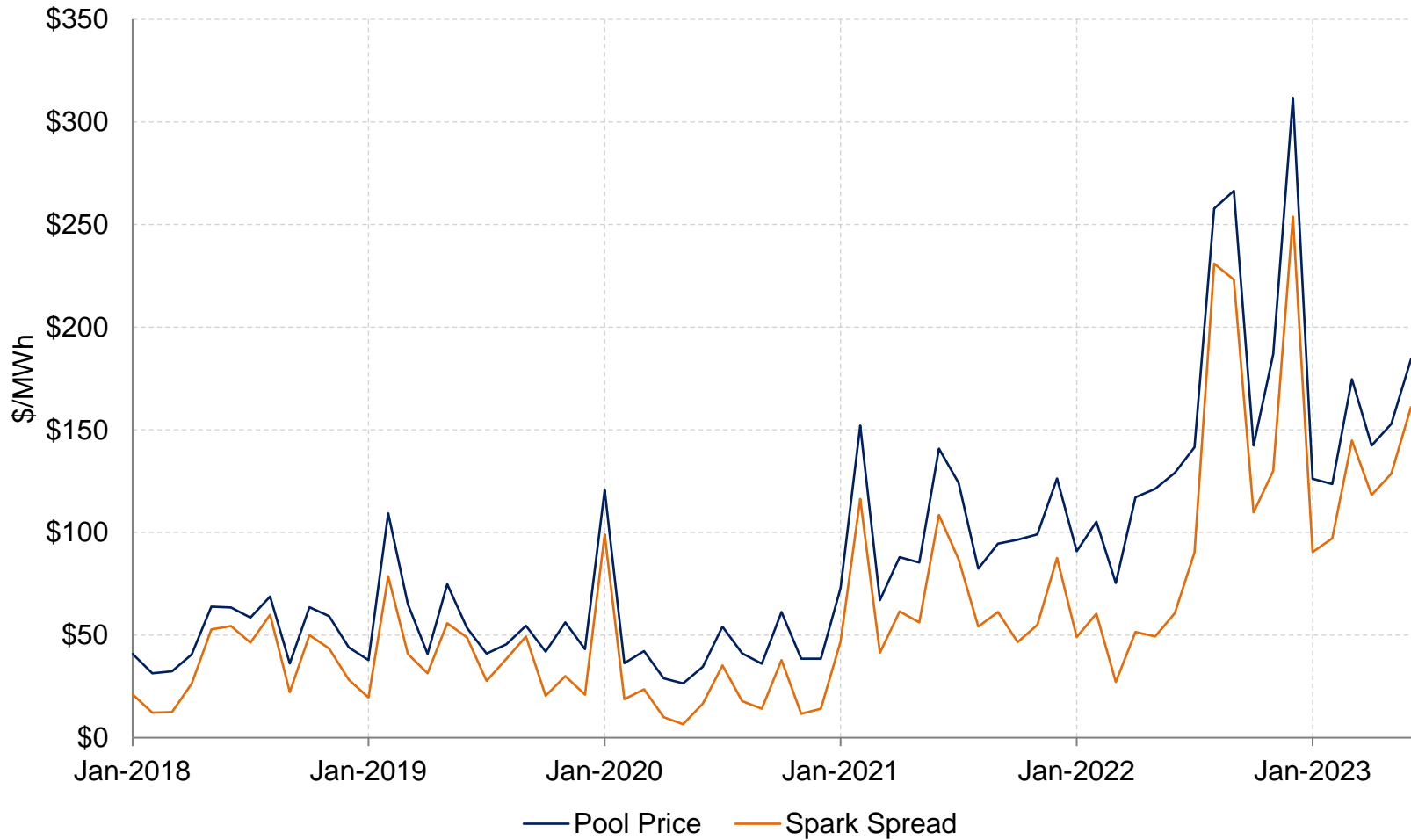


Figure 3: Coal and converted coal capacity that was commercially offline by day and company (April 1 to June 30, 2023)

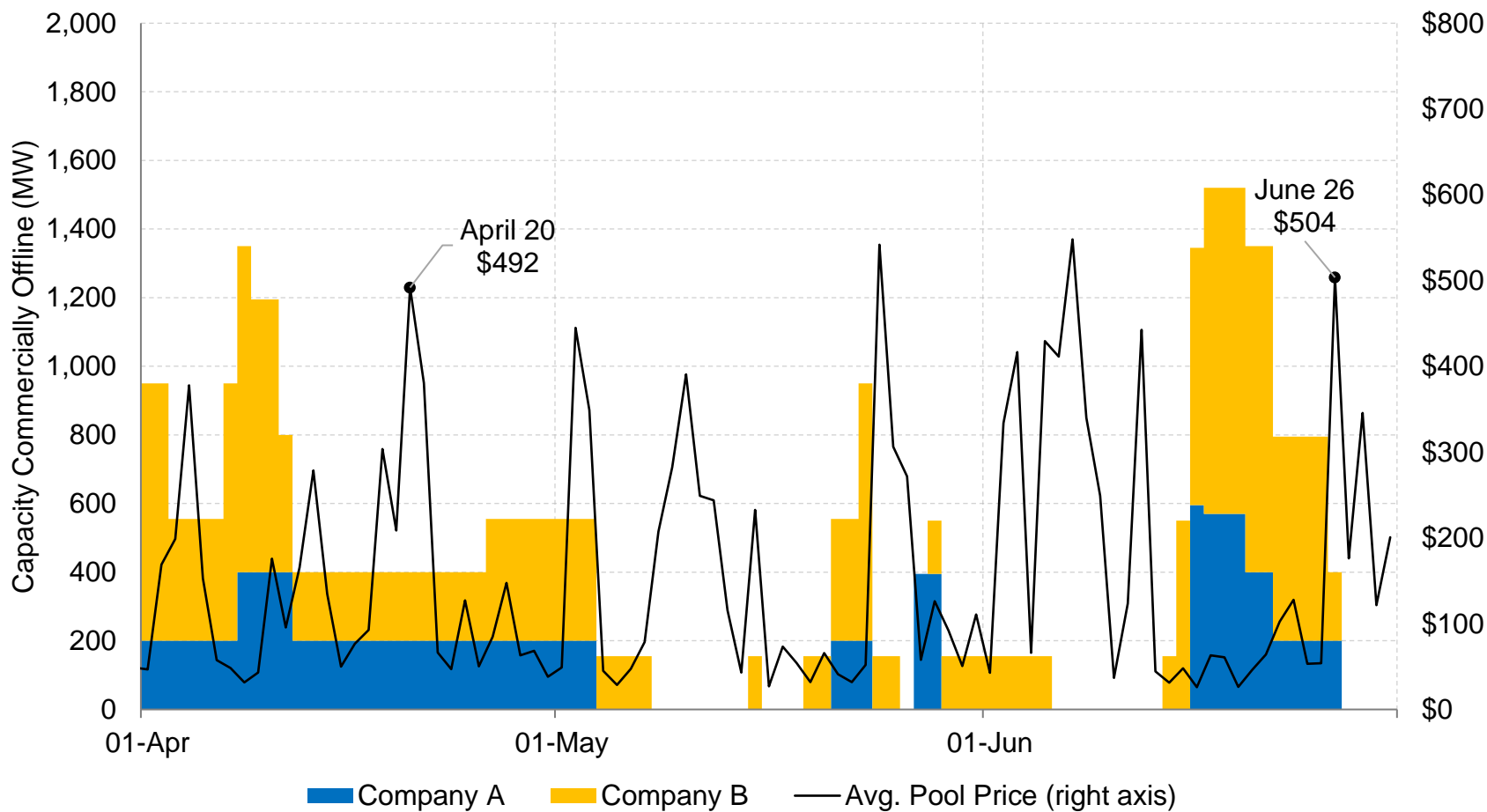


Figure 6: Average net imports and import ATC on BC/MATL by month, for hours when pool price was greater than \$250/MWh (January 2022 to June 2023)

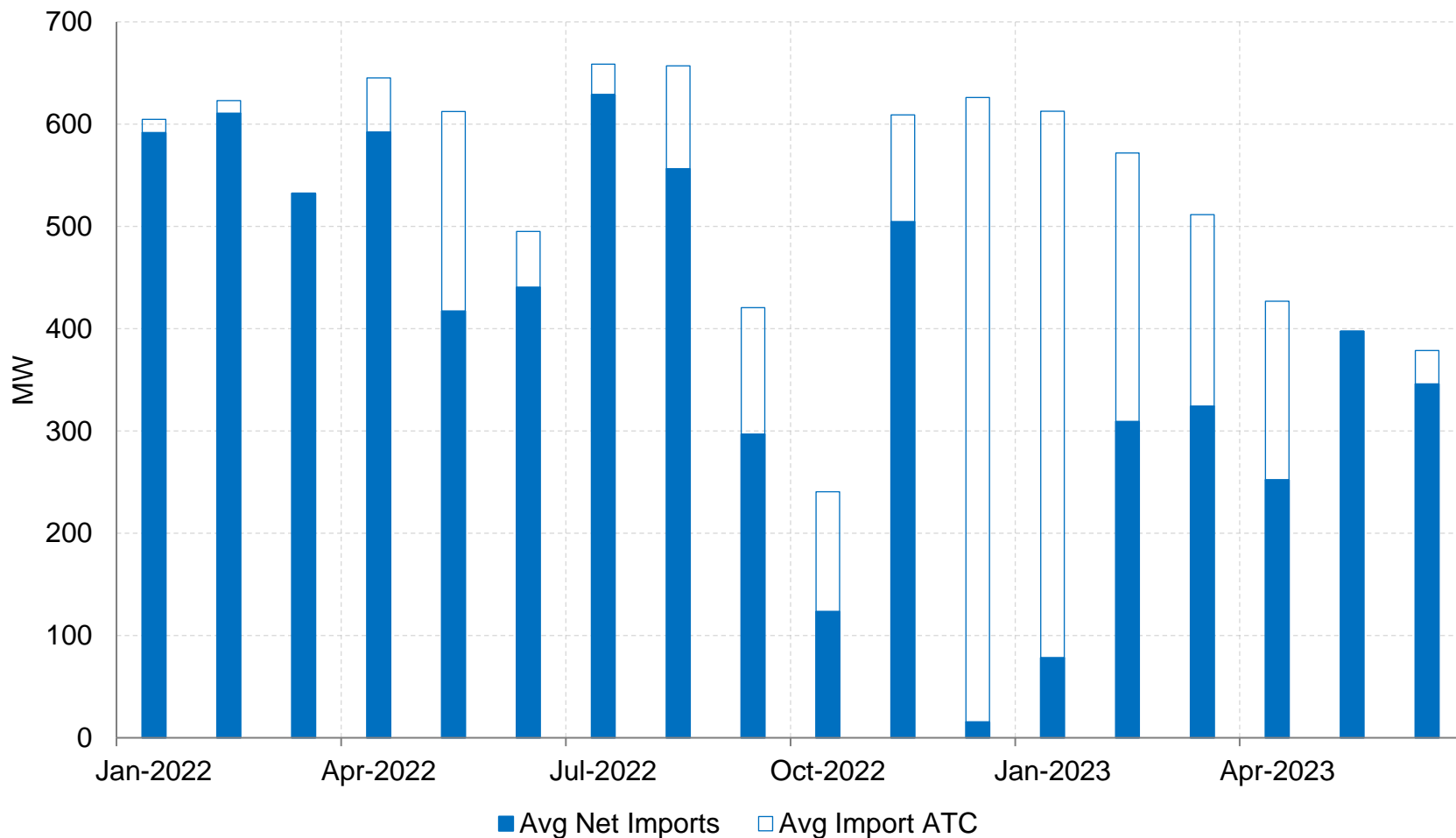


Figure 8: The number of minutes SMP was at the price floor or cap by month (January 2018 to June 2023)

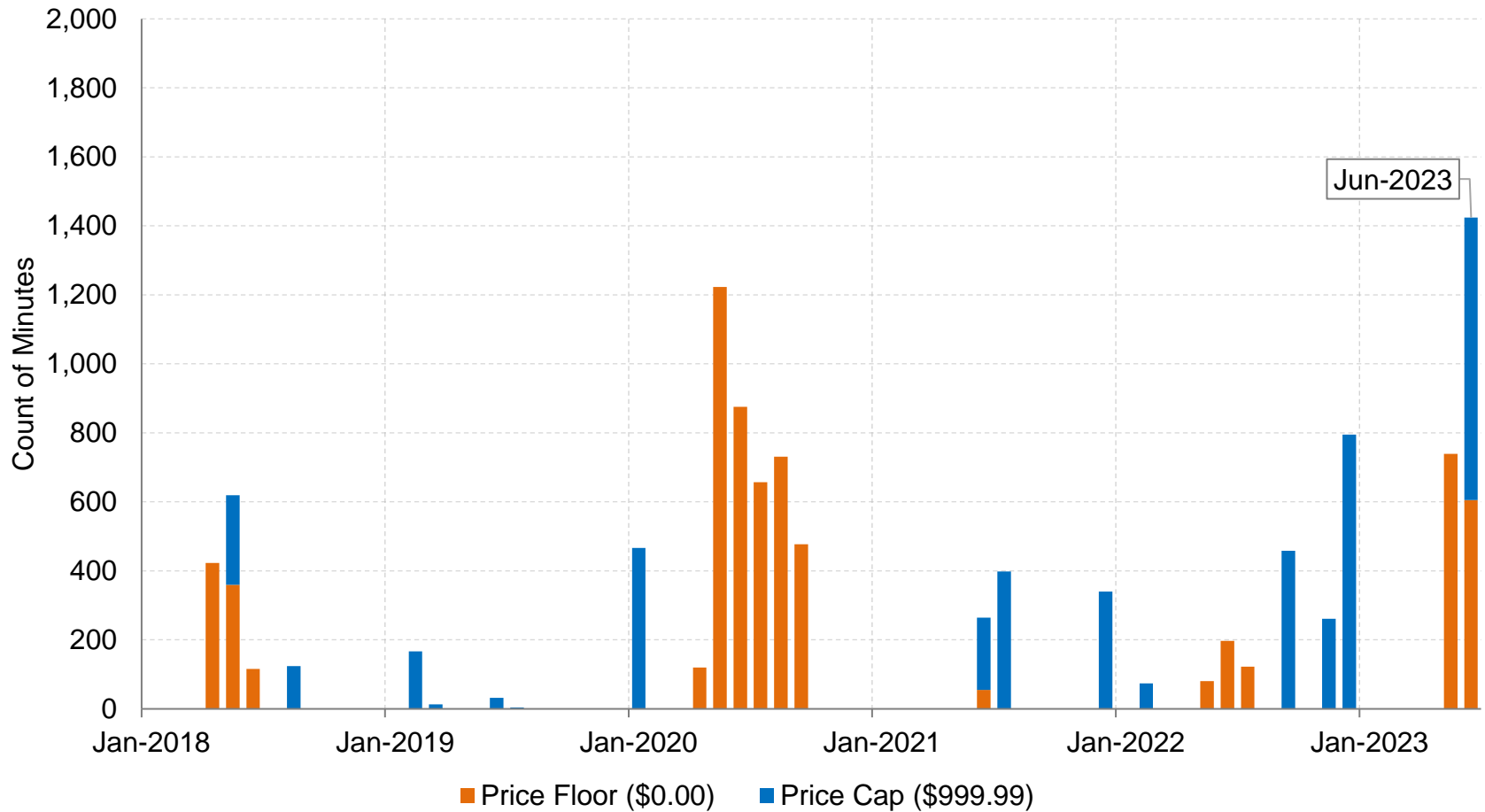


Figure 9: System demand, intermittent generation, net demand, and pool price by hour (June 6 to 13, 2023)

