



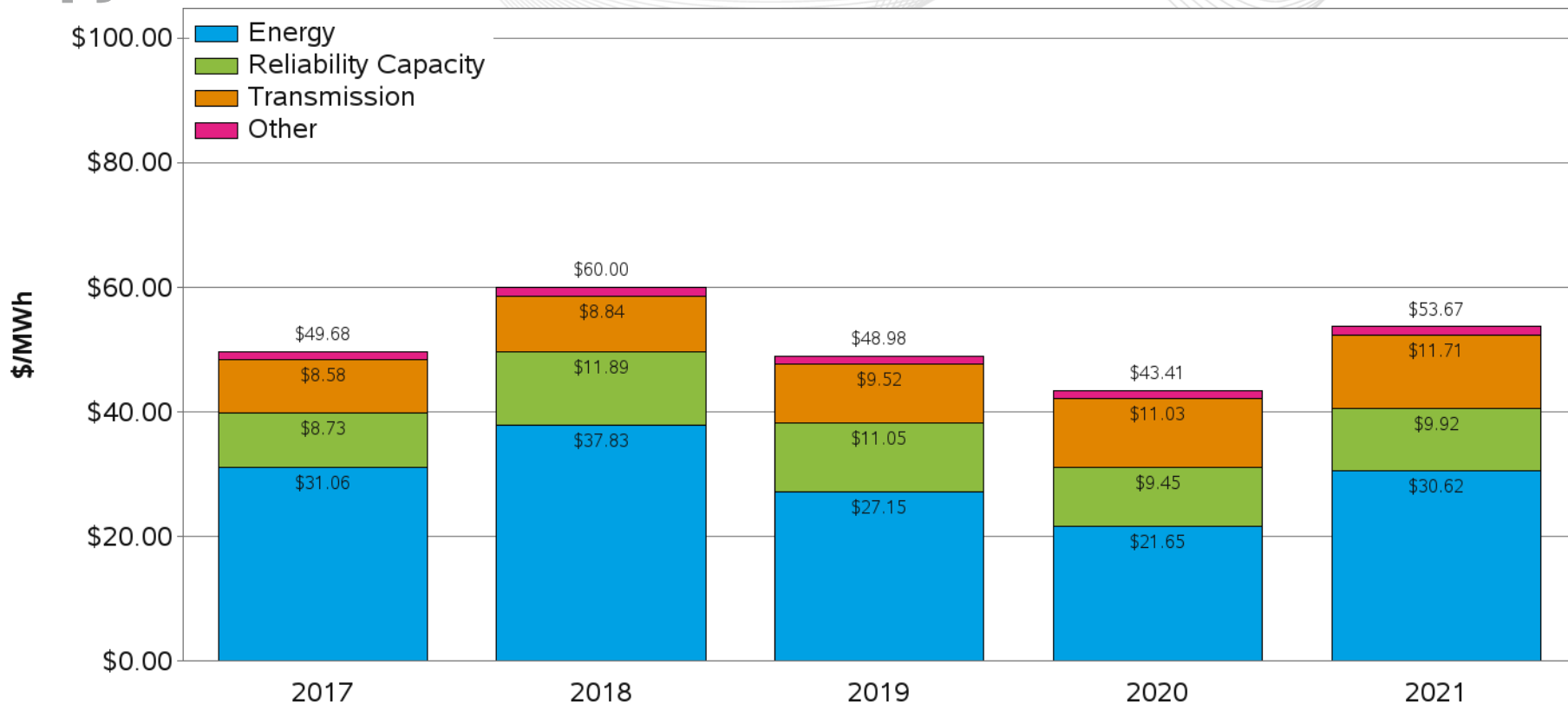
Markets Report

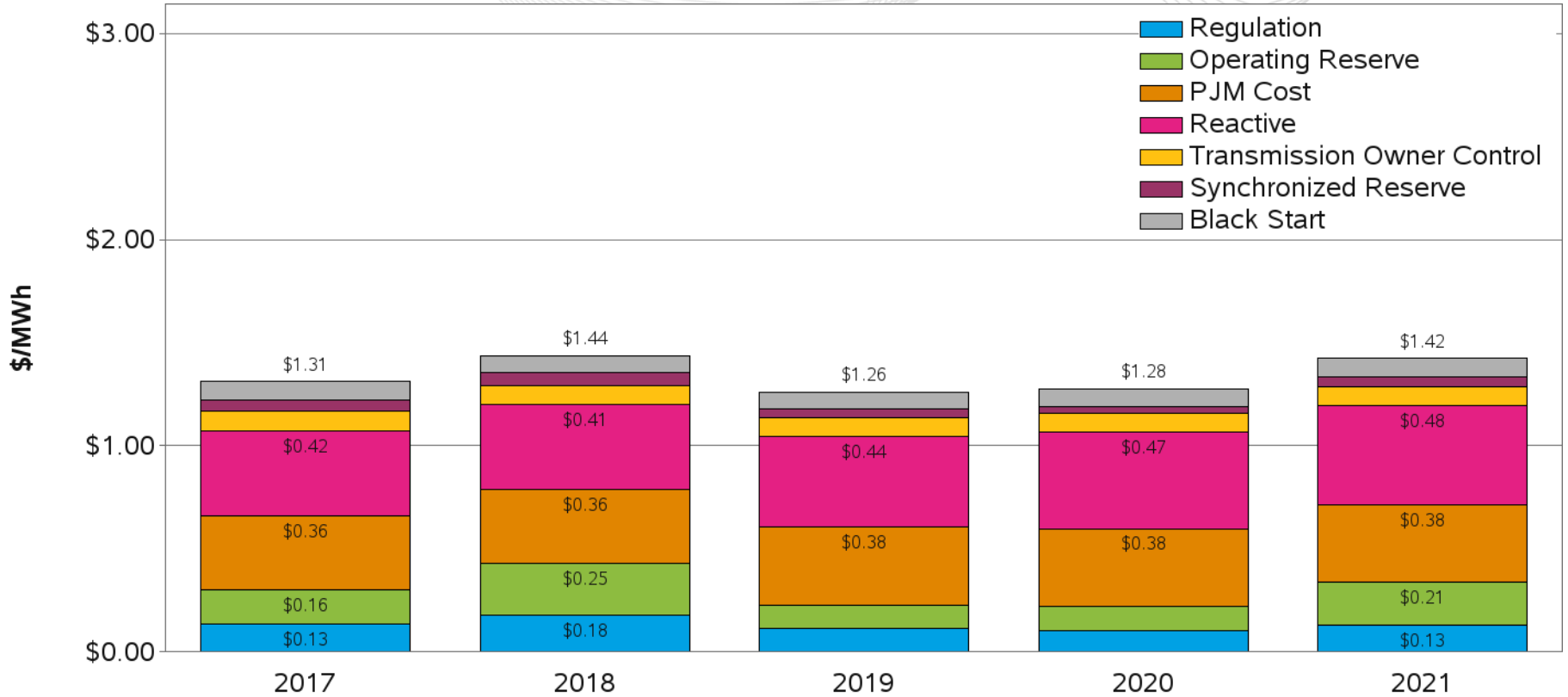
MC Webinar
July 26, 2021

- PJM Wholesale Cost for 2021 is \$53.67/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 June, temperatures were above average throughout the month. Thus, Cooling Degree Days were above its historic average. (Slides 8-10)
- Energy use was above its historic average for June. (Slides 8-10)

- In June, uplift exceeded \$800,000 on nine days. (Slides 24 & 25)
- Load-weighted average LMP for 2021 is \$30.62/MWh: (Slides 33 & 34)
 - June 2021 was \$34.10/MWh, which is higher than June 2020 (\$20.50/MWh) and also higher than June 2019 (\$23.10/MWh).
- There was one 5-minute interval that experienced shortage pricing in June. (Slide 31)
- FTR revenue adequacy for the month of June is 100% and the 2021-2022 Planning Year is currently funded at 100%. (Slides 49-52)
- Congestion remains low, however, higher than values observed last June. (Slide 50)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 65-67)

