Markets Report

MC Webinar

May 20, 2024

Executive Summary

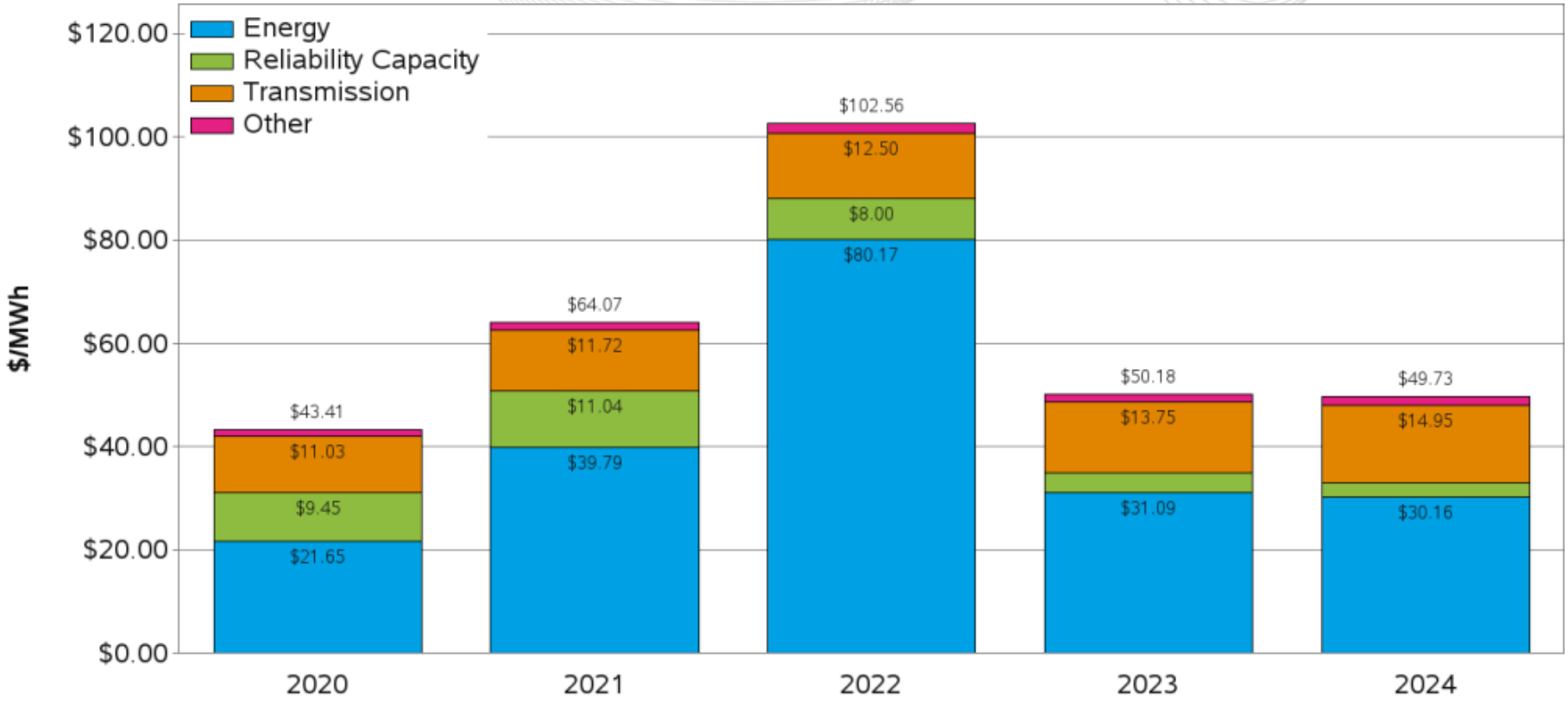
- PJM Wholesale Cost in 2023 is $49.73/MWh, down from full-year 2023 costs of $50.18/MWh. (Slides 5 & 6)
- Slides pertaining to weather conditions, in addition to slides showing average fuel prices, generation on-line fuel mixes, and System Marginal Prices have been combined into a **Market Conditions** section. (Slides 8- 22)
- In April, temperatures were mild and fluctuated above and below average for most of the month. The sum of Heating and Cooling Degree Days was below its historic average. (Slides 8-10)
- Energy use was also below its historic average for April. (Slides 8-10)
- In April, uplift exceeded $800,000 on 13 days. (Slides 26 & 27)

Executive Summary

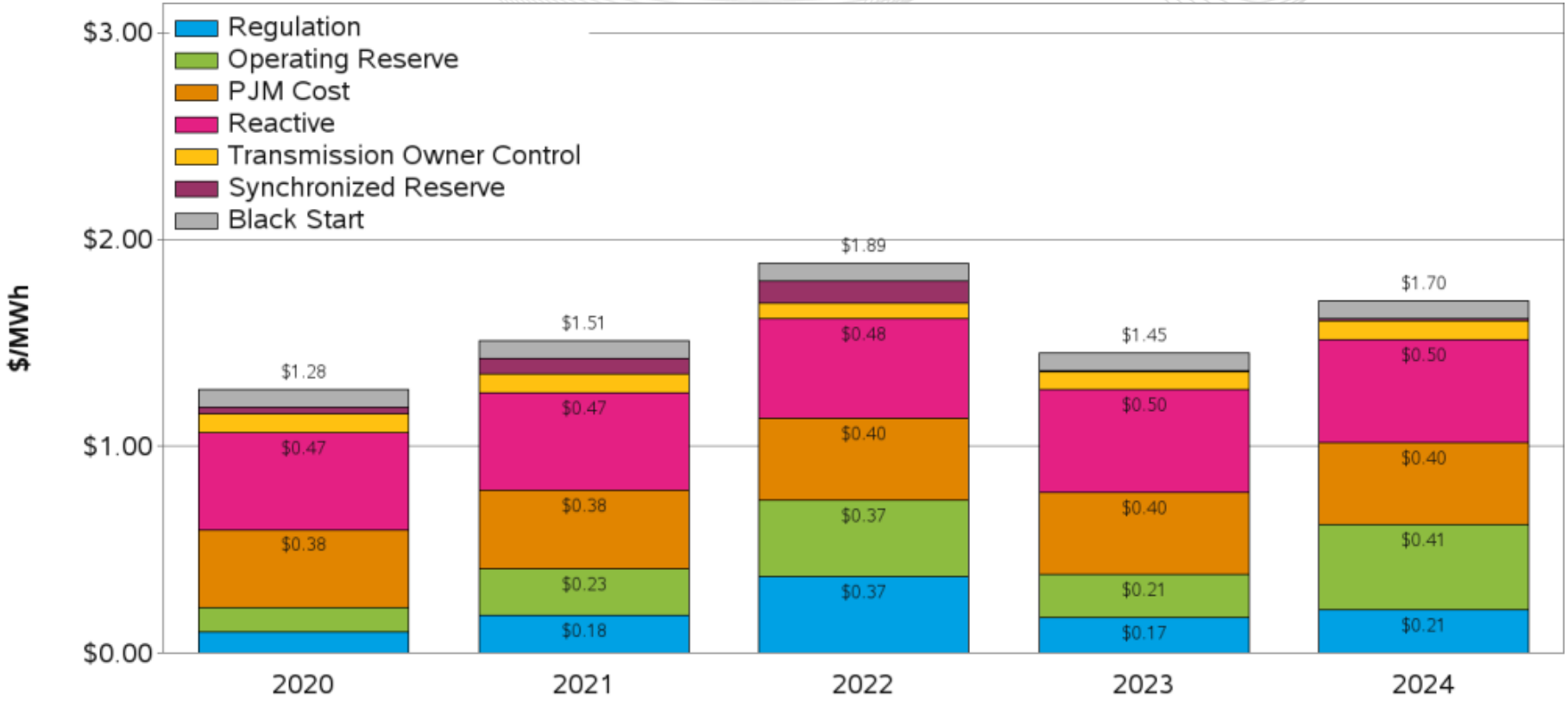
- Load-weighted average LMP for 2024 is $30.16/MWh: (Slides 35-37)
  - April 2024 was $27.20/MWh, which is lower than April 2023 ($29.30/MWh) and much lower than April 2022 ($63.90/MWh).
- There were two 5-minute intervals that experienced shortage pricing in April. (Slide 34, Report Appendix)
- FTR revenue adequacy for the month of April is 100% and the 2023-2024 Planning Year is currently funded at 100%. (Slides 52-55)
- Congestion values have been similar to those seen in 2023 and lower than 2022. (Slide 53)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 69-71)

Markets Report

PJM Wholesale Cost



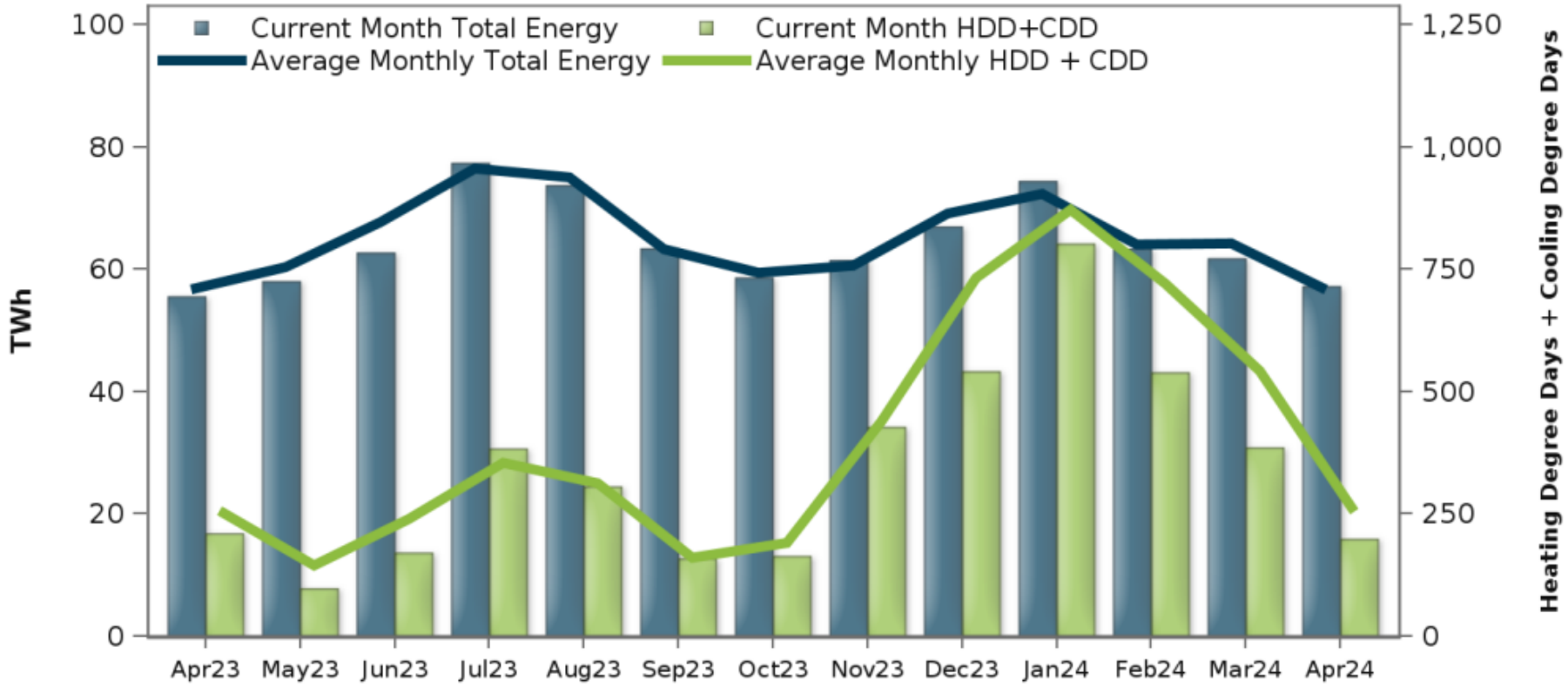
PJM Wholesale Cost - Other



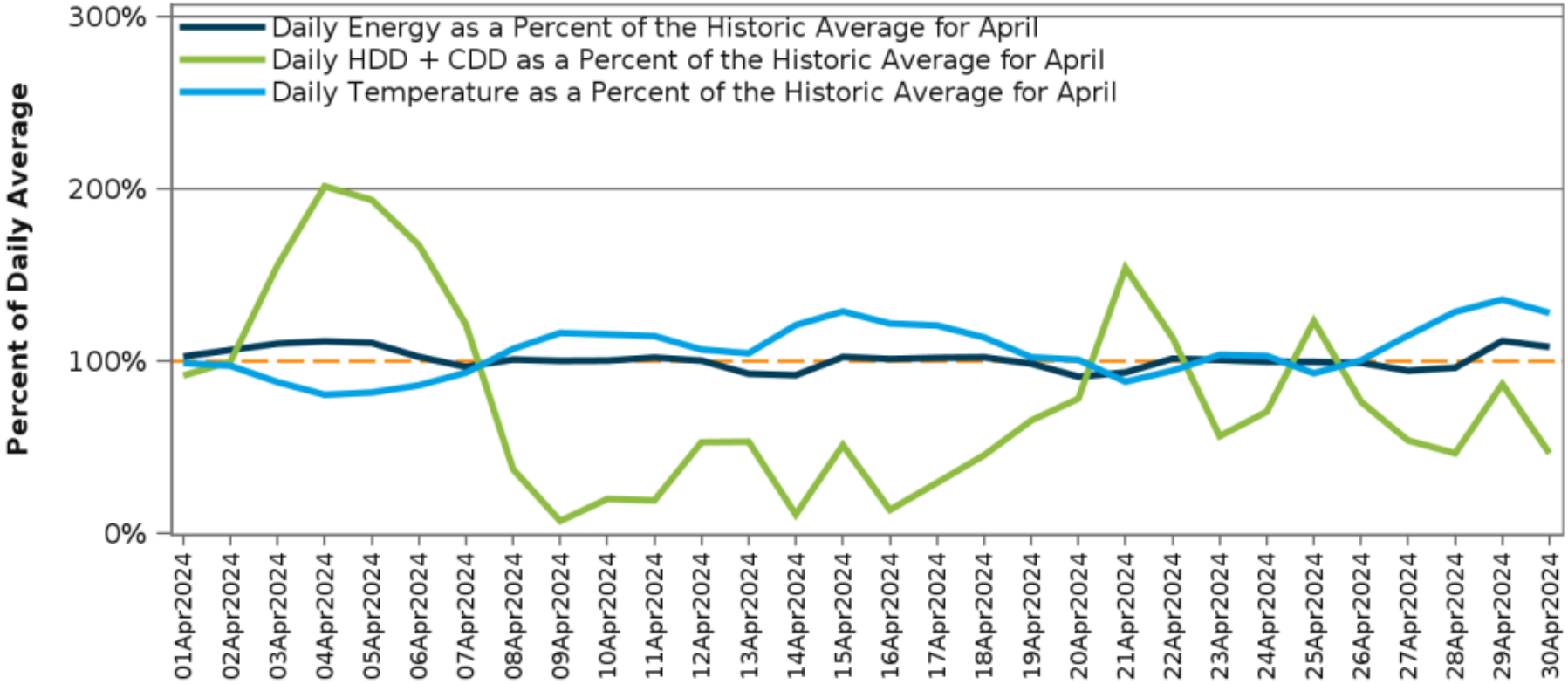
Market Conditions

- The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).
- Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or hotter, either HDDs or CDDs, respectively, will increase.
- Typically, winter months will only record HDDs, while summer months will only record CDDs. Shoulder months may have both HDDs and CDDs.
- Degree Days are calculated using a daily load weighting that weights values from stations in each TO zone according to the zonal contribution to the RTO peak on that day.
- Average values use data from 1998 to the most recent complete year, in this case, 2020. Averages include load data for all of TO zones in the current RTO footprint.

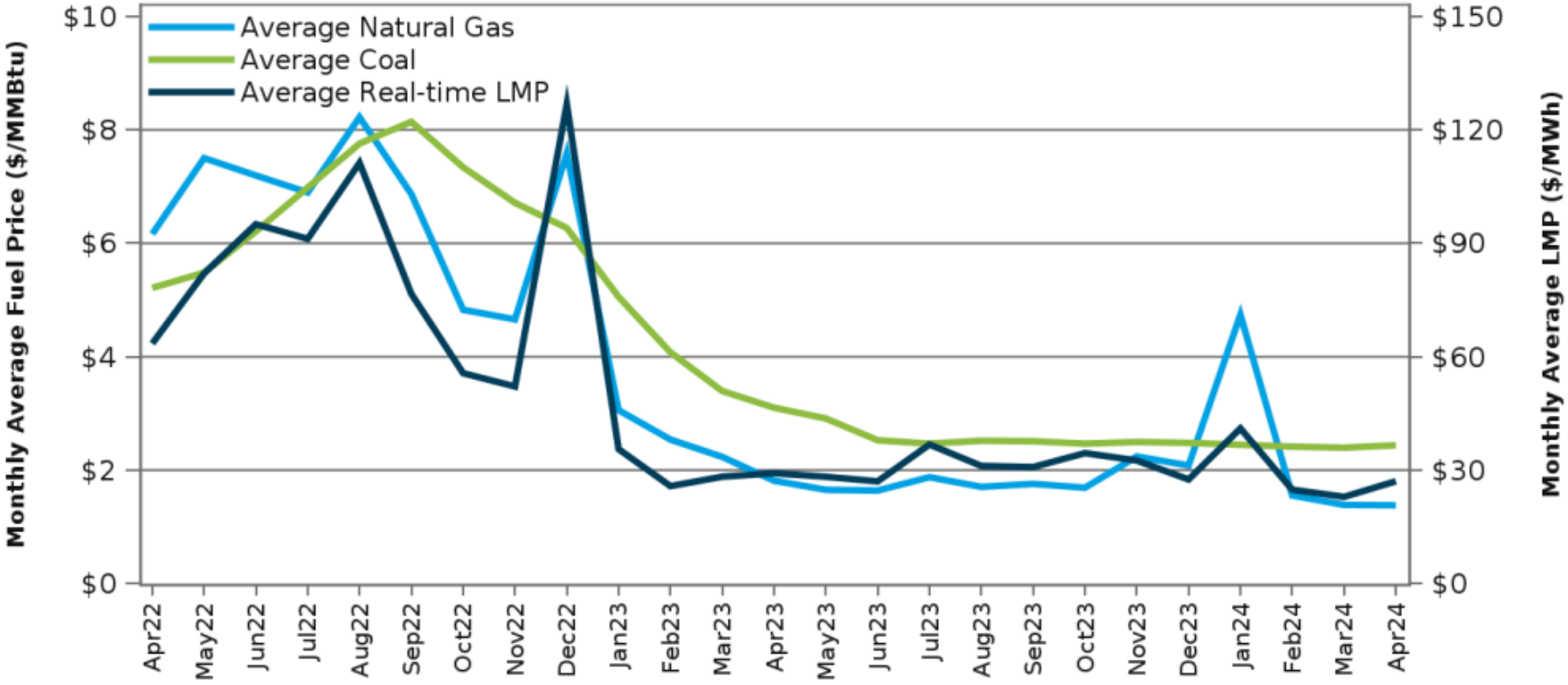
Historic Average Weather and Energy versus Current Month



