



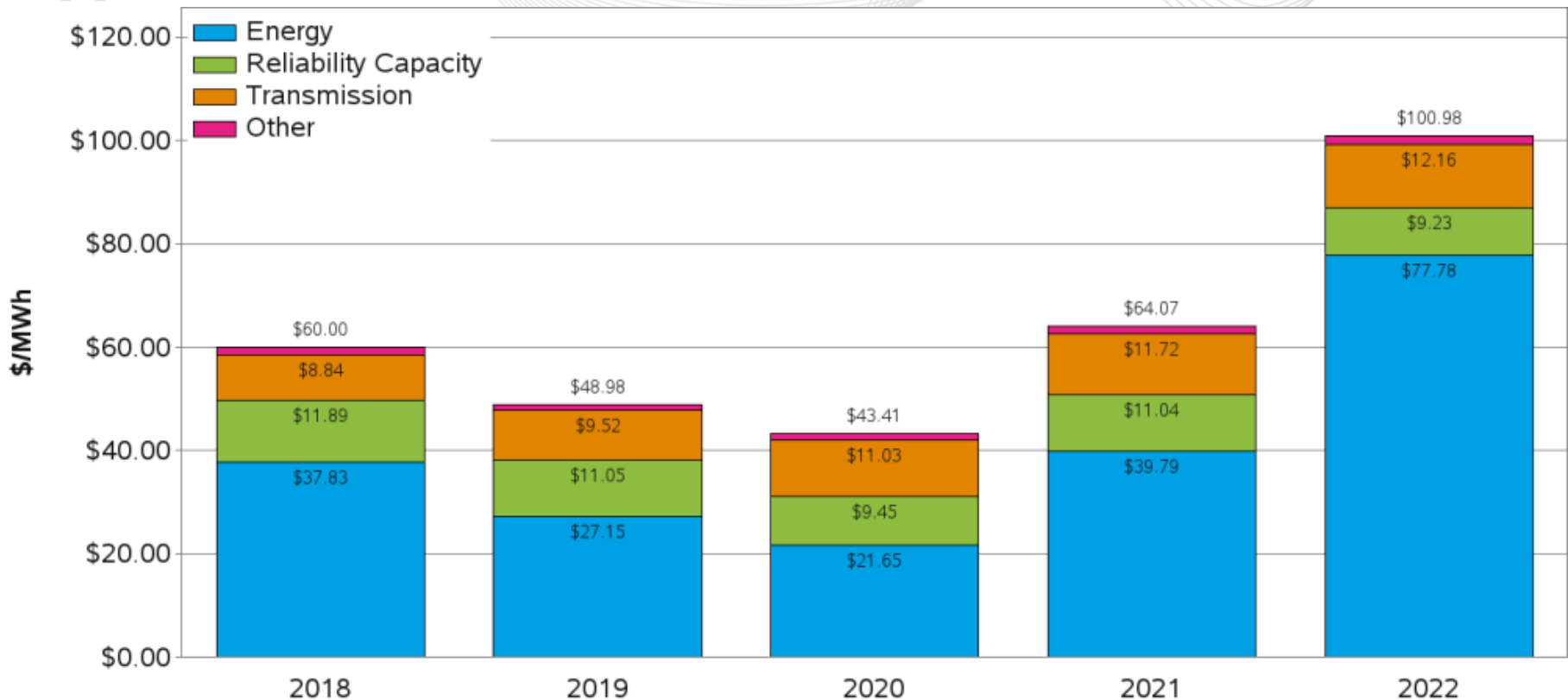
Markets Report

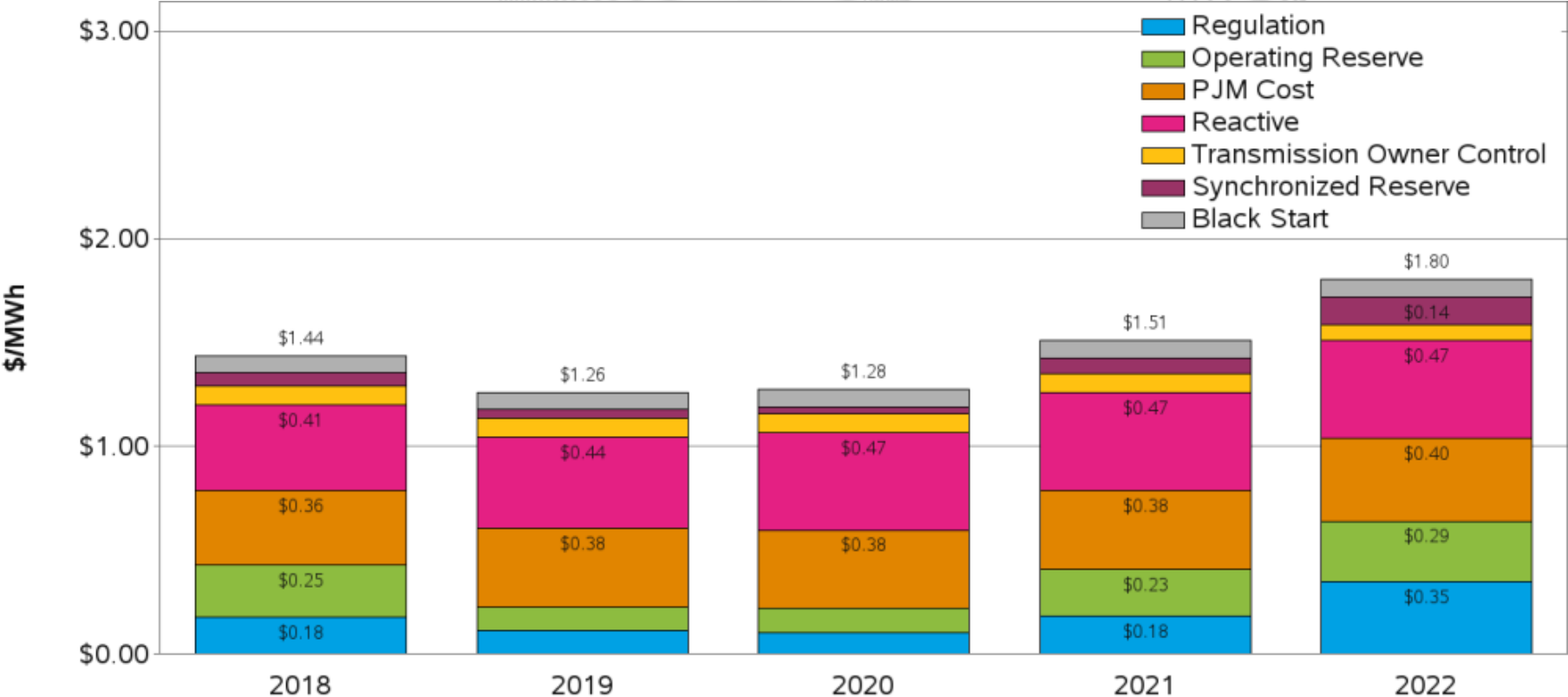
MC Webinar
September 19, 2022

- PJM Wholesale Cost 2022 is \$100.98/MWh, up from full-year 2021 costs of \$64.07/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- 20)
- In August, temperatures were above average for most of the month. Thus , the sum of Heating and Cooling Degree Days was also above its historic average. (Slides 8-10)
- Energy use was also above its historic average for August. (Slides 8-10)
- In August, uplift exceeded \$800,000 on all but 13 days. (Slides 25 & 26)

- Load-weighted average LMP for 2021 is \$77.78/MWh: (Slides 34-36)
 - August 2022 was \$113.80/MWh, which is higher than August 2021 (\$47.40/MWh) and August 2020 (\$25.20/MWh).
- There were no 5-minute intervals that experienced shortage pricing in August. (Slides 32-33)
- FTR revenue adequacy for the month of August is 100% and the 2022-2023 Planning Year is currently funded at 100%. (Slides 51-54)
- Congestion values have been trending upwards with August's value being higher than June or July's. (Slide 52)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 67-69)

Markets Report

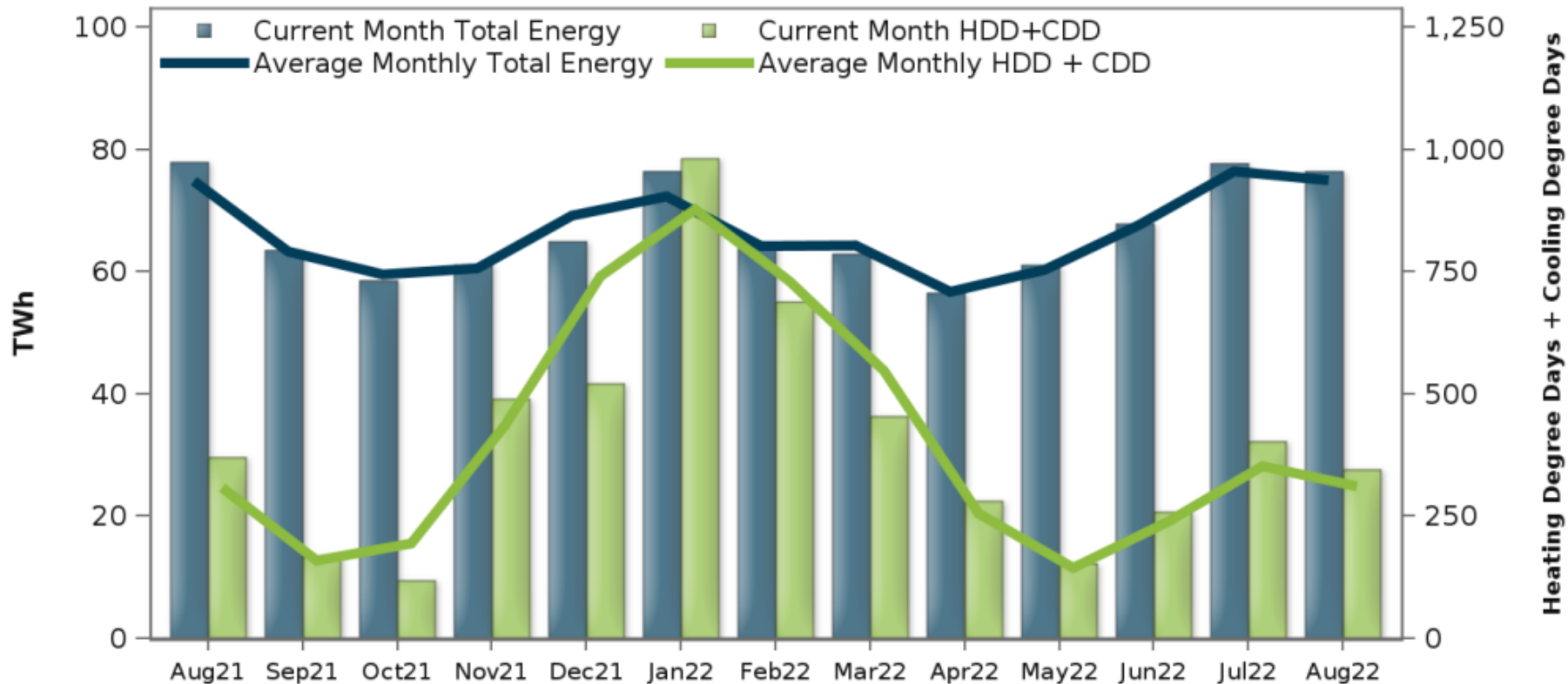




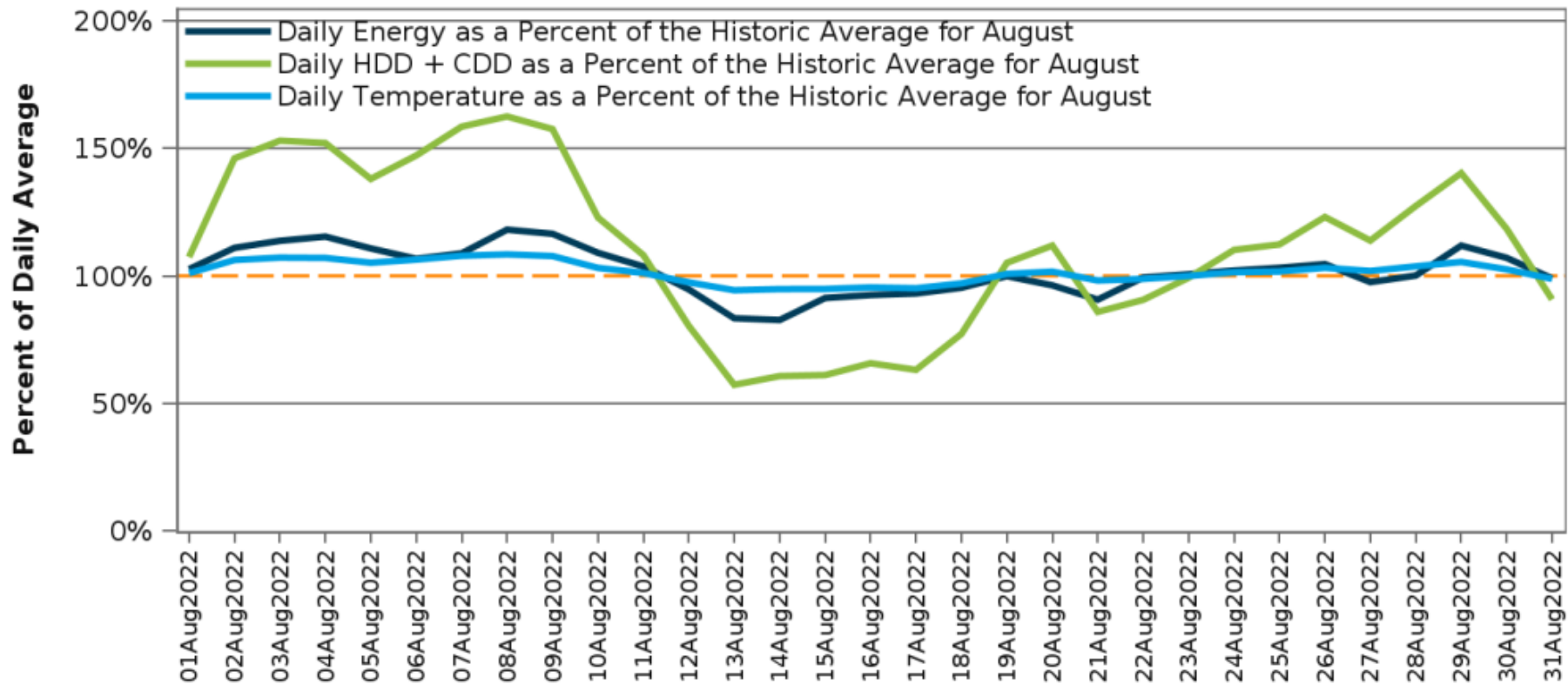
Market Conditions

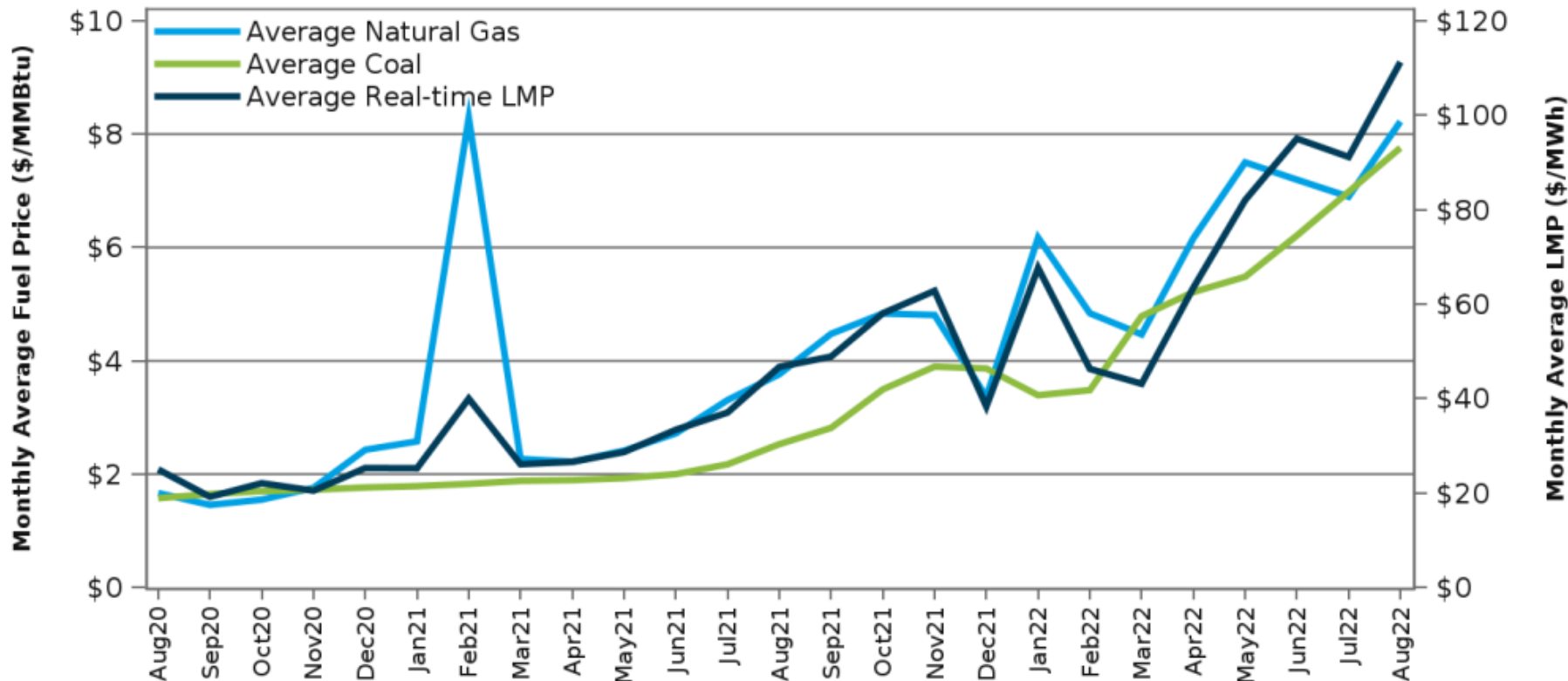
- The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).
- Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or 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, 2021. Averages include load data for all of TO zones in the current RTO footprint.

