



Markets Report

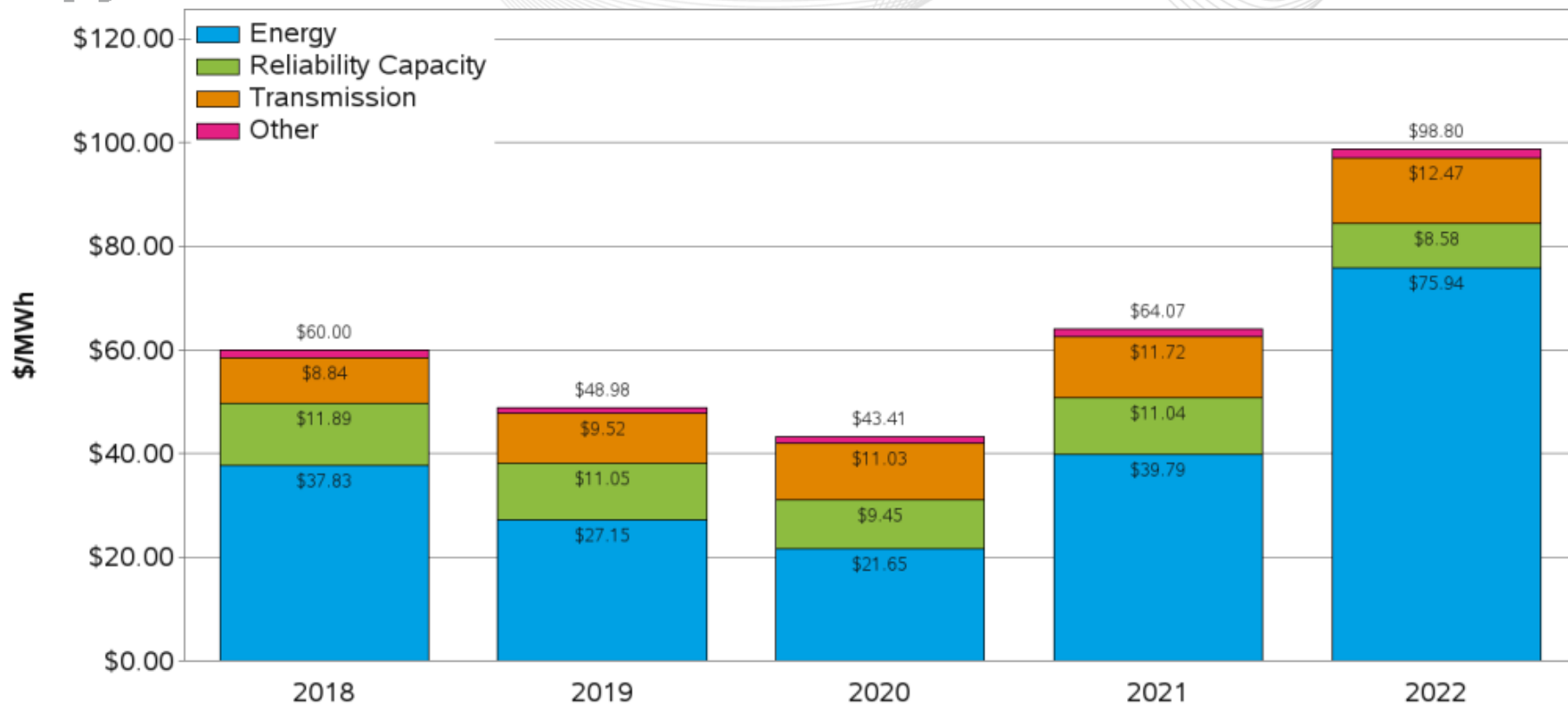
MC Webinar

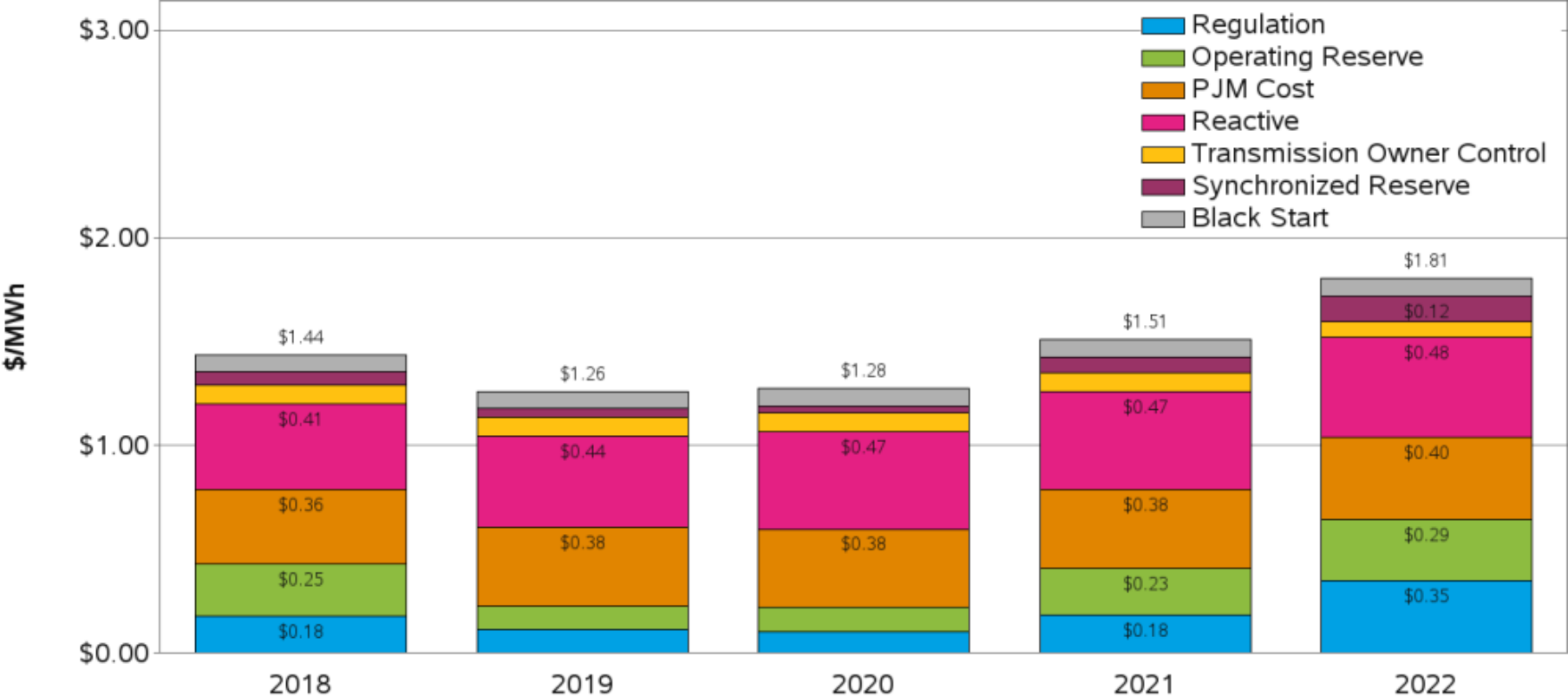
November 14, 2022

- PJM Wholesale Cost 2022 is \$98.80/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- 22)
- In October, temperatures were slightly above average for most of the month. Thus, the sum of Heating and Cooling Degree Days was just below its historic average. (Slides 8-10)
- Energy use was also below its historic average for October. (Slides 8-10)
- In October, uplift exceeded \$800,000 on five days. (Slides 25 & 26)

- Load-weighted average LMP for 2022 is \$75.94/MWh: (Slides 35-37)
 - October 2022 was \$55.90/MWh, which is lower than October 2021 (\$58.40/MWh) but higher than October 2020 (\$22.20/MWh).
- There was one 5-minute intervals that experienced shortage pricing in October. (Slides 33-34)
- FTR revenue adequacy for the month of October is 86% and the 2022-2023 Planning Year is currently funded at 100%. (Slides 52-55)
- Congestion values have been trending upwards. However, October's value is lower than recent history. (Slide 53)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 69-71)

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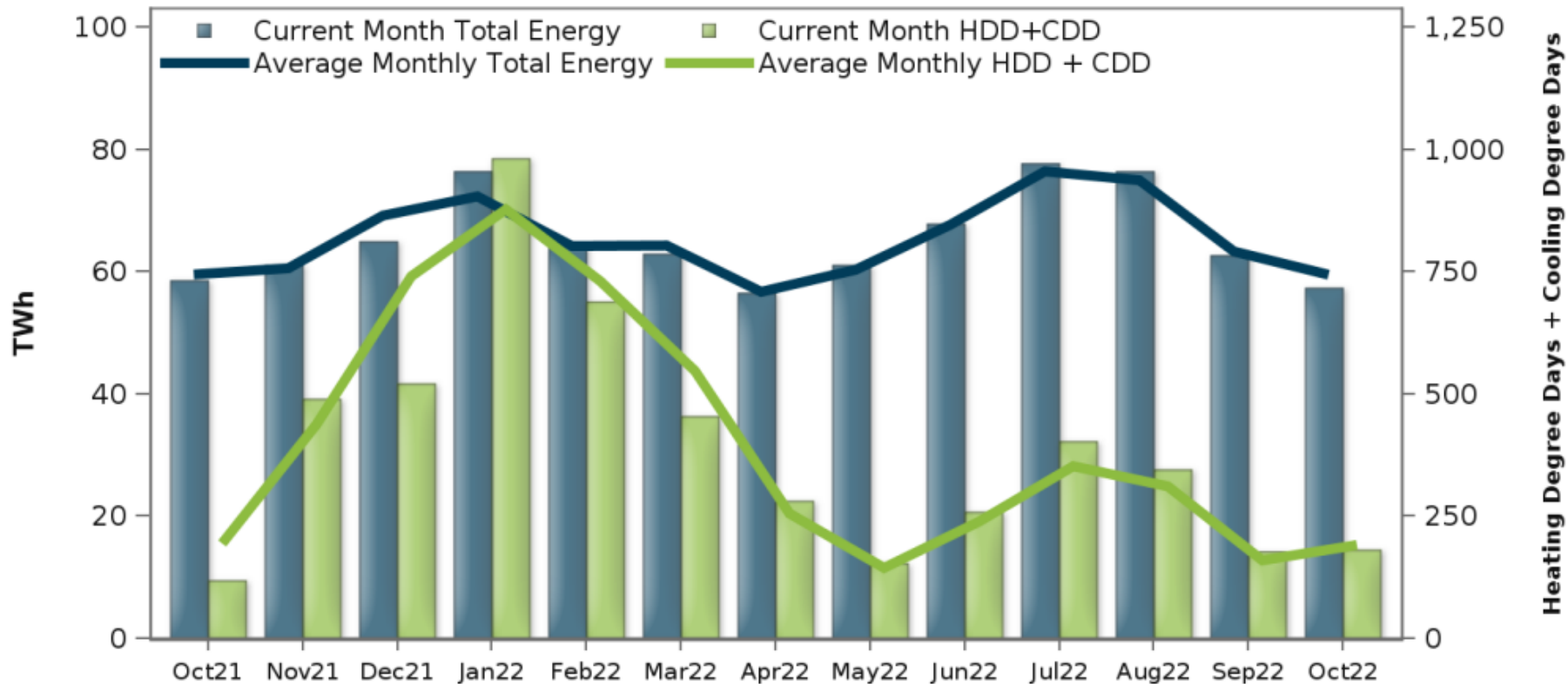




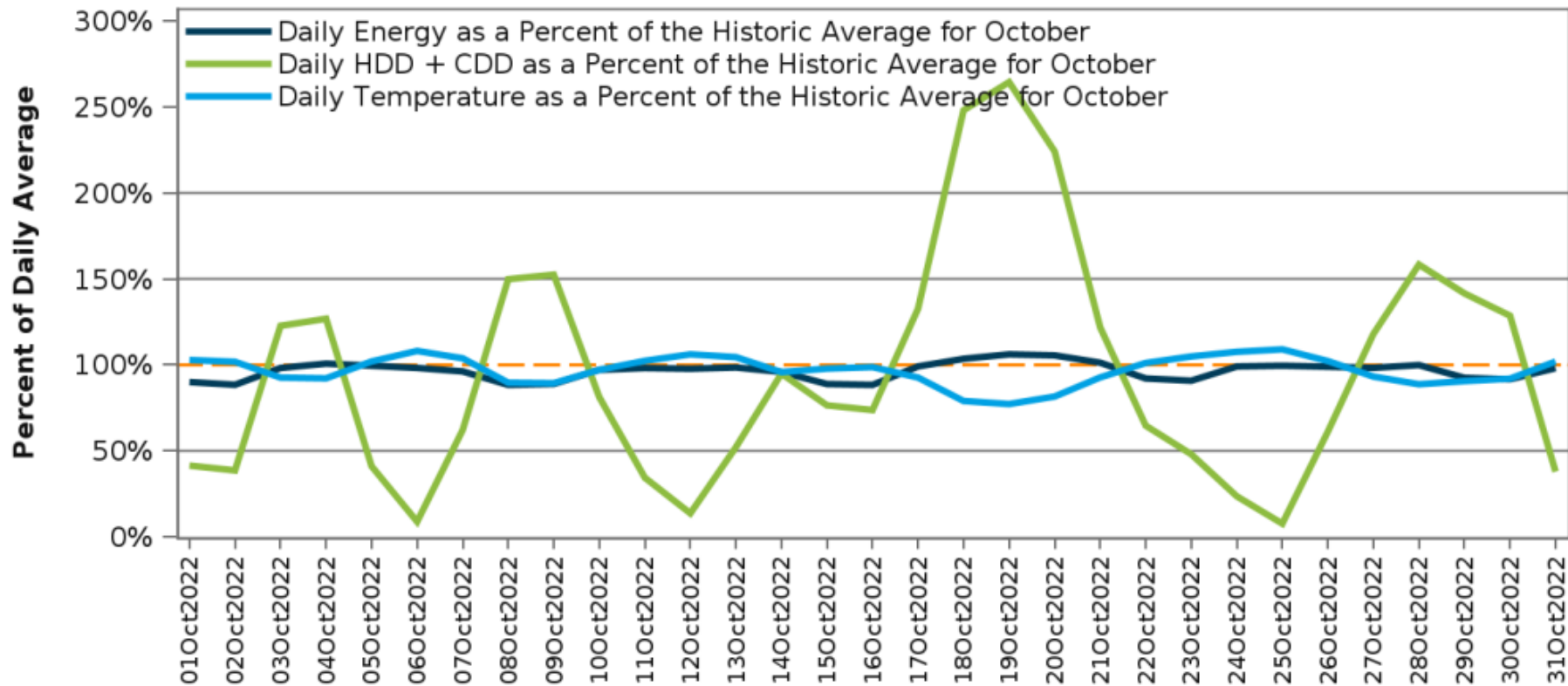
Market Conditions

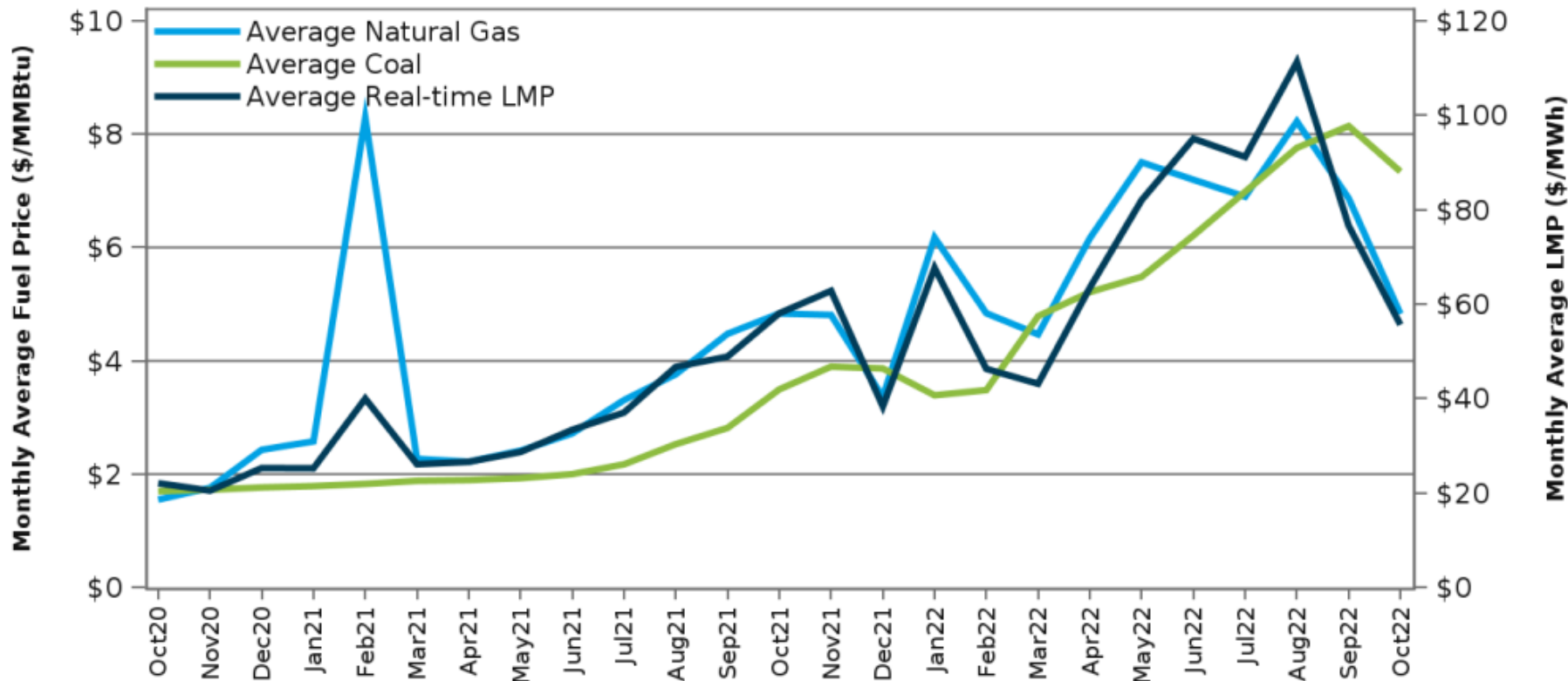
- The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).
- Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or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