Markets Report

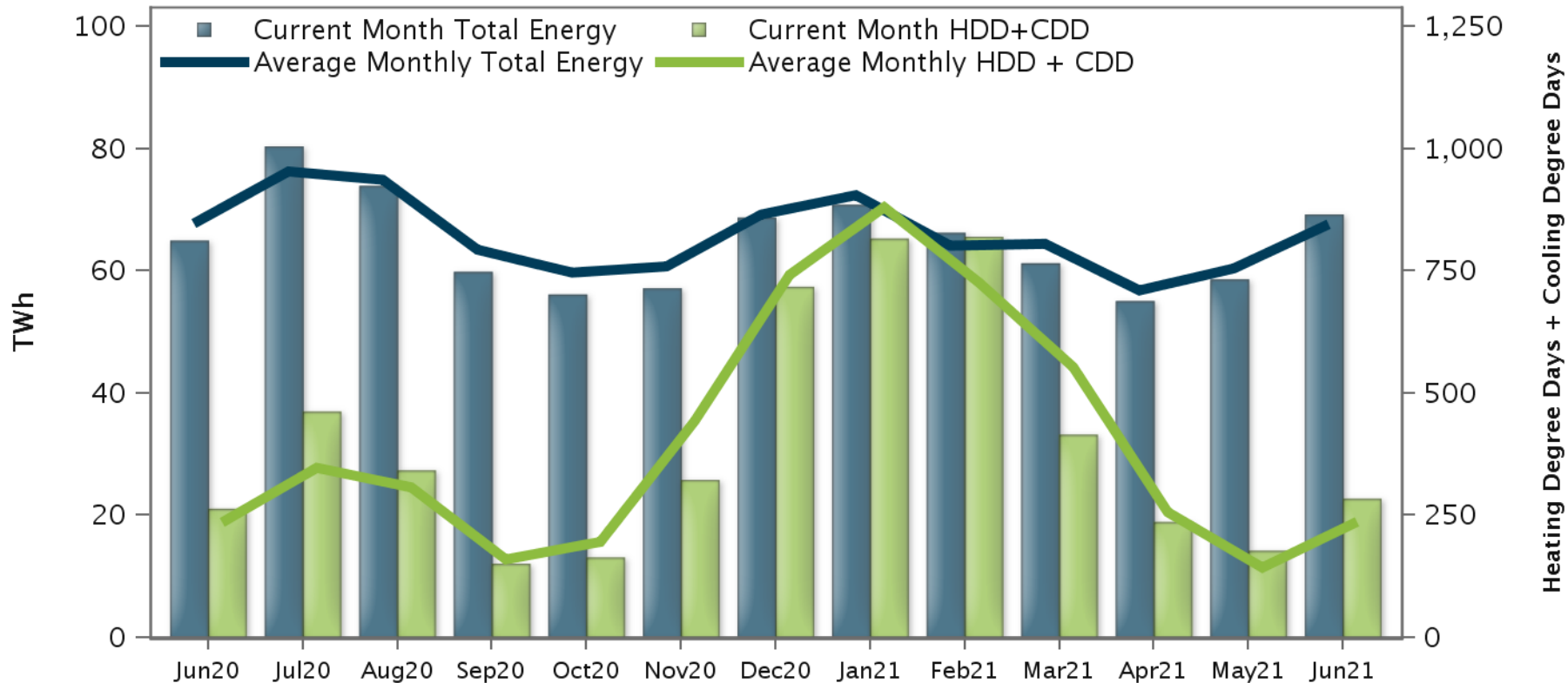




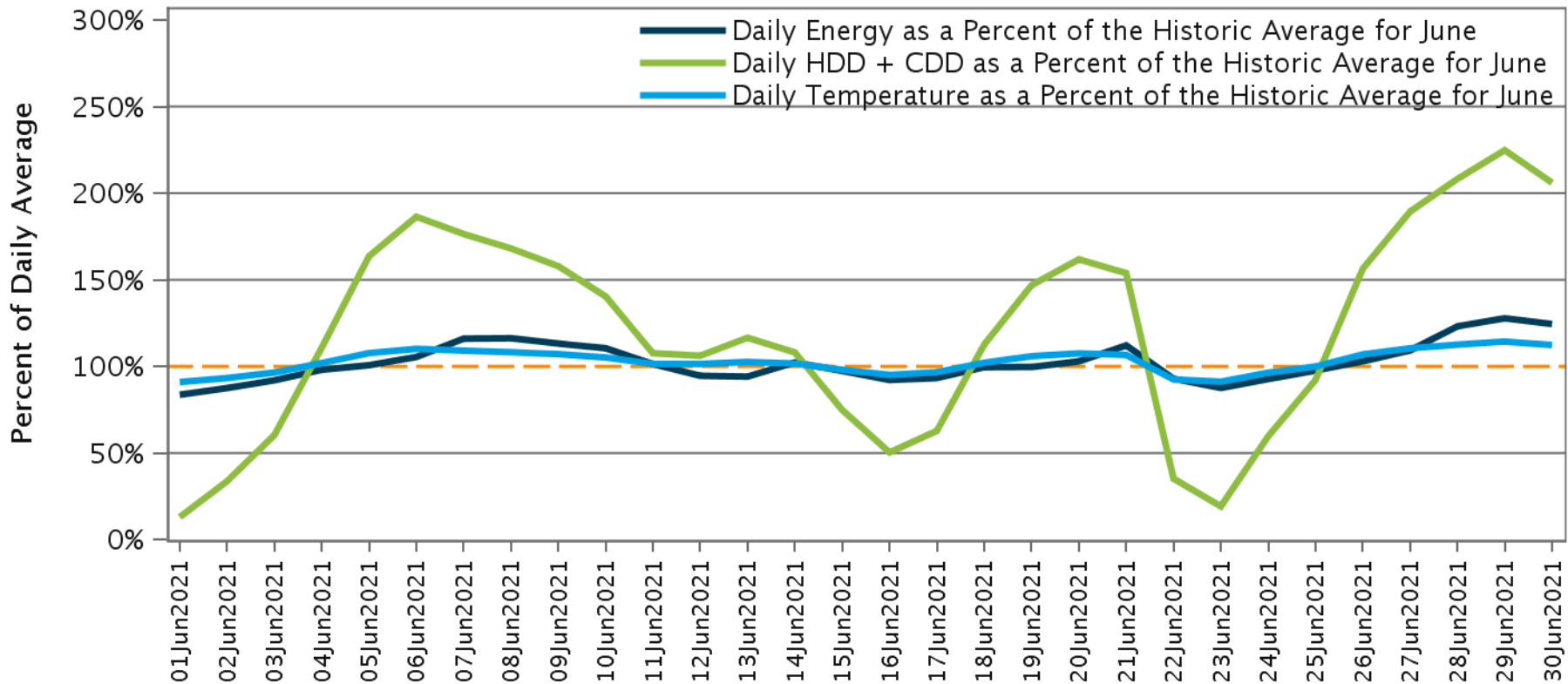
Market Conditions

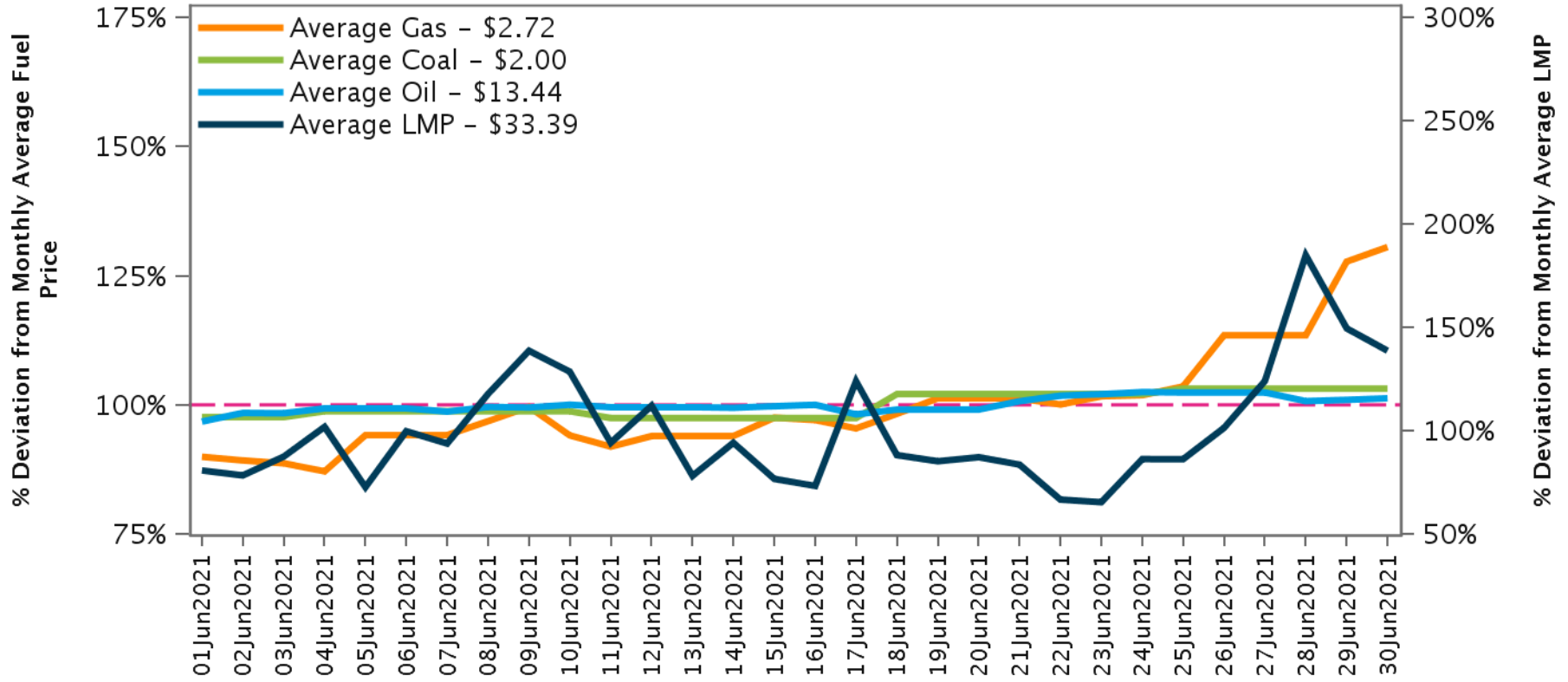
- The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).
- Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or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