Historic Average Weather and Energy versus Current Month - Daily

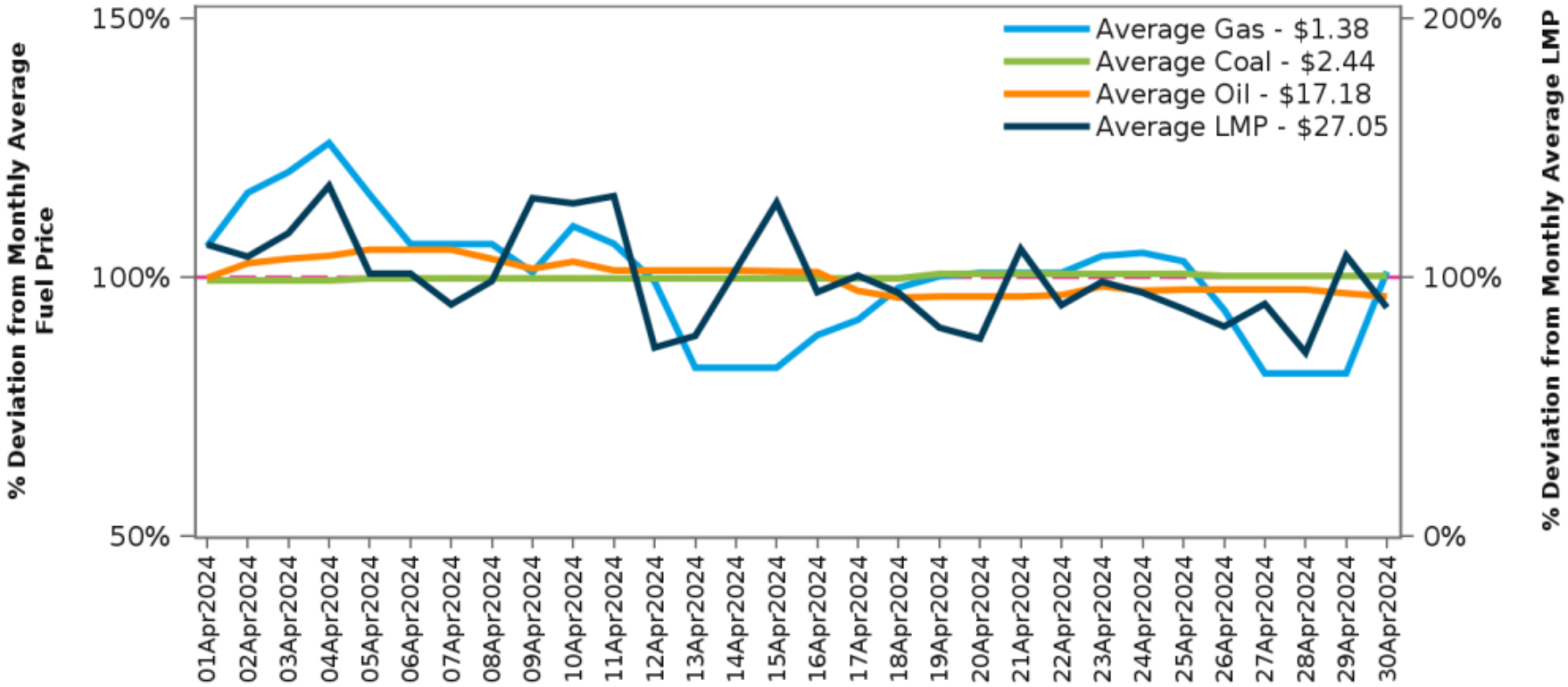


Average Fuel Prices - Monthly



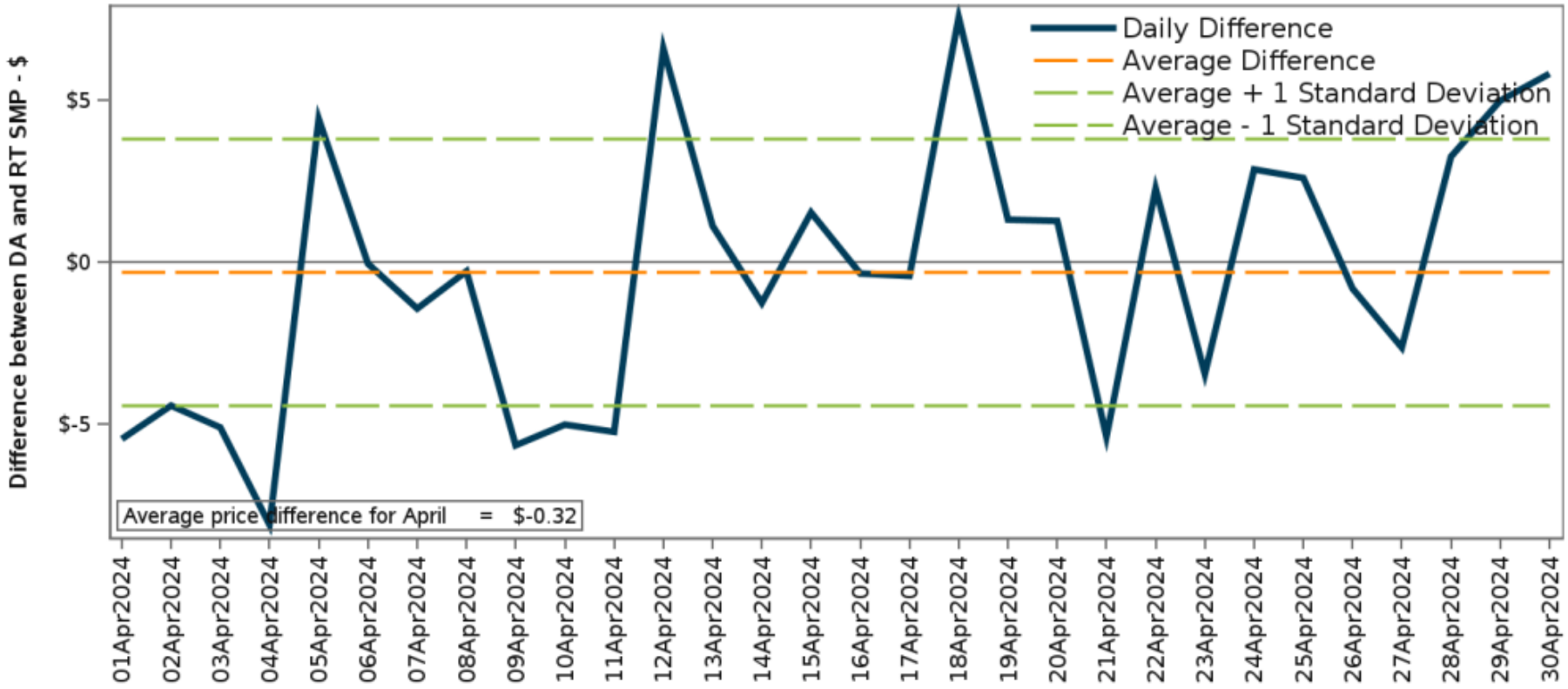
Fuel Price Source: S&P Global Platts

Average Fuel Prices - Daily



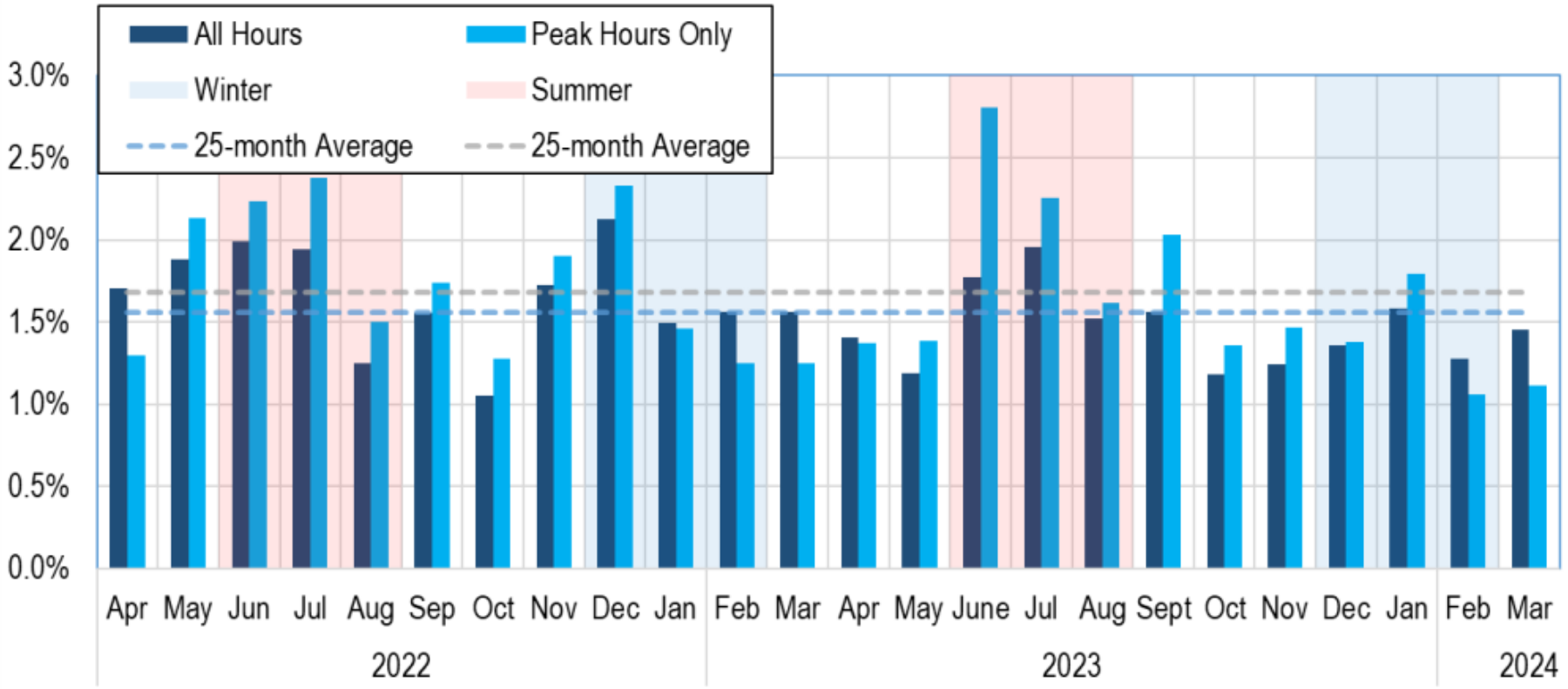
Fuel Price Source: S&P Global Platts

Daily Difference Between Day-Ahead and Real-Time System Marginal Prices

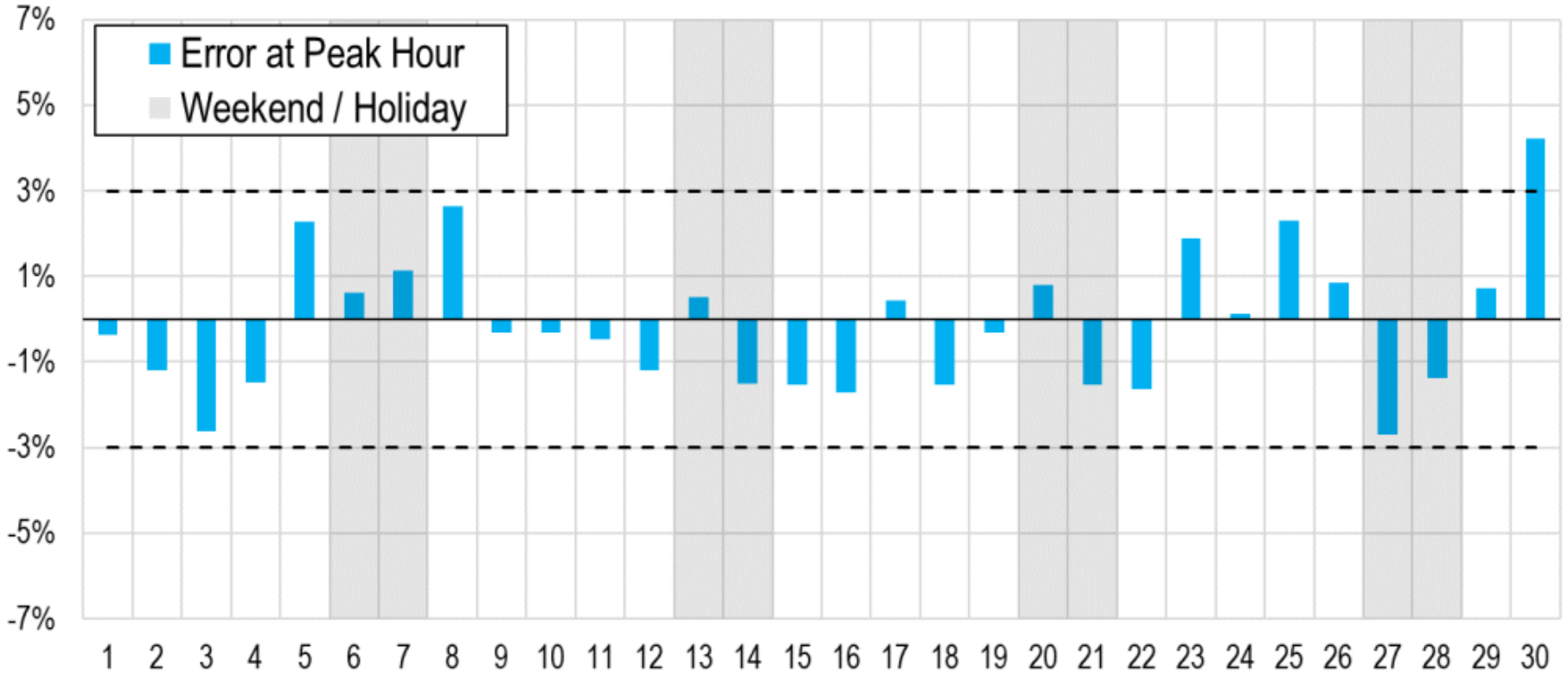


Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.

Load Forecast Error - Monthly Absolute Error, 10:00 Forecast



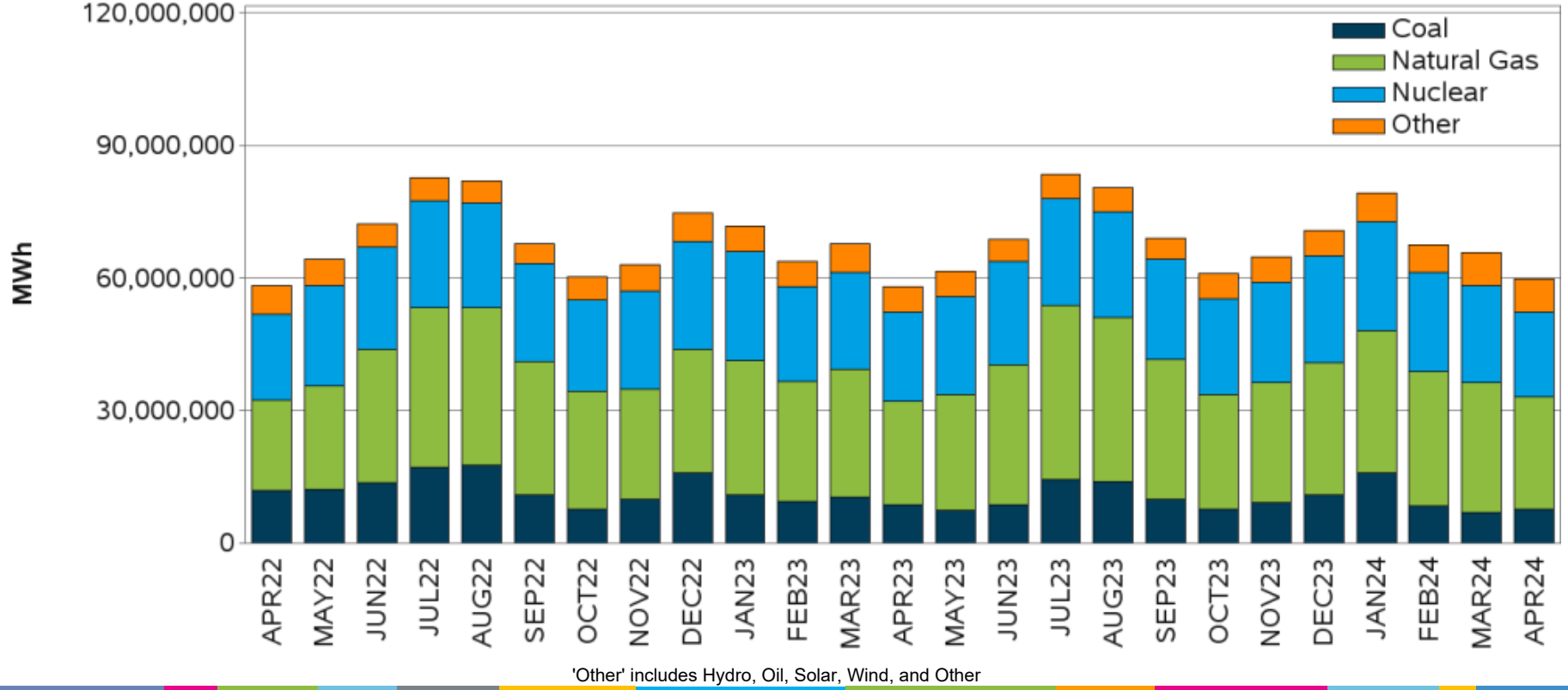
Load Forecast Error - April Daily Peaks, 10:00 Forecast



- PJM prepares a day-ahead load forecast at 10:00 am for use by our members.
- This forecast is not used to clear the day-ahead market and is not utilized for the reliability tools that run subsequent to the day-ahead market.

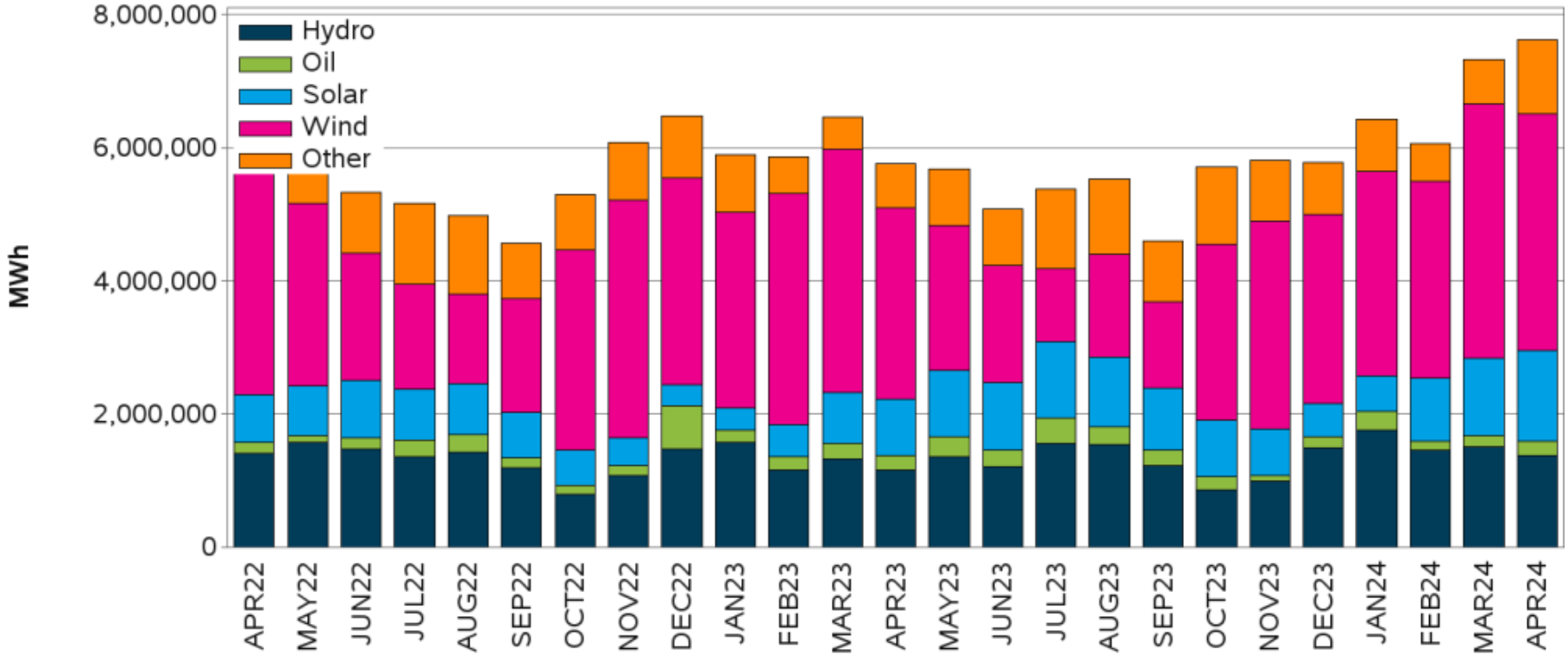
- 4/30 (*Tuesday*): forecast was higher than actuals due to a change in weather pattern; temperatures decreased significantly from previous days' buildup of heat, and loads decreased for the day. There was temperature forecast error, as temperatures came in cooler than forecast in multiple zones, leading to lower loads as well.

Monthly Generation by Fuel



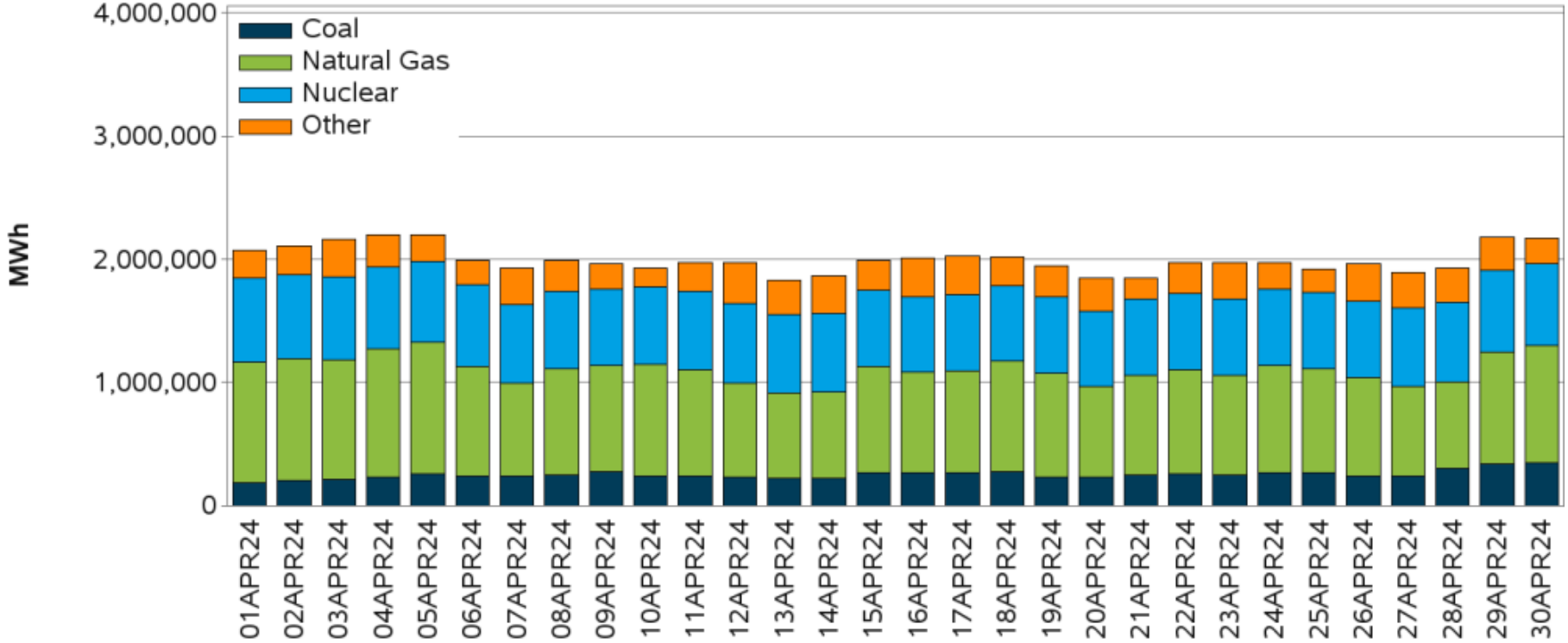
'Other' includes Hydro, Oil, Solar, Wind, and Other

Monthly Generation by Fuel, Other



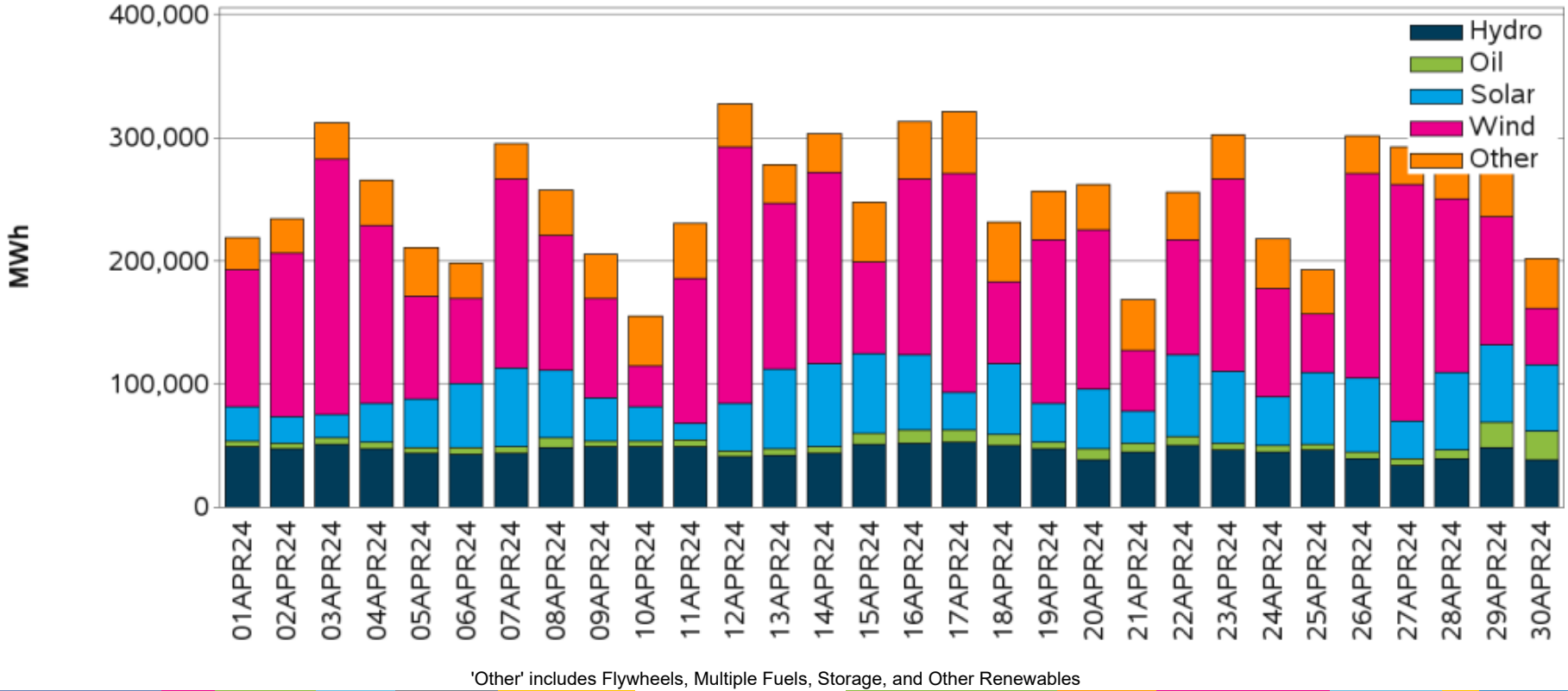
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Daily Generation by Fuel - April



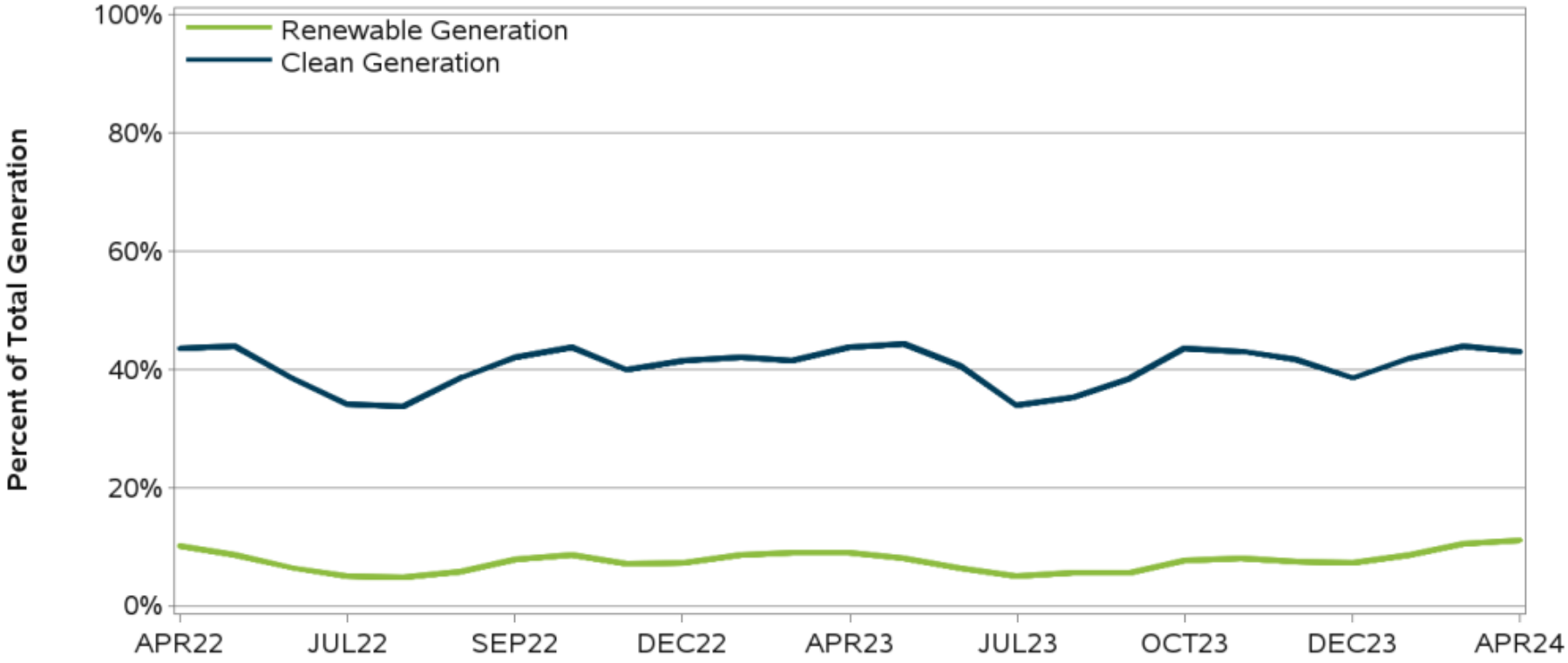
'Other' includes Hydro, Oil, Solar, Wind, and Other