Historic Average Weather and Energy versus Current Month

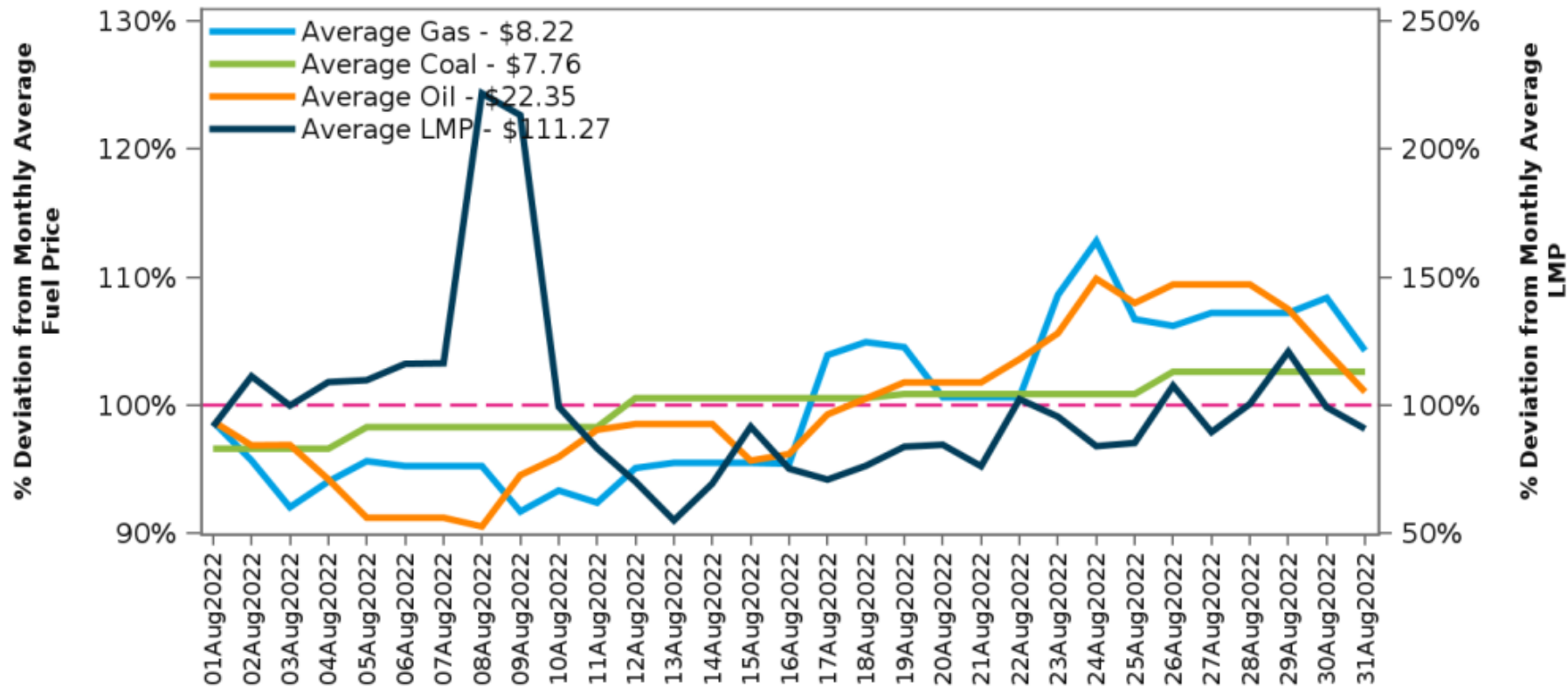


Historic Average Weather and Energy versus Current Month - Daily





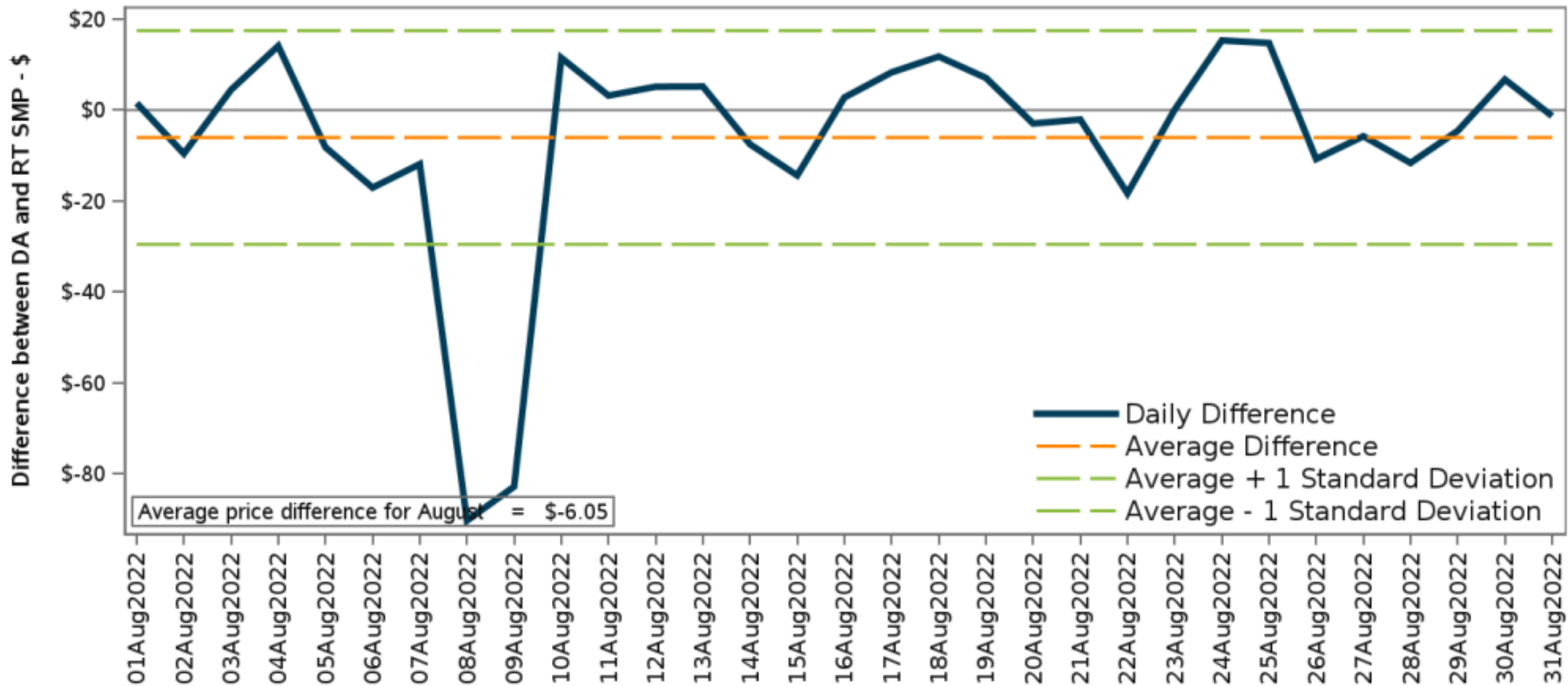
Fuel Price Source: S&P Global Platts



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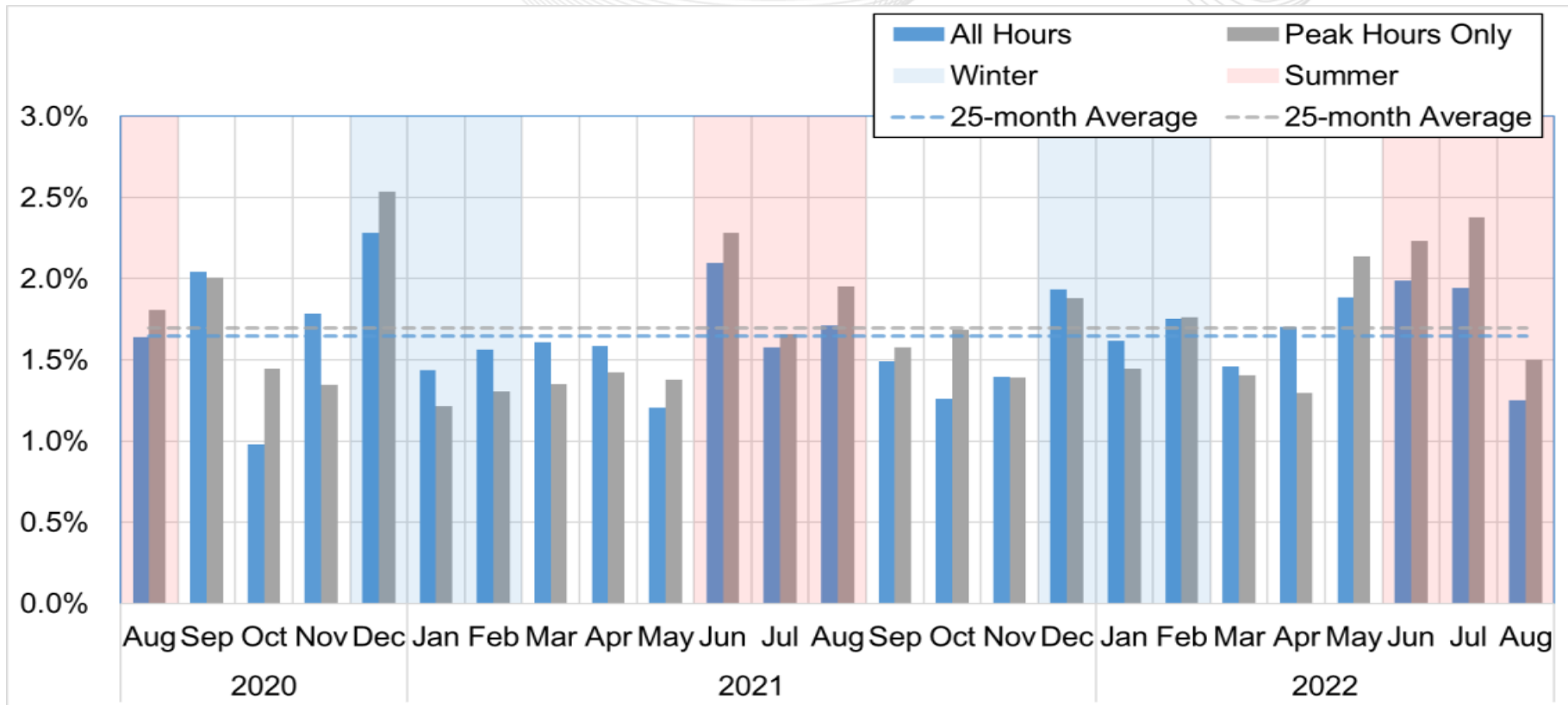


Daily Difference Between Day-Ahead and Real-Time System Marginal Prices

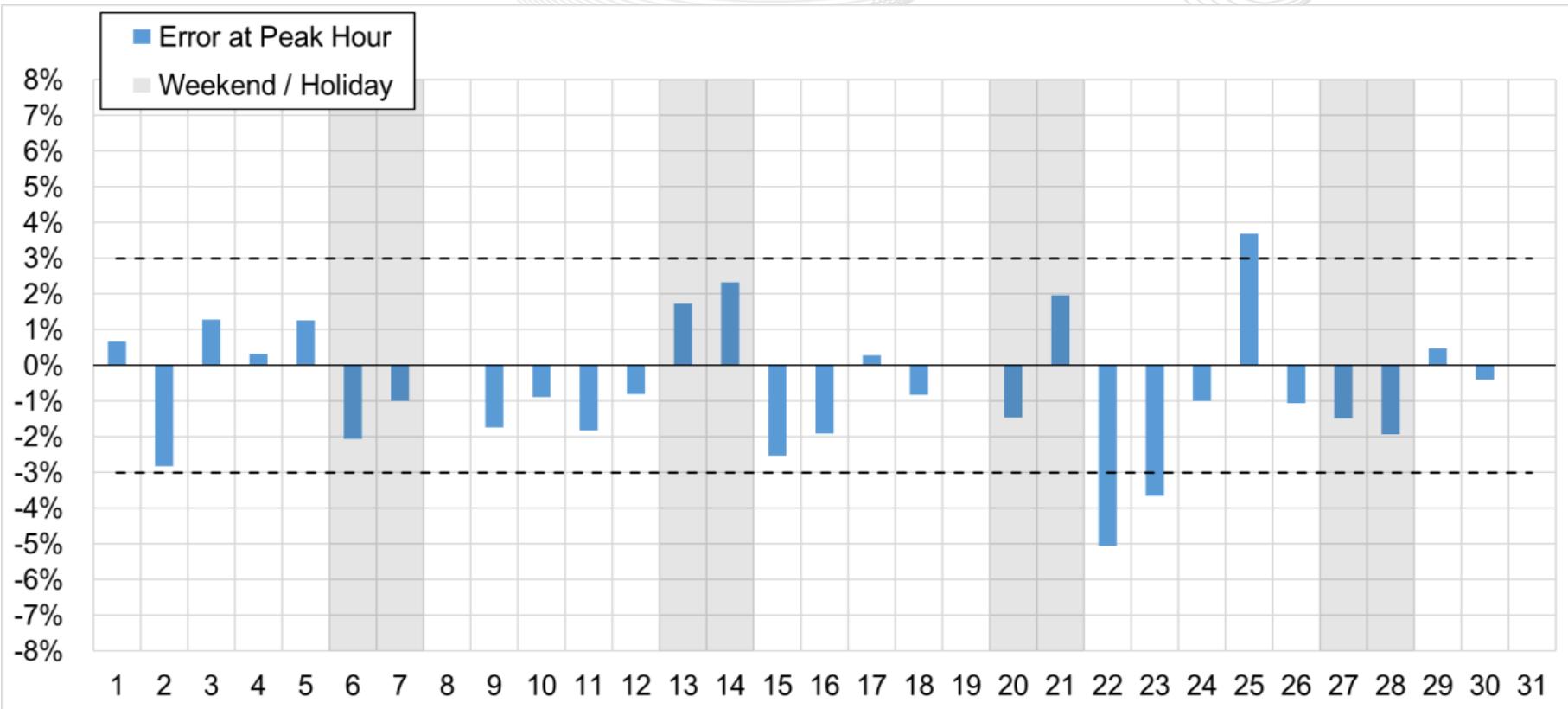


Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.

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

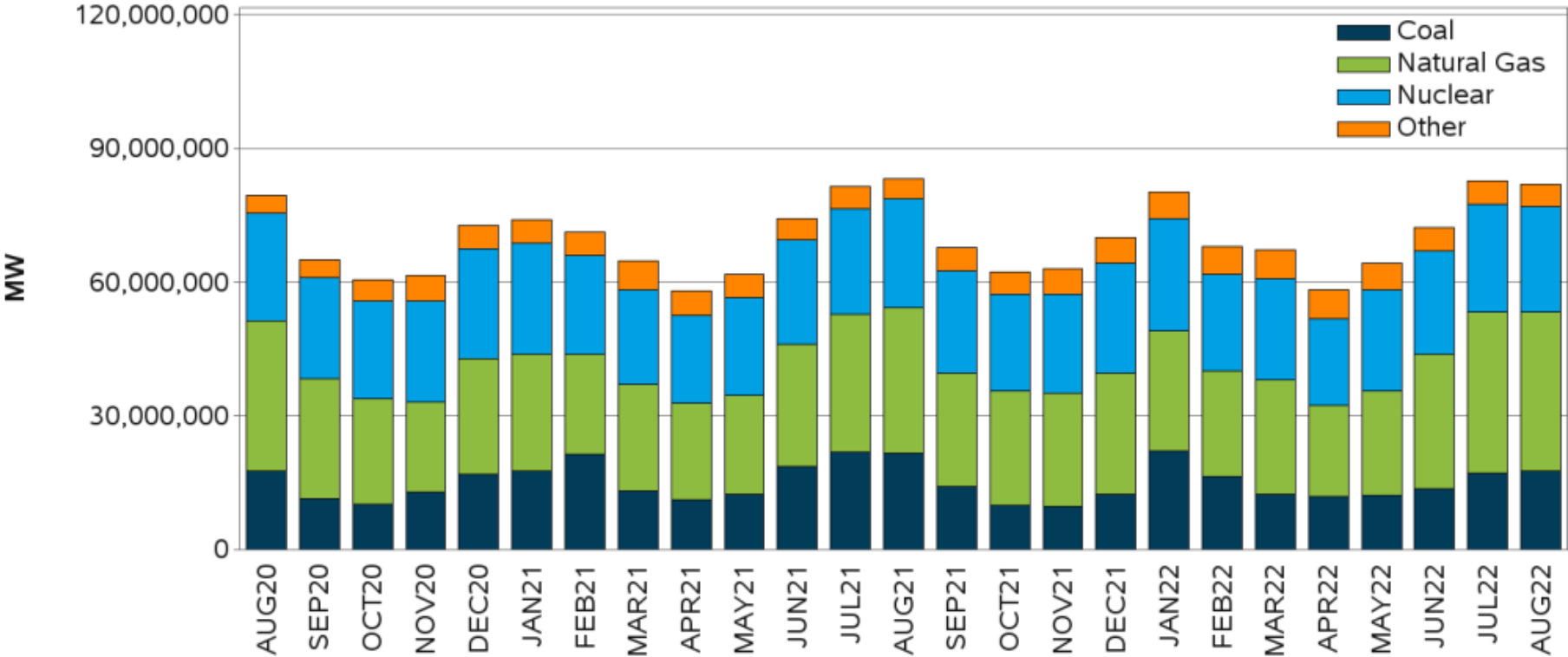


Load Forecast Error - August Daily Peaks, 10:00 Forecast

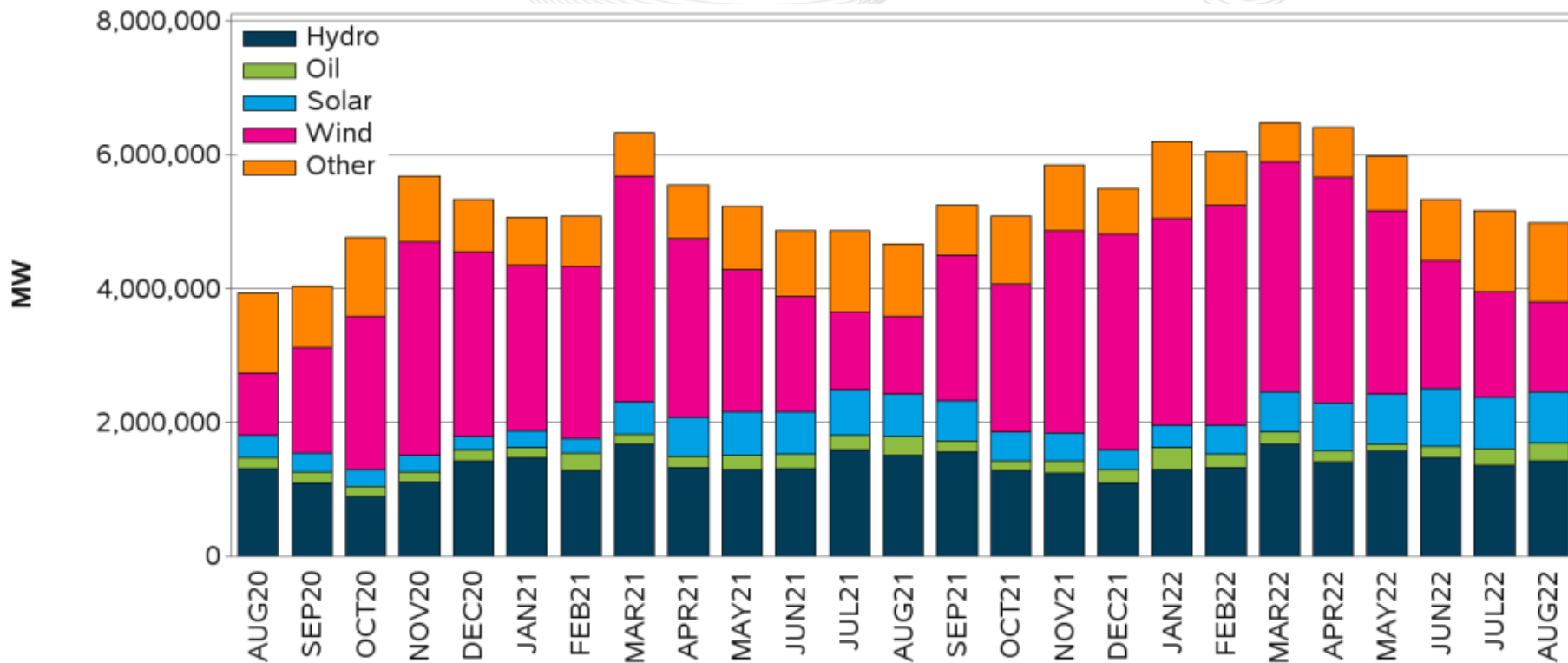


- PJM prepares a day-ahead load forecast at 10:00 am for use by our members.
- This forecast is not used to clear the day-ahead market and is not utilized for the reliability tools that run subsequent to the day-ahead market.

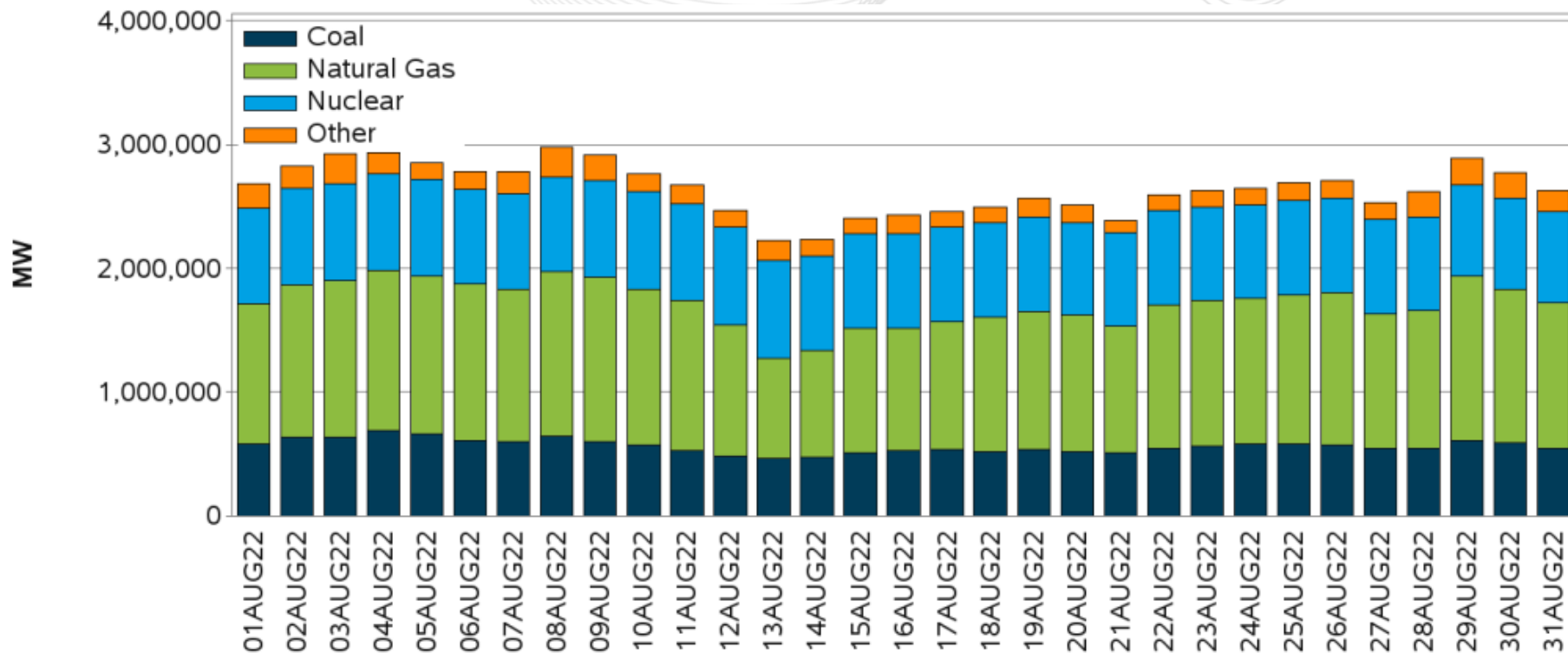
During the week of the 22nd, we started with a couple days that had significant model error during the afternoon and missed temperature forecasts that only made things worse. After the miss on Monday the 22nd, we were able to mitigate some of the model error on Tuesday. While we still missed our mark on the 23rd, we did reduce the error coming out of our primary ensemble model by over half a percent. Unfortunately, that trend reversed later in the week, with both positive model and temperature forecast error on Thursday the 25th. This seemed to be at least partly driven by some drastic changes in humidity.



