



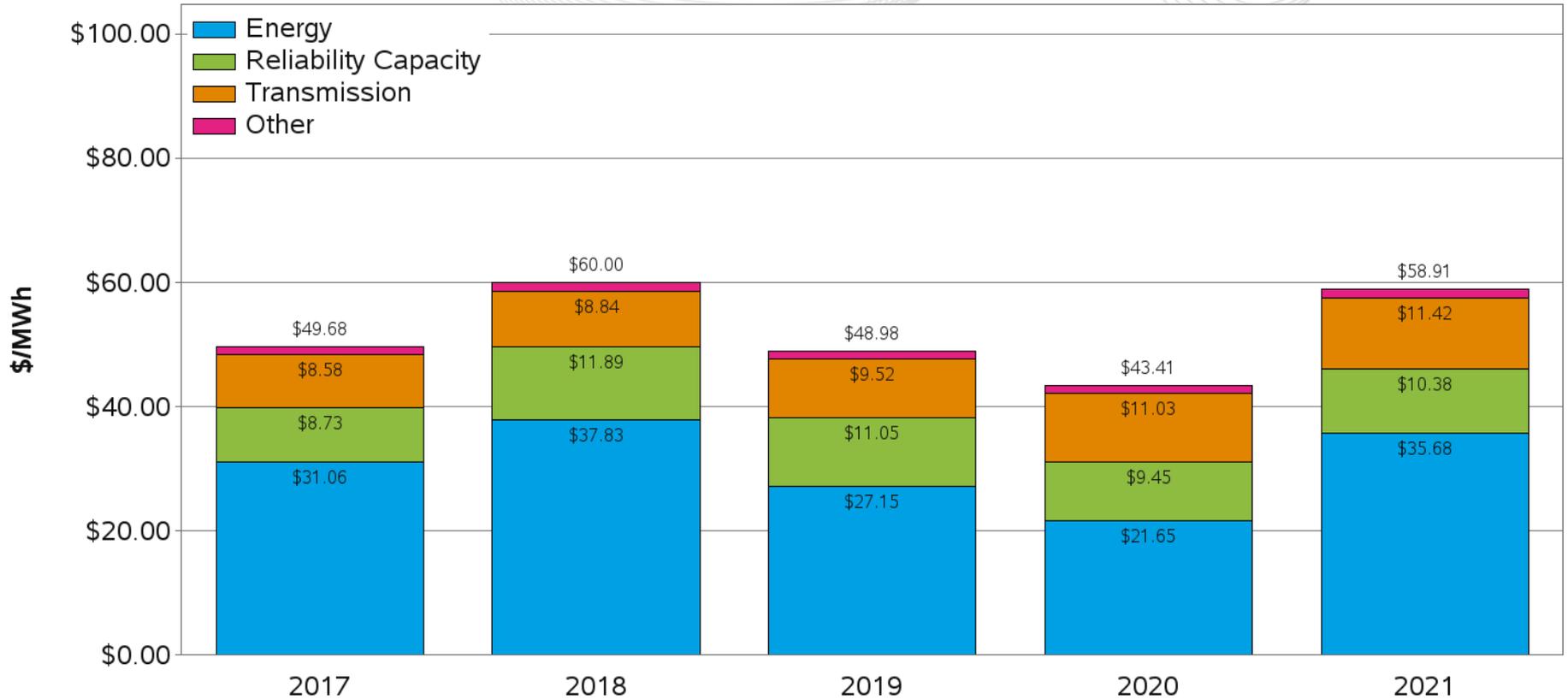
Markets Report

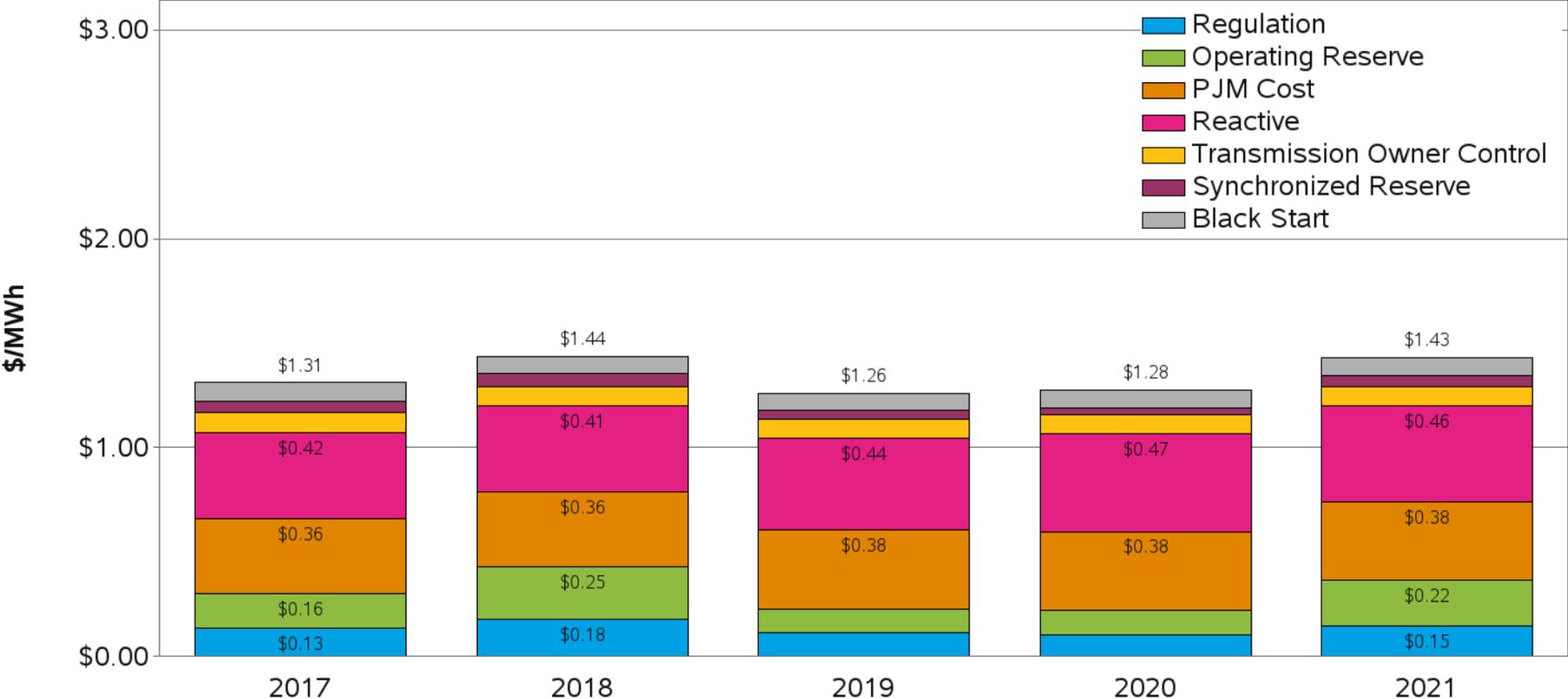
MC Webinar
September 27, 2021

- PJM Wholesale Cost for 2021 is \$58.91/MWh, up from full-year 2020 costs of \$43.41/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- 19)
- In September, temperatures were about average throughout the month. Thus, Cooling Degree Days were very close to their historic average. (Slides 8-10)
- Energy use was also about equal to its historic average for September. (Slides 8-10)
- In September, uplift exceeded \$800,000 on one days.(Slides 24 & 25)

- Load-weighted average LMP for 2021 is \$35.68/MWh: (Slides 33 & 34)
 - September 2021 was \$49.60/MWh, which is higher than September 2020 (\$19.70/MWh) and also higher than September 2019 (\$29.40/MWh).
- There were two 5-minute intervals that experienced shortage pricing in September. (Slides 31 & 32)
- FTR revenue adequacy for the month of September is 83% and the 2021-2022 Planning Year is currently funded at 96%. (Slides 49-52)
- Congestion values have been trending upwards with September's level being similar to that seen in August, which was the highest level in the last several years. (Slide 50)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 65-67)

Markets Report

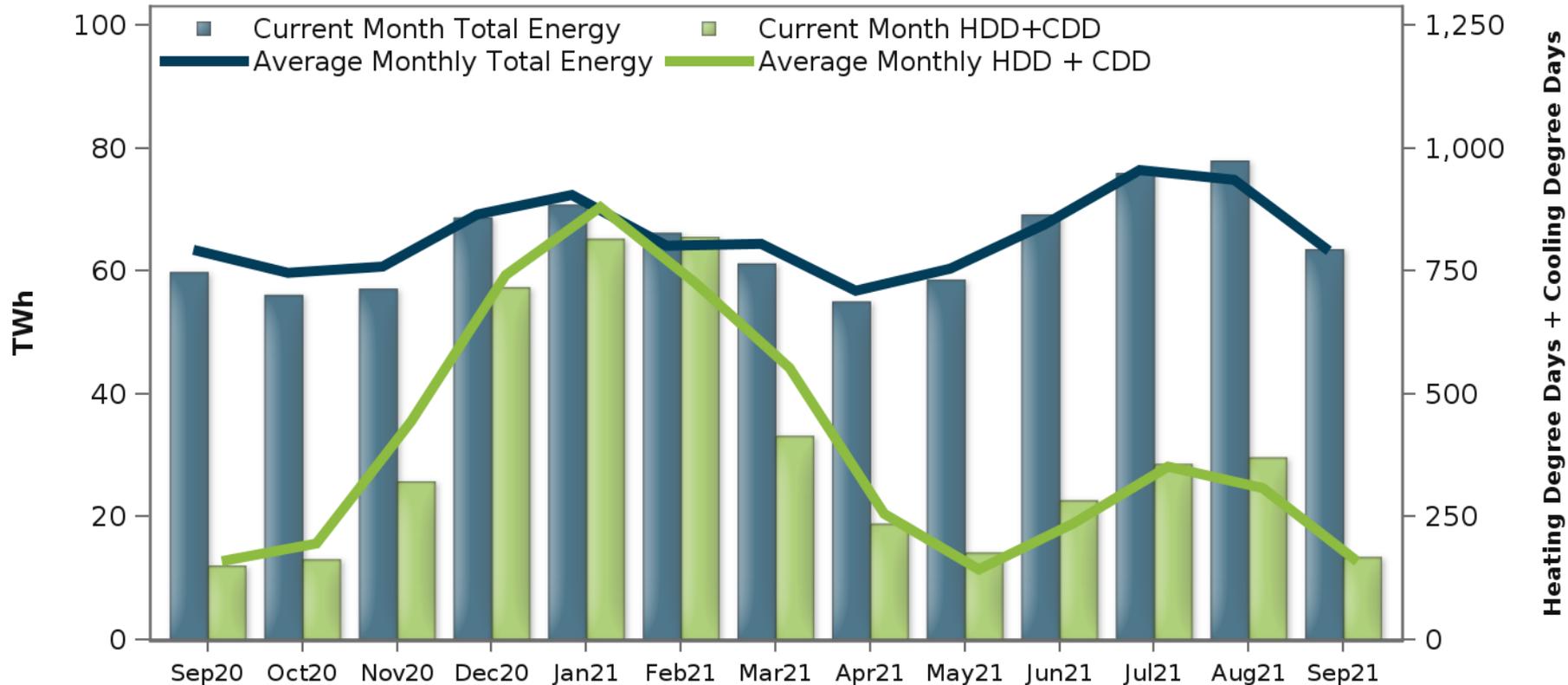




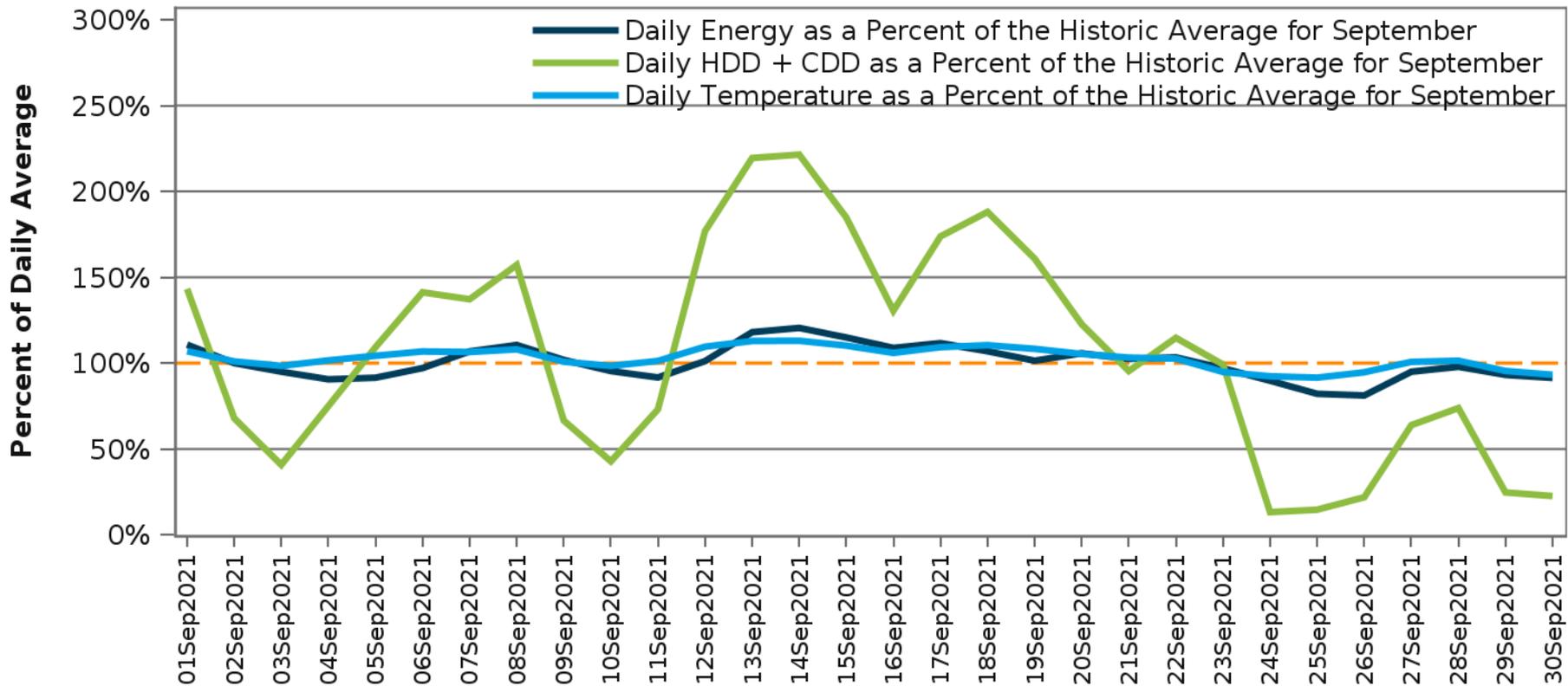
Market Conditions

- 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, 2020. Averages include load data for all of TO zones in the current RTO footprint.