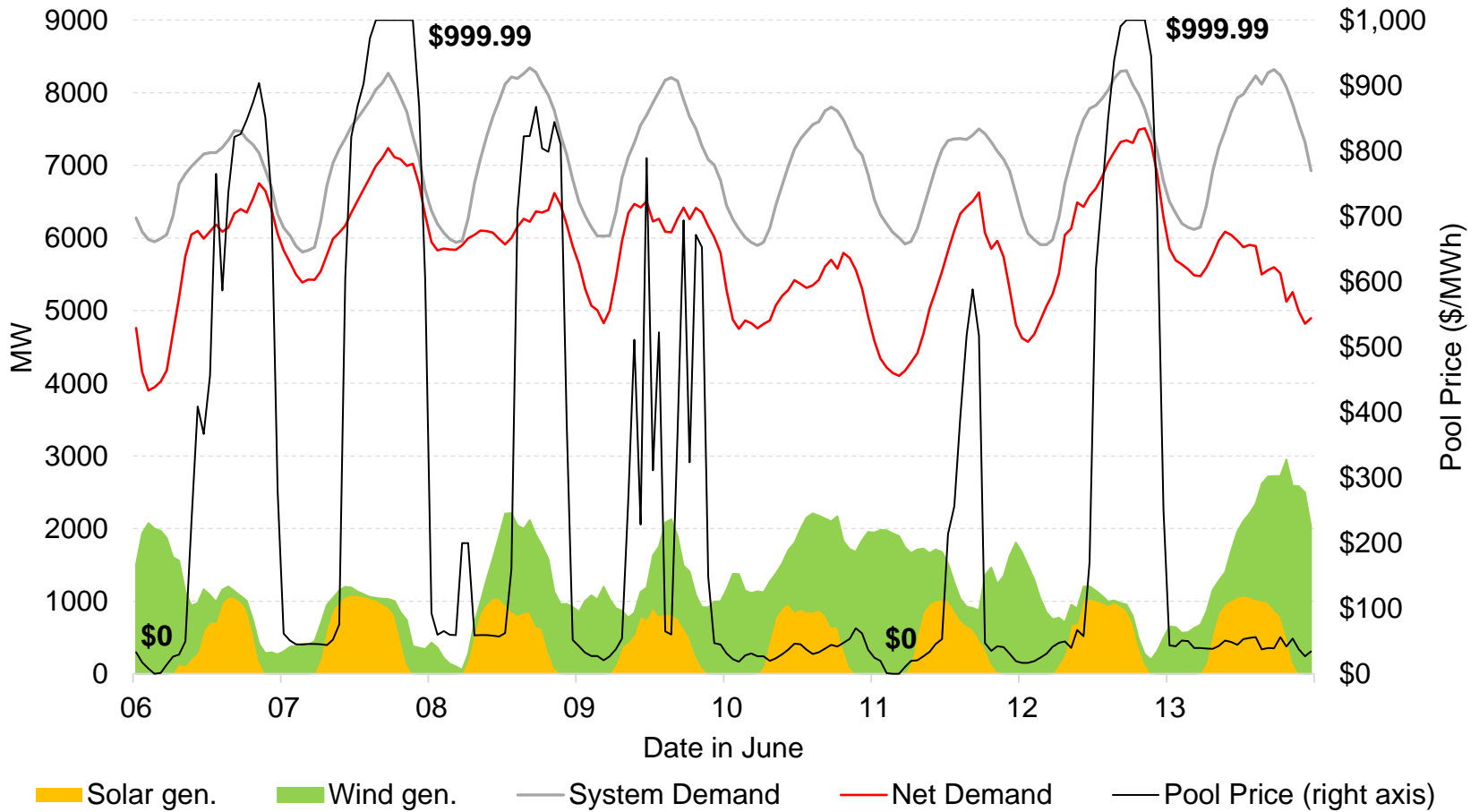
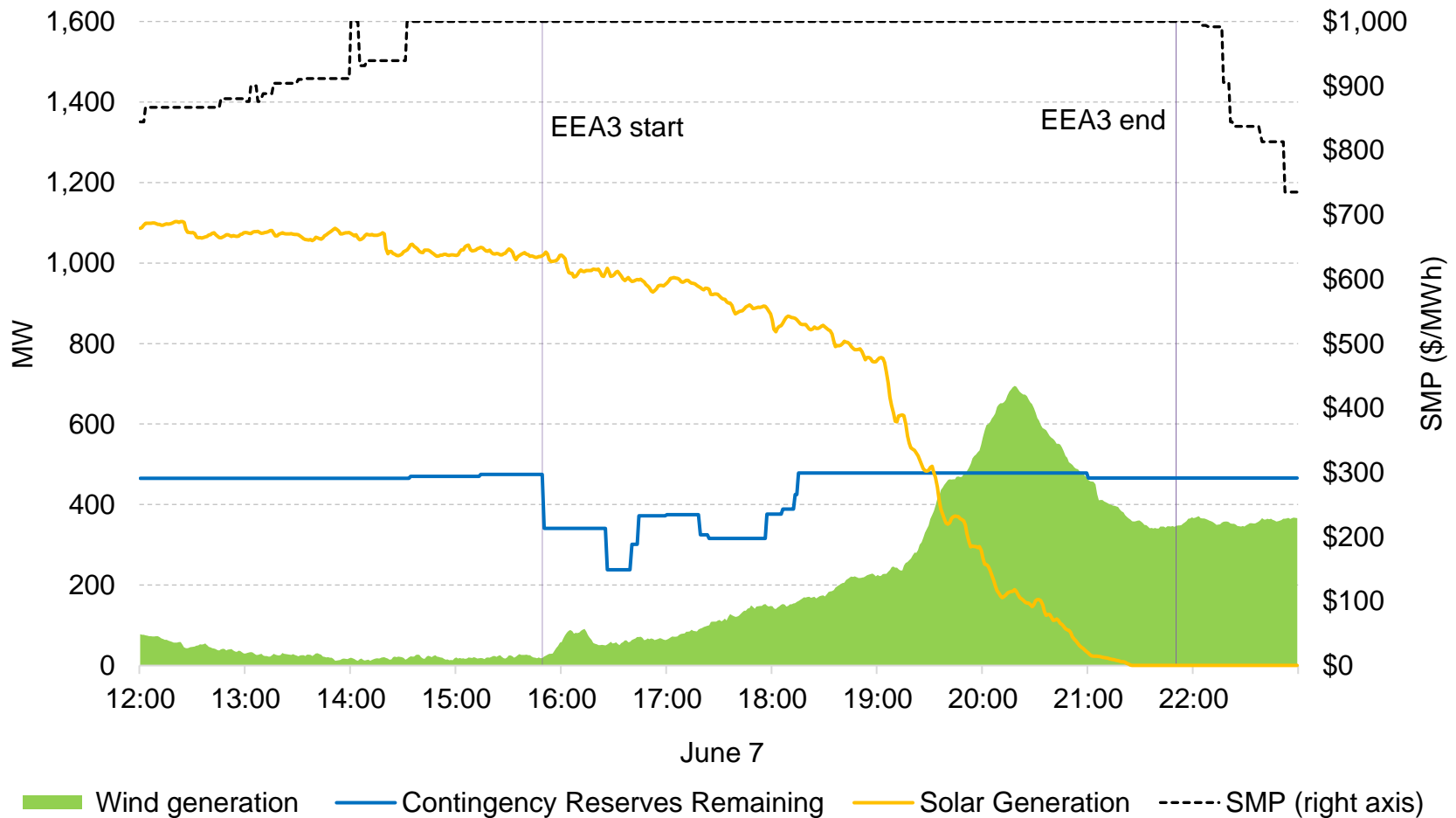


Figure 11: Wind generation, solar generation, and contingency reserves (June 7, 2023)



Market power and offer behaviour

Figure 13: Monthly average static inefficiency (January 2022 to June 2023)

Static Inefficiency (\$/MWh)