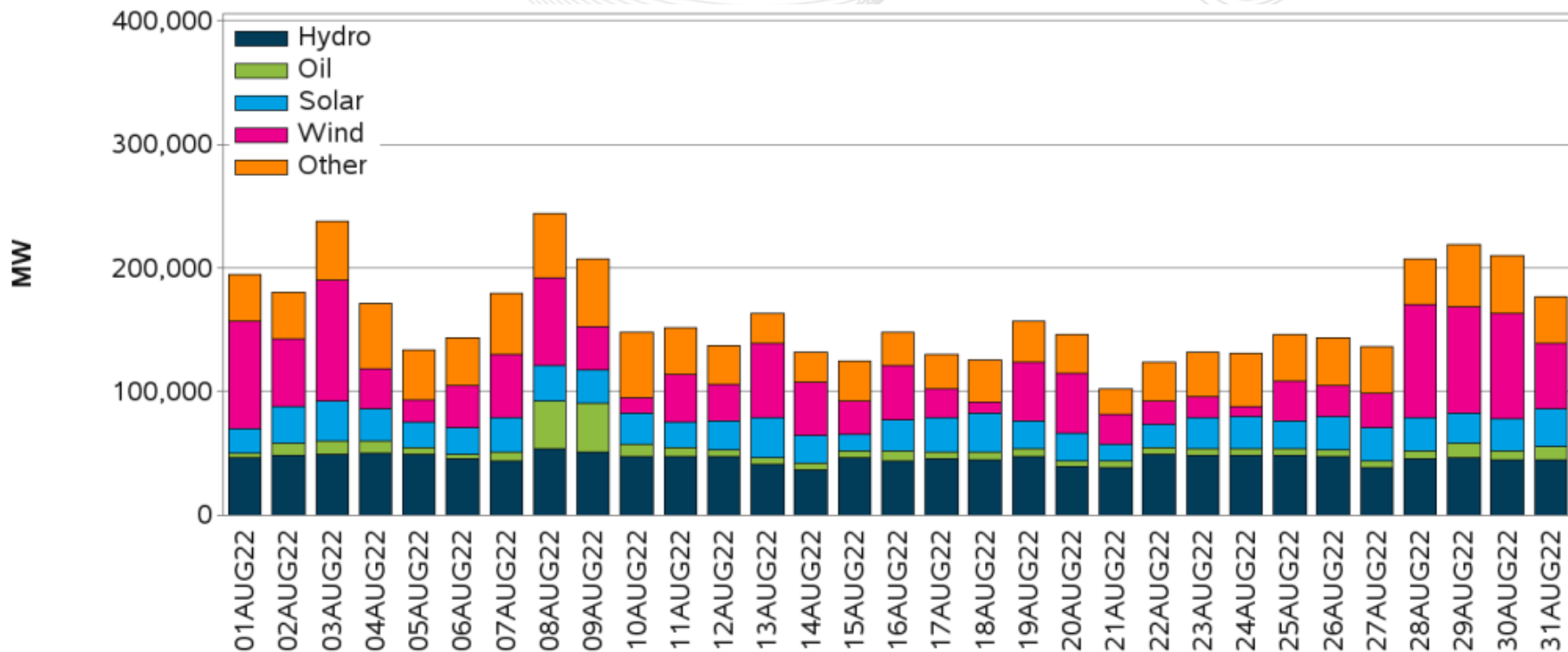
Other includes Hydro, Oil, Solar, Wind, and Other



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

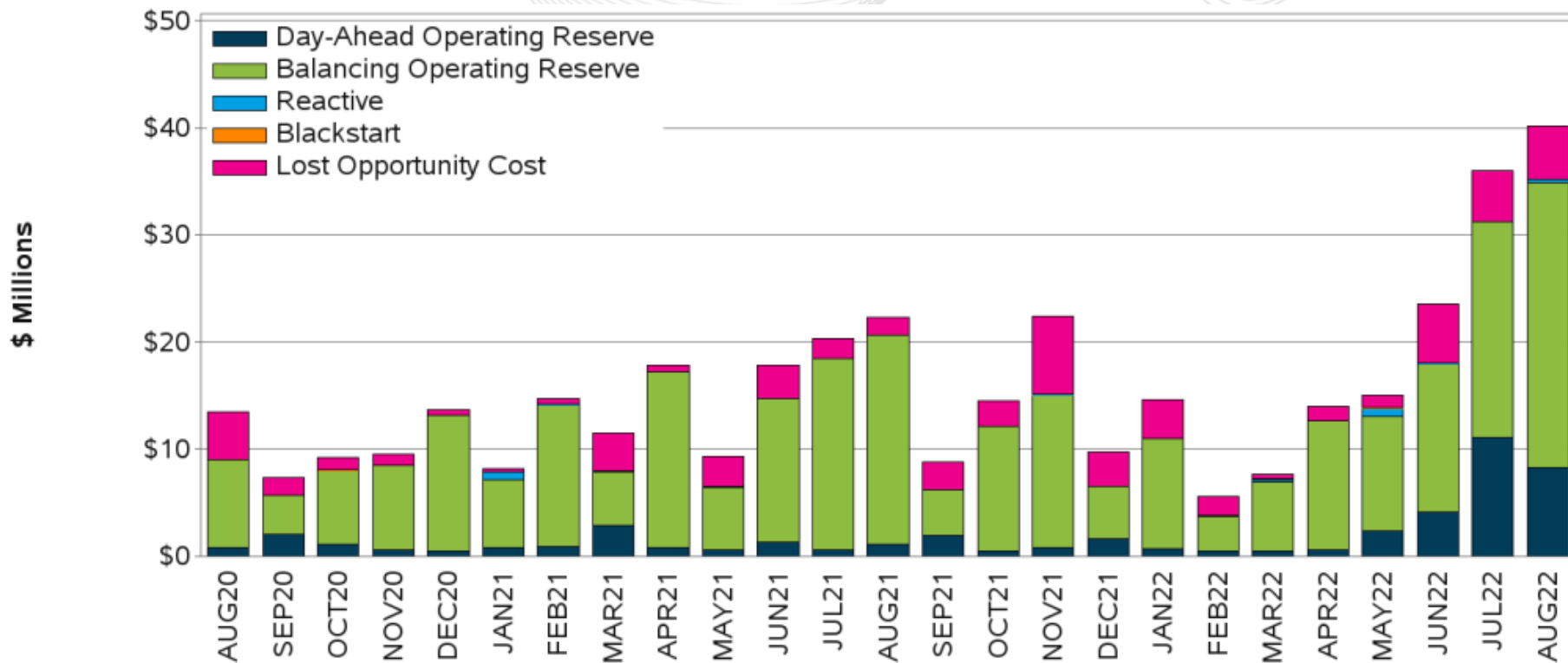


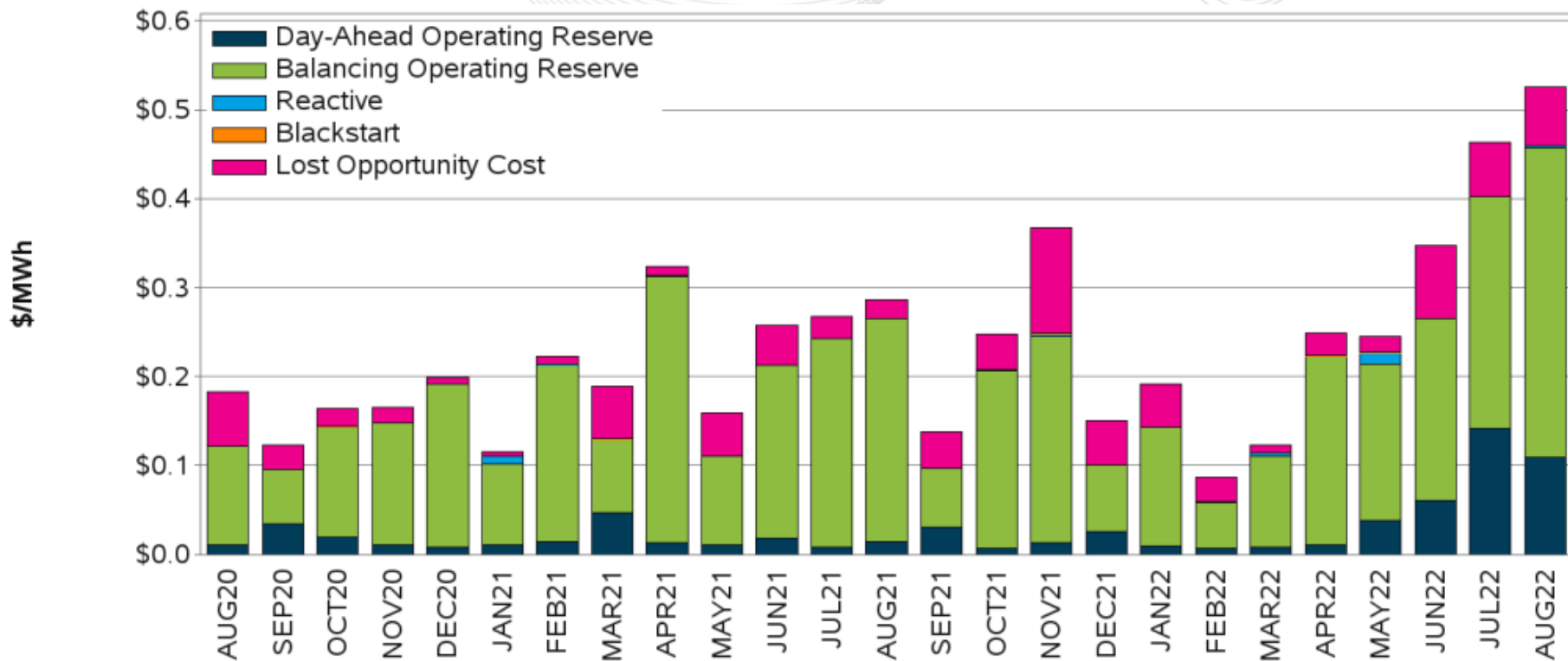
Other includes Hydro, Oil, Solar, Wind, and Other

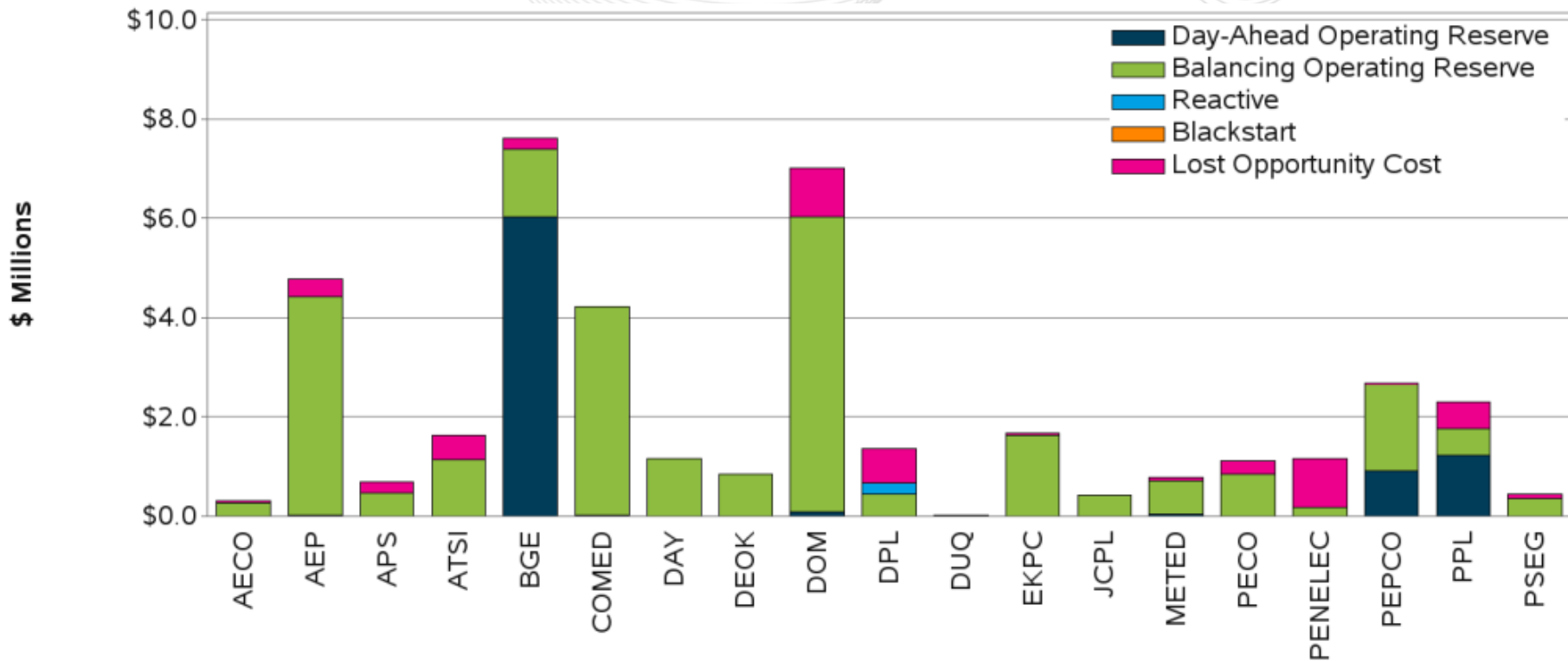


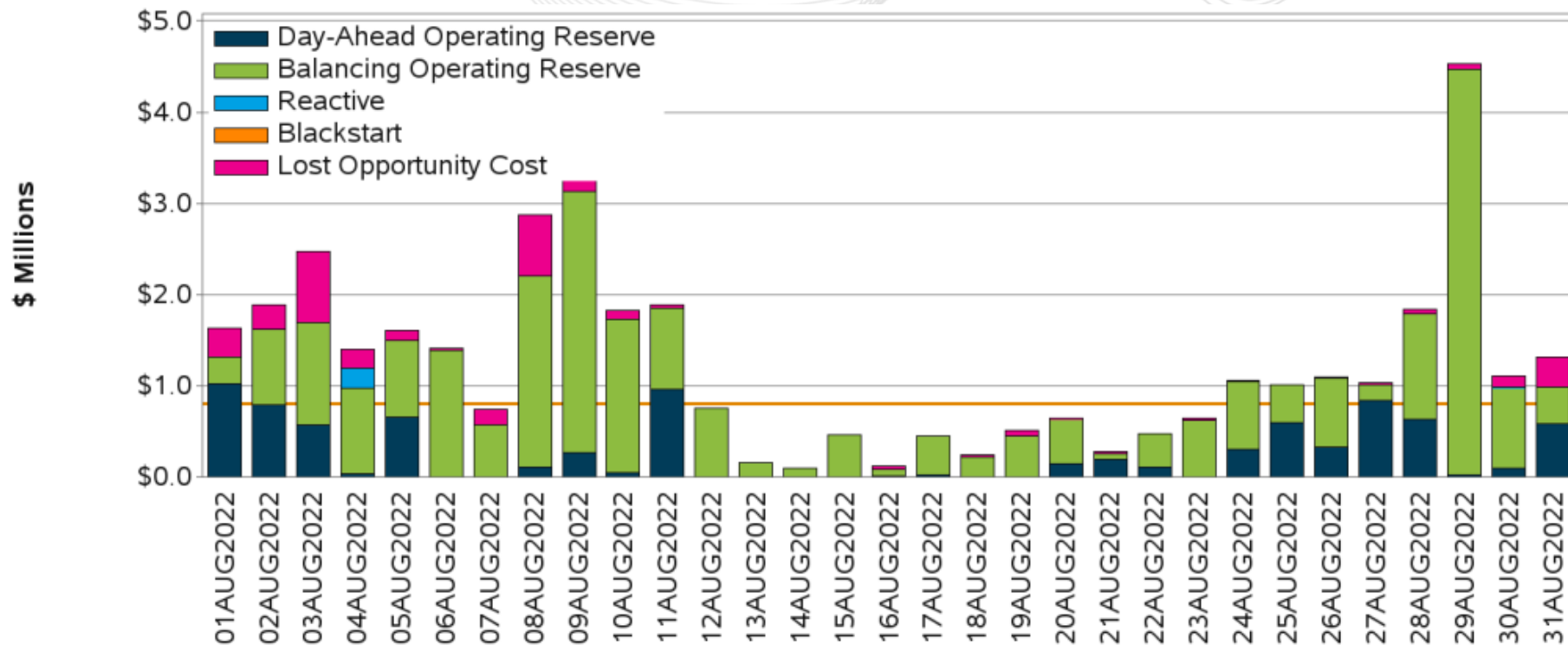
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Operating Reserve (Uplift)







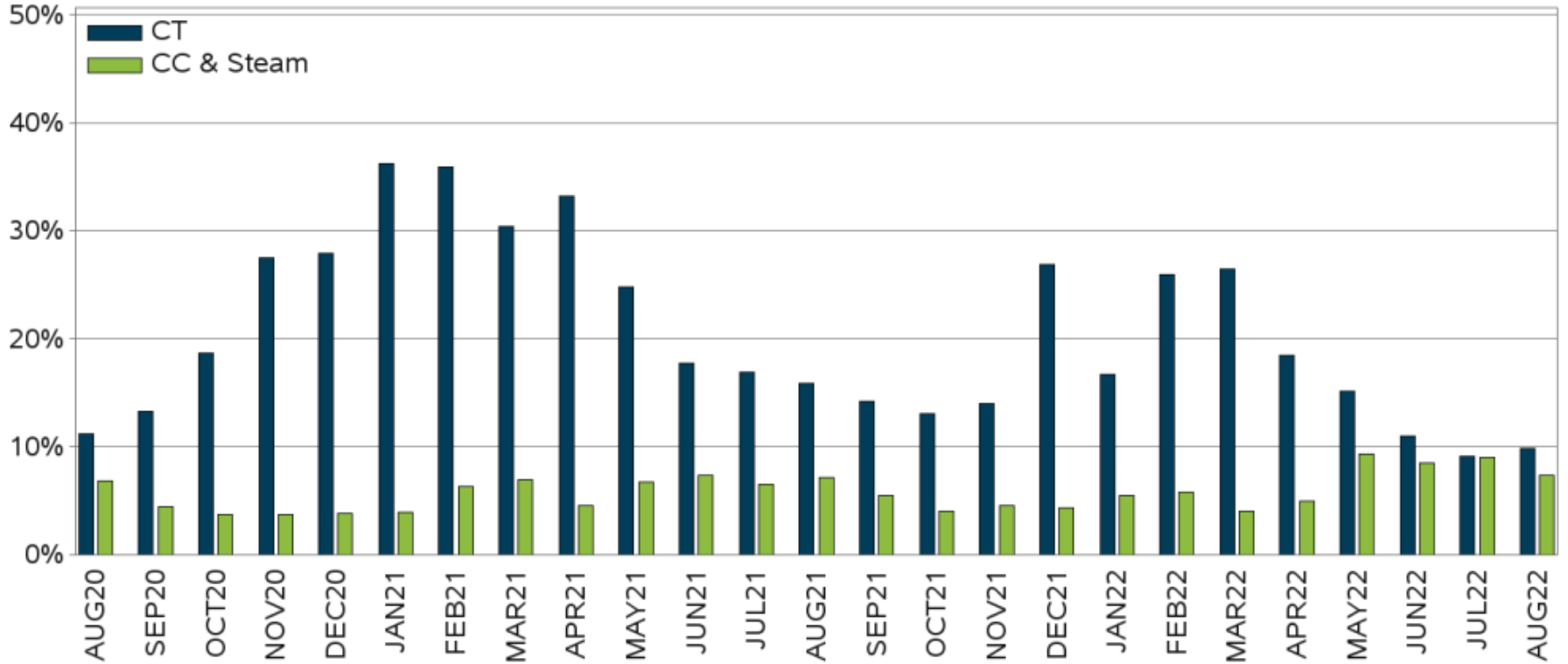


- In August, uplift exceeded \$800,000 on 18 days -
- Contributing factors to uplift were:

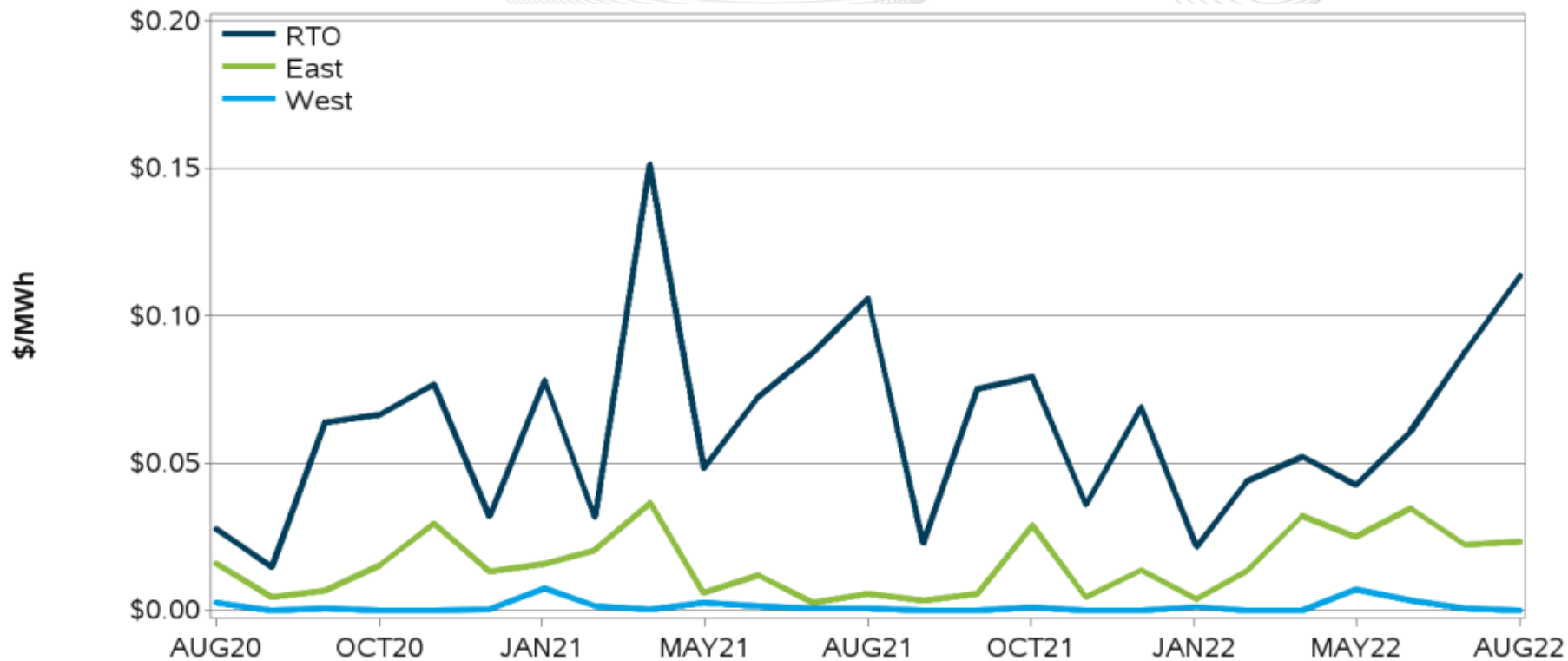
Our reliability needs compounded by the hot weather and forecast error continue to be the biggest drivers of uplift. For BOR, the volatility of localized congestion continue to require us to run more expensive CTs longer. For DA OR, the localized congesting limiting our north to south flows on smaller scale have continue to drive the need for the additional steam. As for LOC, if and when congestion materializing in Real Time is the biggest driver but there have also been days where our reliability needs have been a factor.