Historic Average Weather and Energy versus Current Month

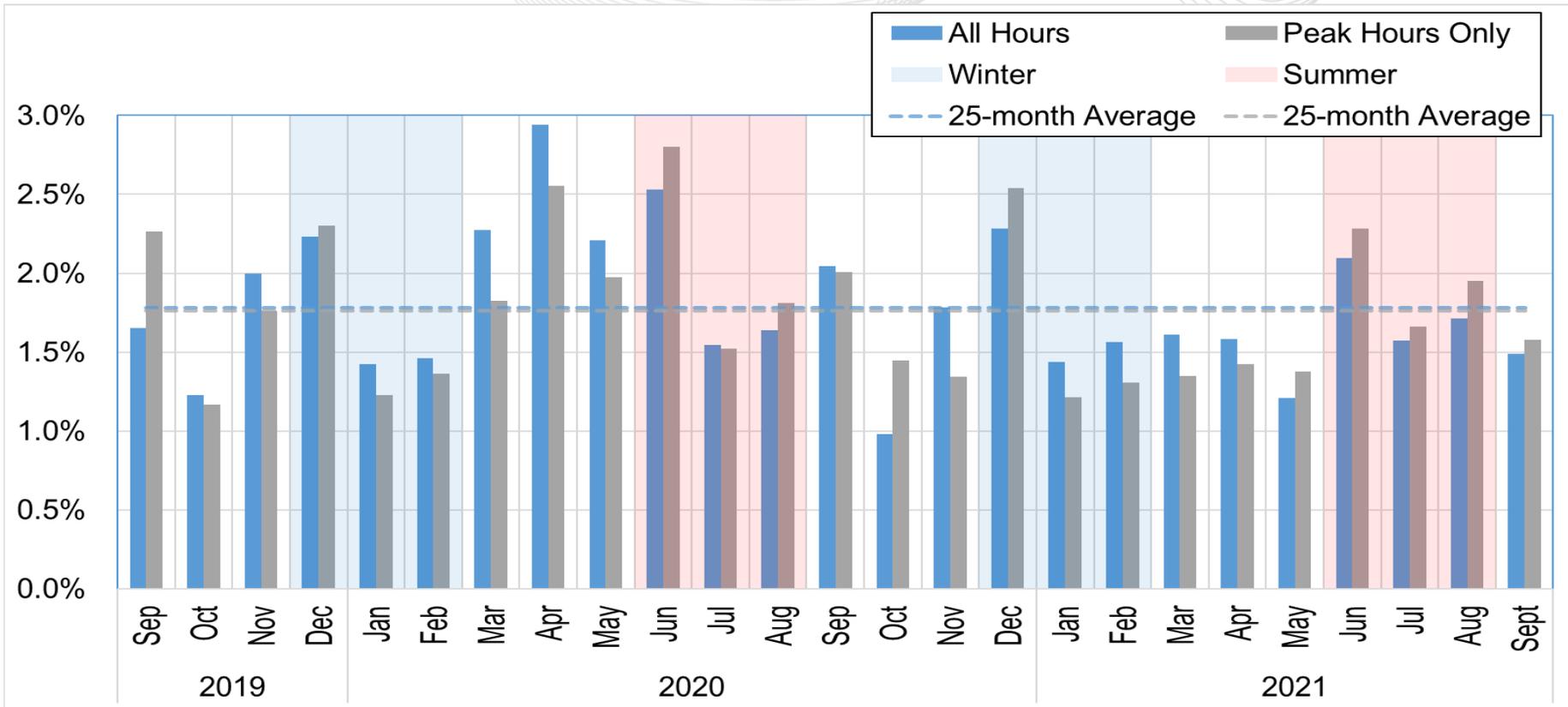


Historic Average Weather and Energy versus Current Month - Daily

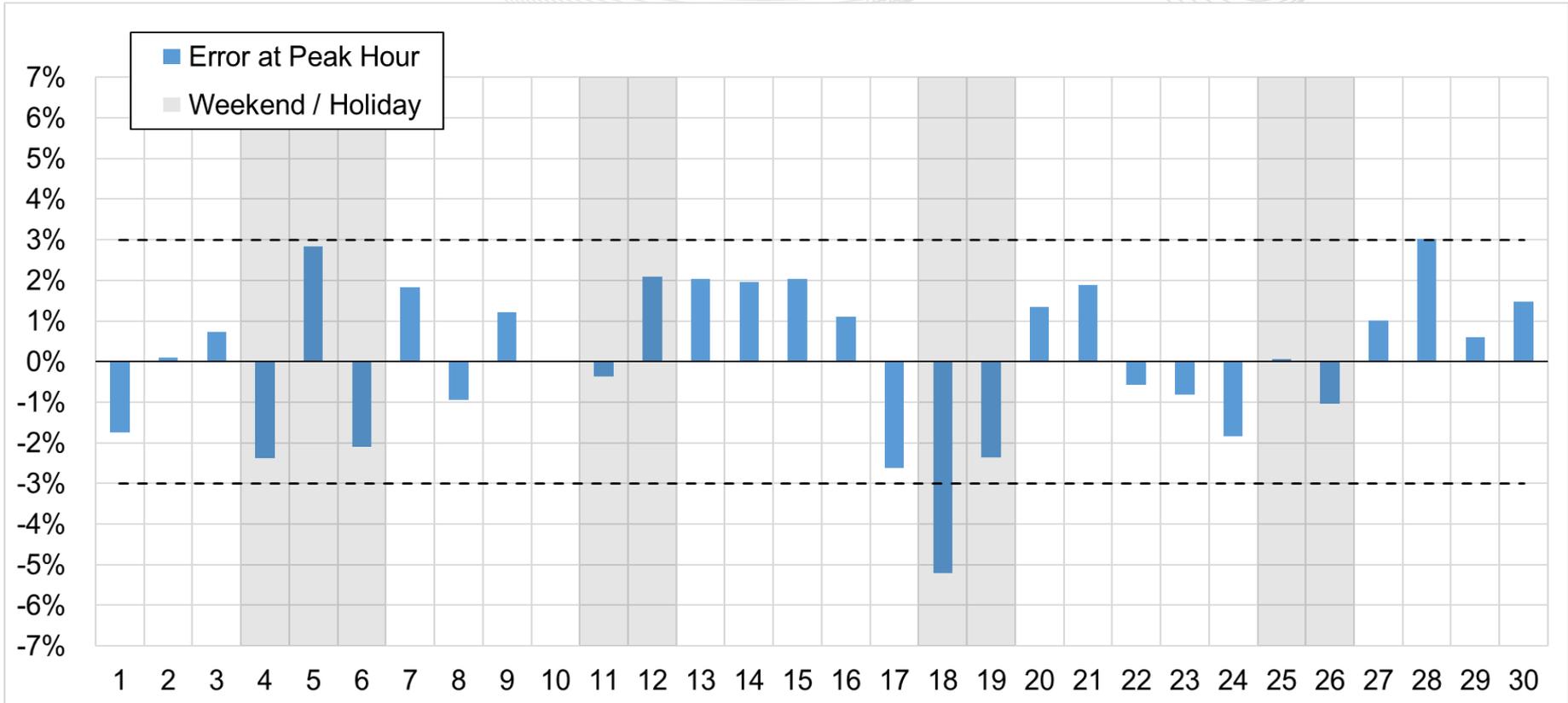




Load Forecast Error – Monthly Absolute Error, 10:00 Forecast



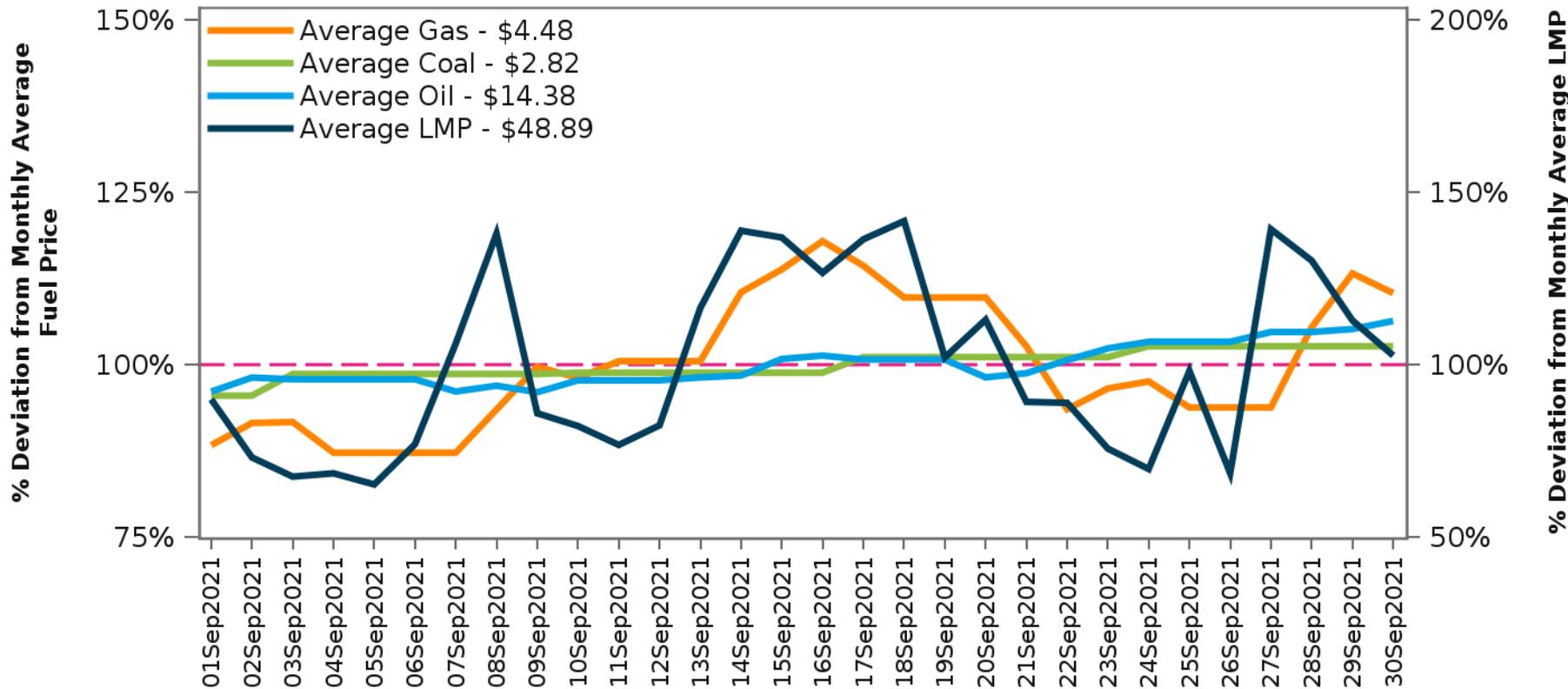
pjm® Load Forecast Error – September Daily Peaks, 10:00 Forecast



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.

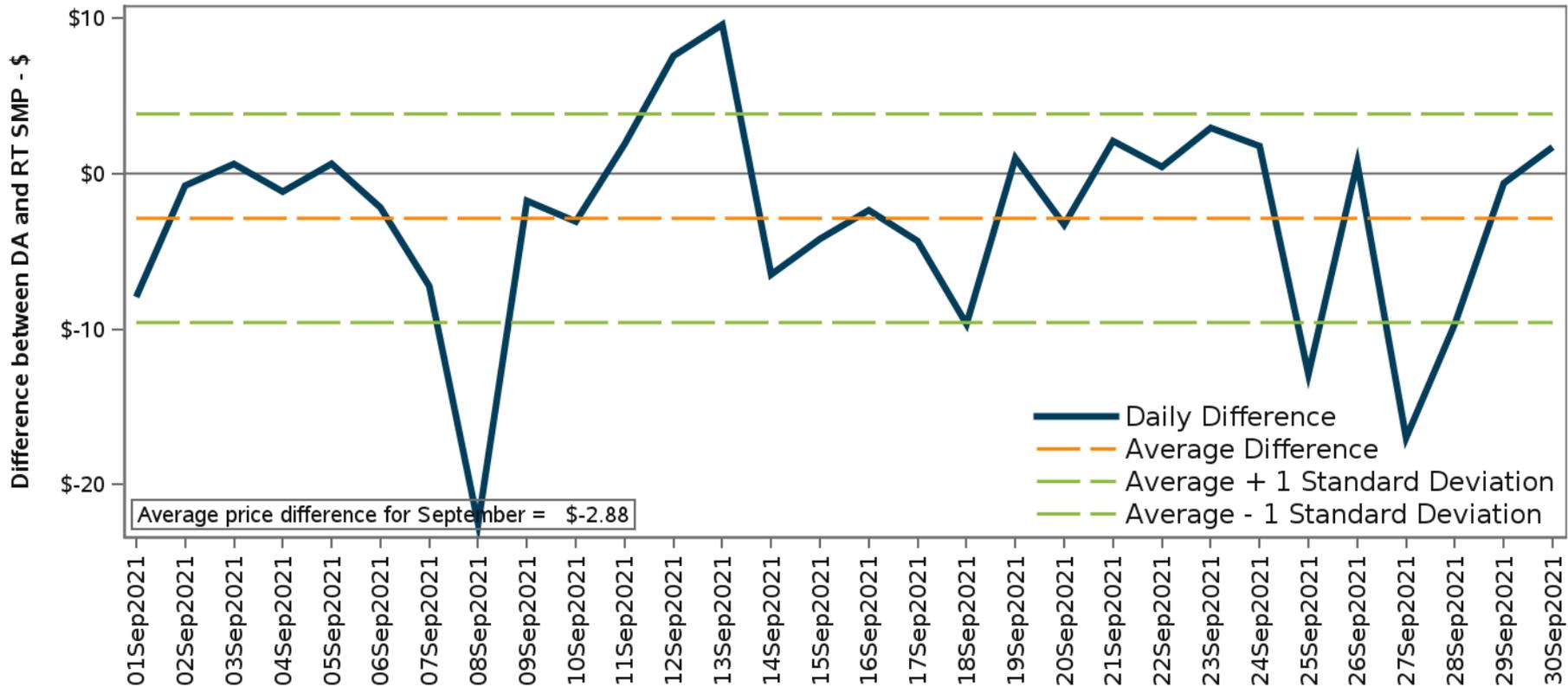
- While overall load forecast performance was good in September, we saw a few intervals plagued by the challenges that come with the transitional weather of the shoulder months. Hot days adjacent to cool days, and the rain that often accompanies those transitions, can impact model performance and forecaster intuition. The afternoon of Sept 18 was quite warm for that time in September. Both temperature and load forecast models were a bit low for that period. Later in the month, dropping temperatures and the rain associated with a cold front caused load to peak lower than expected on Sept 28.



Fuel Price Source: S&P Global Platts

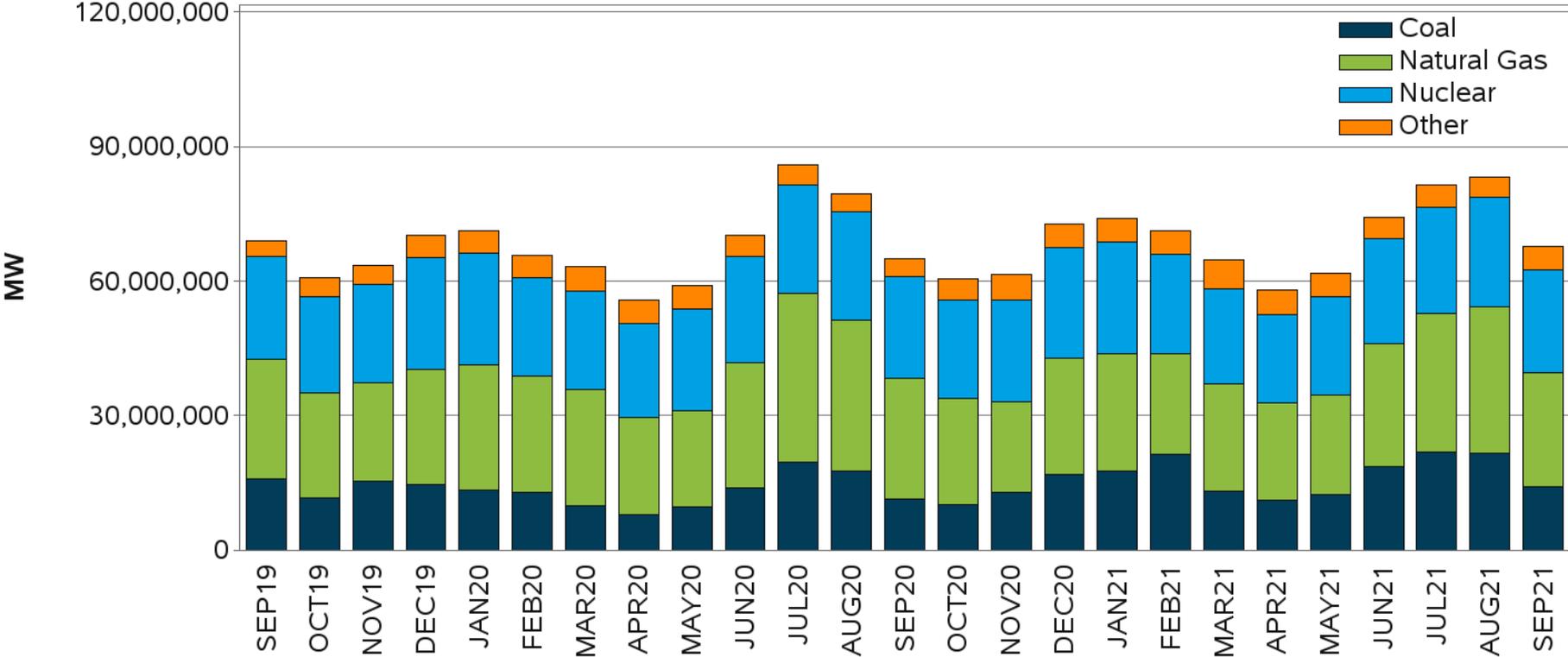


Daily Difference Between Day-Ahead and Real-Time System Marginal Prices

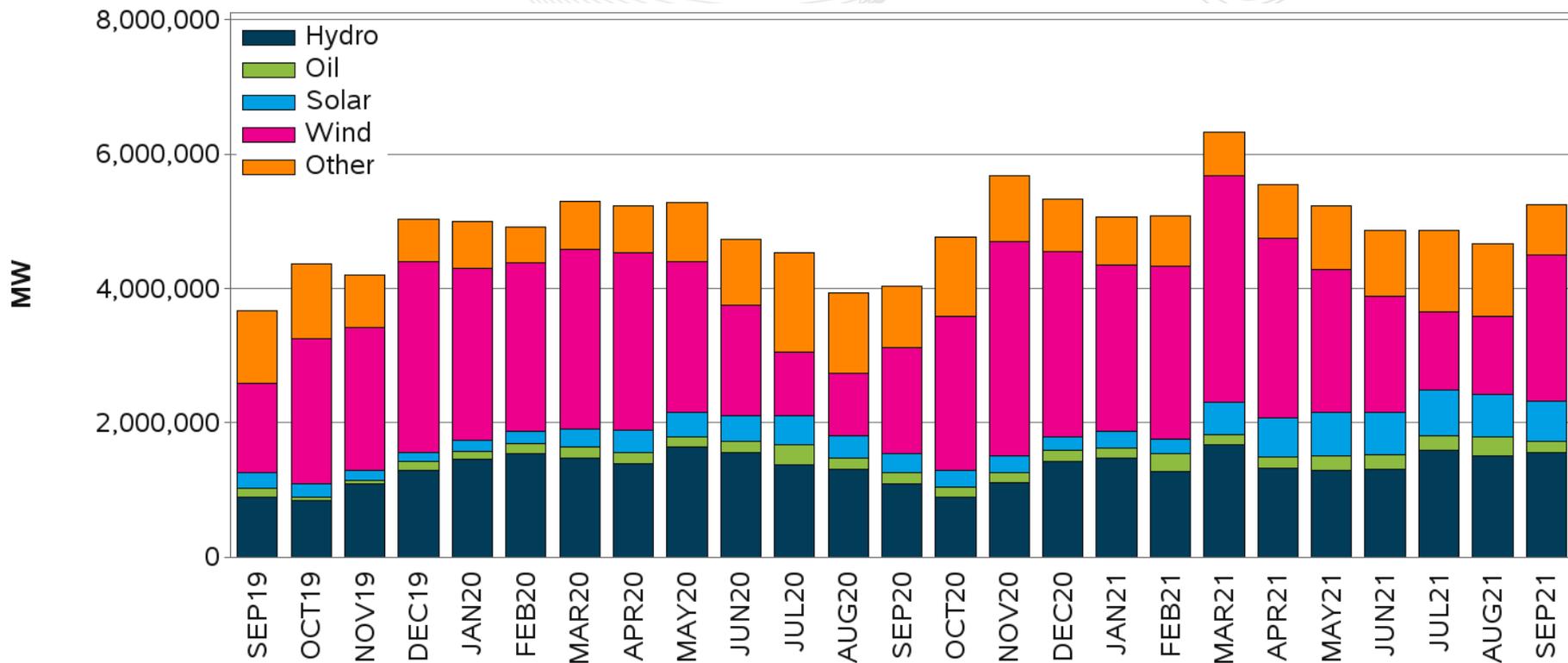


Average price difference for September = \$-2.88

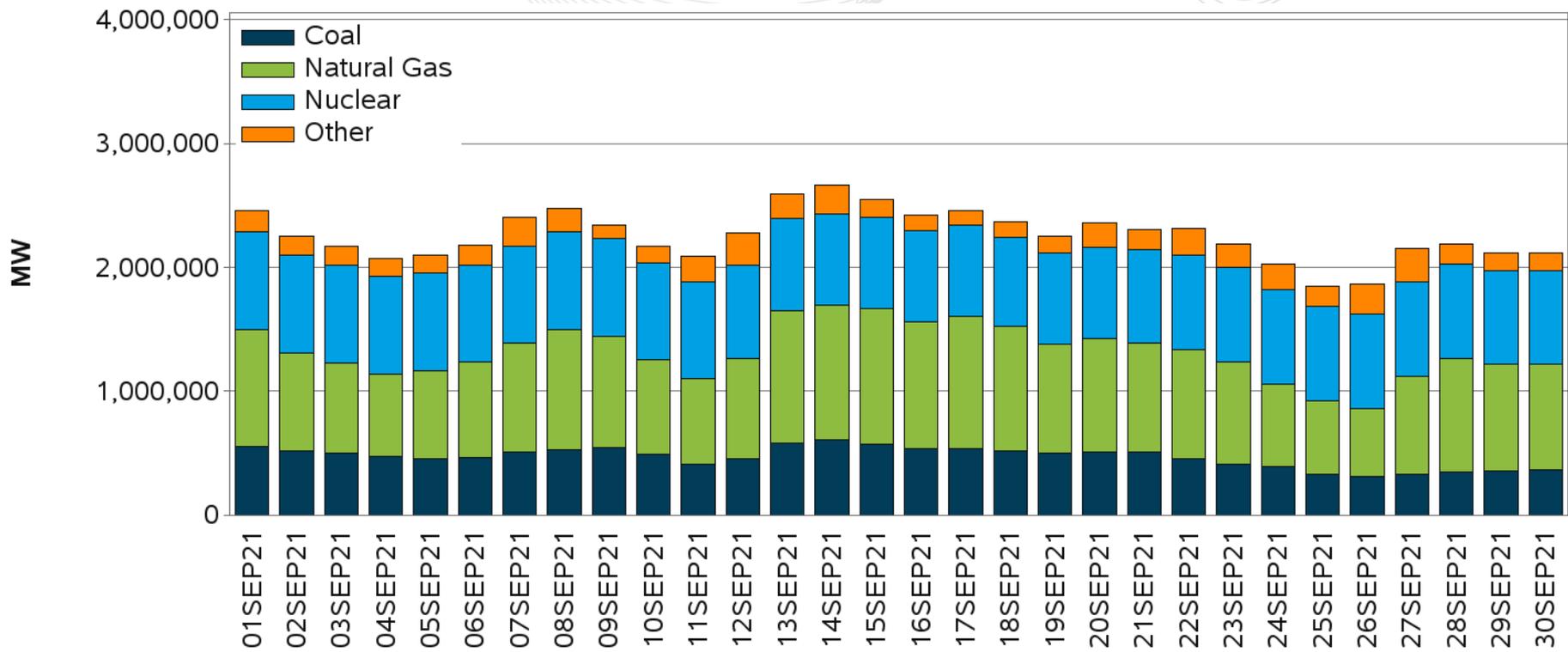
Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.



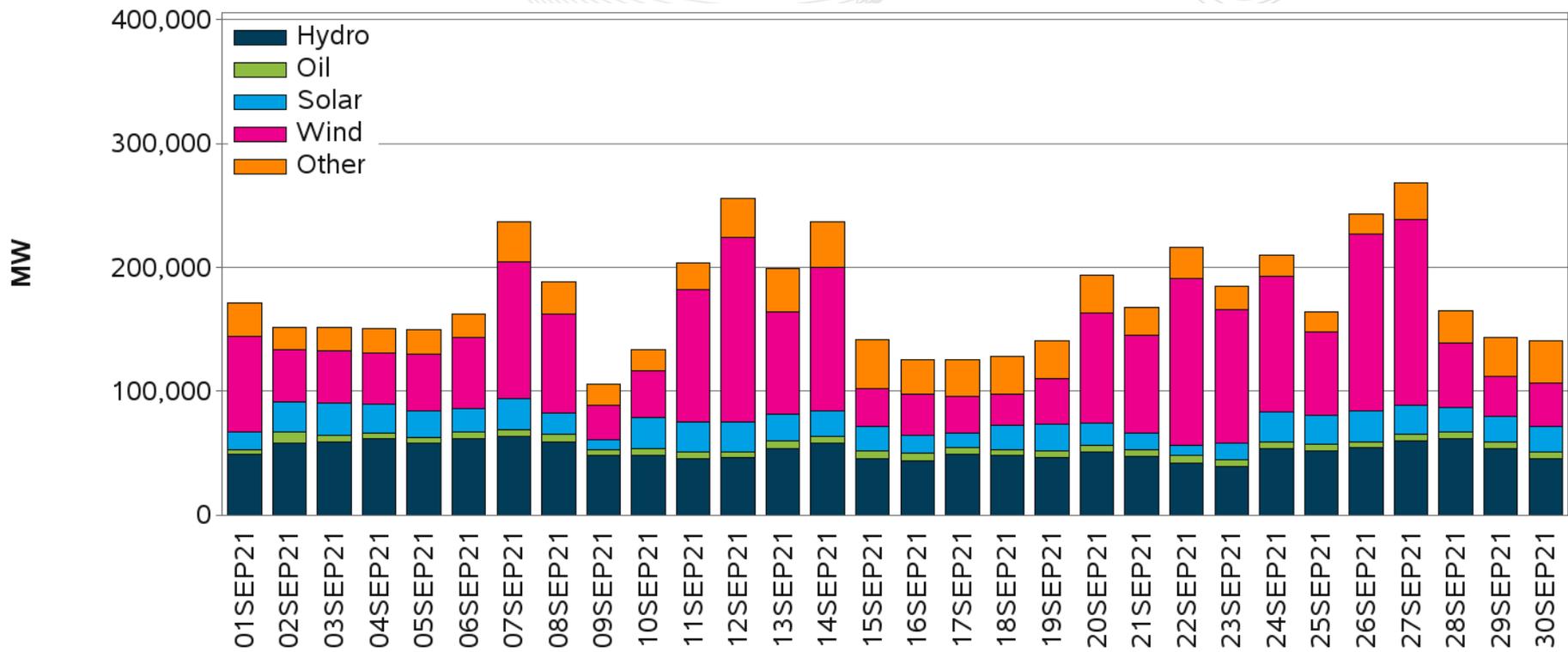
Other includes Hydro, Oil, Solar, Wind, and Other