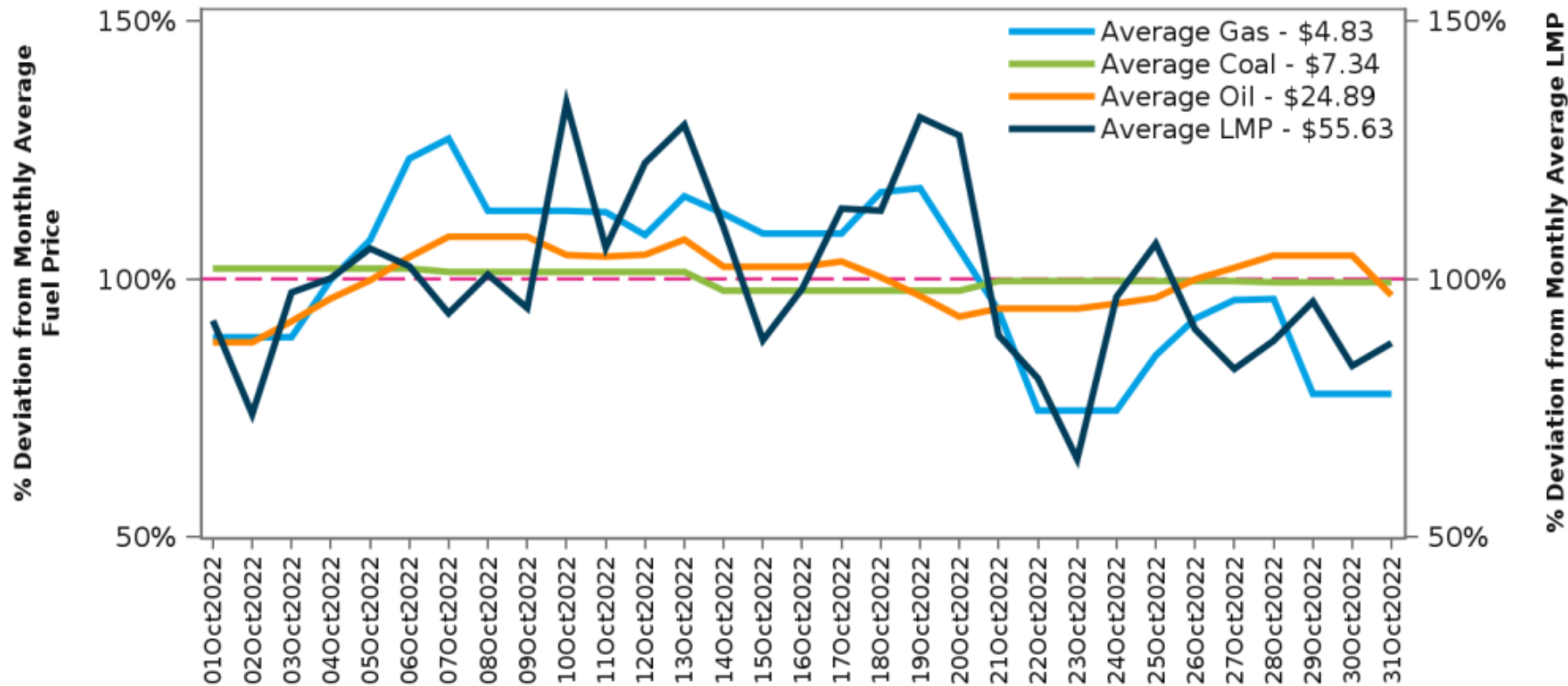


Historic Average Weather and Energy versus Current Month - Daily





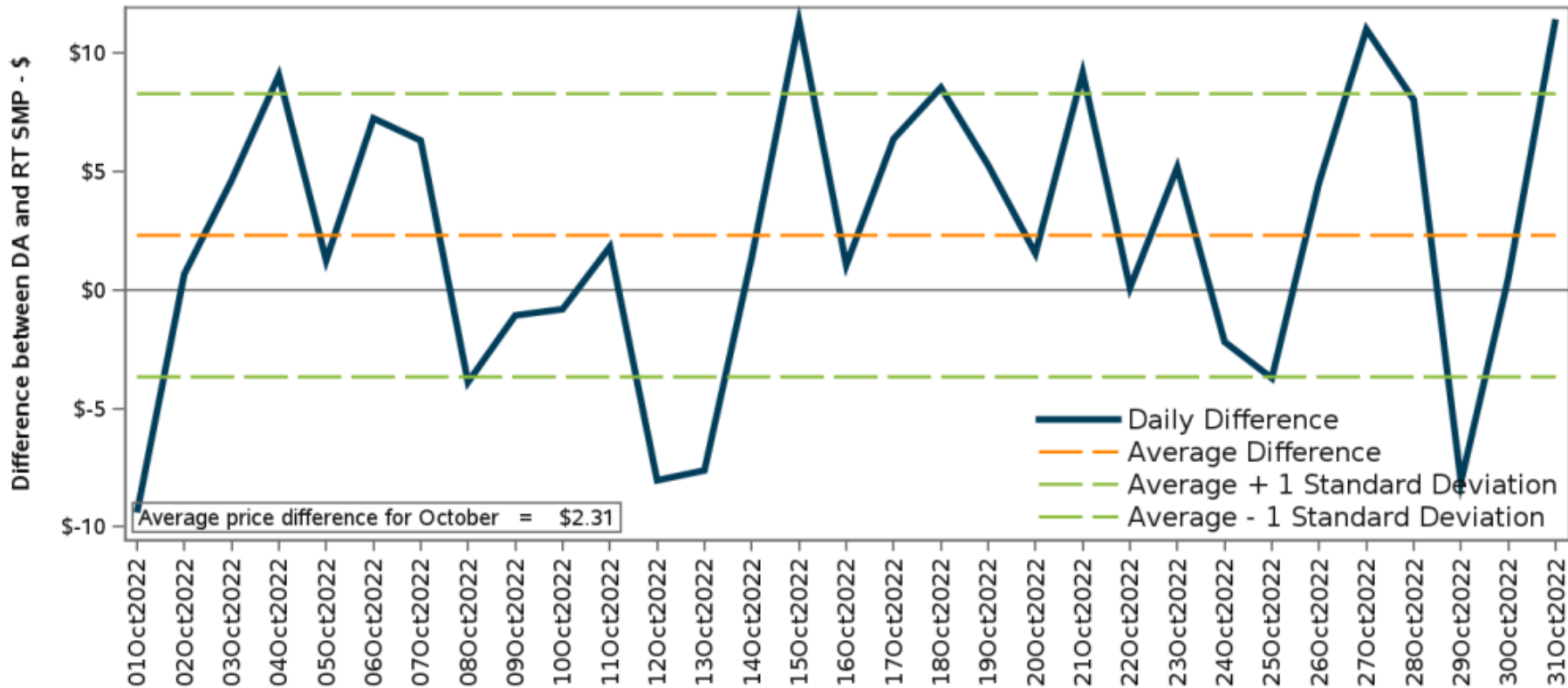
Fuel Price Source: S&P Global Platts



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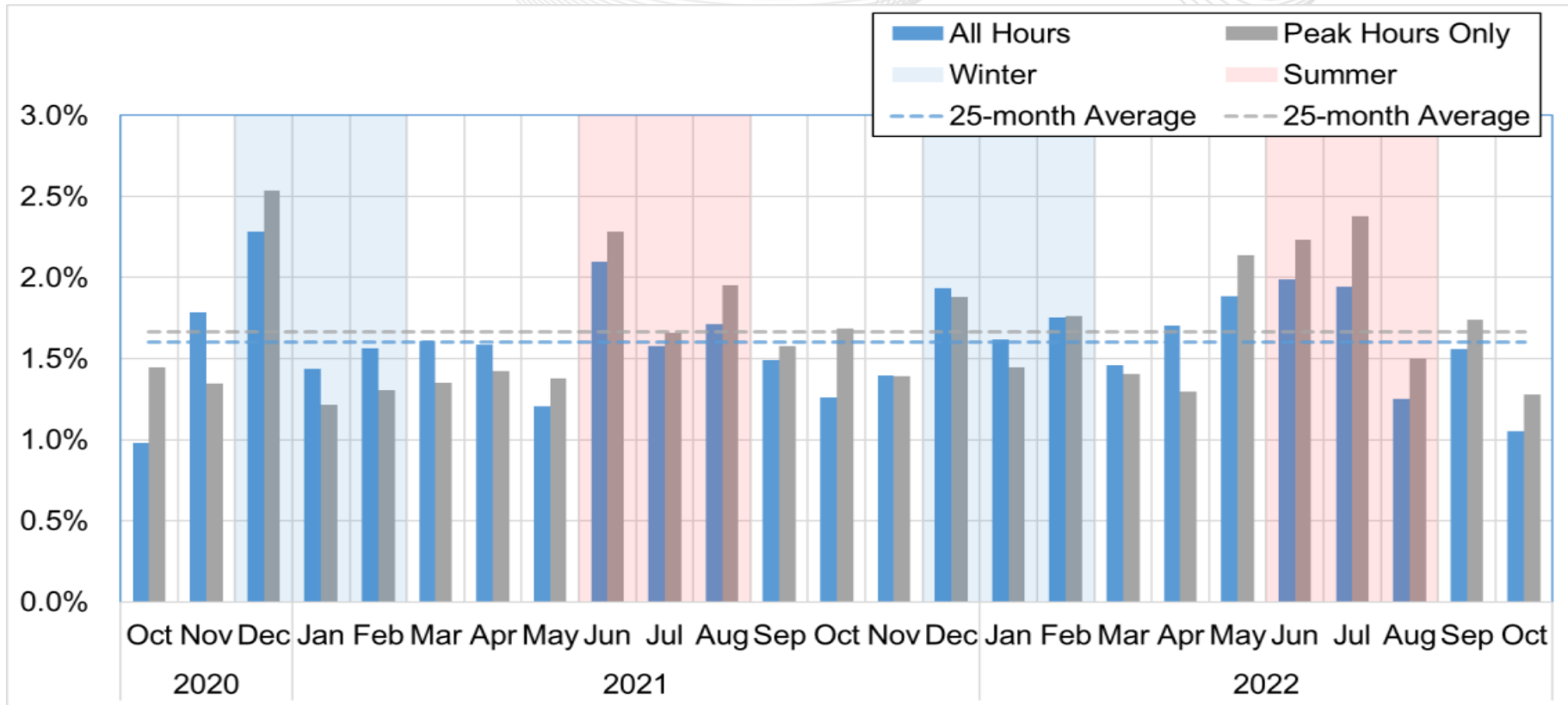


Daily Difference Between Day-Ahead and Real-Time System Marginal Prices

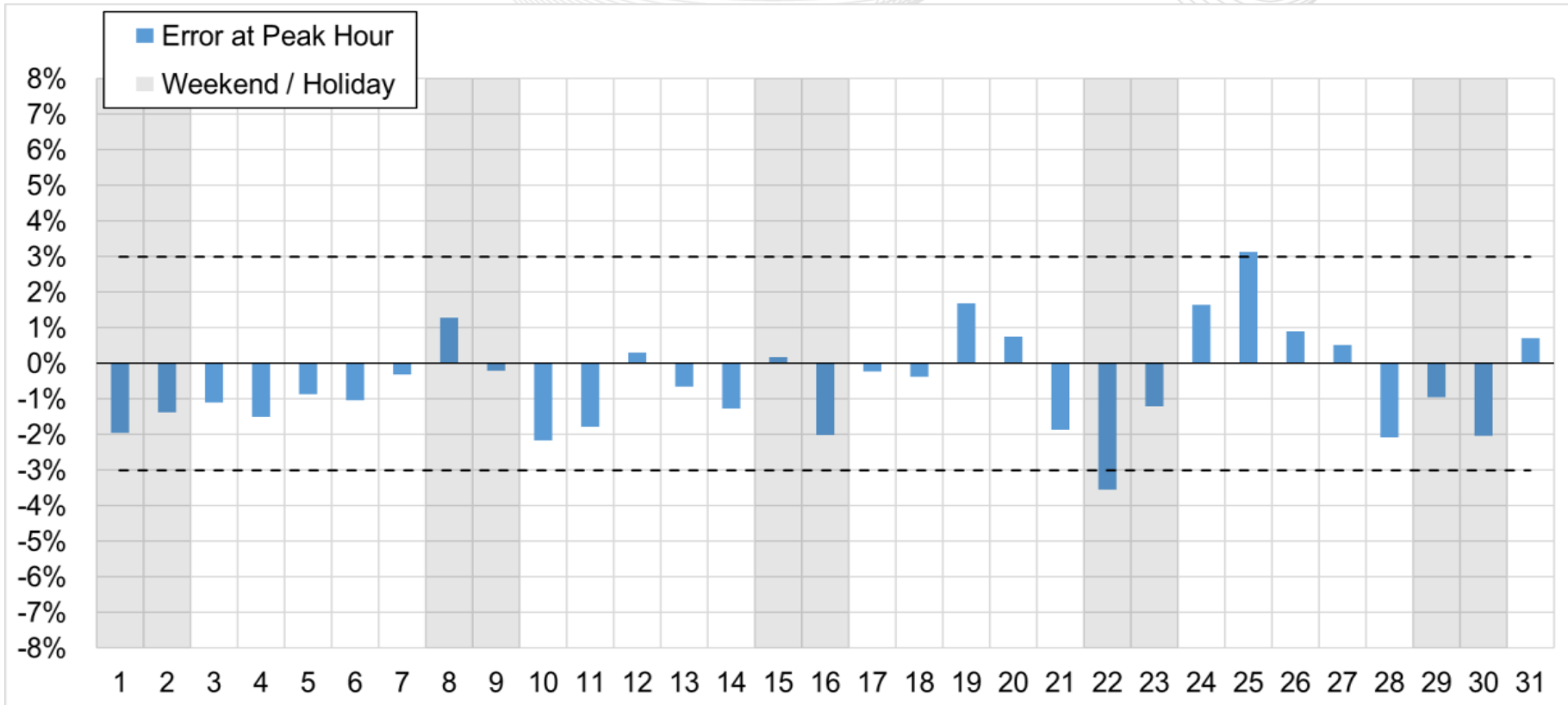


Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.

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

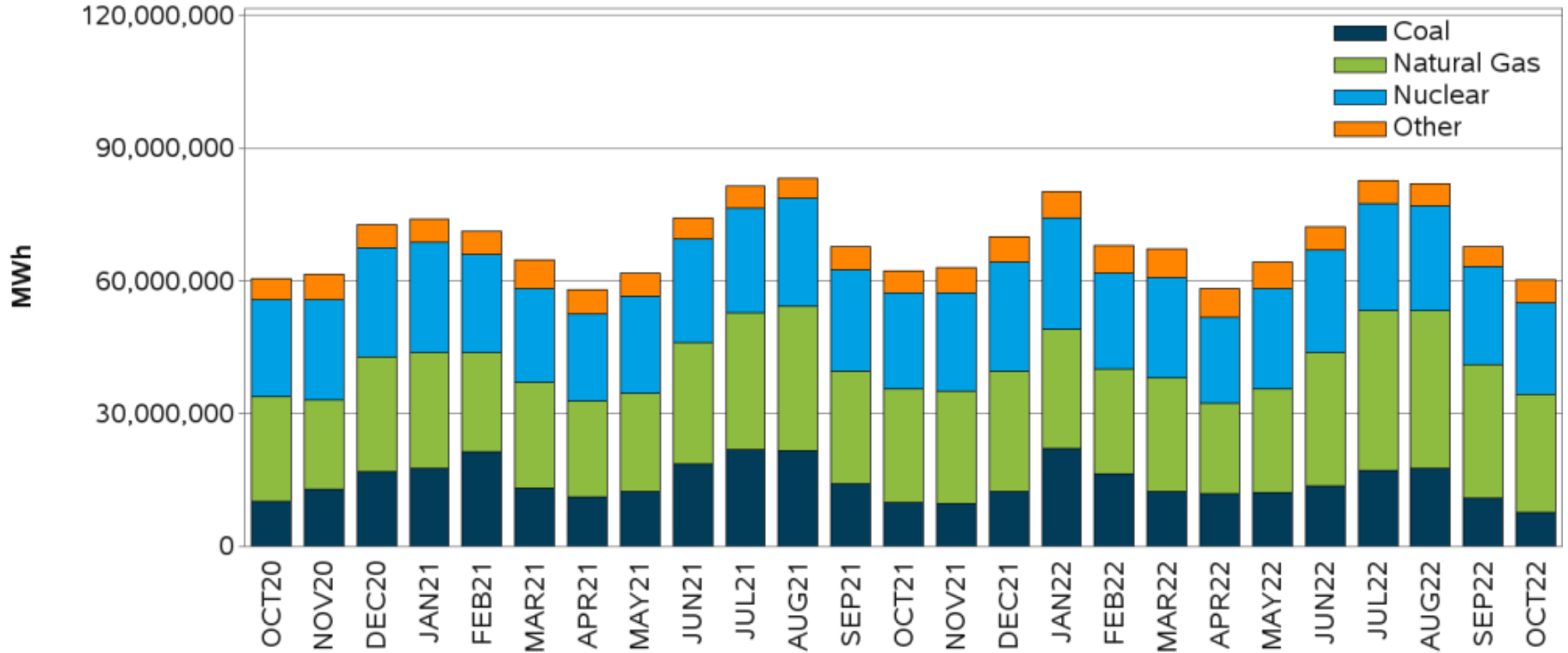


Load Forecast Error - October Daily Peaks, 10:00 Forecast

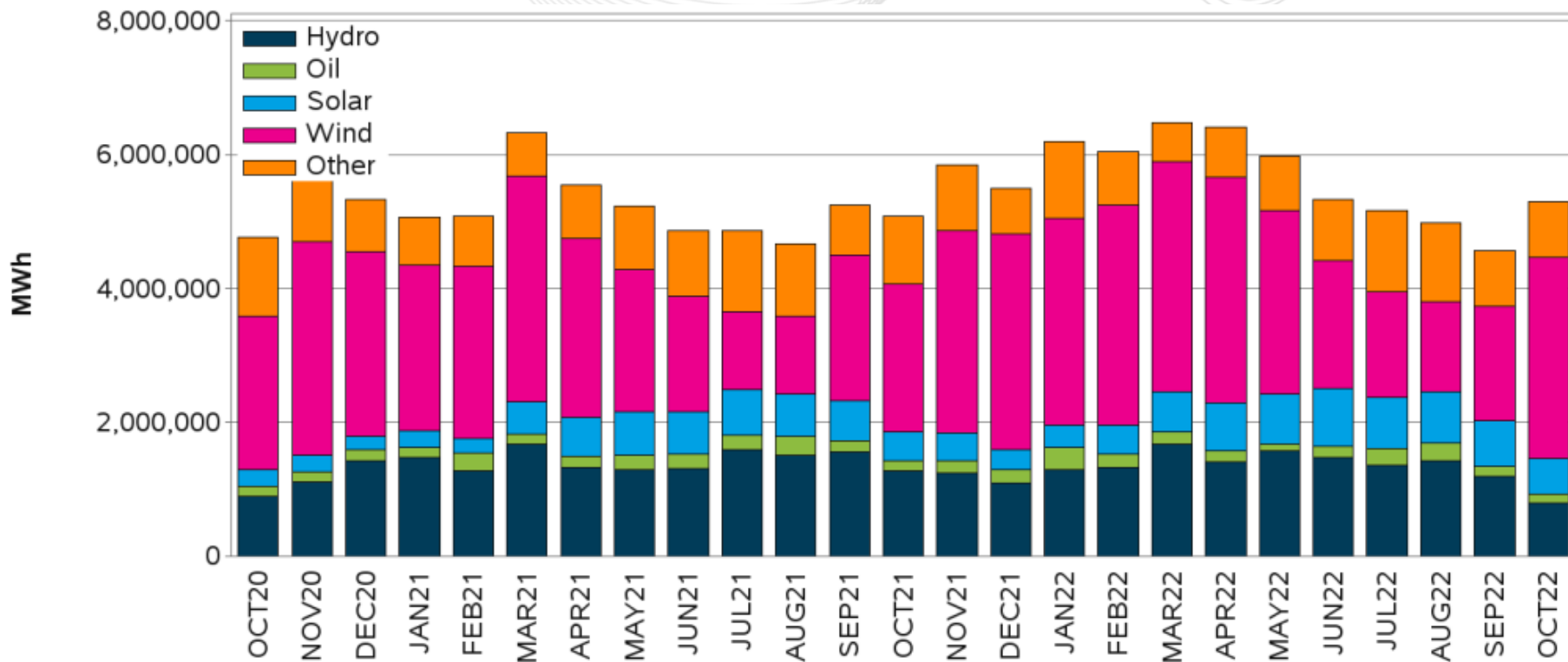


- PJM prepares a day-ahead load forecast at 10:00 am for use by our members.
- This forecast is not used to clear the day-ahead market and is not utilized for the reliability tools that run subsequent to the day-ahead market.

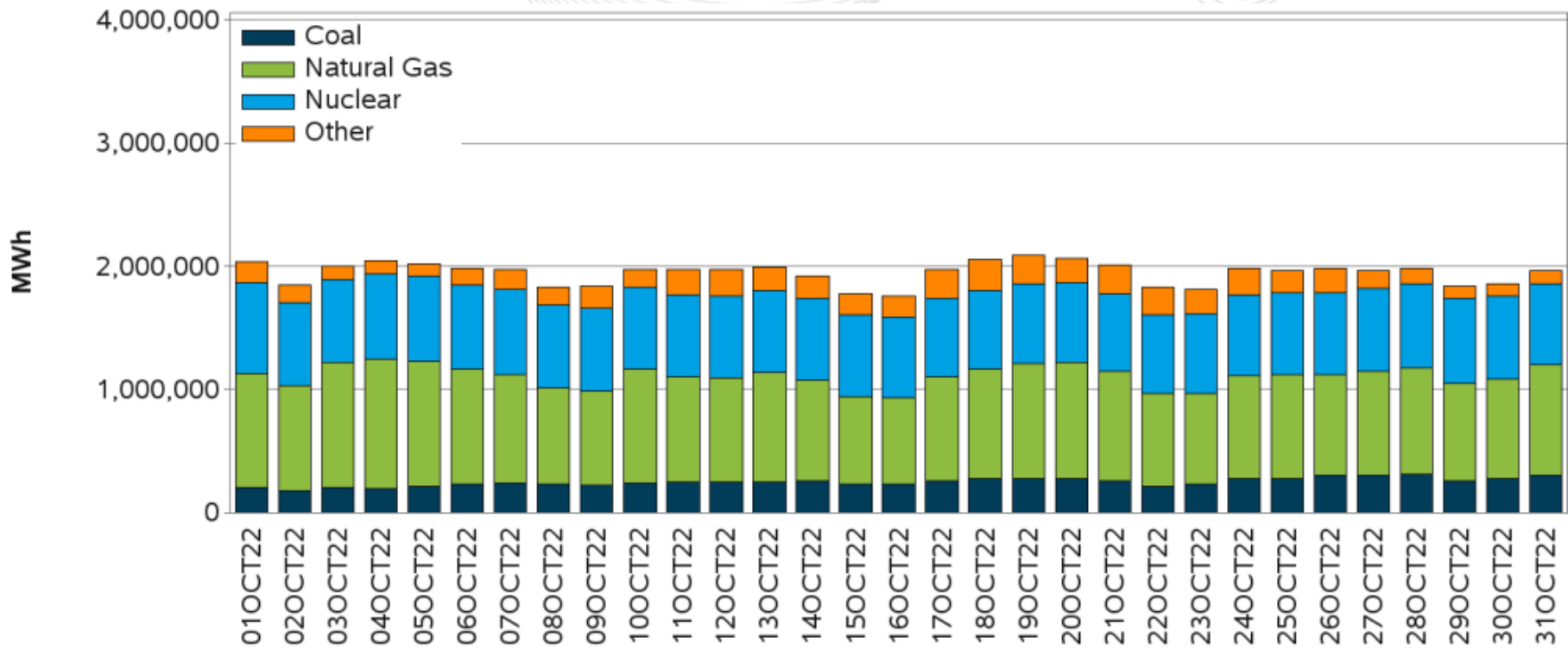
Overall, the load forecast performed well in October, which is typical this time of year due to the mild temperatures. There was some notable forecast error on Saturday, October 22, where the models did not forecast a high enough morning peak throughout the RTO despite having accurate temperature forecasts. On Tuesday, October 25, temperatures came in cooler than forecasted, resulting in over-forecasting by ~ 3%.



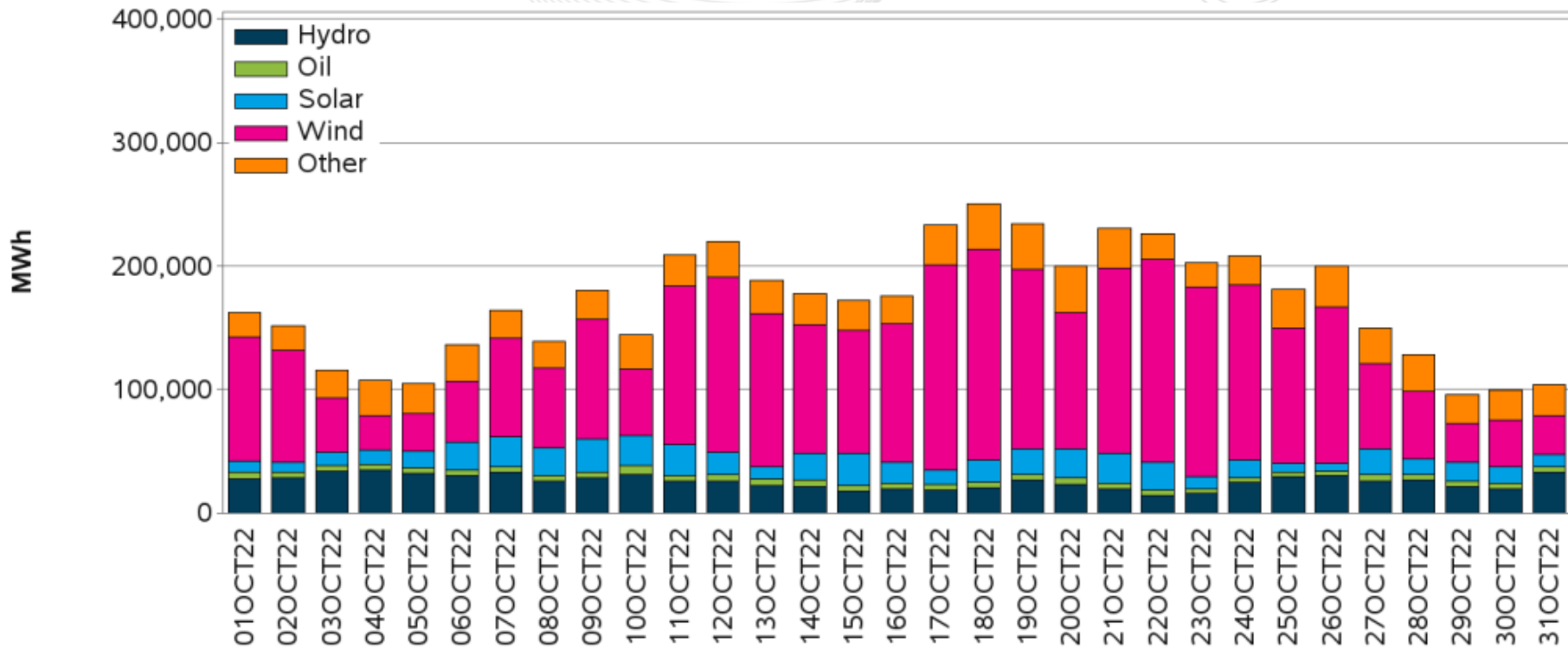
Other includes Hydro, Oil, Solar, Wind, and Other