- More information on Uplift can be found on the PJM website at [Drivers of Uplift](#)

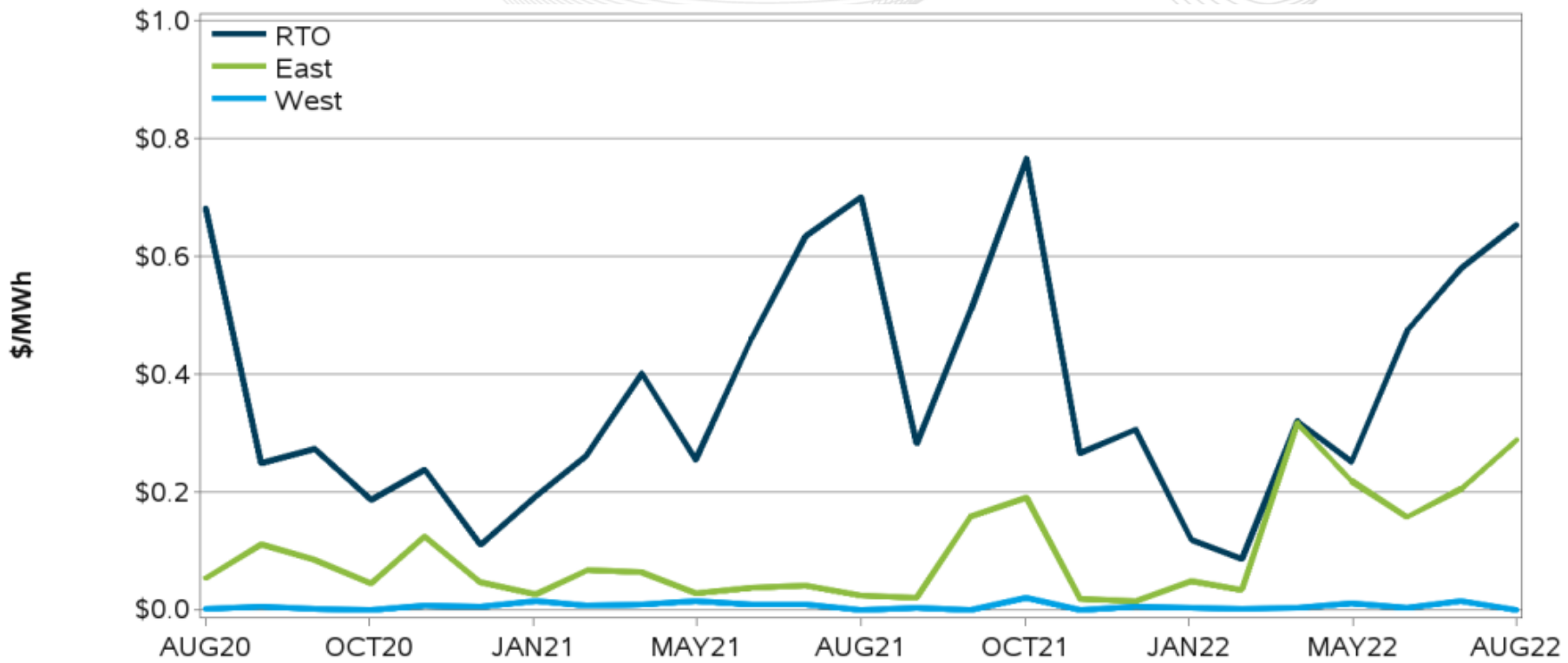
Percent of Total CT, CC and Steam Hours with LMP < Offer



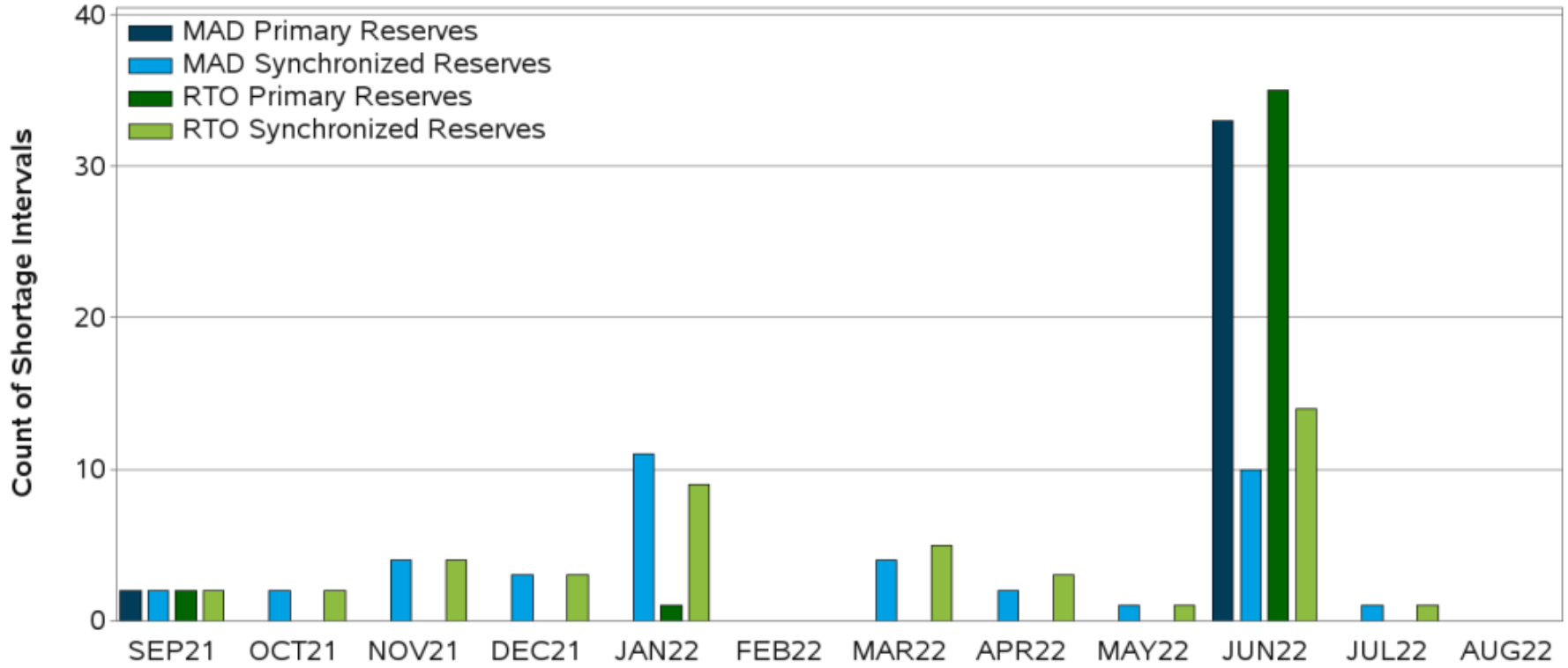
- Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.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



Deviations Balancing Operating Reserve Rates



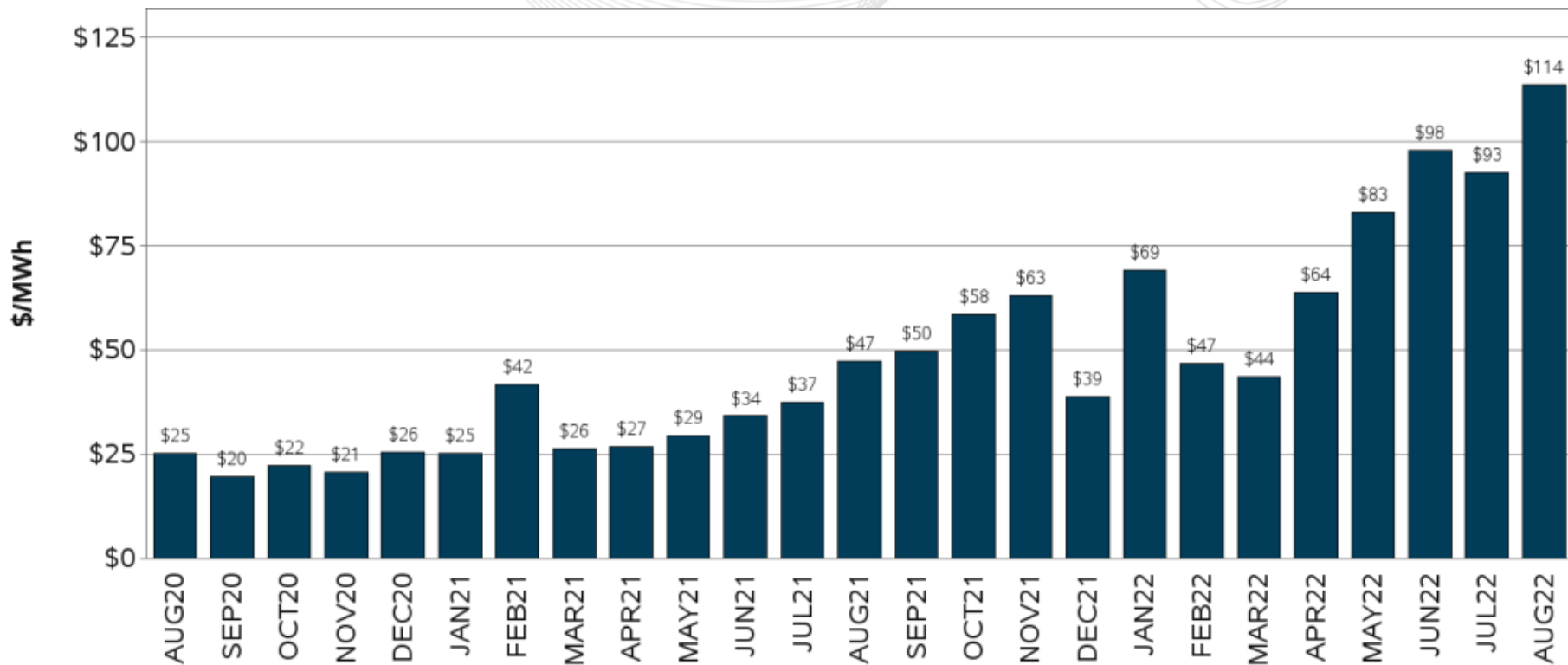
Energy Market LMP Summary



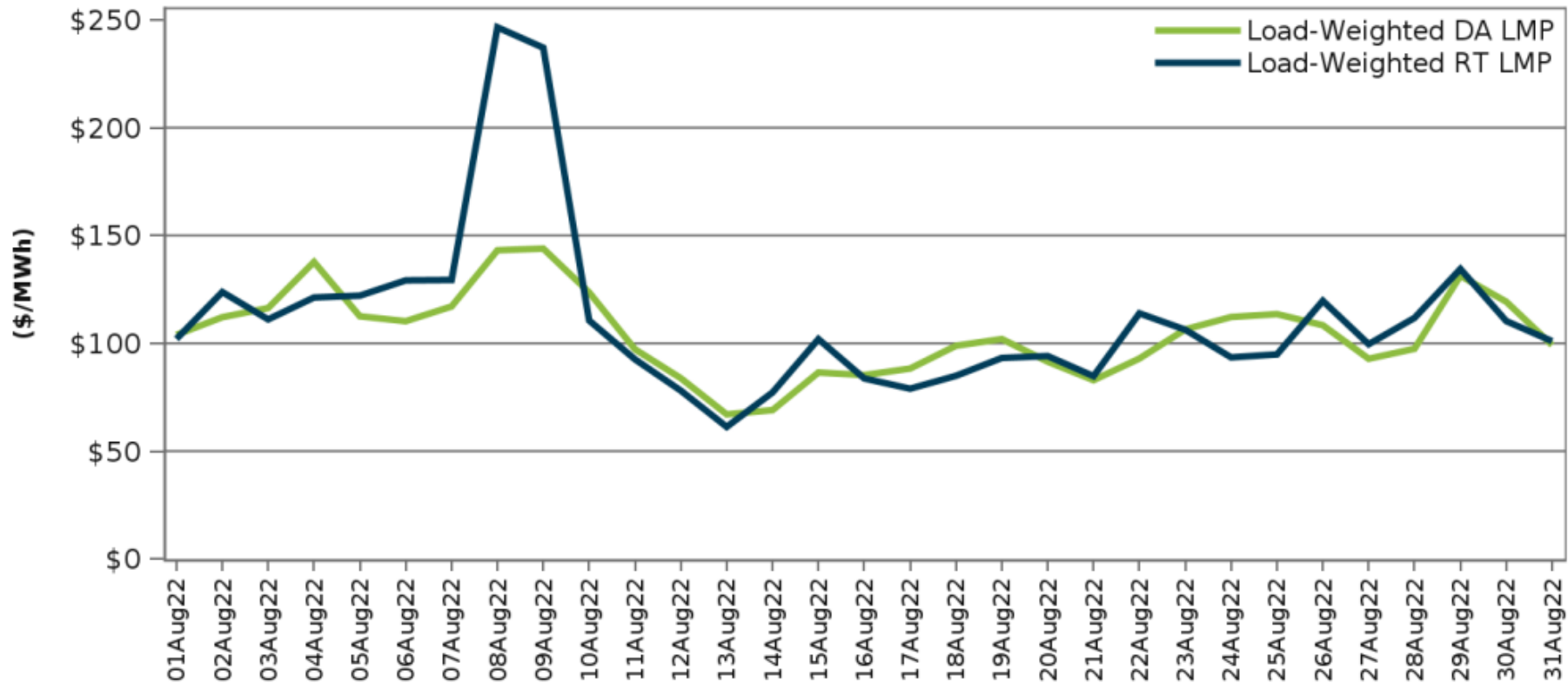
Information on constraints and shadow prices can be found here:

http://dataminer2.pjm.com/feed/rt_marginal_value

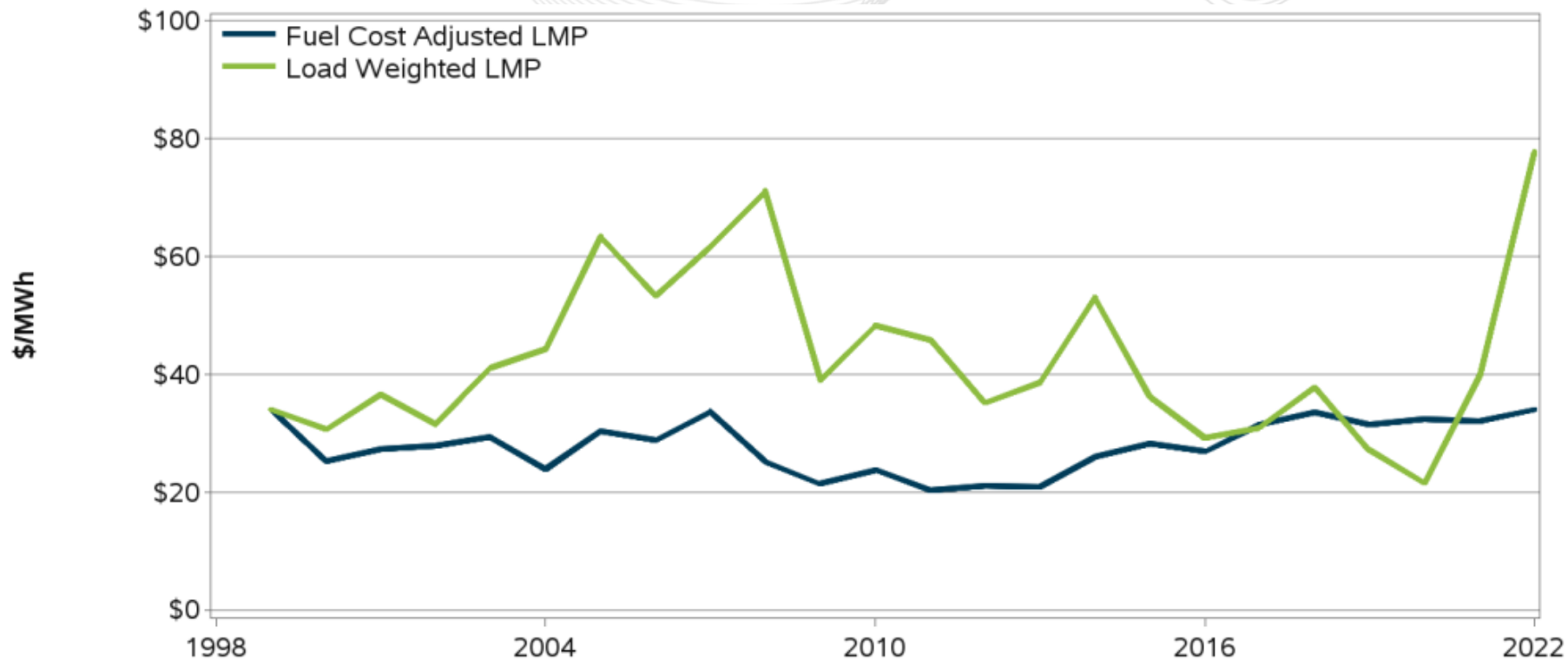
Monthly Load-Weighted Average Real-time LMP

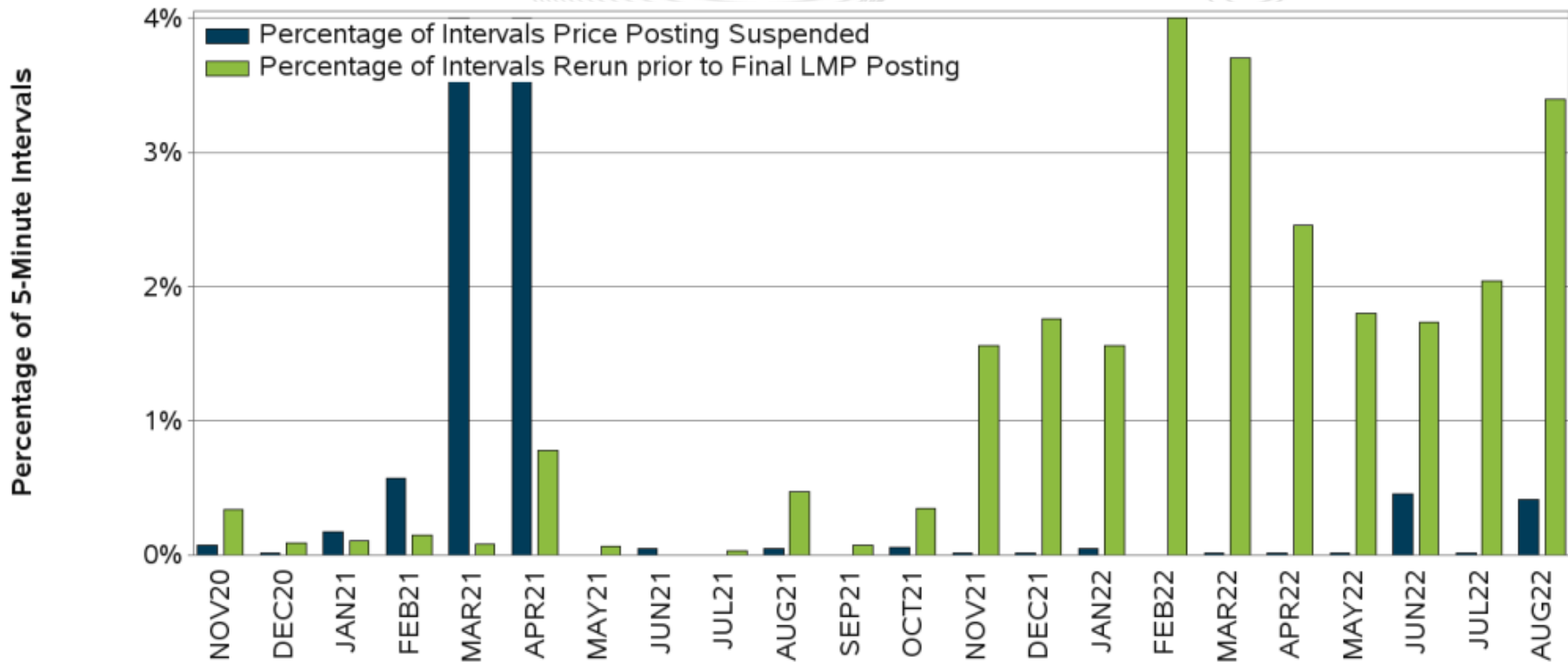


Daily Load-Weighted Average DA & RT LMP



Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)

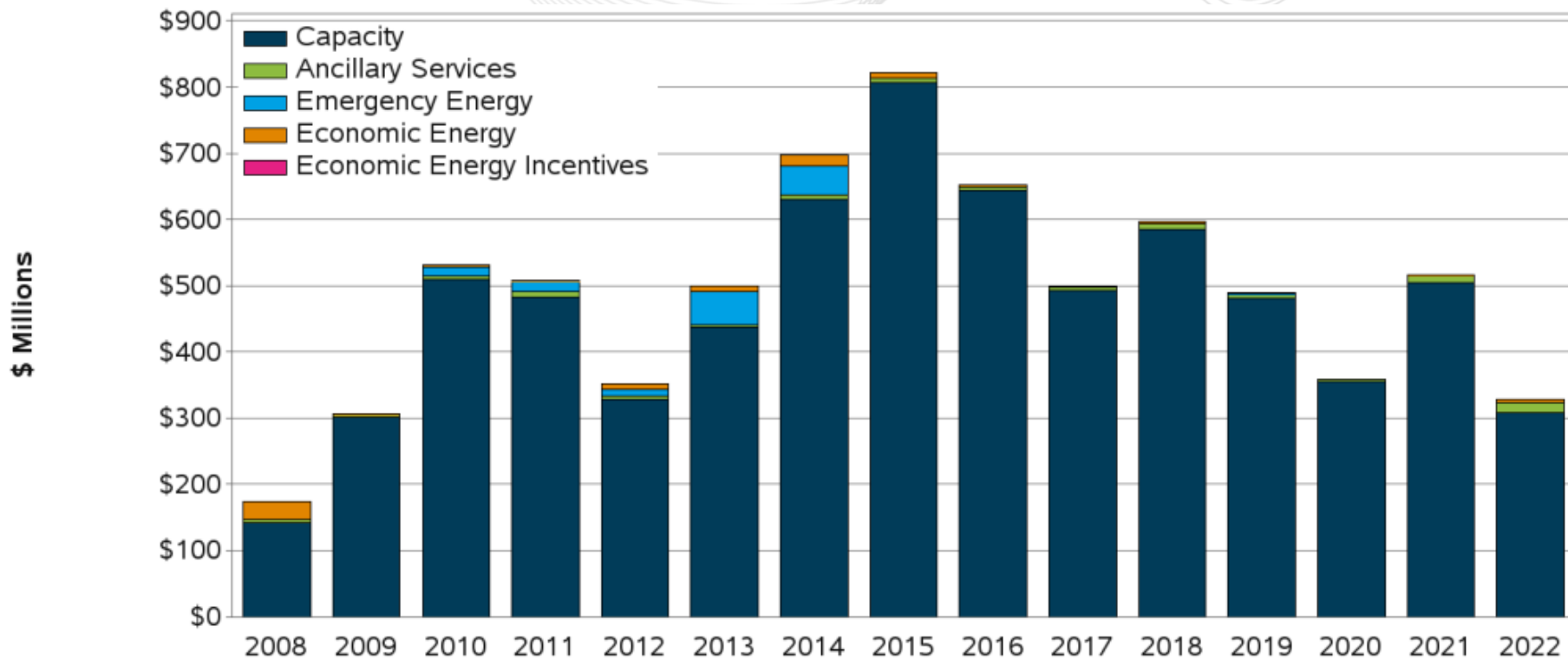


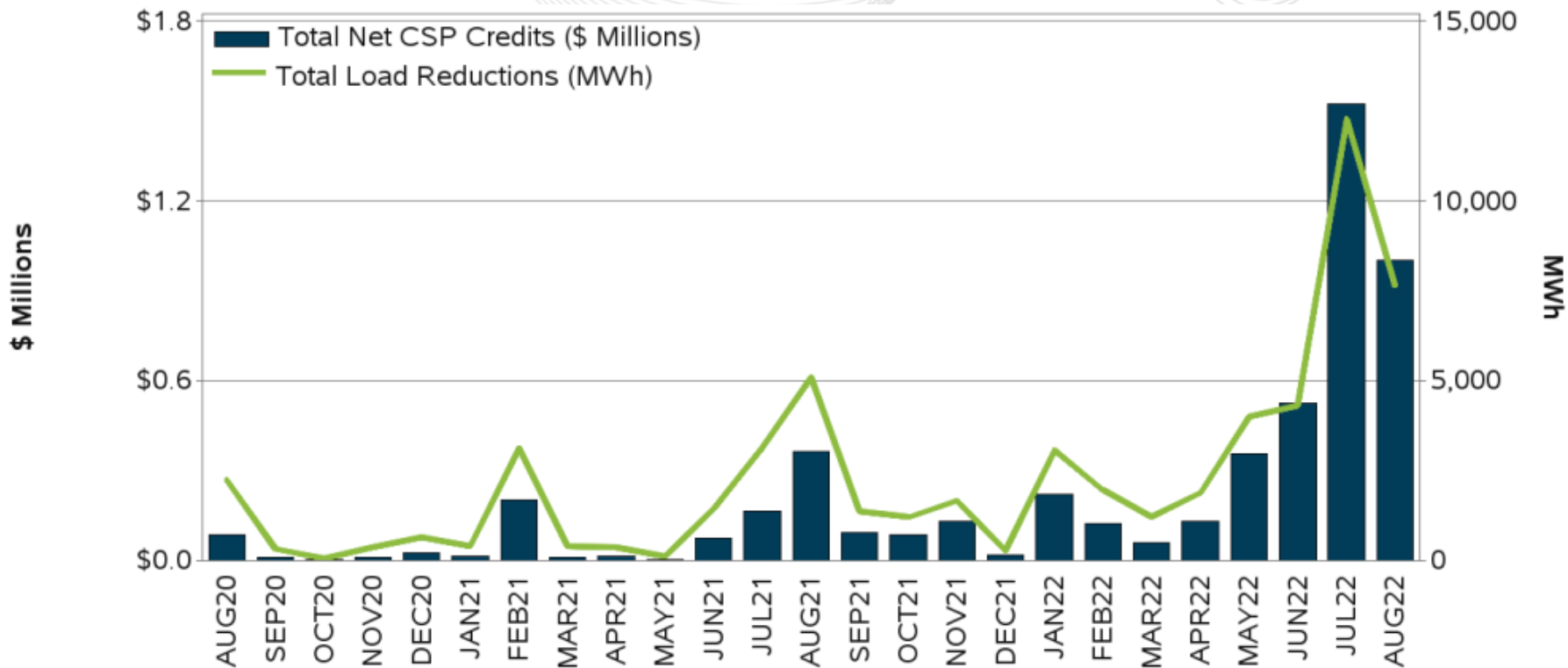


Spikes seen in March and April 2021 are incorrect and due to a software bug which has since been fixed.