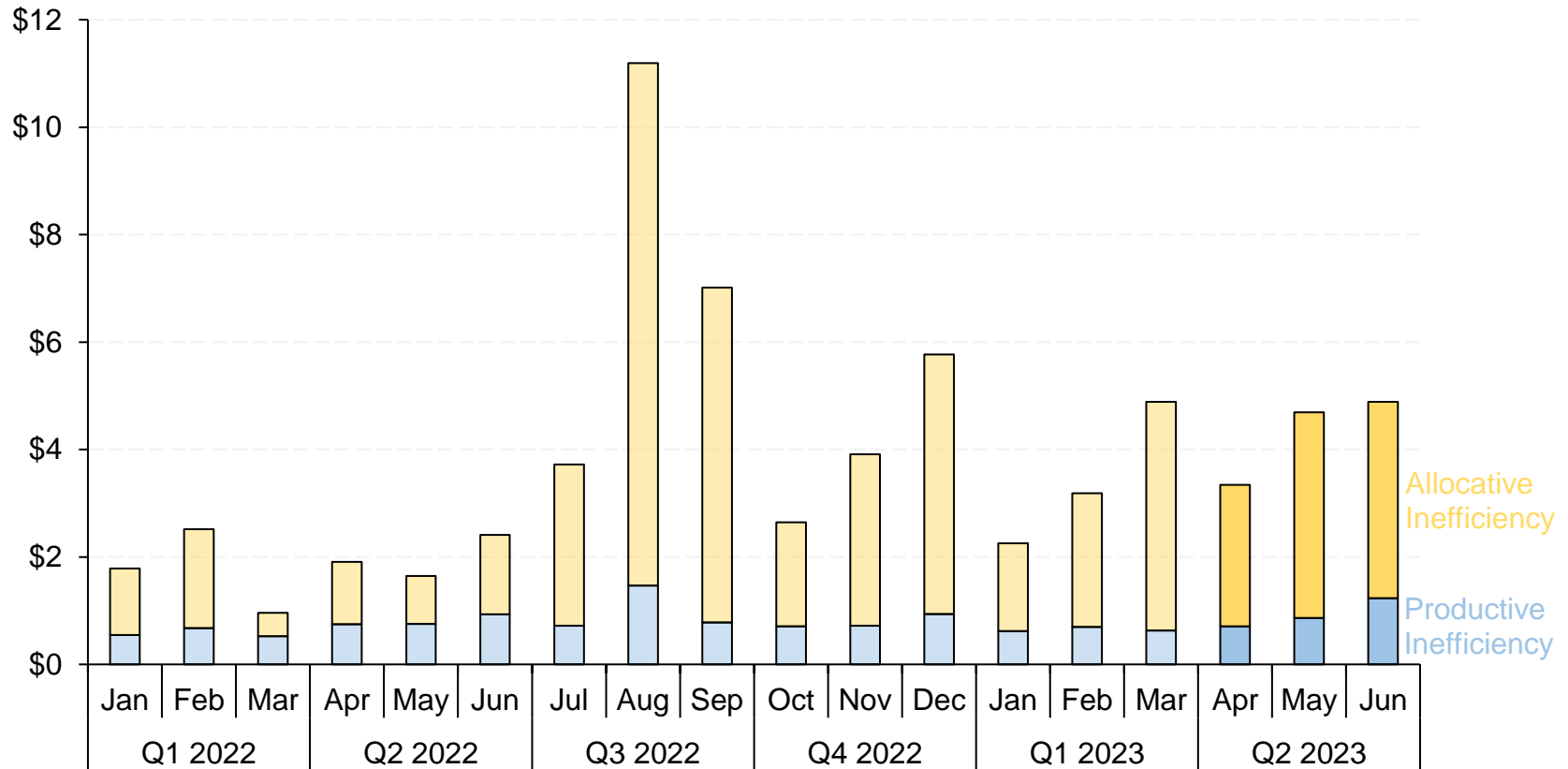
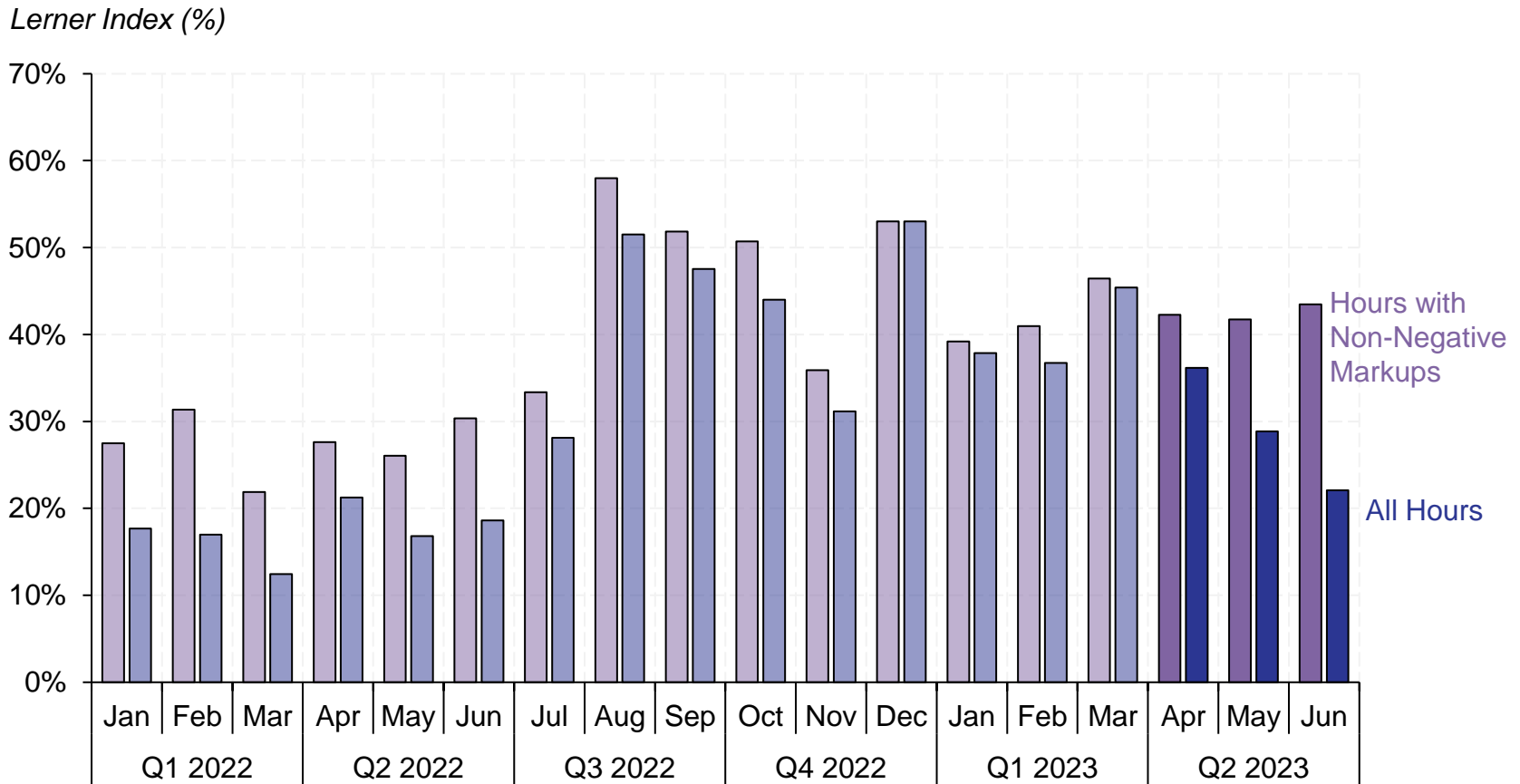
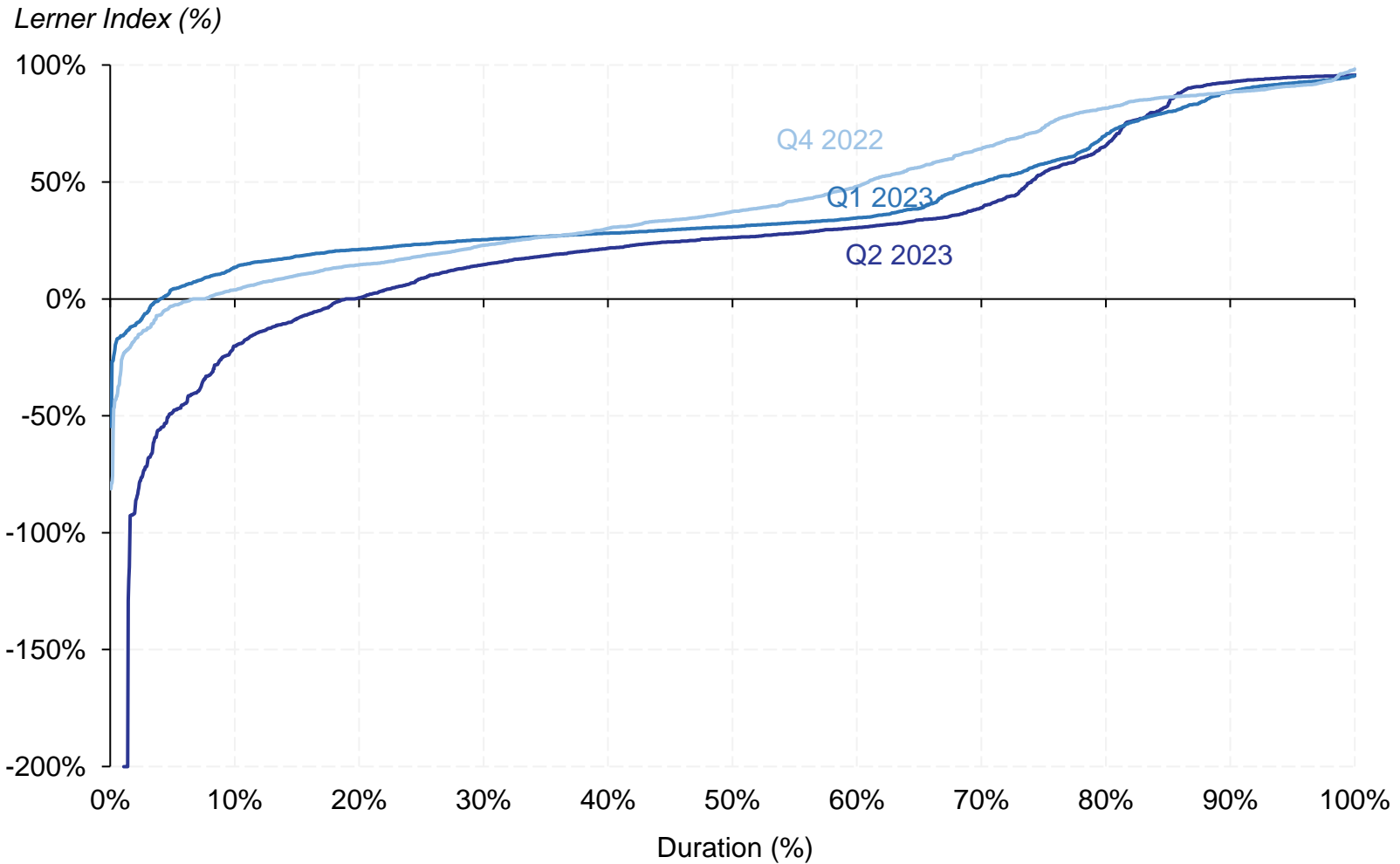


Figure 15: Monthly average market markup, all hours and non-negative hours (January 2022 to June 2023)



*Figure 16: Duration curve of market markup, all hours
(Q4 2022 to Q2 2023)*



*Figure 20: Market-level pivotality by month
(January 2022 to June 2023)*

% of Hours

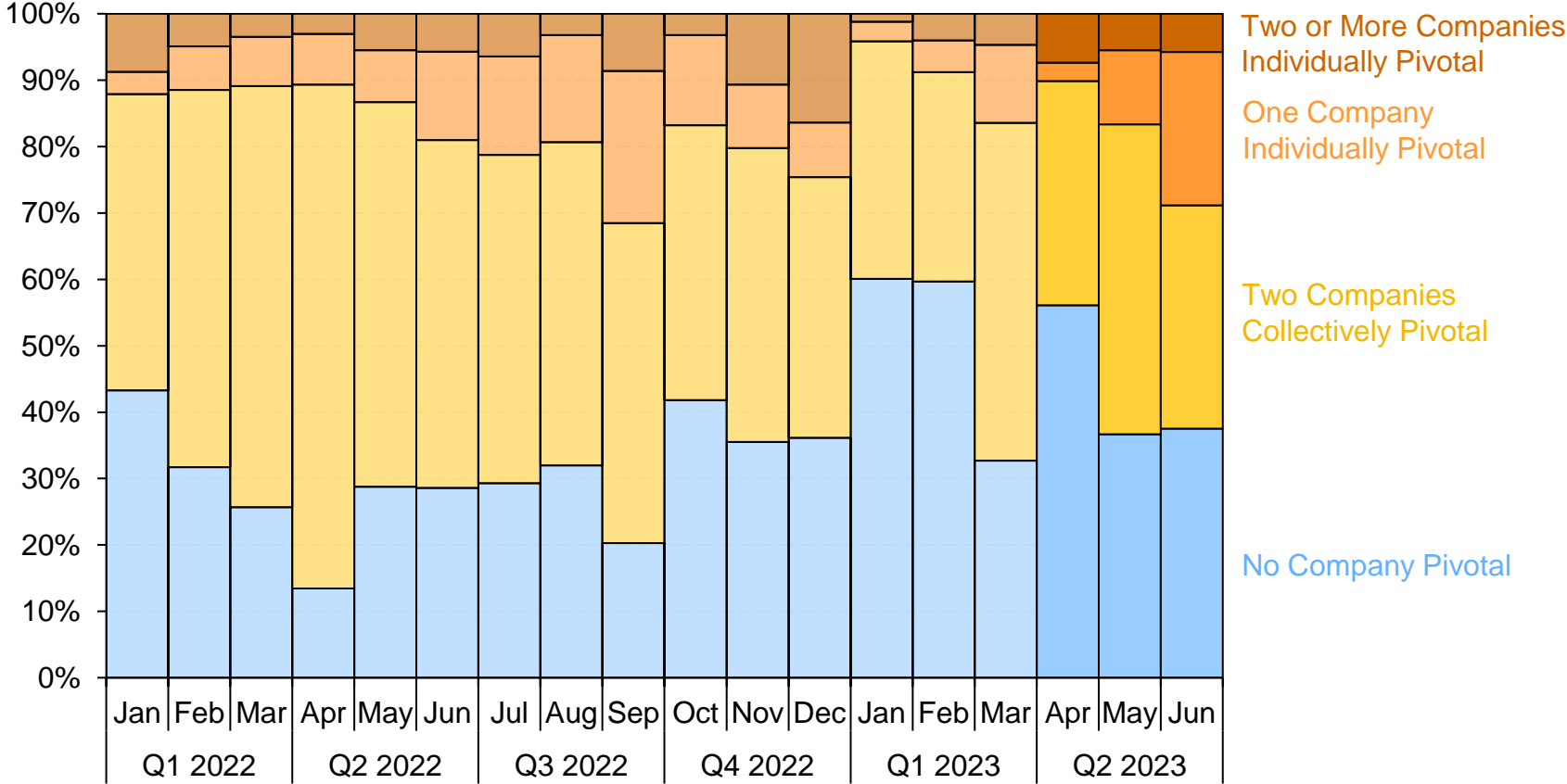
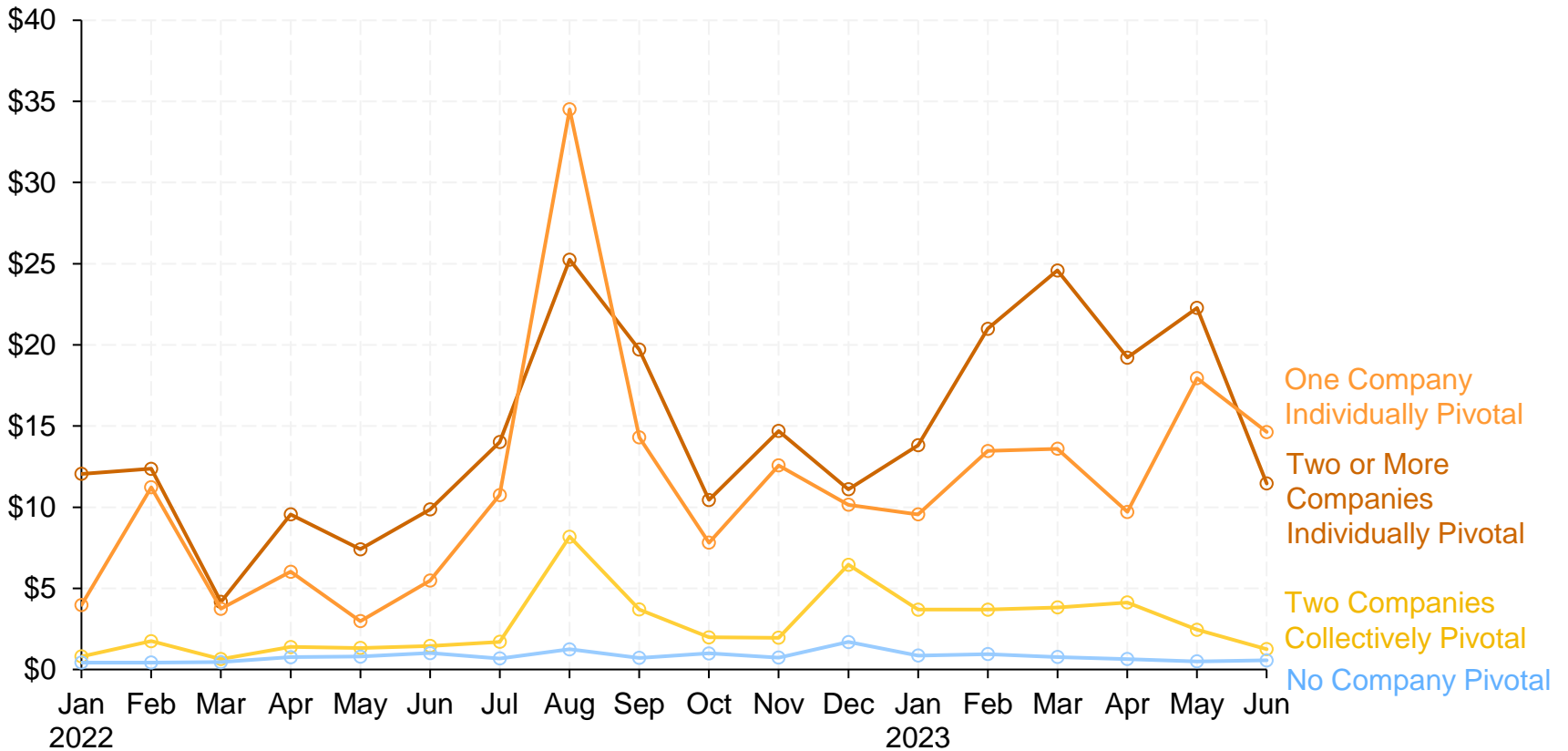