Daily Generation by Fuel, Other - April



'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Percent of Renewable and Clean Generation

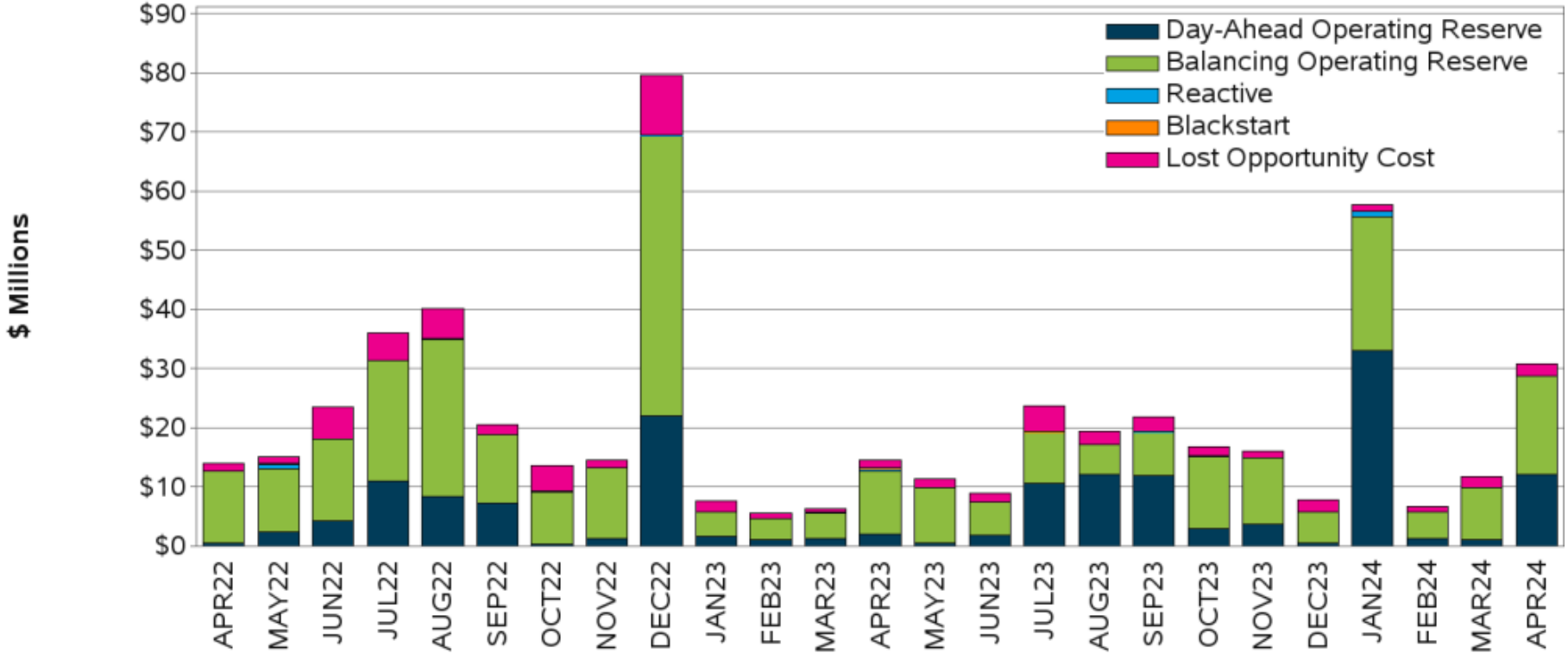


'Renewable' includes Wind, Solar, Hydro, and Other Renewables. 'Clean' includes Renewable and Nuclear.

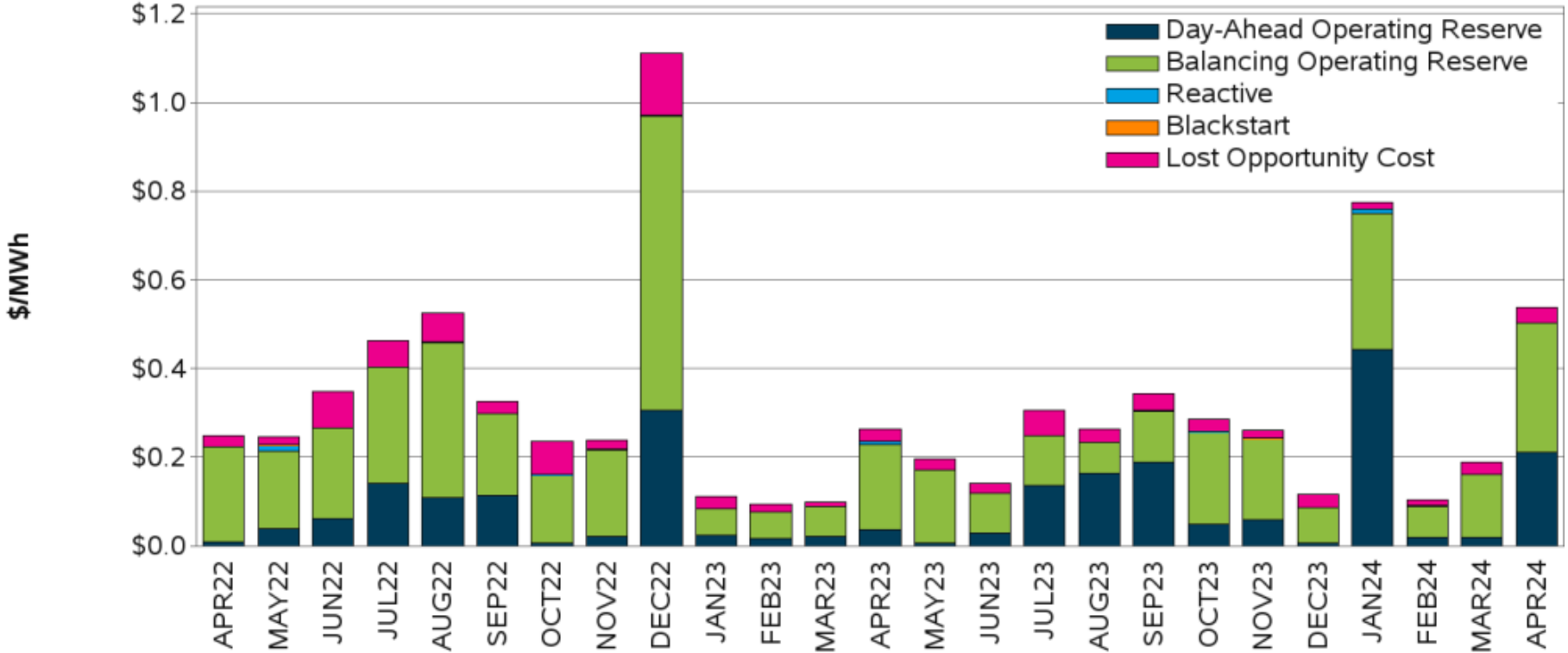
Operating Reserve

(Uplift)

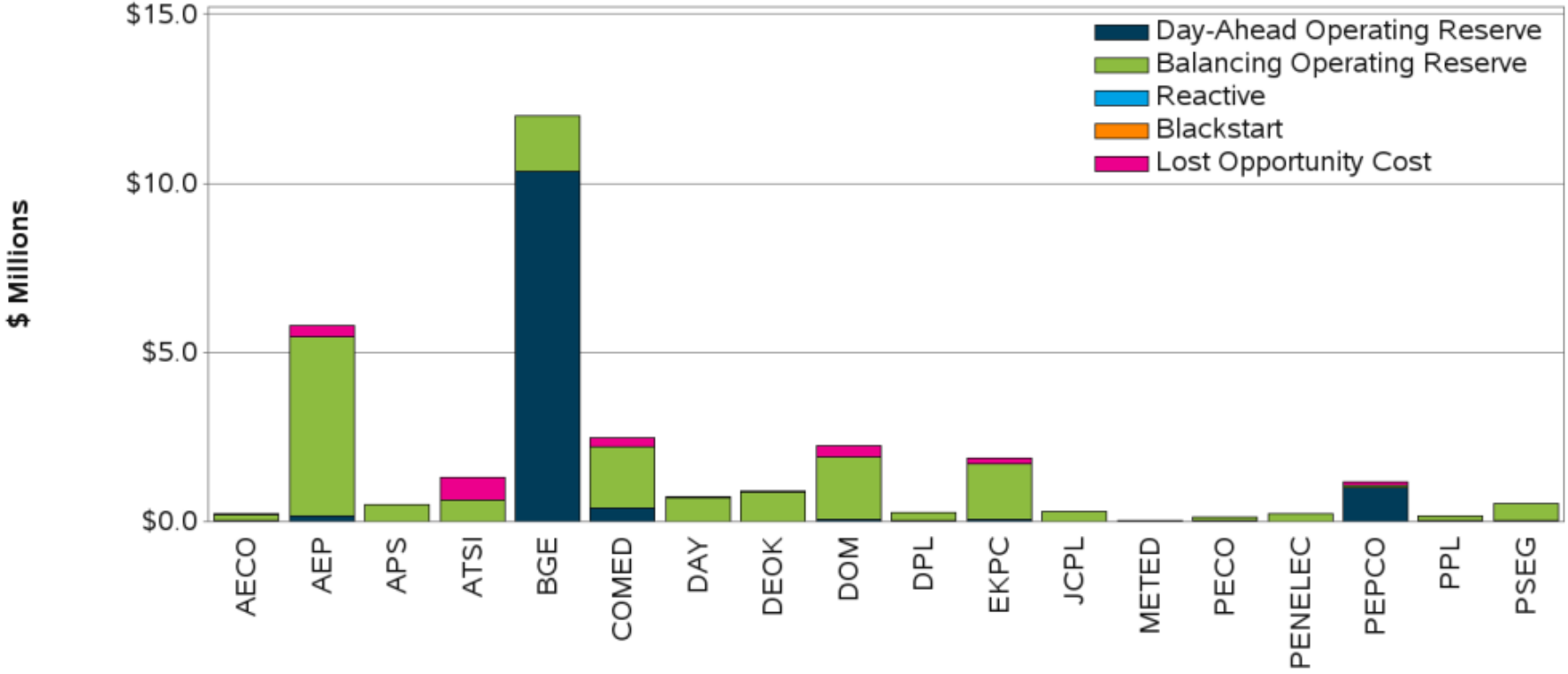
Monthly Uplift



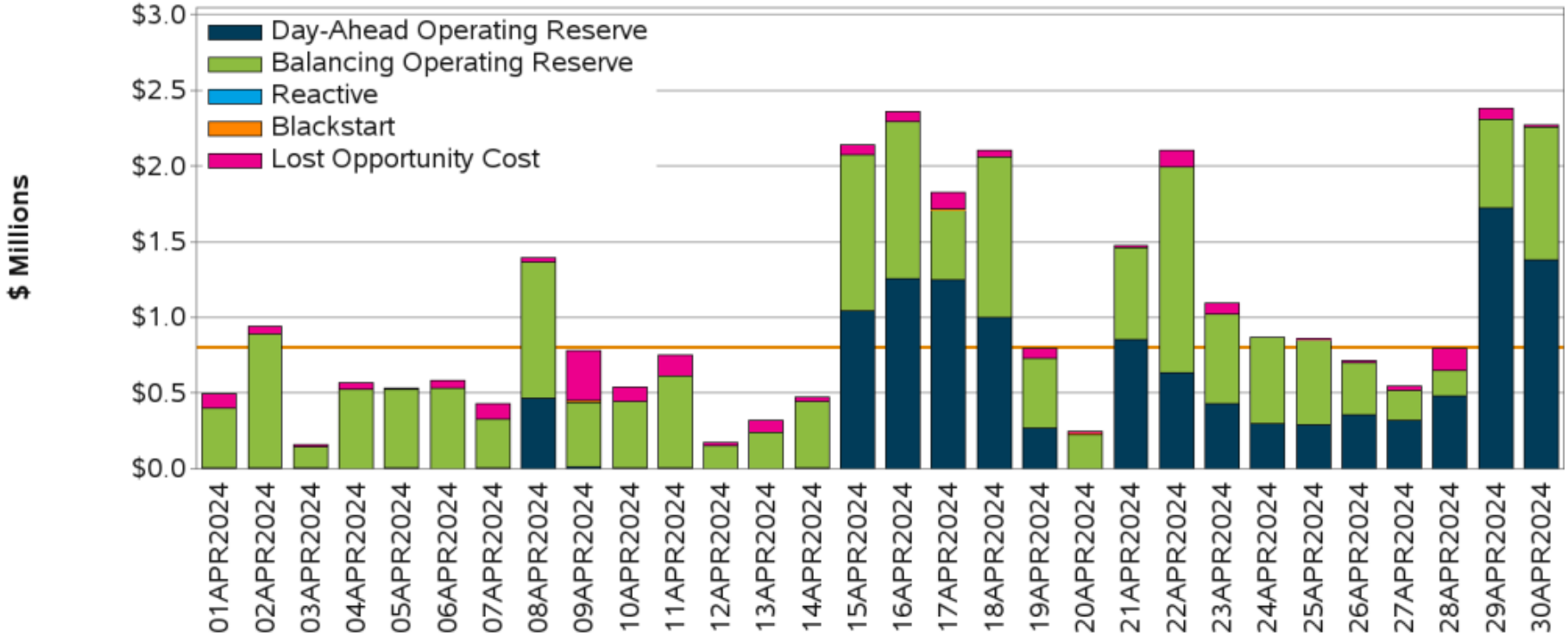
Monthly Uplift - $/MWh Load



Zonal Uplift - April



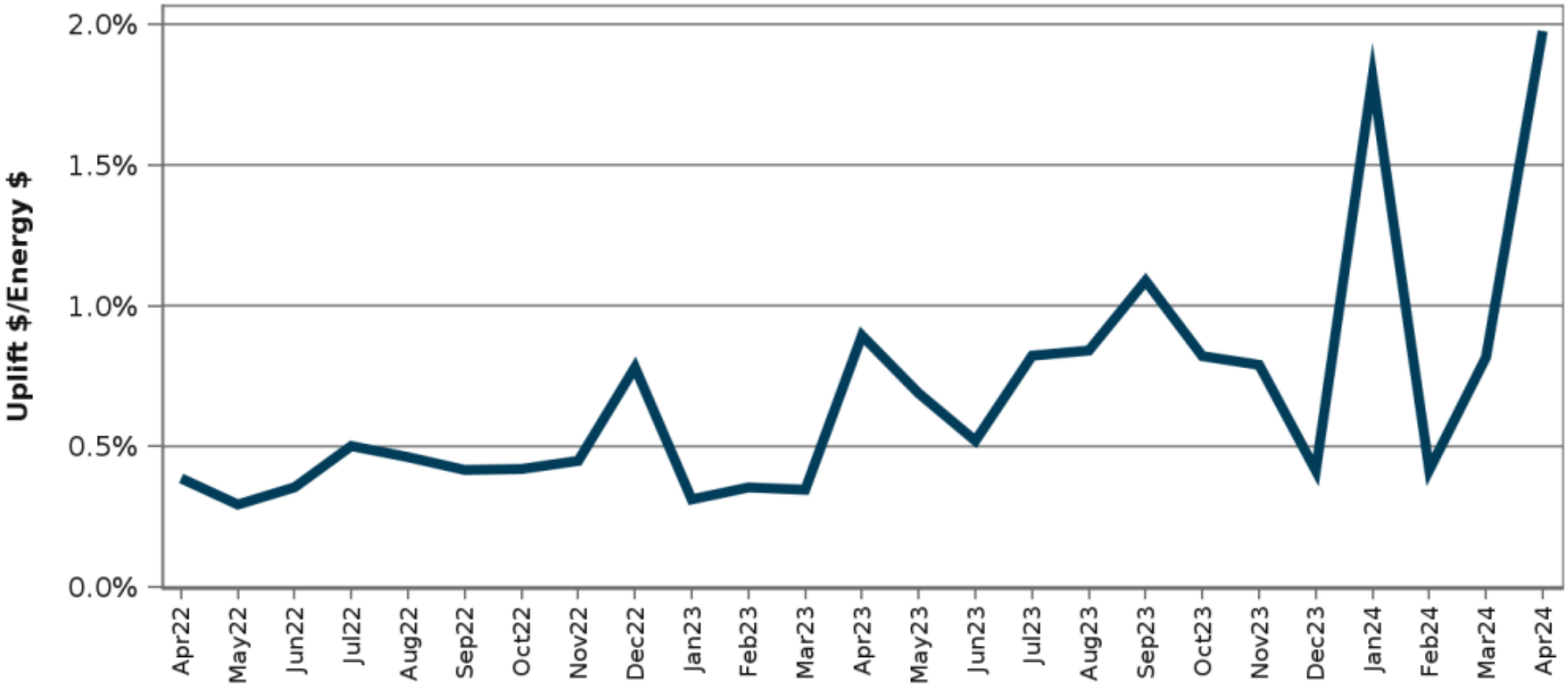
Daily Uplift - April



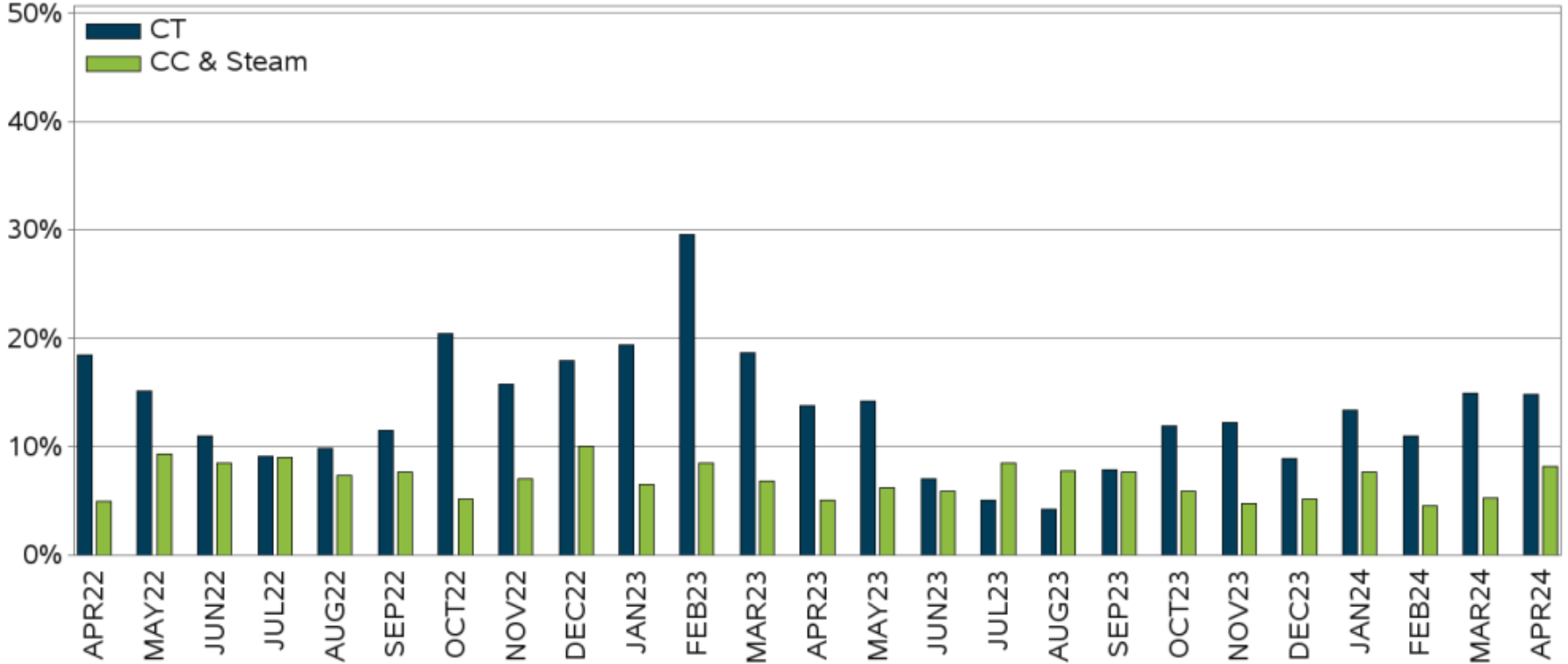
- In April, uplift exceeded $800,000 on 13 days -
- Contributing factors to uplift were:
  - Reliability needs to support our north south flows
  - Localized congestion

- More information on Uplift can be found on the PJM website at Drivers of Uplift

Uplift as a Percent of Energy Costs



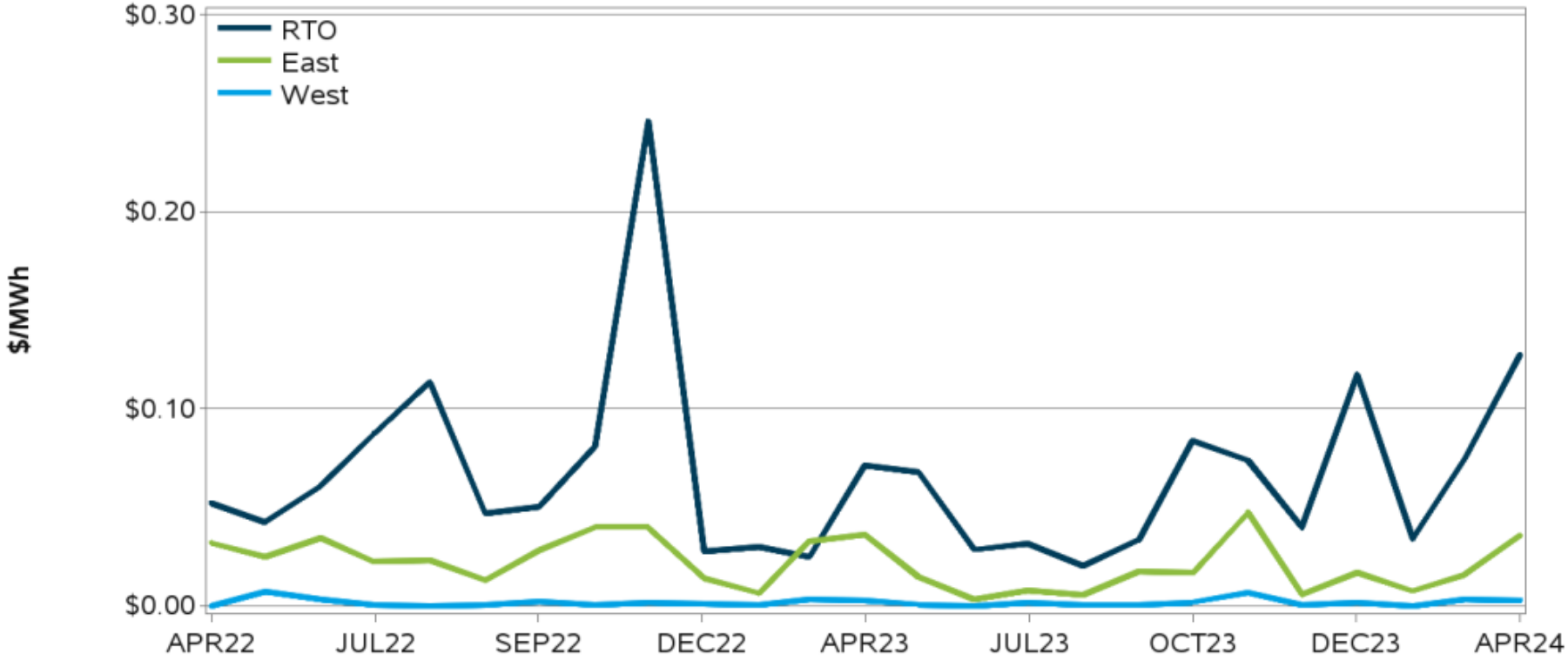
Percent of Total CT, CC and Steam Hours with LMP < Offer



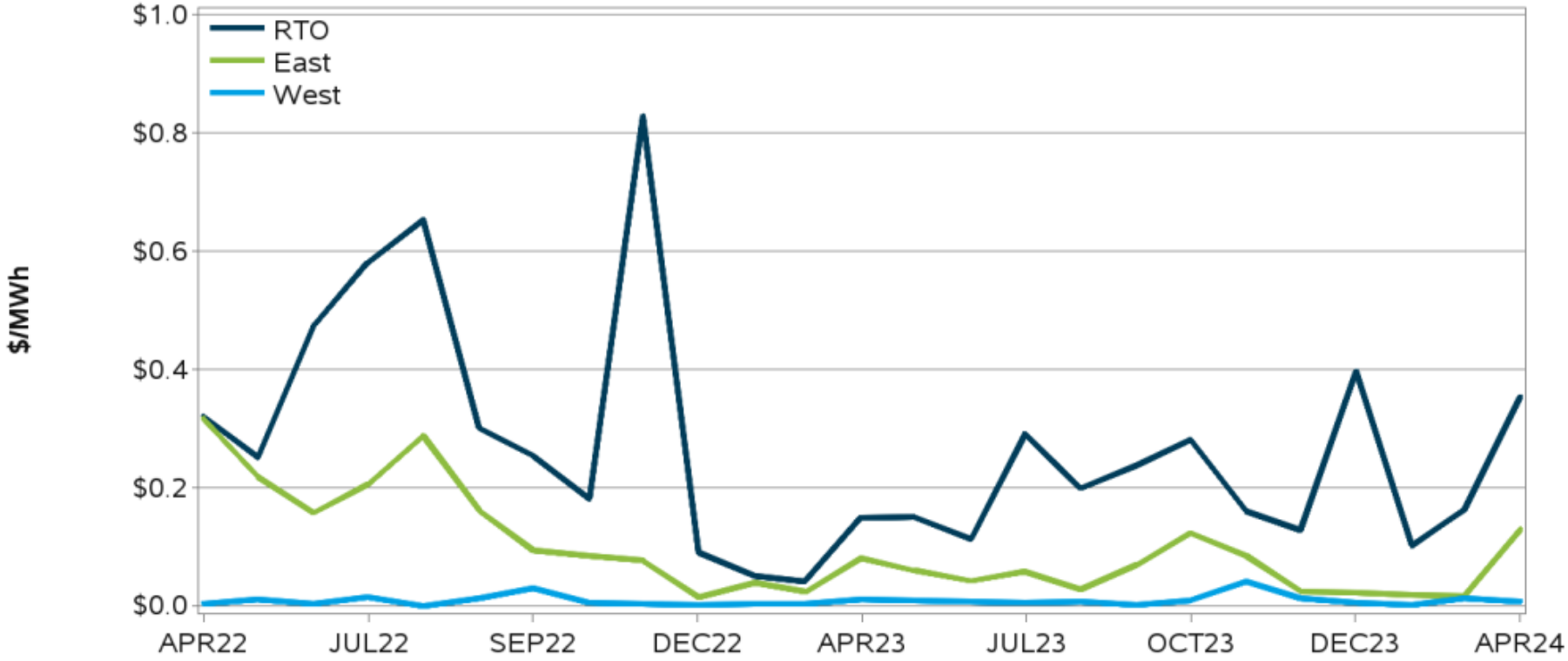
- Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.