Energy Market

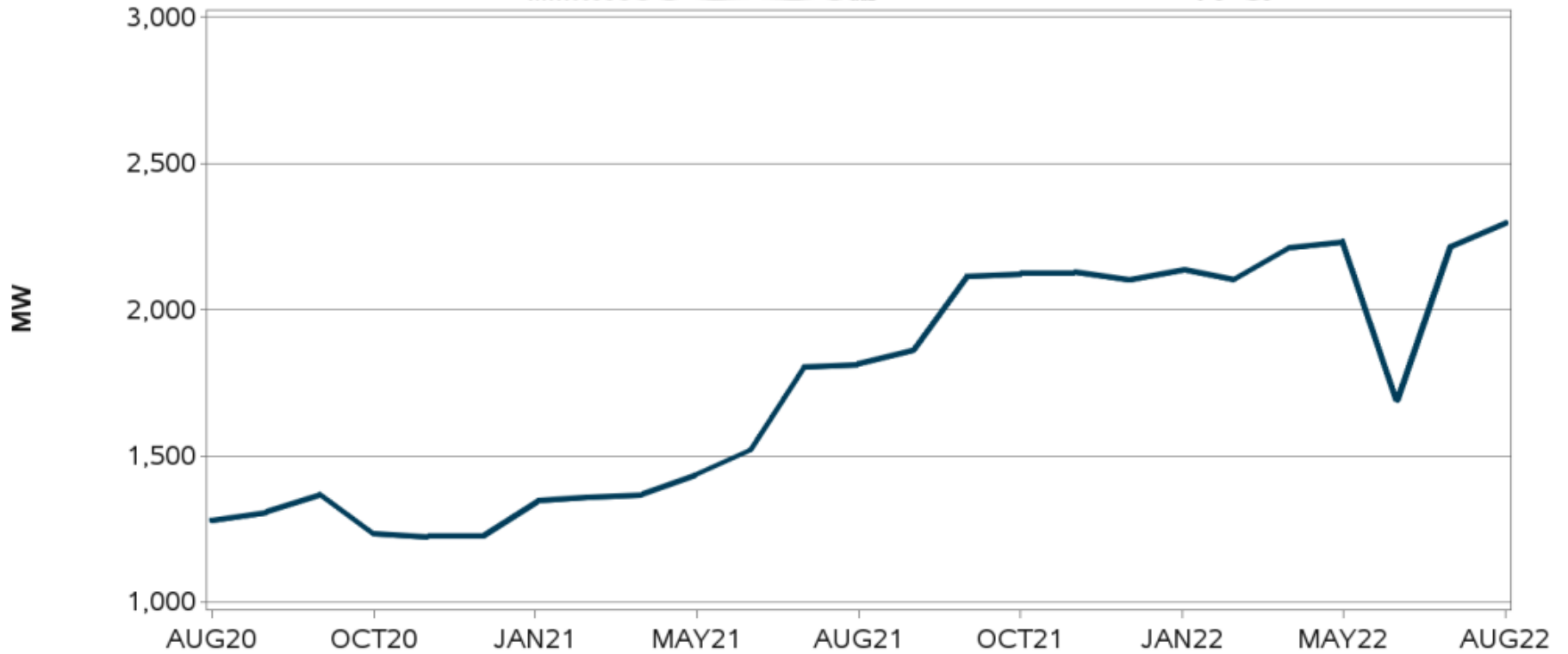
Demand Response Summary





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

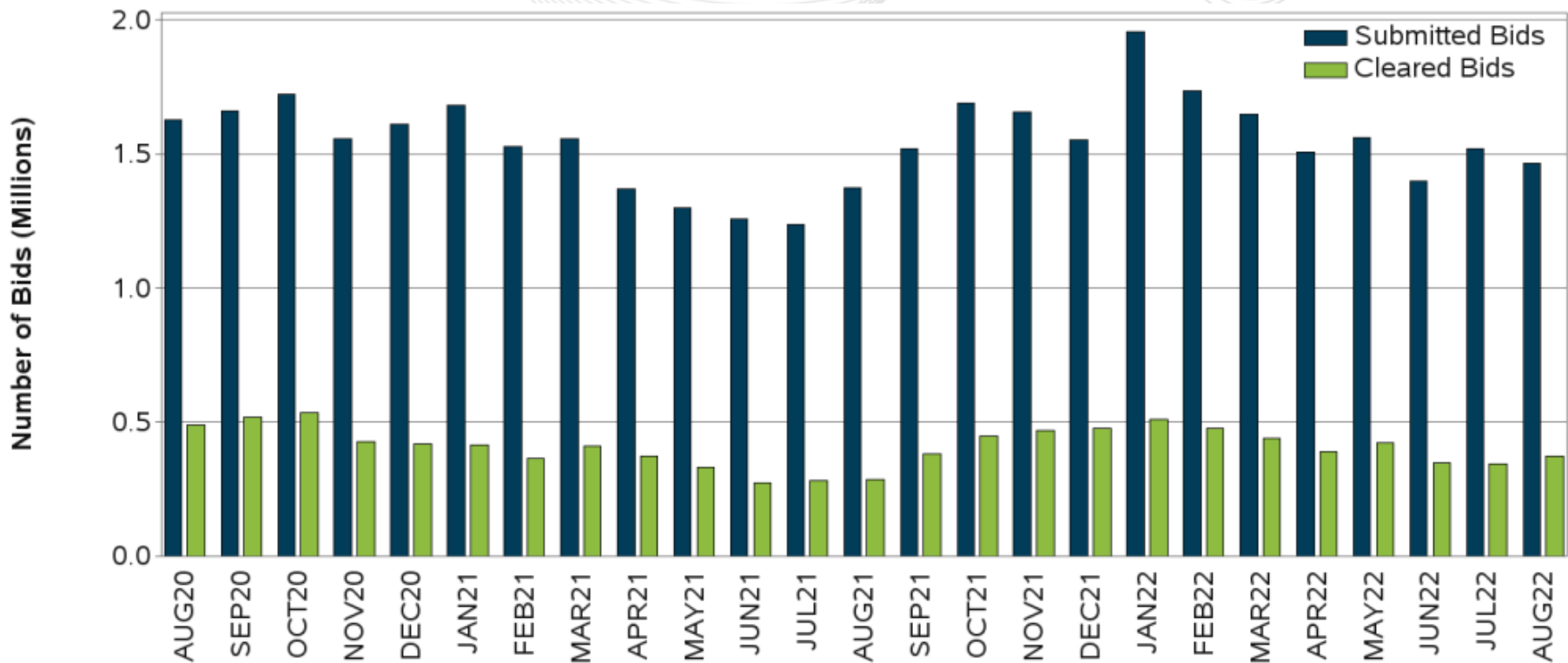
Total Registered MW in PJM's Economic Demand Response

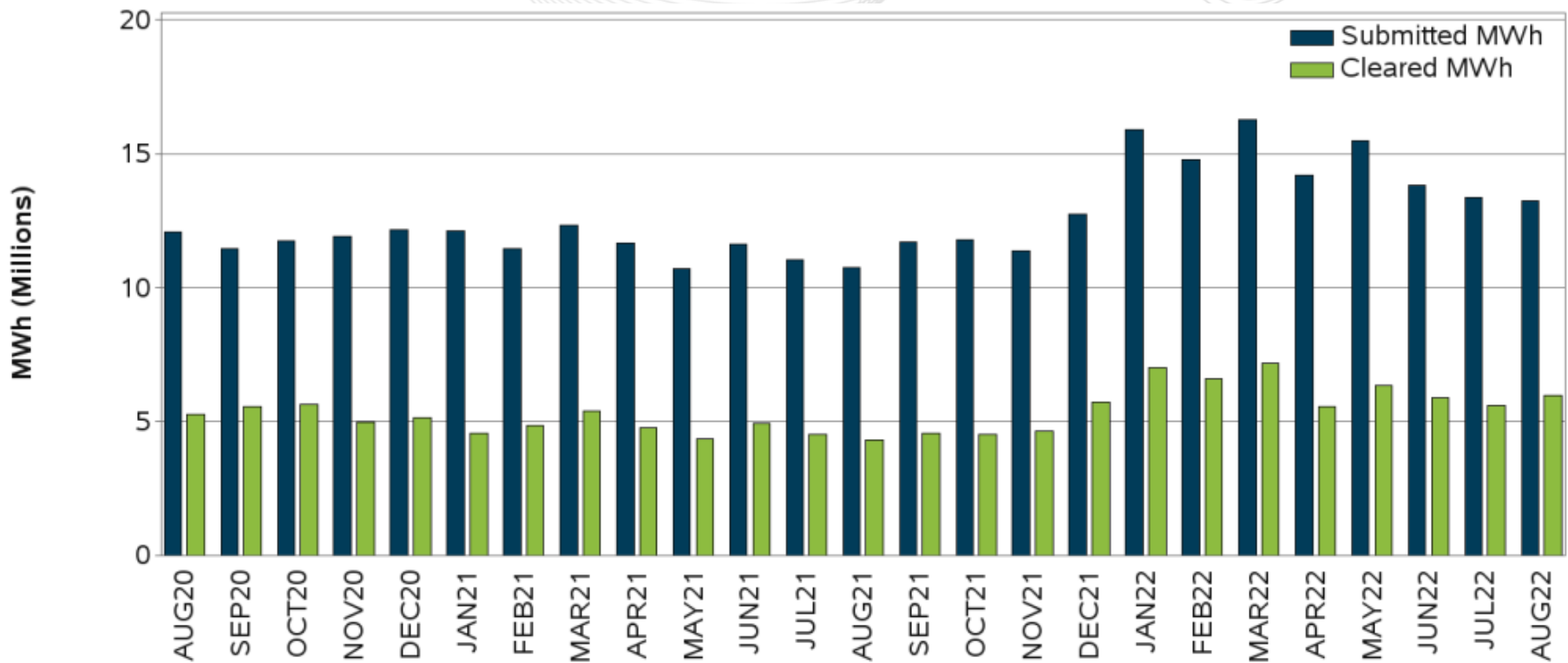


Energy Market

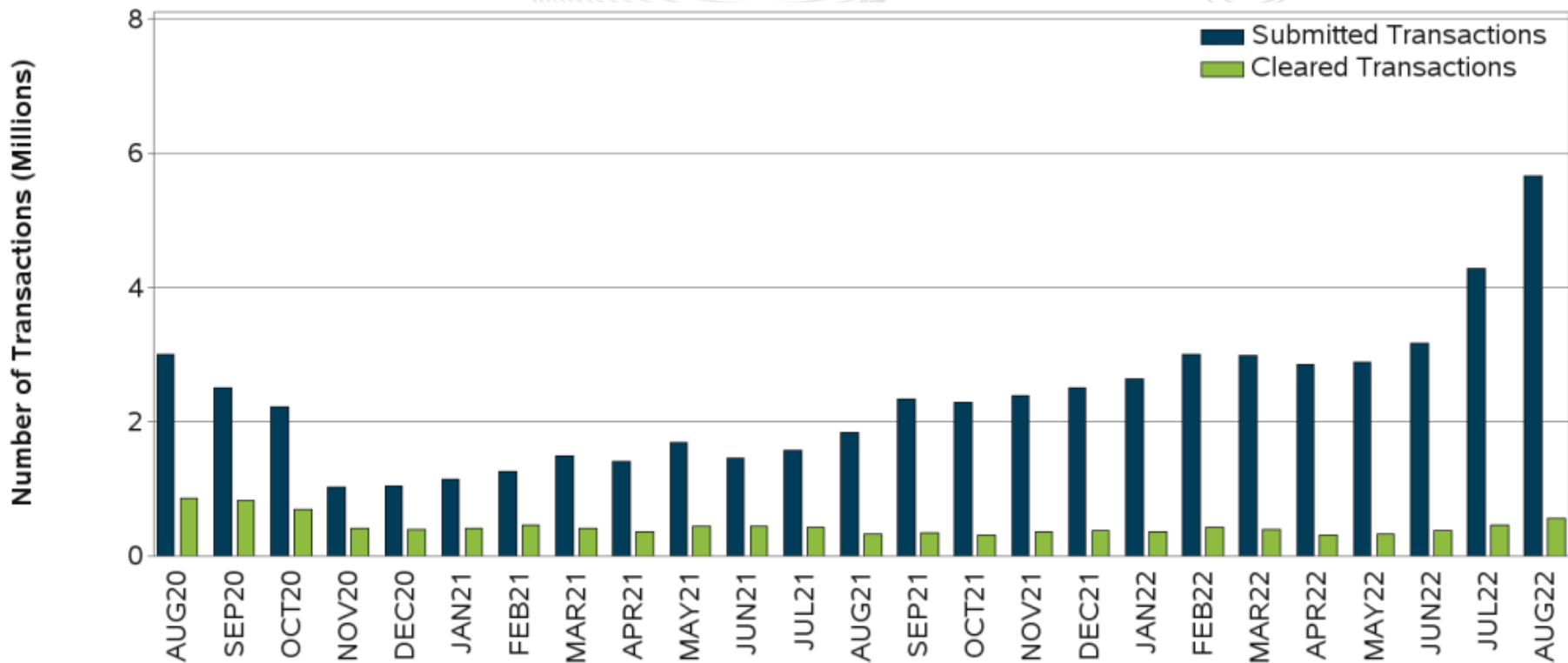
Virtual Activity Summary

- 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.

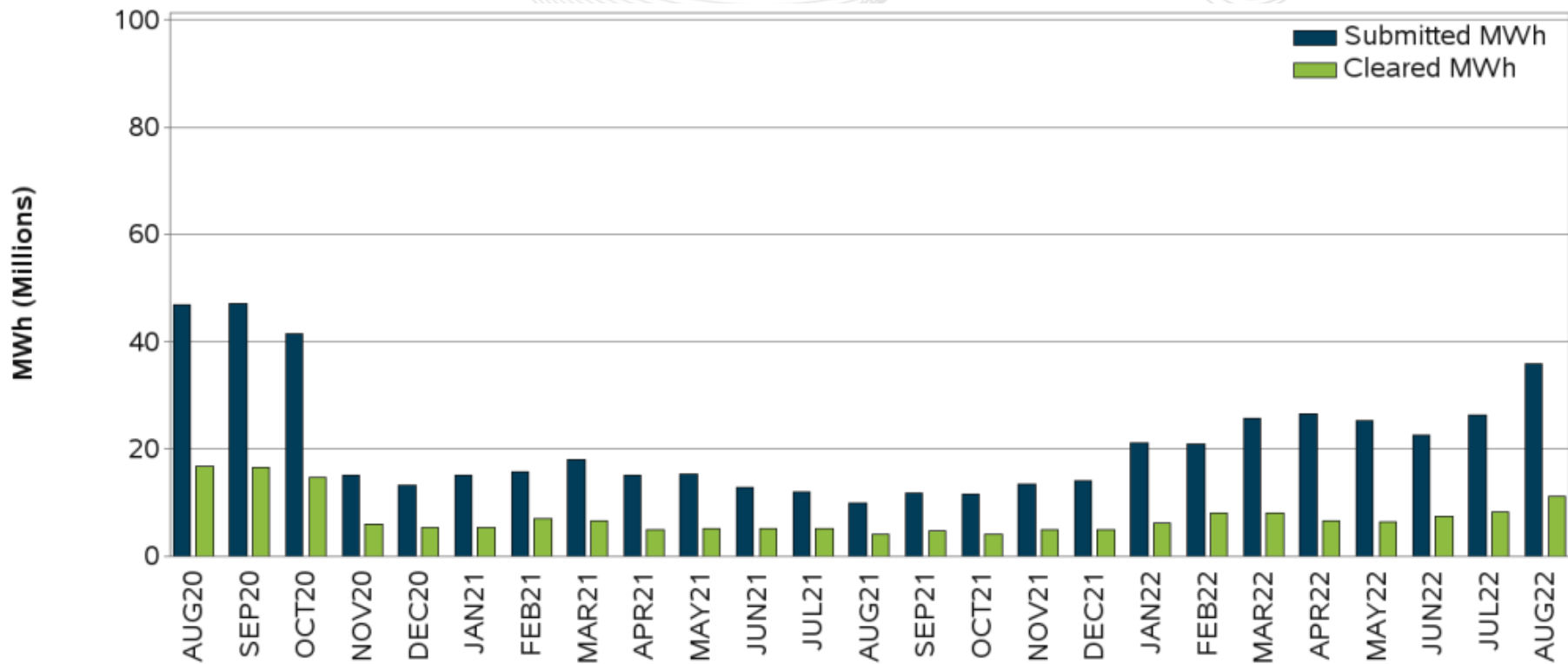




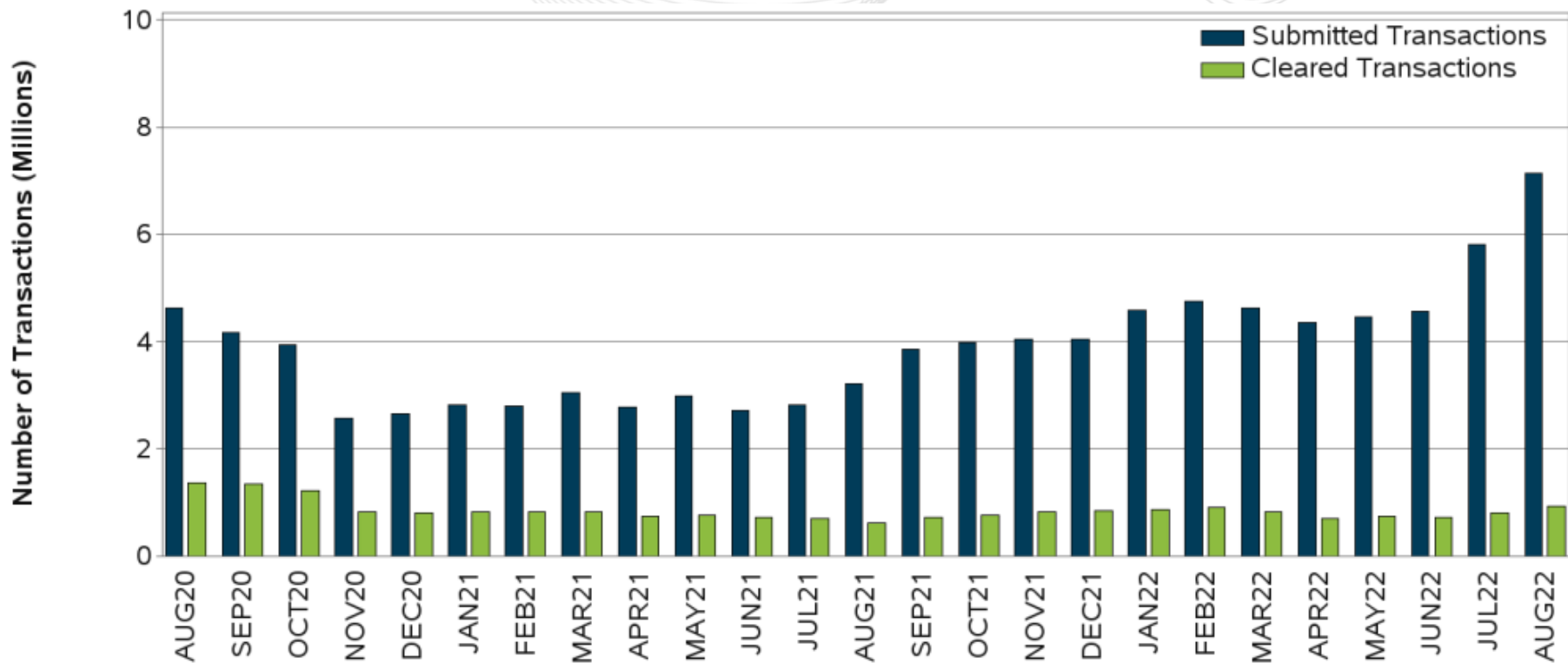
Up-To-Congestion Transactions - Total Number



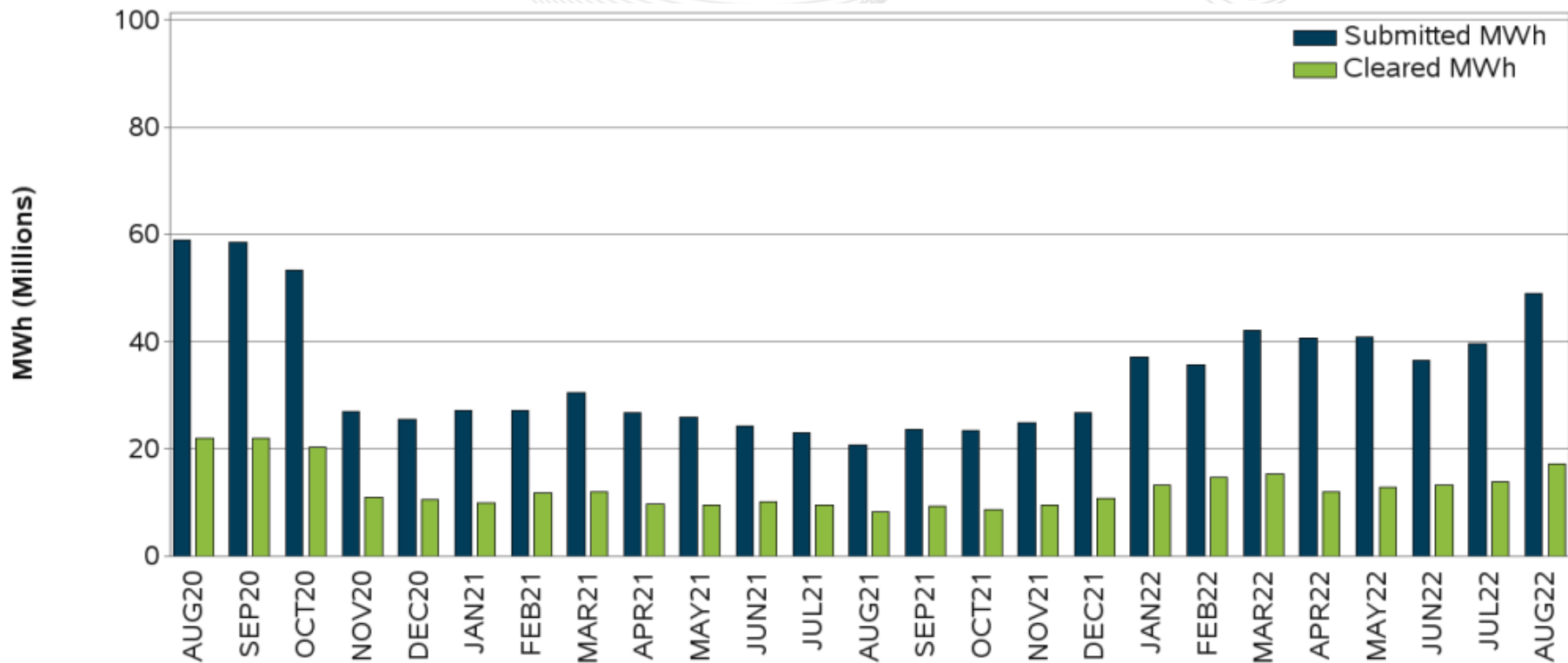
Up-To-Congestion Transactions - Total Volume