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

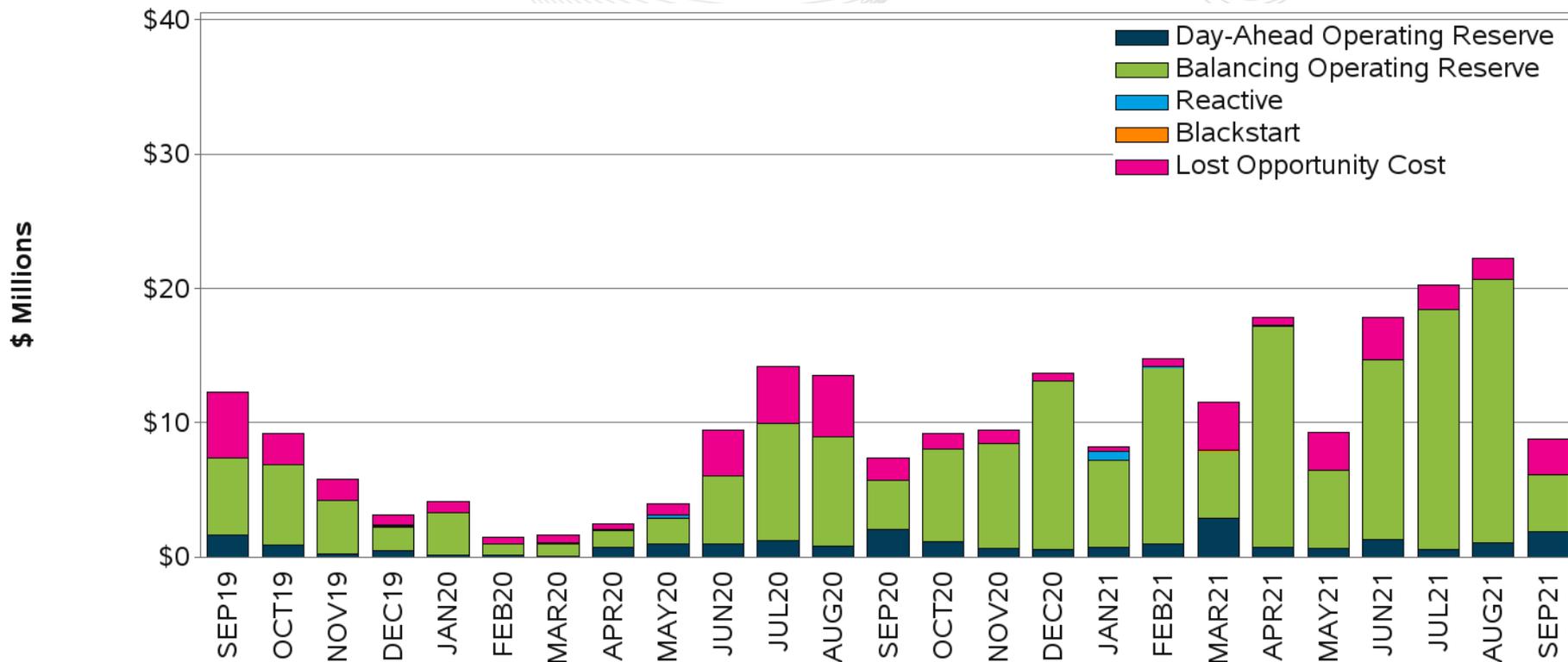


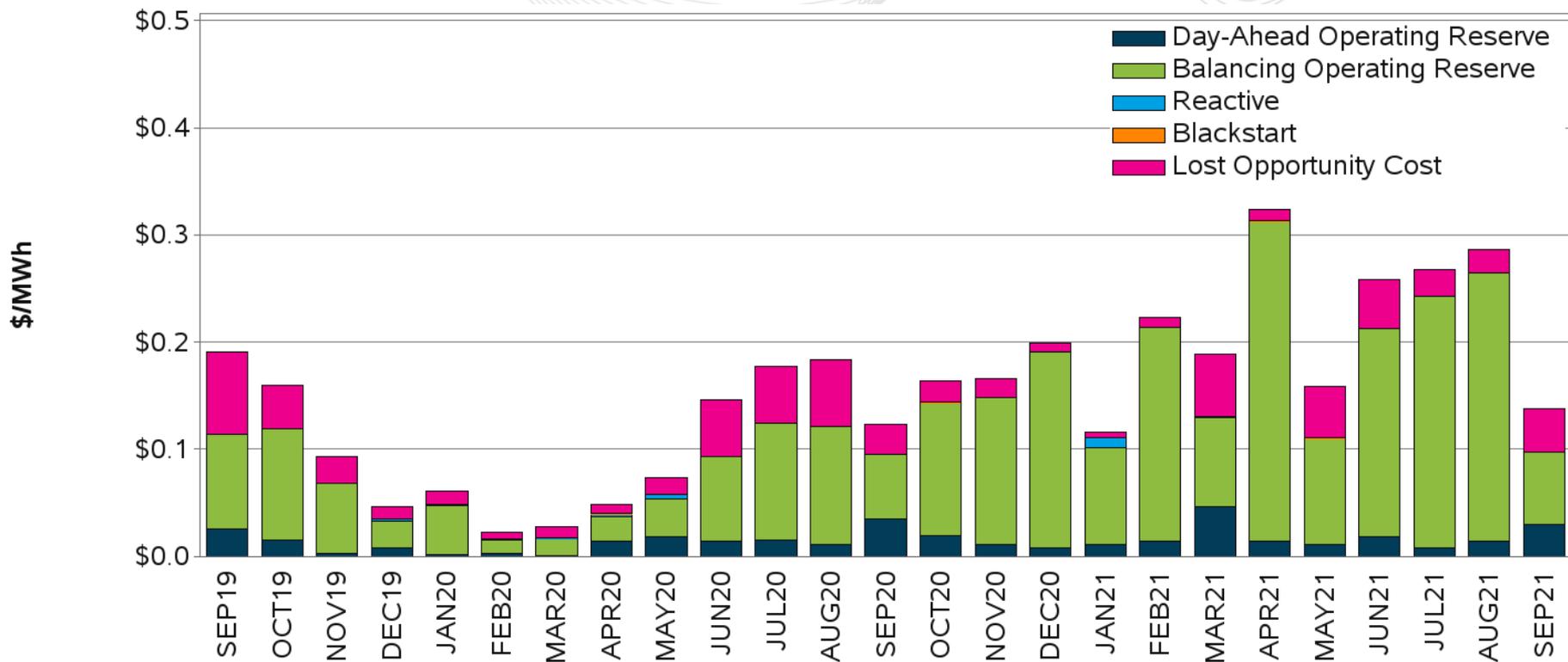
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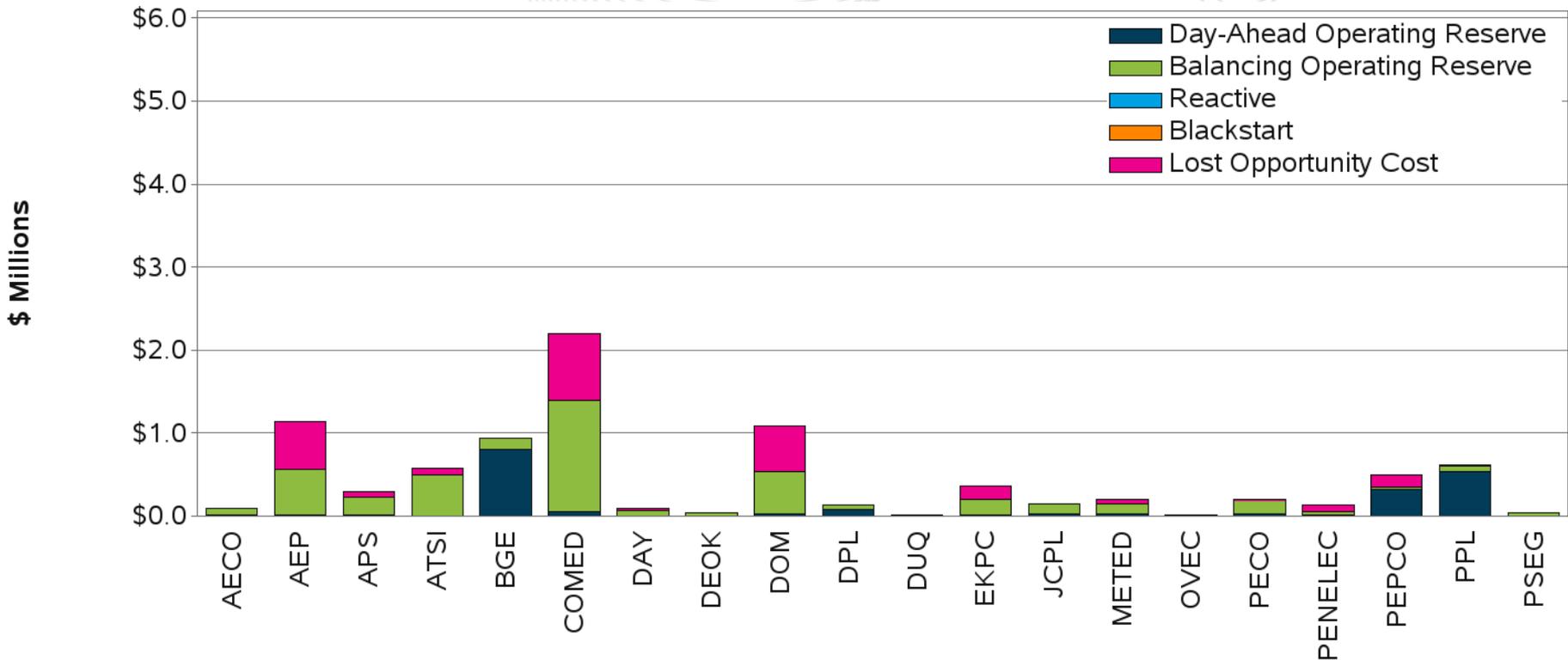


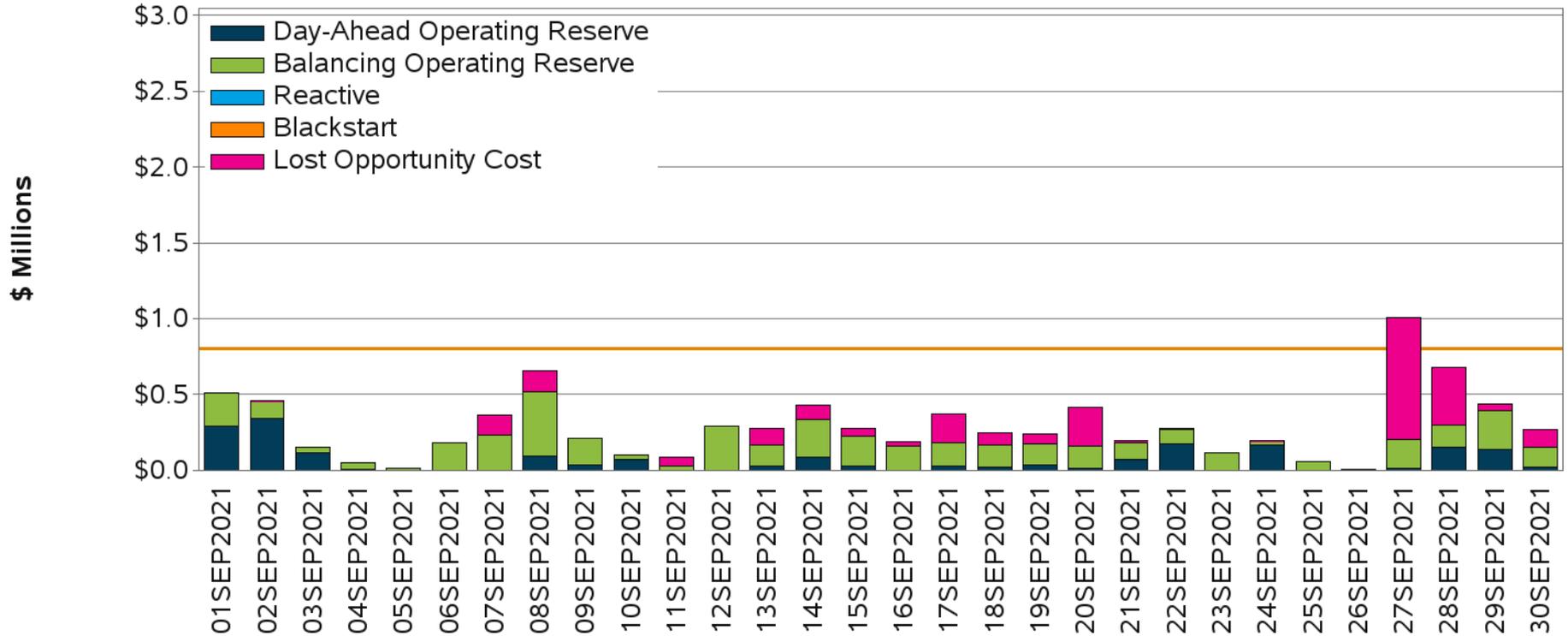
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Operating Reserve (Uplift)







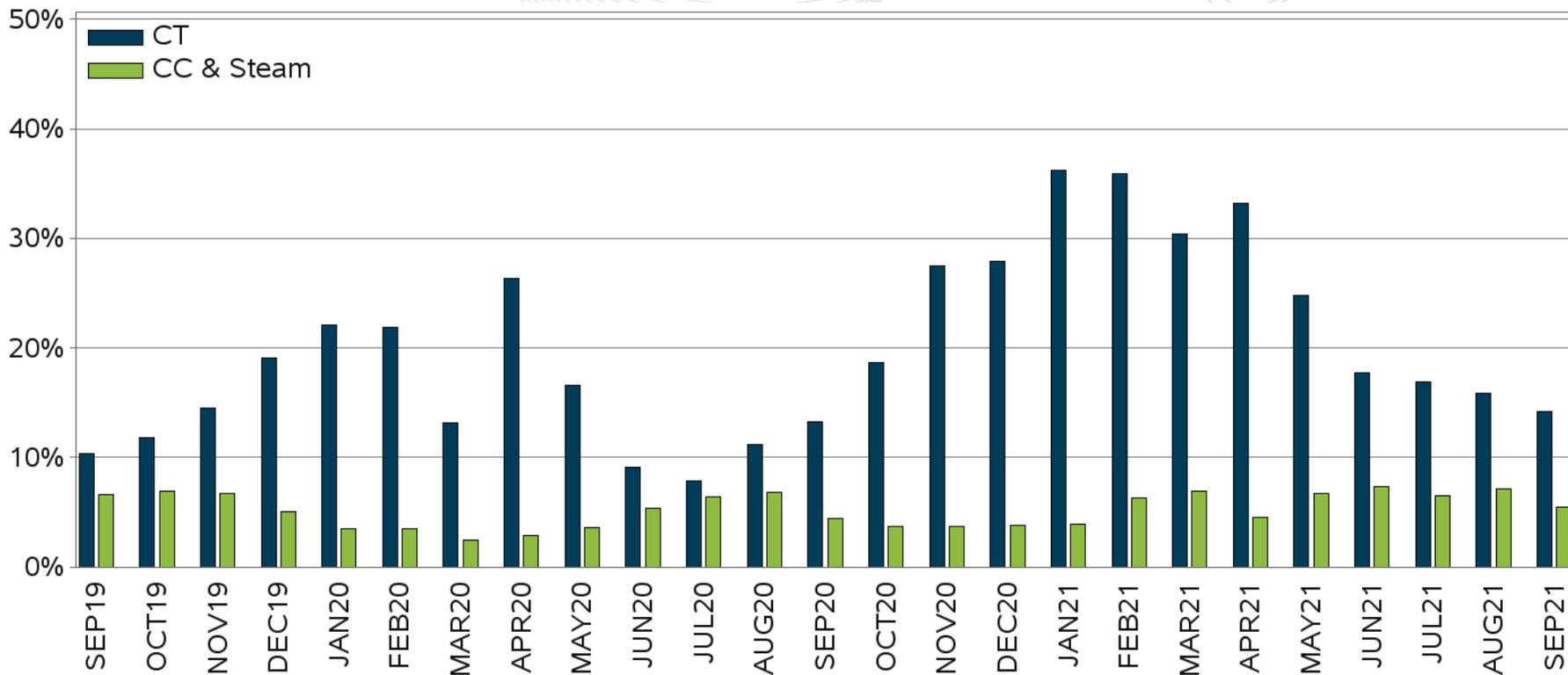


In September, uplift exceeded \$800,000 on one day – September 27th.
Contributing factors to uplift were:

- LOC accrual during shortage pricing intervals

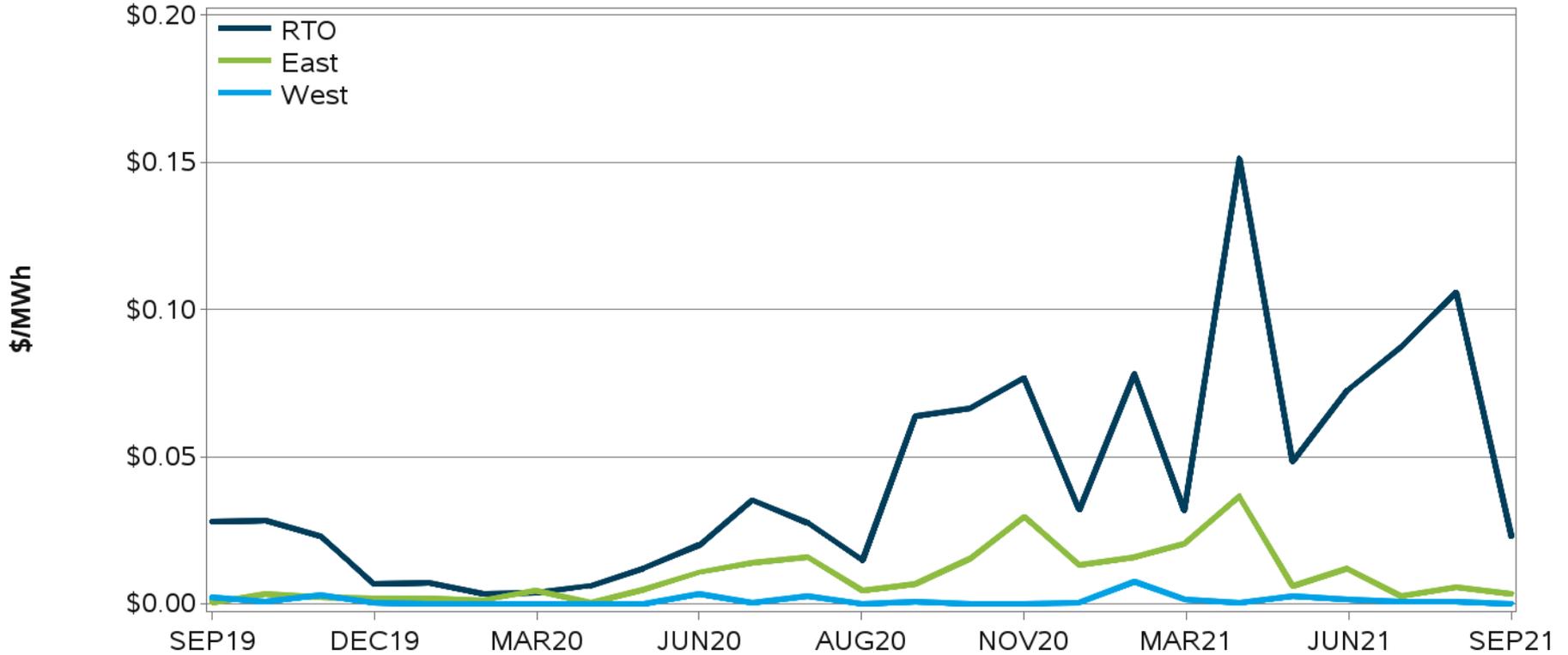
More information on Uplift can be found on PJM's
website at [Drivers of Uplift](#)

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

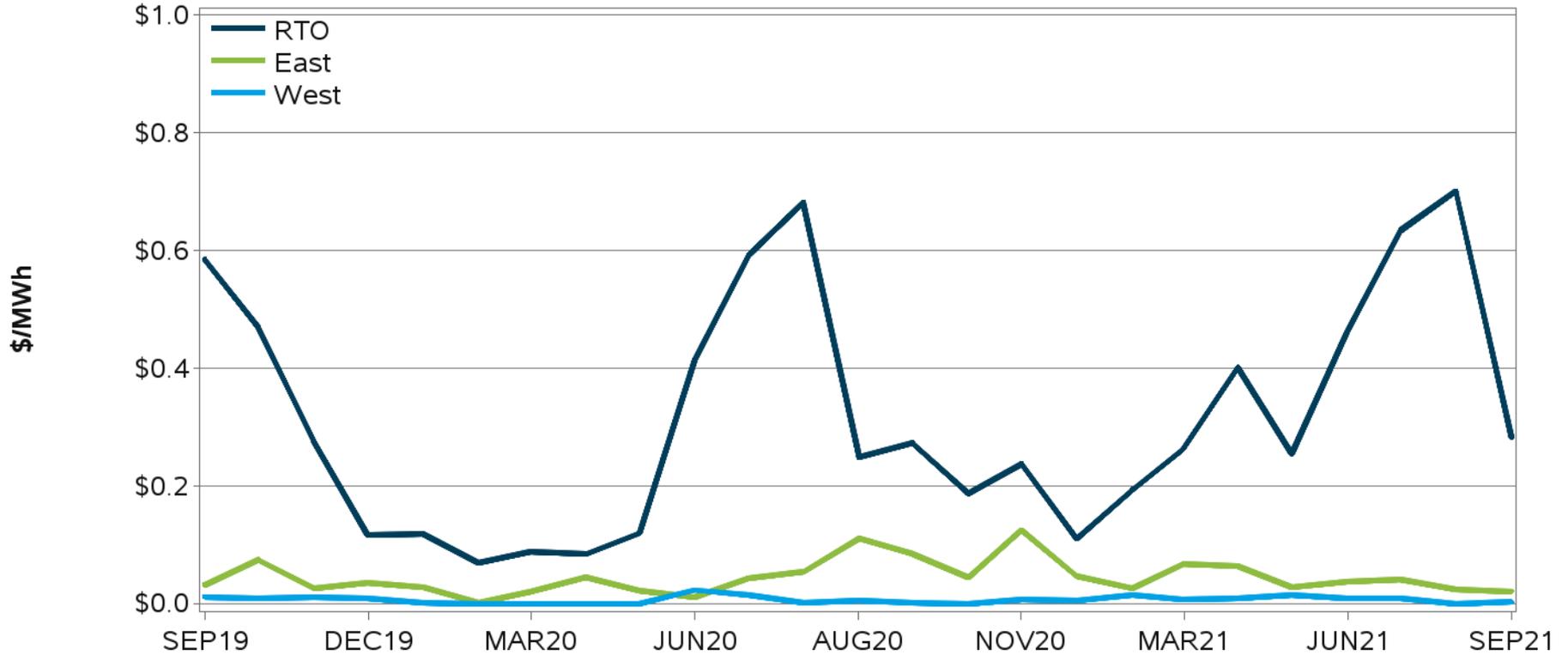


- Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.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