- Reliability rates are charged to all real-time load and exports, whereas deviation rates, as before, are charged only to real-time deviations. RTO rates are charged to the whole footprint, whereas East and West rate adders are charged based on location.

Reliability Balancing Operating Reserve Rates



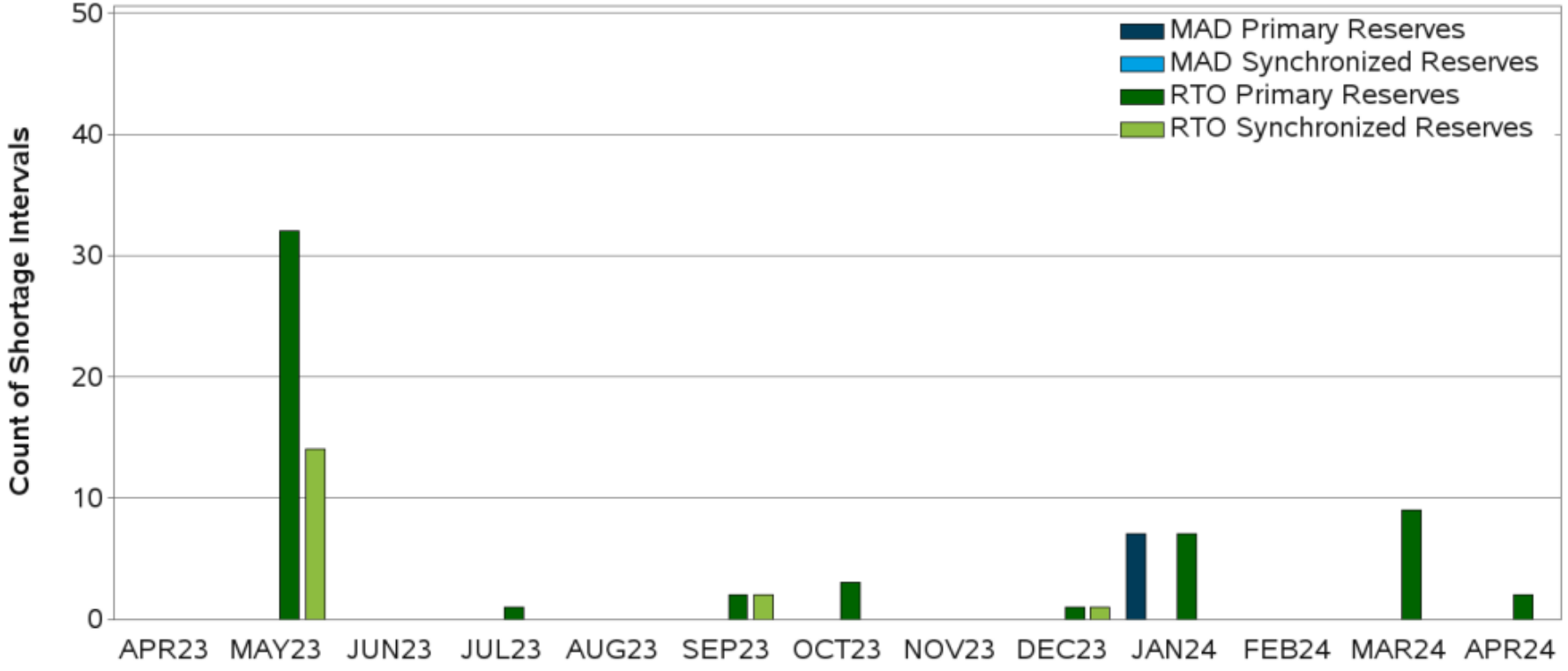
Deviations Balancing Operating Reserve Rates



Energy Market

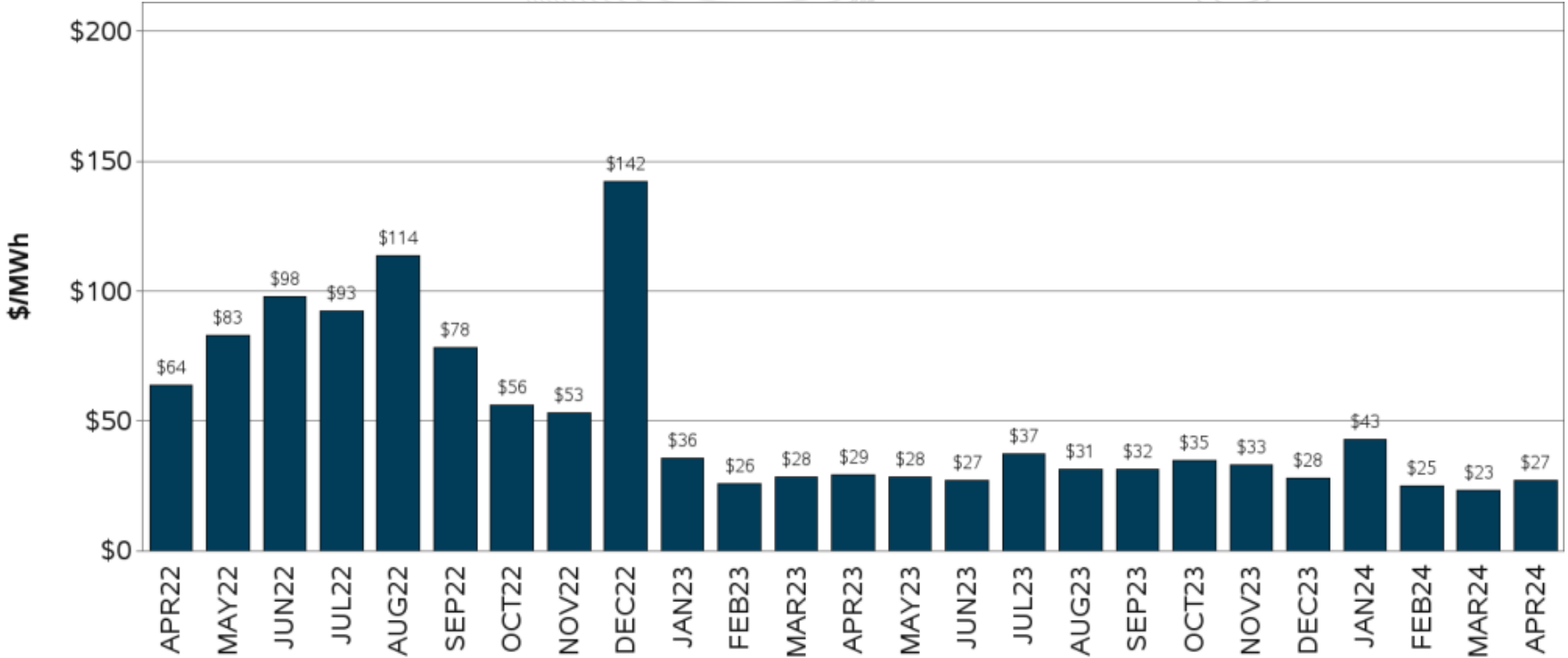
LMP Summary

Shortage Pricing Intervals

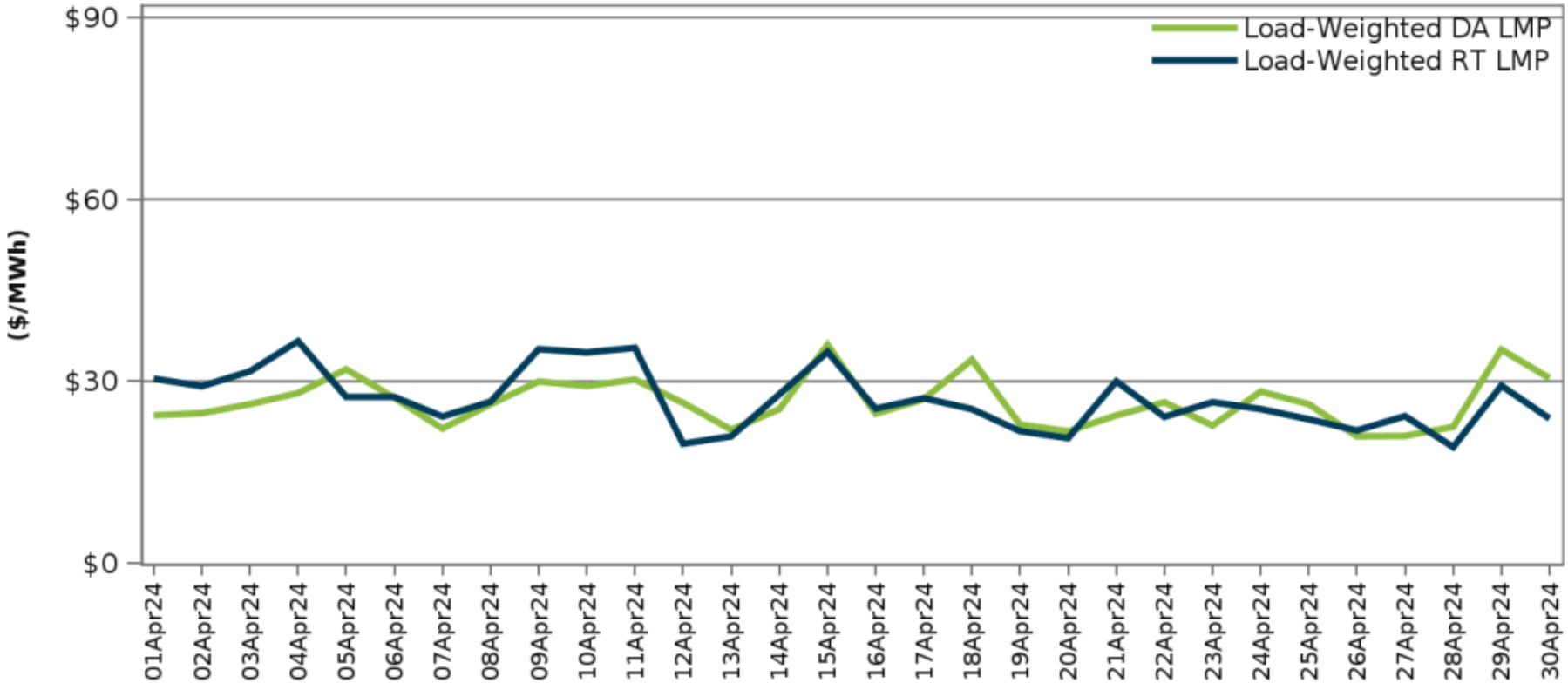


[Information on constraints and shadow prices can be found here]

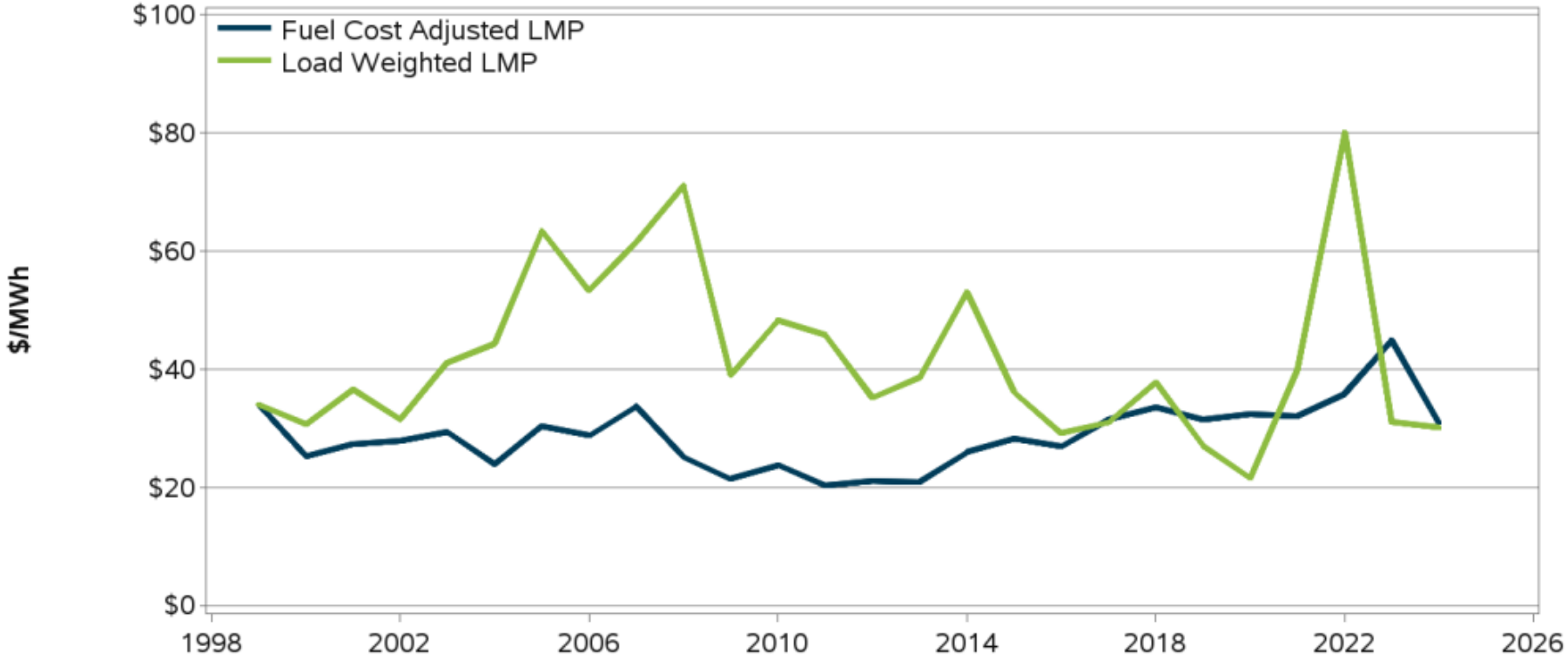
Monthly Load-Weighted Average Real-time LMP



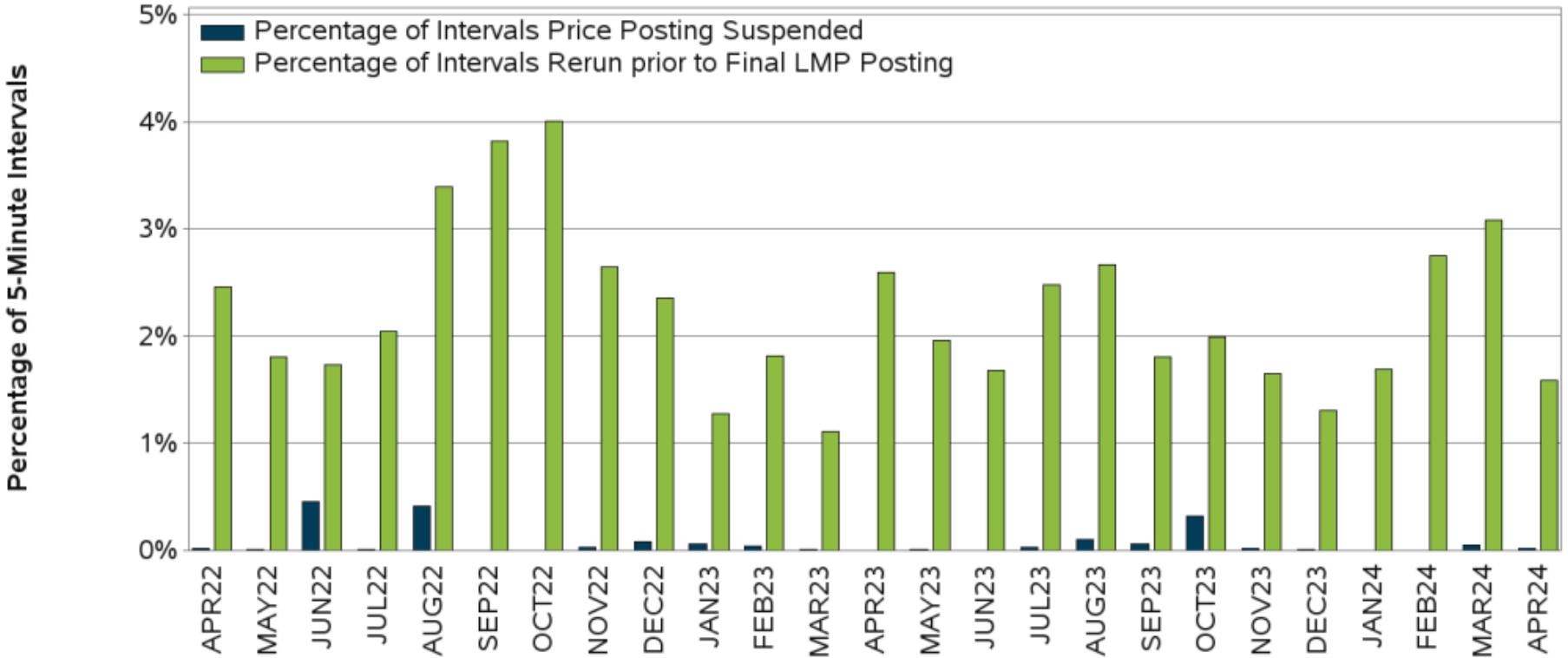
Daily Load-Weighted Average DA & RT LMP



Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)



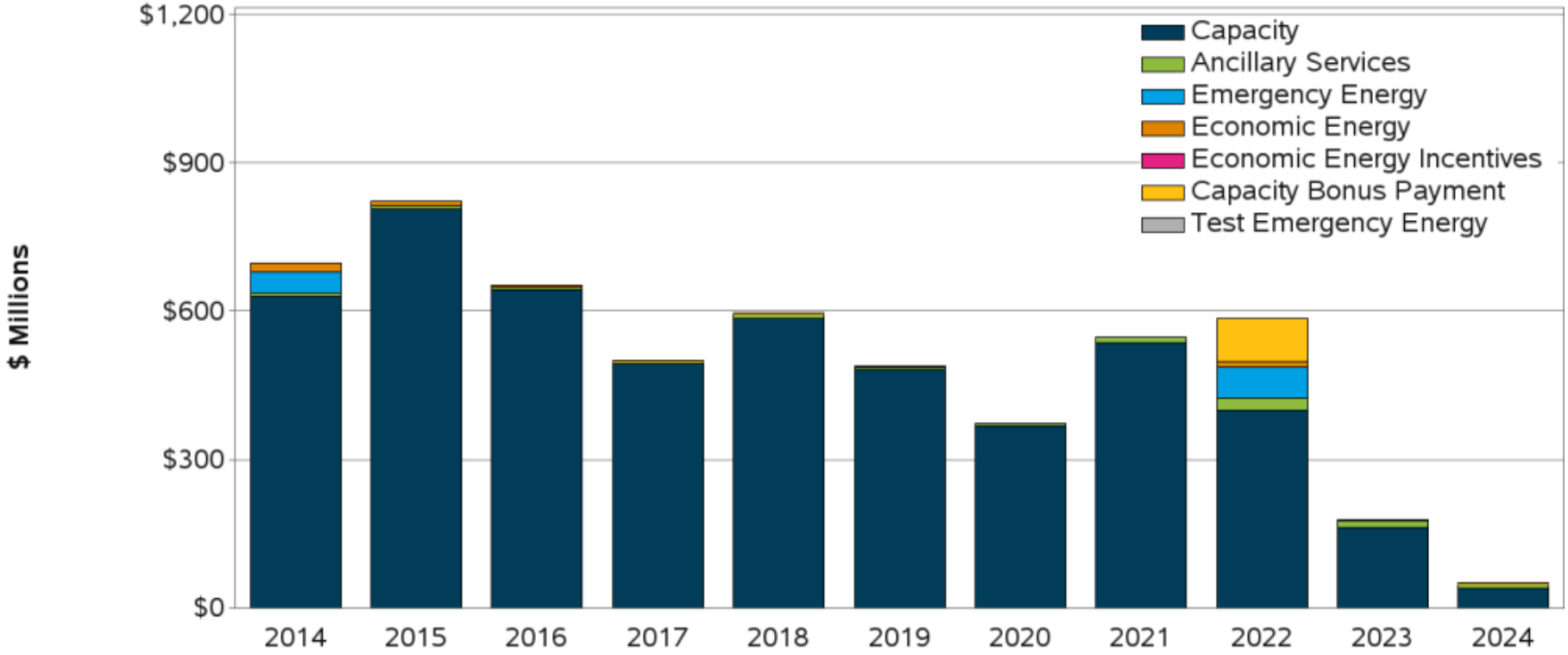
LMP Price Posting Suspensions and Reruns