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



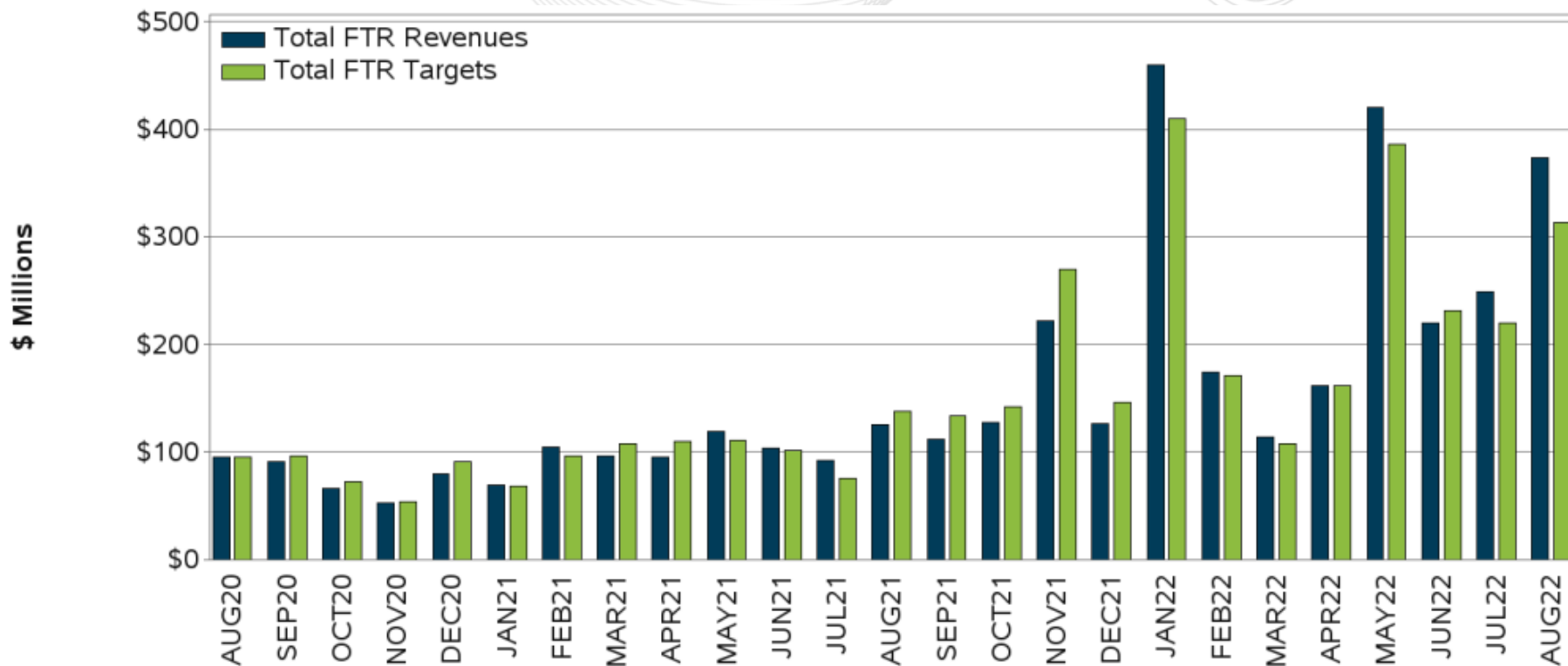
INCs, DEC and Up-To-Congestion Transactions - Total Volume

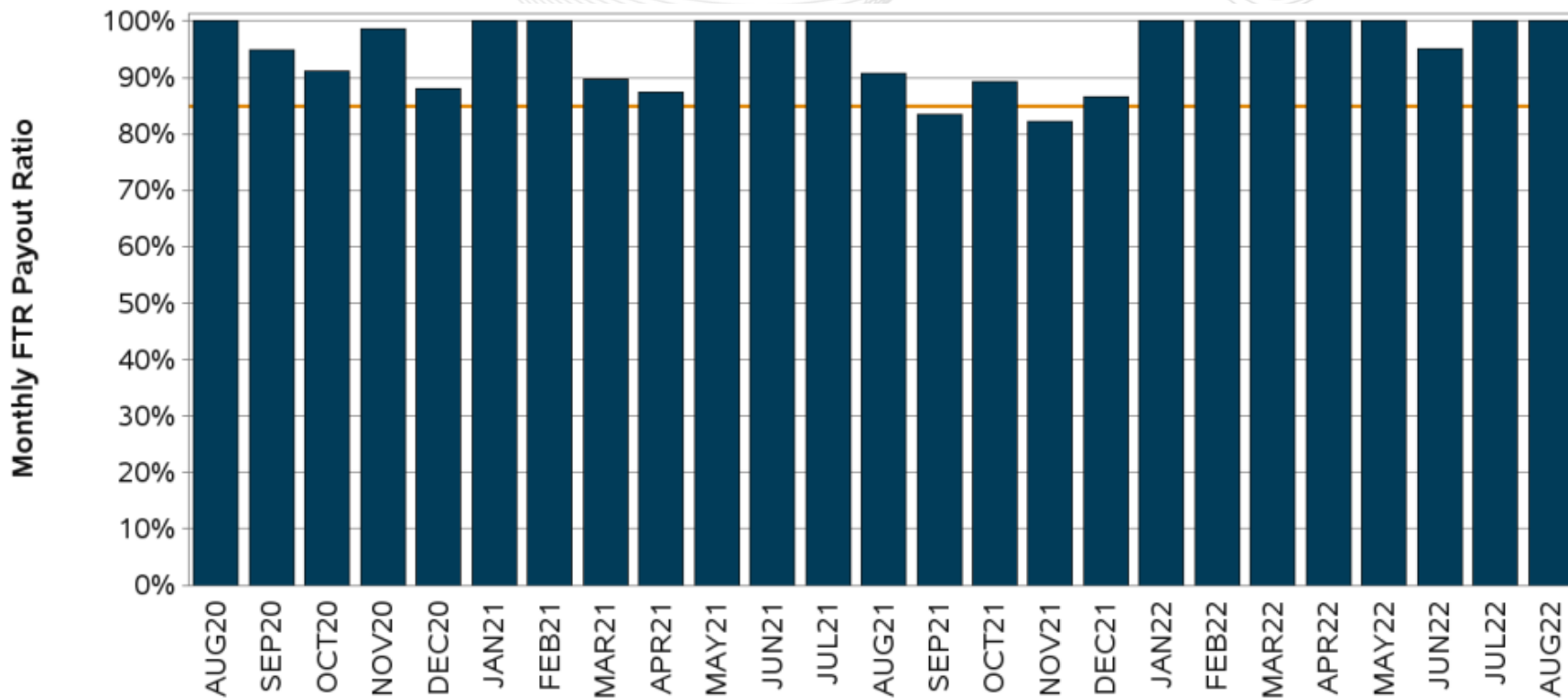


Energy Market

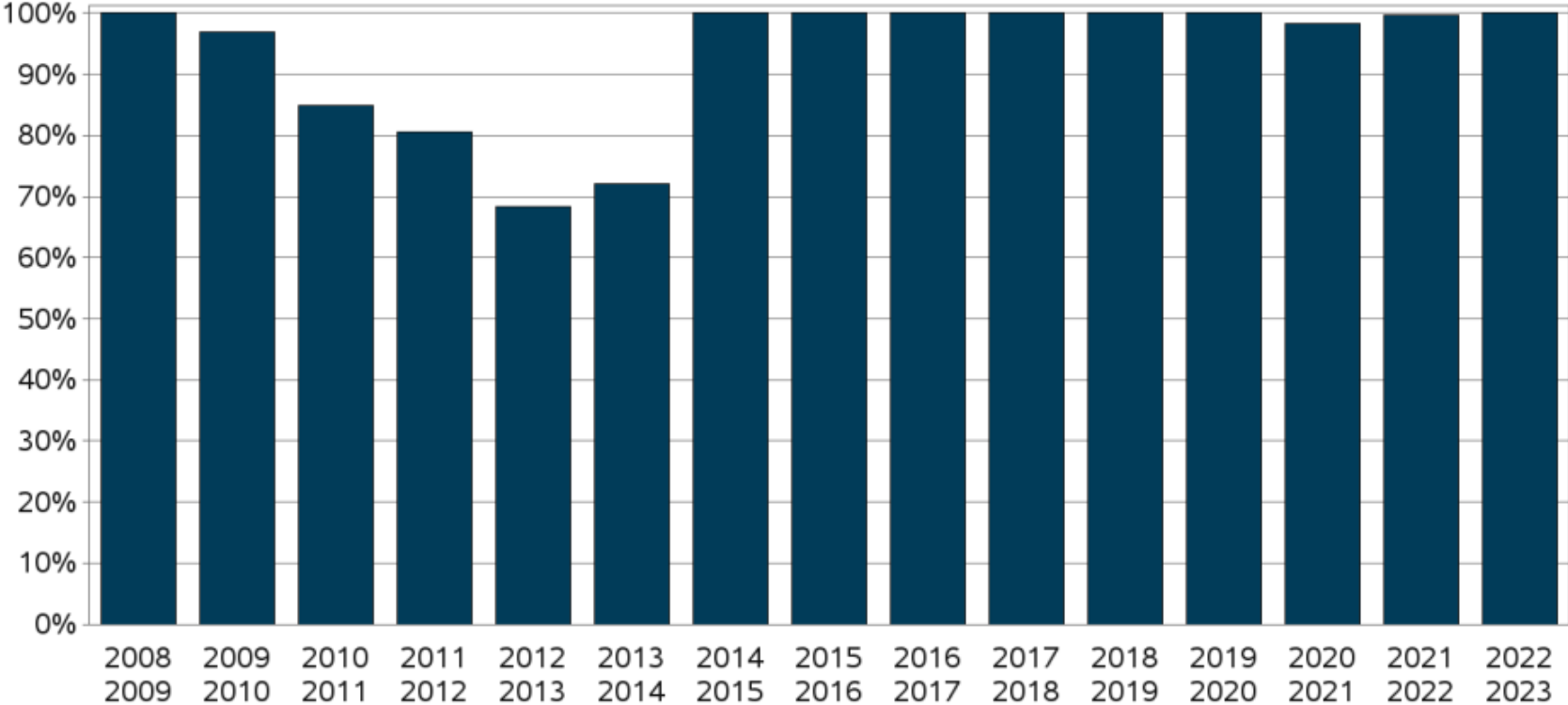
Congestion and FTR Summary

Period	Surplus / Underfunding	Payout Ratio
August 2022	\$59,925,069	100%
2022	\$171,027,764	100%
2022/2023	\$76,921,744	100%

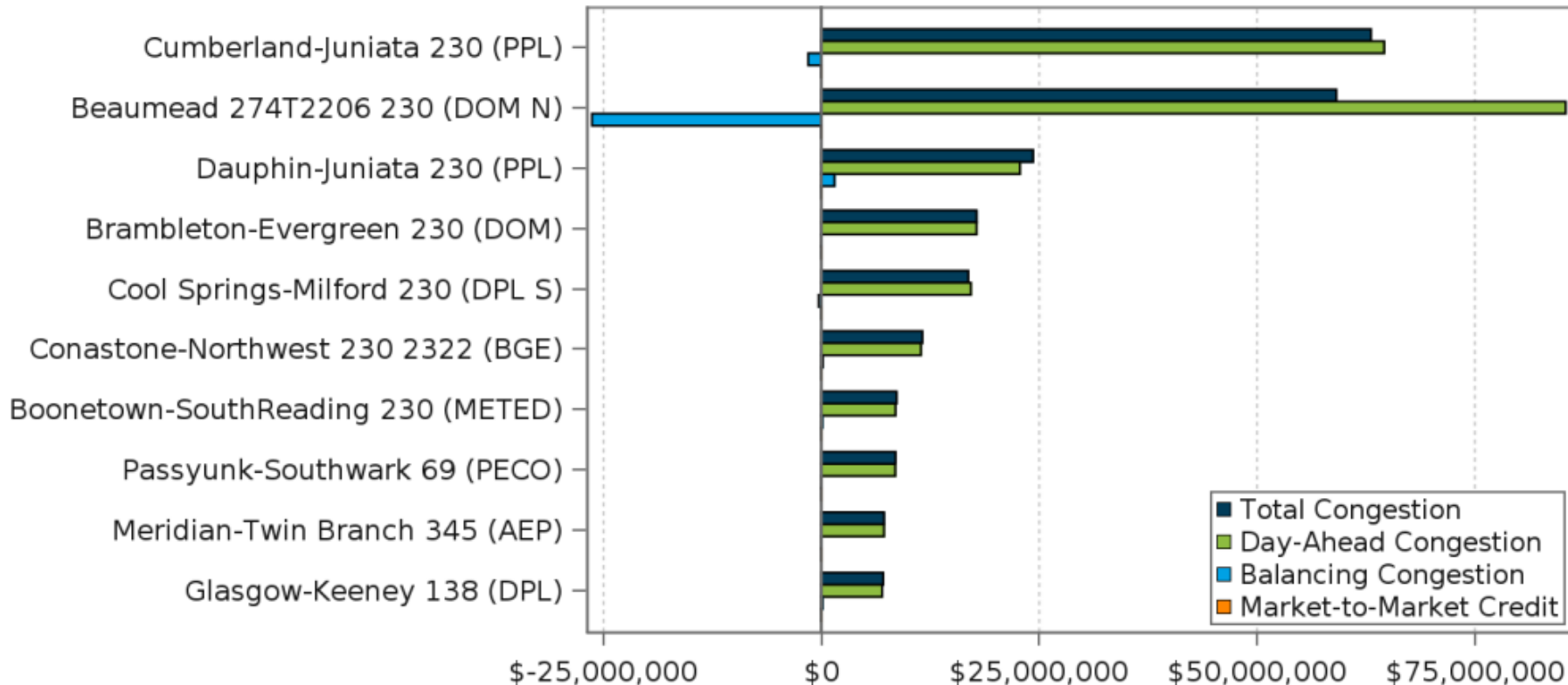




Planning Period FTR Payout Ratio

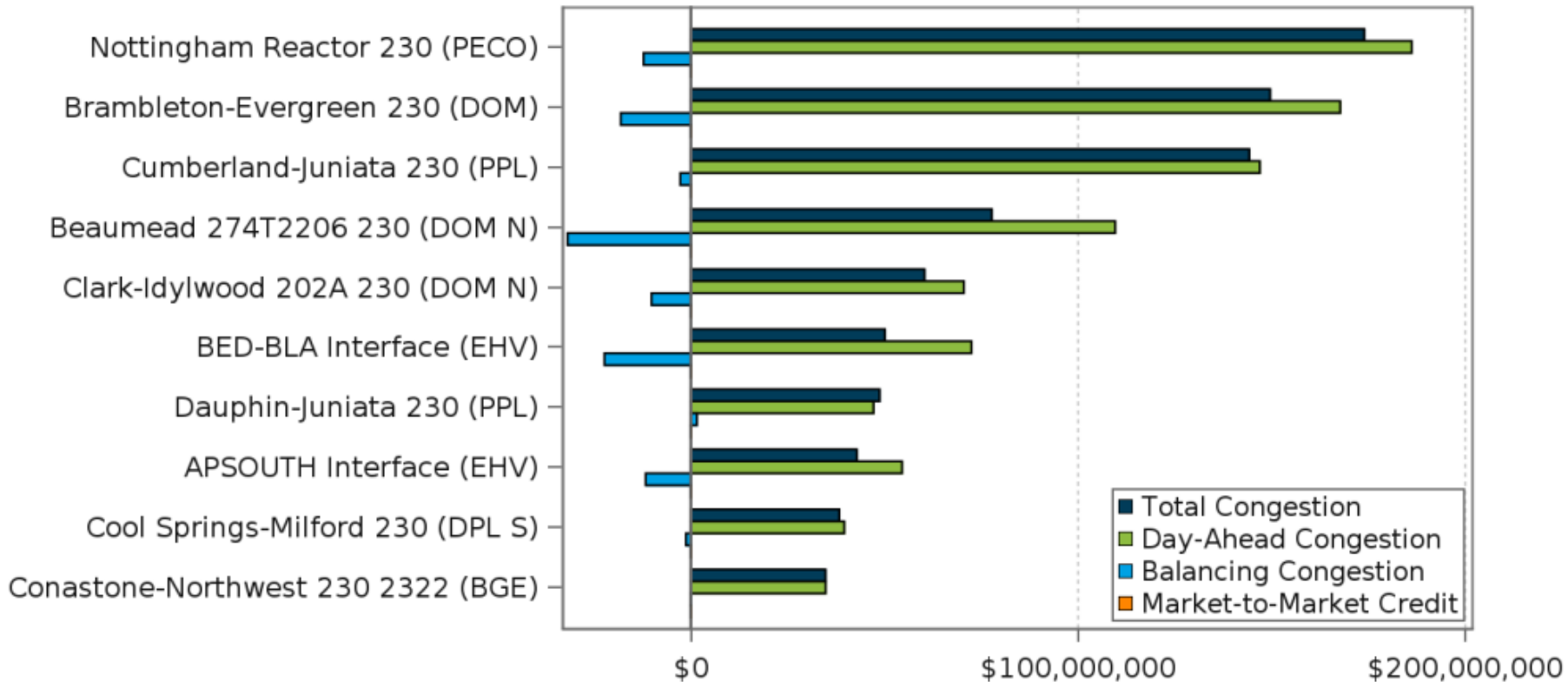


Ten Most Heavily Congested Transmission Facilities - Overall, August



The ten most heavily congested facilities account for 74% of total congestion for August.

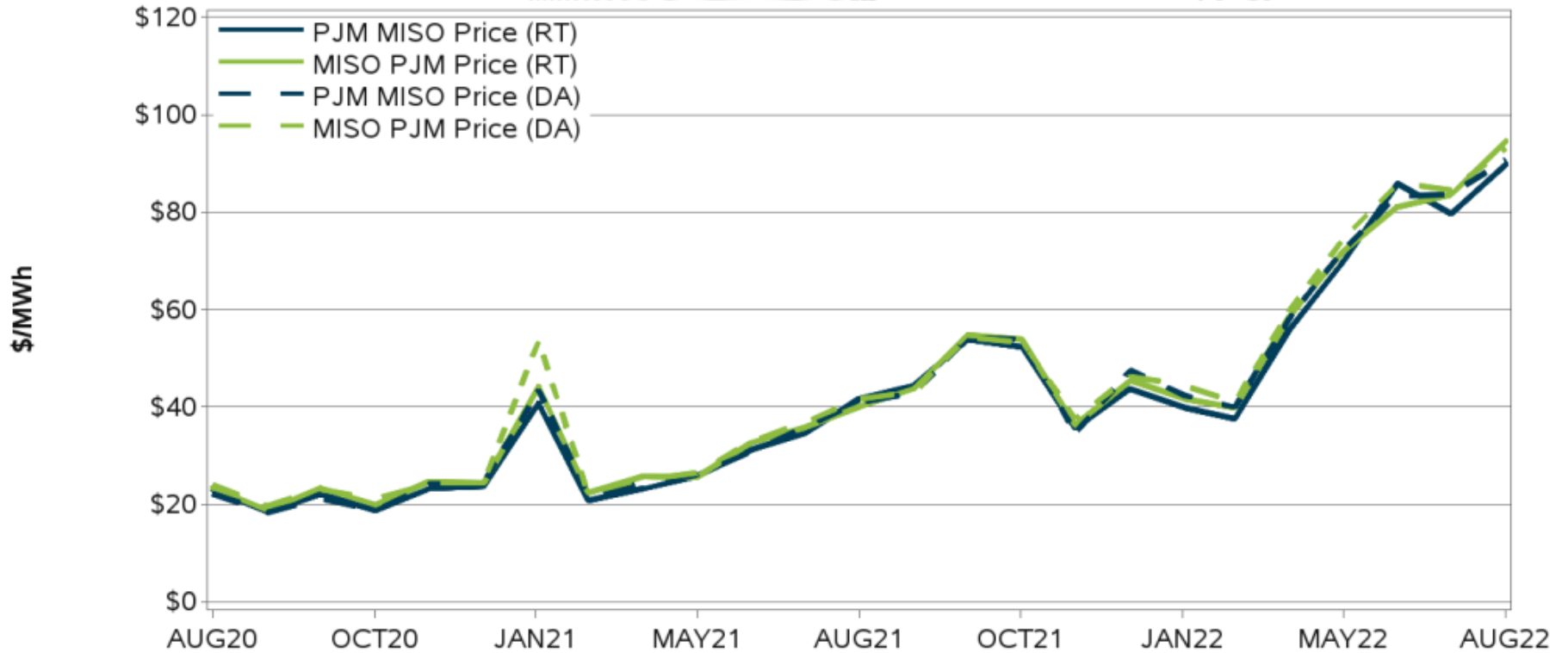
Ten Most Heavily Congested Transmission Facilities - Overall, 2022

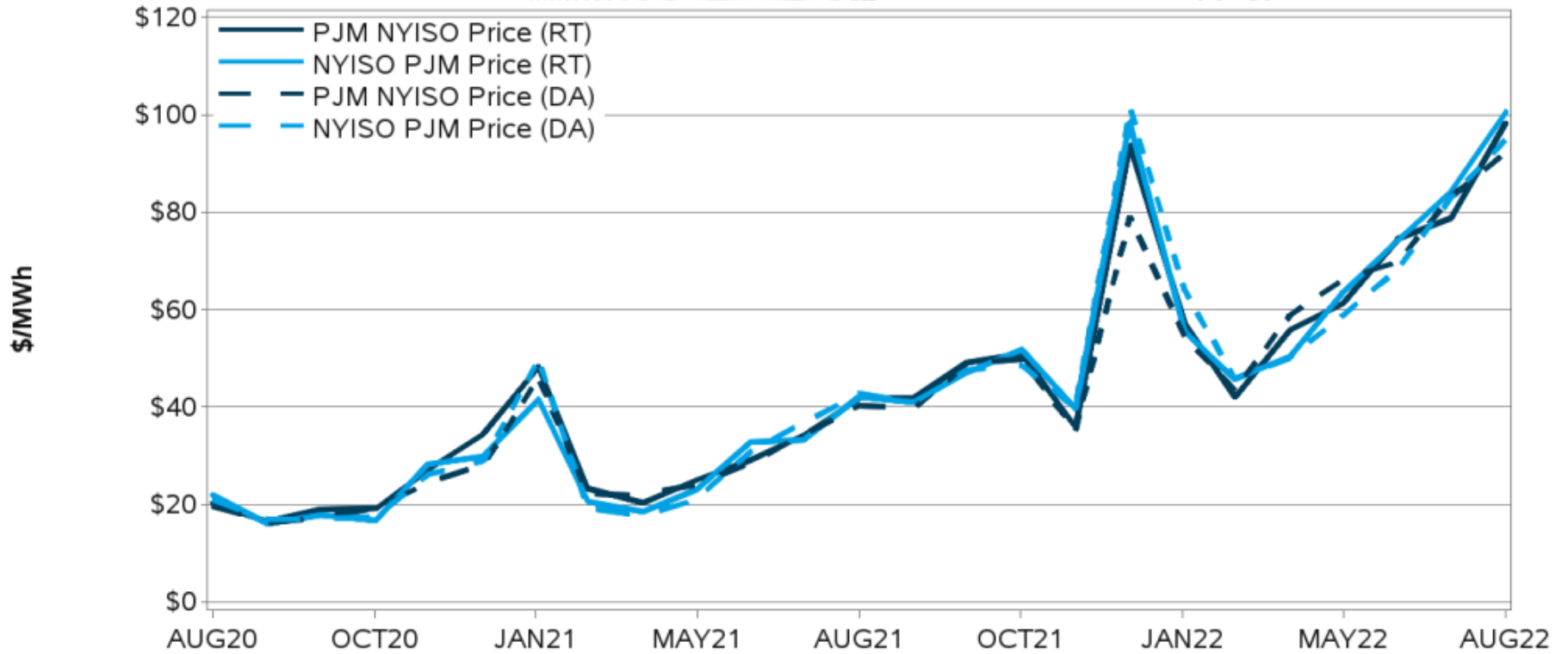


The ten most heavily congested facilities account for 51% of total congestion for 2022.