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

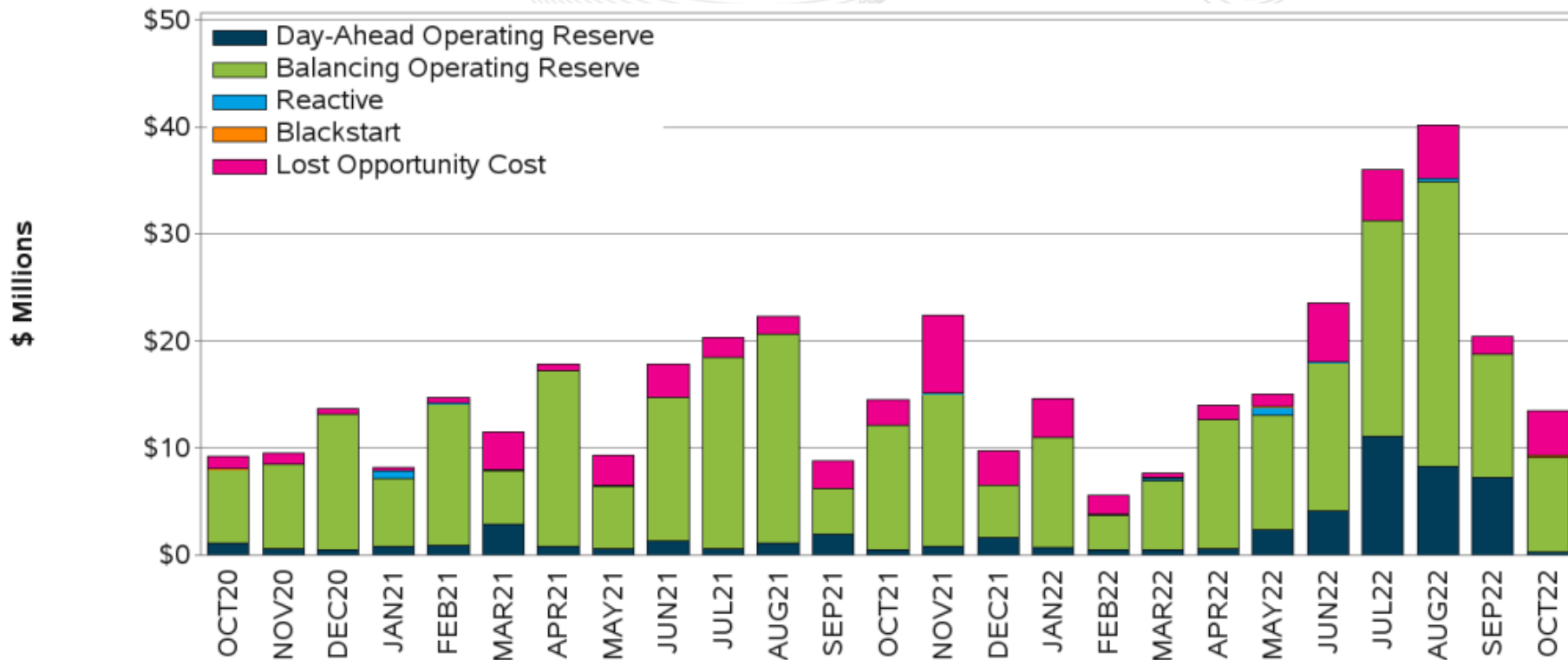


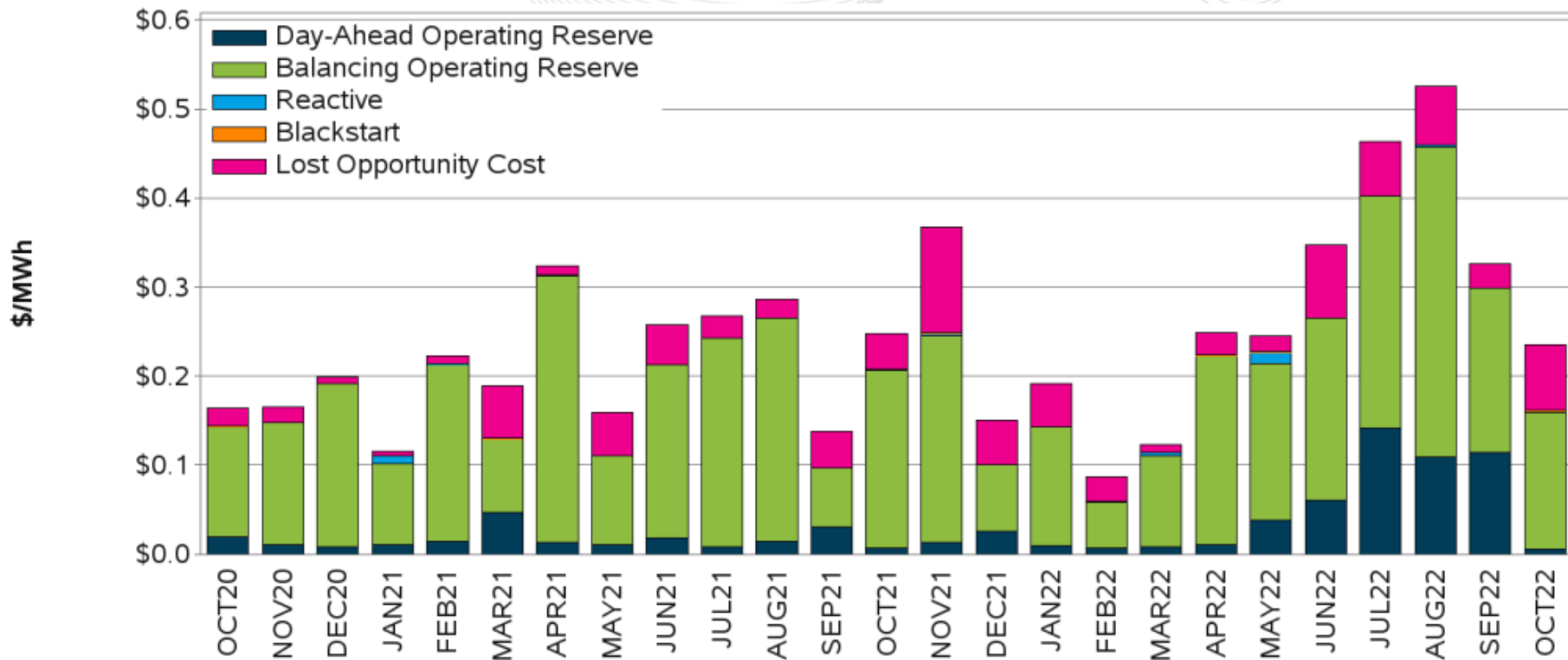
Other includes Hydro, Oil, Solar, Wind, and Other

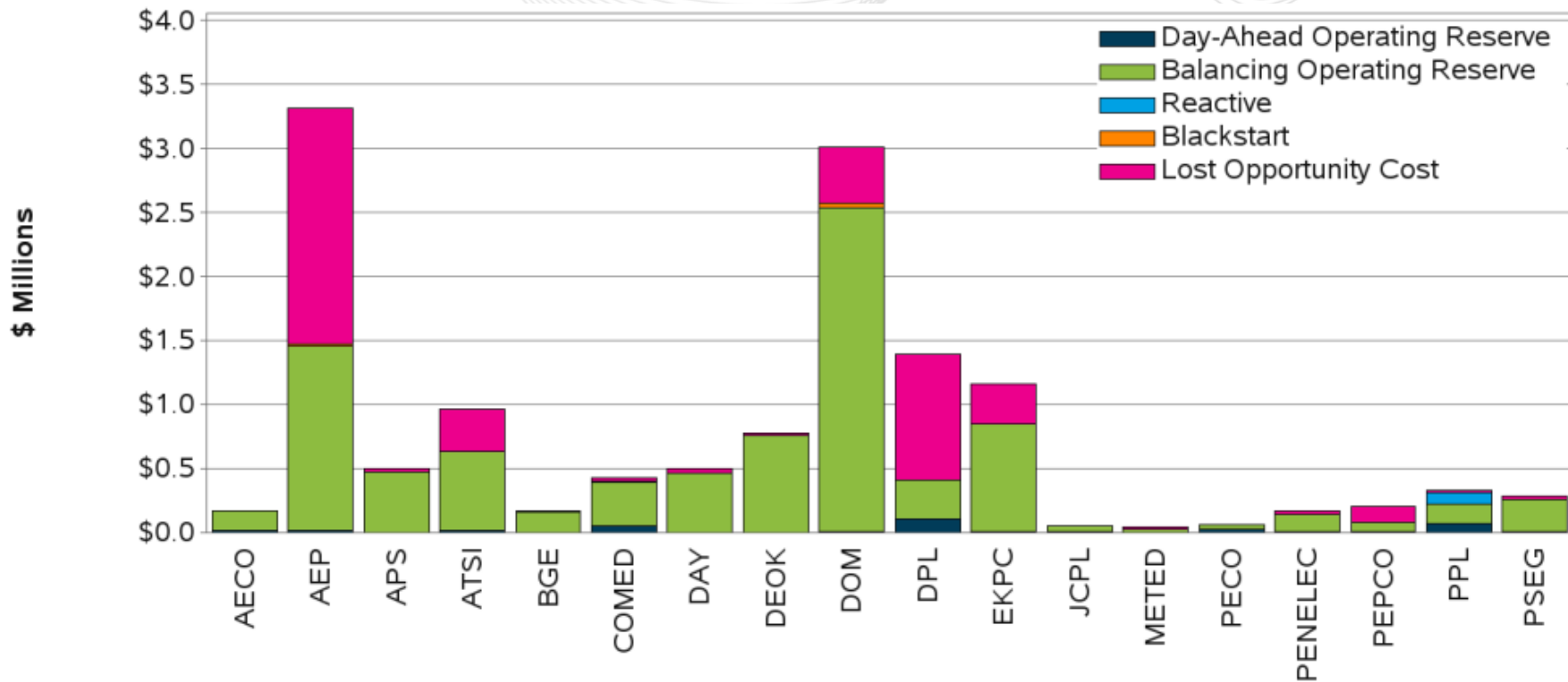


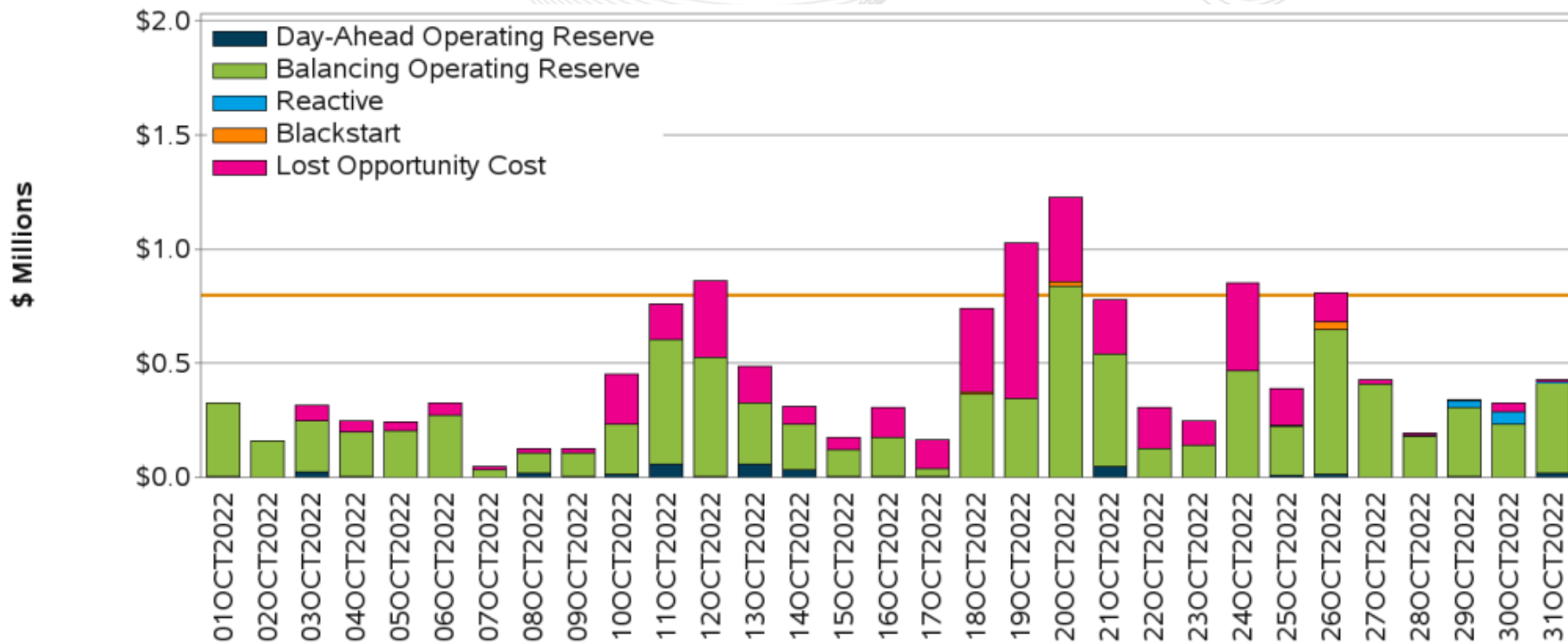
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Operating Reserve (Uplift)





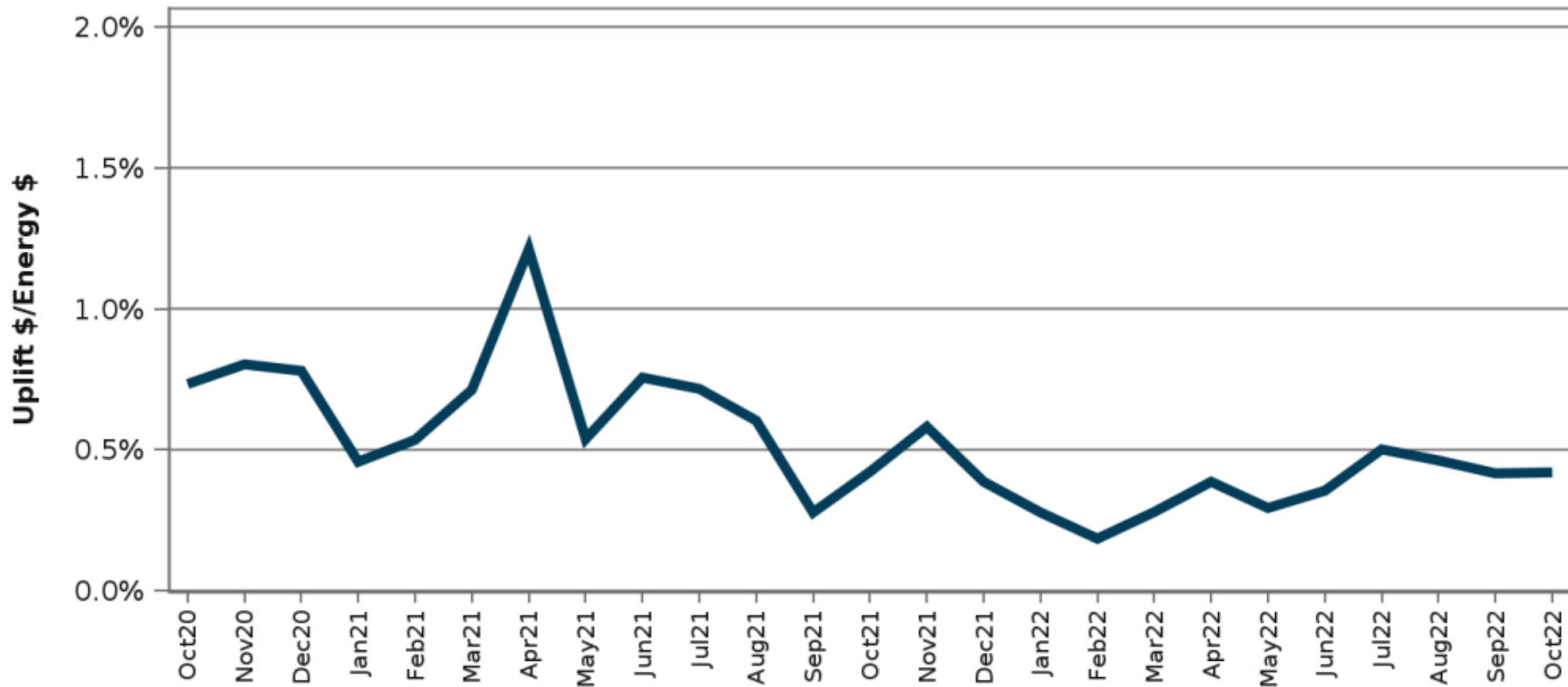




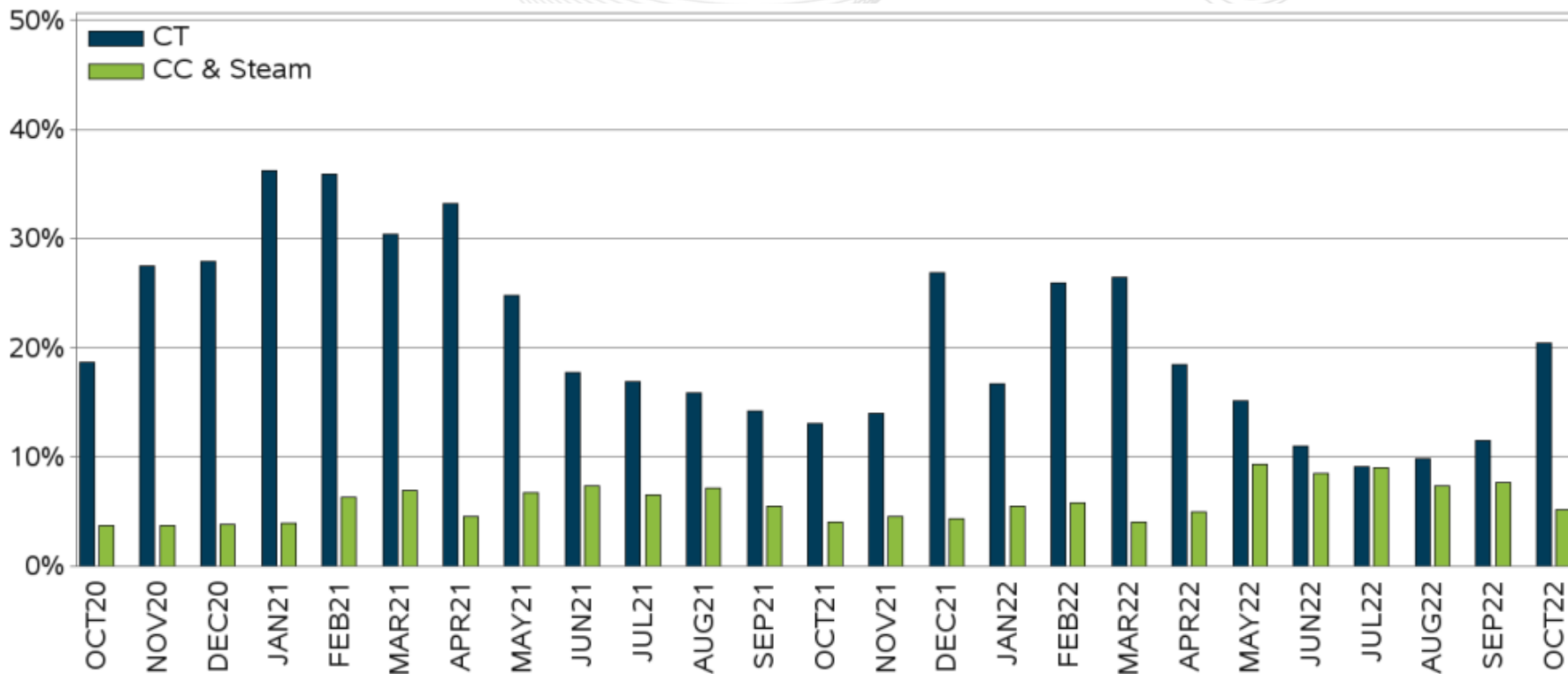
- In October, uplift exceeded \$800,000 on five days -
- Contributing factors to uplift were:

Volatility of localized congestion, some of which was outage driven, was the biggest driver of BOR and LOC.

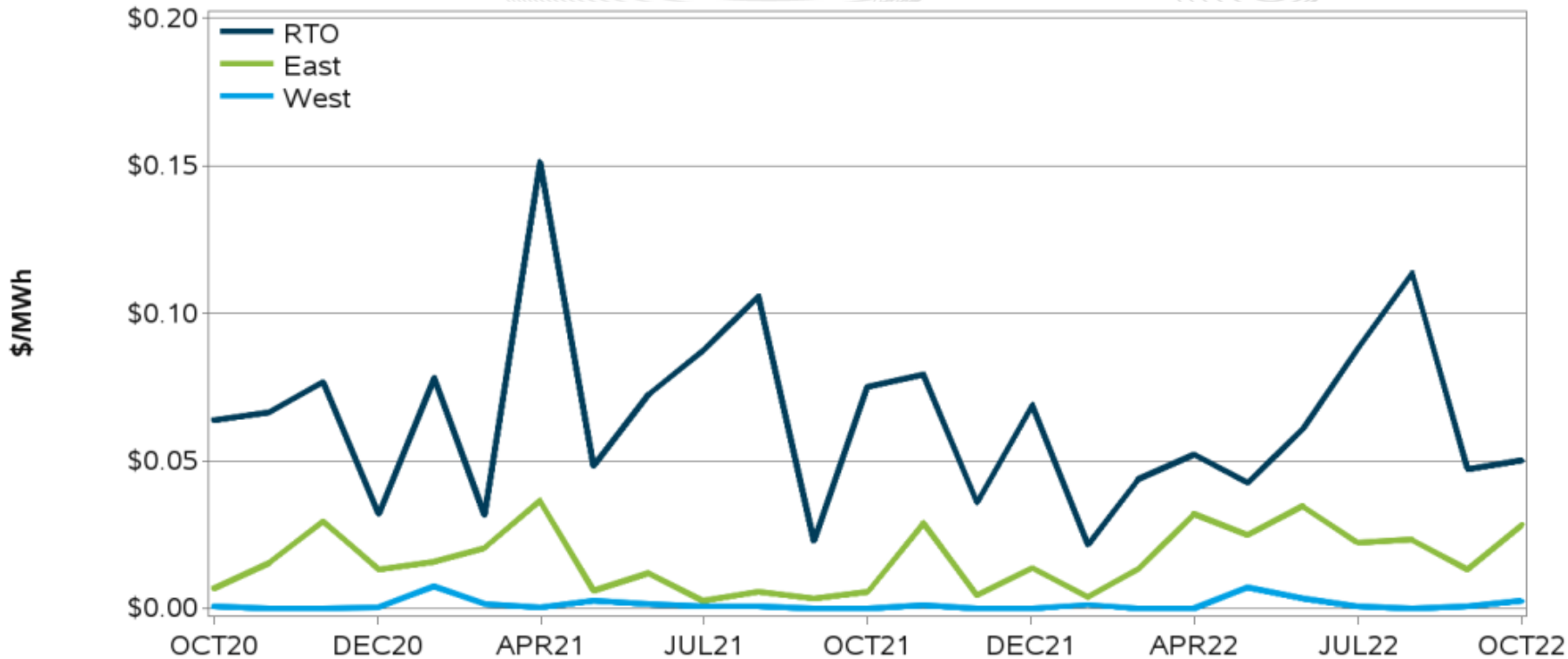
- More information on Uplift can be found on the PJM website at [Drivers of Uplift](#)



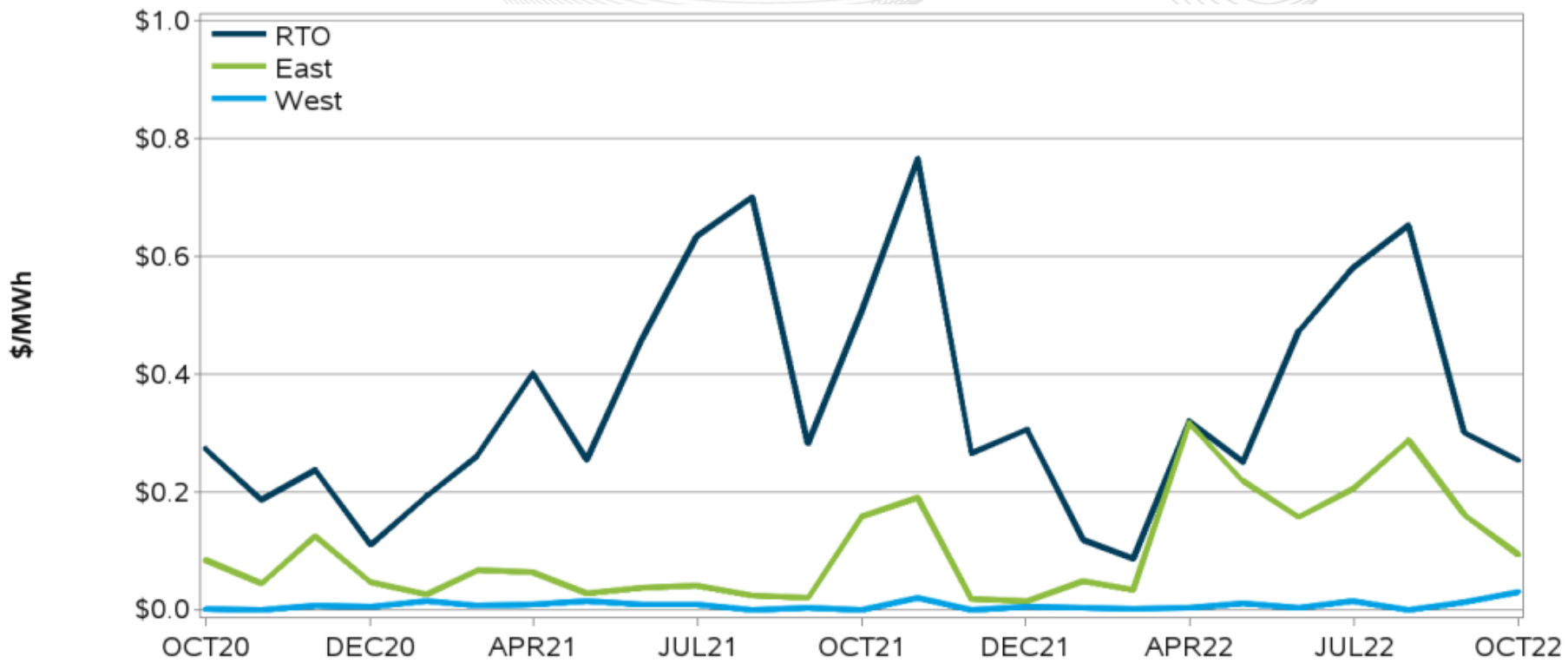
Percent of Total CT, CC and Steam Hours with LMP < Offer