Reliability Balancing Operating Reserve Rates

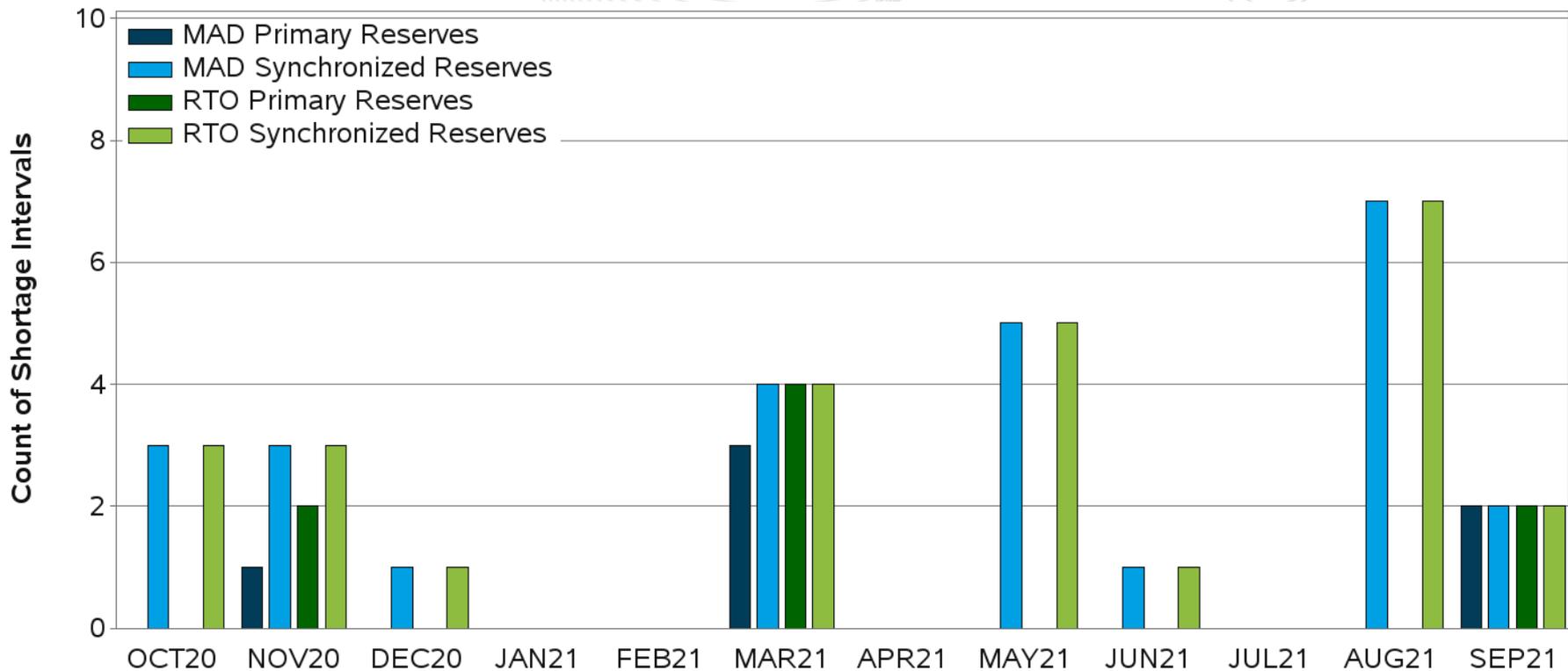


Deviations Balancing Operating Reserve Rates



Energy Market

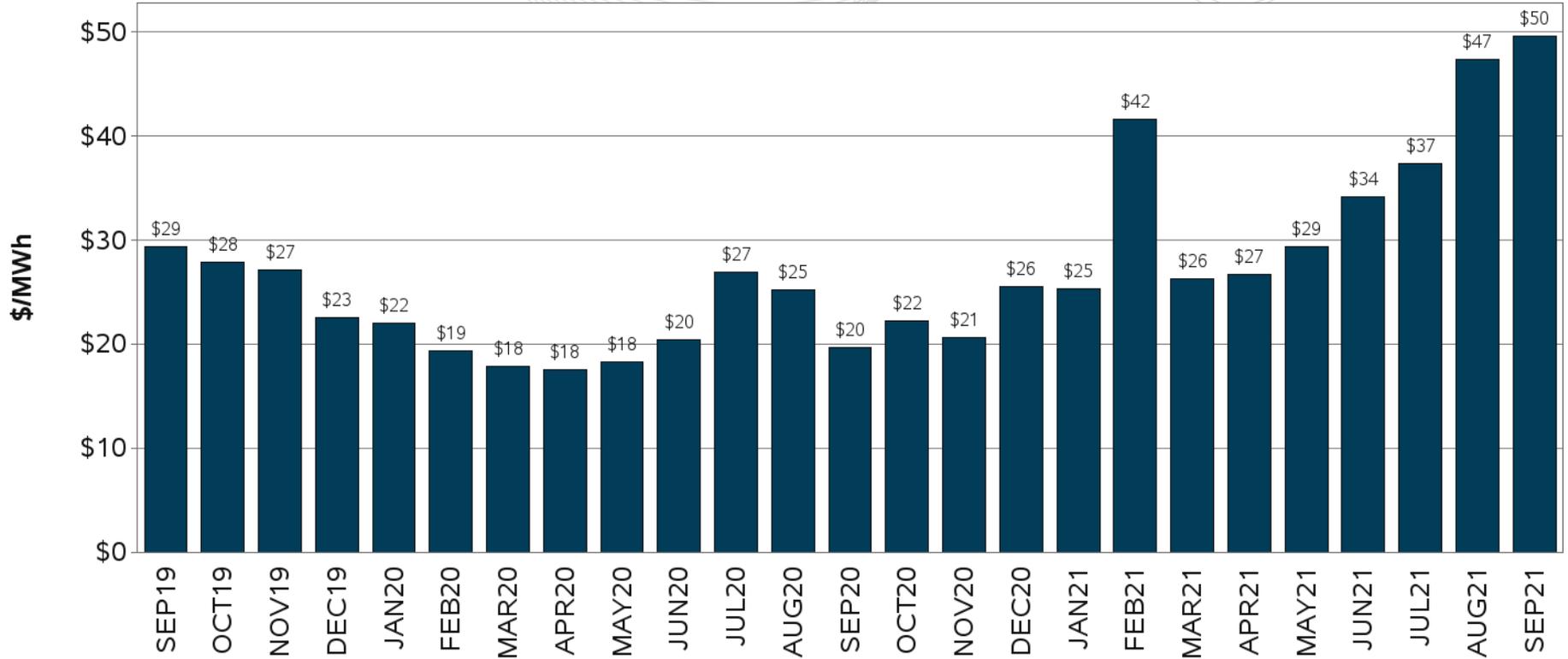
LMP Summary



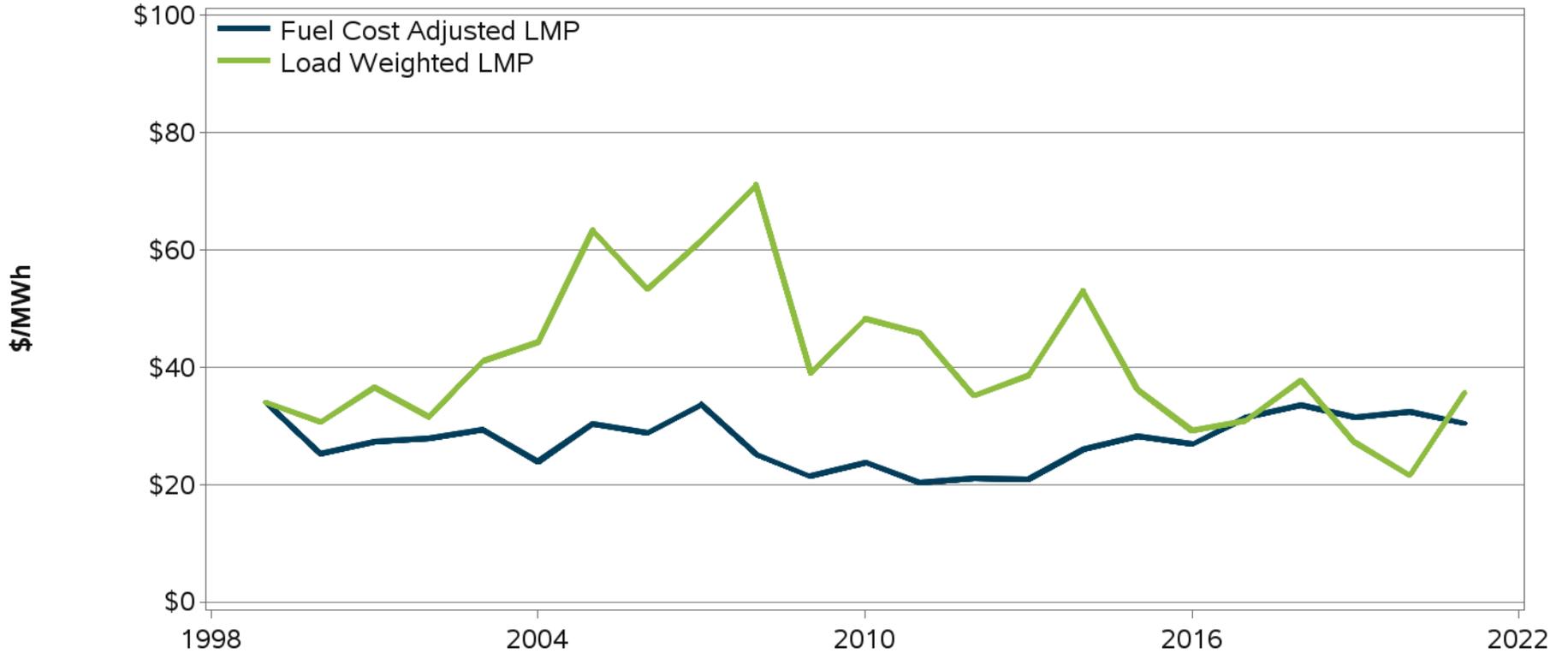
Date	5-minute Interval	Reserve Penalty Factors	5-minute Interval SMP	Hourly Integrated SMP
Monday, September 27, 2021	17:00 - 17:05	2nd step penalty for Primary and Synchronized Reserve deficiencies in RTO and MAD	\$2,153.64	\$450.70
Monday, September 27, 2021	17:05 - 17:10	2nd step penalty for Primary and Synchronized Reserve deficiencies in RTO and MAD	\$2,153.64	\$450.70

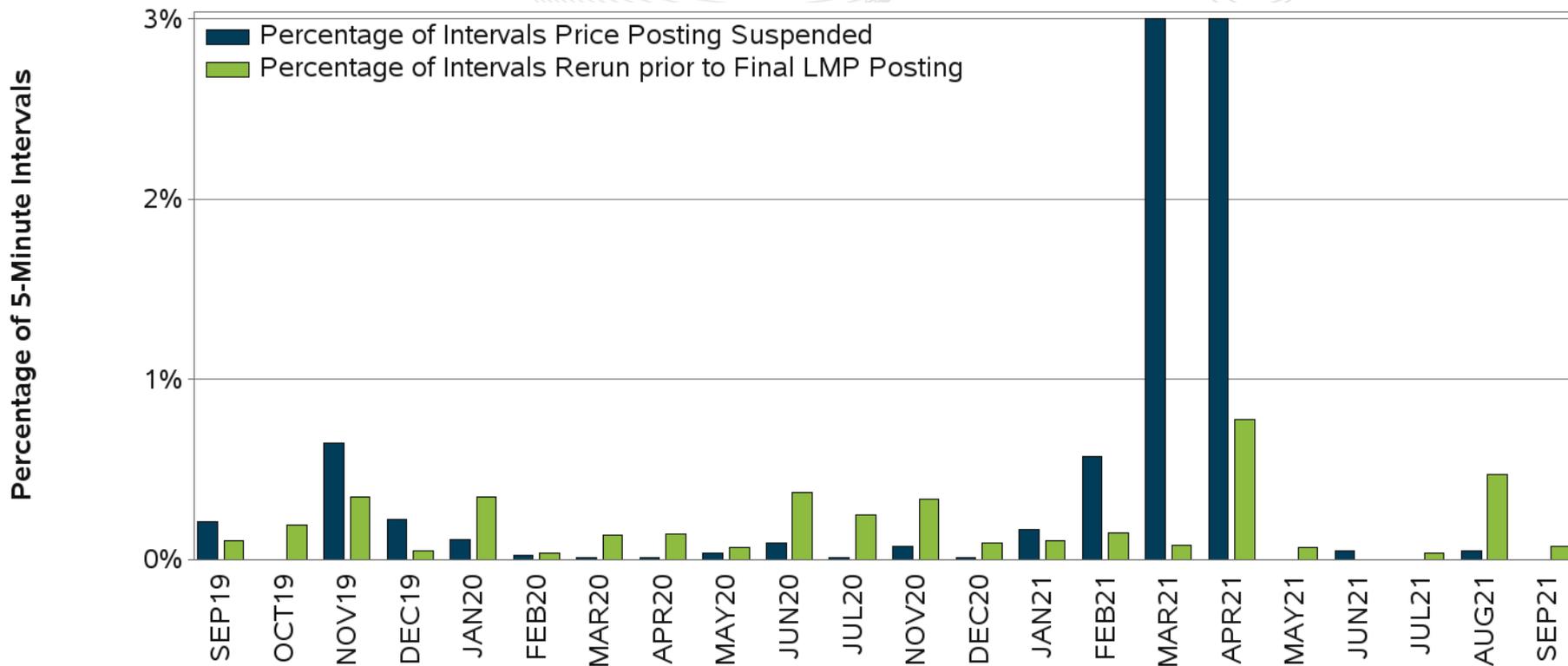
Information on constraints and shadow prices can be found here:

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



Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)

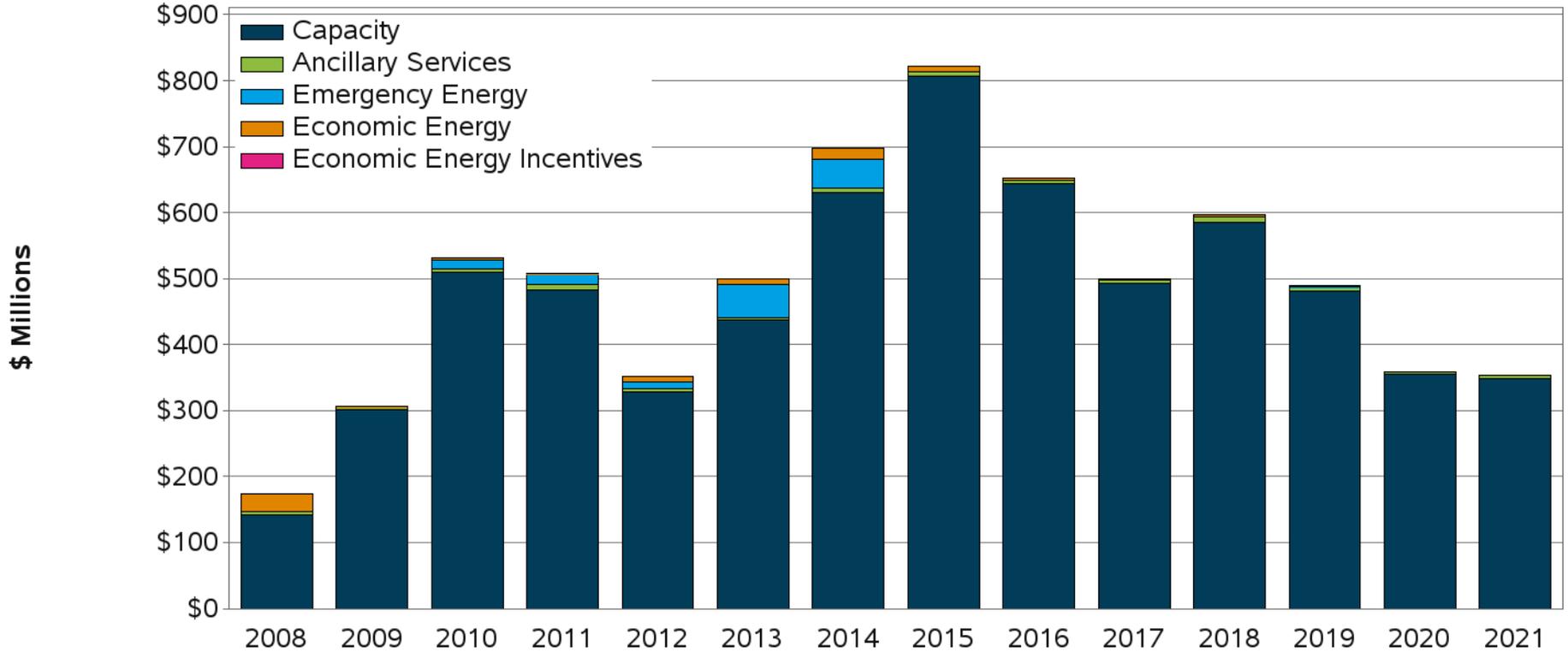


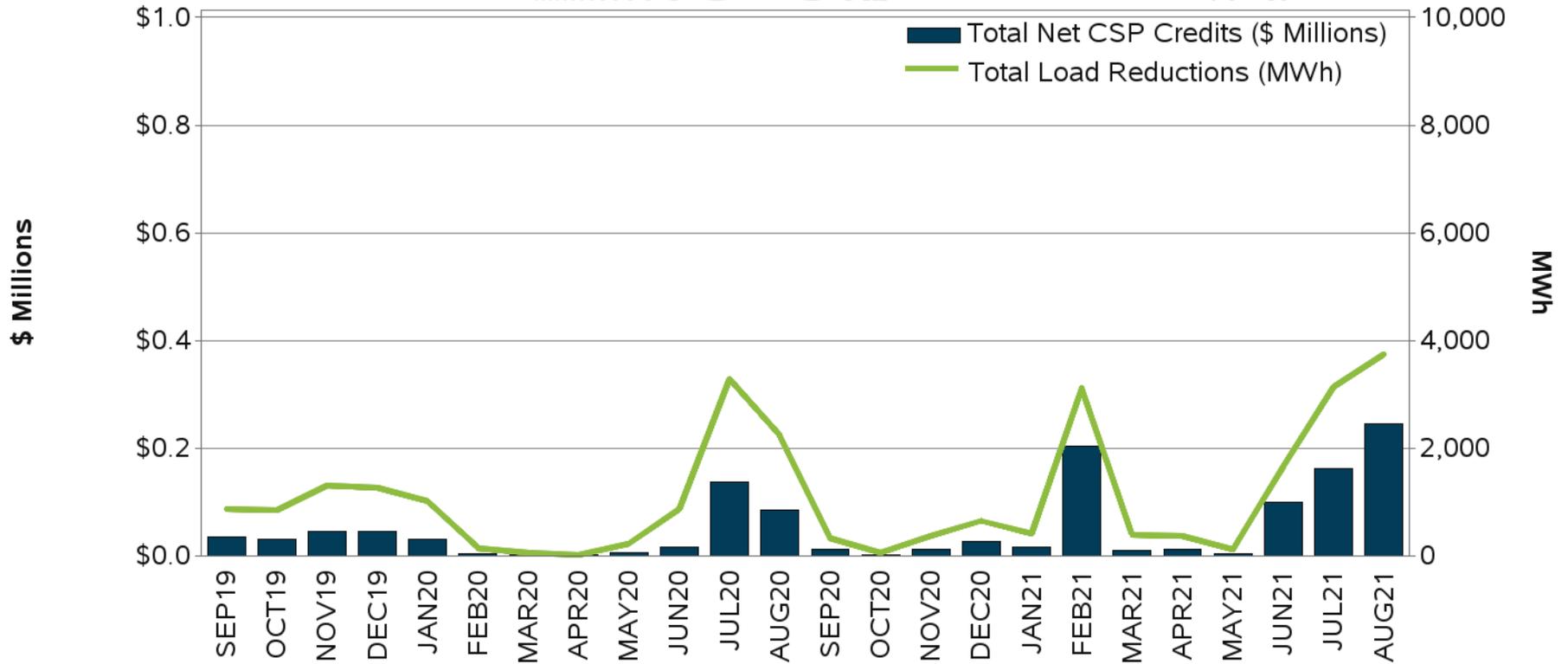


Spikes seen in March and April 2021 are incorrect and due to a software bug which has since been fixed.

Energy Market

Demand Response Summary

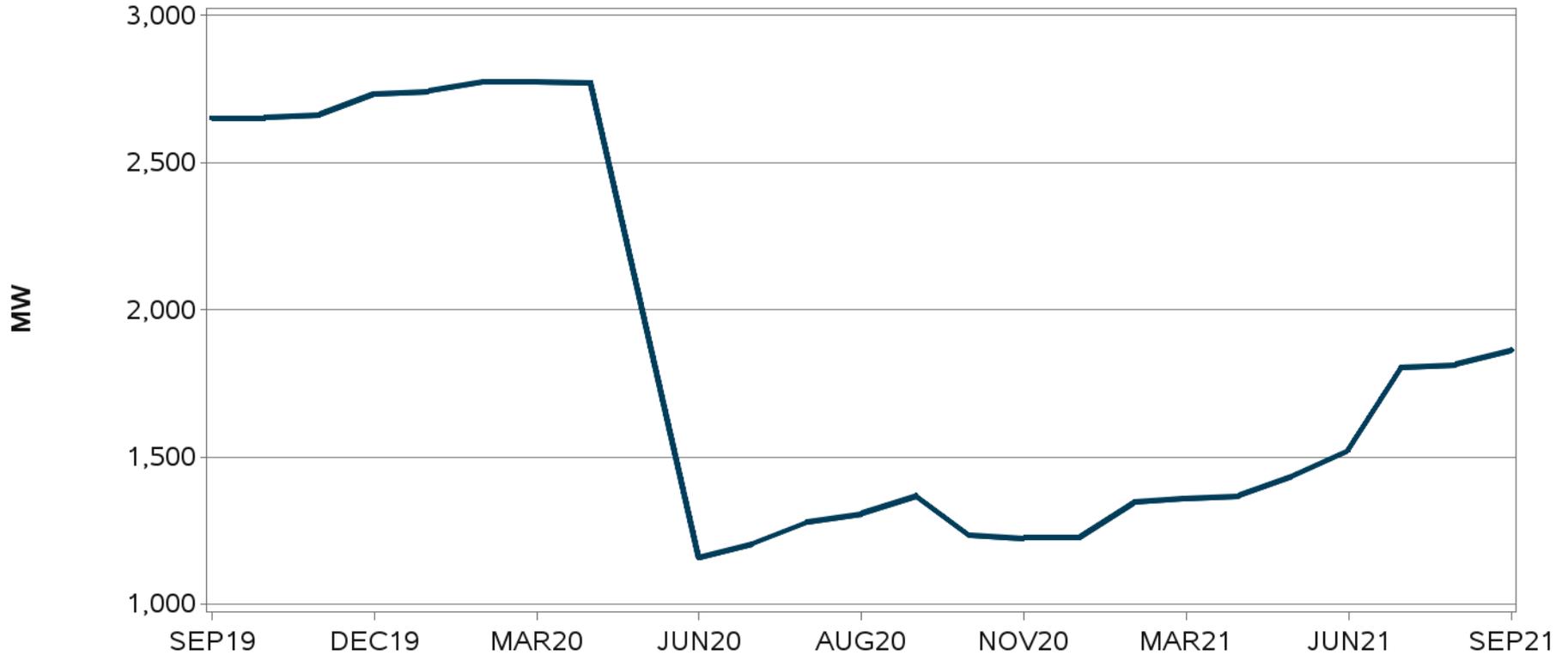




*Data for the last few months are subject to significant change due to the settlement window.