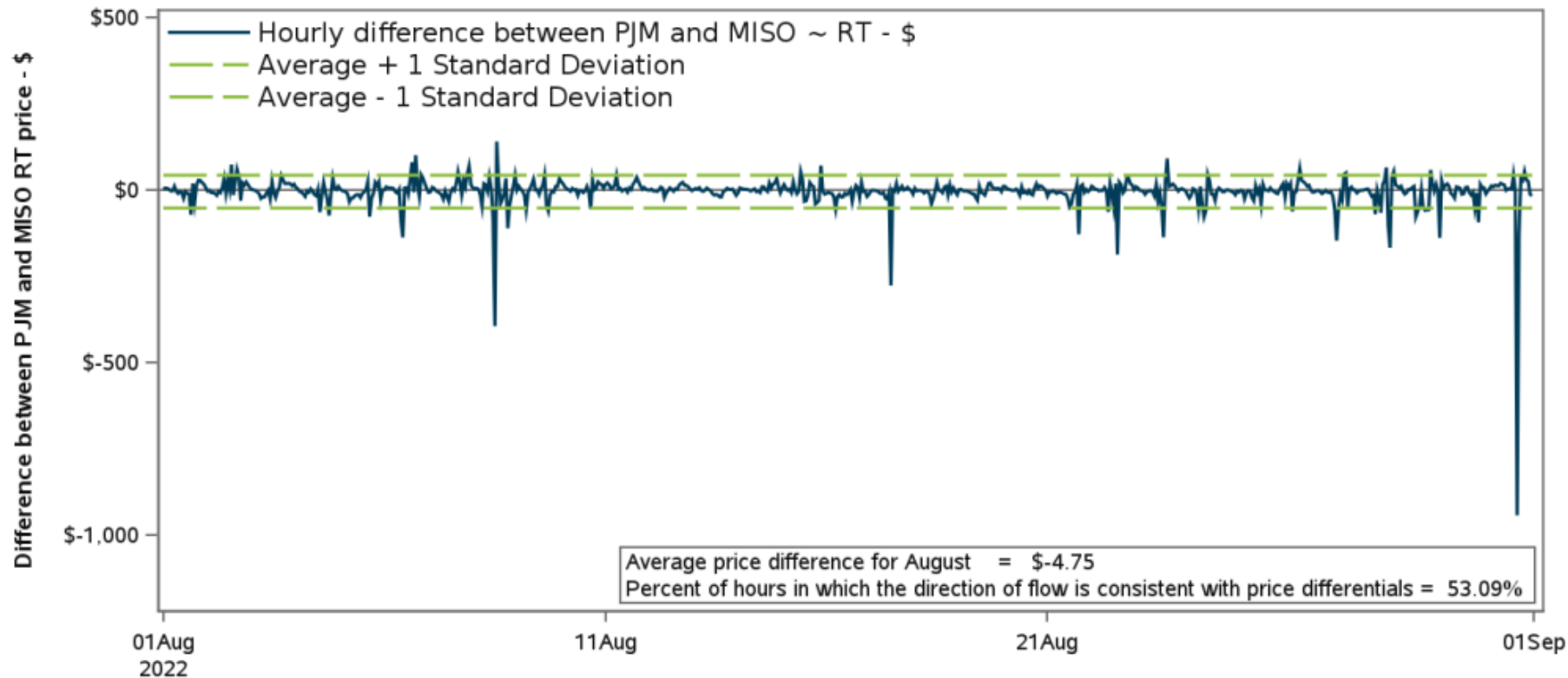
Energy Market

Interchange/Seams Summary



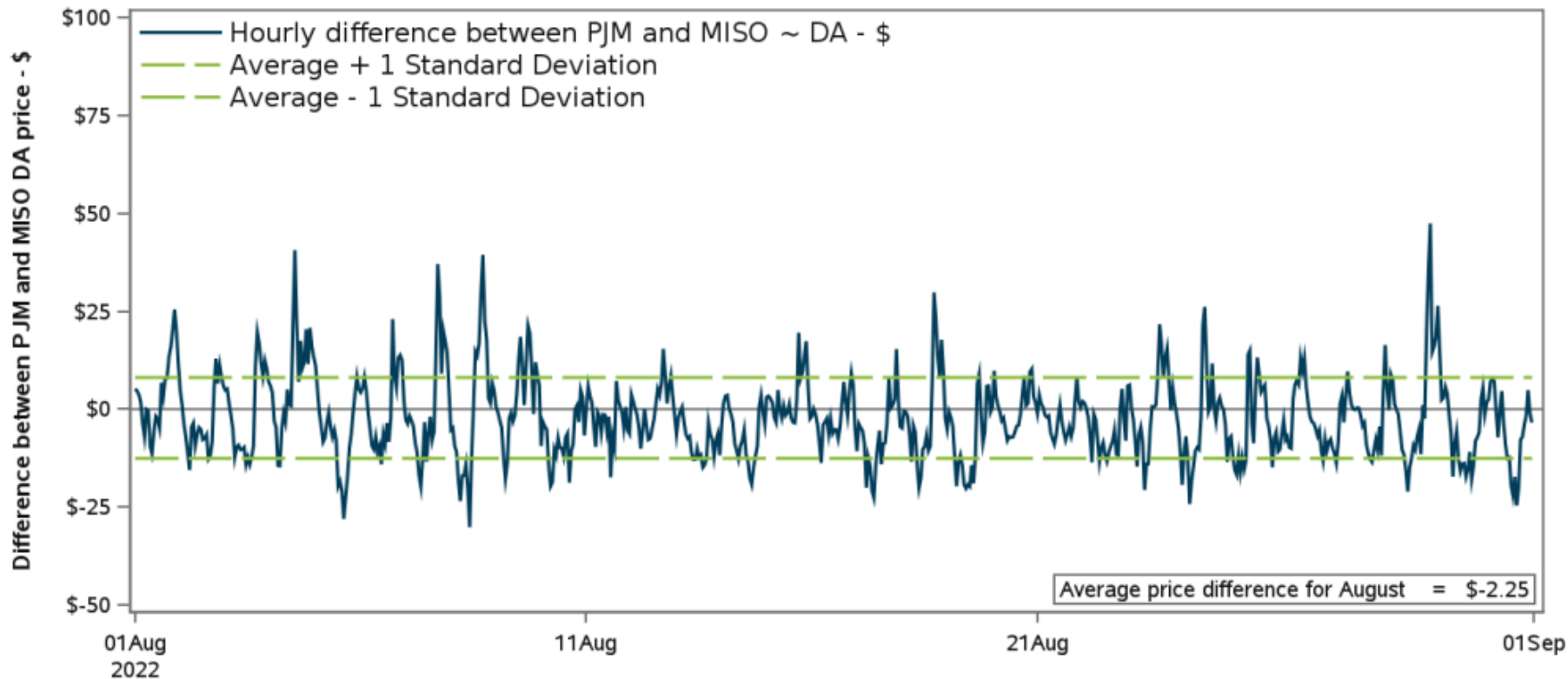


Hourly Difference Between PJM and MISO Real-Time Prices



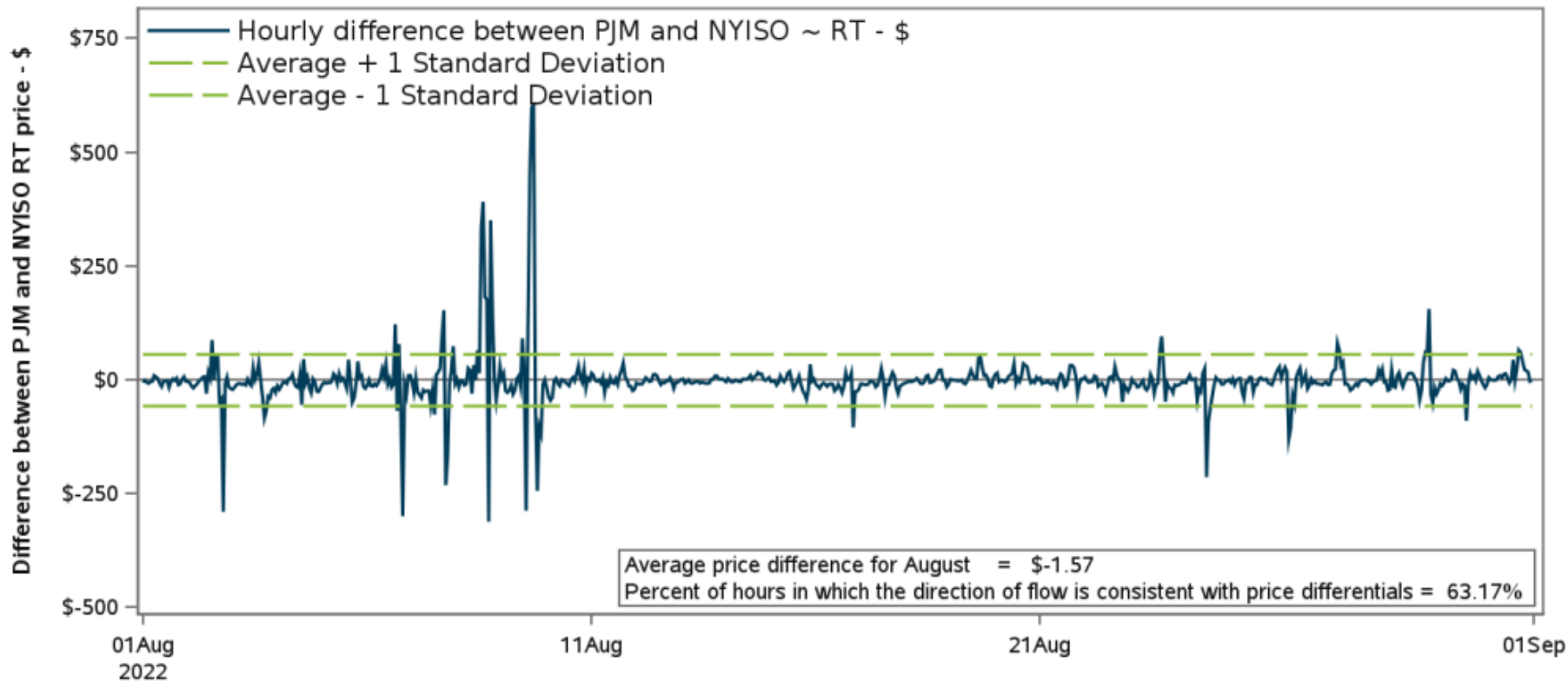
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and MISO Day-Ahead Prices



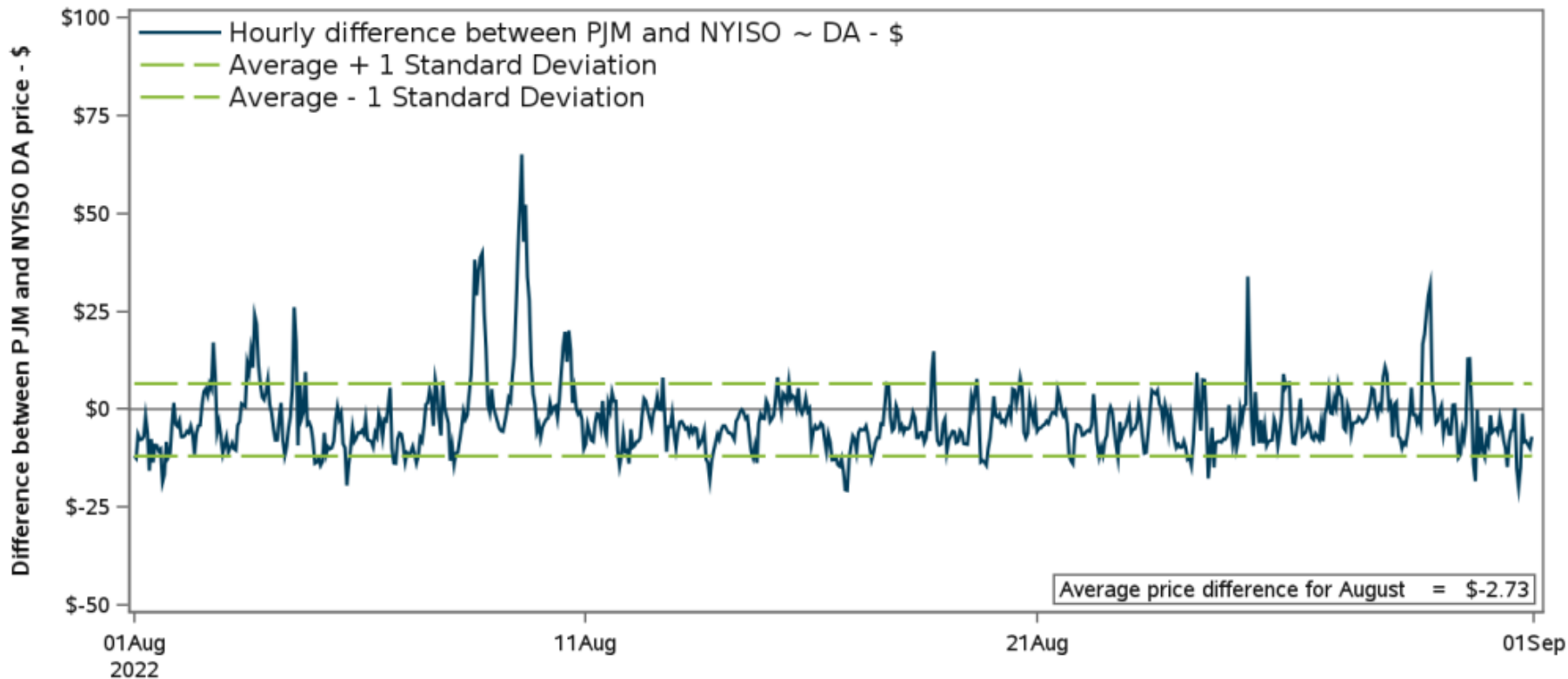
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Real-Time Prices

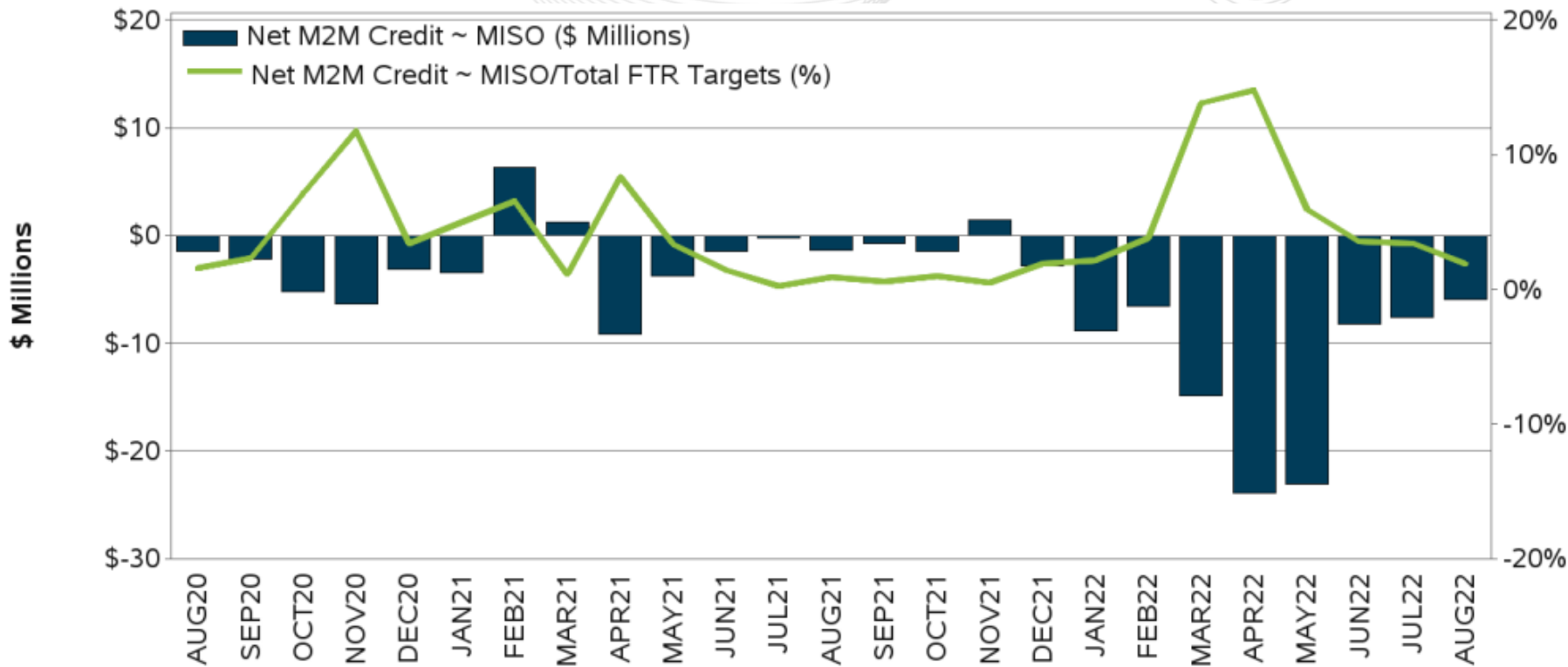


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Day-Ahead Prices

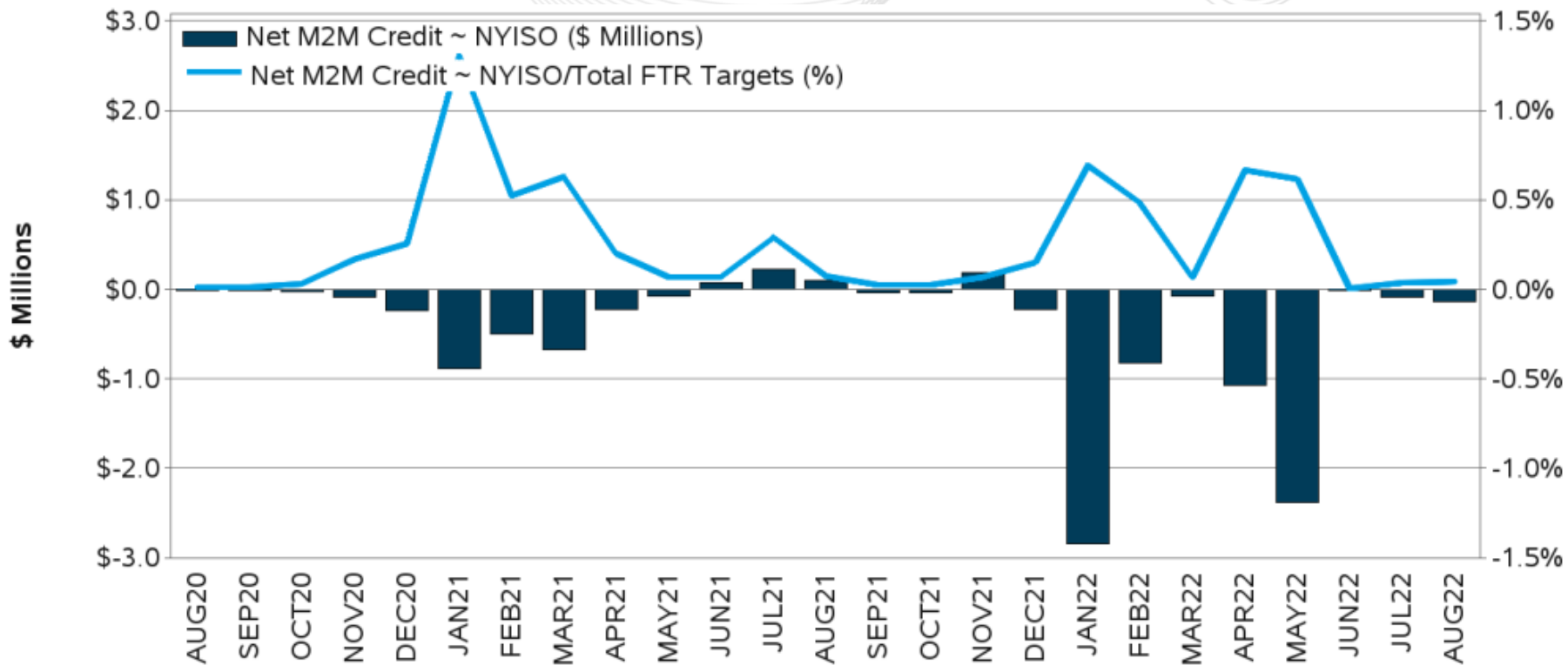


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.