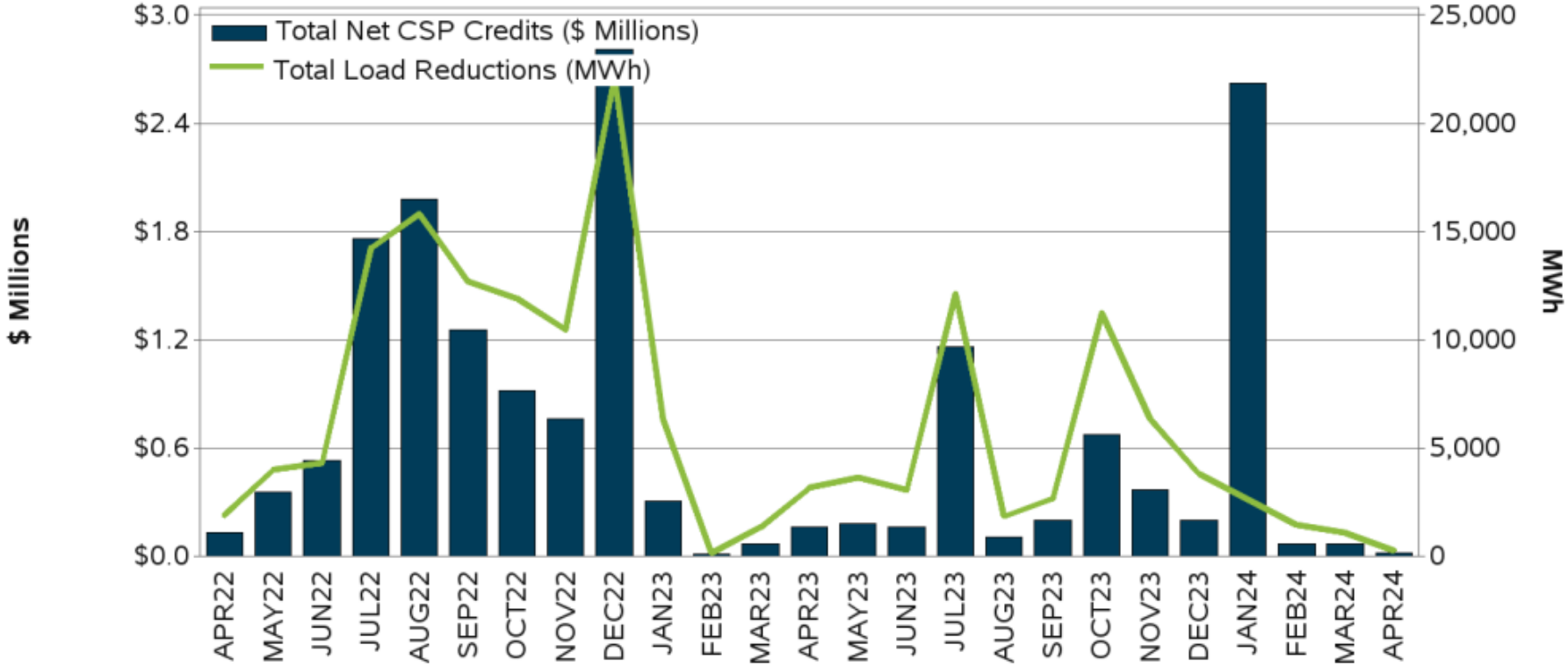
Energy Market

Demand Response Summary

Demand Side Response Estimated Revenue

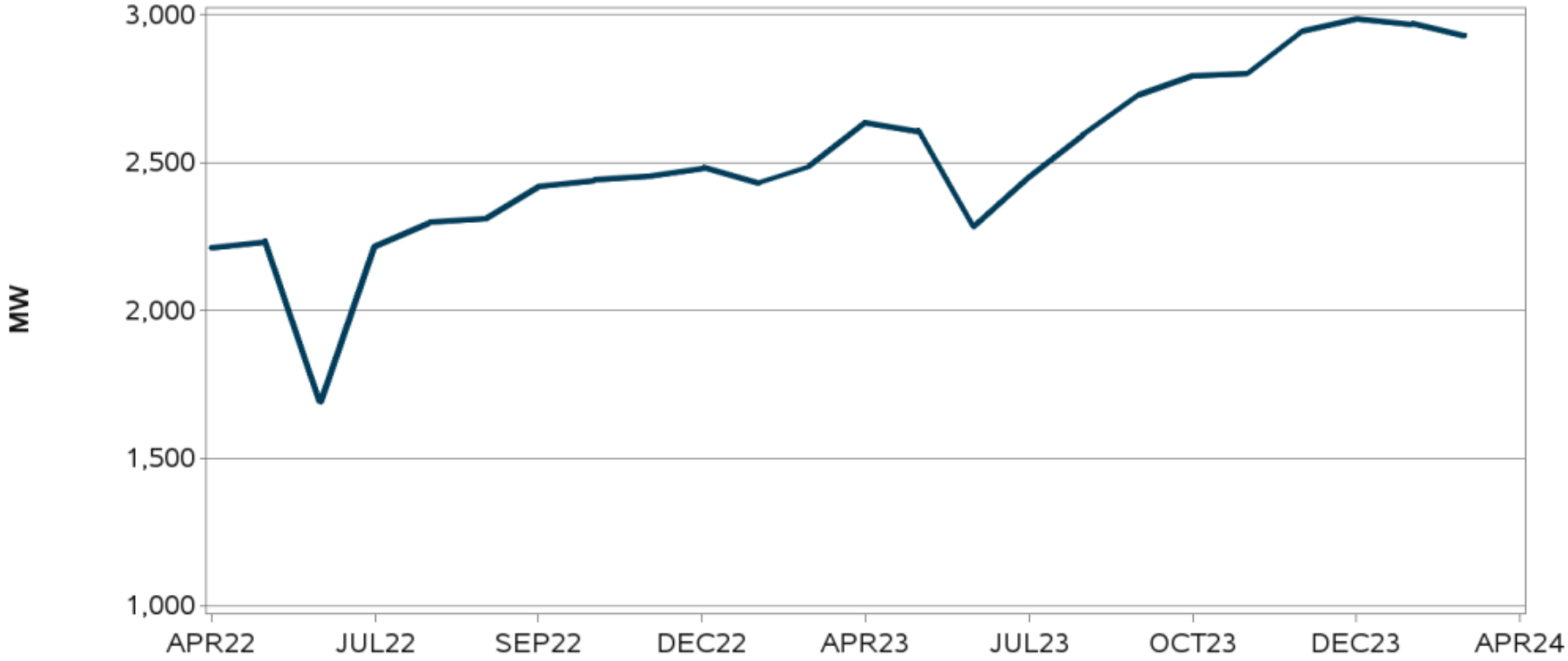


Economic Demand Response Activity



*Data for the last few months are subject to significant change due to the settlement window.

Total Registered MW in PJM's Economic Demand Response

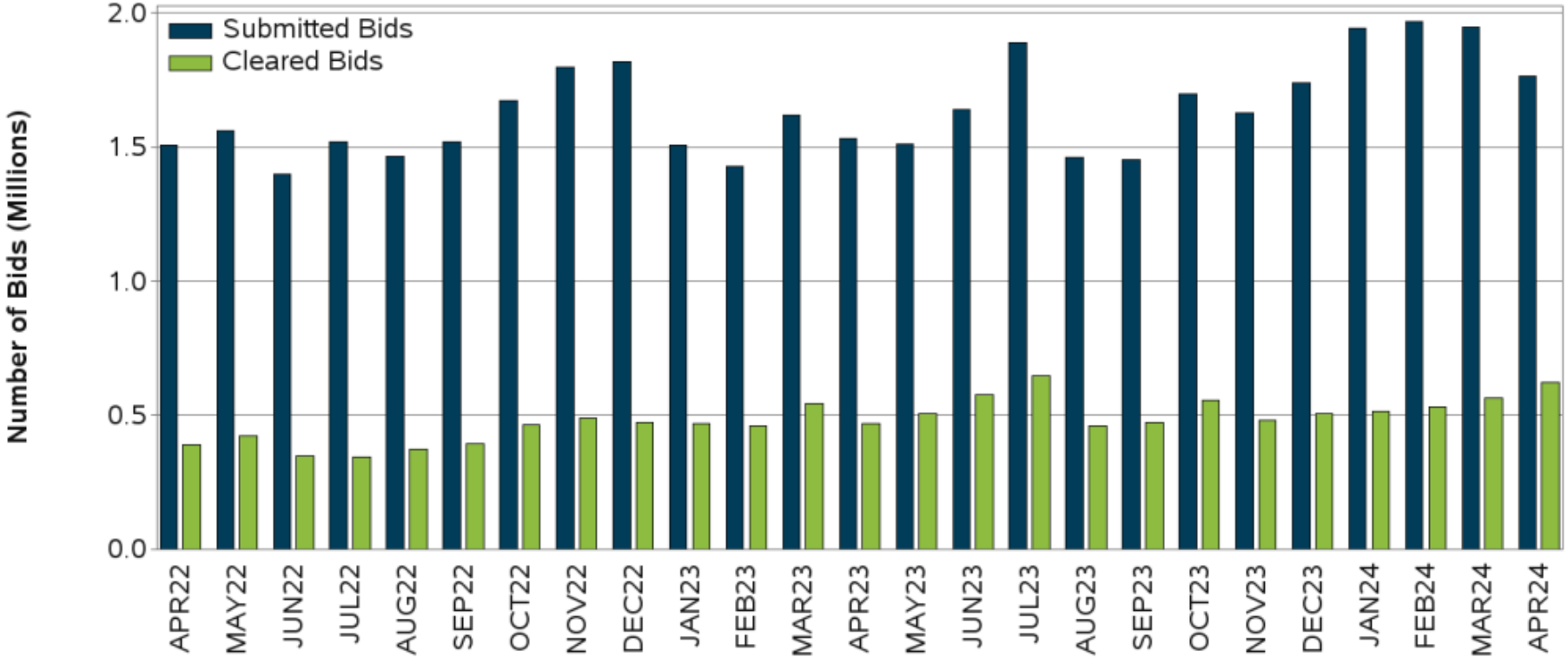


Energy Market

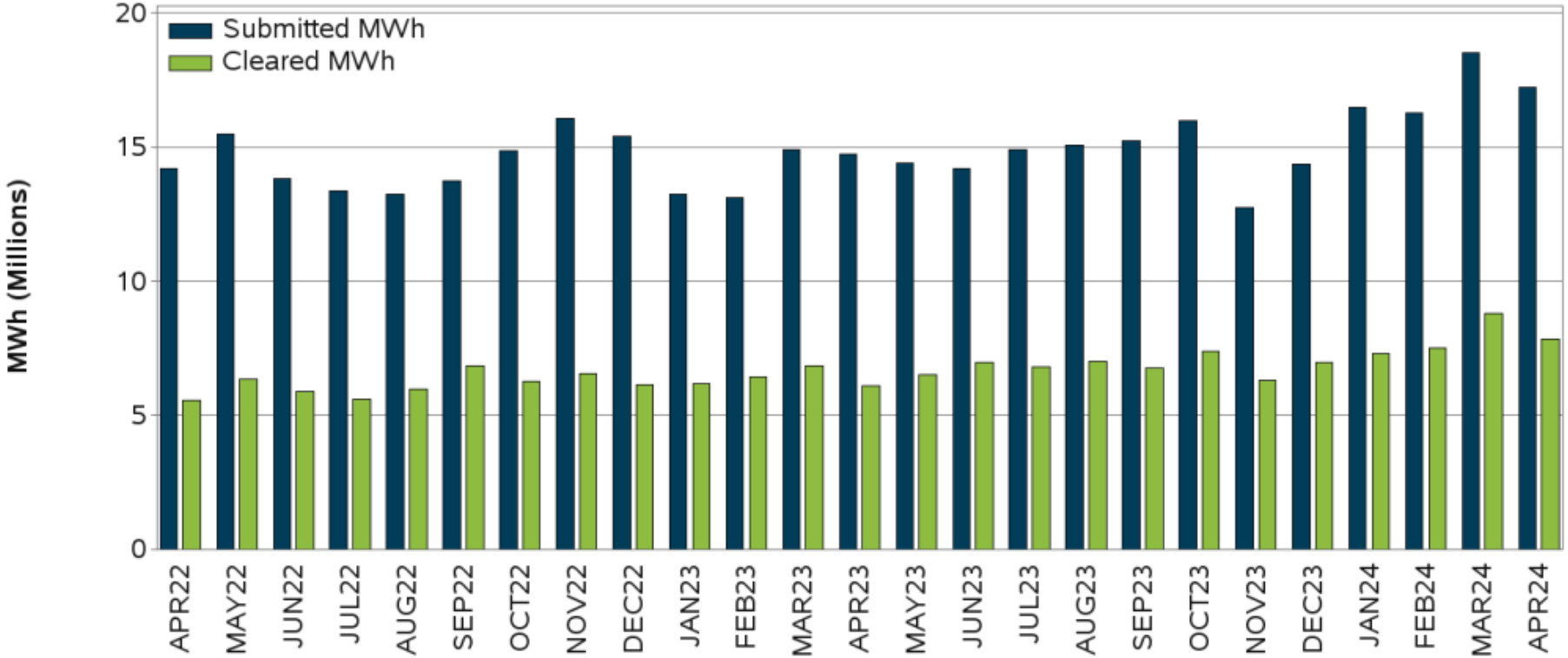
Virtual Activity Summary

- The following six charts depict trends in submitted and cleared virtual and up-to-congestion transactions, in terms of number and volume, into the PJM Energy Market. The first two of these charts show the submitted and cleared increment and decrement bids (virtual transactions or virtuals) and they are the same as what was previously being presented in this report. The two charts after them display the trends in submitted and cleared up-to-congestion transactions into the PJM Energy Market. The last two of these six charts combine the virtual and up-to-congestion transactions and show the sum of these two categories.
- To clarify what a bid or transaction is, please consider the following example: An offer (increment, decrement or up-to-congestion) of 10 MW, valid for eight hours for a given day, is captured in the charts as eight submitted bids/transactions and 80 submitted MWh. If this offer fully clears for three of the hours it was submitted for, it shows in the charts as three cleared bids/transactions and 30 cleared MWh.

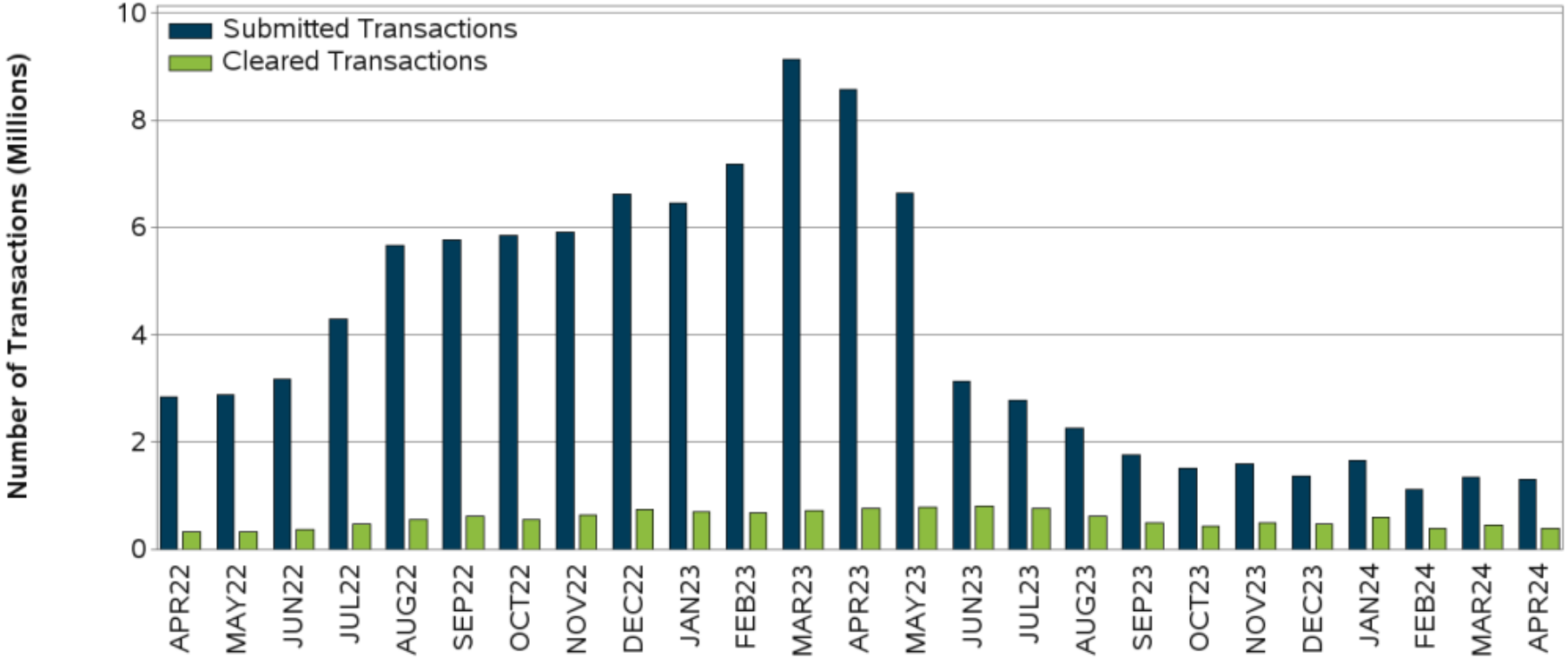
Virtual Bids (INCs & DECs) - Total Number



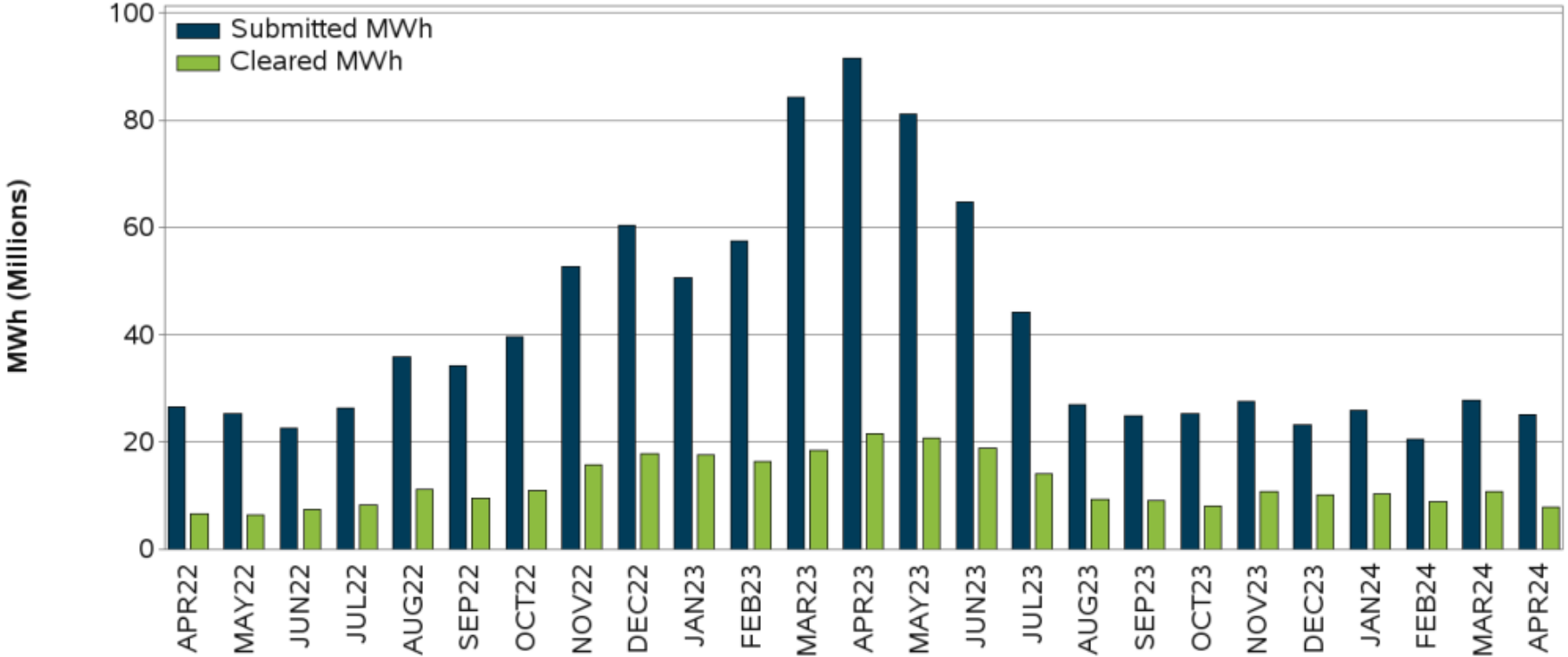
Virtual Bids (INCs & DECs) - Total Volume



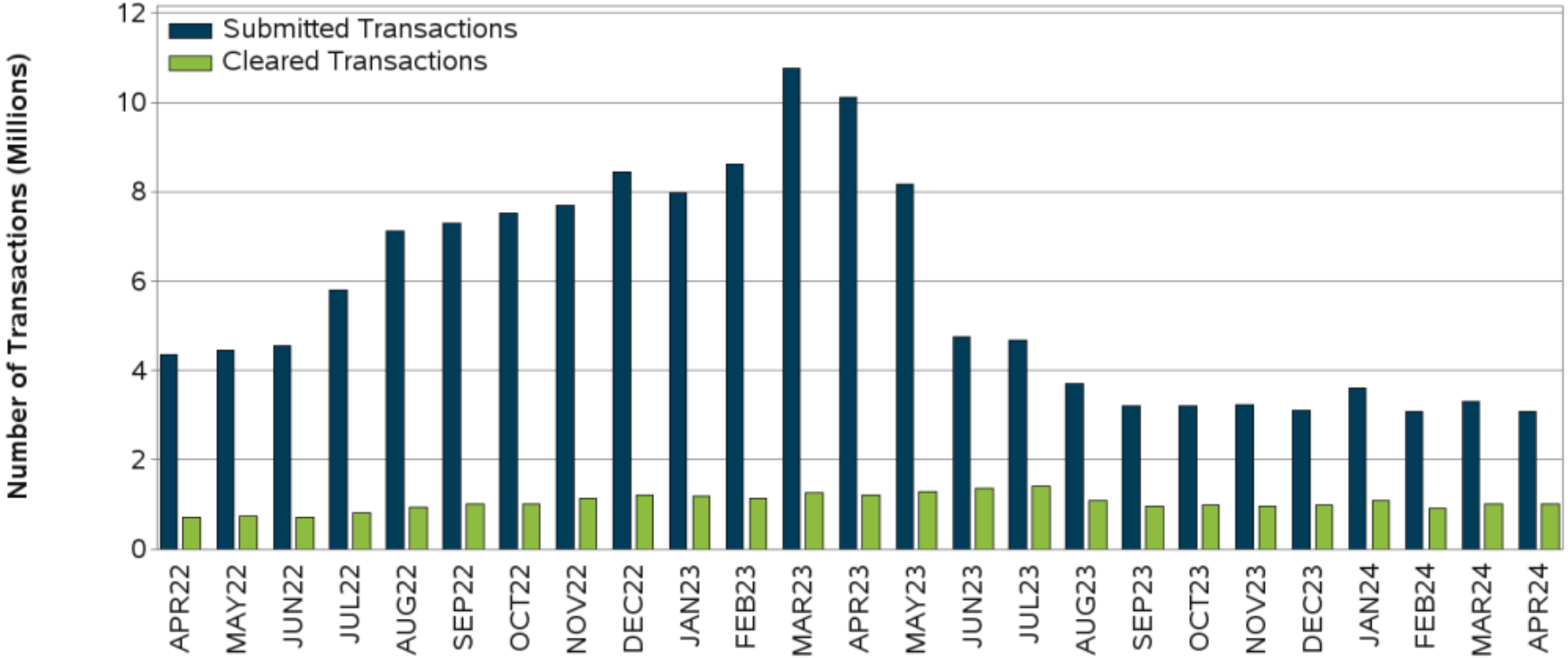
Up-To-Congestion Transactions - Total Number