Total Registered MW in PJM's Economic Demand Response

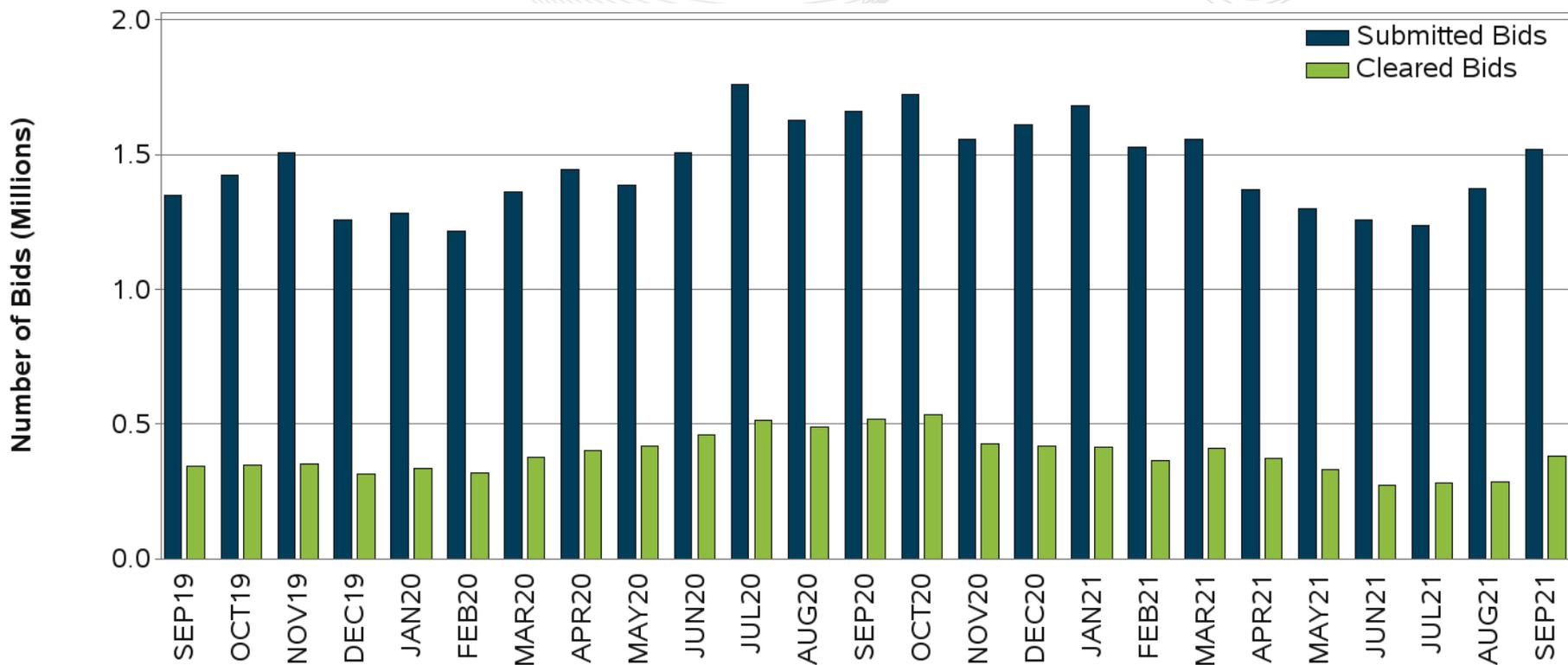


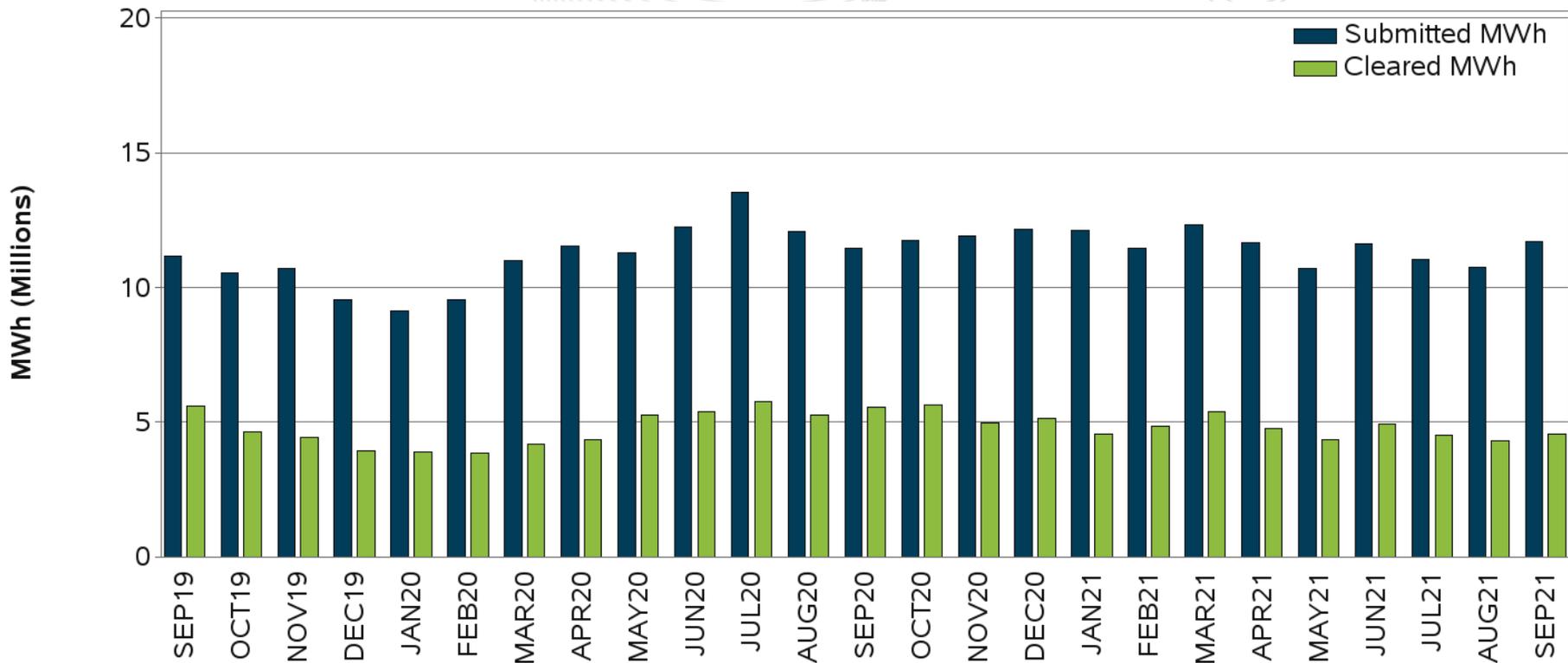
Energy Market

Virtual Activity Summary

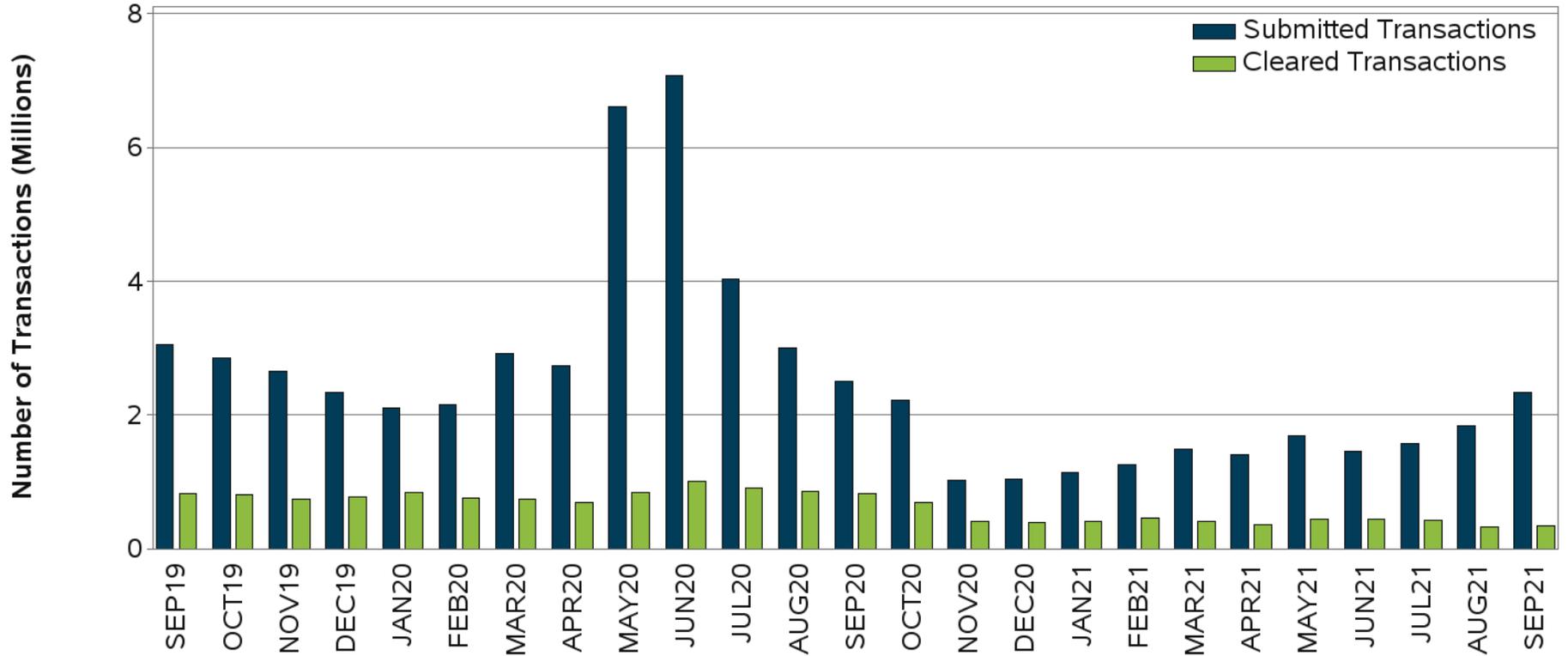
- The following six charts depict trends in submitted and cleared virtual and up-to-congestion transactions, in terms of number and volume, into the PJM Energy Market. The first two of these charts show the submitted and cleared increment and decrement bids (virtual transactions or virtuals) and they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

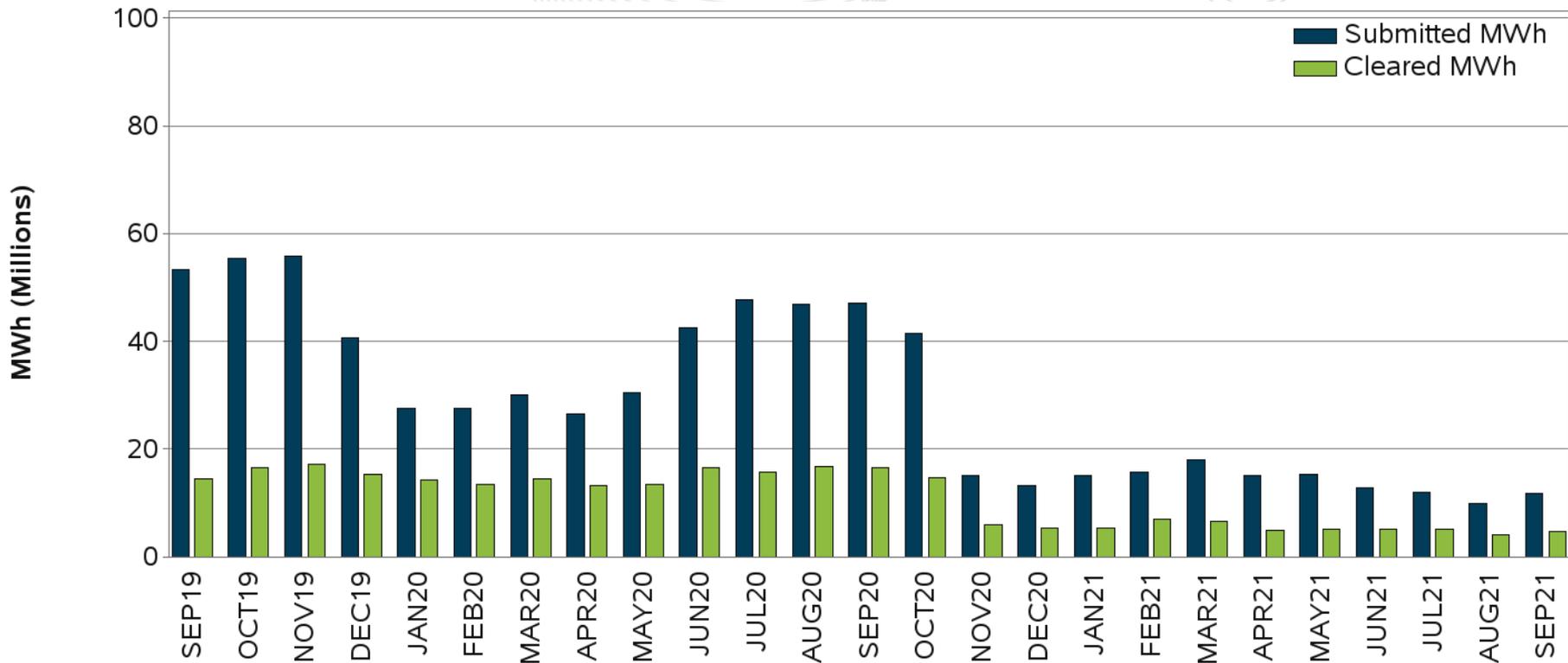




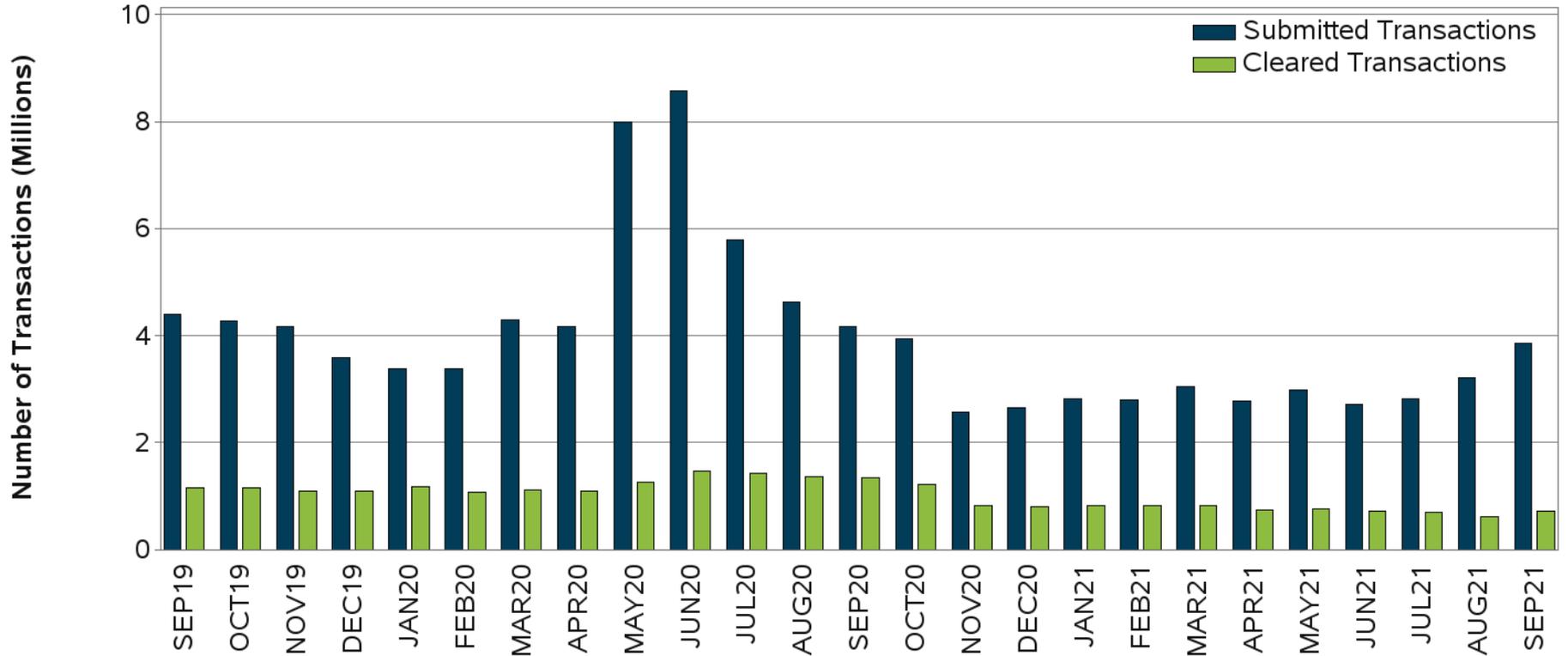
Up-To-Congestion Transactions - Total Number



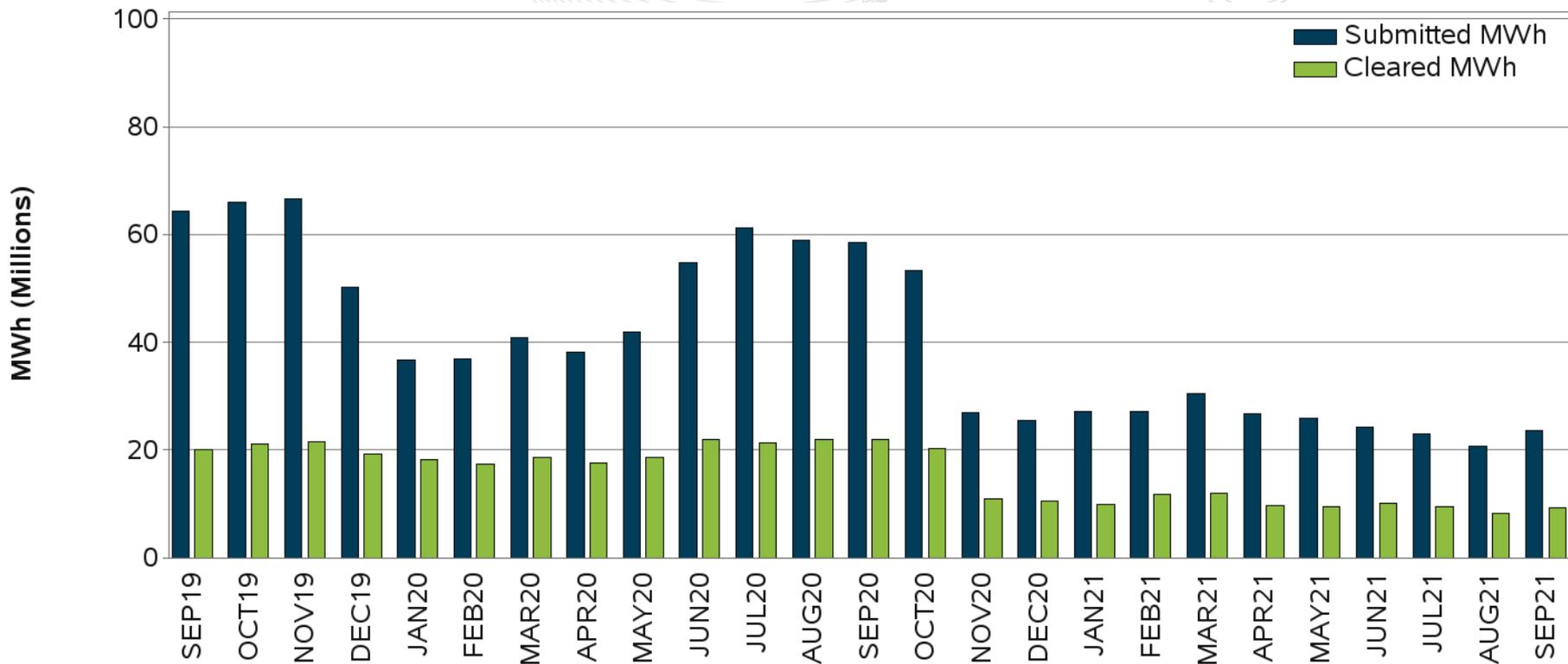
Up-To-Congestion Transactions - Total Volume