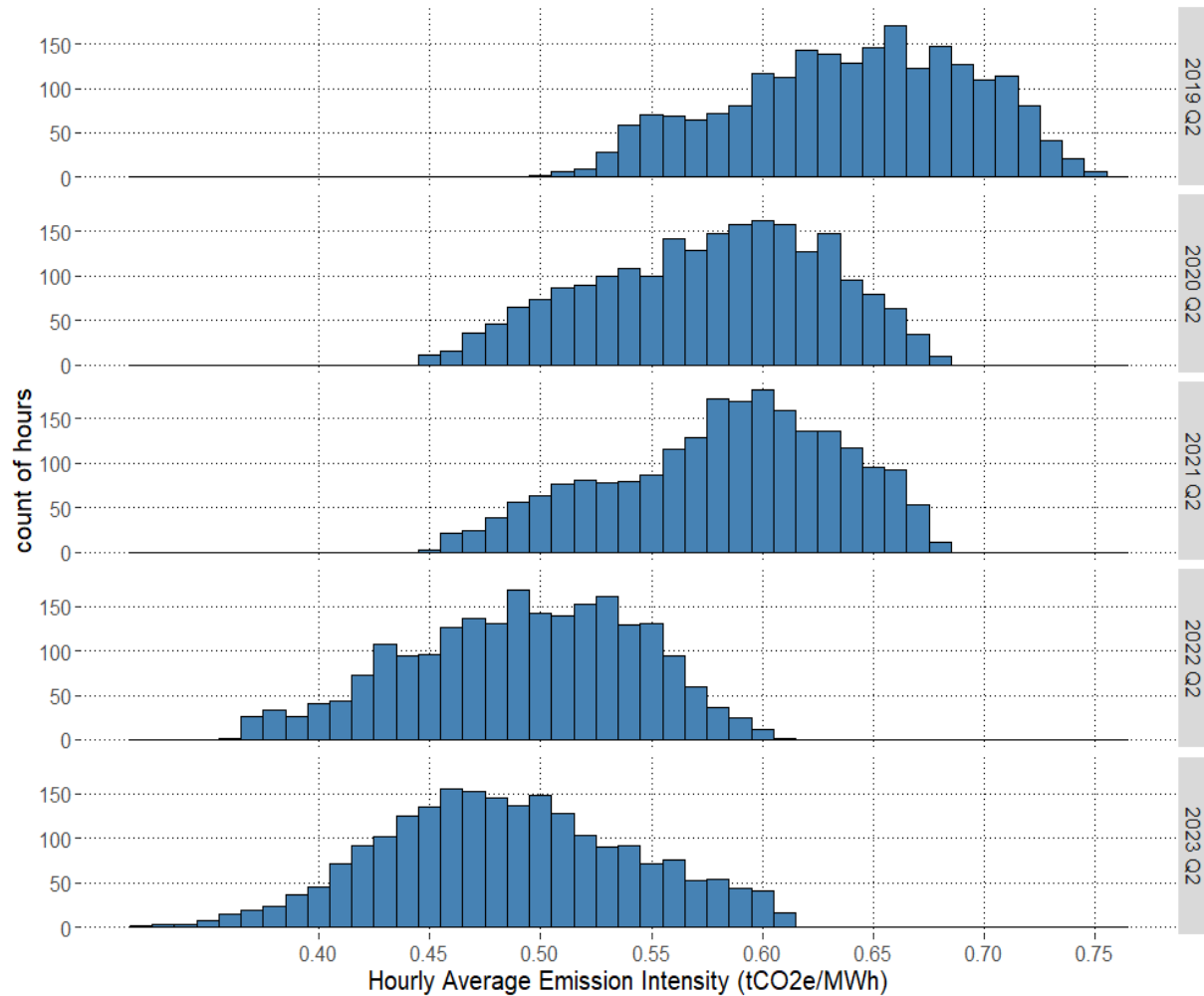
Figure 27: Monthly average static inefficiency by pivotality condition (January 2022 to June 2023)

Static Inefficiency (\$/MWh)



Carbon emissions

Figure 35: The distribution of average carbon emission intensities in Q2 (2019 to 2023)



Long lead time:
MSA analysis and recommendations

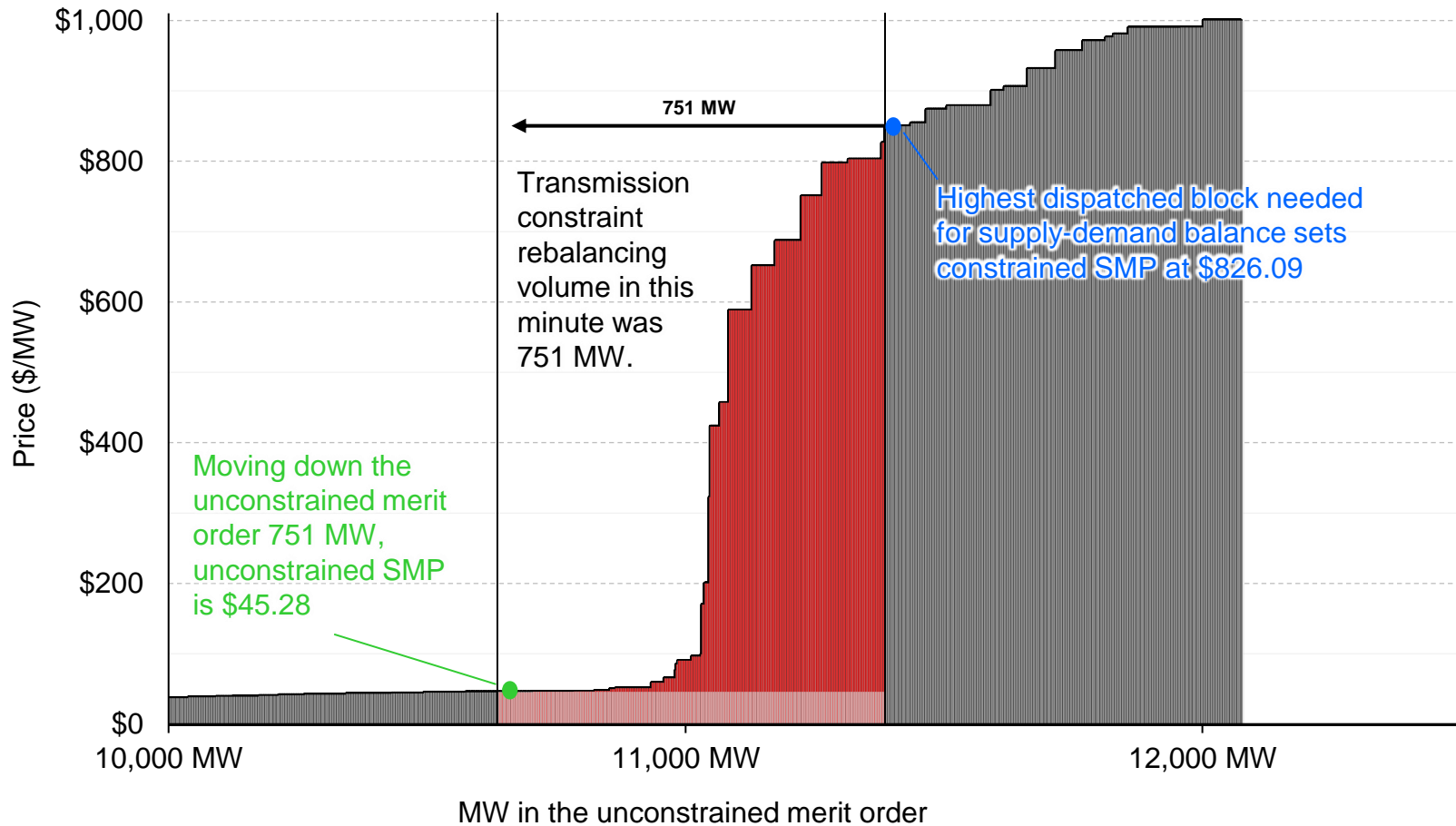
- See section 1.5 of the report for the MSA's long lead time analysis
- The MSA is of the view that incremental changes to the current market framework will not result in a satisfactory solution to the unit commitment problem in the long run. Instead, significant structural market design changes will be necessary to enable the market to manage increased uncertainty and net demand variability. These changes should be explored and progressed in the AESO's Market Pathways initiative.
- The MSA makes the following recommendations in relation to this issue:
 - the AESO's public short-term adequacy metrics should align with its directive issuing authority and obligations under the existing ISO rules related to the reliable operation of the power system,
 - the AESO should provide public guidance indicating when and how it will issue and revoke directives under the existing ISO rules,
 - the AESO should reconsider the threshold at which it will issue directives, in particular for LLT assets, to ensure they support an efficient allocation of resources, and
 - the predictive quality of the AESO's forward-looking supply adequacy metrics is poor and should be improved.

Transmission congestion and pool price formation

*Table 7: Constrained down volume on
May 4, 2023 at 18:05:30*

Asset ID	Fuel Type	MC	Constrained down volume (MW*minute)
TVS1	Solar	465	323
BSR1	Wind	300	185
WHE1	Wind	120	77
SCR4	Wind	88	64
NEP1	Wind	82	43
EC01	Combined Cycle	120	24
STR2	Solar	23	10
STR1	Solar	18	9
NMK1	Solar	20	7
BUR1	Solar	20	4
CRD1	Solar	23	2
RTL1	Wind	130	2
TAB1	Wind	81	1
			Total: 751

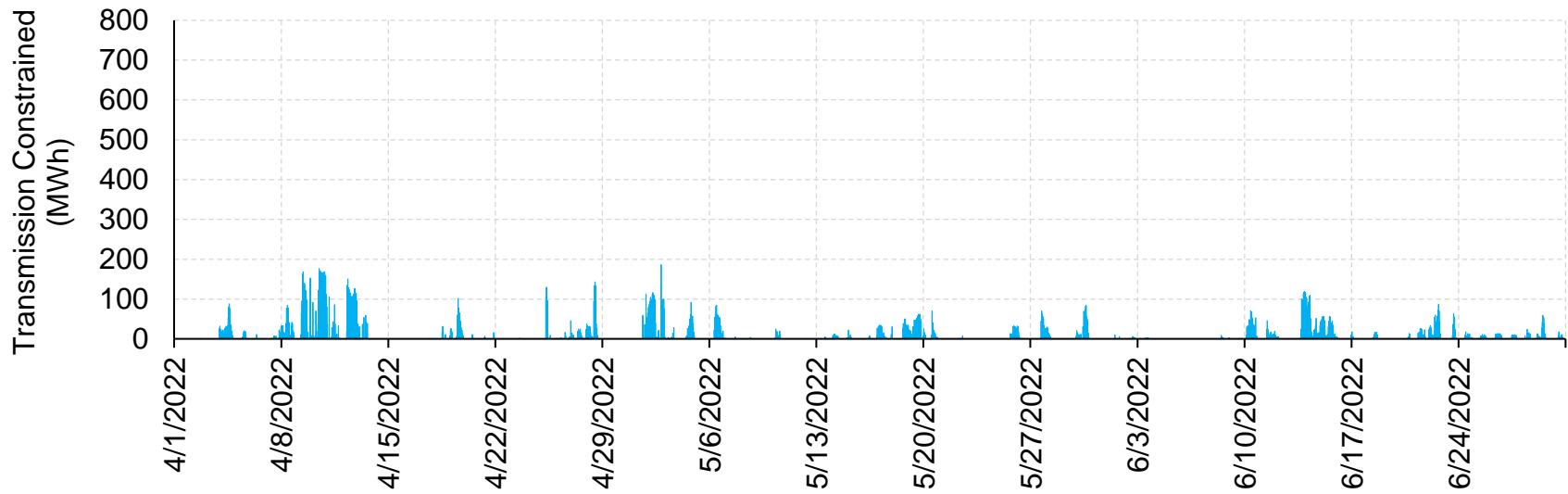
Figure 53: Unconstrained energy market merit order snapshot on May 4, 2023 at 18:05:30



Wind and solar constrained down generation

Figure 54, 55: Hourly transmission constrained wind and solar generation

Q2
2022



Q2
2023

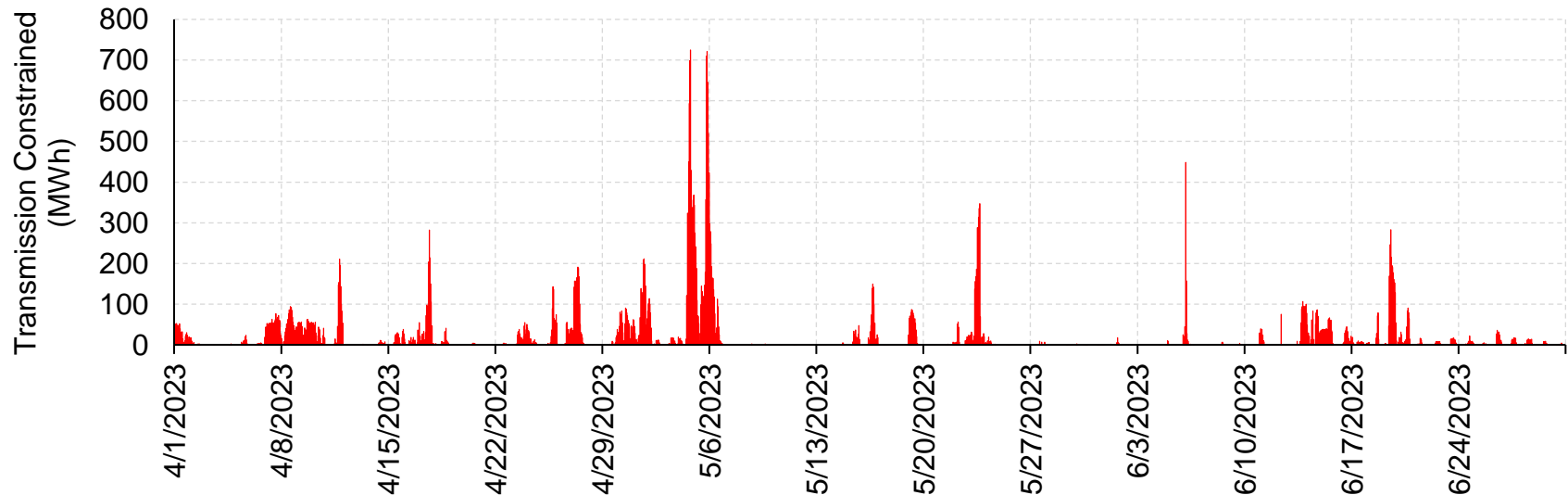


Figure 57: Duration of constrained and unconstrained SMP difference (Q2 2022 and Q2 2023)