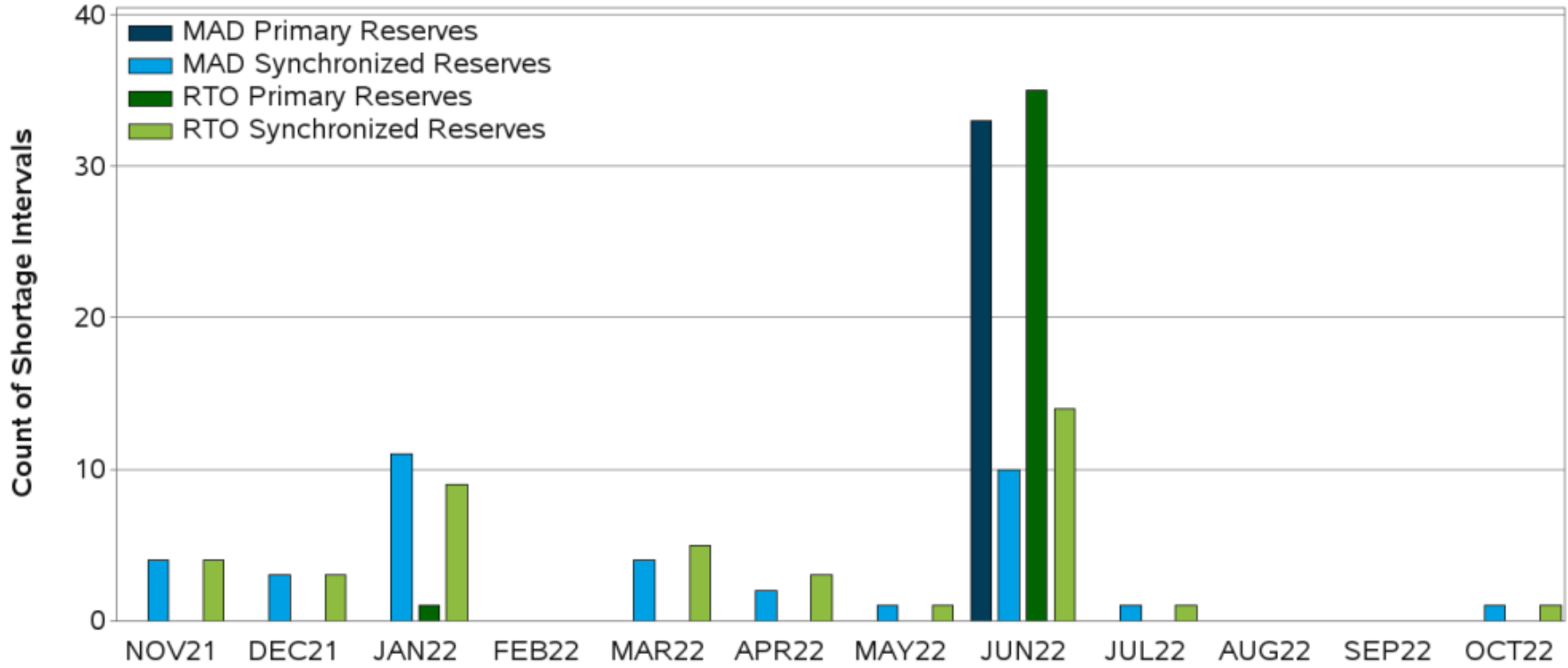
- Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.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



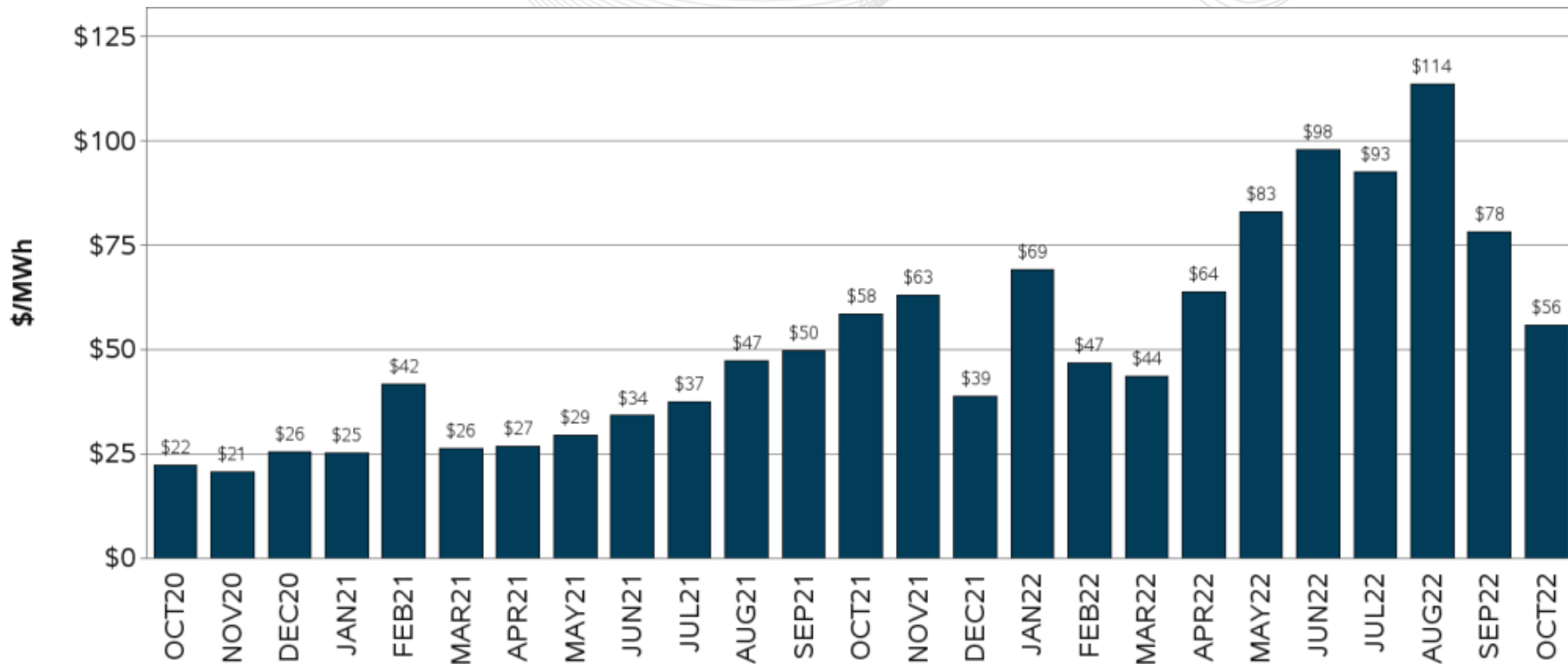
Date	5-Minute Interval	Reserve Penalty Factors	5-Minute Interval SMP	Hourly Integrated SMP
Wednesday, October 12, 2022	14:05 - 14:10	RTO Synchronized Reserves; MAD Synchronized Reserves	\$668.09	\$138.11

Information on constraints and shadow prices can be found here:

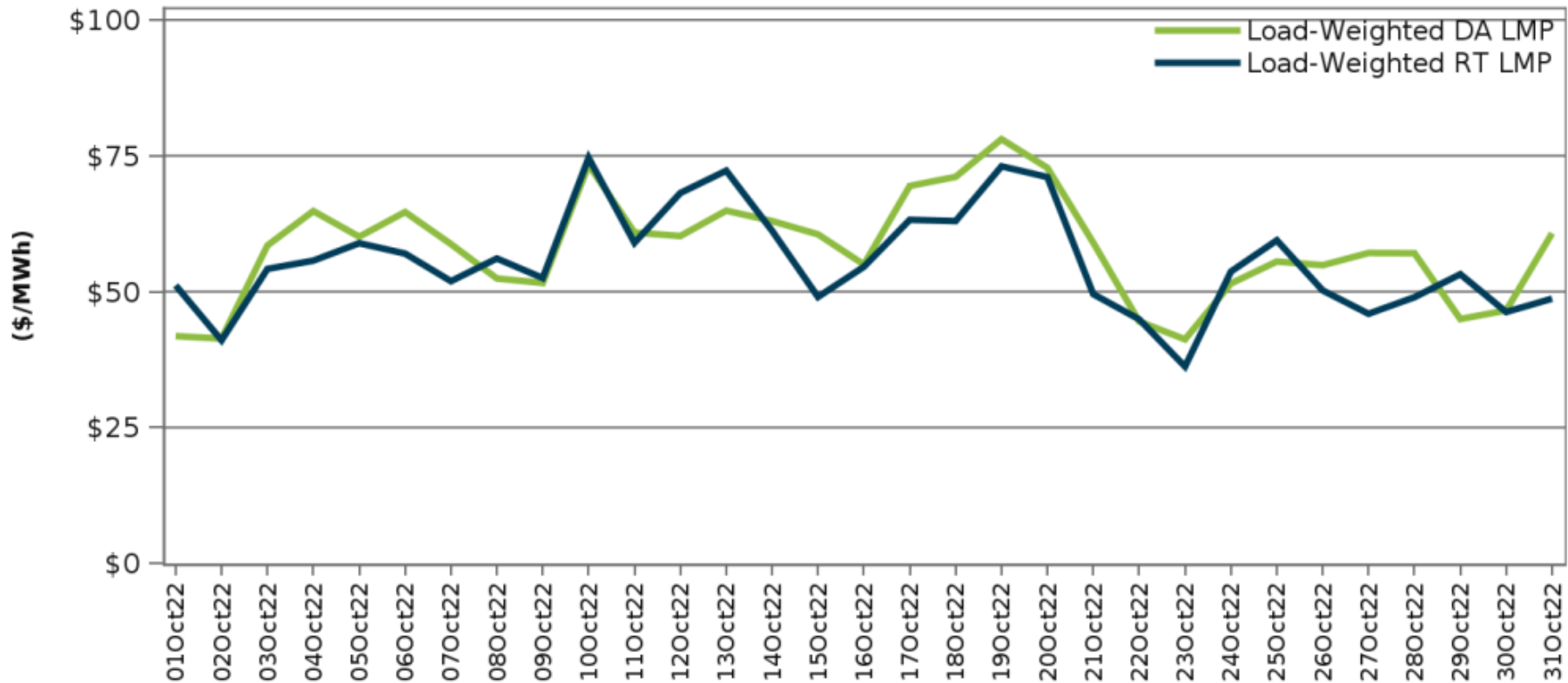
http://dataminer2.pjm.com/feed/rt_marginal_value



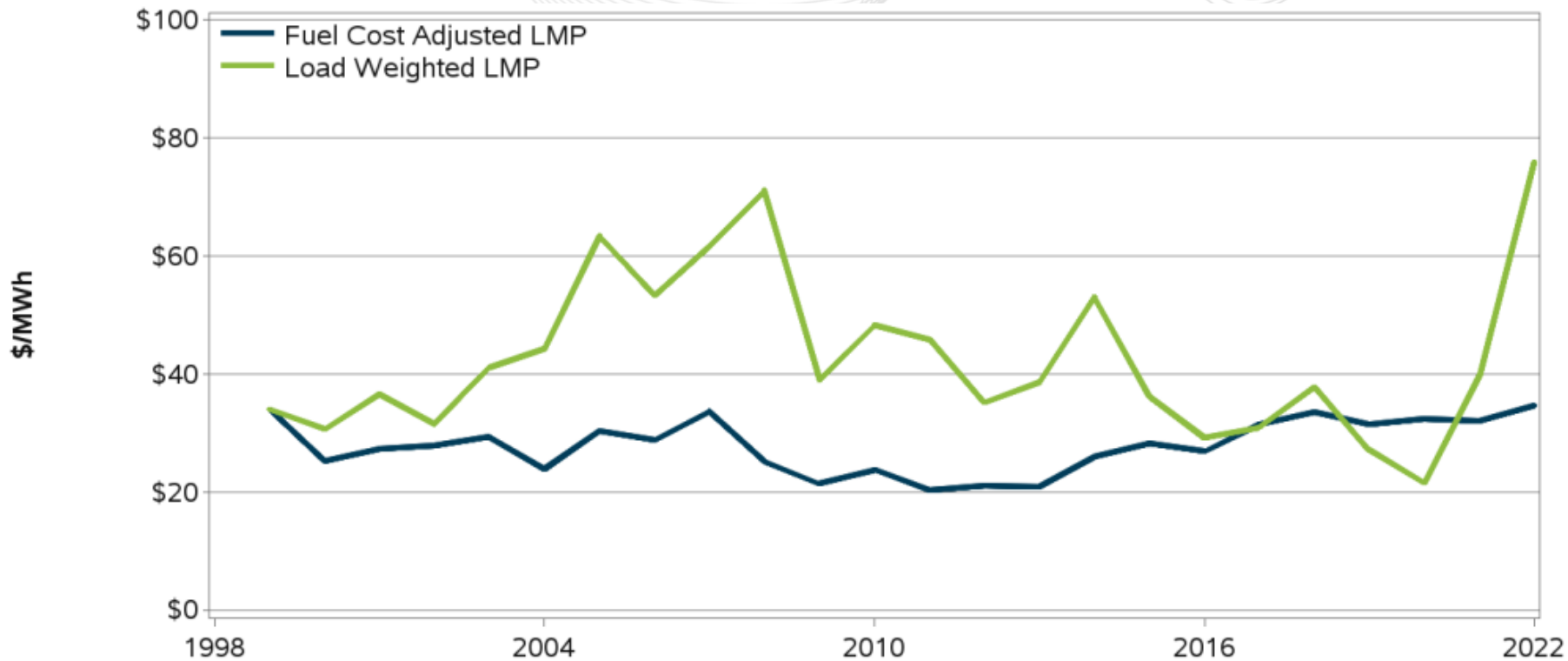
Monthly Load-Weighted Average Real-time LMP

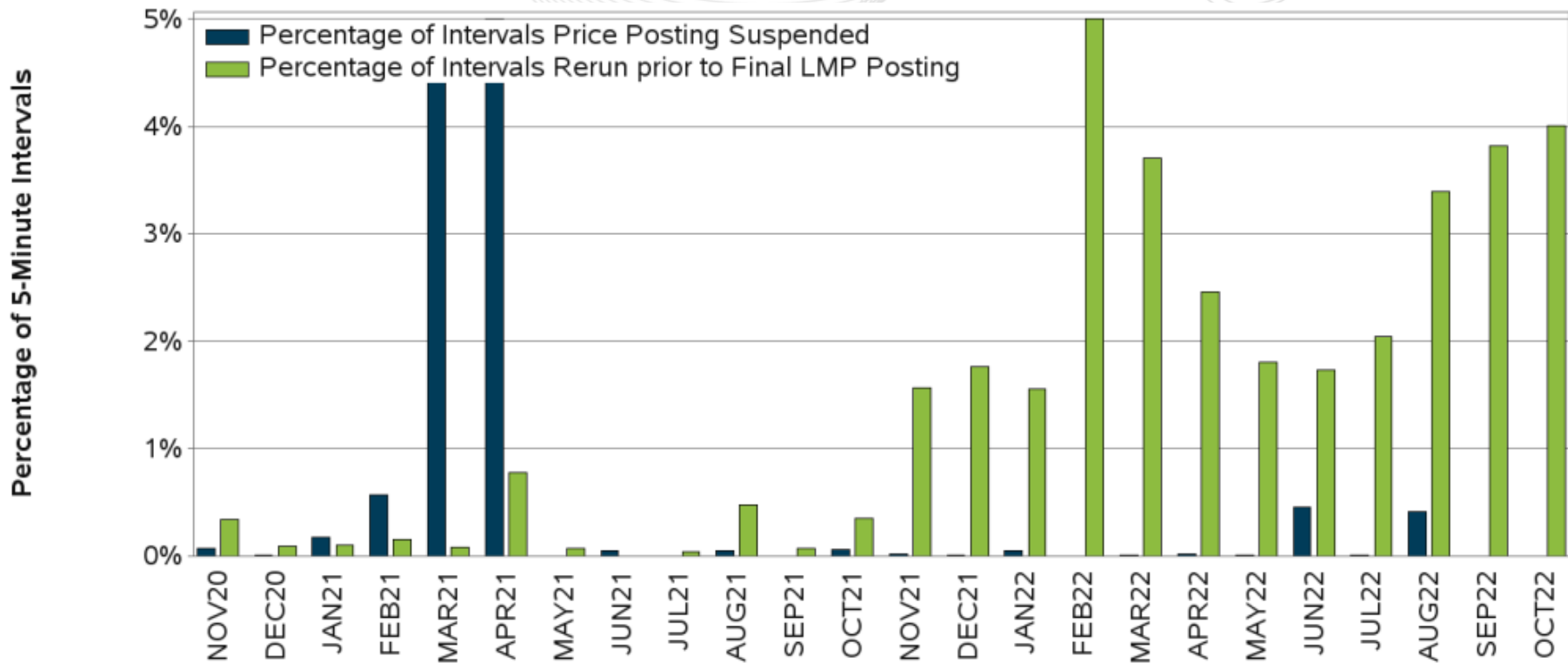


Daily Load-Weighted Average DA & RT LMP



Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)

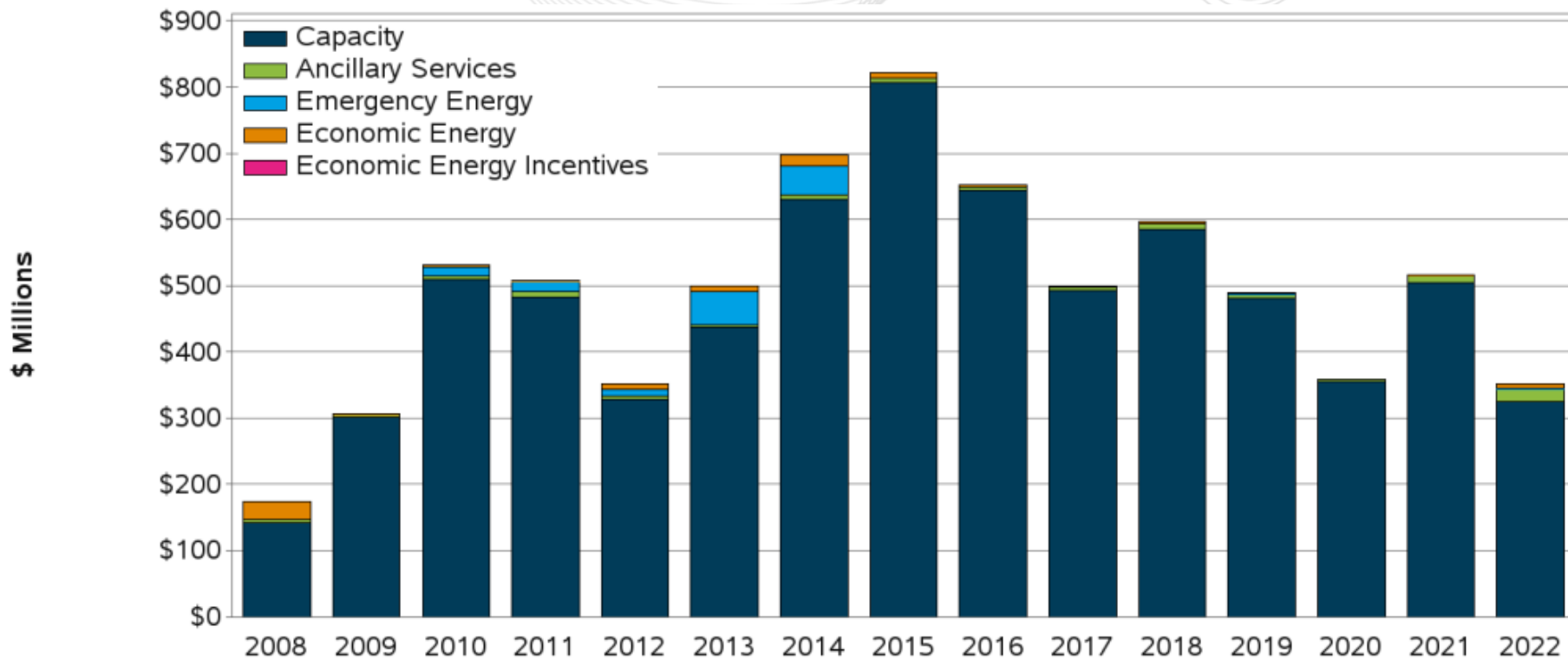


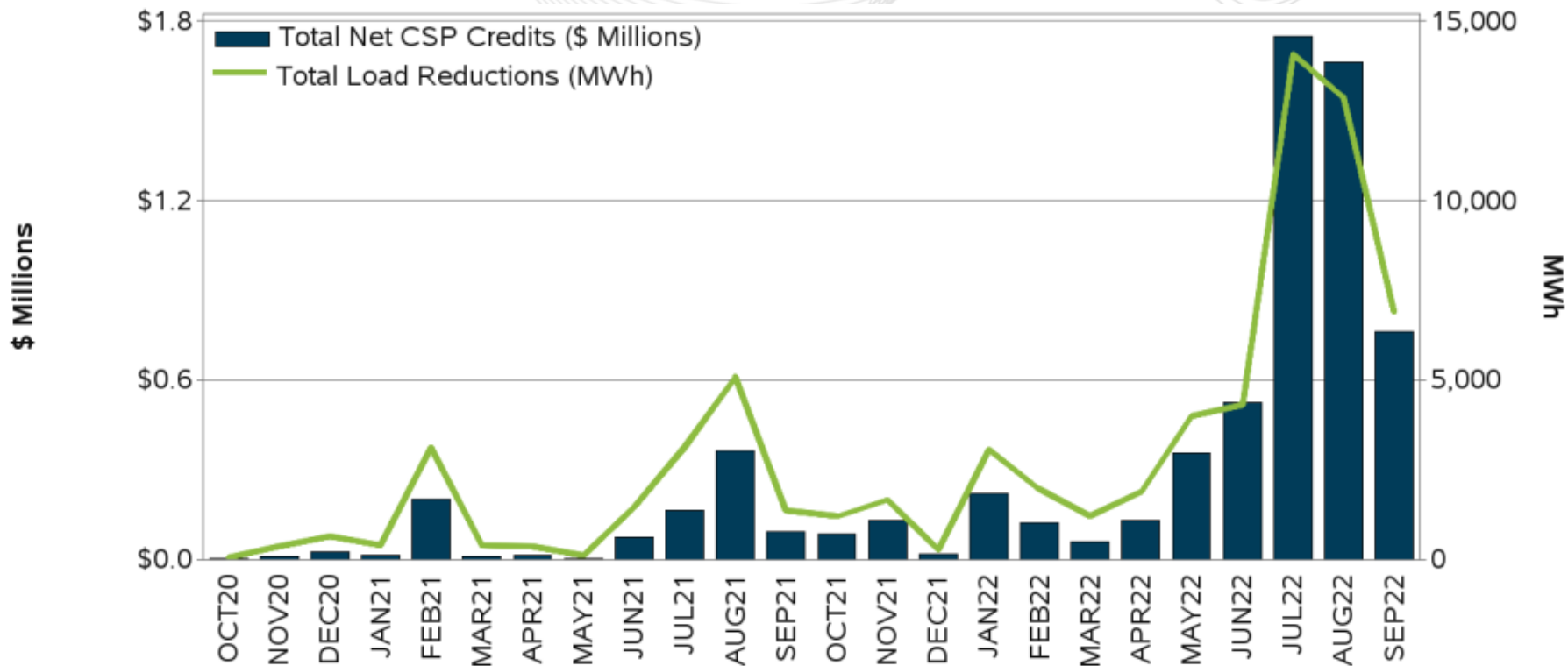


Spikes seen in March and April 2021 are incorrect and due to a software bug which has since been fixed.