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



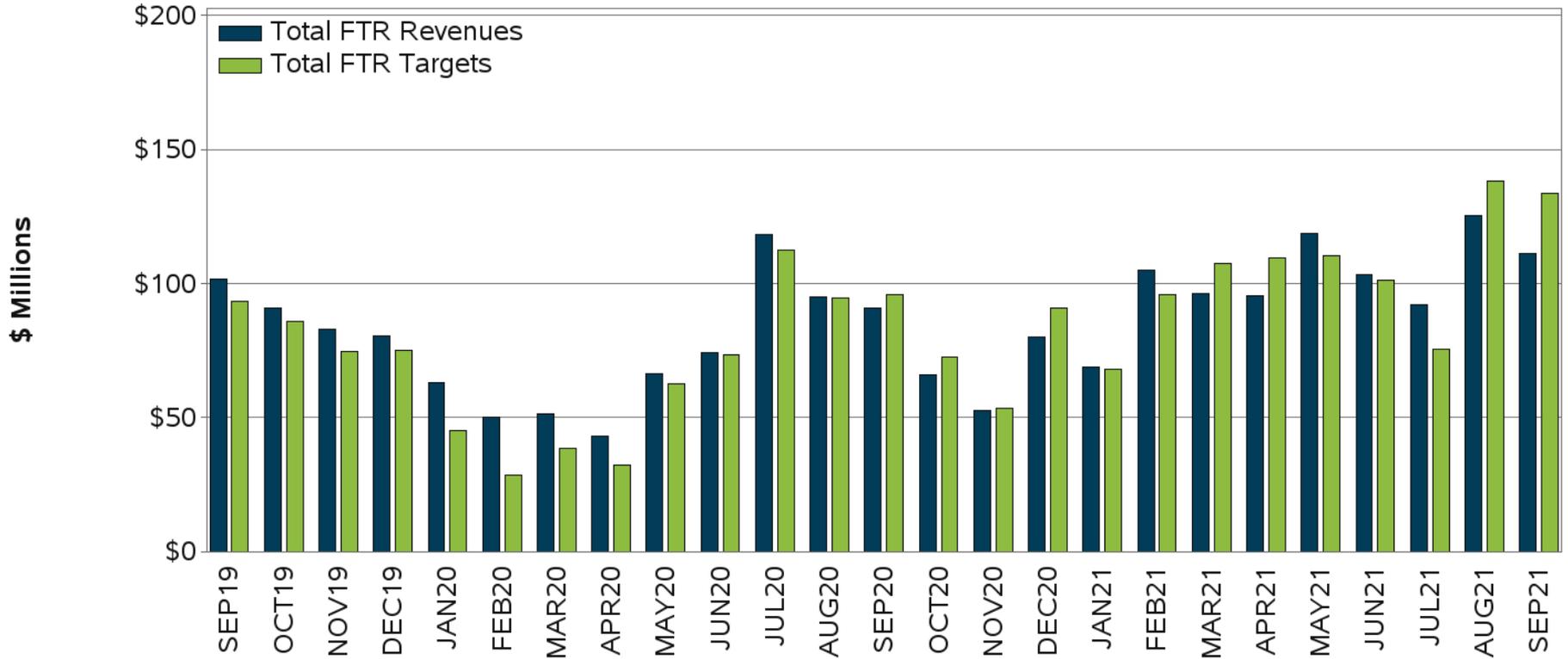
INCs, DECs and Up-To-Congestion Transactions - Total Volume

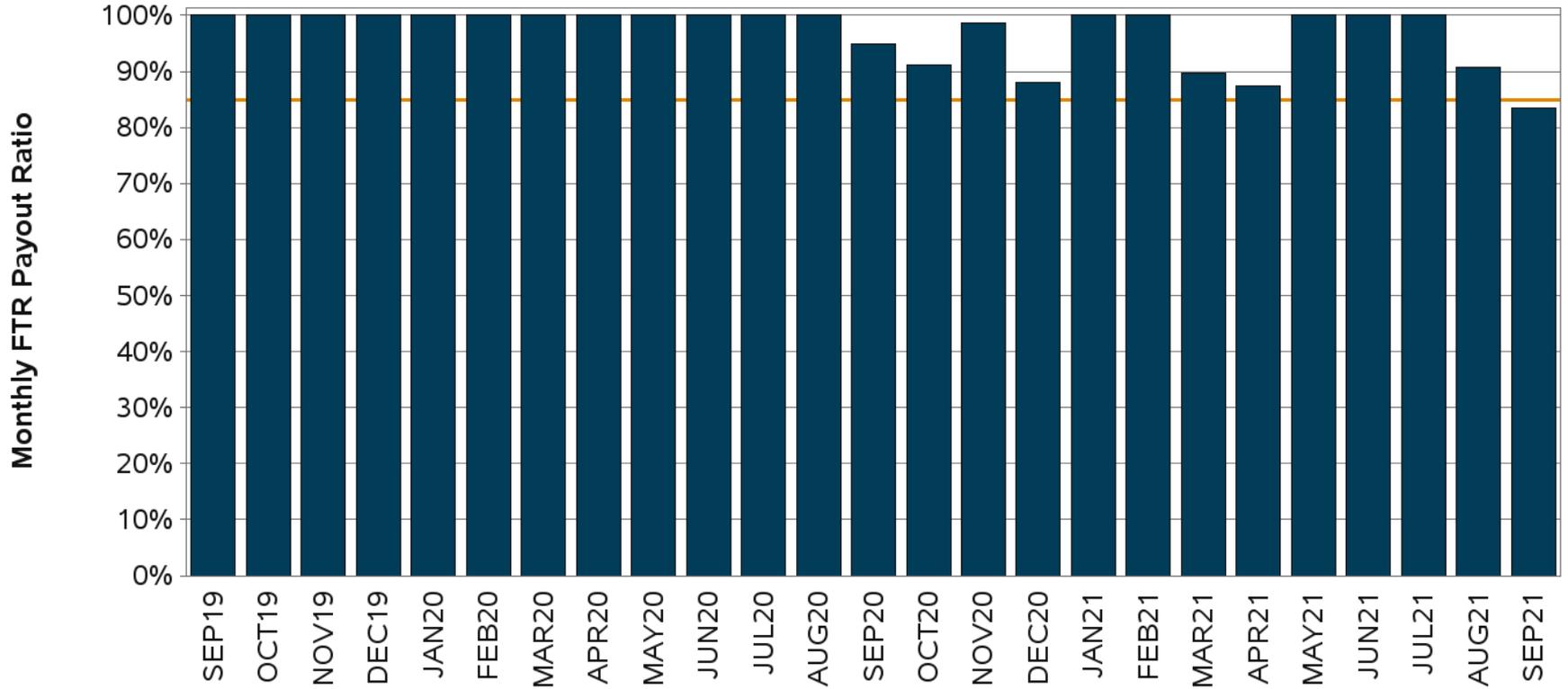


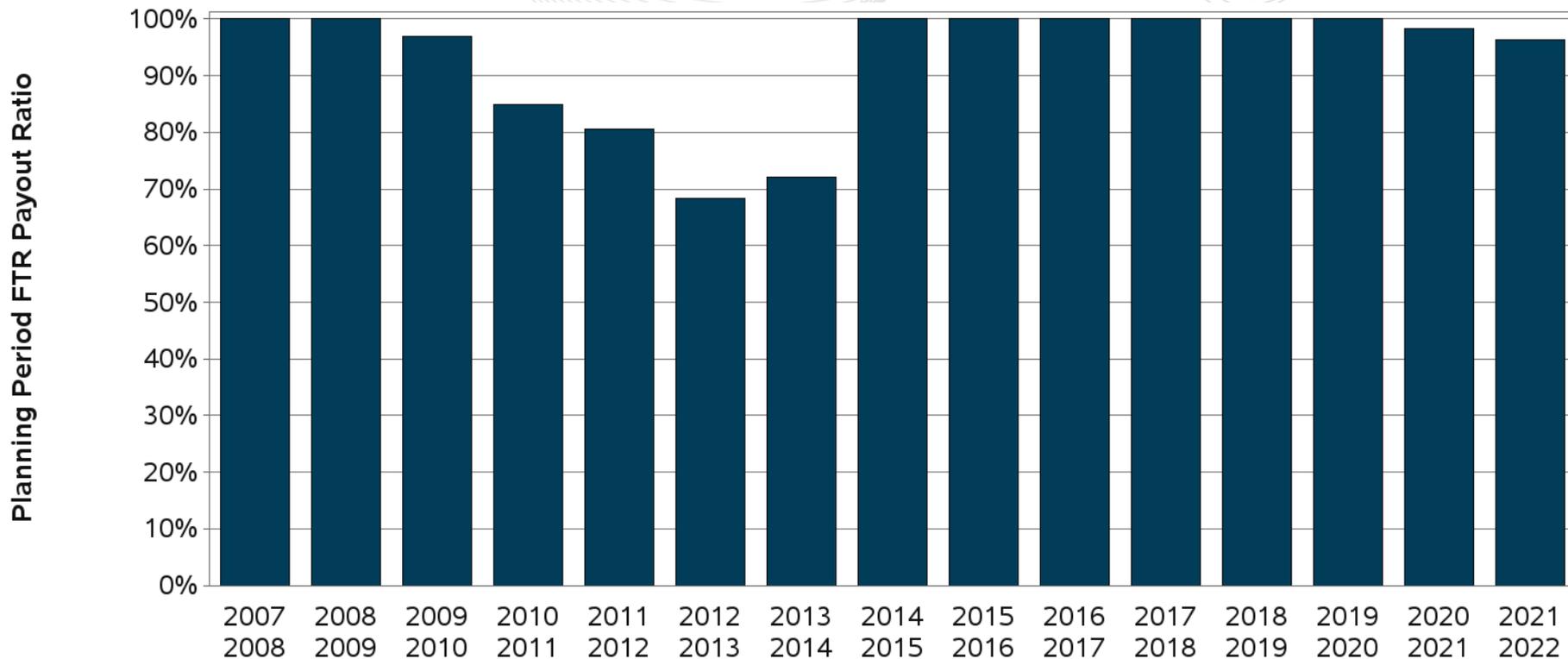
Energy Market

Congestion and FTR Summary

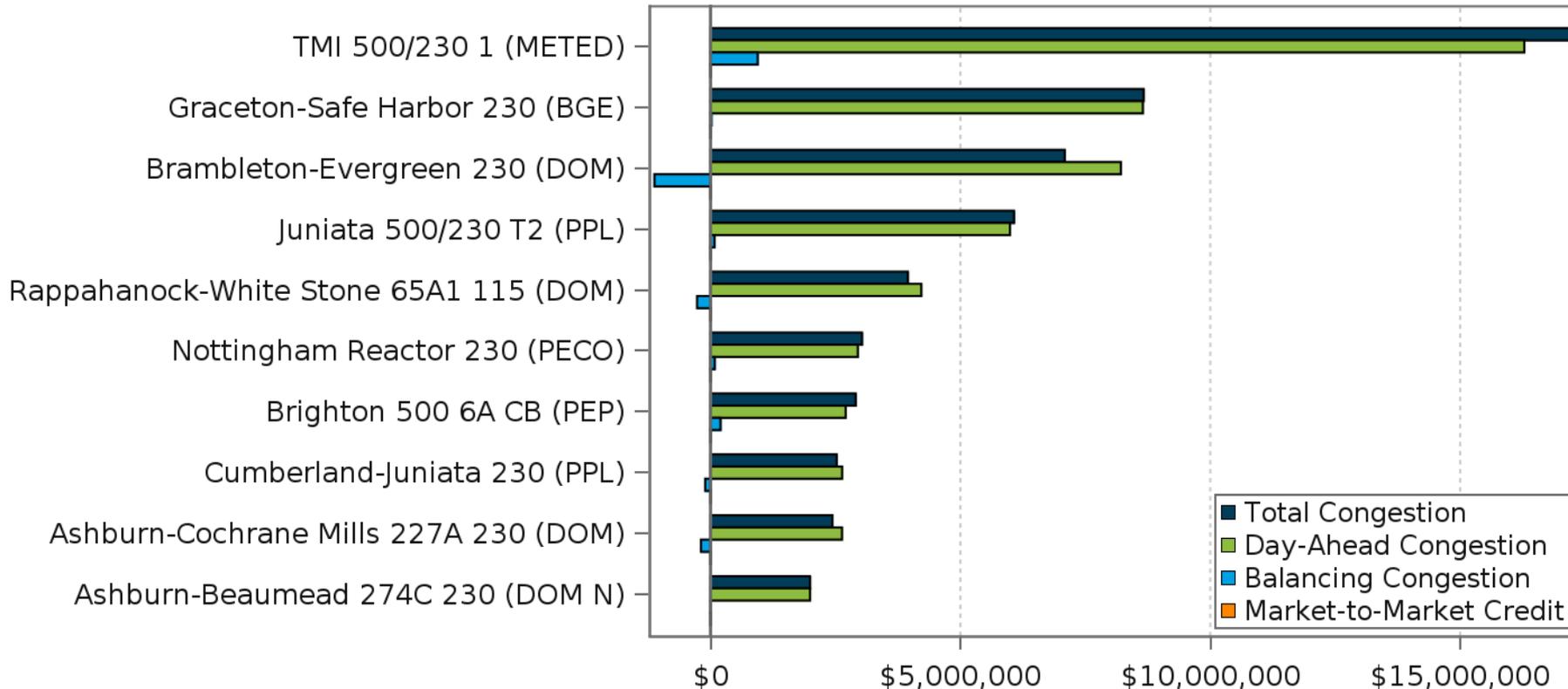
Period	Surplus / Underfunding	Payout Ratio
September, 2021	\$-22,183,220	83%
2021	\$-22,864,351	98%
2021/2022	\$-16,466,780	96%





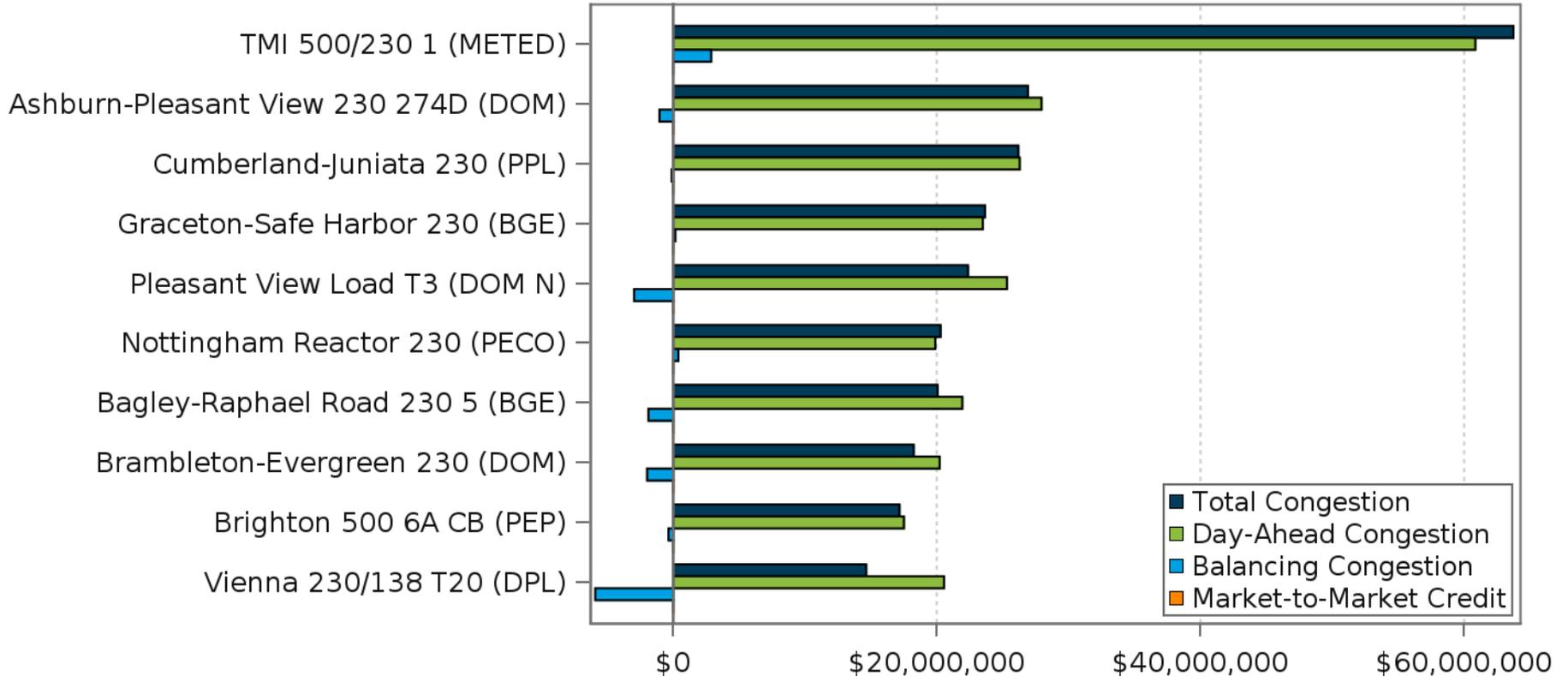


pjm Ten Most Heavily Congested Transmission Facilities - Overall, September



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

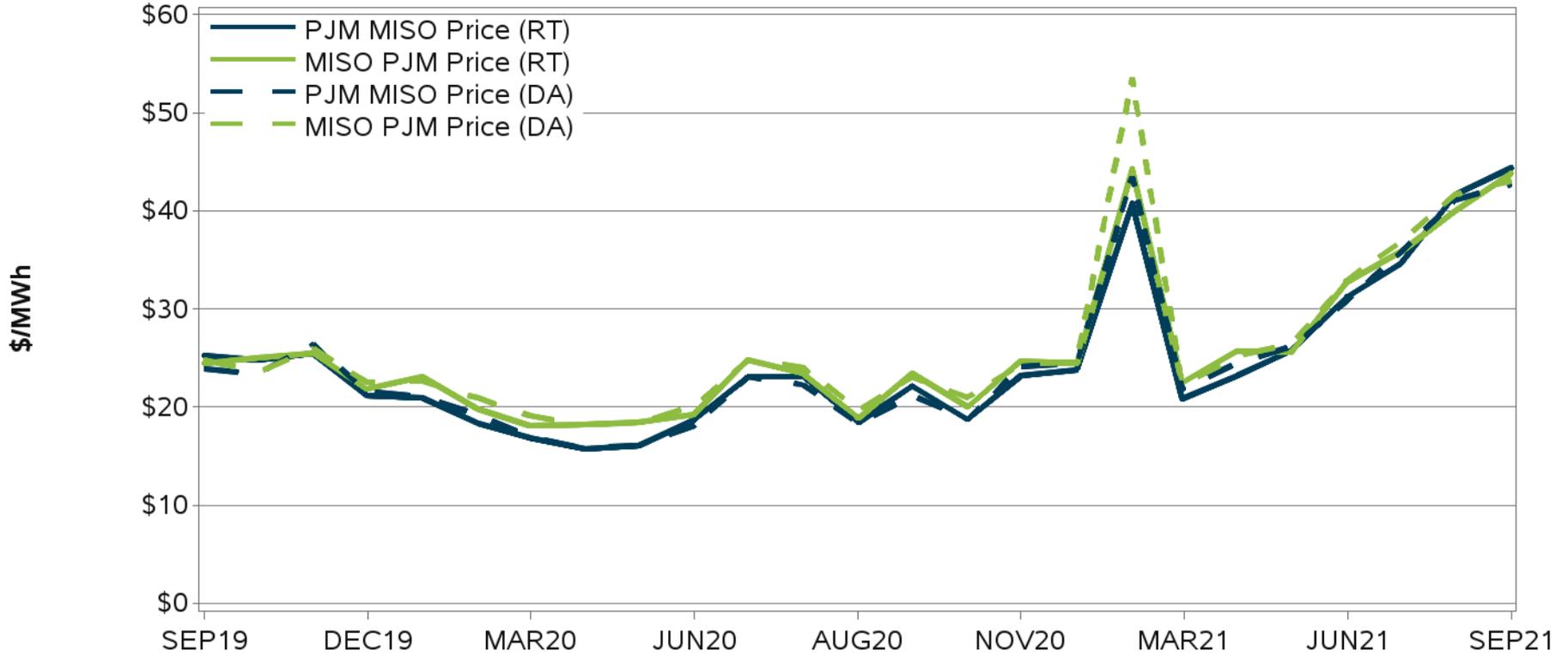
Ten Most Heavily Congested Transmission Facilities - Overall, 2021

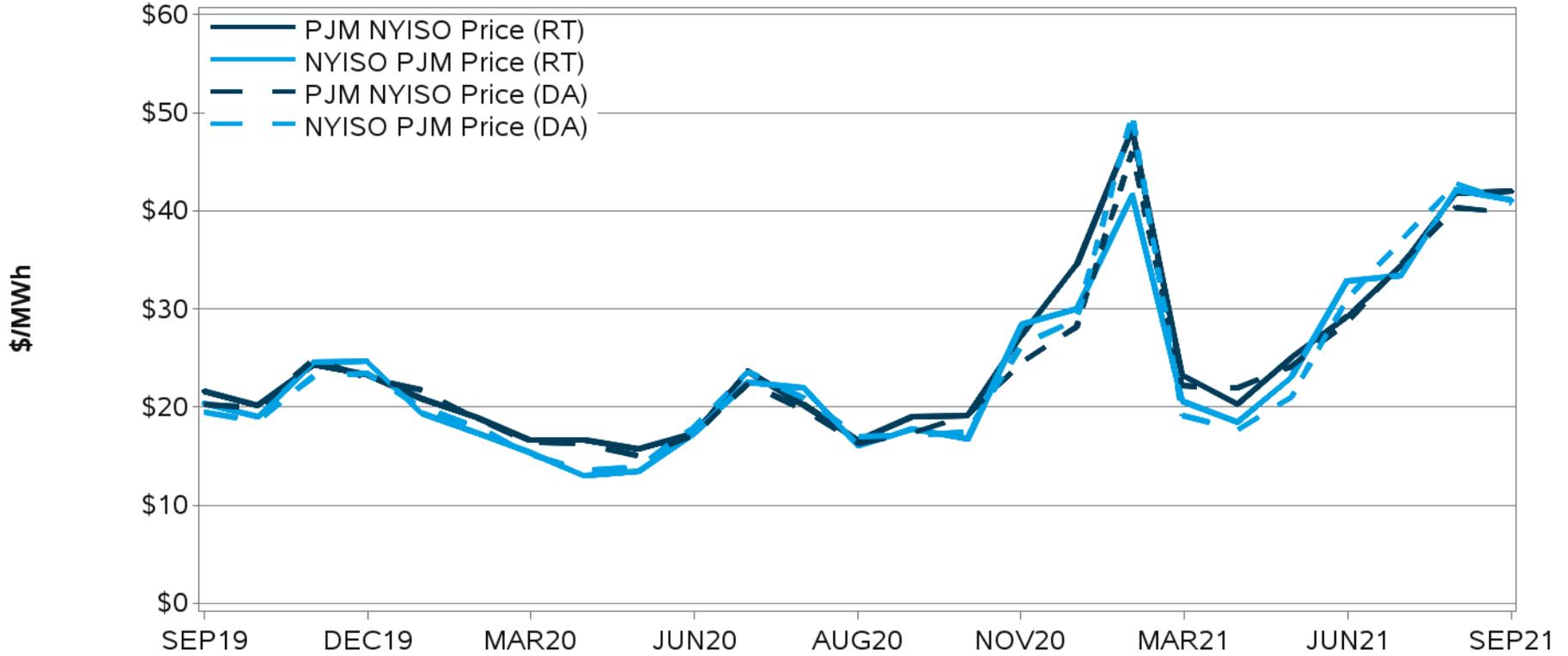


The ten most heavily congested facilities account for 42% of total congestion for 2021.