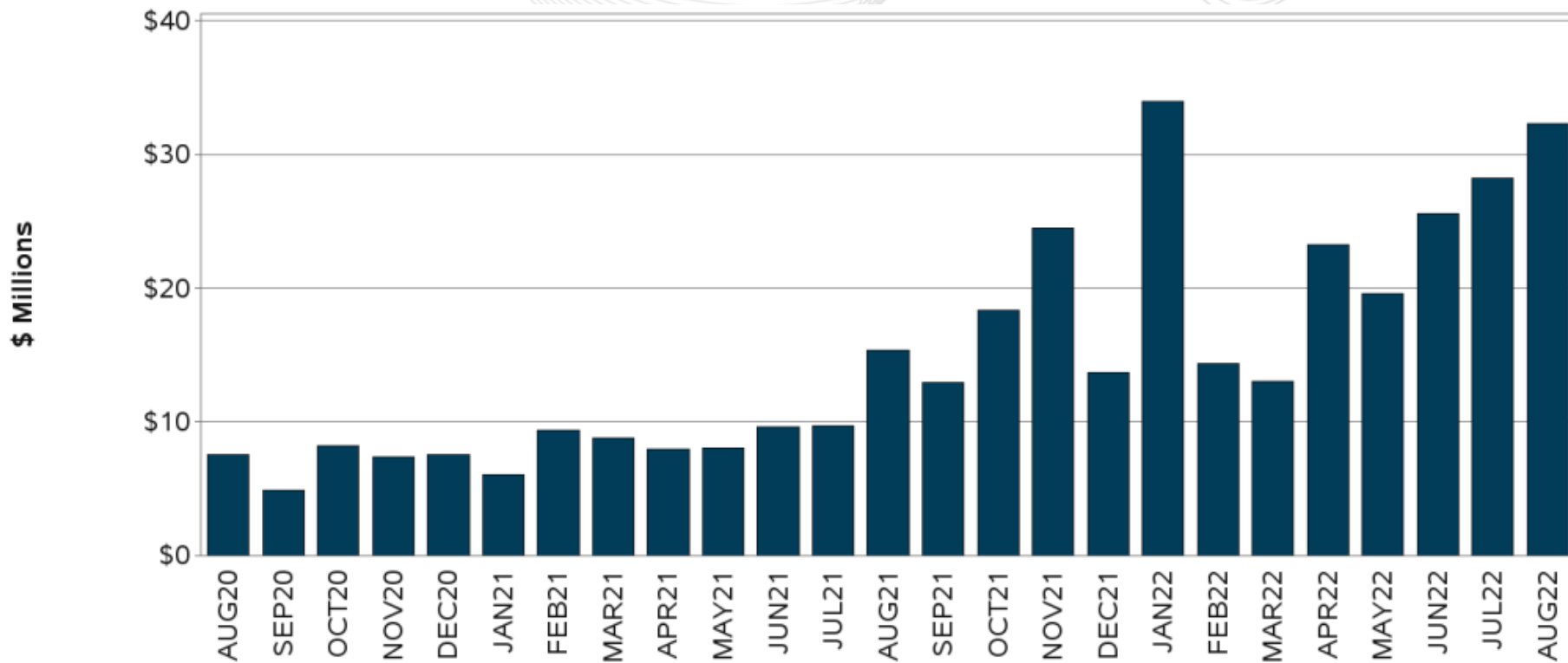
Negative M2M Credit represents PJM payment to MISO

PJM-NYISO Market-to-Market Coordination Settlement

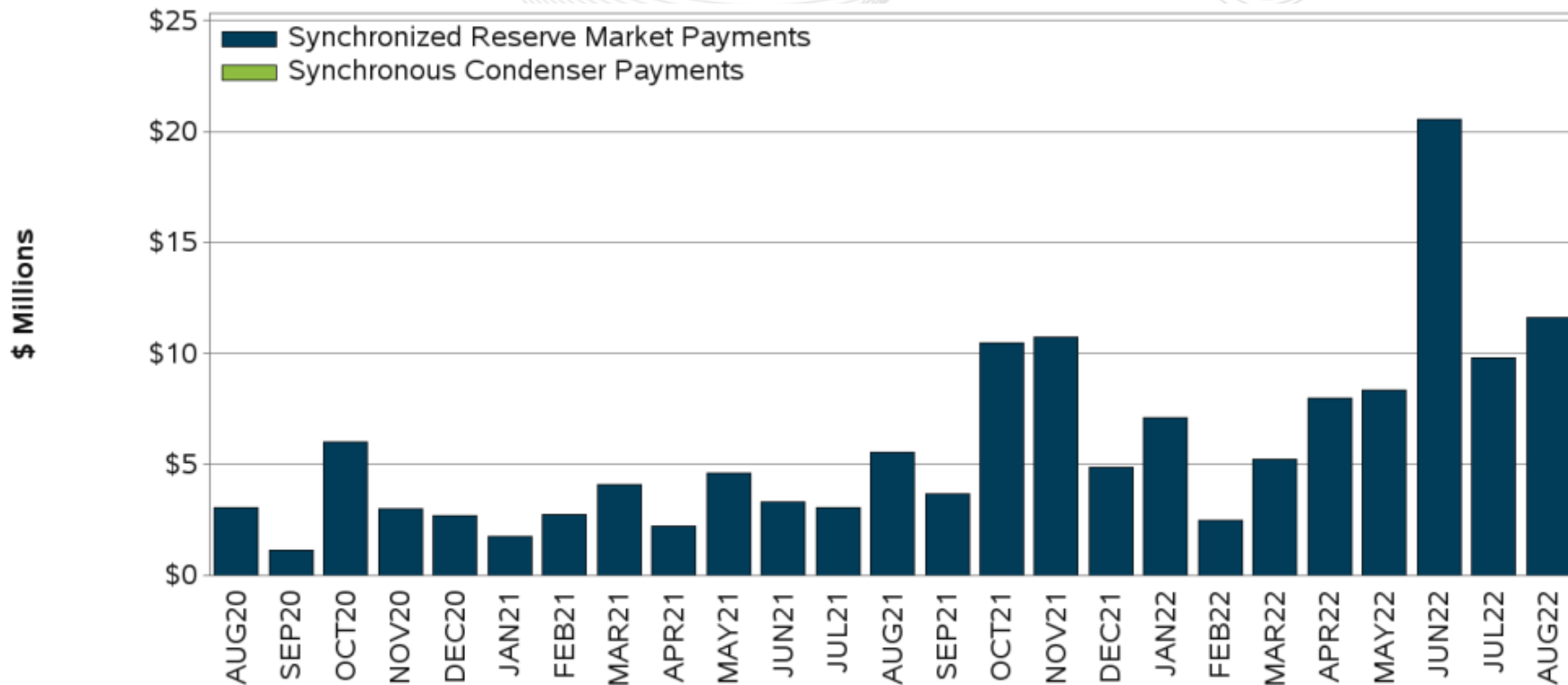


Negative M2M Credit represents PJM payment to NYISO

Ancillary Service Market Summary

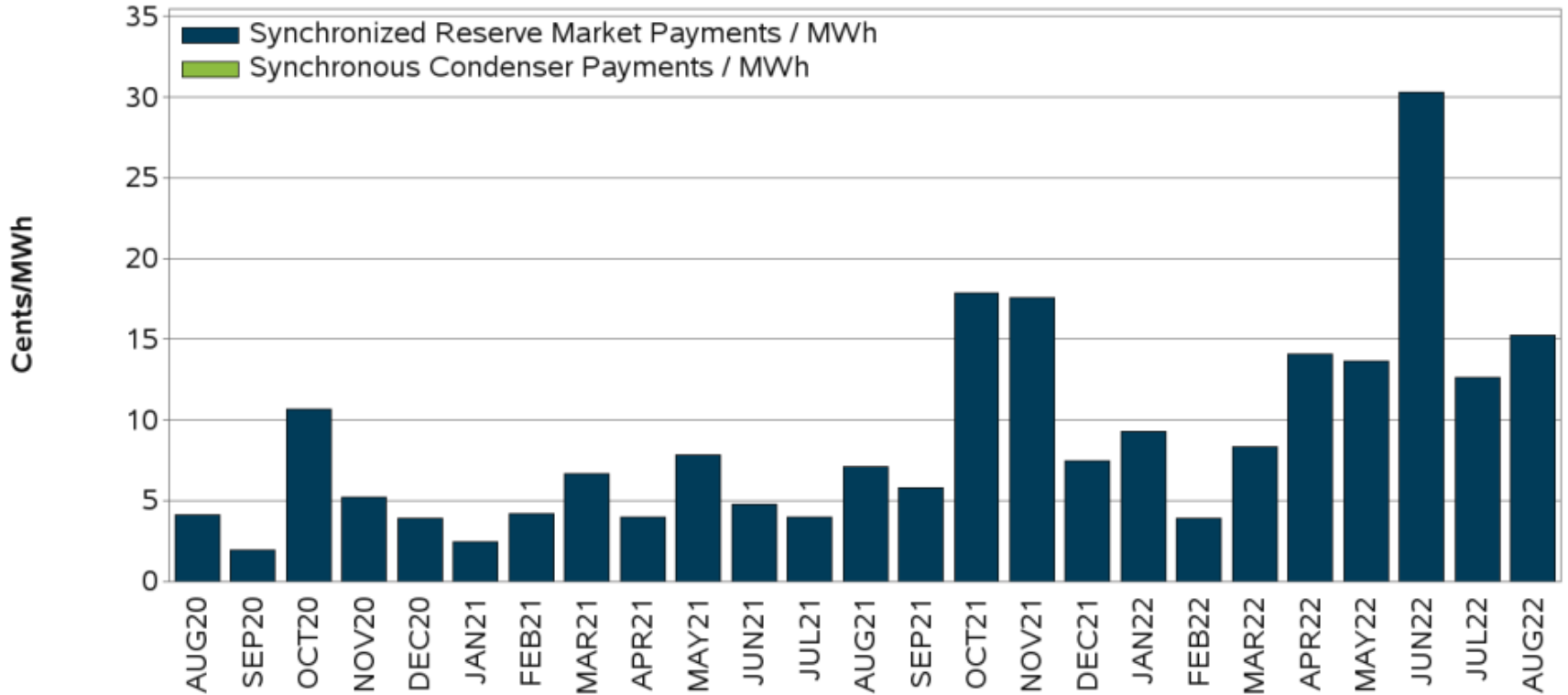


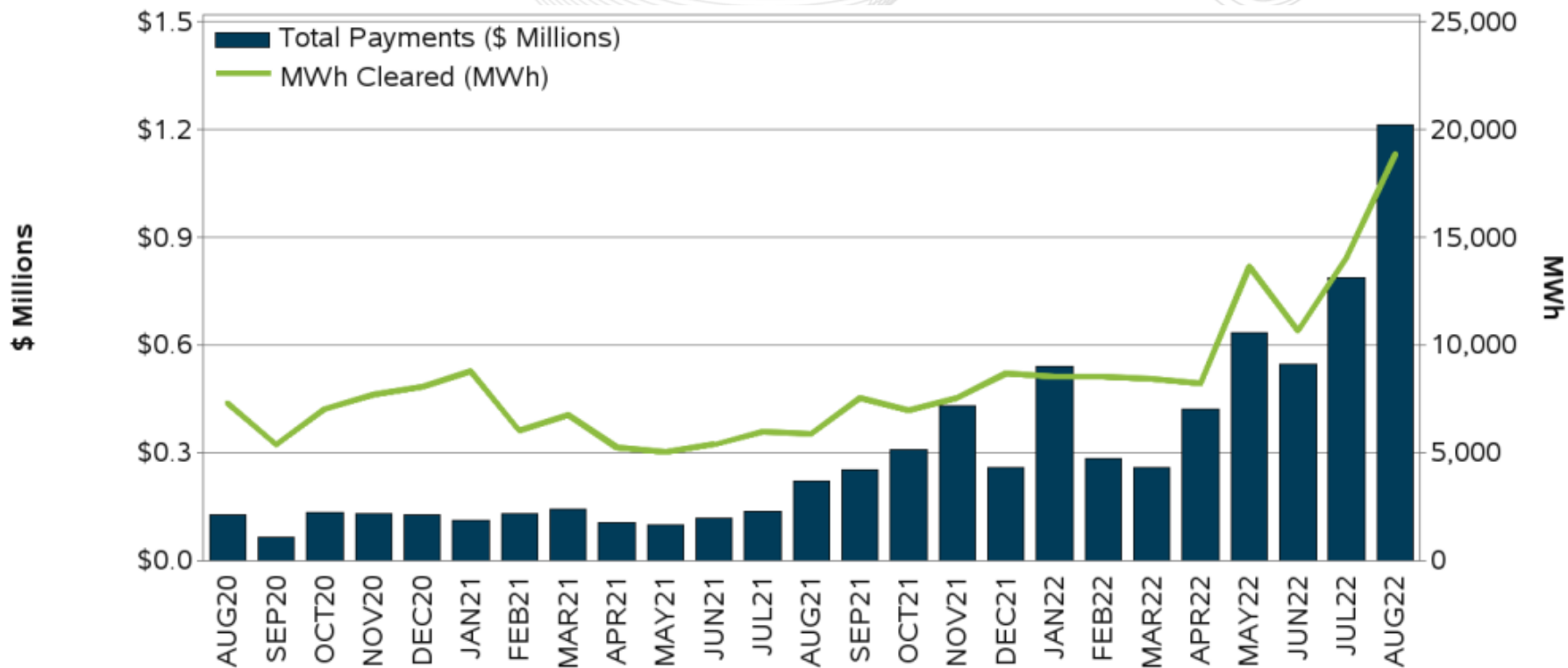
Synchronized Reserve and Synchronous Condenser Costs



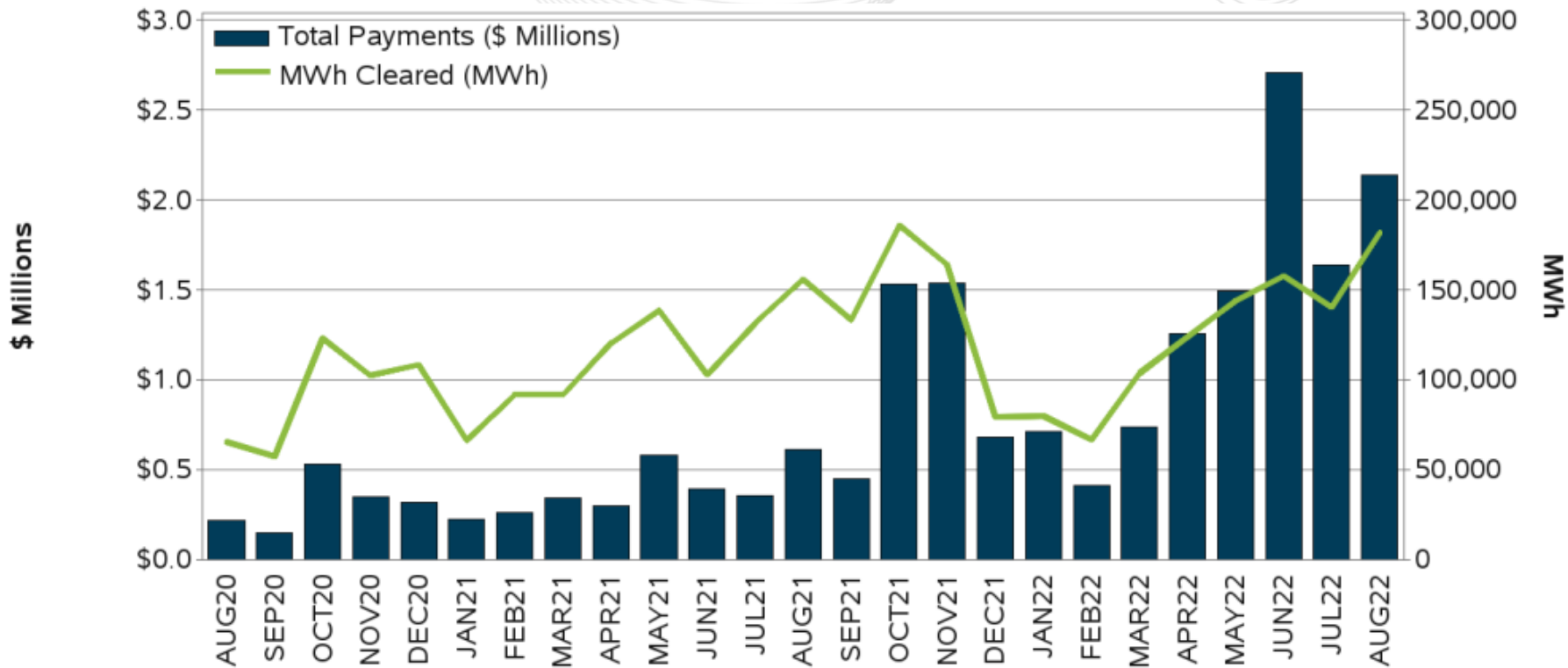


Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs

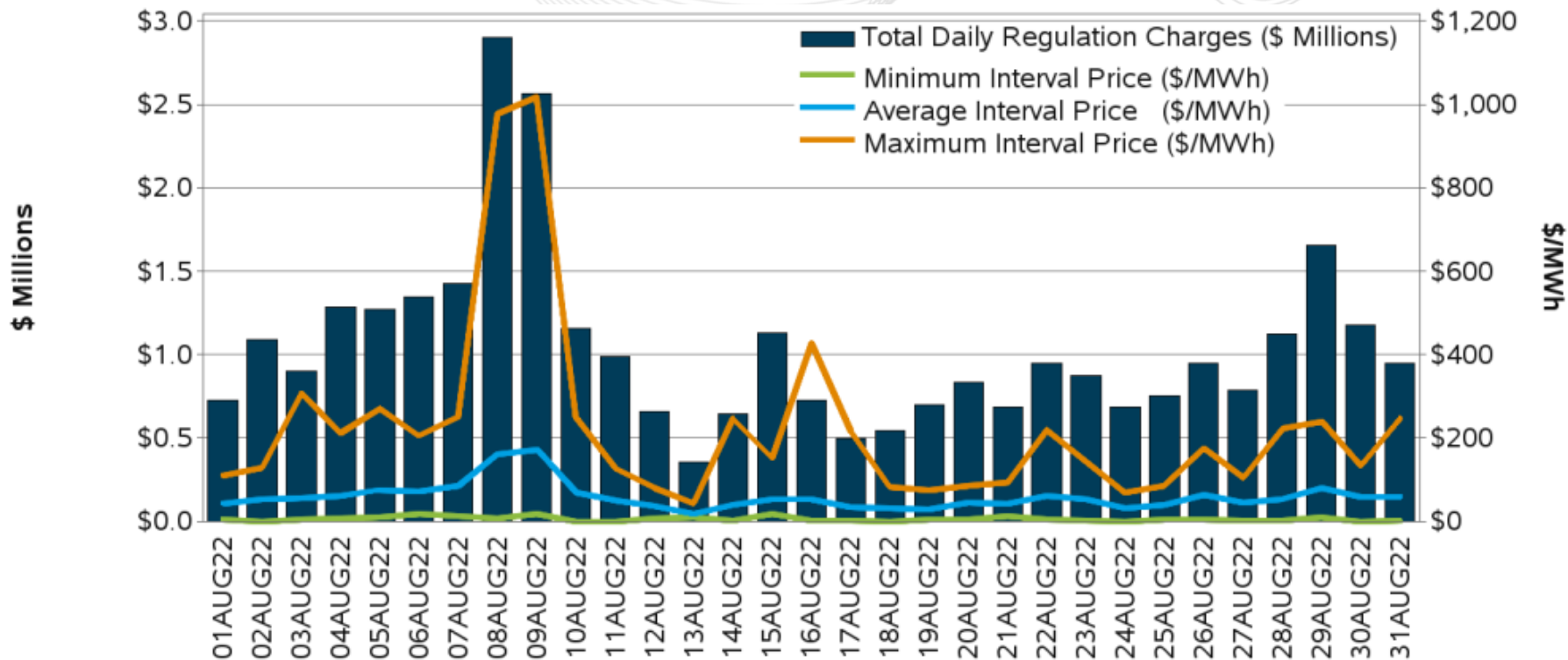




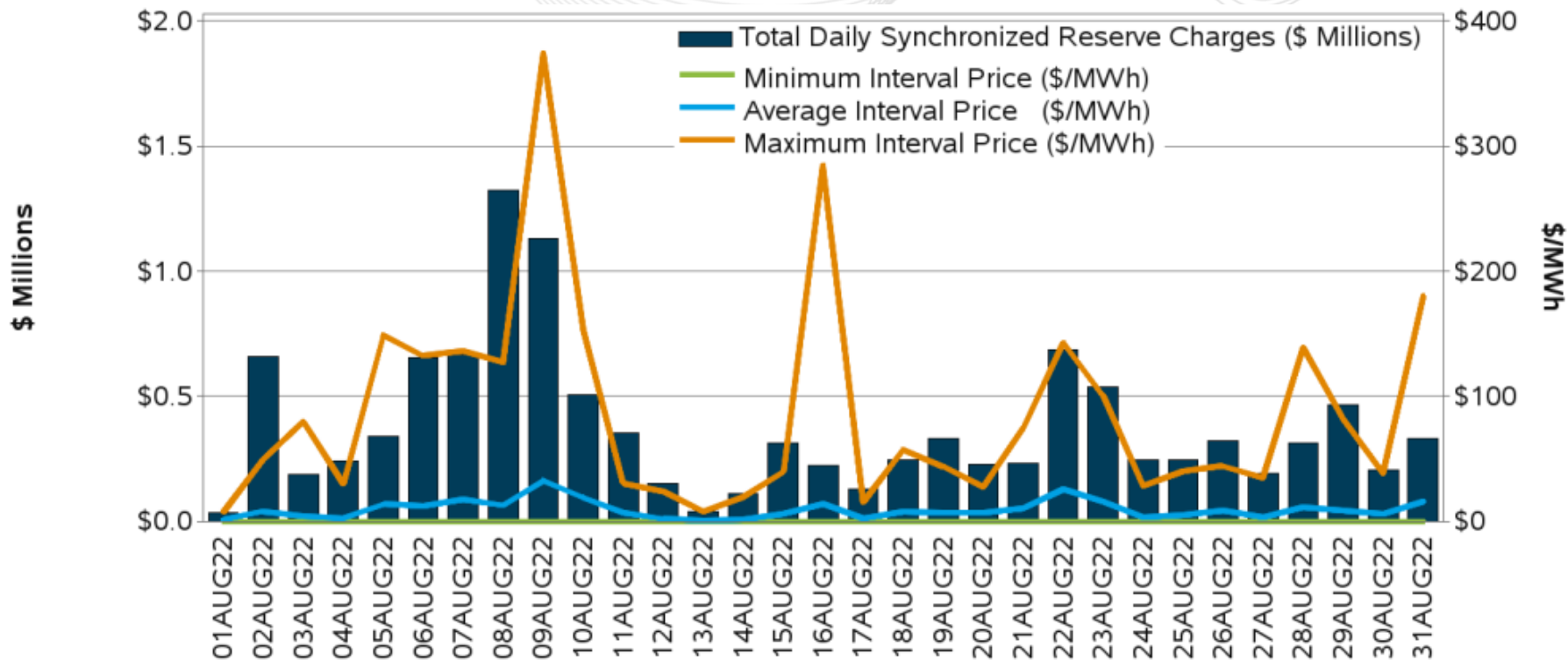
DR Participation in PJM Synchronized Reserve Markets



Regulation Market Daily Prices and Charges



Synchronized Reserve Market Daily Prices and Charges



Markets Report

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