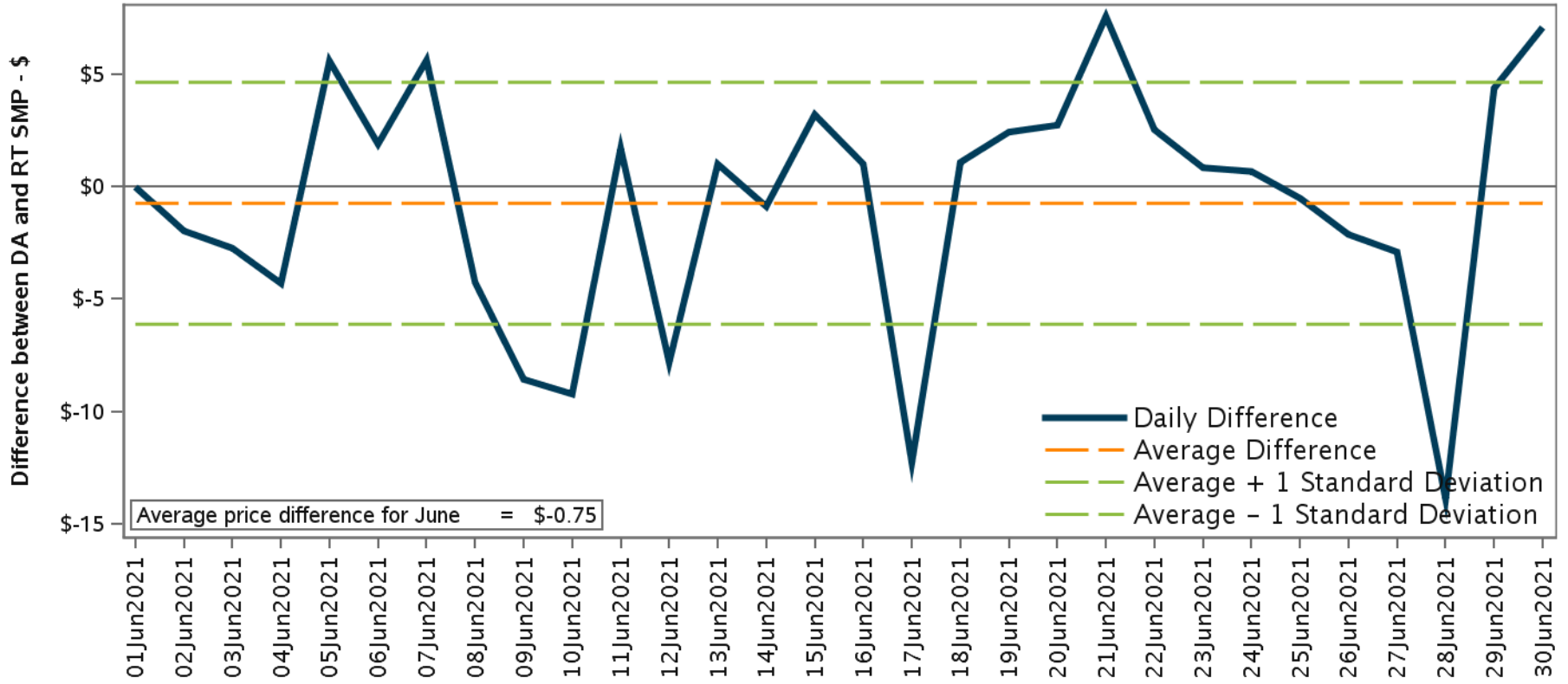




Fuel Price Source: S&P Global Platts