Energy Market

Demand Response Summary

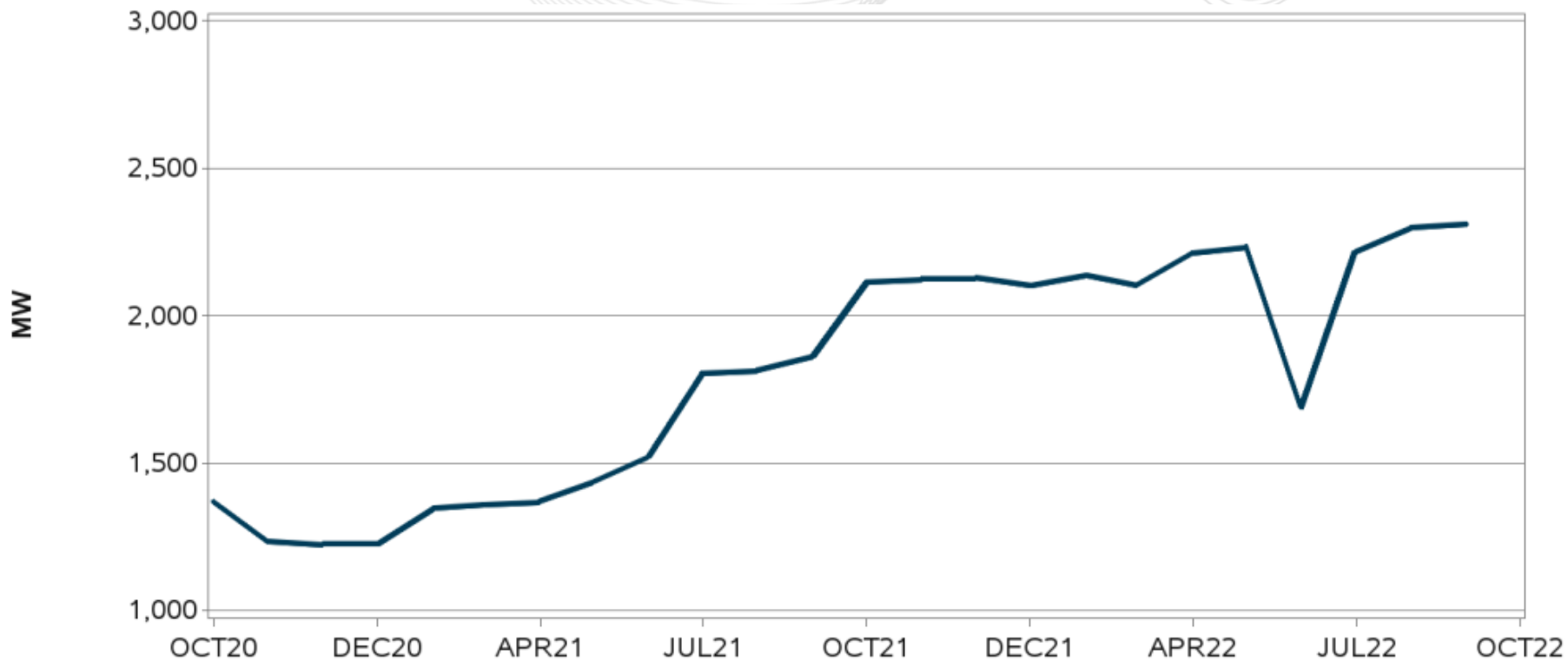




*Data for the last few months are subject to significant change due to the settlement window.



Total Registered MW in PJM's Economic Demand Response

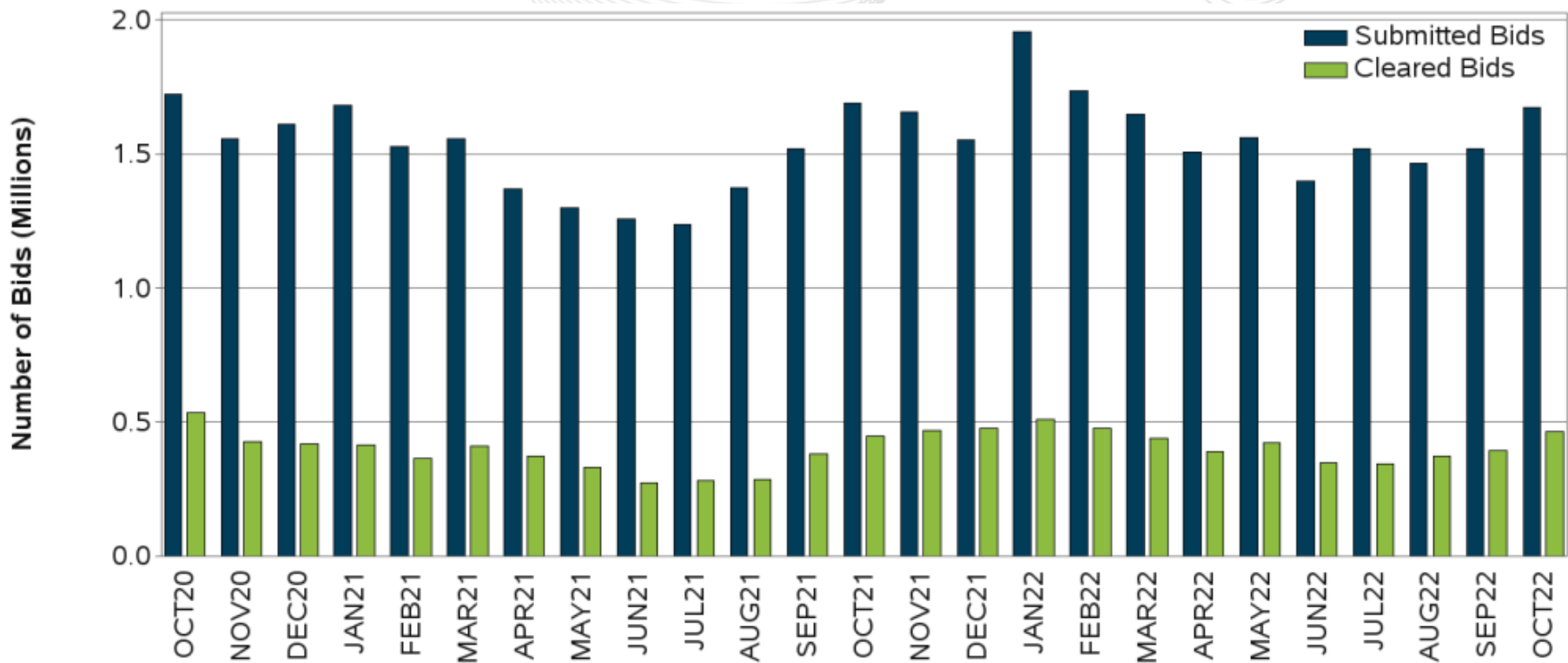


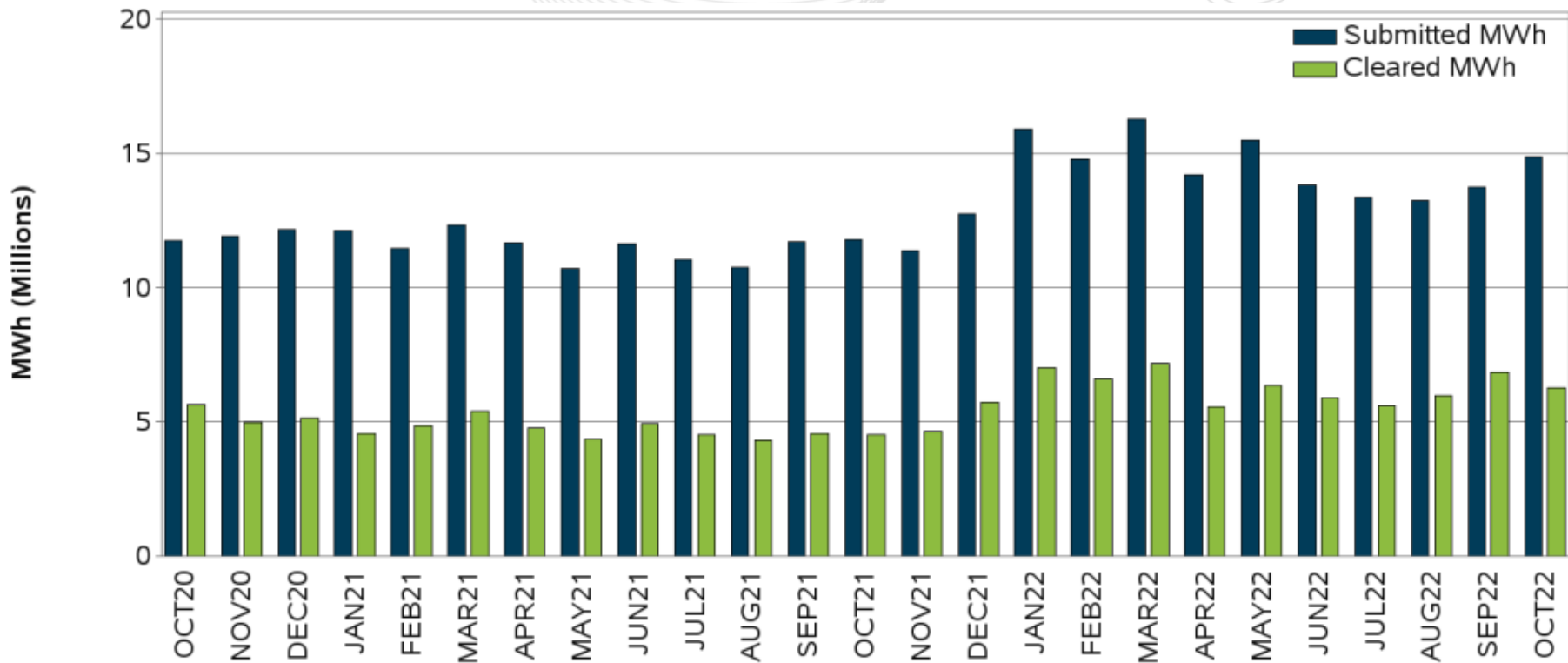
Energy Market

Virtual Activity Summary

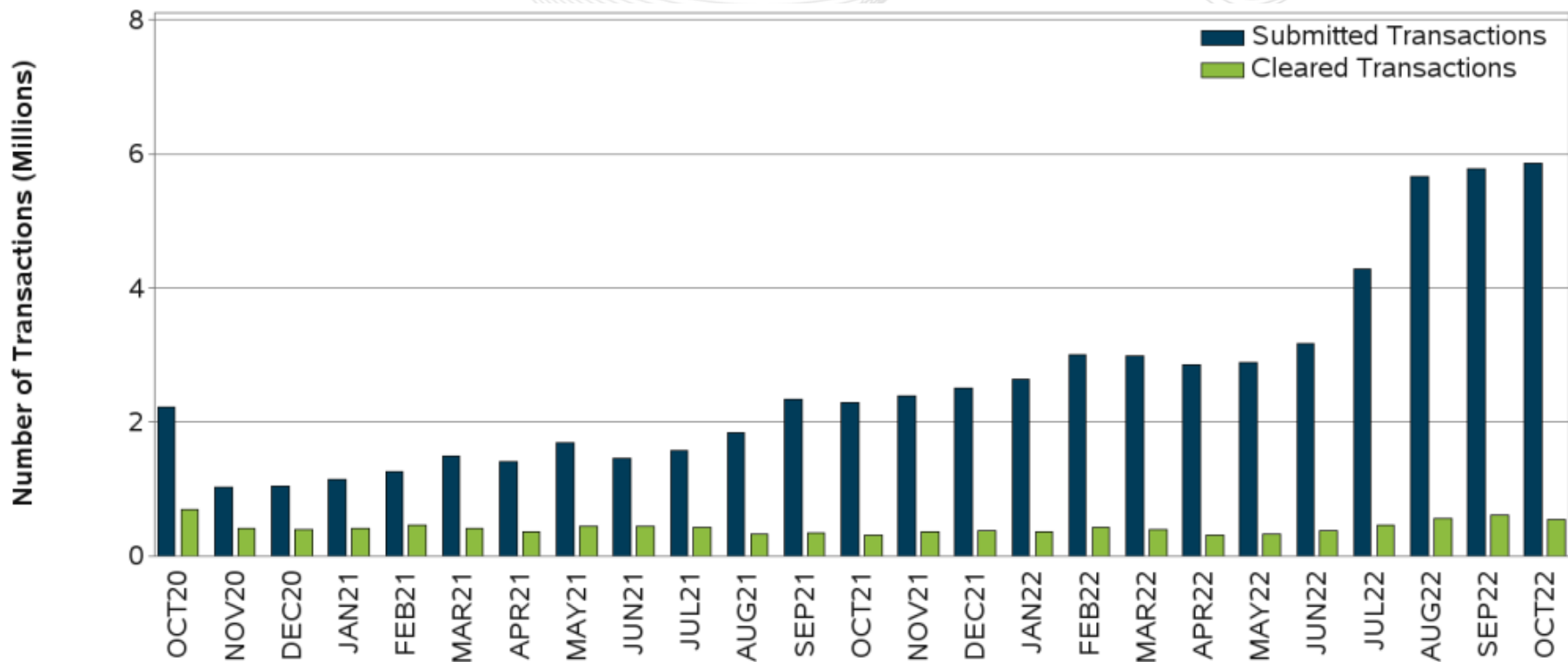
- The following six charts depict trends in submitted and cleared virtual and up-to-congestion transactions, in terms of number and volume, into the PJM Energy Market. The first two of these charts show the submitted and cleared increment and decrement bids (virtual transactions or virtuals) and they 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.

Virtual Bids (INCs & DEC)s - Total Number

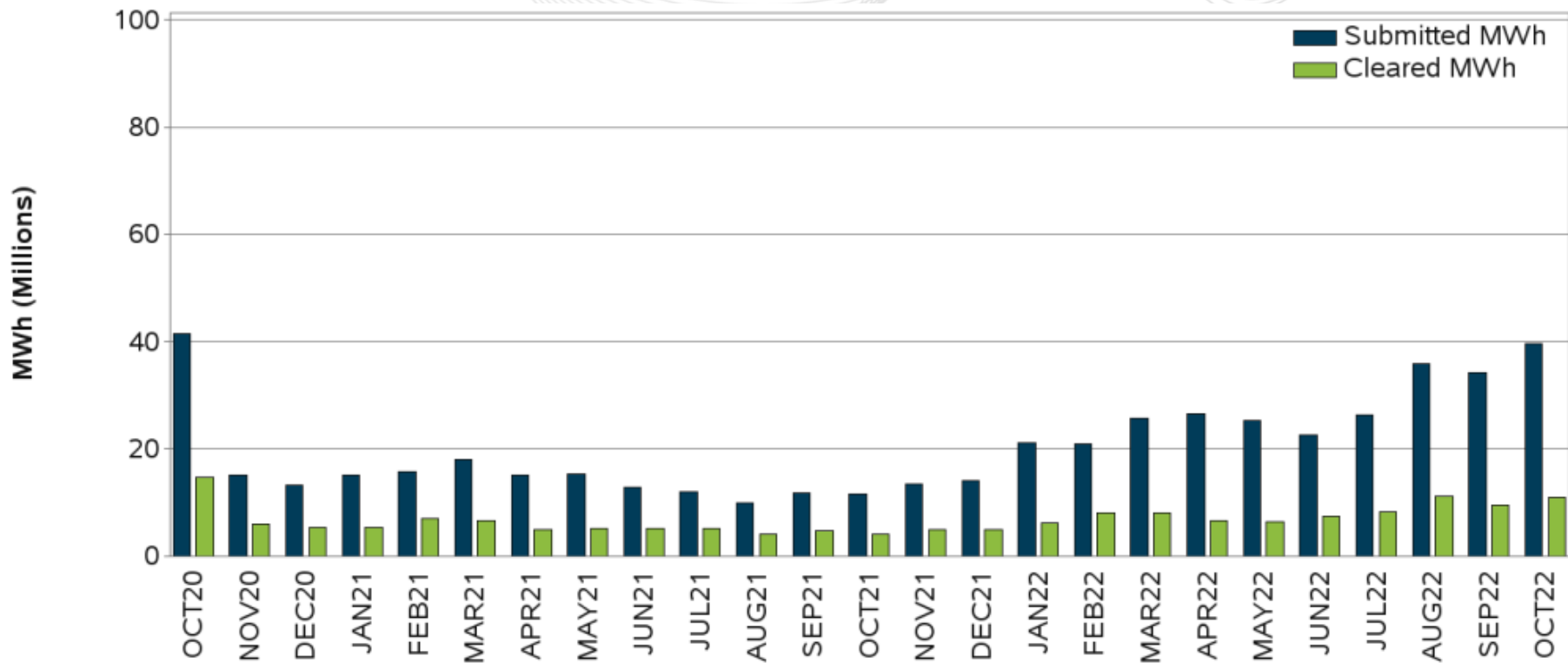




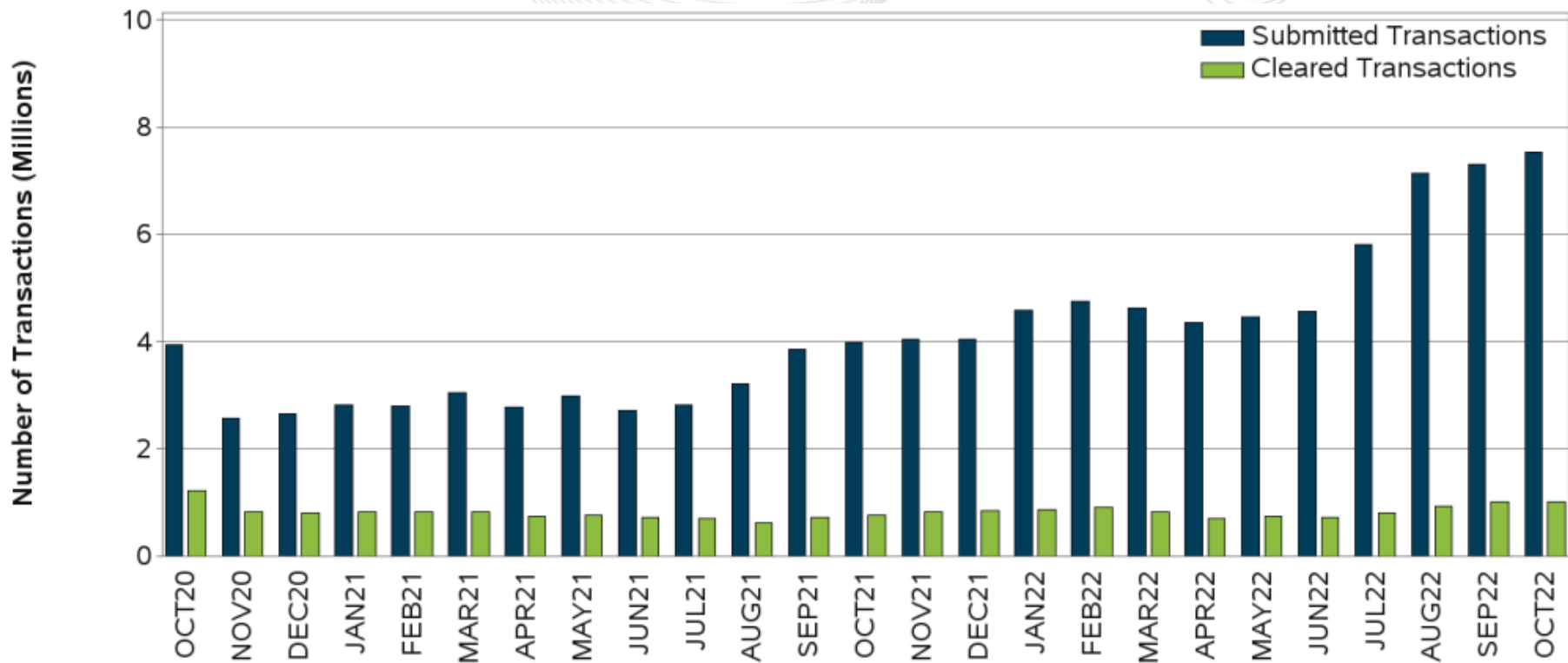
Up-To-Congestion Transactions - Total Number



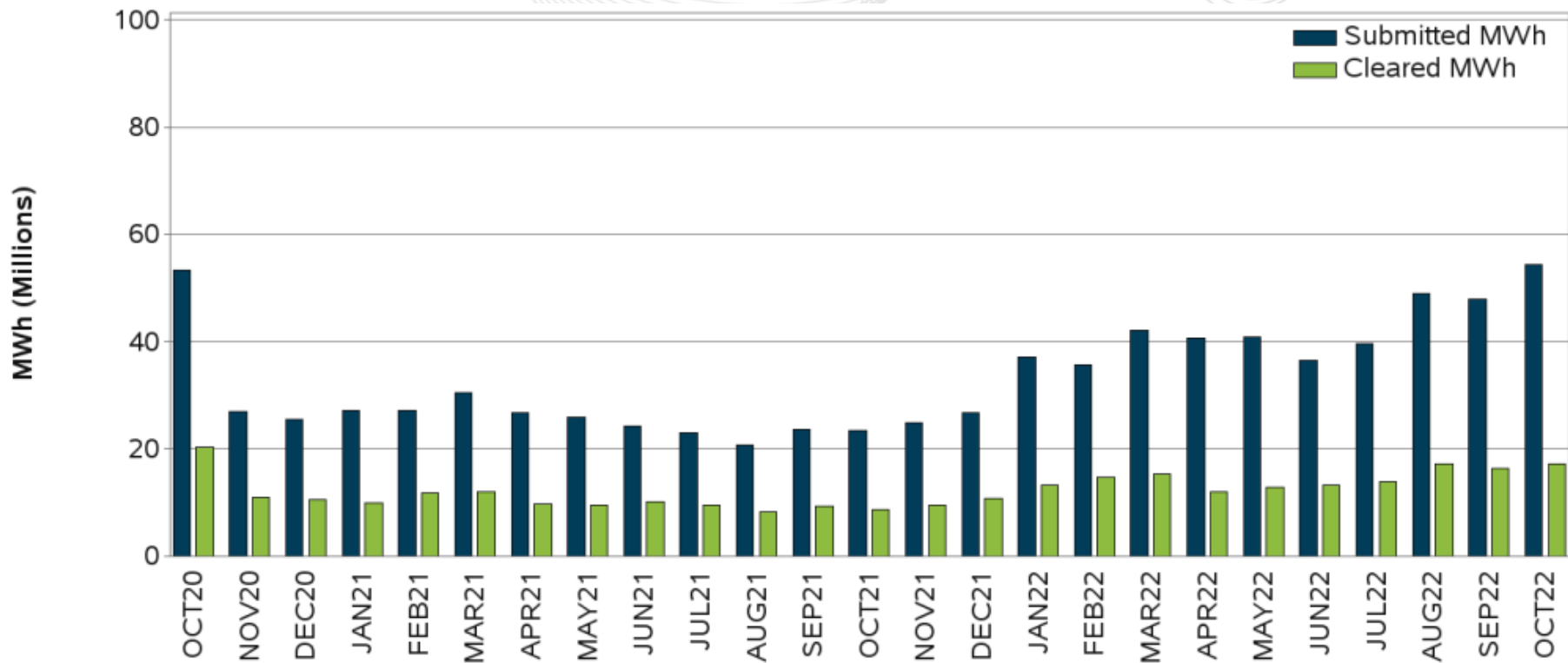
Up-To-Congestion Transactions - Total Volume