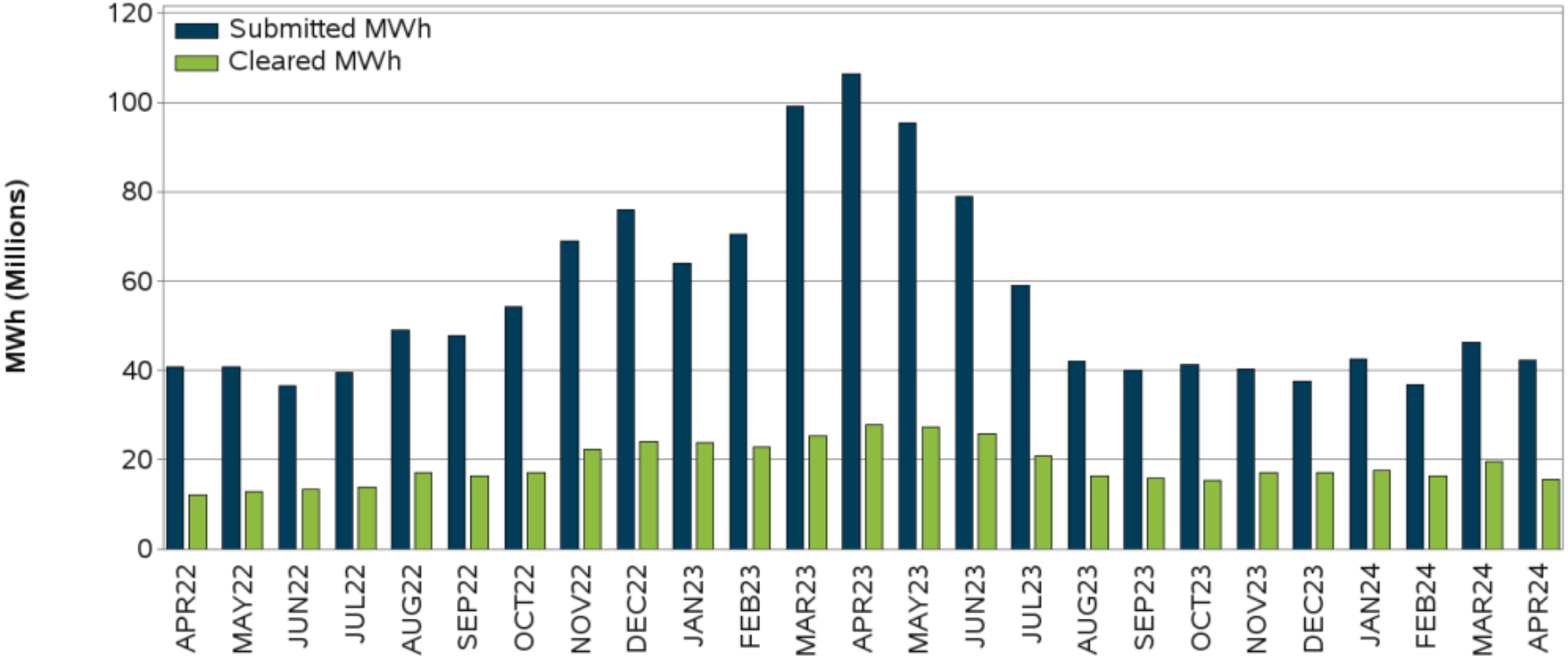
Up-To-Congestion Transactions - Total Volume



INCs, DECs and Up-To-Congestion Transactions - Total Number



INCs, DECs and Up-To-Congestion Transactions - Total Volume



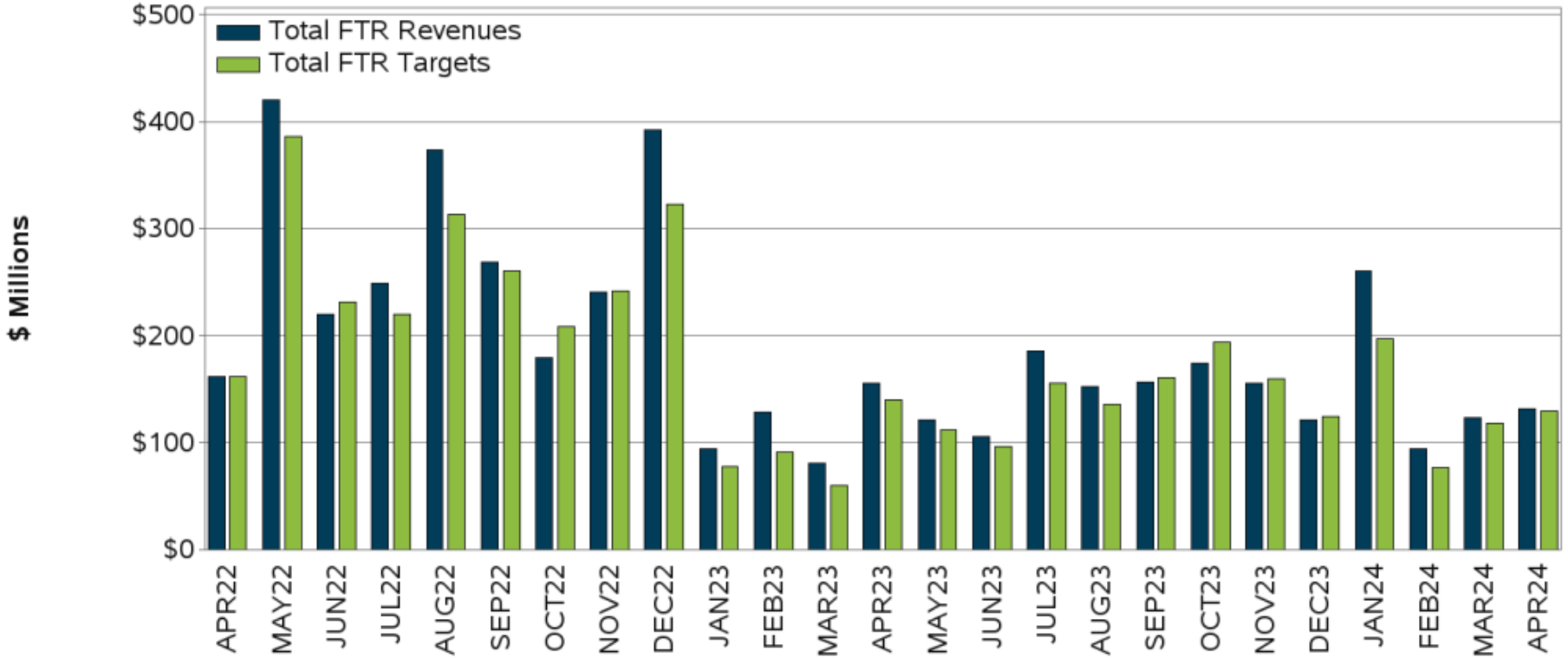
Energy Market

Congestion and FTR Summary

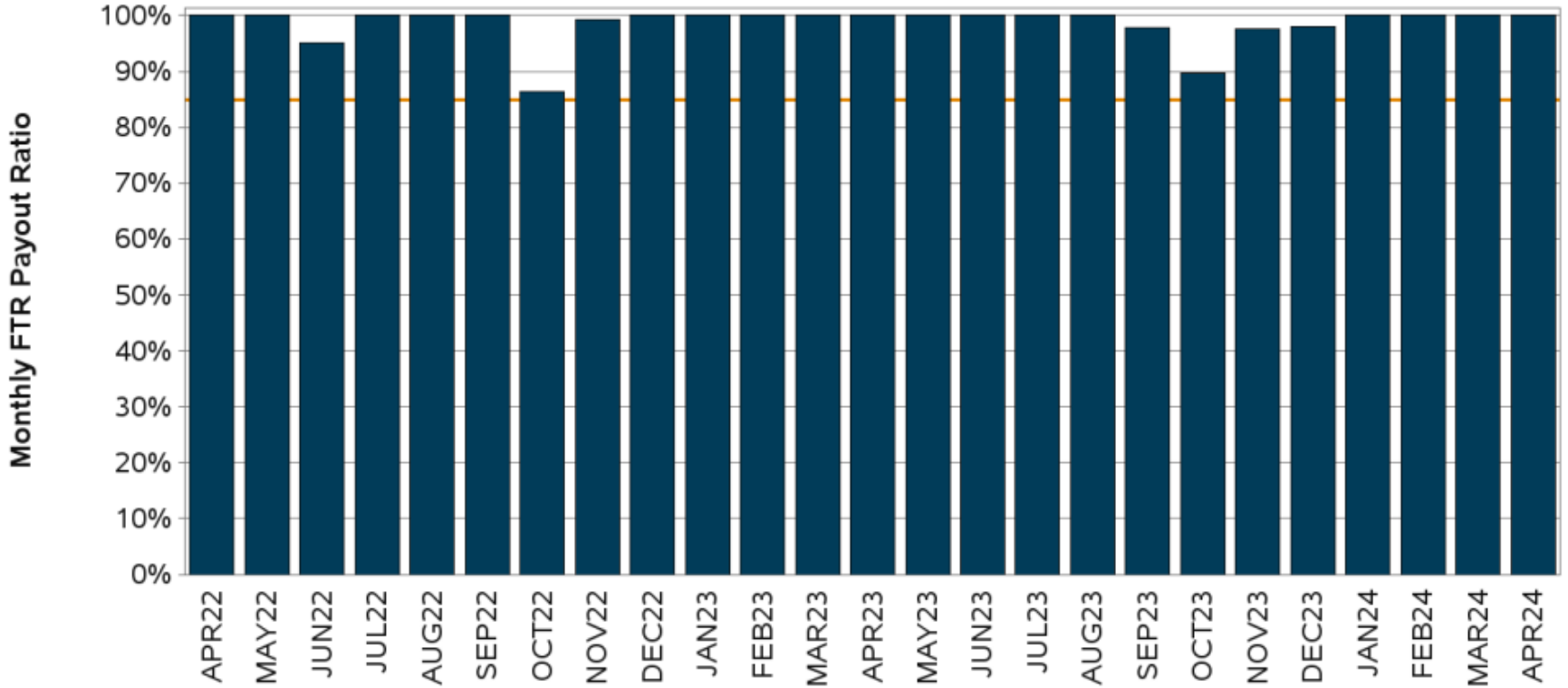
FTR Funding

Period	Surplus / Underfunding	Payout Ratio
April 2024	$2,172,756	100%
2024	$88,884,573	100%
2023/2024	$115,240,770	100%

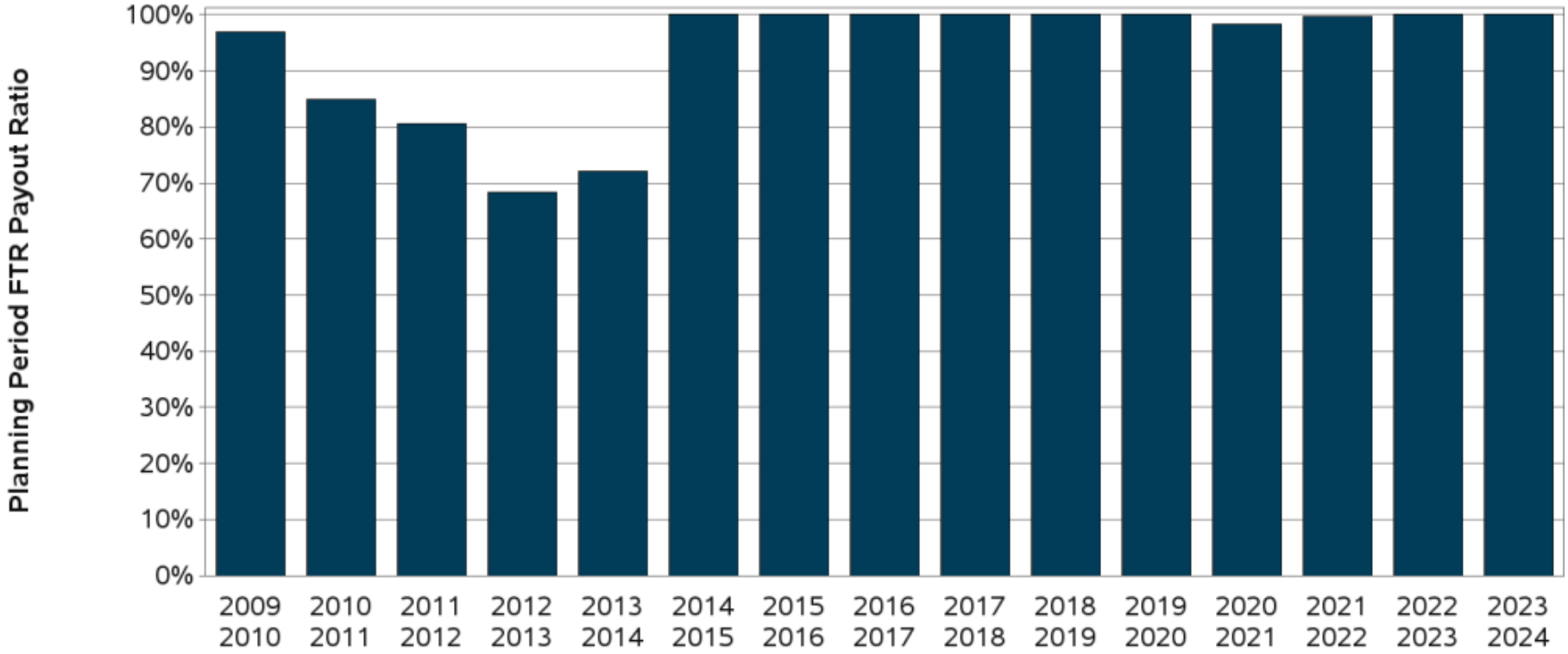
FTR Revenue vs. FTR Target Allocation



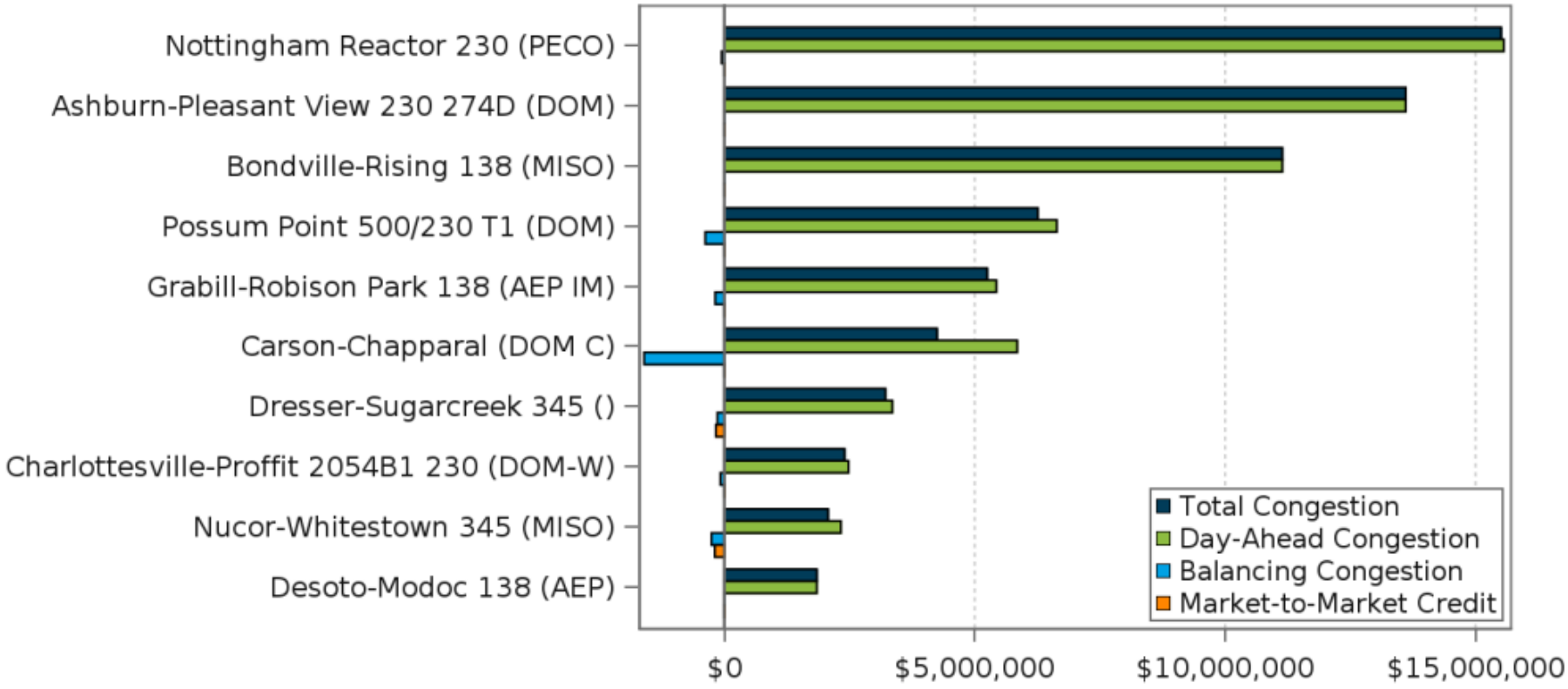
Monthly FTR Payout



Planning Period FTR Payout

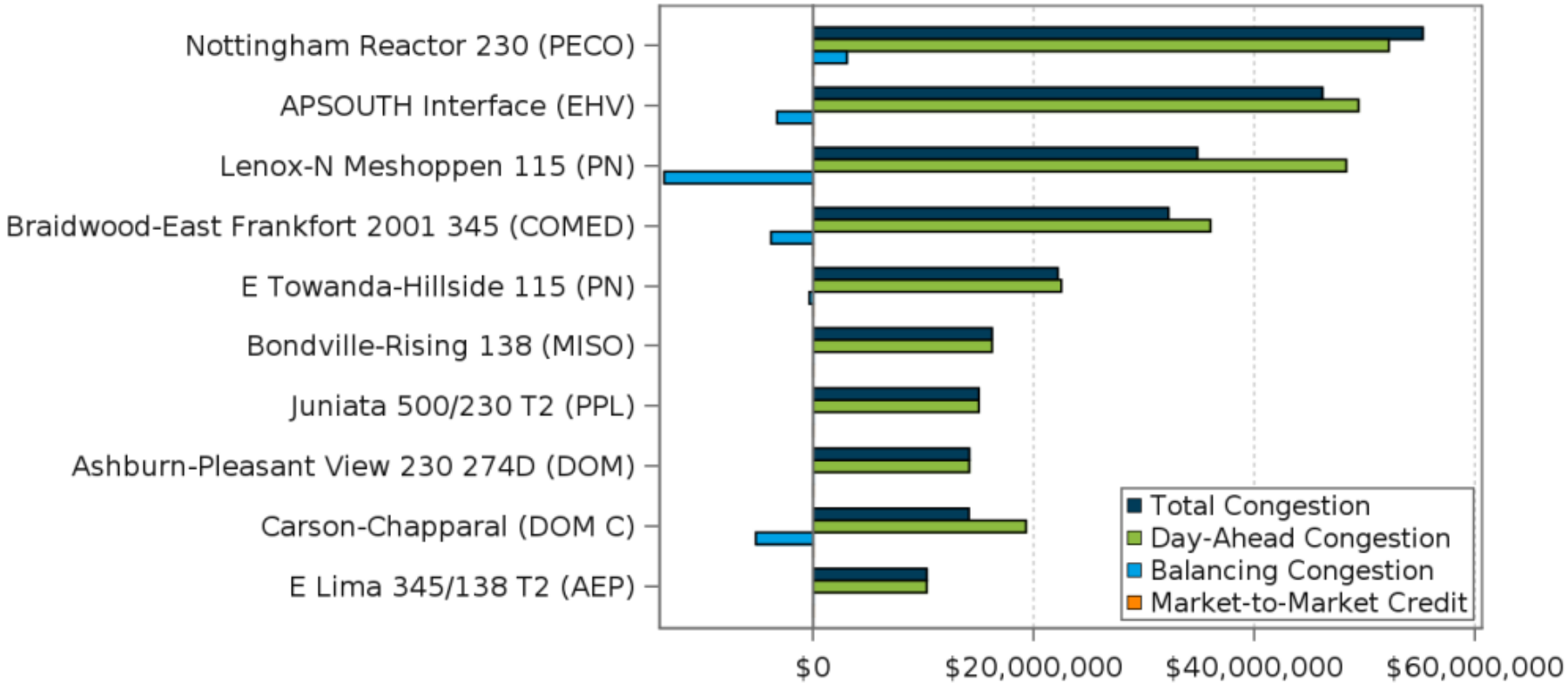


Ten Most Heavily Congested Transmission Facilities - Overall, April



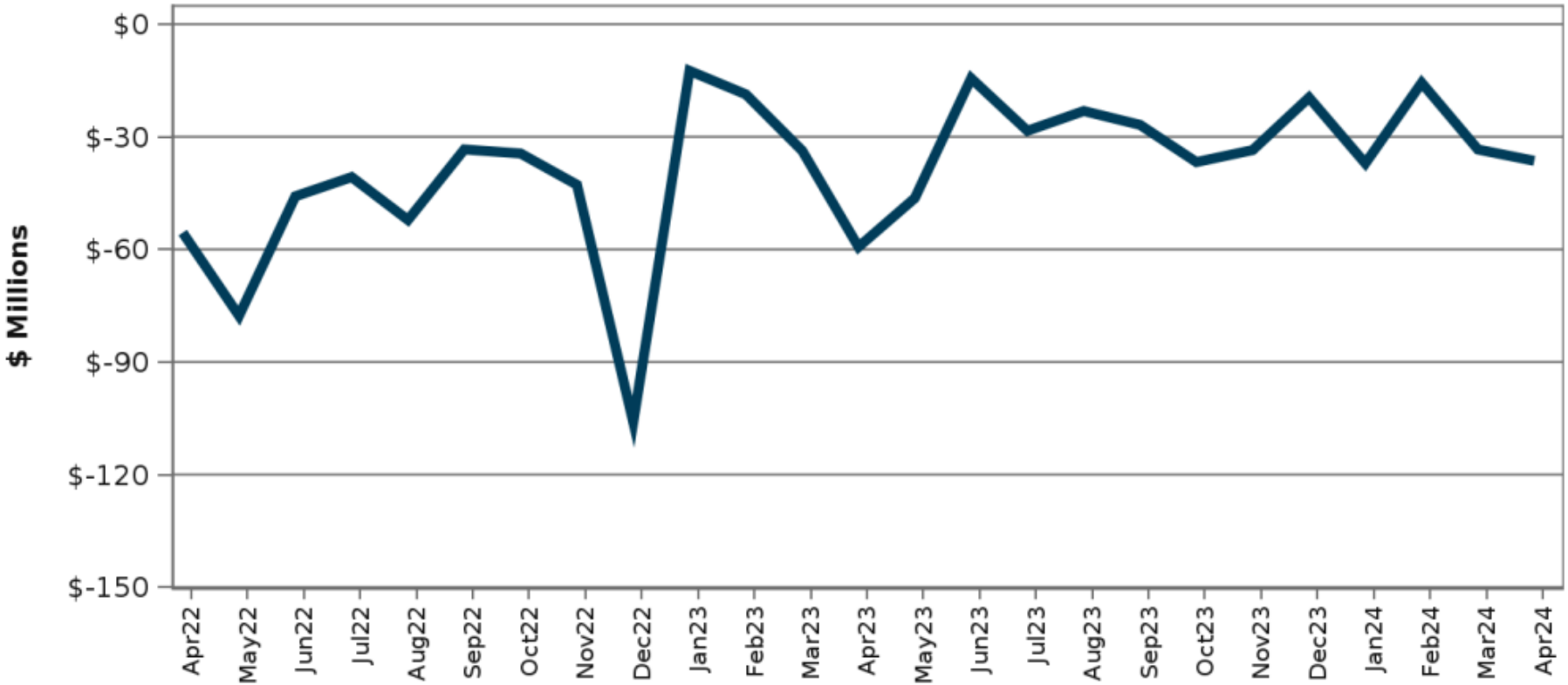
The ten most heavily congested facilities account for 79% of total congestion for April.

Ten Most Heavily Congested Transmission Facilities - Overall, 2024



The ten most heavily congested facilities account for 62% of total congestion for 2024.