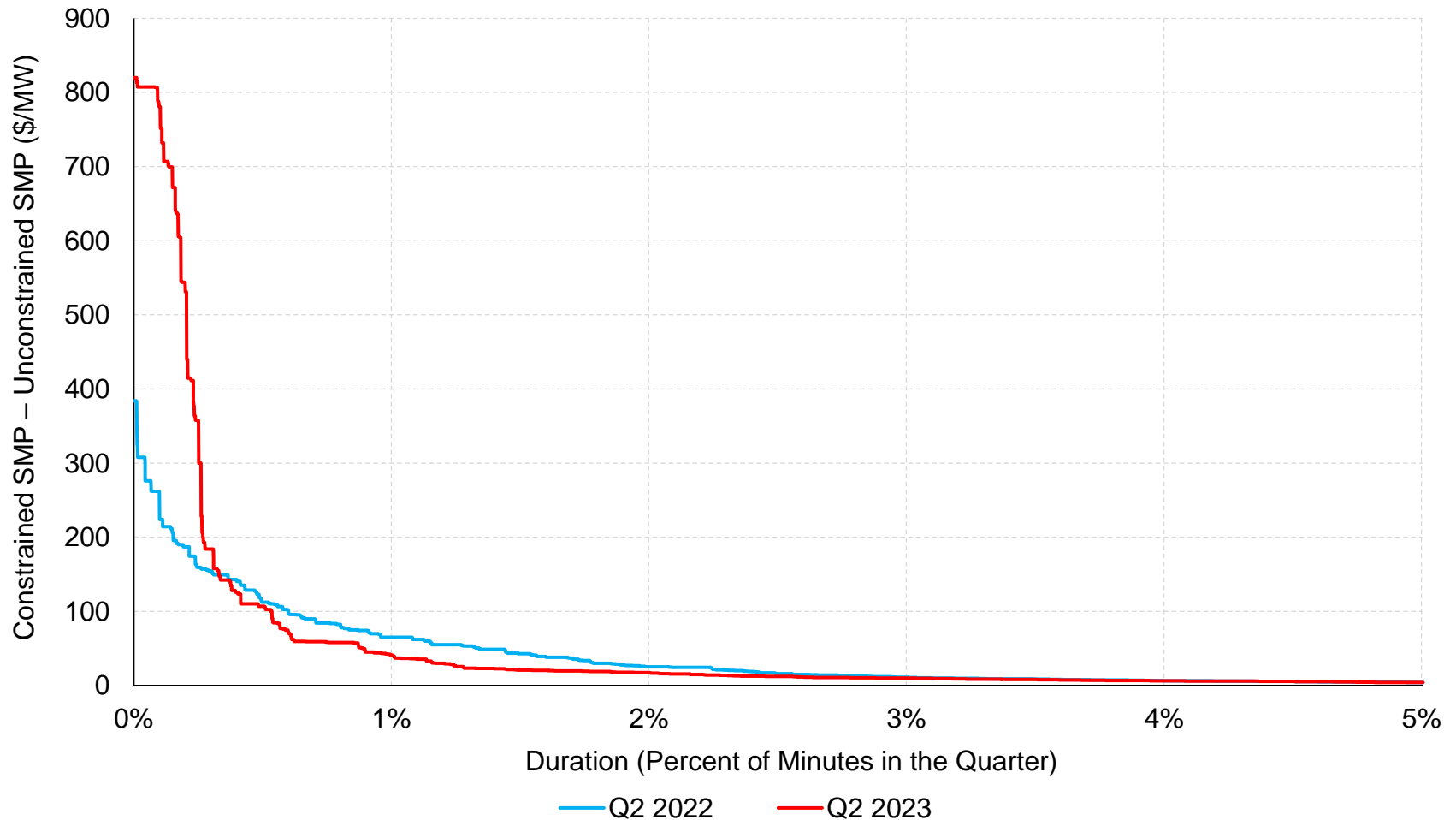


Figure 60: Wind and solar transmission constrained MWh by asset (Q2 2022 and Q2 2023)

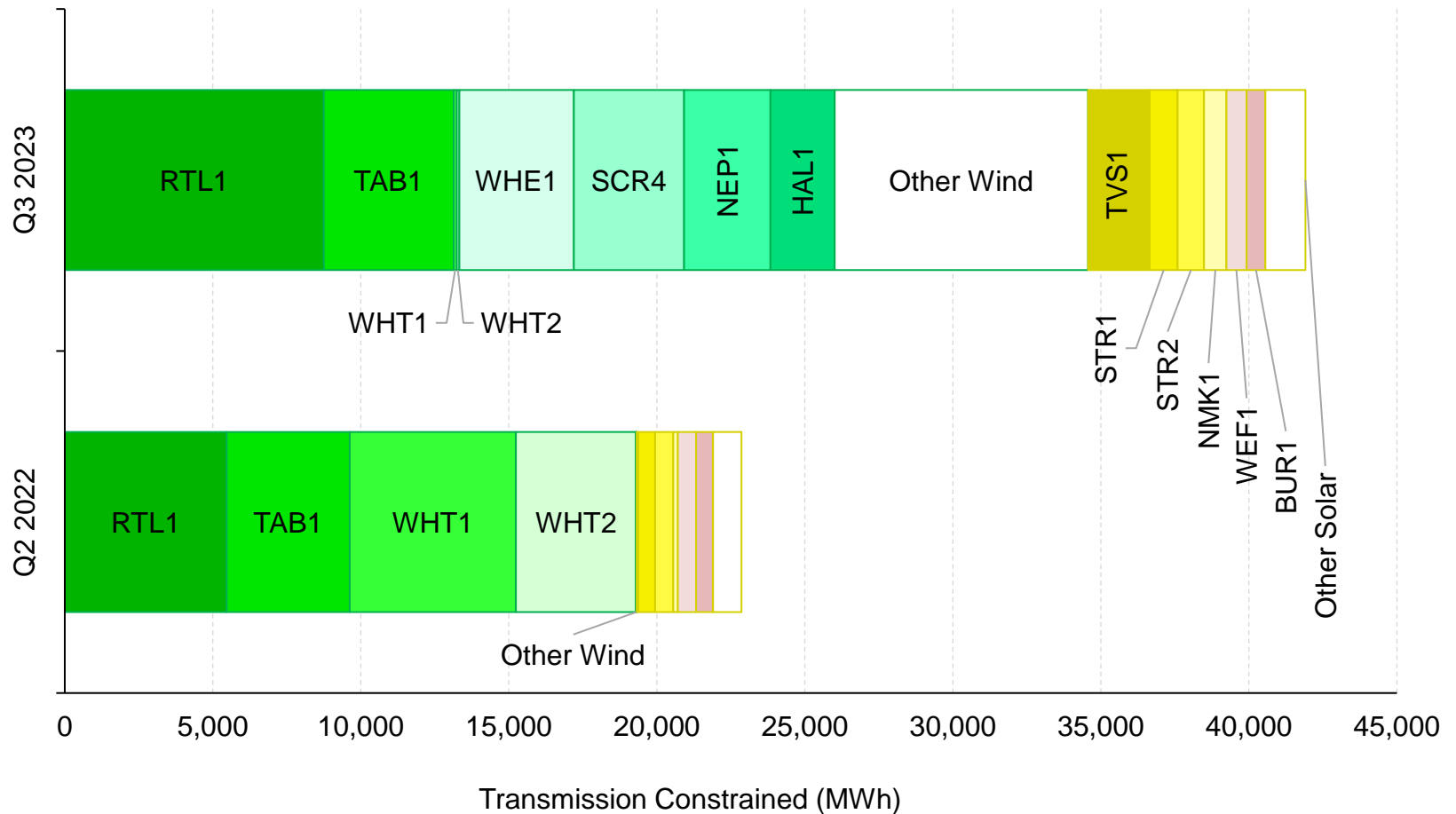
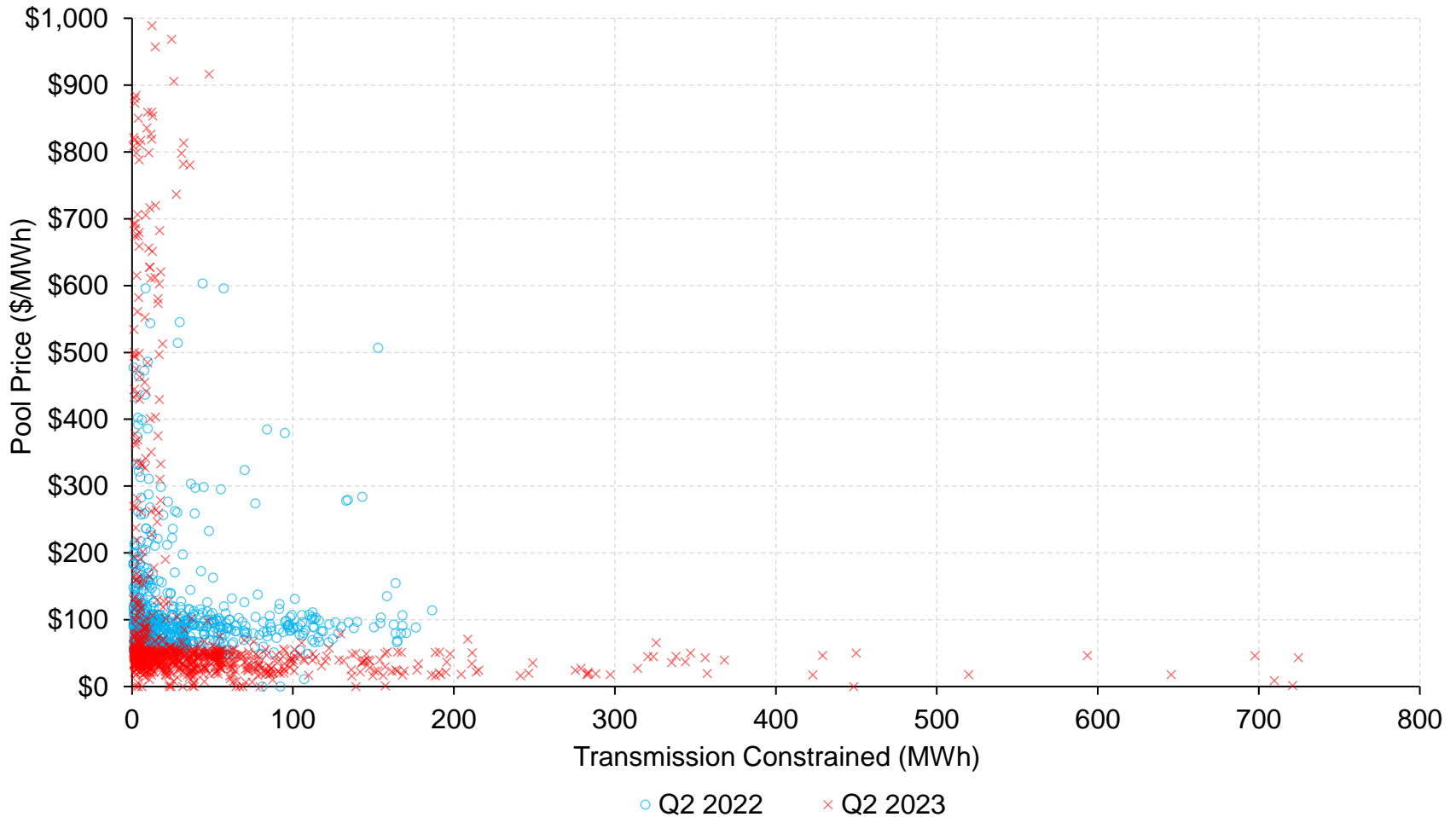


Figure 62: Wind and solar constrained MW vs. pool price (Q2 2022 and Q2 2023)



Operating reserve markets

Figure 70: Average received price for active spinning, supplemental, and regulating reserve (January to June, 2023)