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



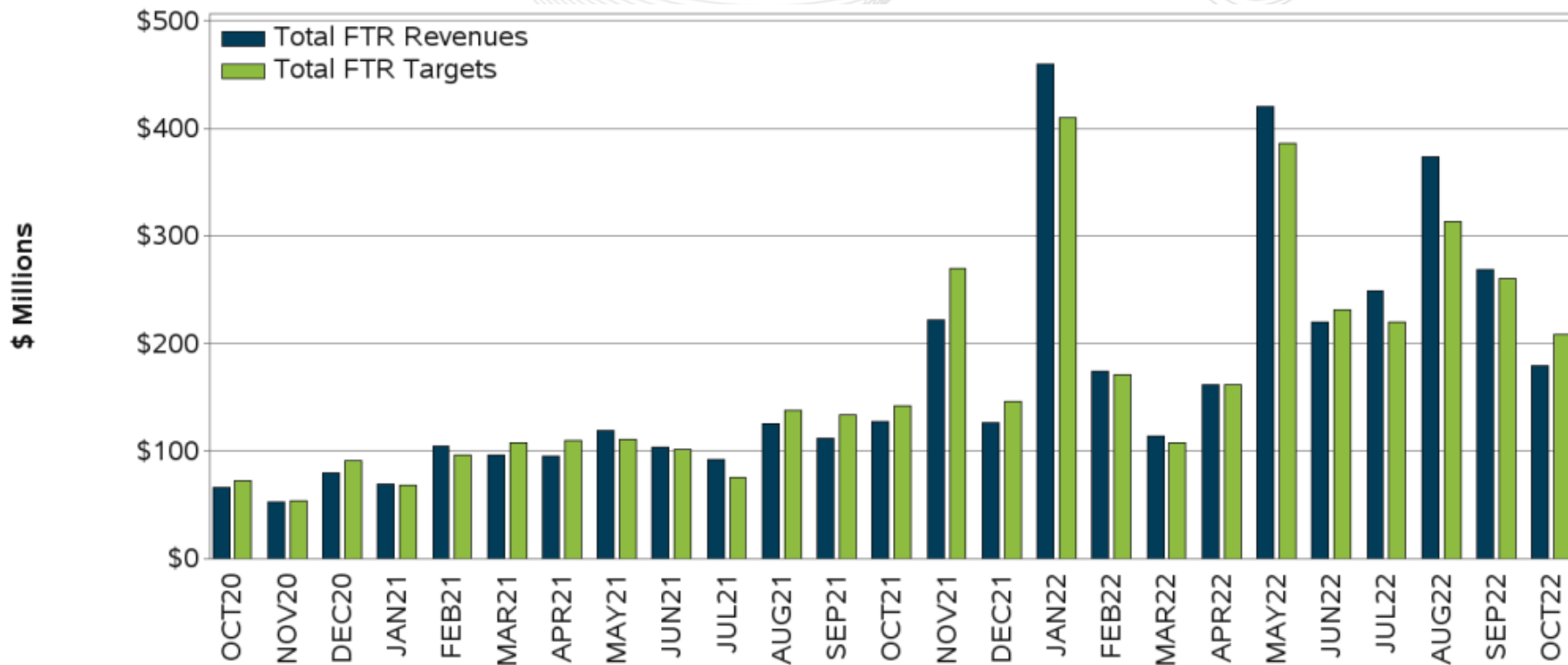
INCs, DEC and Up-To-Congestion Transactions - Total Volume

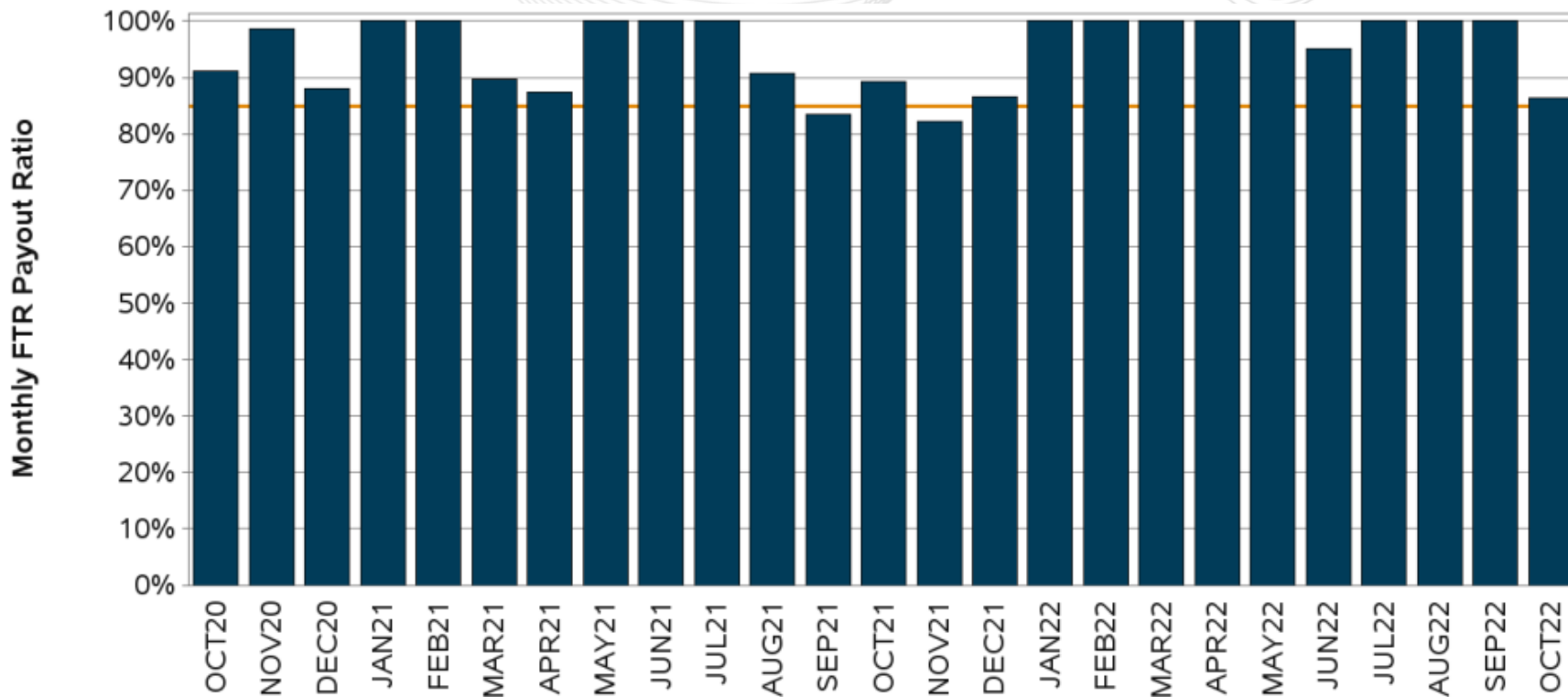


Energy Market

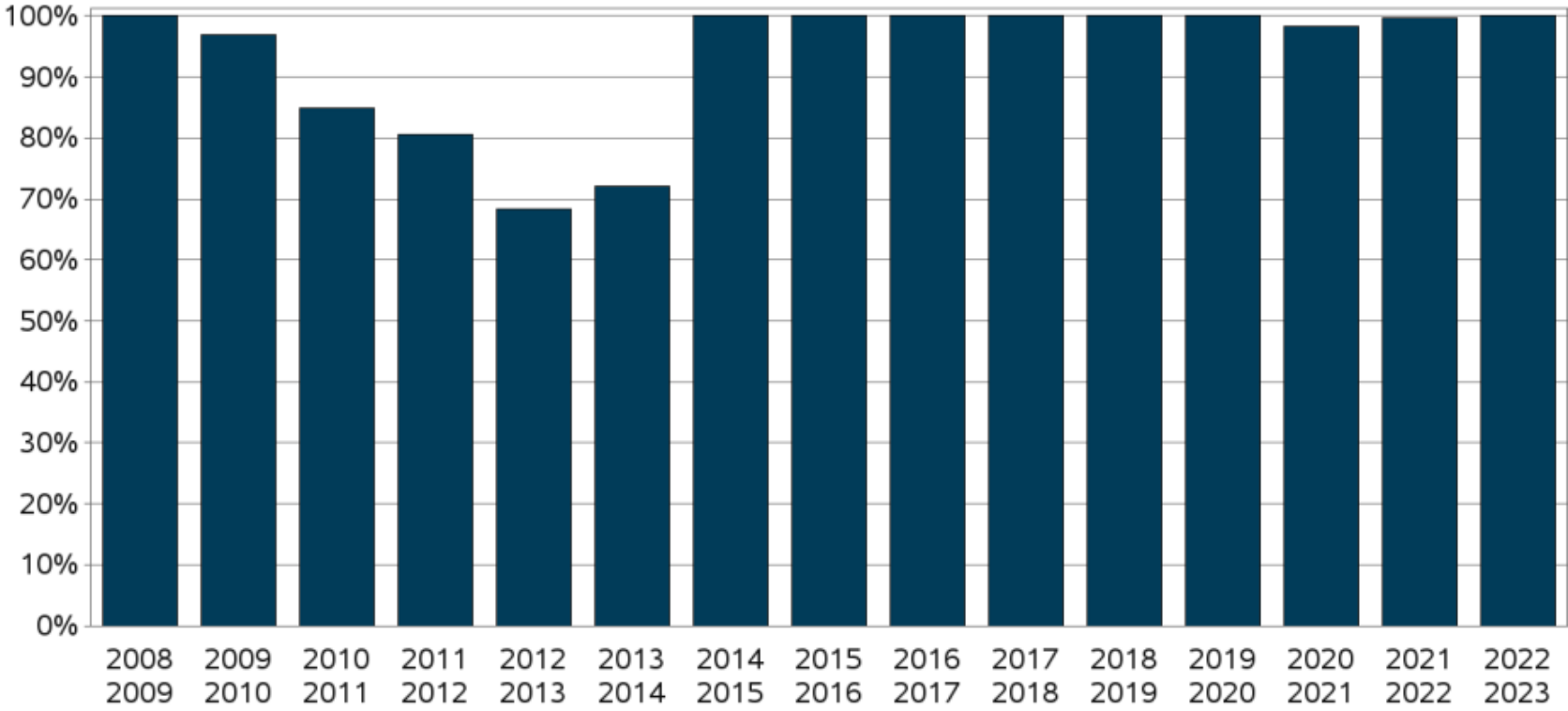
Congestion and FTR Summary

Period	Surplus / Underfunding	Payout Ratio
October 2022	\$-28,354,960	86%
2022	\$156,171,062	100%
2022/2023	\$62,065,041	100%

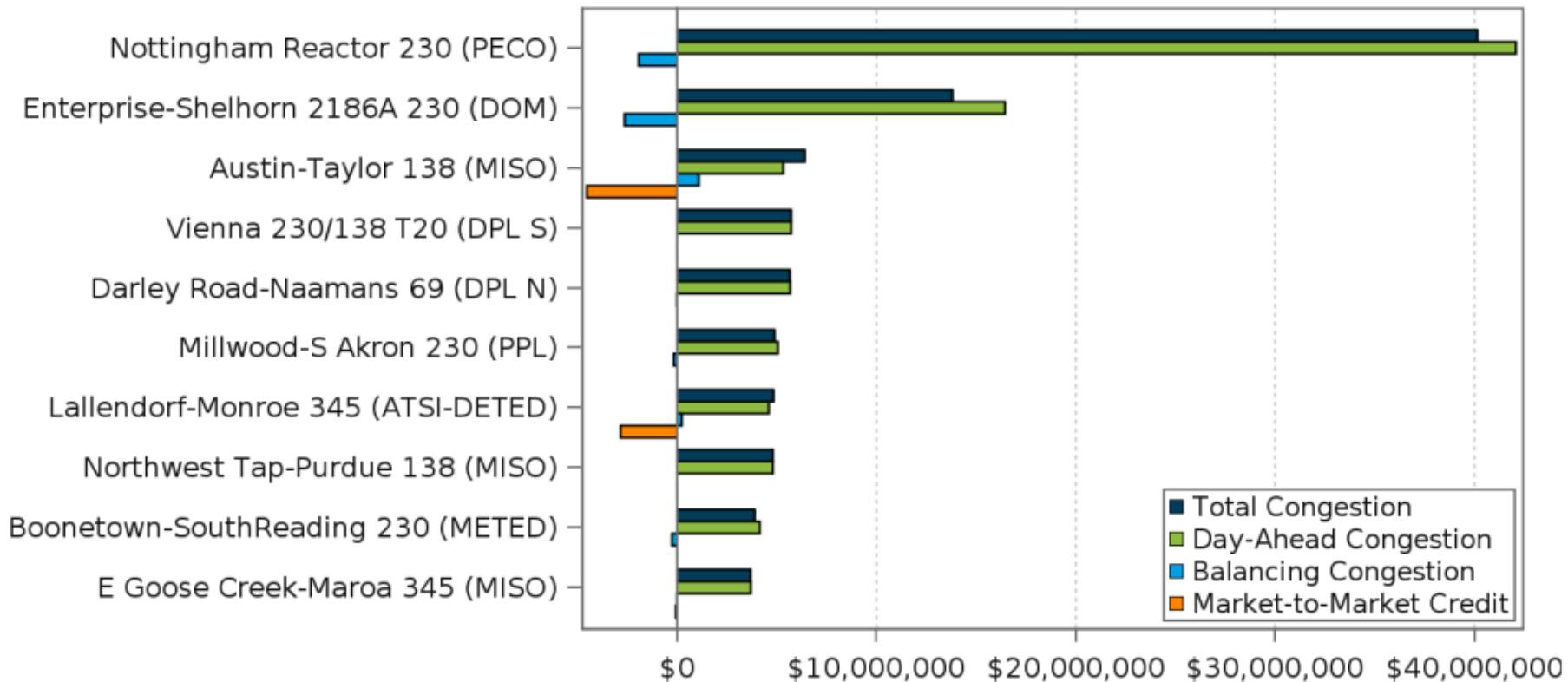




Planning Period FTR Payout Ratio

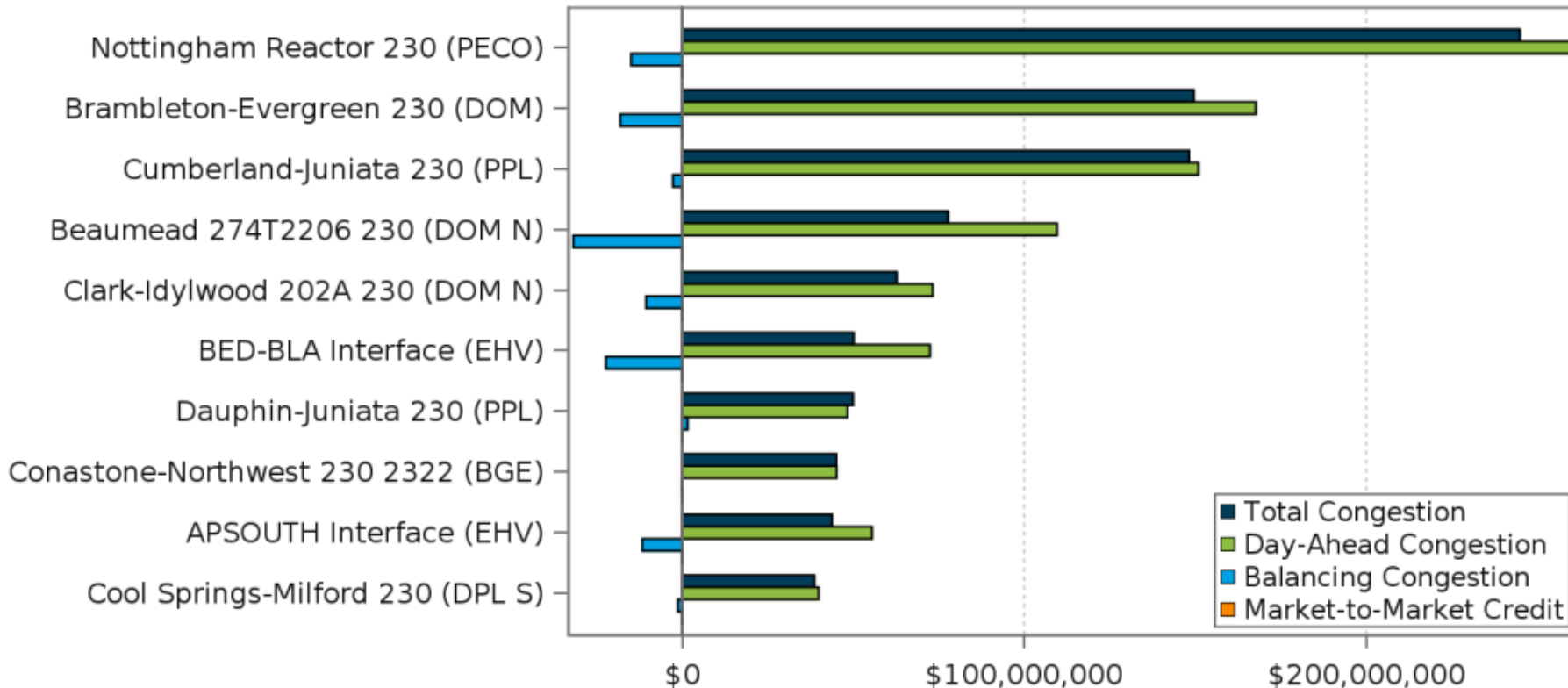


Ten Most Heavily Congested Transmission Facilities - Overall, October



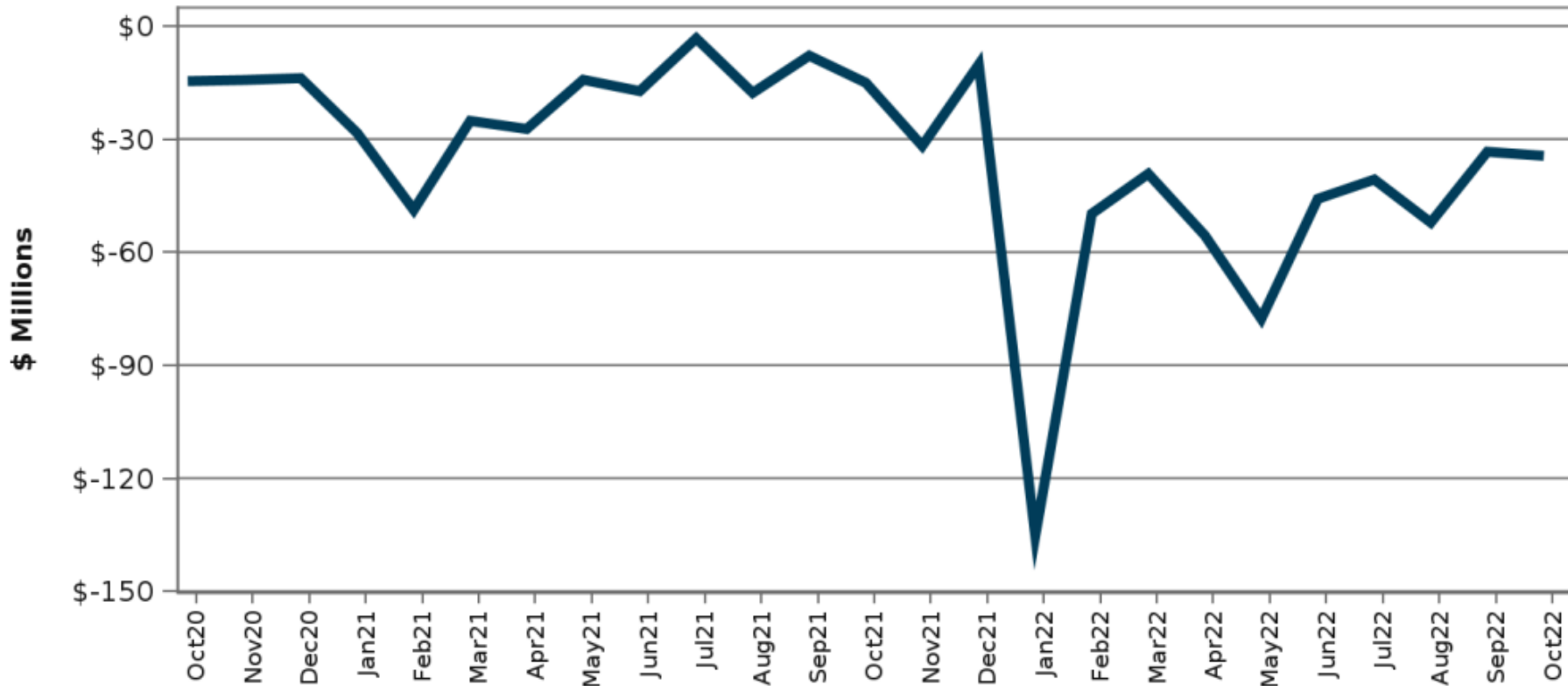
The ten most heavily congested facilities account for 63% of total congestion for October.

Ten Most Heavily Congested Transmission Facilities - Overall, 2022



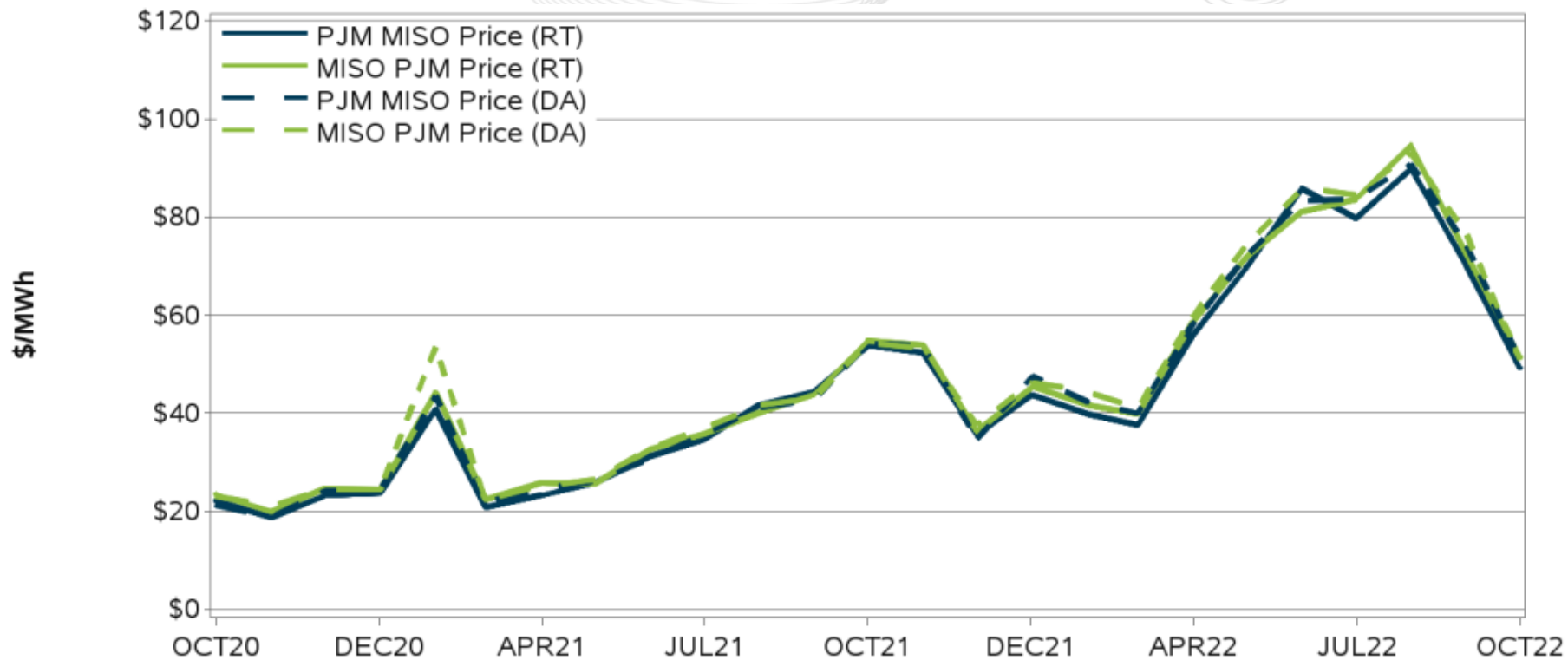
The ten most heavily congested facilities account for 48% of total congestion for 2022.