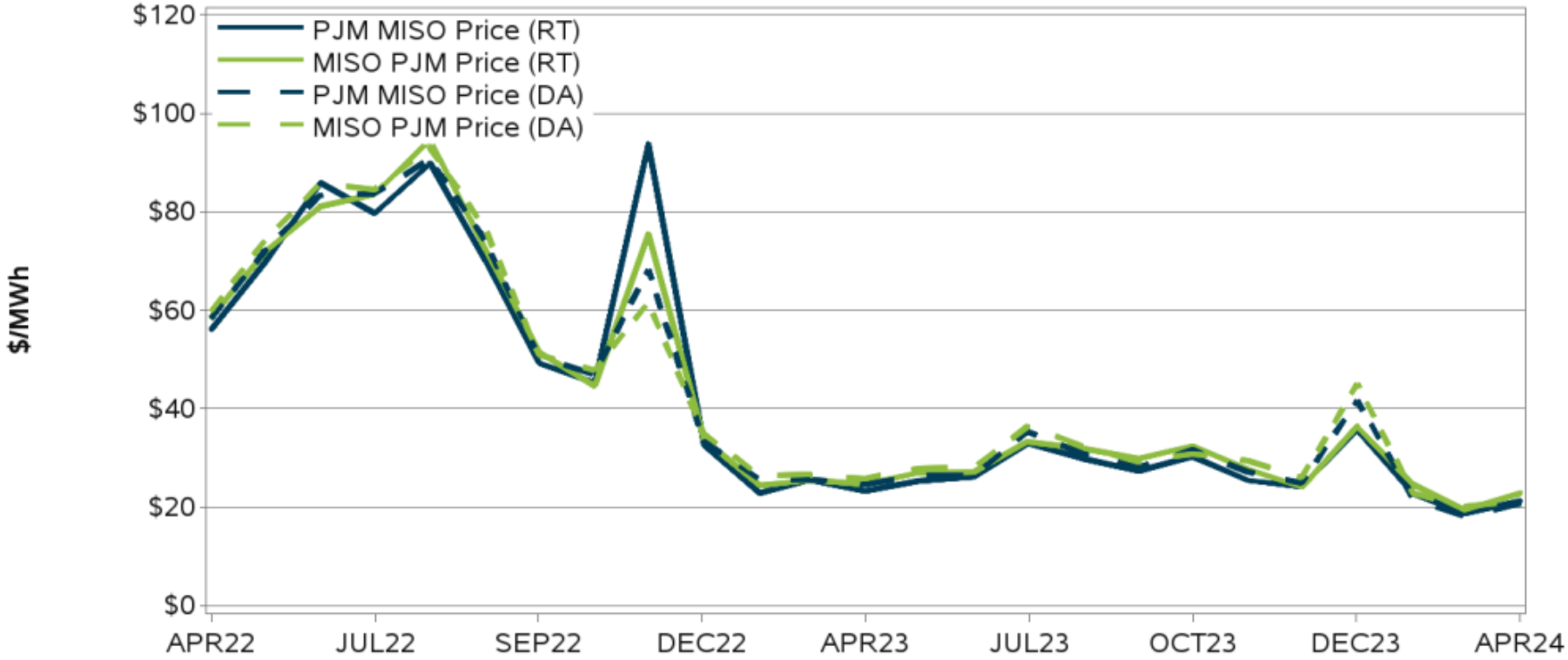
Balancing Congestion Charge Revenues (BLI 2215)



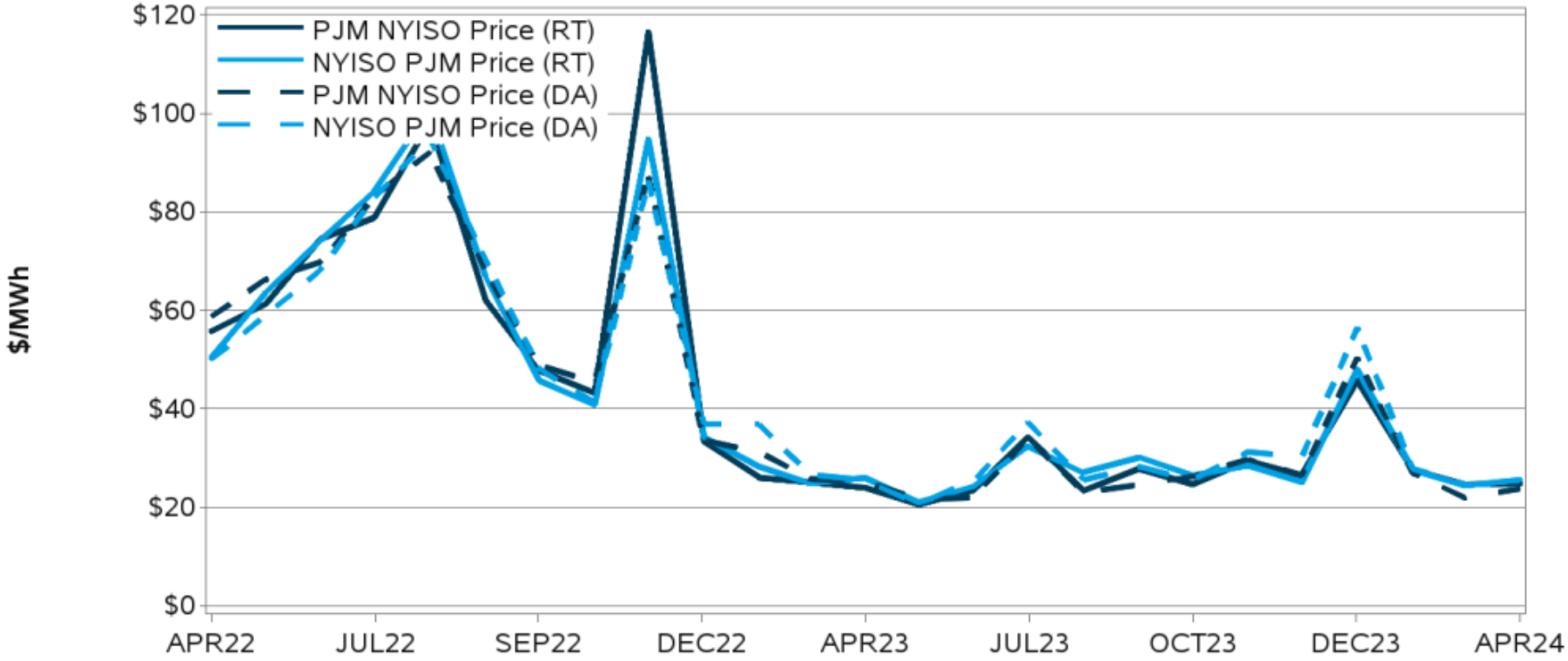
Energy Market

Interchange/Seams Summary

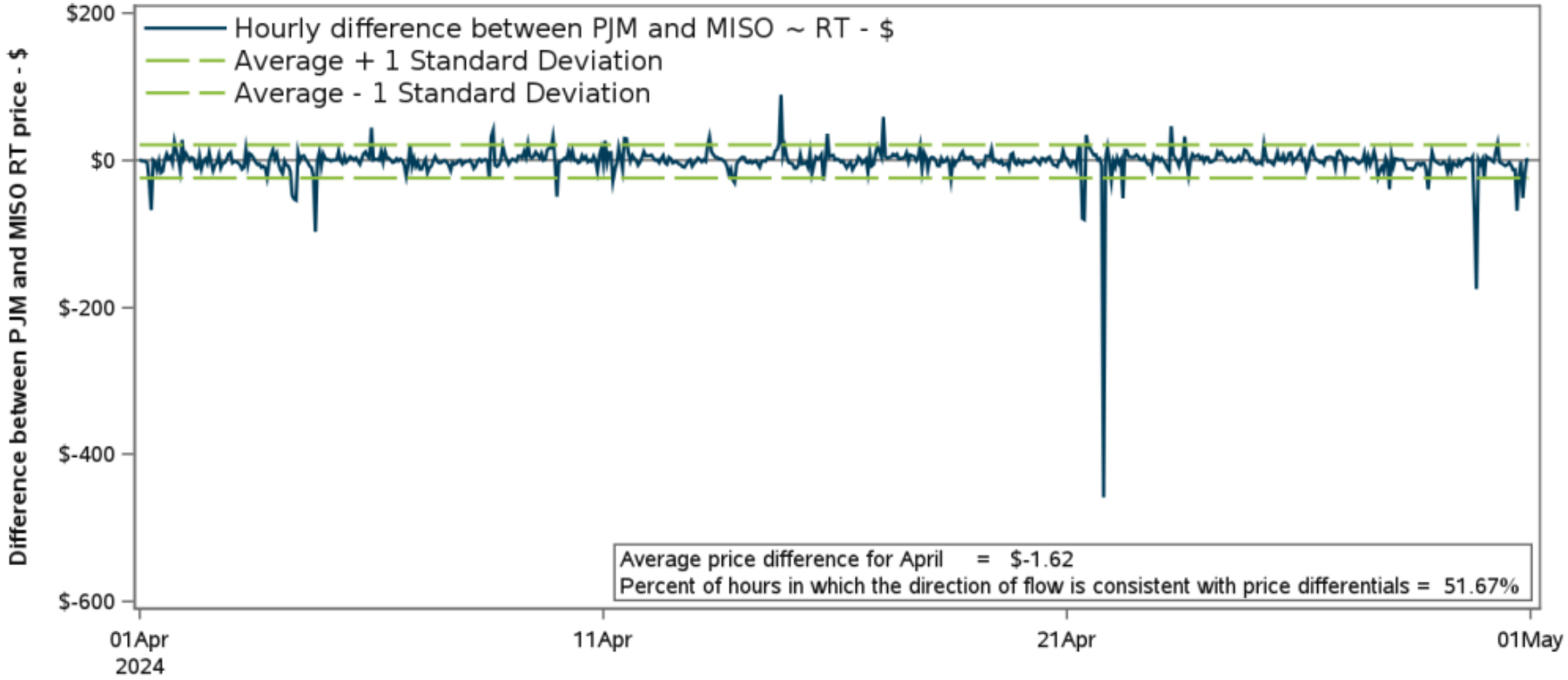
Monthly Average MISO Interface Pricing



Monthly Average NYISO Interface Pricing

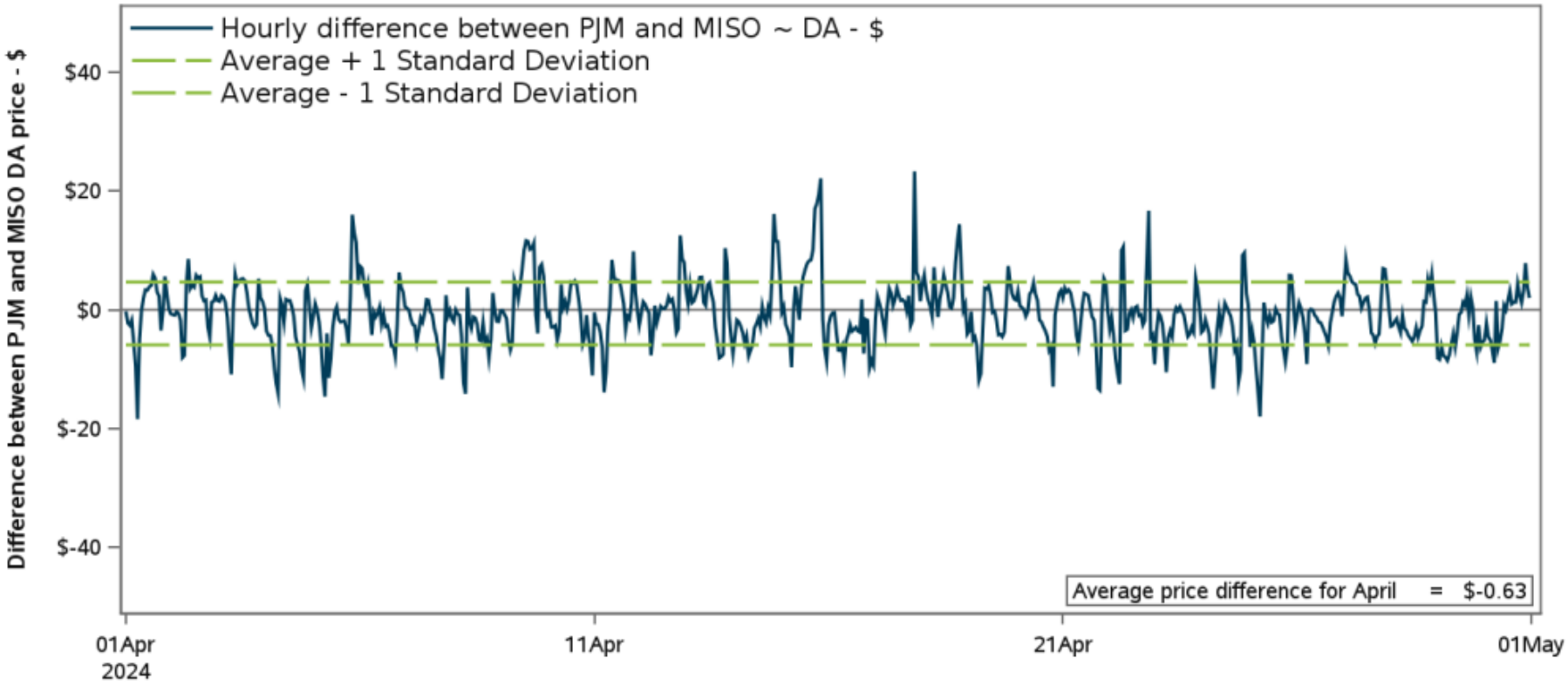


Hourly Difference Between PJM and MISO Real-Time Prices



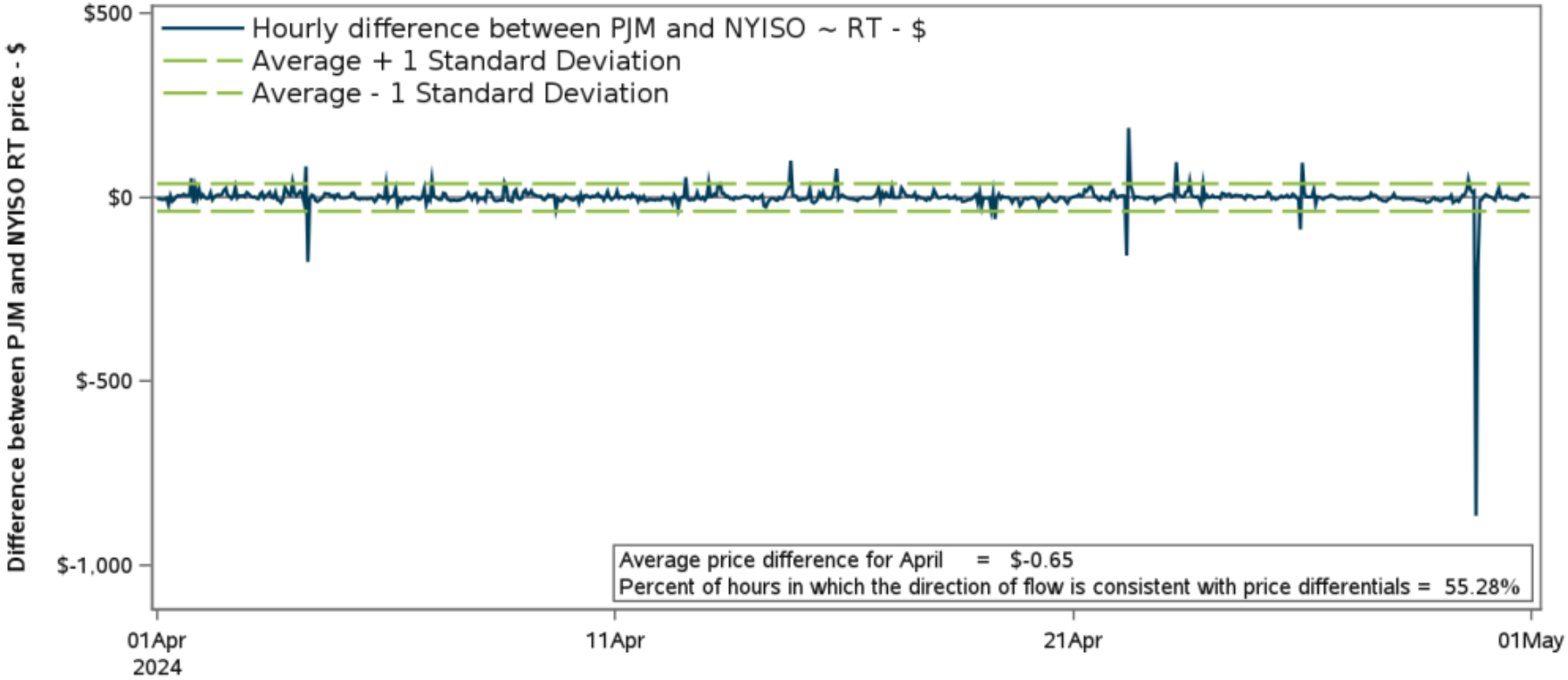
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and MISO Day-Ahead Prices



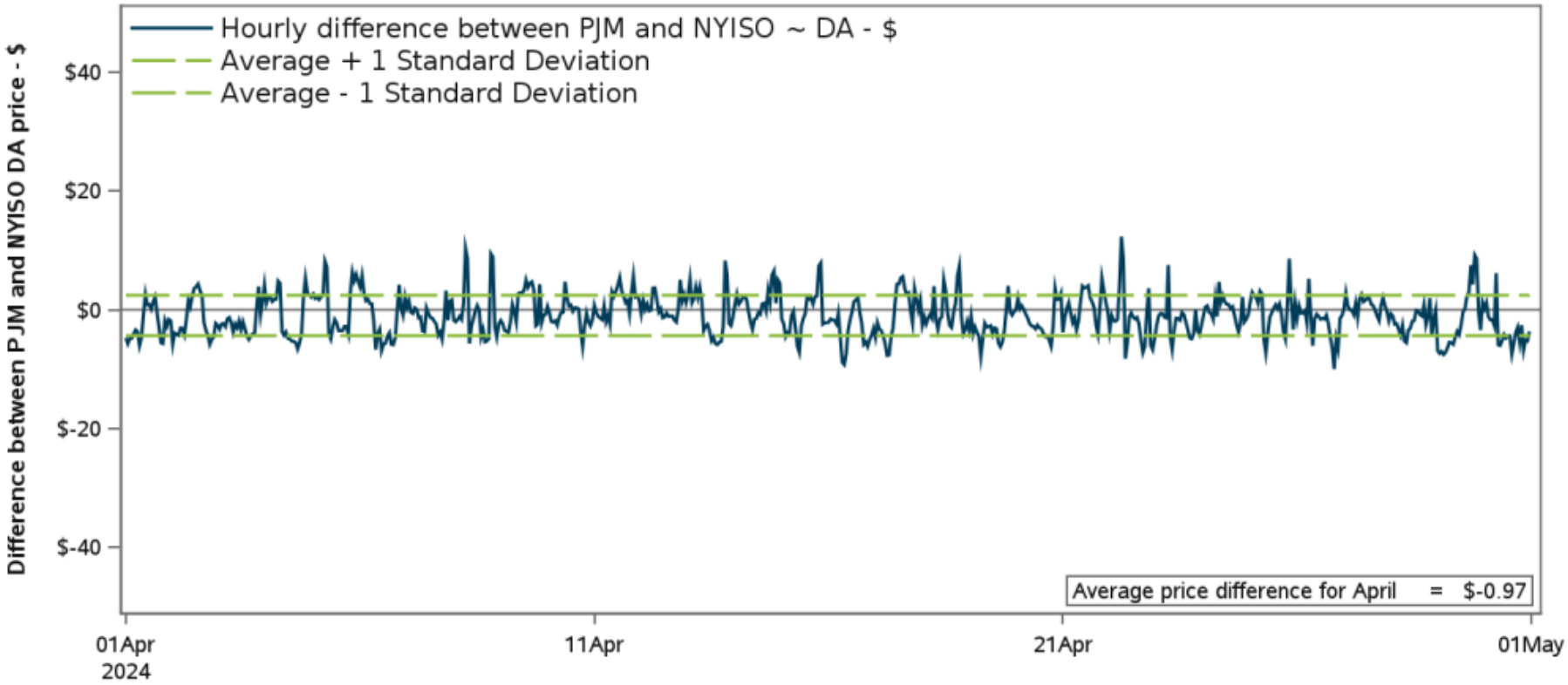
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Real-Time Prices



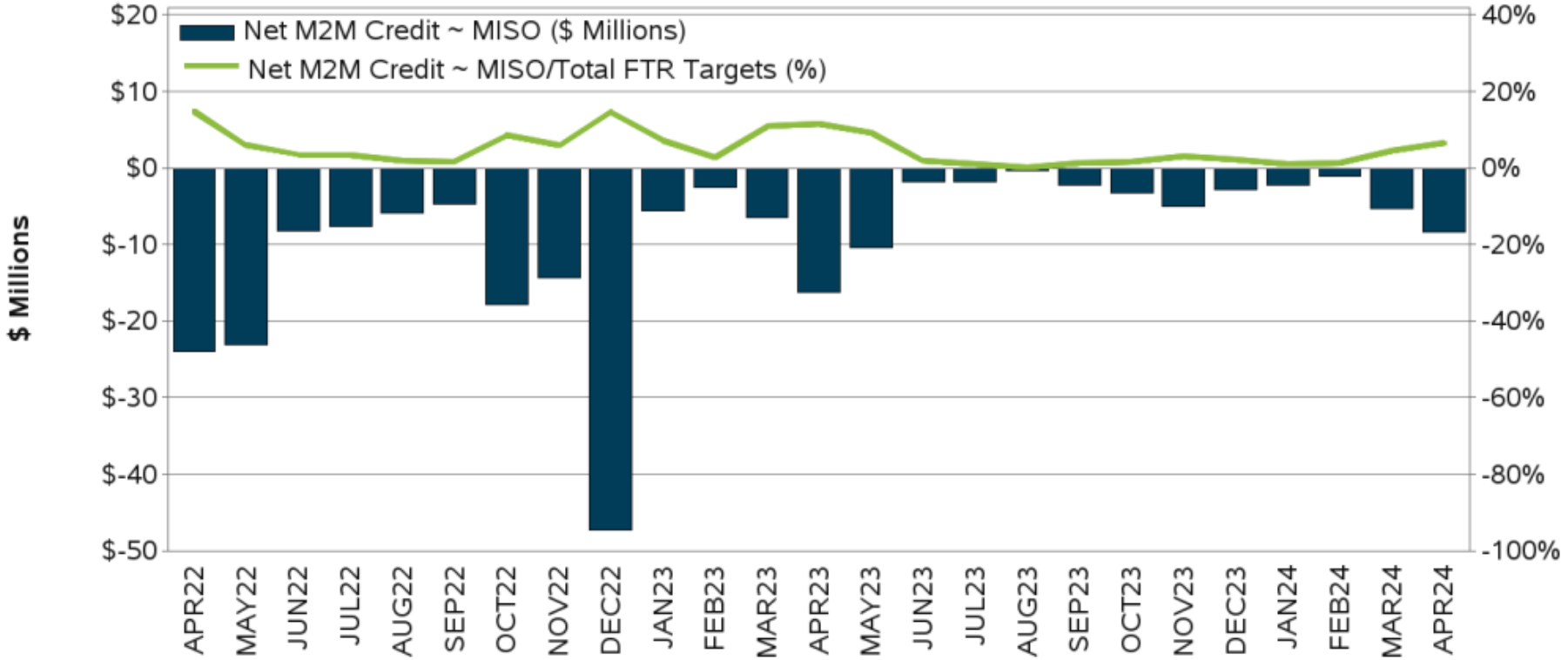
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Day-Ahead Prices



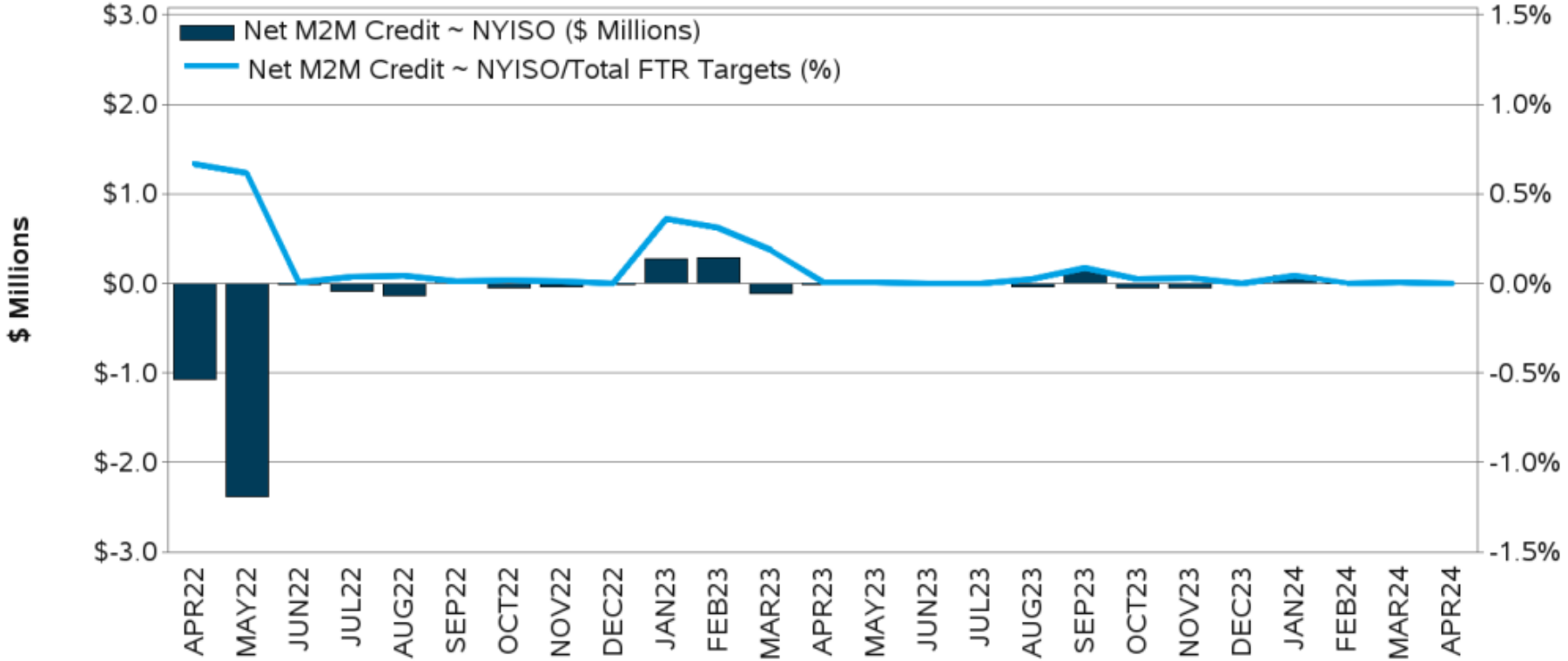
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