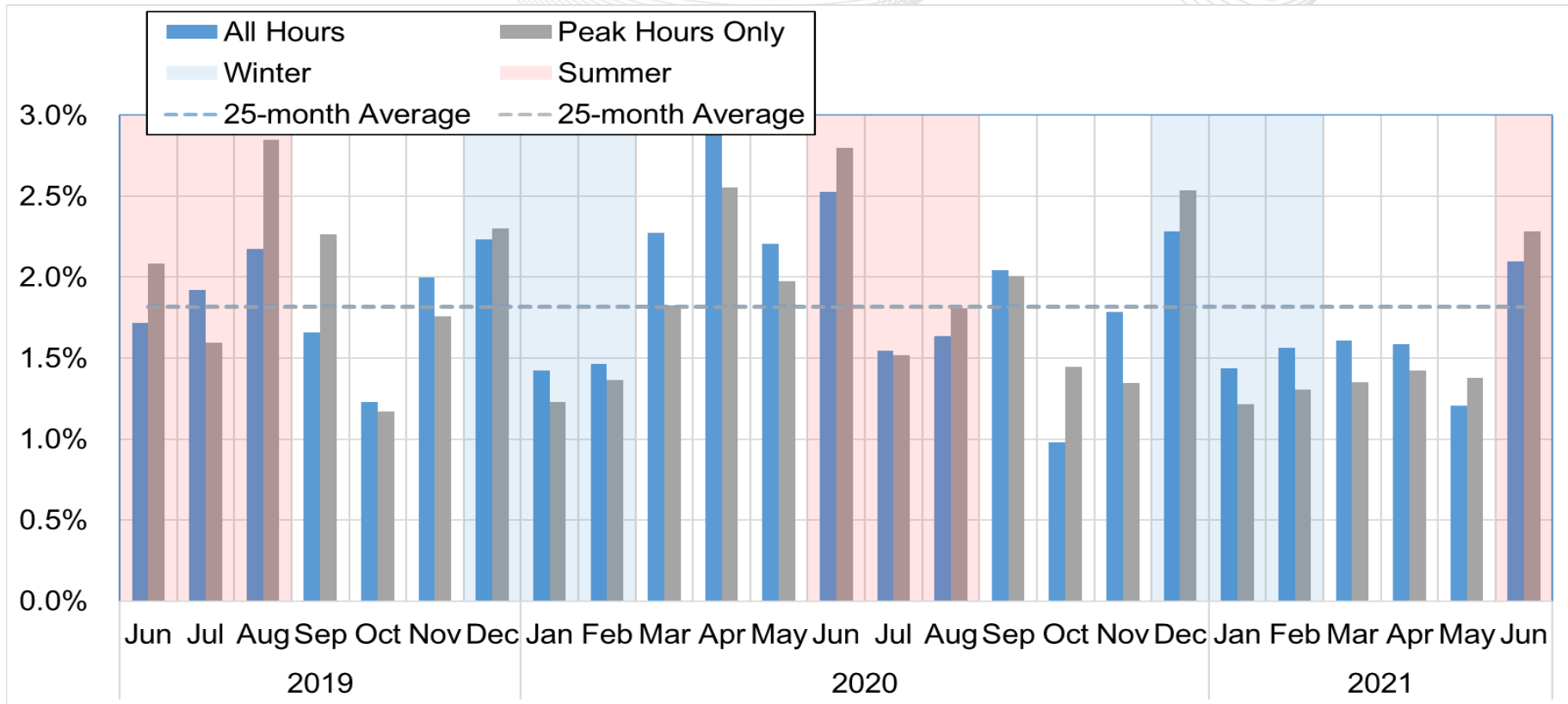
Daily Difference Between Day-Ahead and Real-Time System Marginal Prices