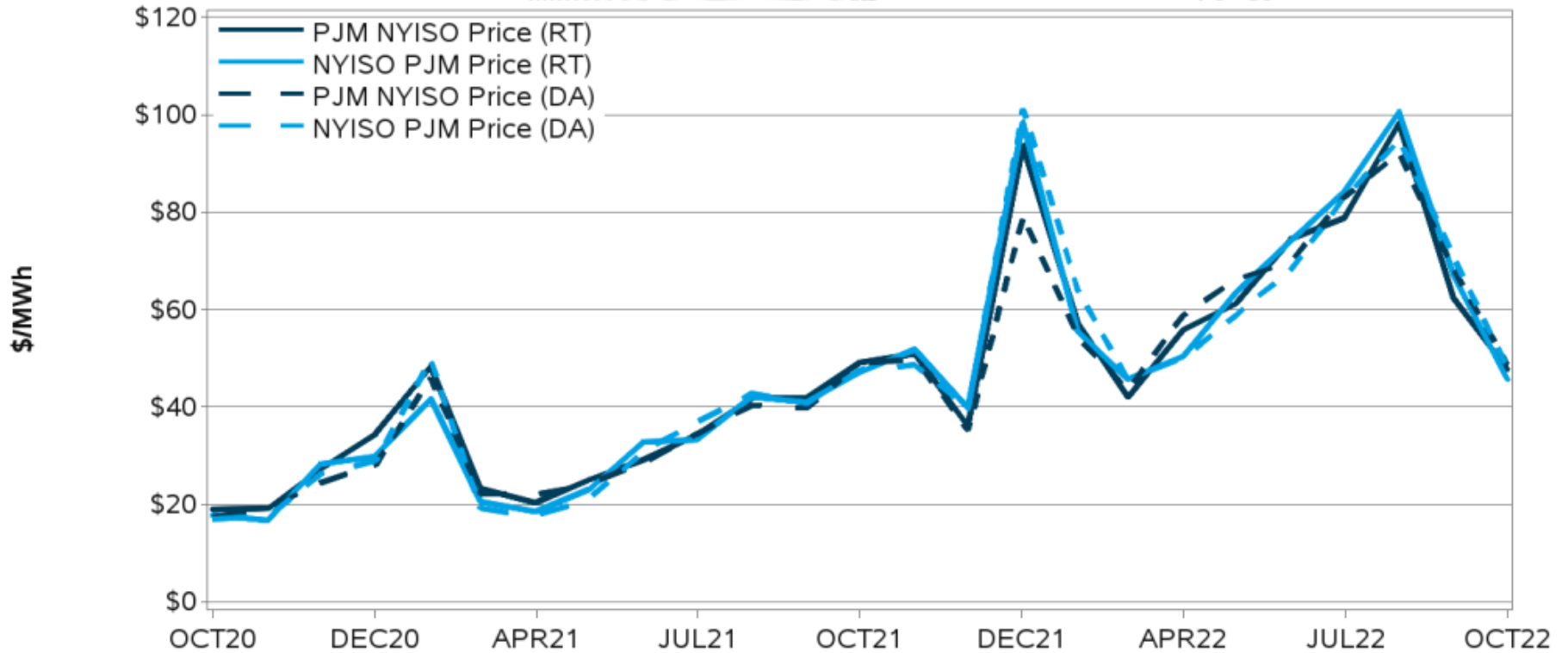
Balancing Congestion Charge Revenues (BLI 2215)



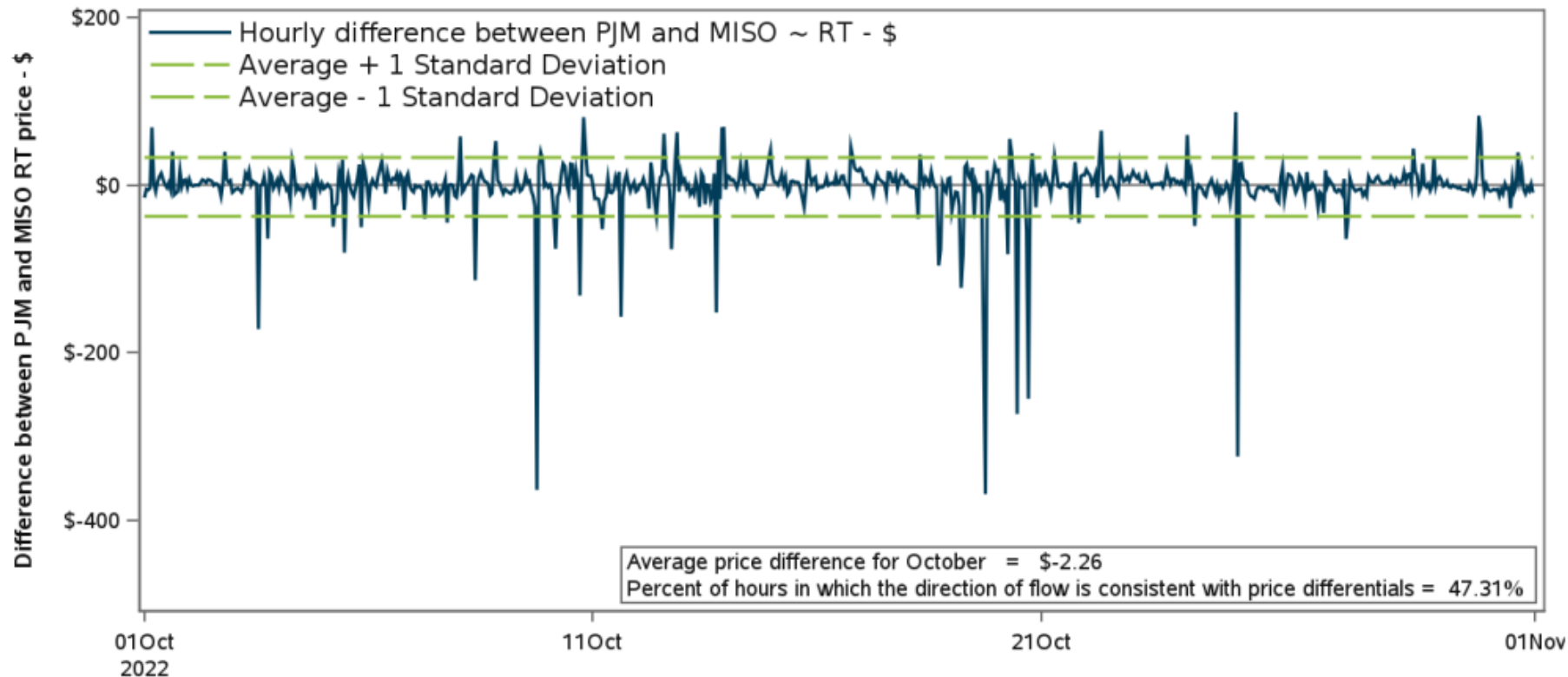
Energy Market

Interchange/Seams Summary



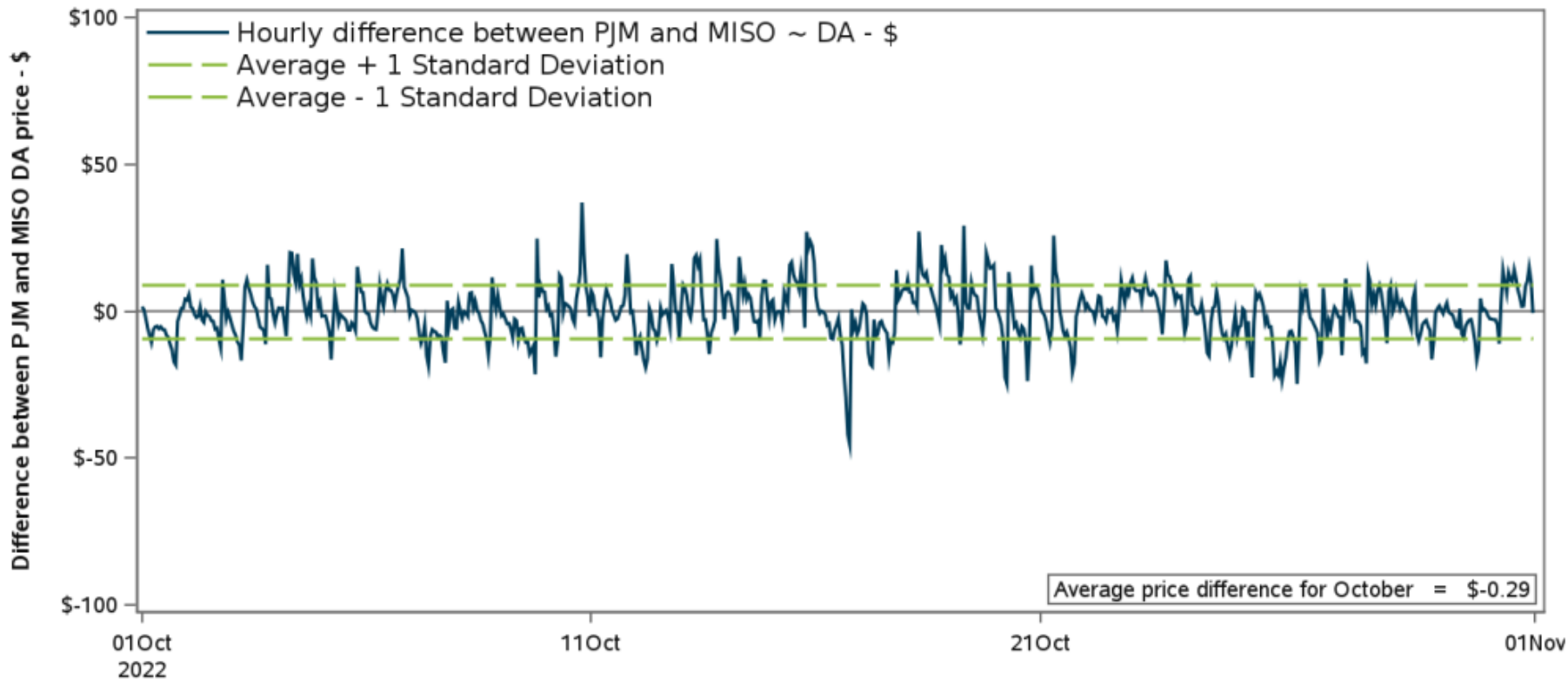


Hourly Difference Between PJM and MISO Real-Time Prices



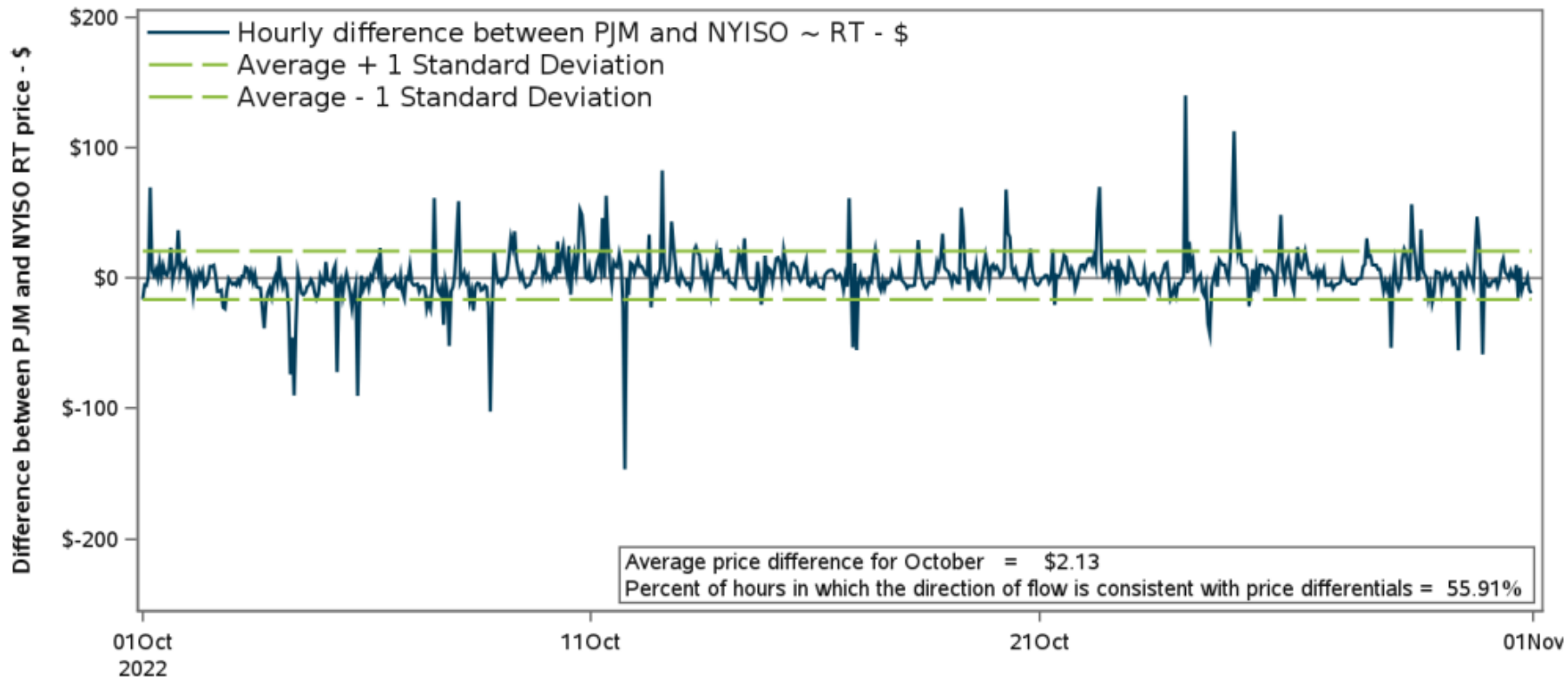
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and MISO Day-Ahead Prices



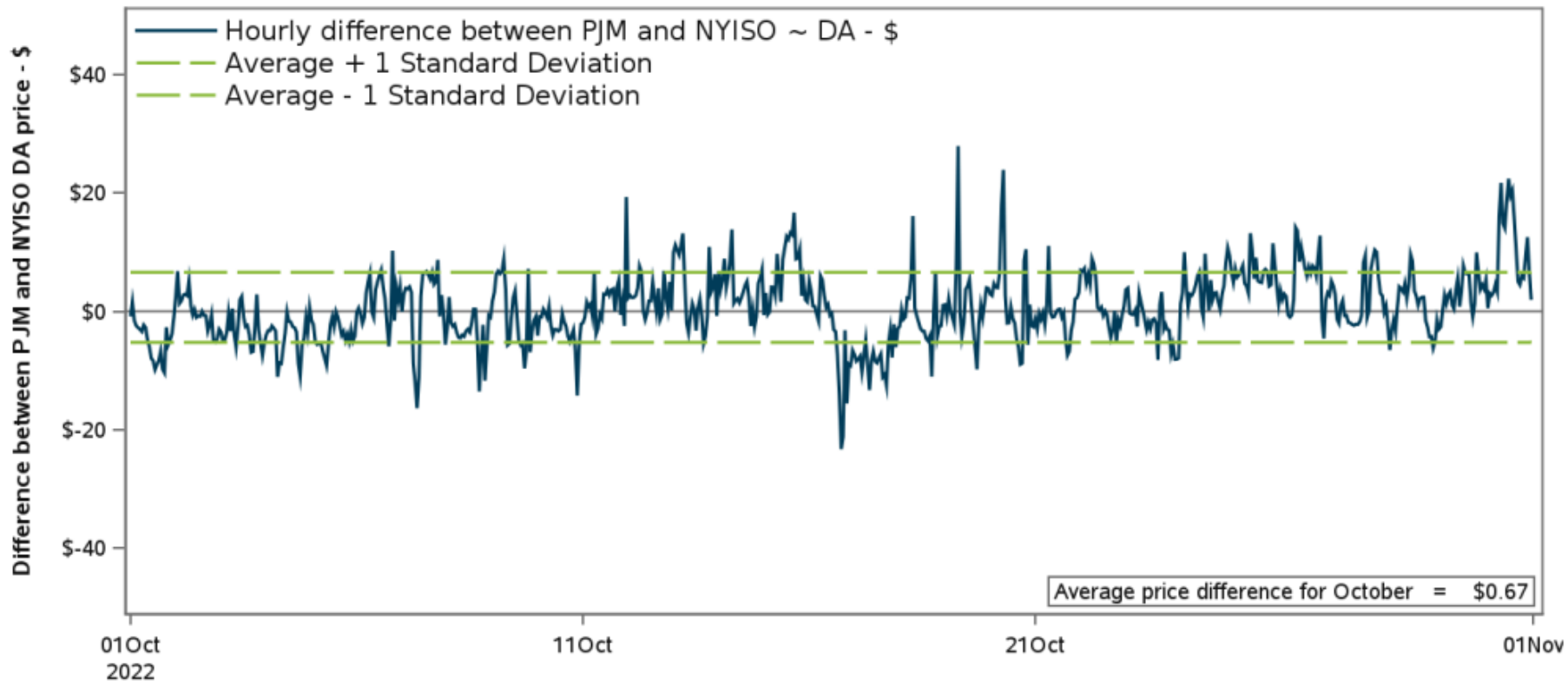
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Real-Time Prices

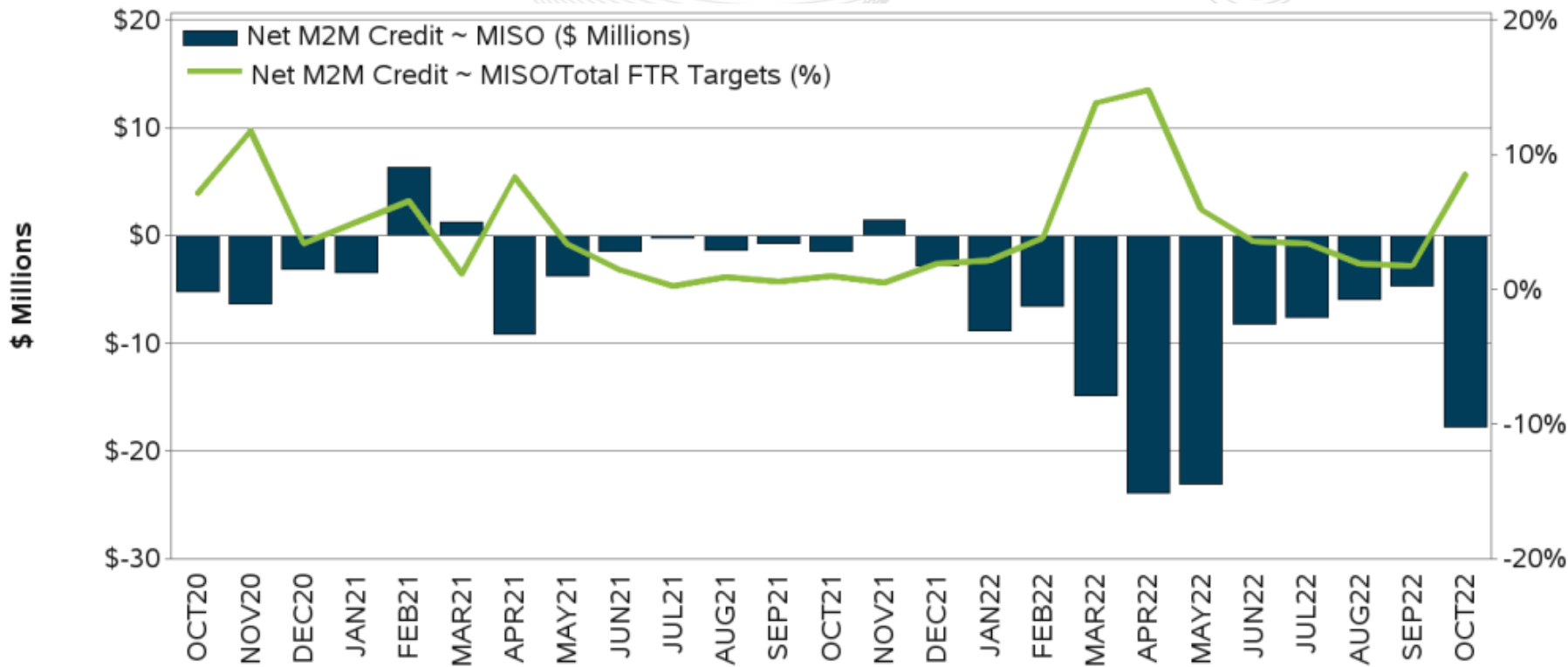


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Day-Ahead Prices



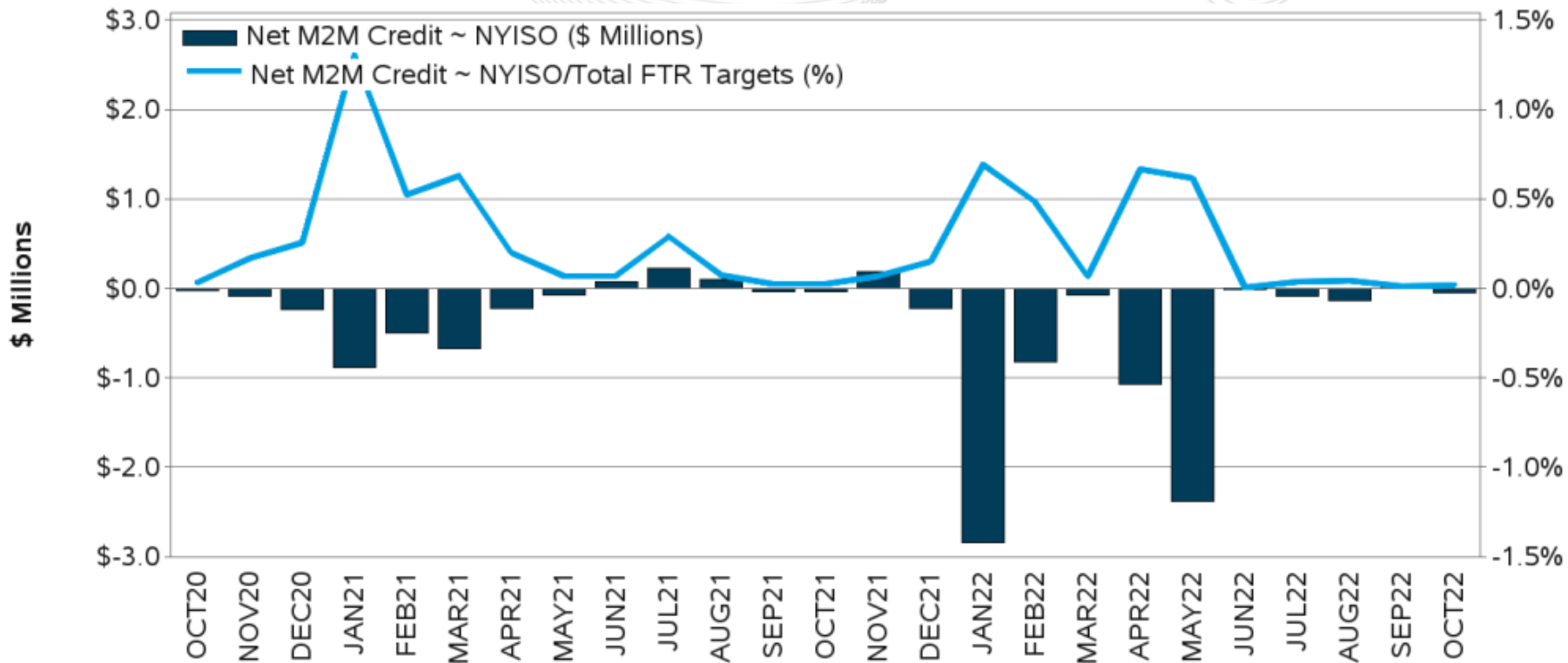
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.