PJM-MISO Market-to-Market Coordination Settlement



Negative M2M Credit represents PJM payment to MISO

PJM-NYISO Market-to-Market Coordination Settlement

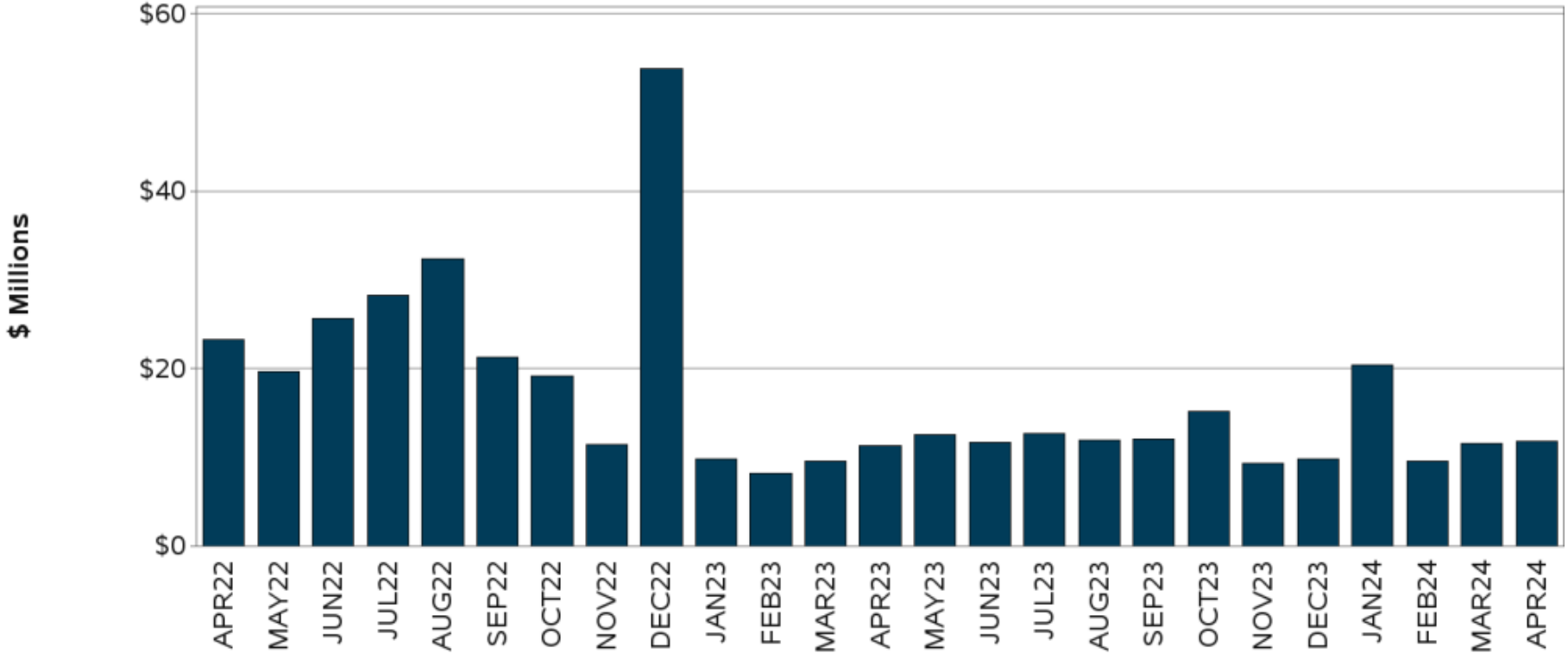


Negative M2M Credit represents PJM payment to NYISO

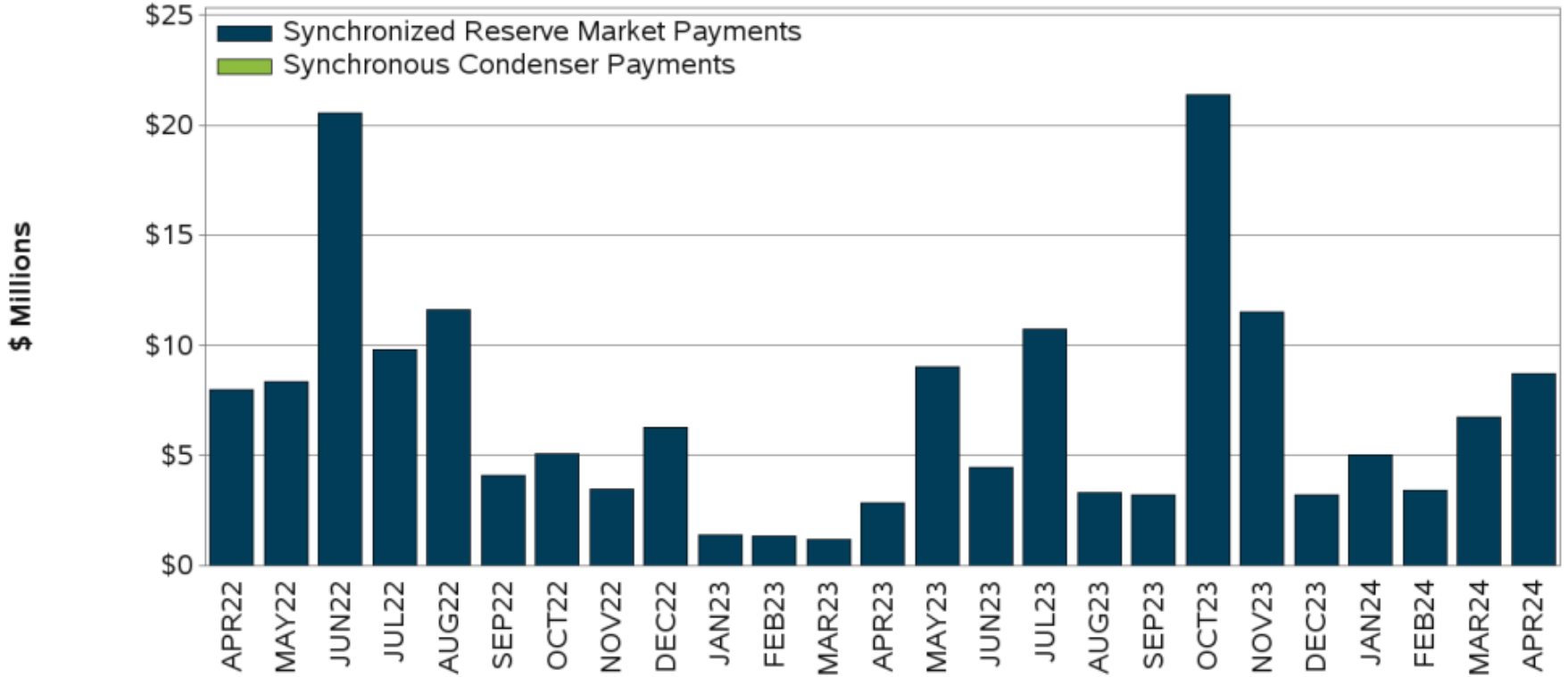
Ancillary Service Market

Summary

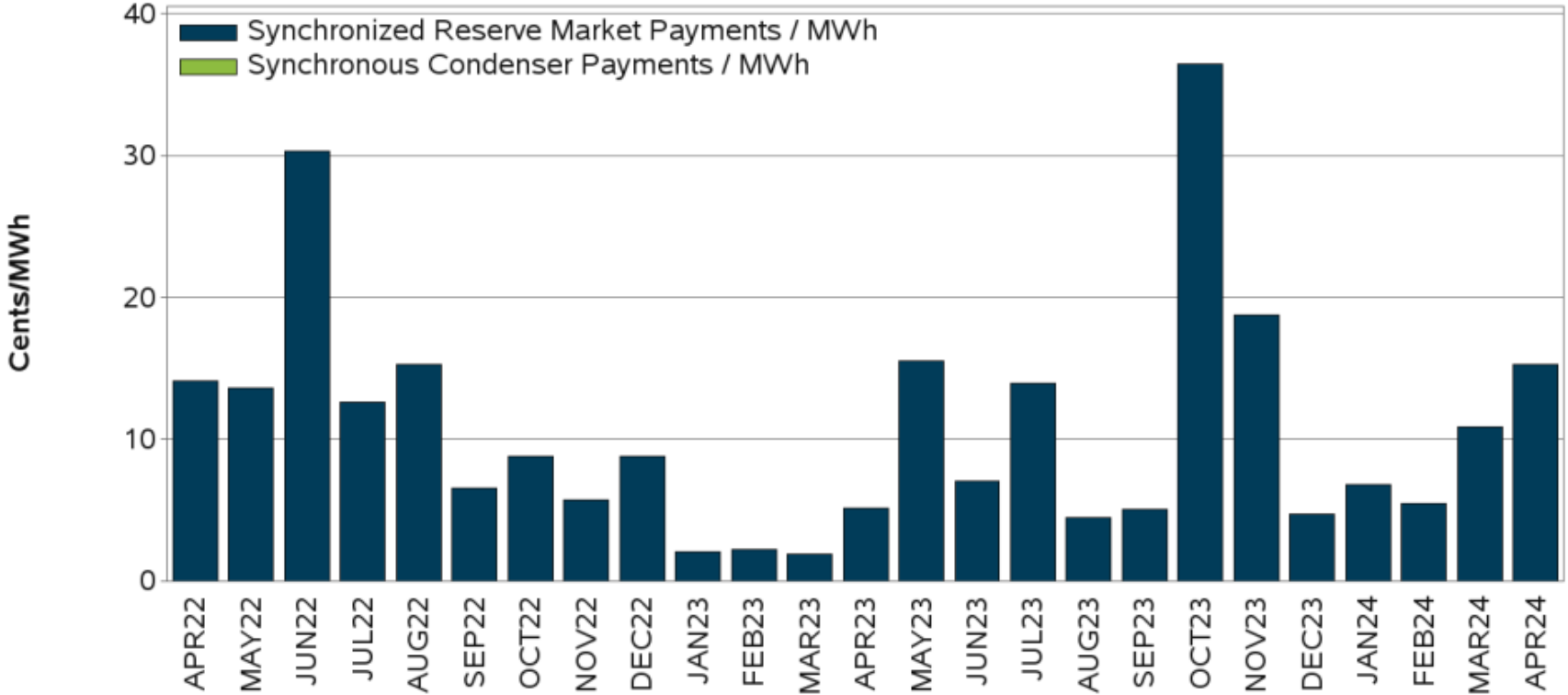
Regulation Costs



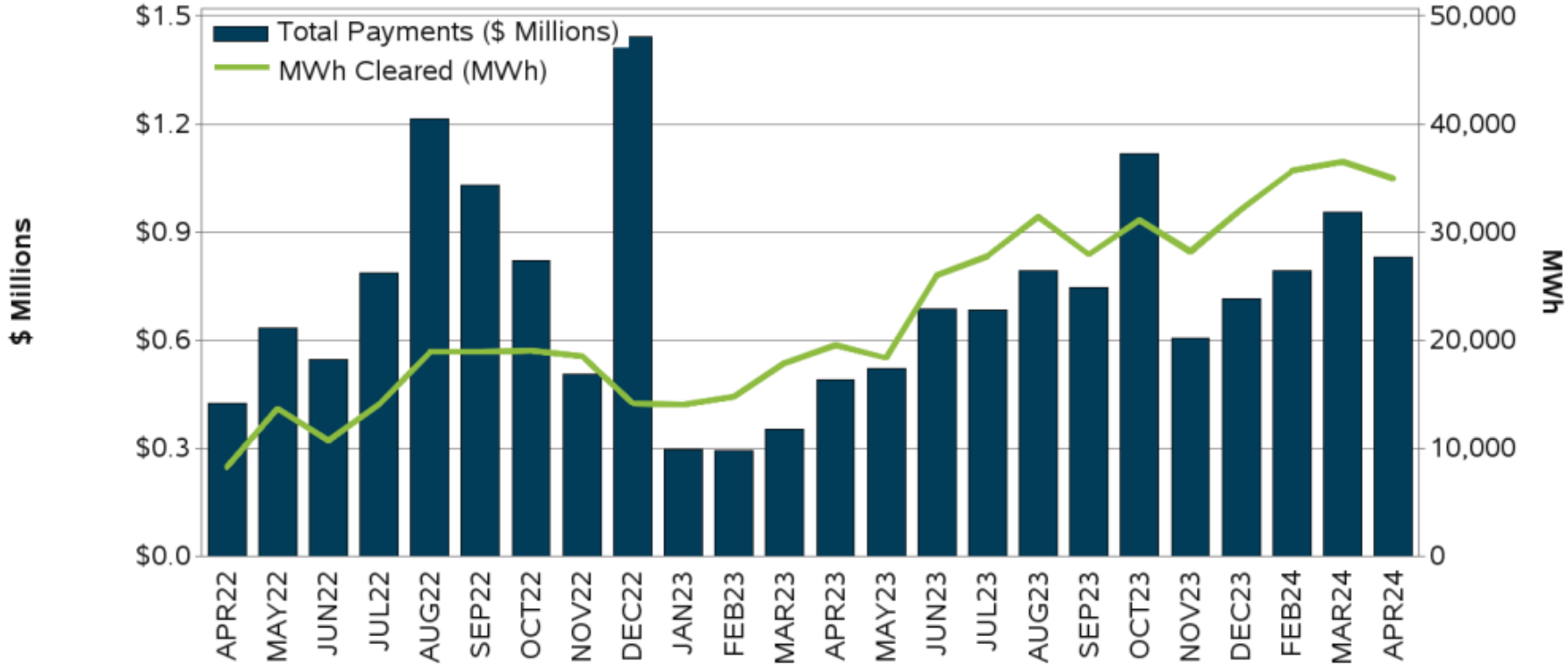
Synchronized Reserve and Synchronous Condenser Costs



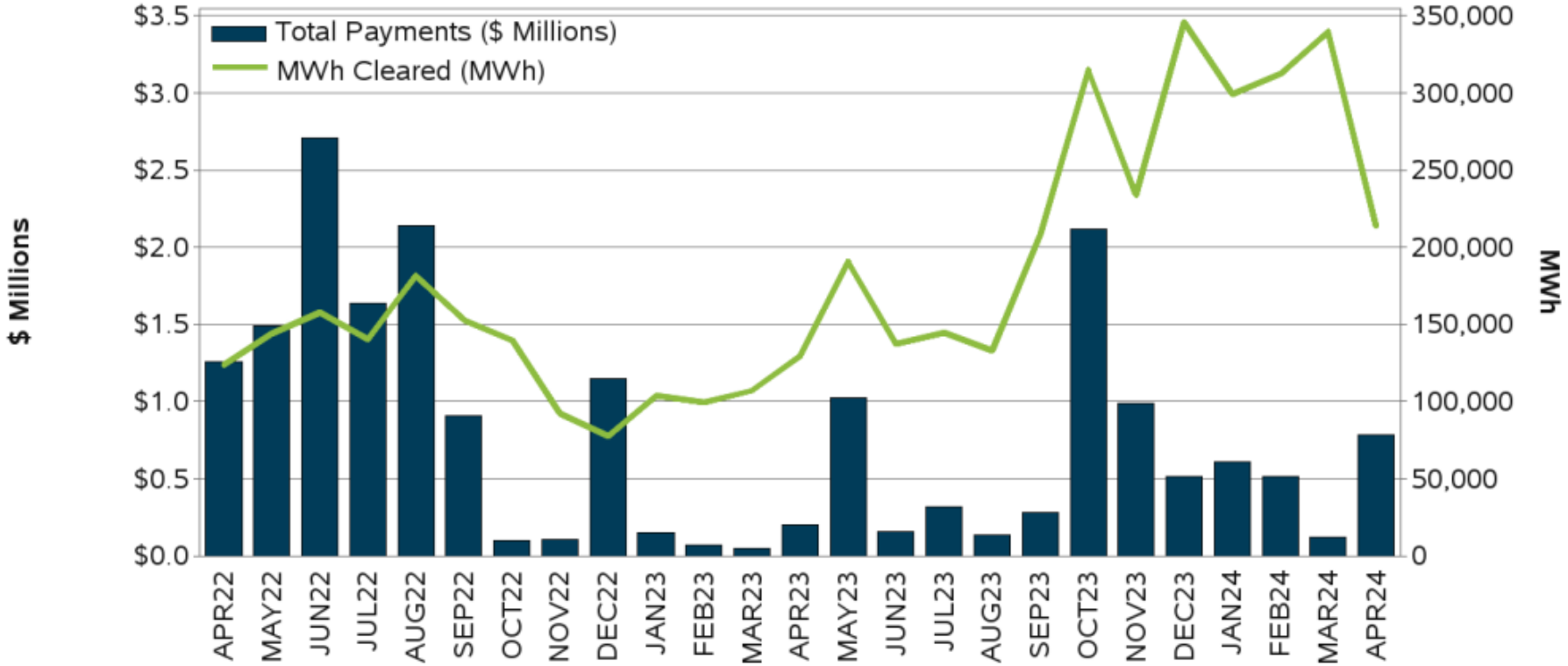
Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs



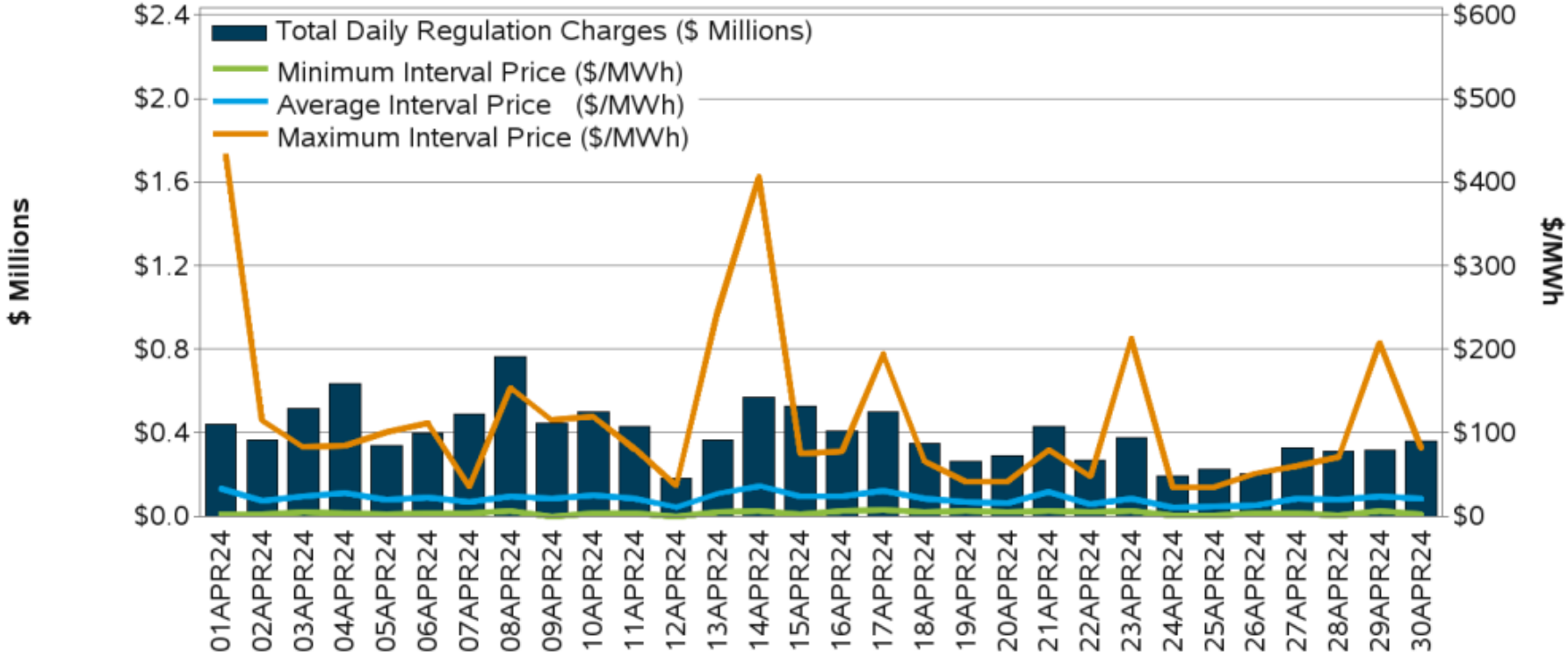
DR Participation in PJM Regulation Markets



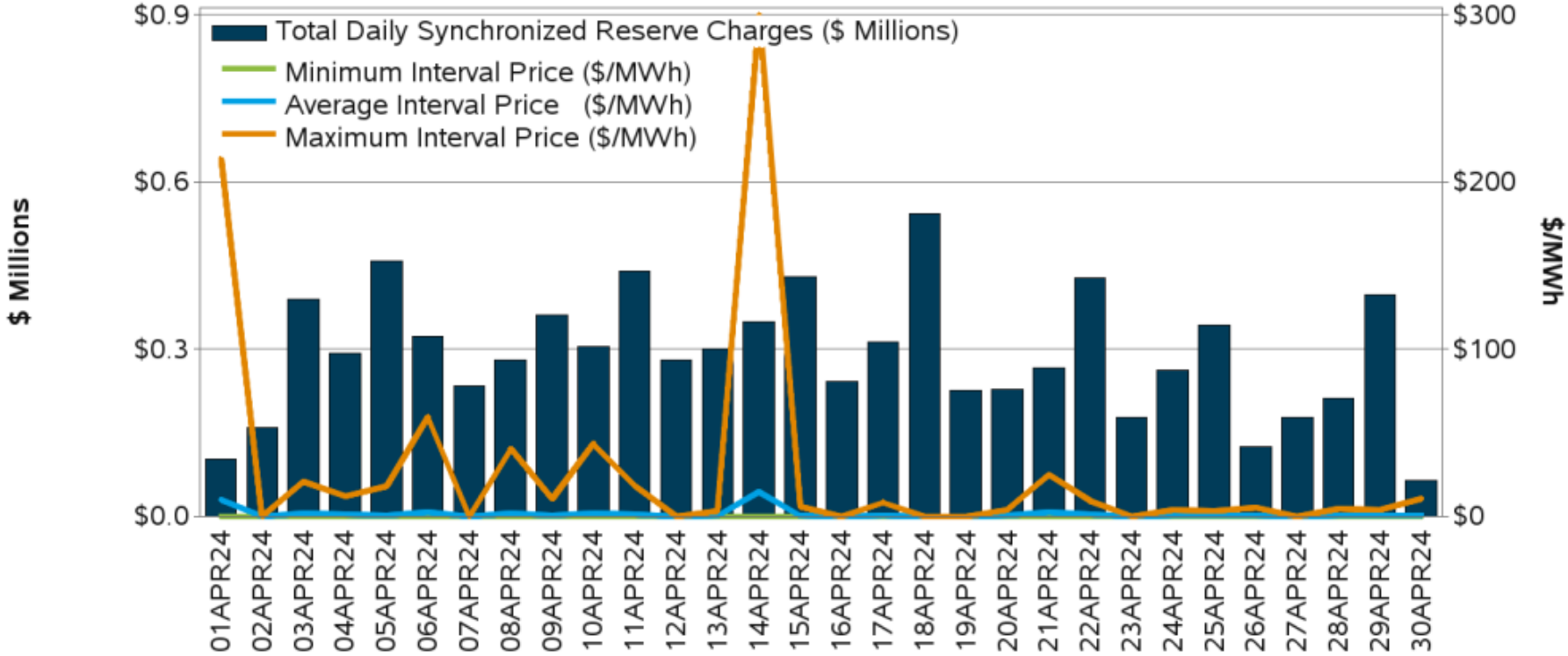
DR Participation in PJM Synchronized Reserve Markets



Regulation Market Daily Prices and Charges



Synchronized Reserve Market Daily Prices and Charges



Contact

Jennifer Warner-Freeman

Jennifer.Freeman@pjm.com

Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

PROTECT THE POWER GRID

THINK BEFORE YOU CLICK!

pjm

Be alert to malicious phishing emails.

Report suspicious email activity to PJM.

(610) 666-2244 / it_ops_ctr_shift@pjm.com