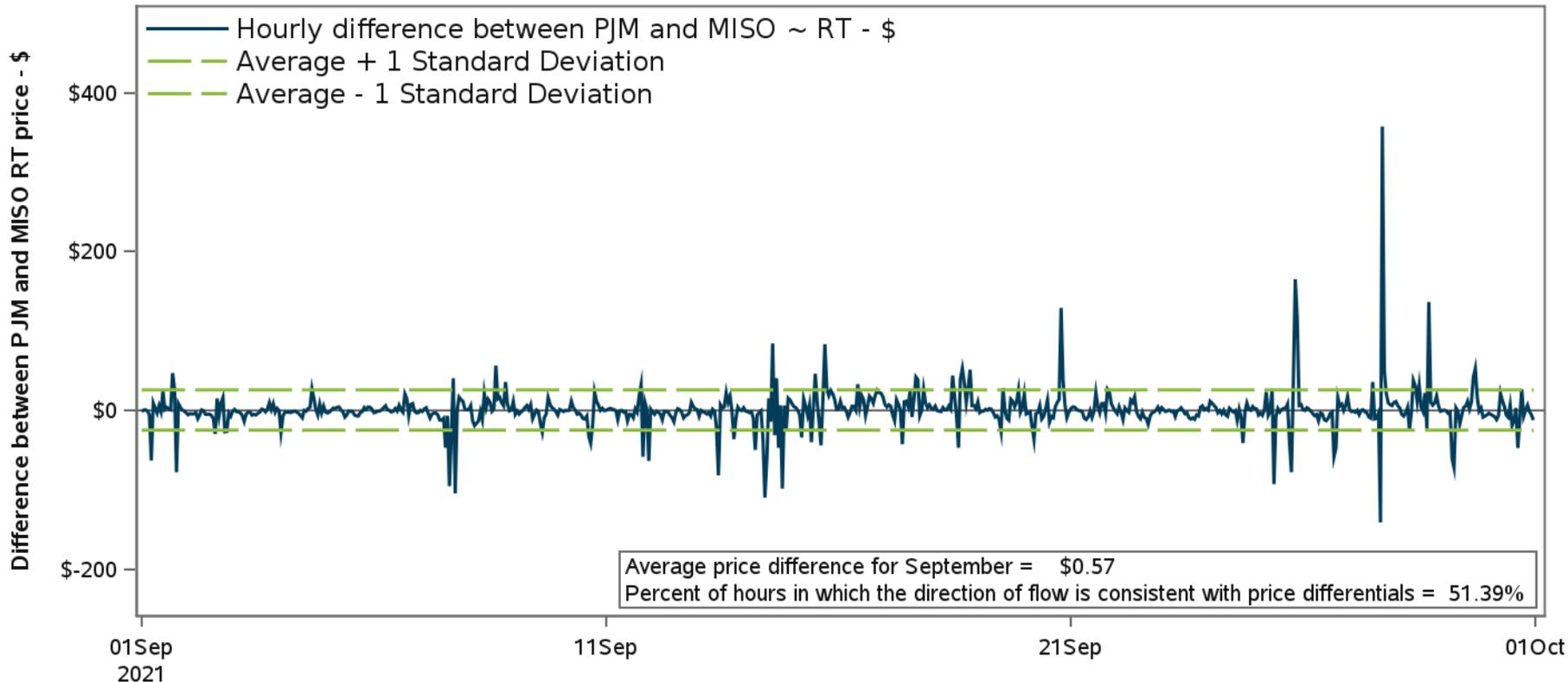
Energy Market

Interchange/Seams Summary



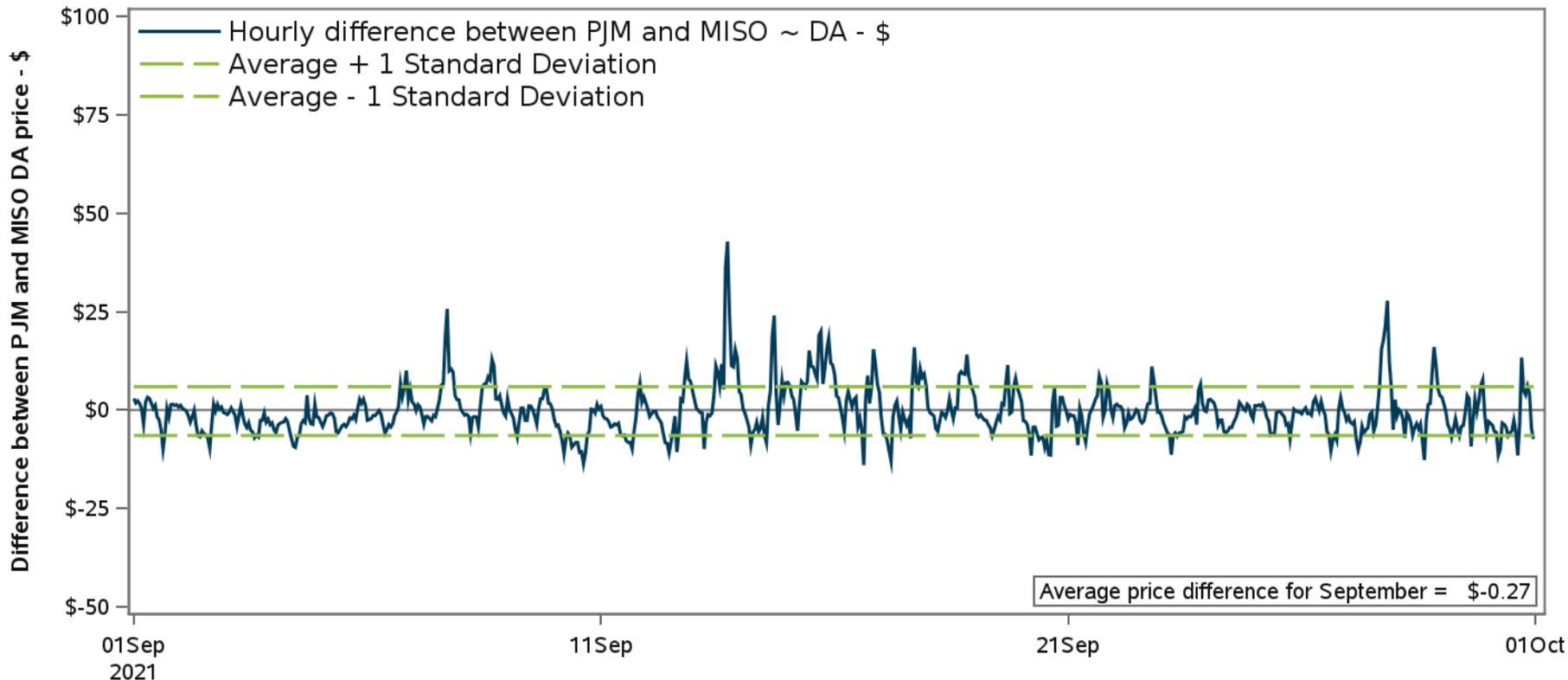


Hourly Difference Between PJM and MISO Real-Time Prices



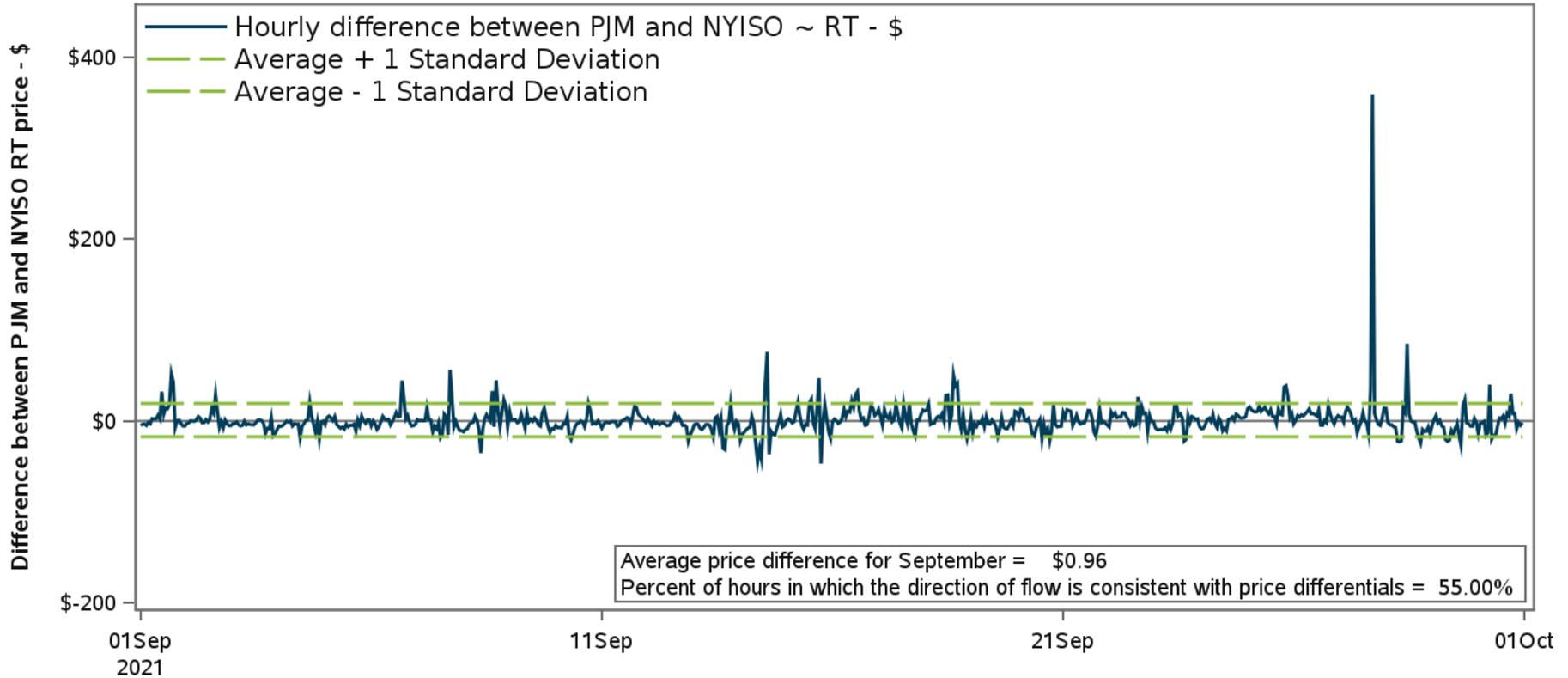
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and MISO Day-Ahead Prices



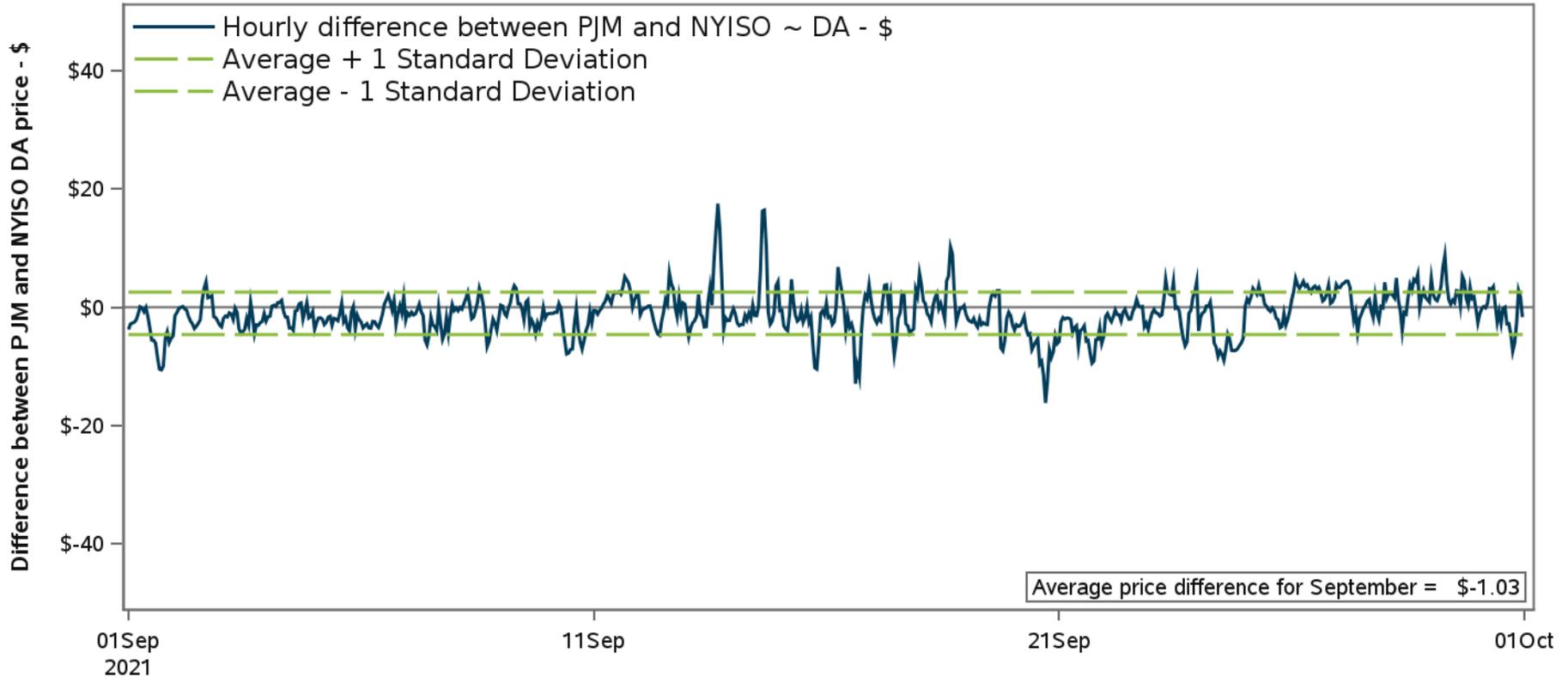
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Real-Time Prices

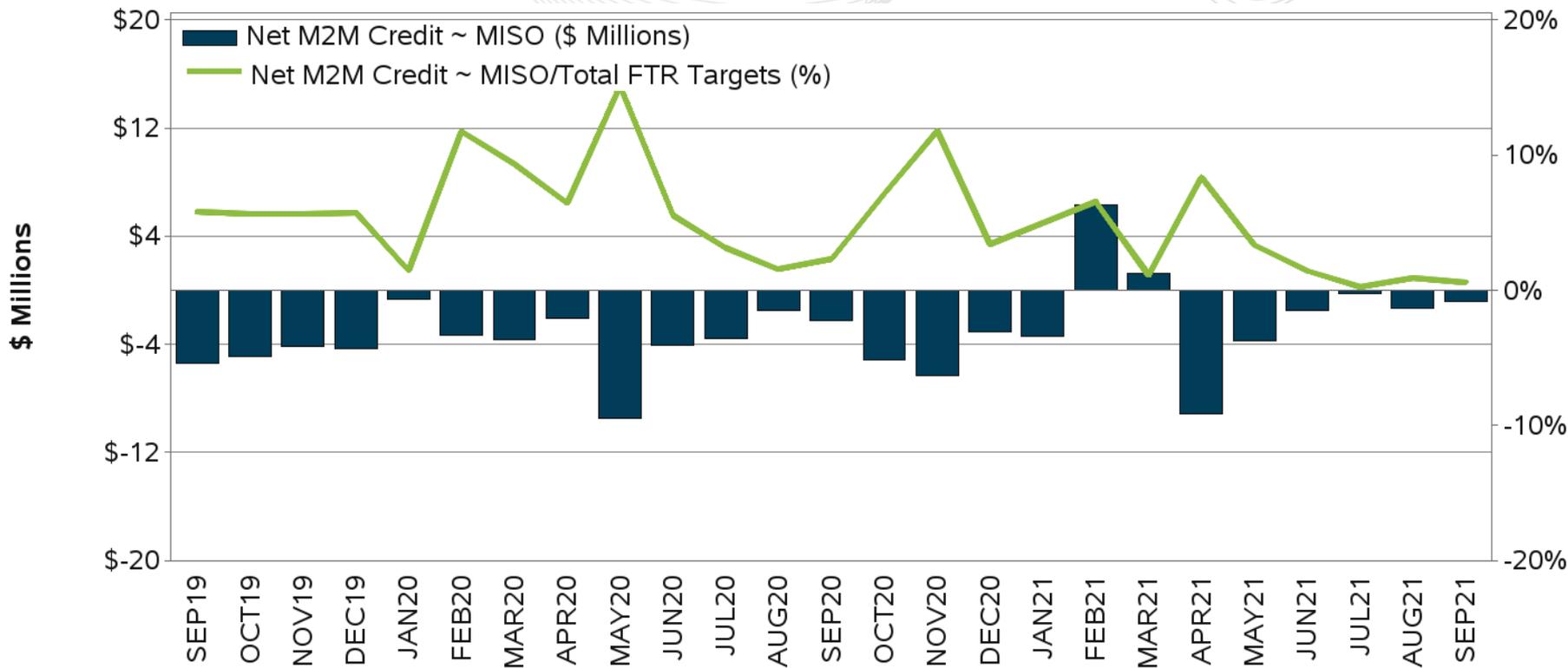


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

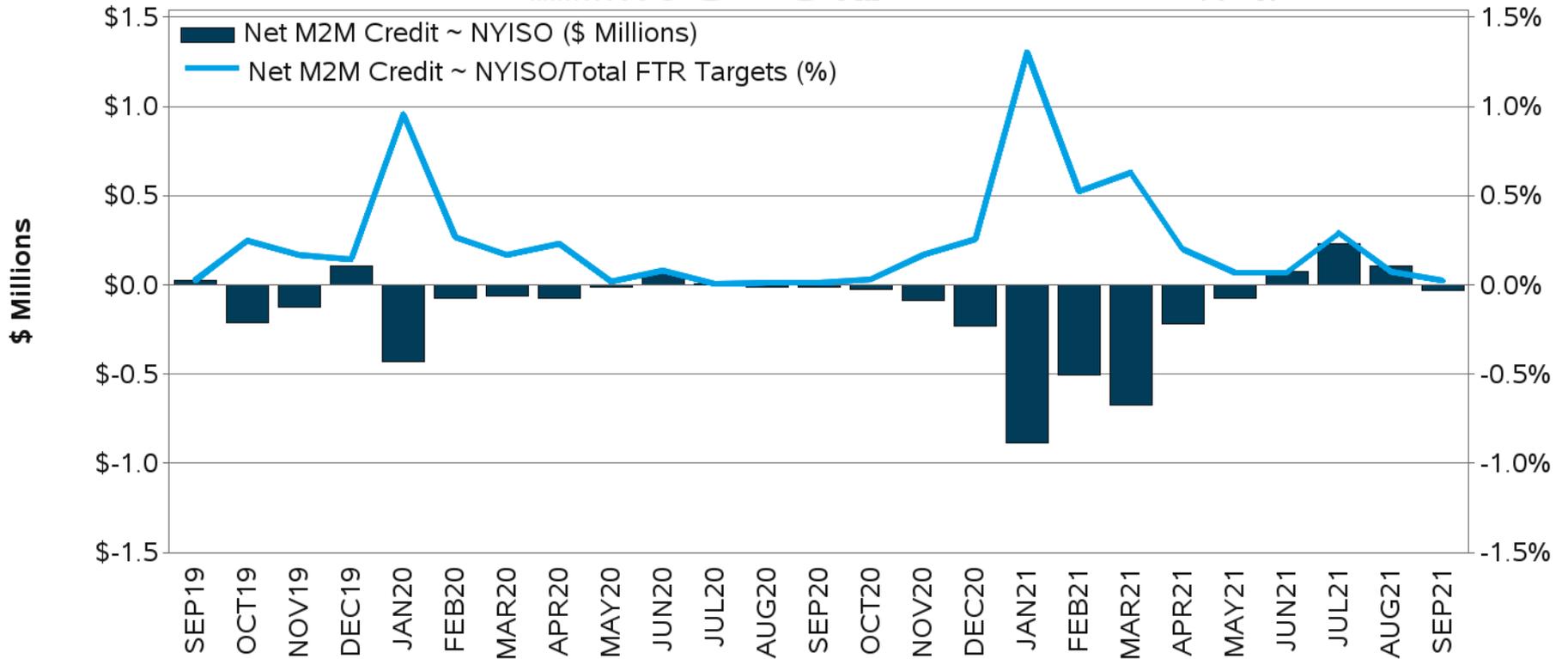
Hourly Difference Between PJM and NYISO Day-Ahead Prices