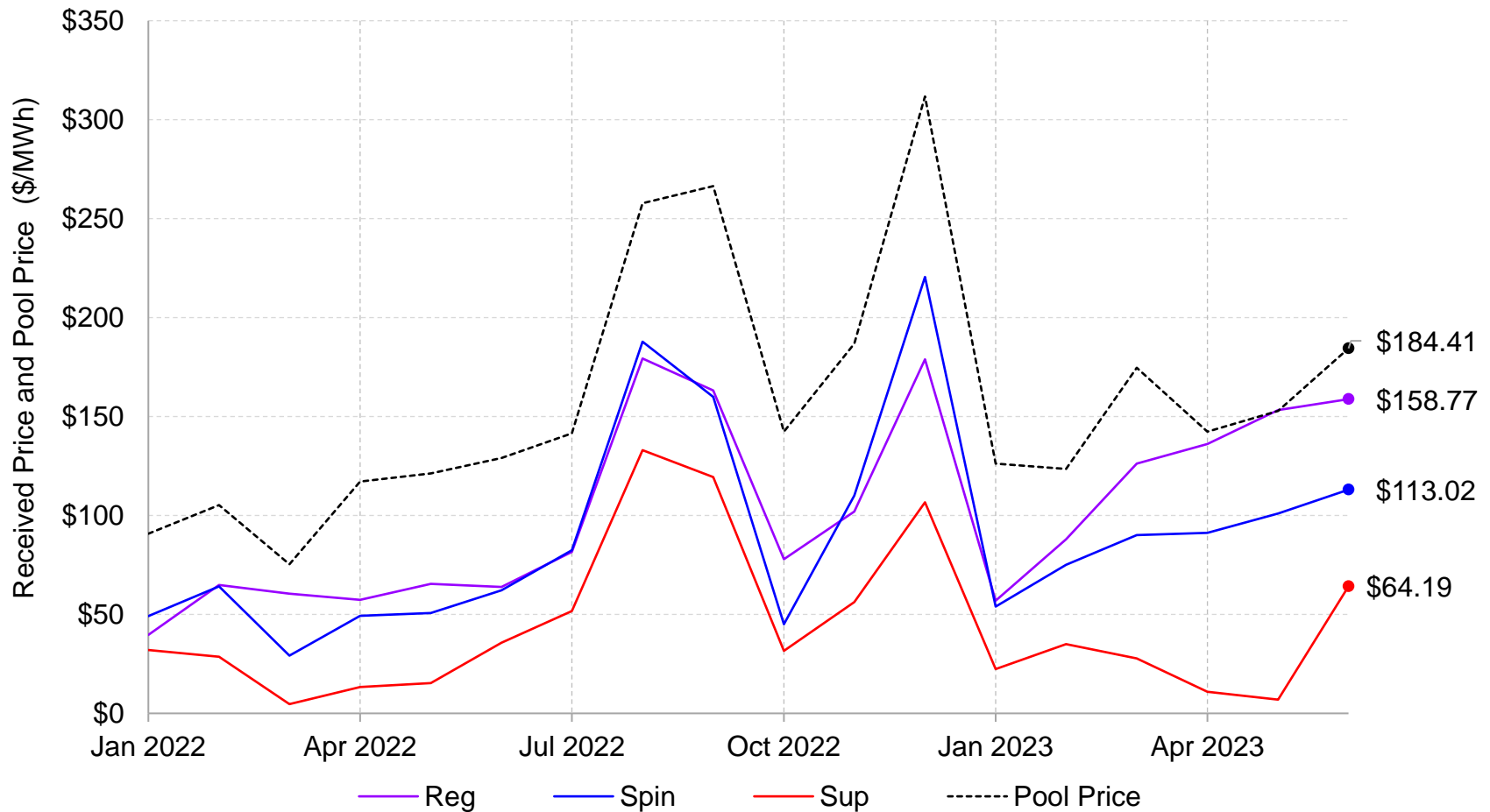
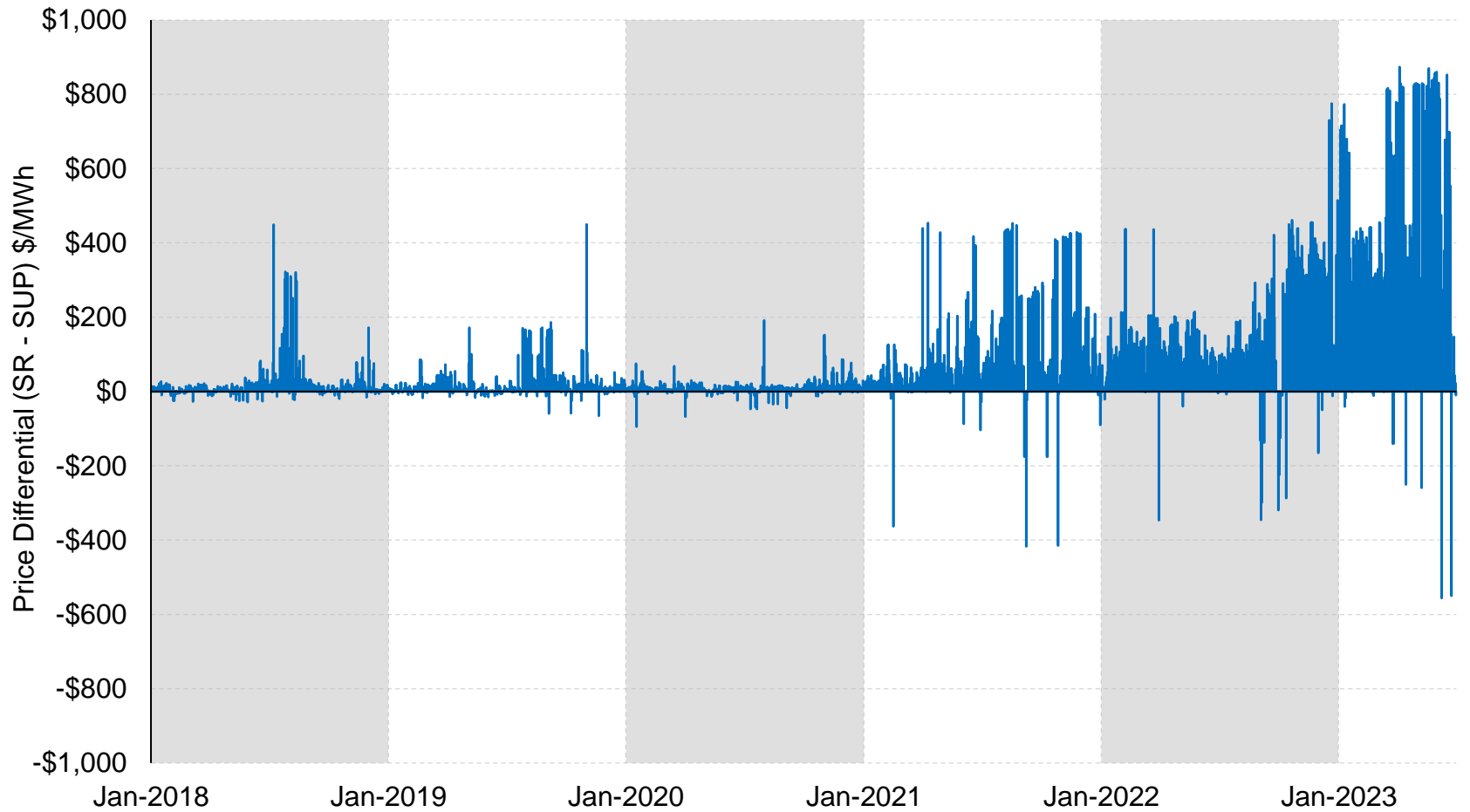


Figure 72: Daily equilibrium price difference between active spinning and supplemental reserve (on-peak, January 2018 to June 2023)



*Figure 73: Offers for active on-peak supplemental reserve
(April 4, 2023)*

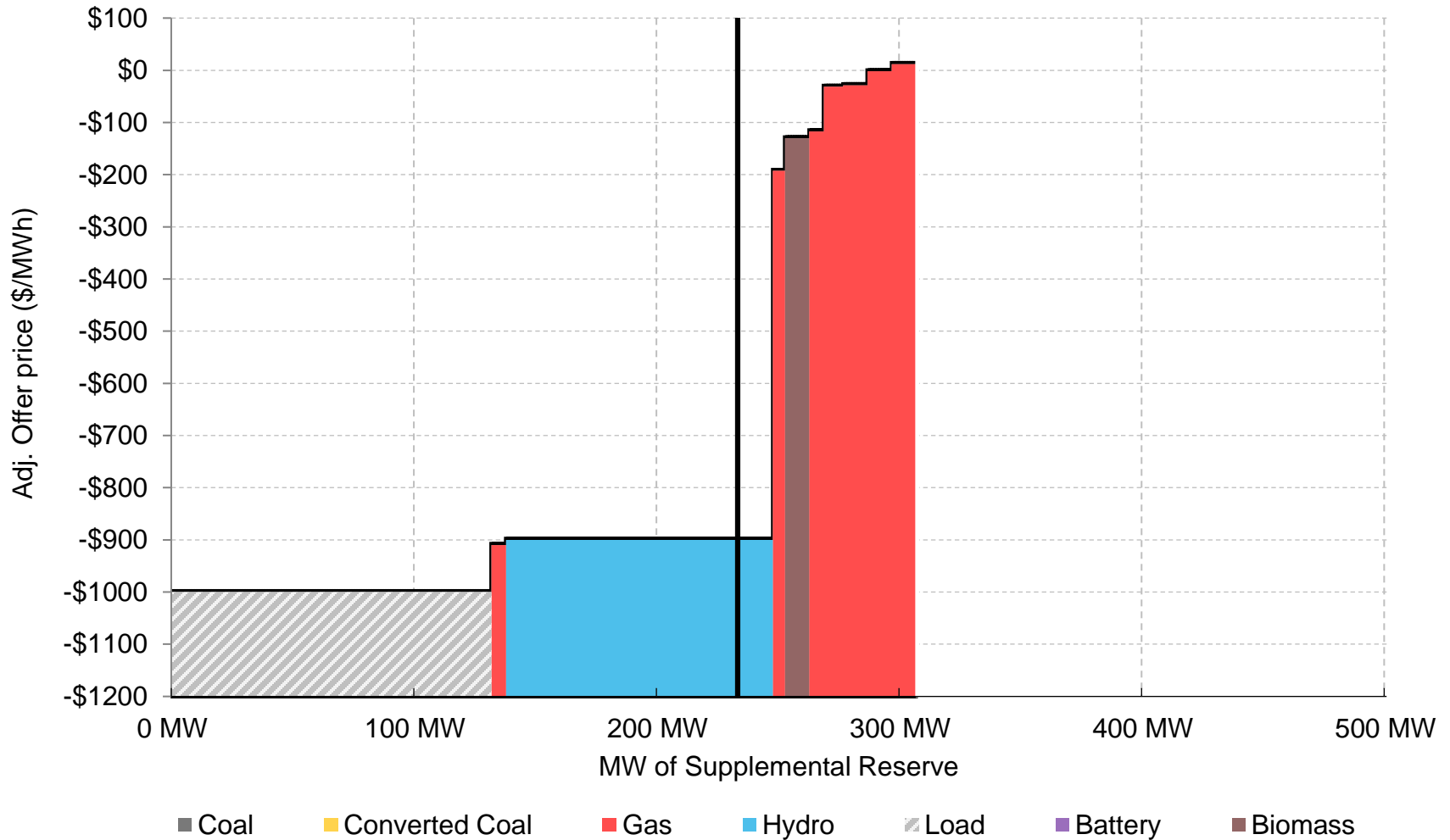
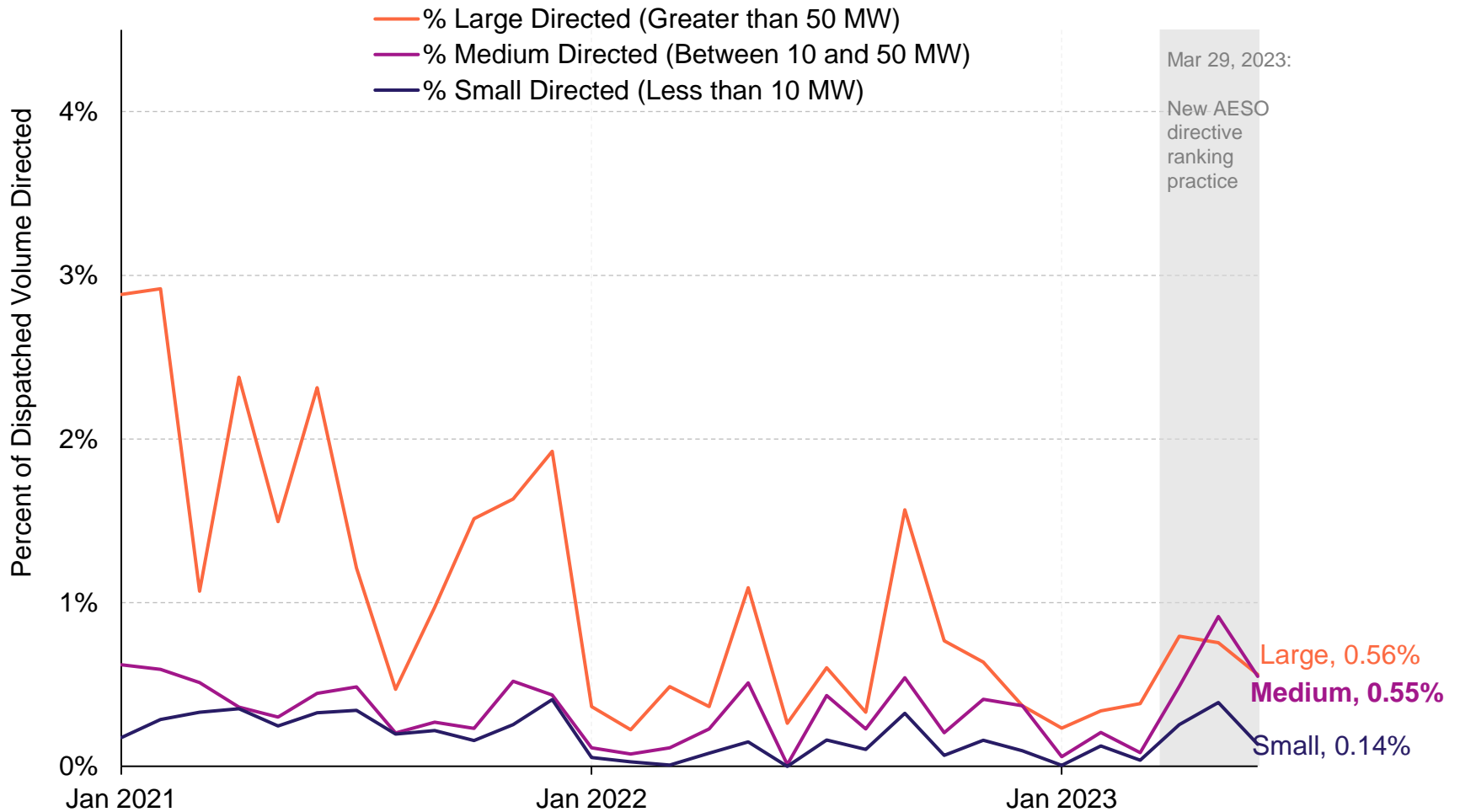


Figure 78: Dispatched contingency reserve directed by asset size (January 2021 to June 2023)