Negative M2M Credit represents PJM payment to MISO

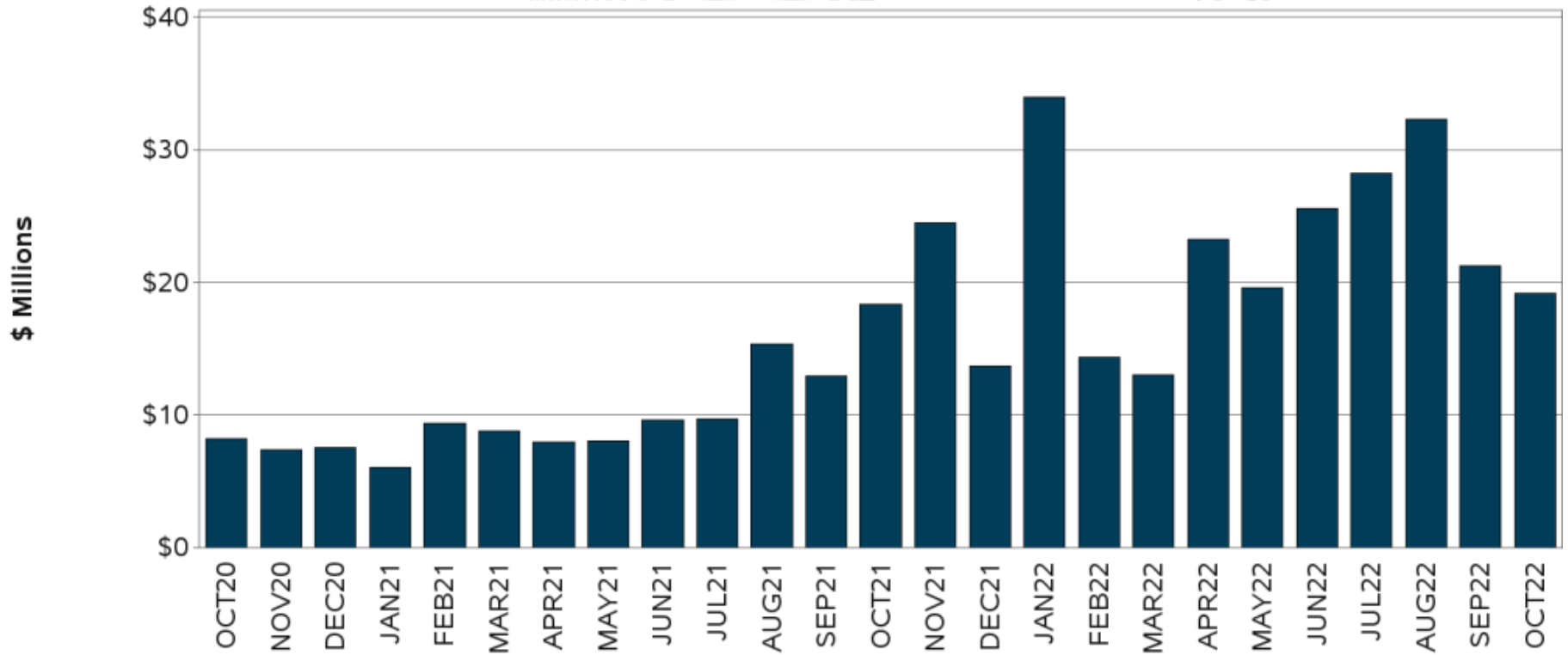


PJM-NYISO Market-to-Market Coordination Settlement

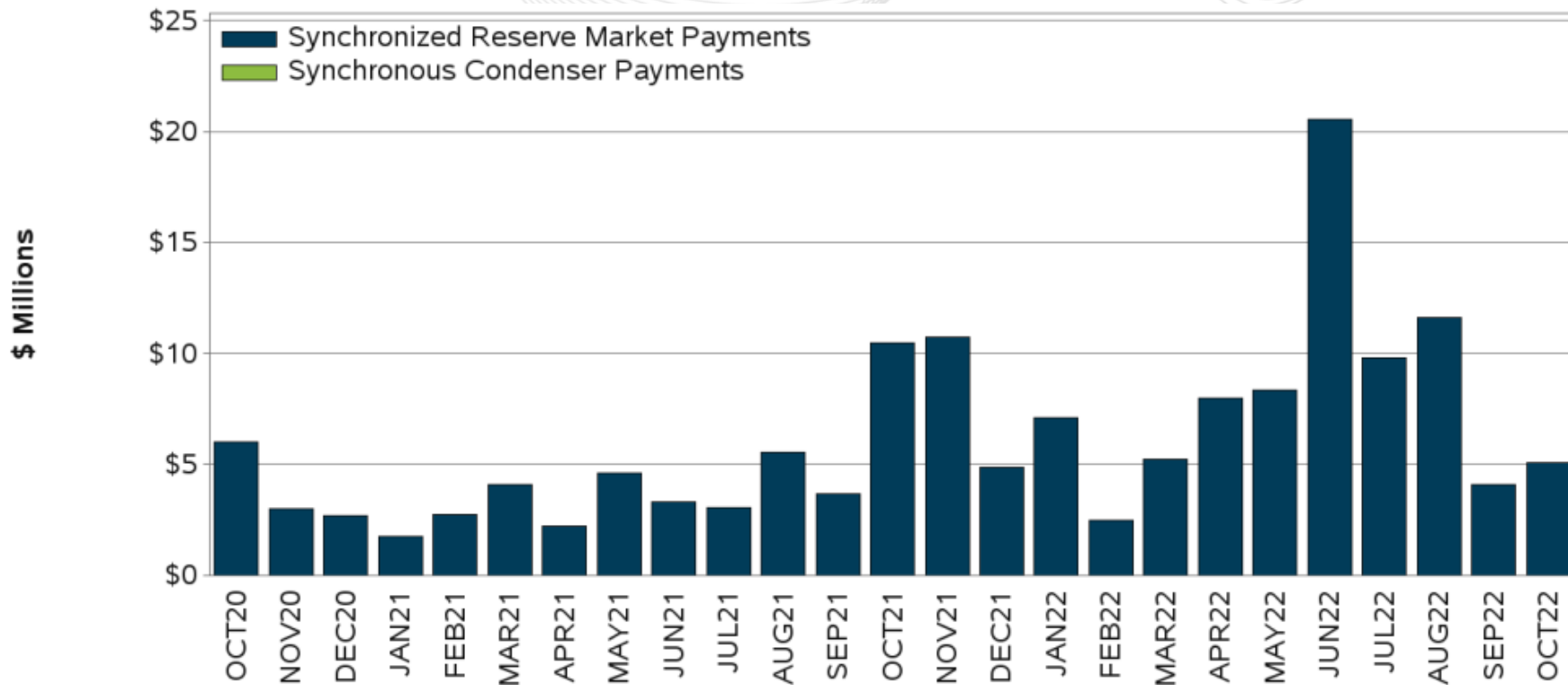


Negative M2M Credit represents PJM payment to NYISO

Ancillary Service Market Summary

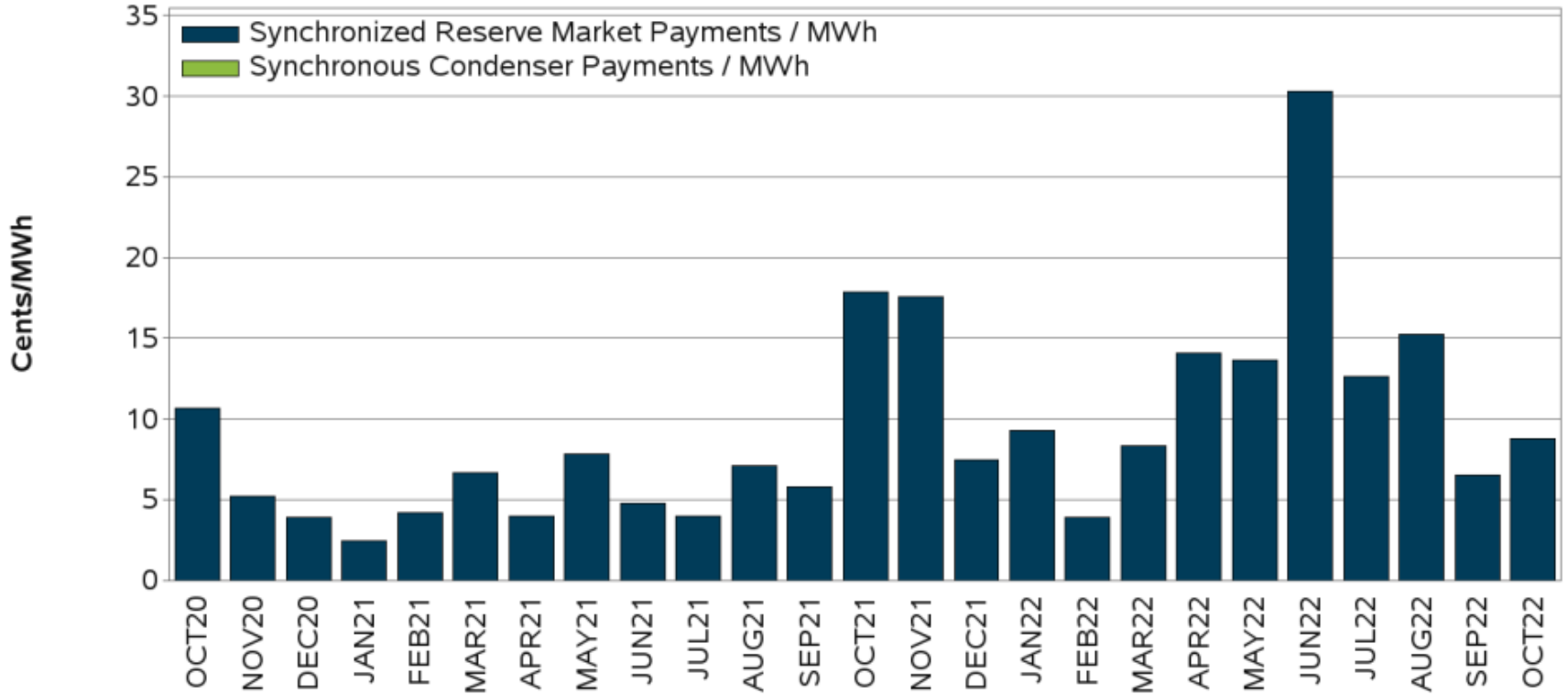


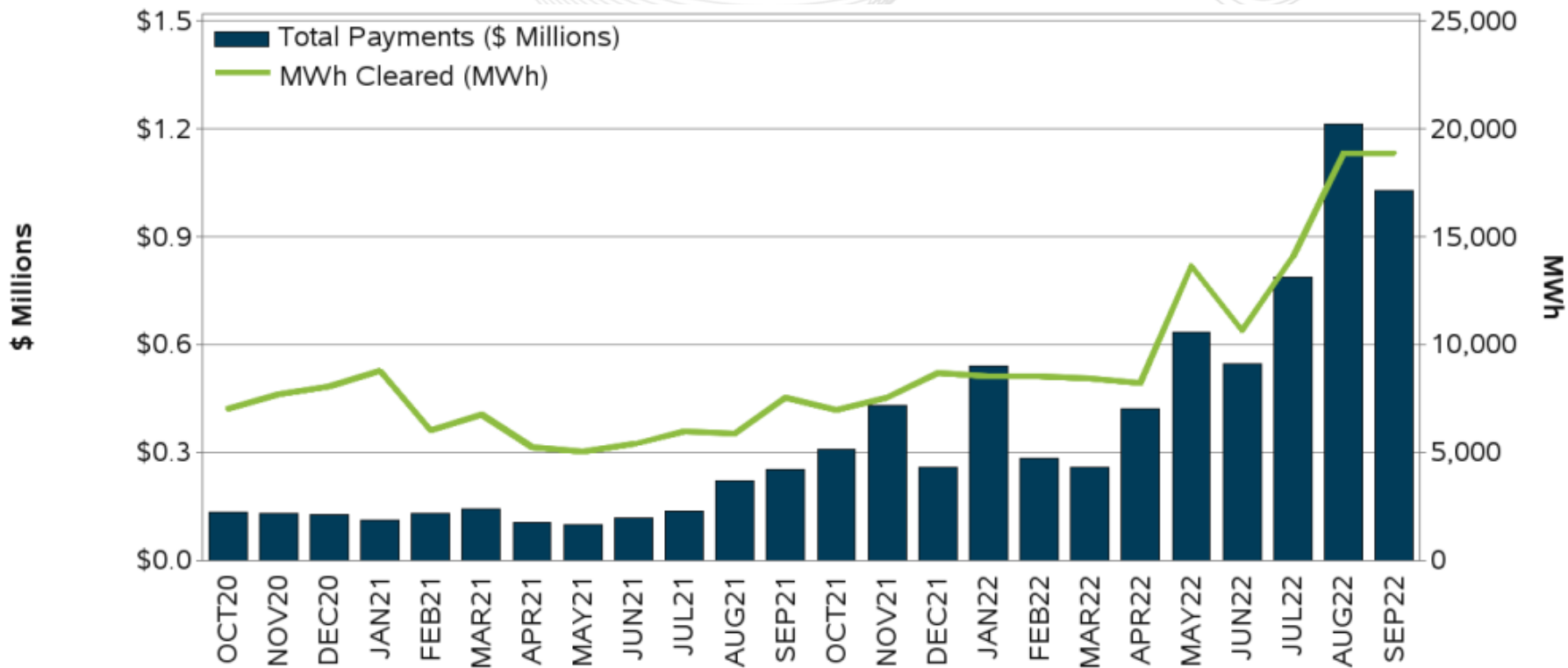
Synchronized Reserve and Synchronous Condenser Costs



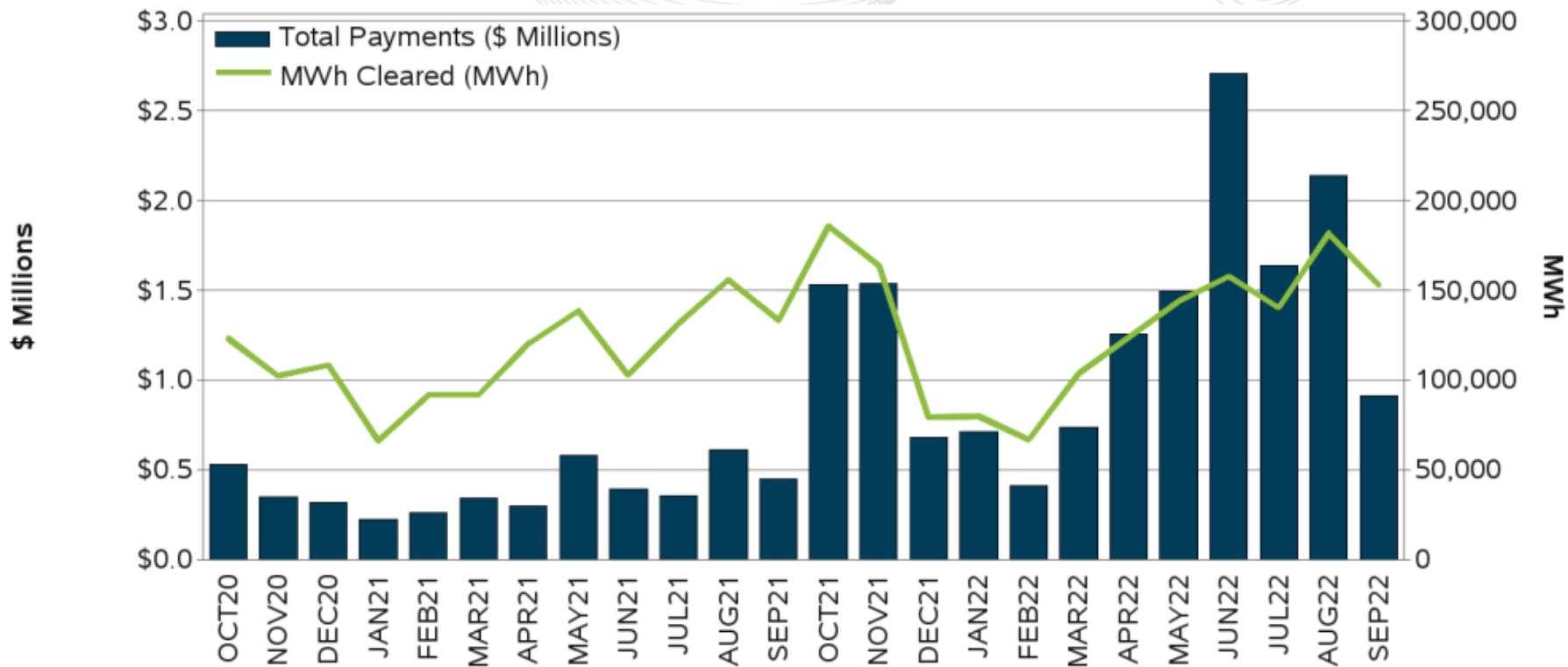


Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs

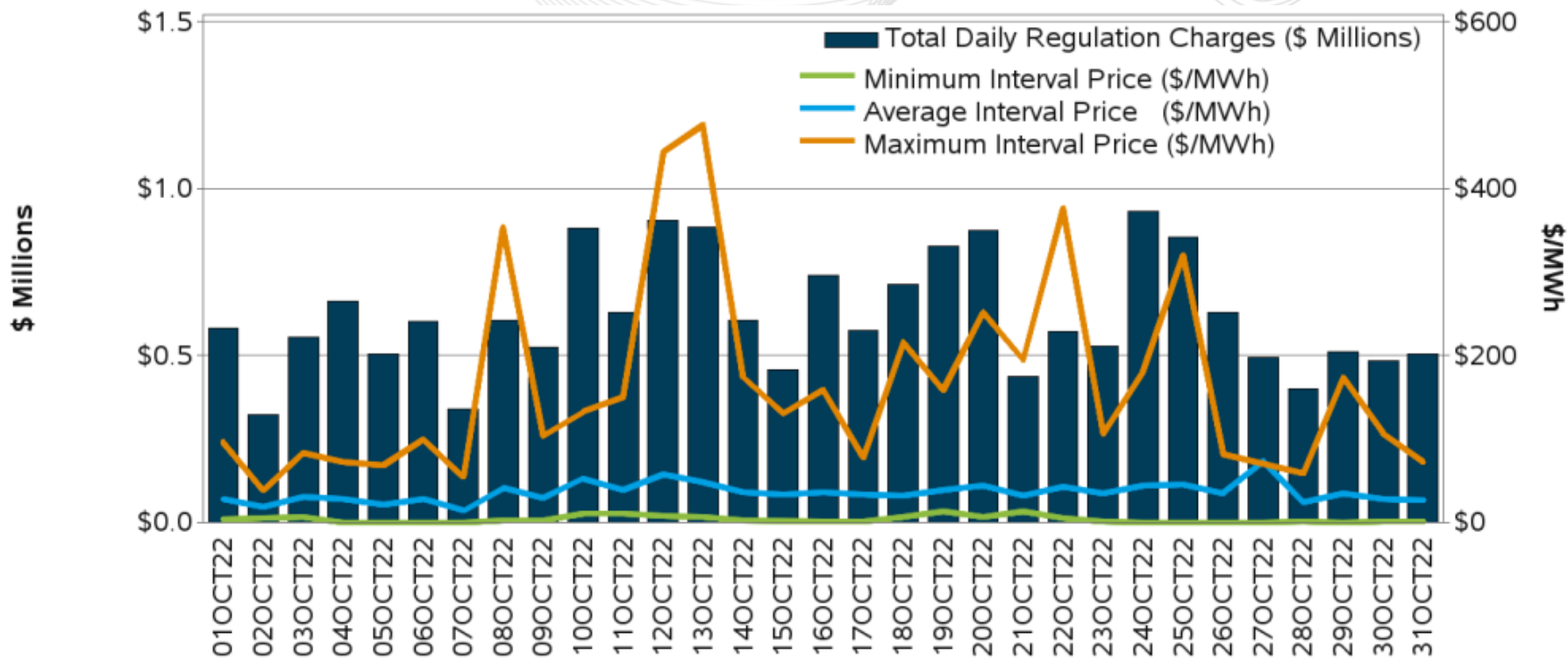




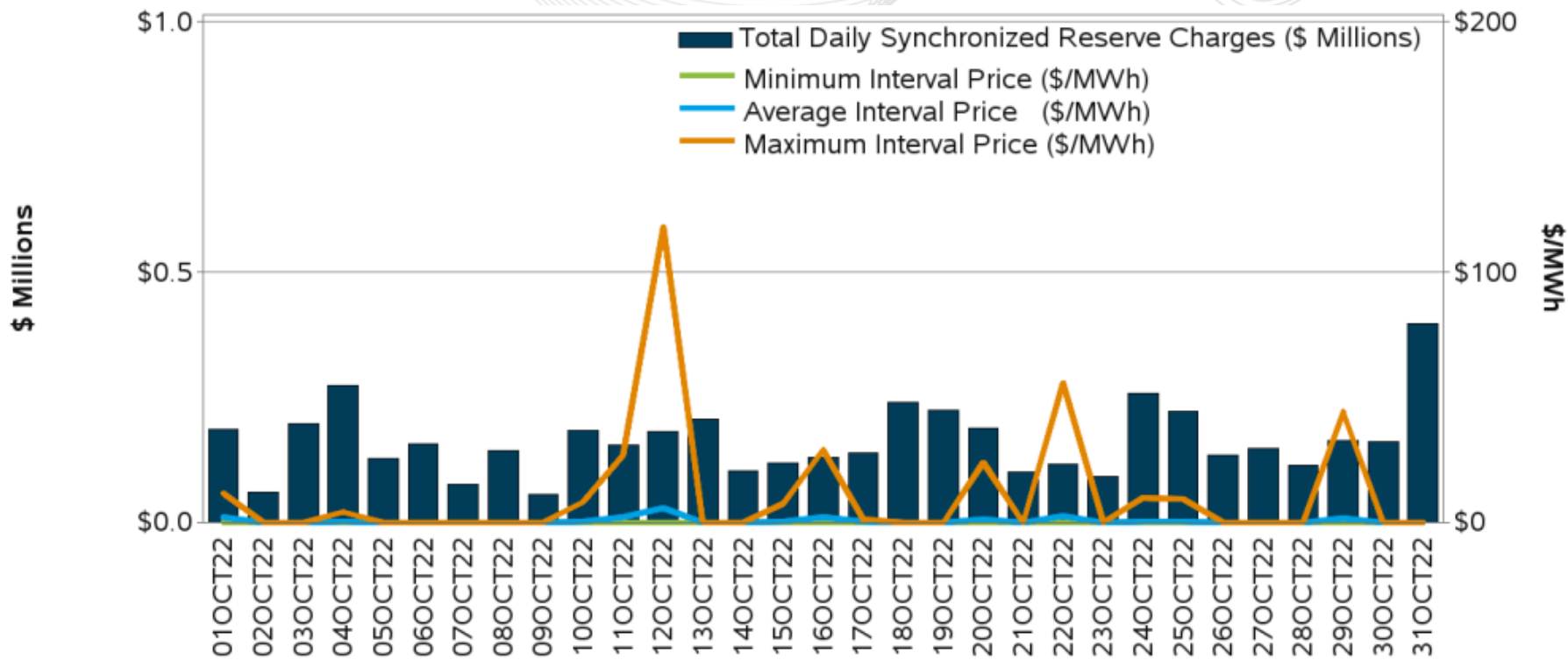
DR Participation in PJM Synchronized Reserve Markets



Regulation Market Daily Prices and Charges



Synchronized Reserve Market Daily Prices and Charges



Jennifer Warner-Freeman
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