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

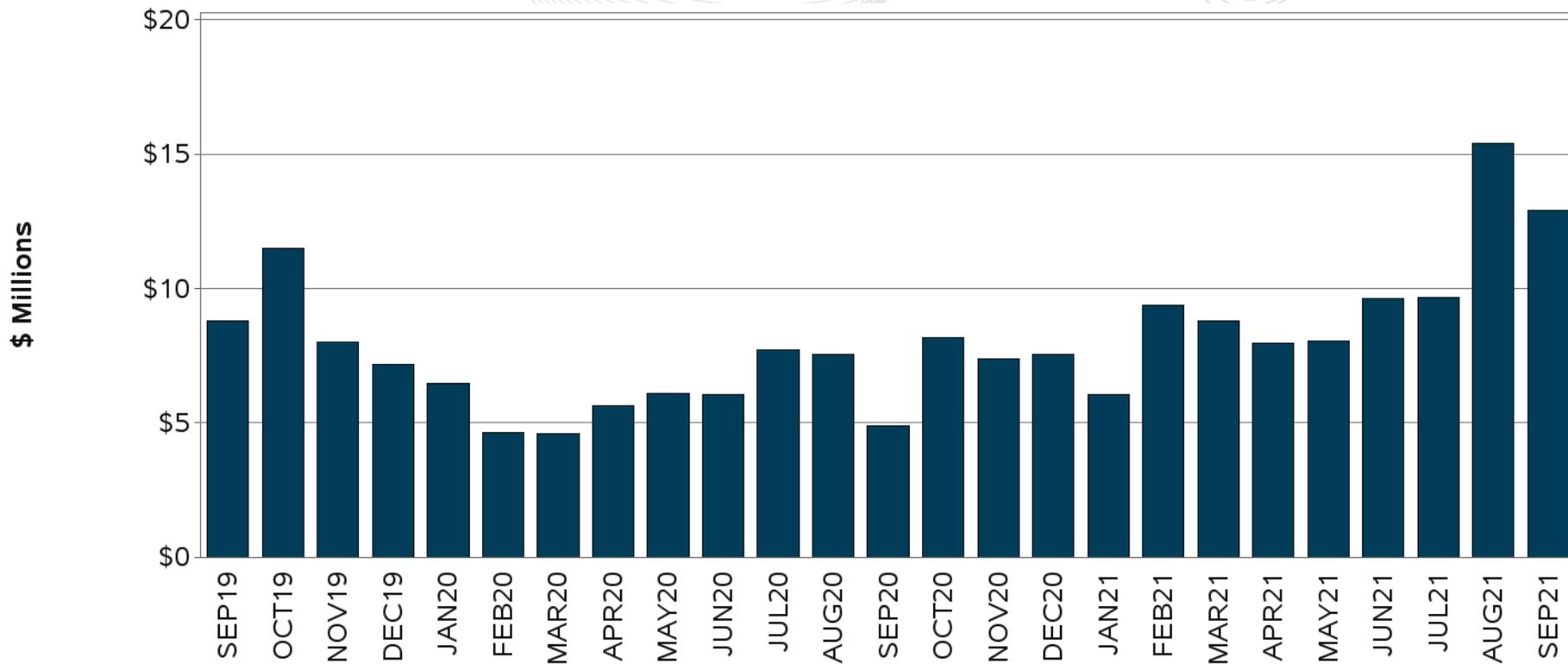


Negative M2M Credit represents PJM payment to MISO

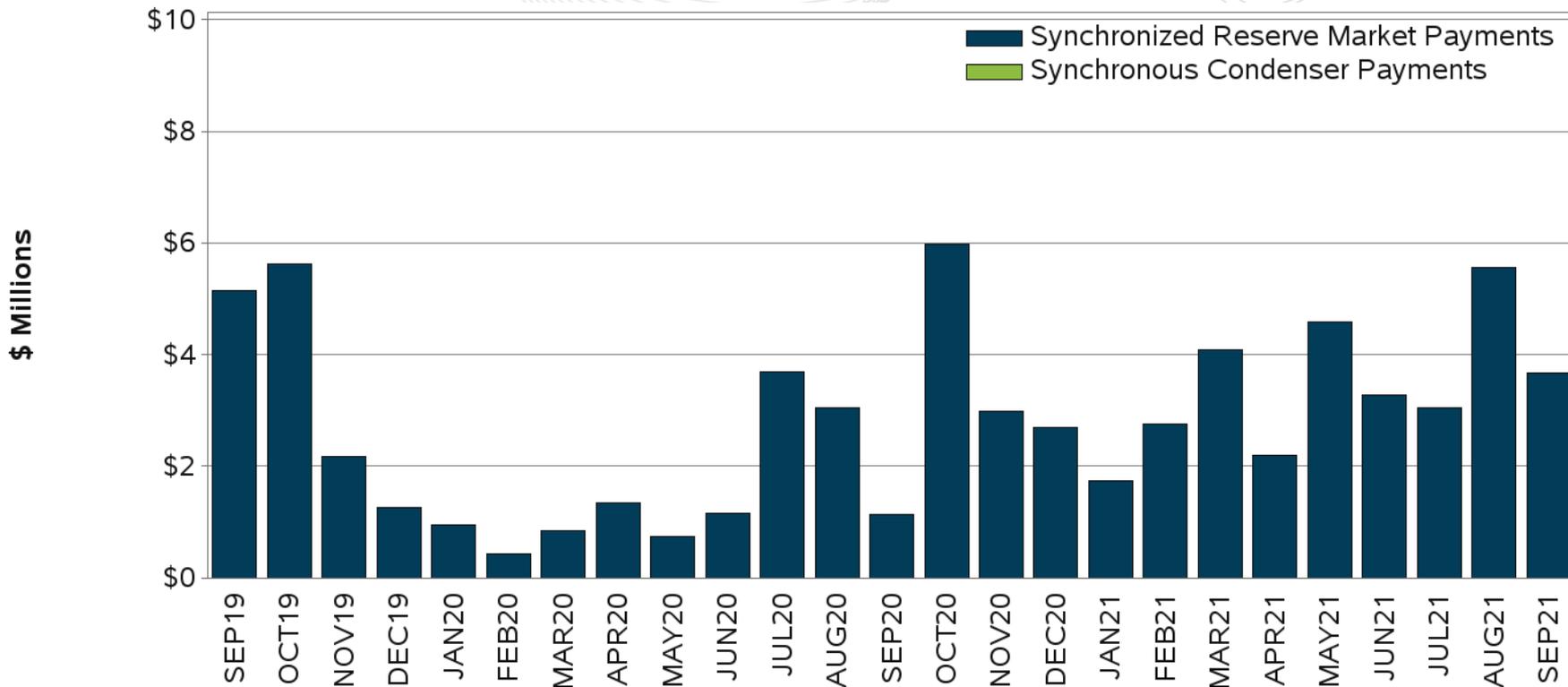


Negative M2M Credit represents PJM payment to NYISO

Ancillary Service Market Summary

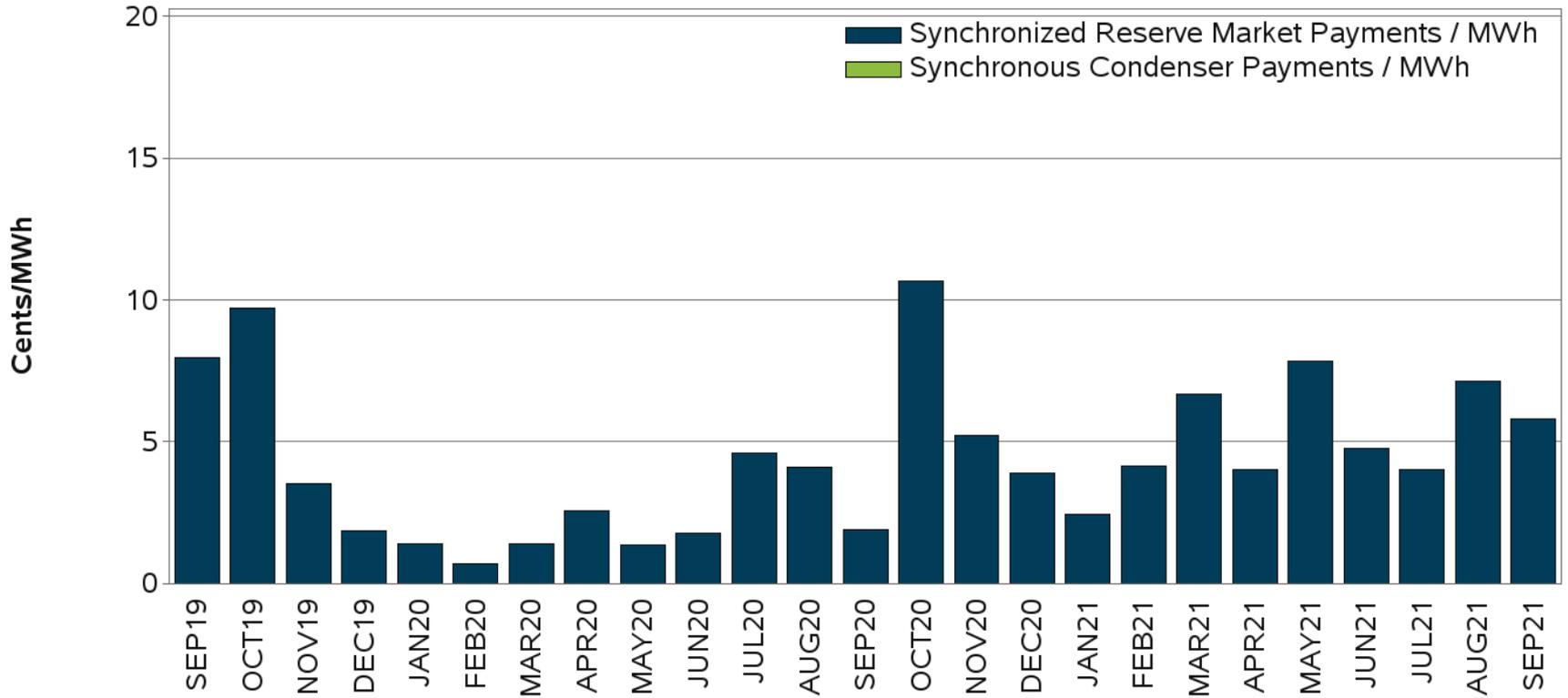


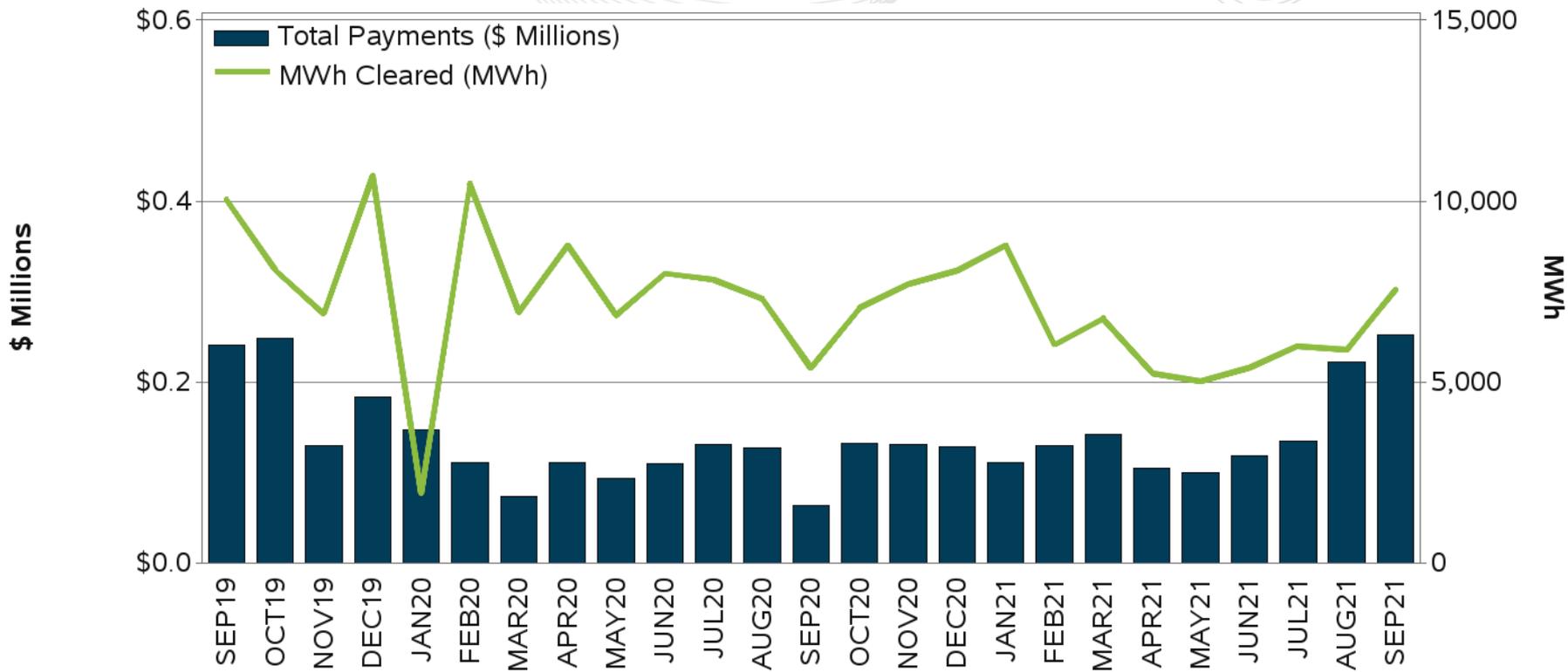
Synchronized Reserve and Synchronous Condenser Costs



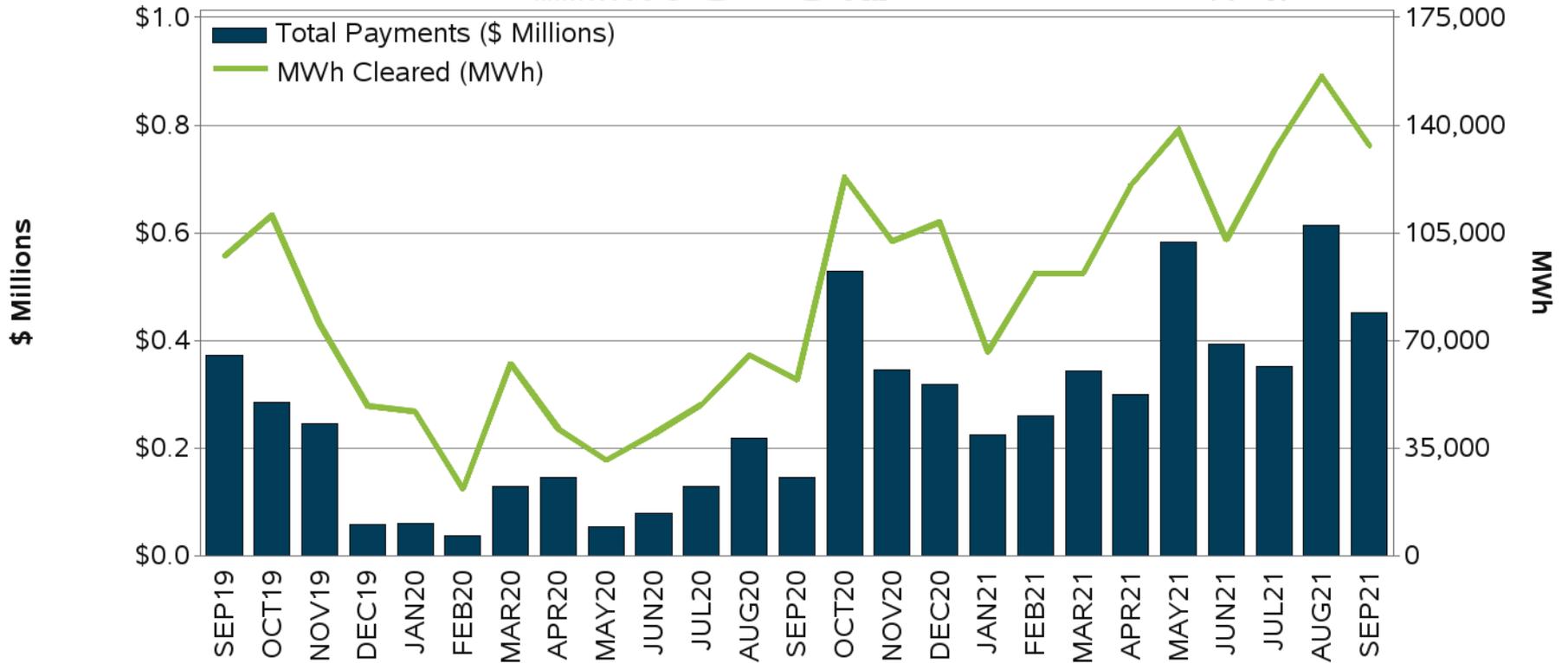


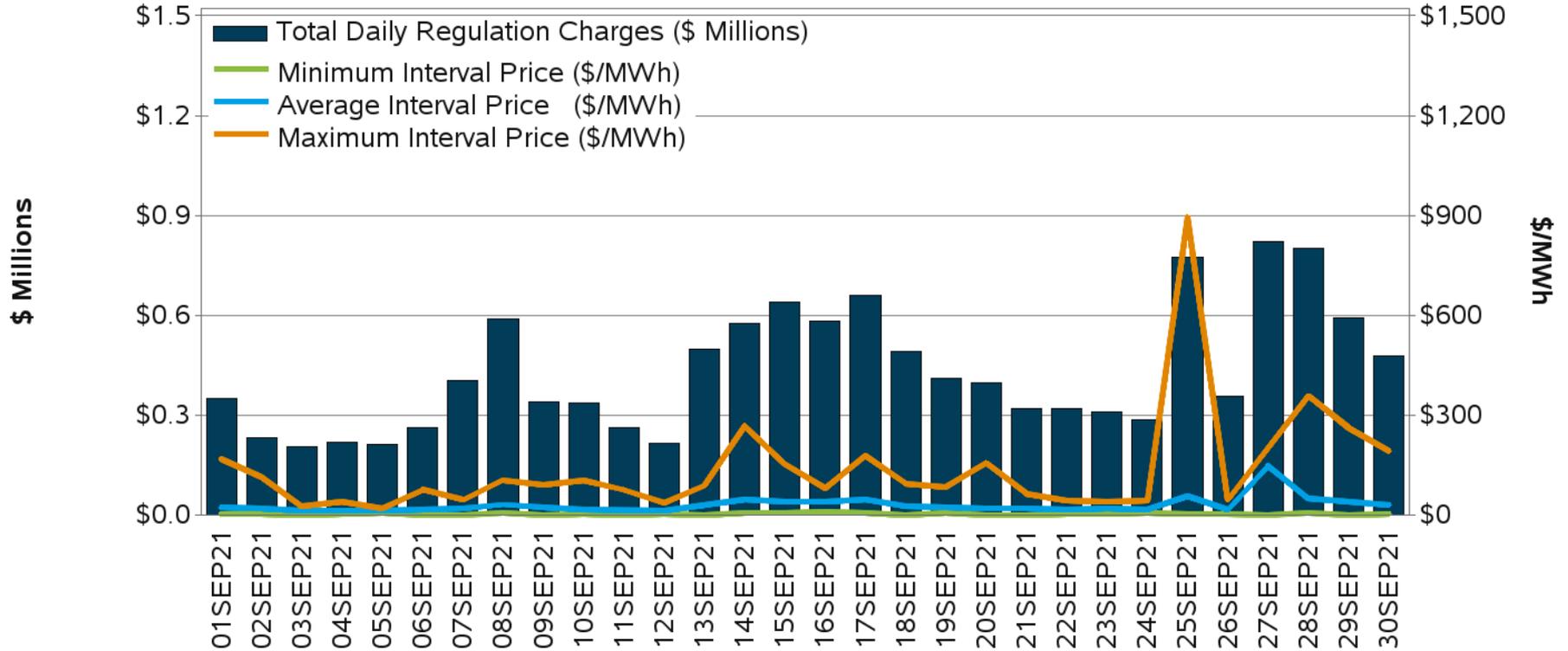
Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs



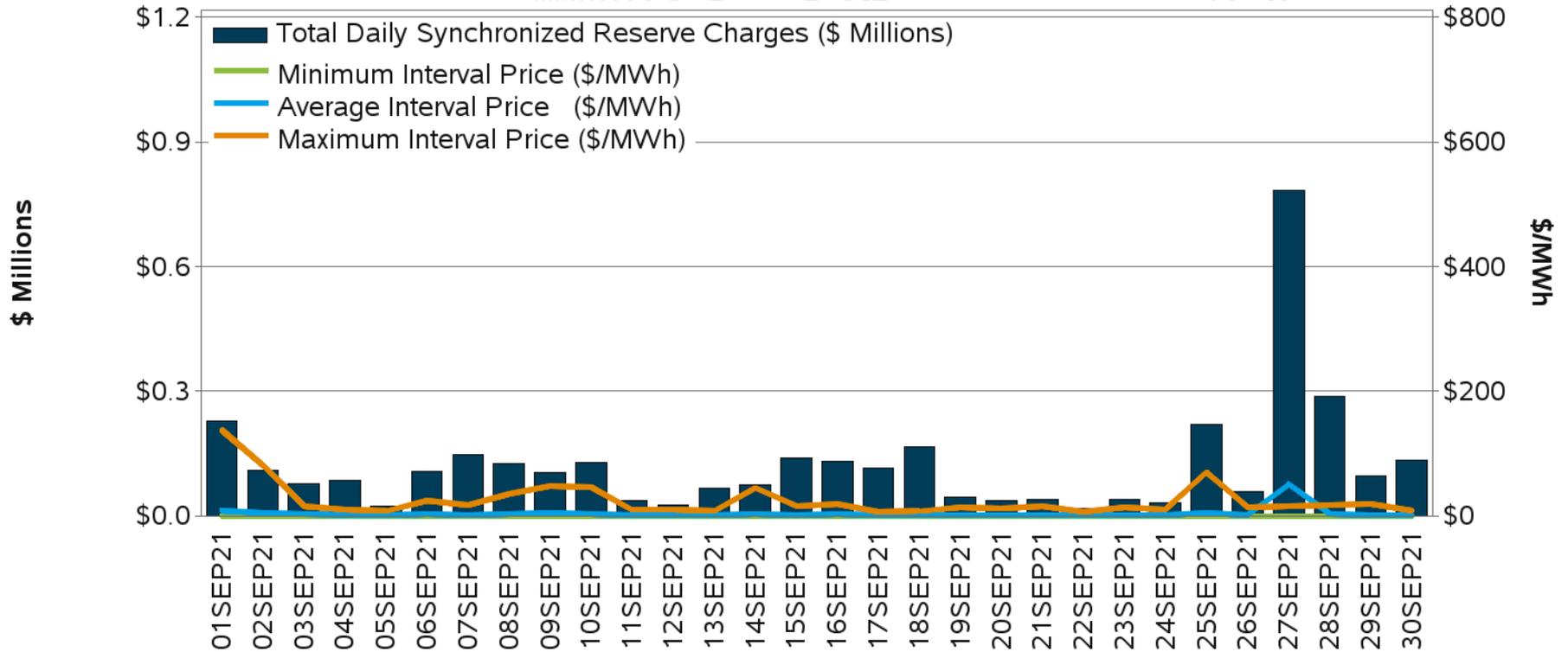


DR Participation in PJM Synchronized Reserve Markets





Synchronized Reserve Market Daily Prices and Charges



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