Forward market

Figure 82: Monthly forward prices for May to September over Q2

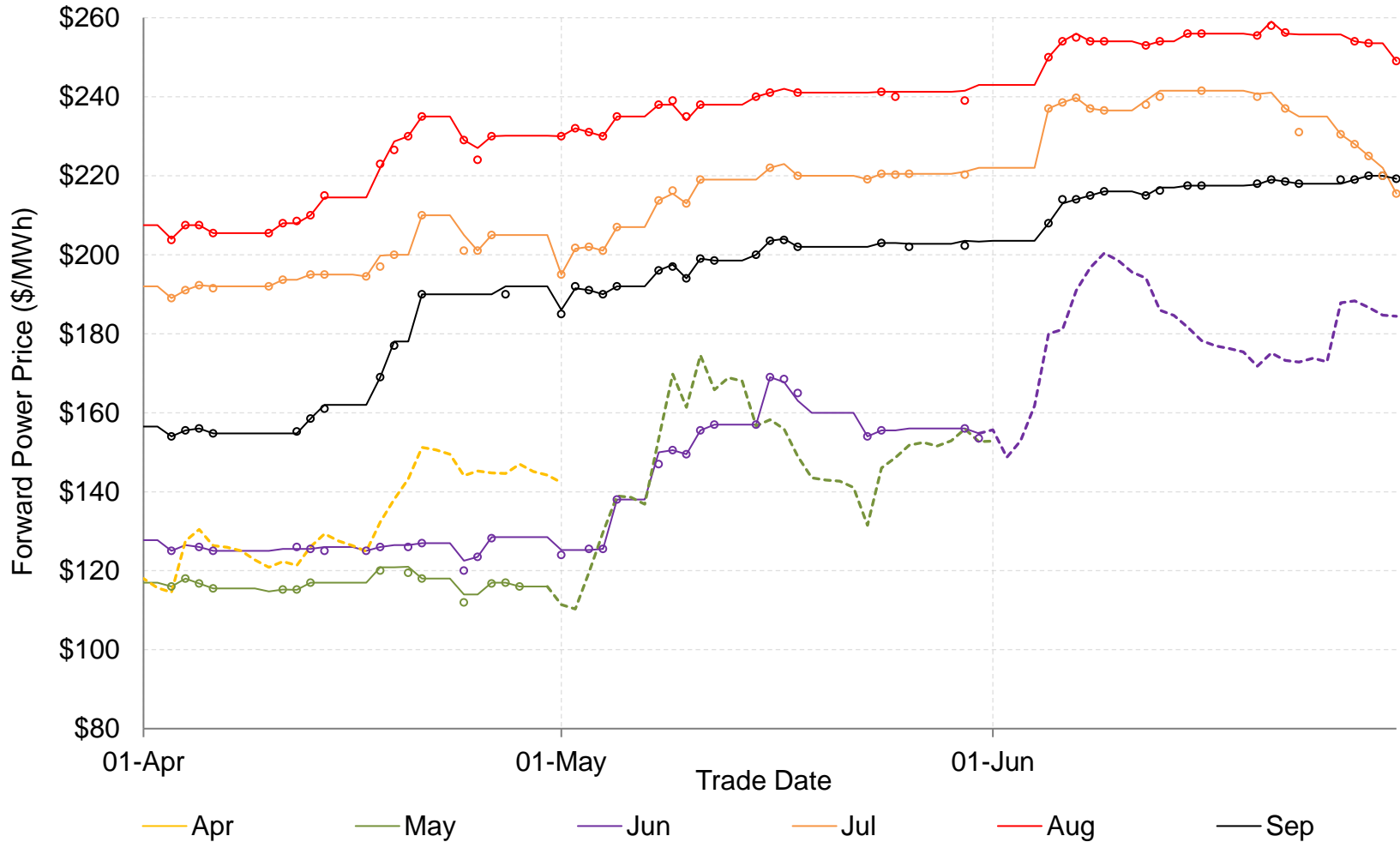
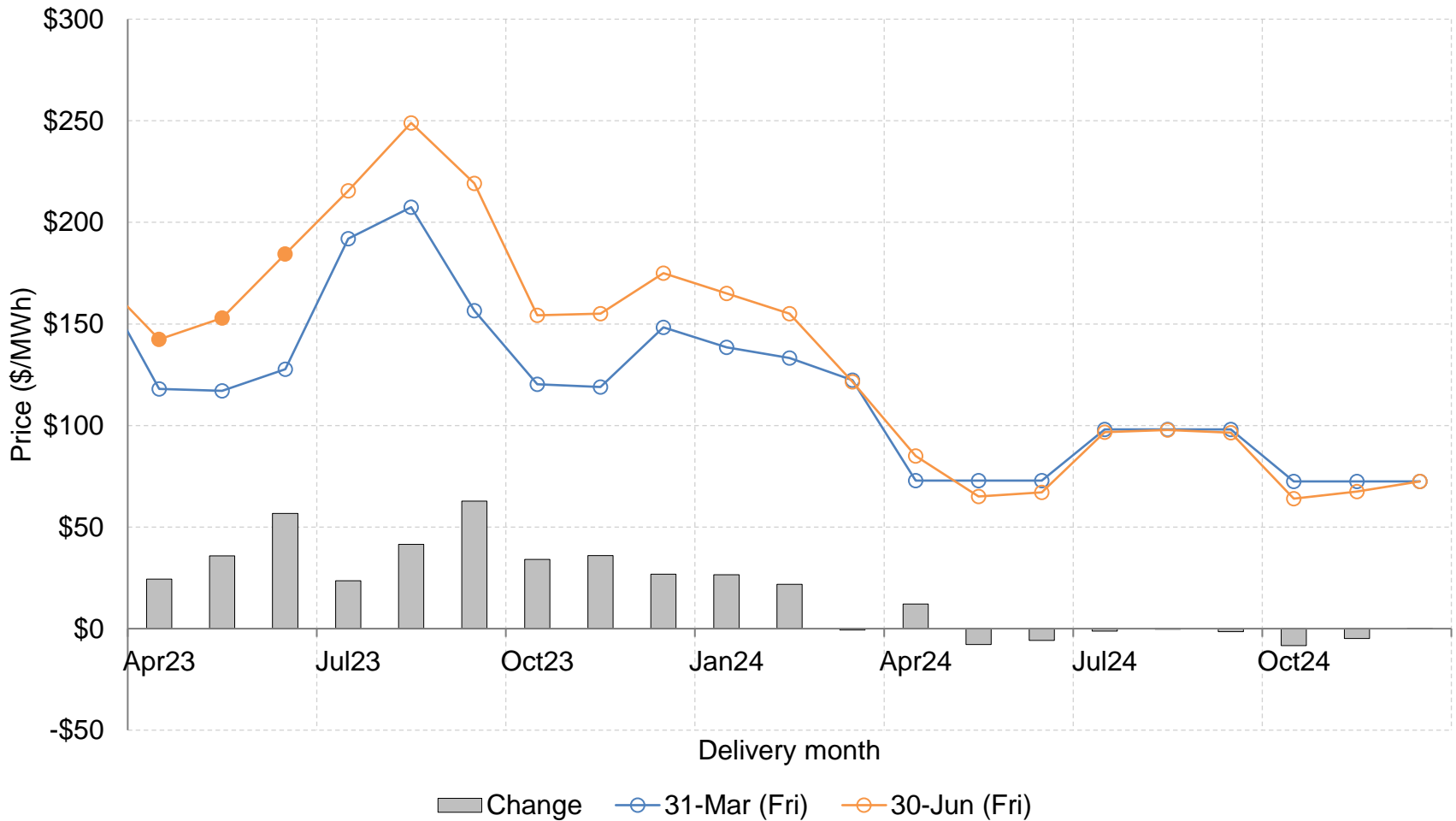
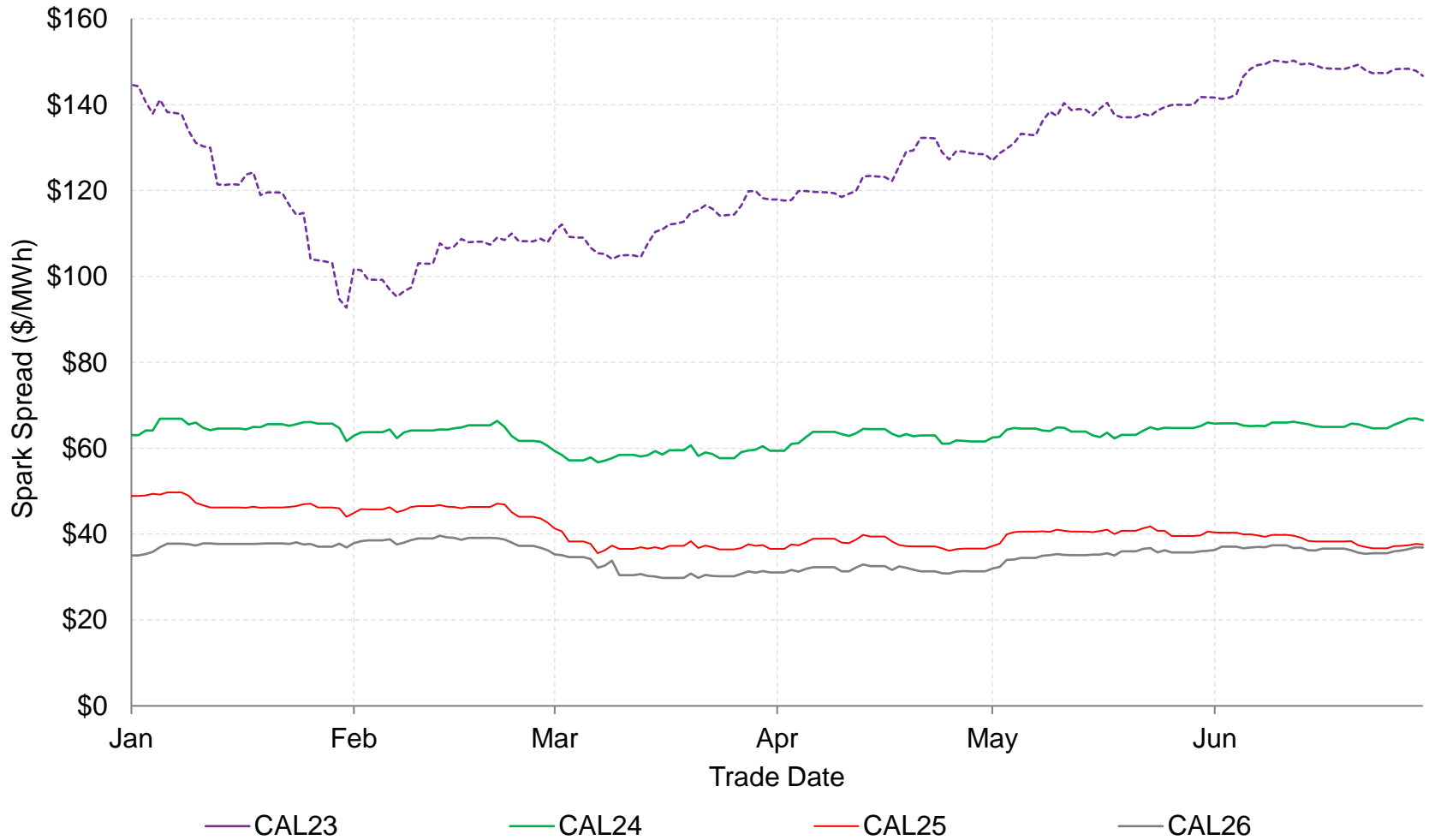


Figure 83: The monthly forward curve as of March 31 and June 30, 2023



*Figure 84: Annual spark spreads for CAL23 to CAL26
(from January 1 to June 30, 2023)*



Retail market

Figure 86: RRO customer losses and gains, residential customers (January 2022 to March 2023)

Number of Customers
(000's)

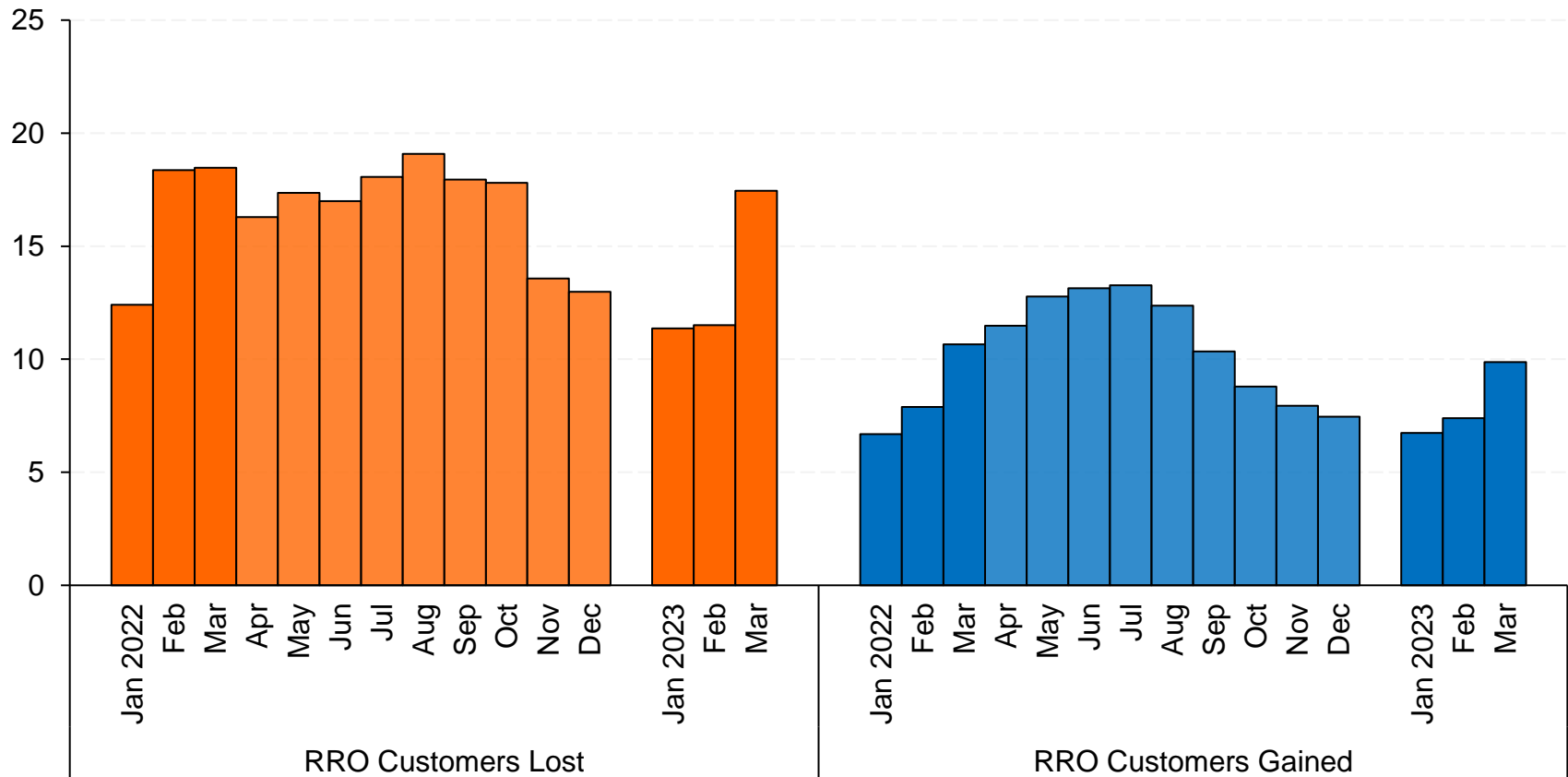


Figure 94: 3-year fixed electricity contract prices, residential customers, ENMAX service area (May 1, 2022 to July 1, 2023)

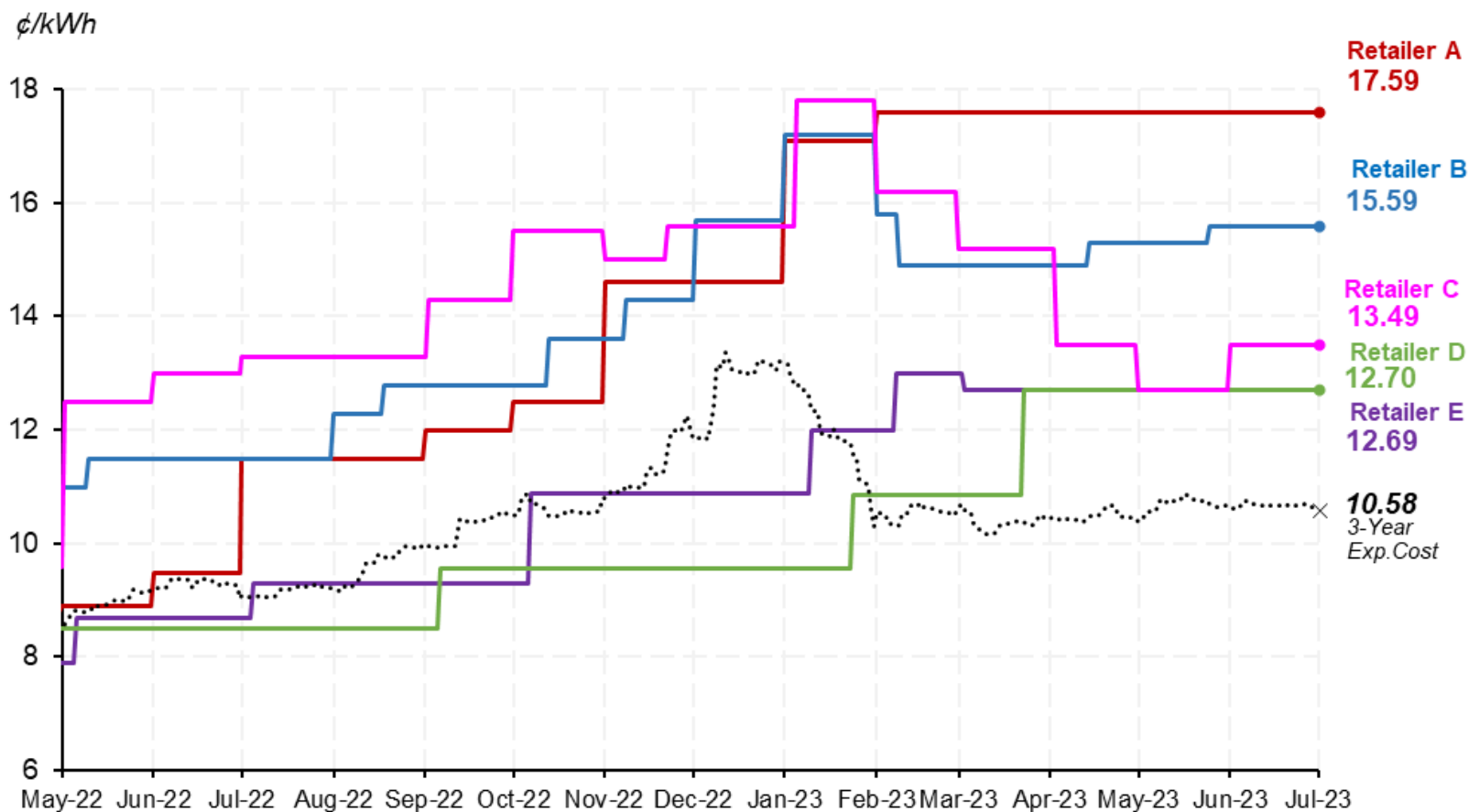
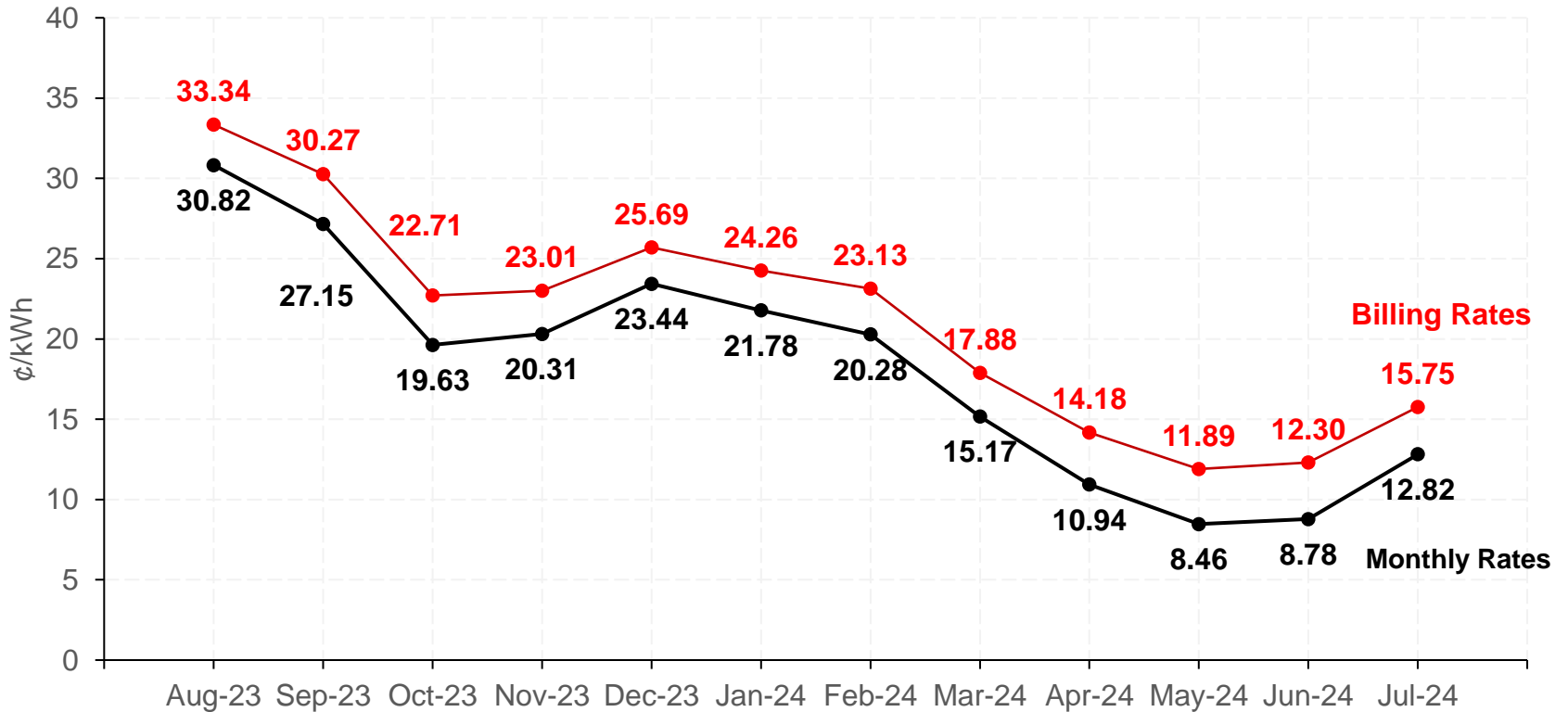
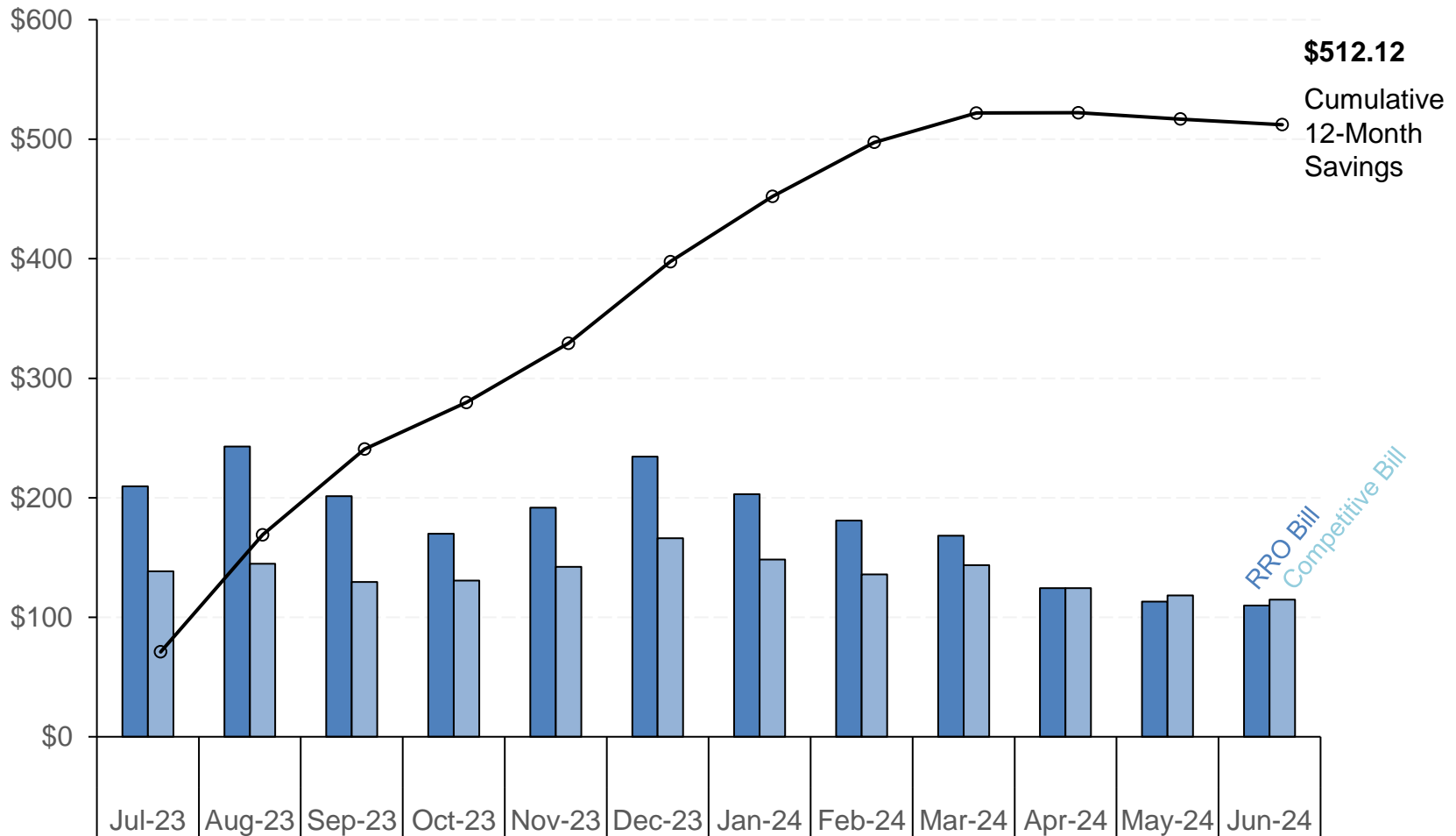


Figure 97: August 2023 to July 2024 estimated residential RRO monthly rates and billing rates, EPCOR service area (as of July 1, 2023)



*Figure 104: Expected RRO bill vs. competitive electricity bill
(3-year fixed rate at 12.69 ¢/kWh, \$8.99/month)*



Micro-generation update

Figure 110: Number of small micro-gen sites by municipality (December 31, 2015 to December 31, 2022)

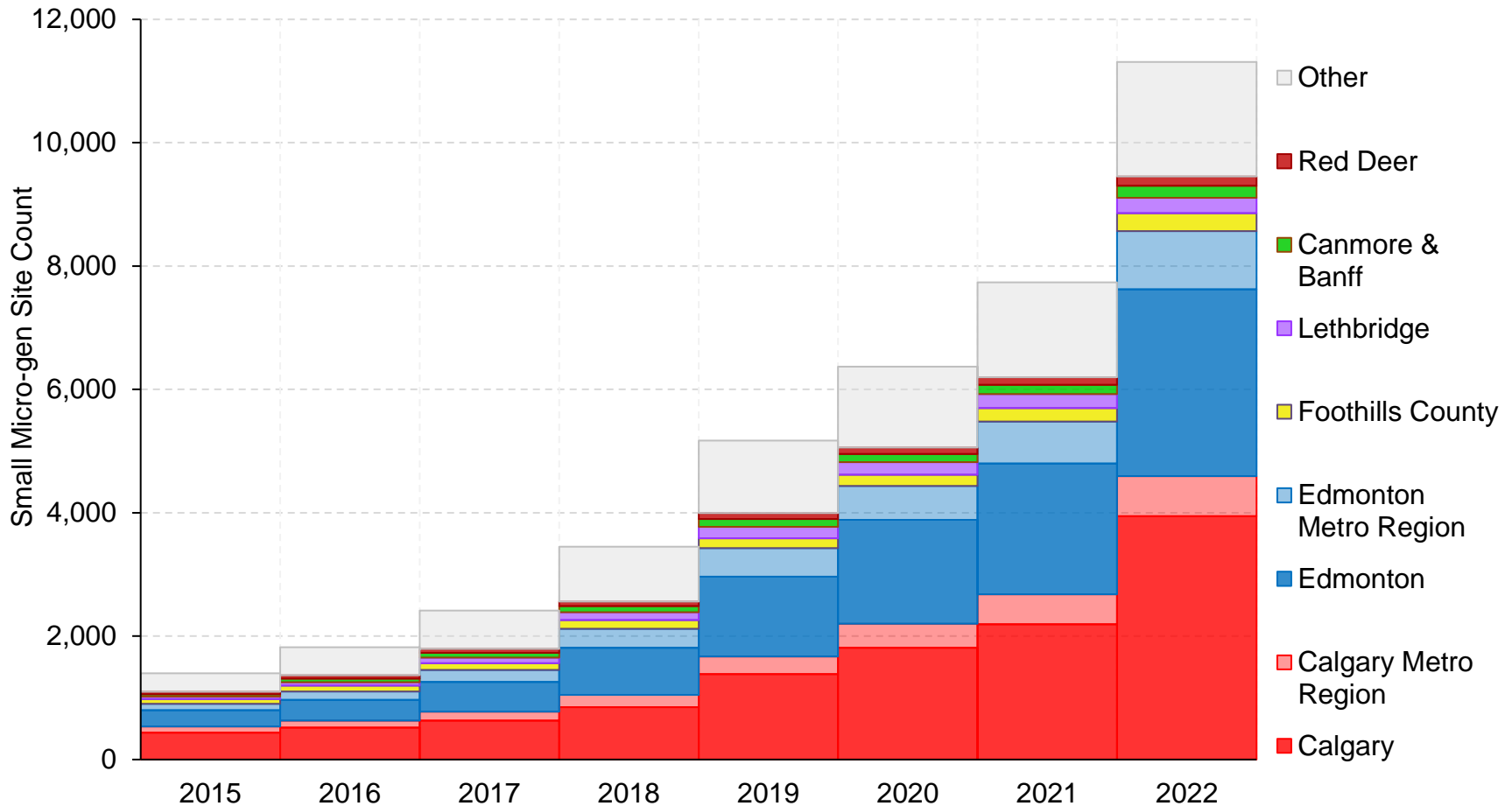


Table 14: Annual exports to the grid and compensation paid to small micro-gen

Year	Exports (MWh)	Small micro-gen compensation	Value of exports
2018	12,000	\$820,000	\$970,000
2019	21,000	\$1,650,000	\$1,480,000
2020	29,000	\$2,580,000	\$1,630,000
2021	37,000	\$4,900,000	\$4,980,000
2022	56,000	\$8,970,000	\$10,130,000

Figure 112: Site-level small micro-gen exports and compensation in 2022