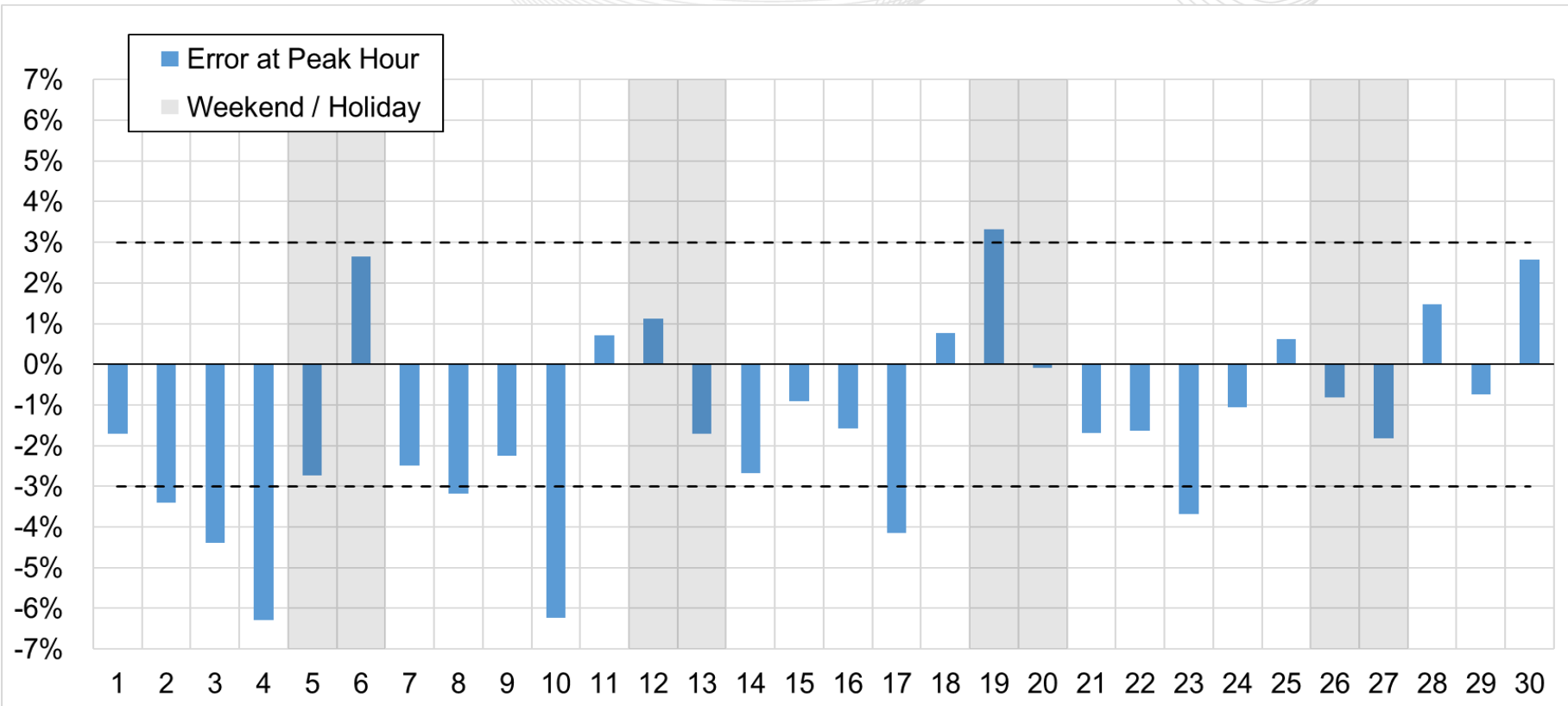
Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.



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



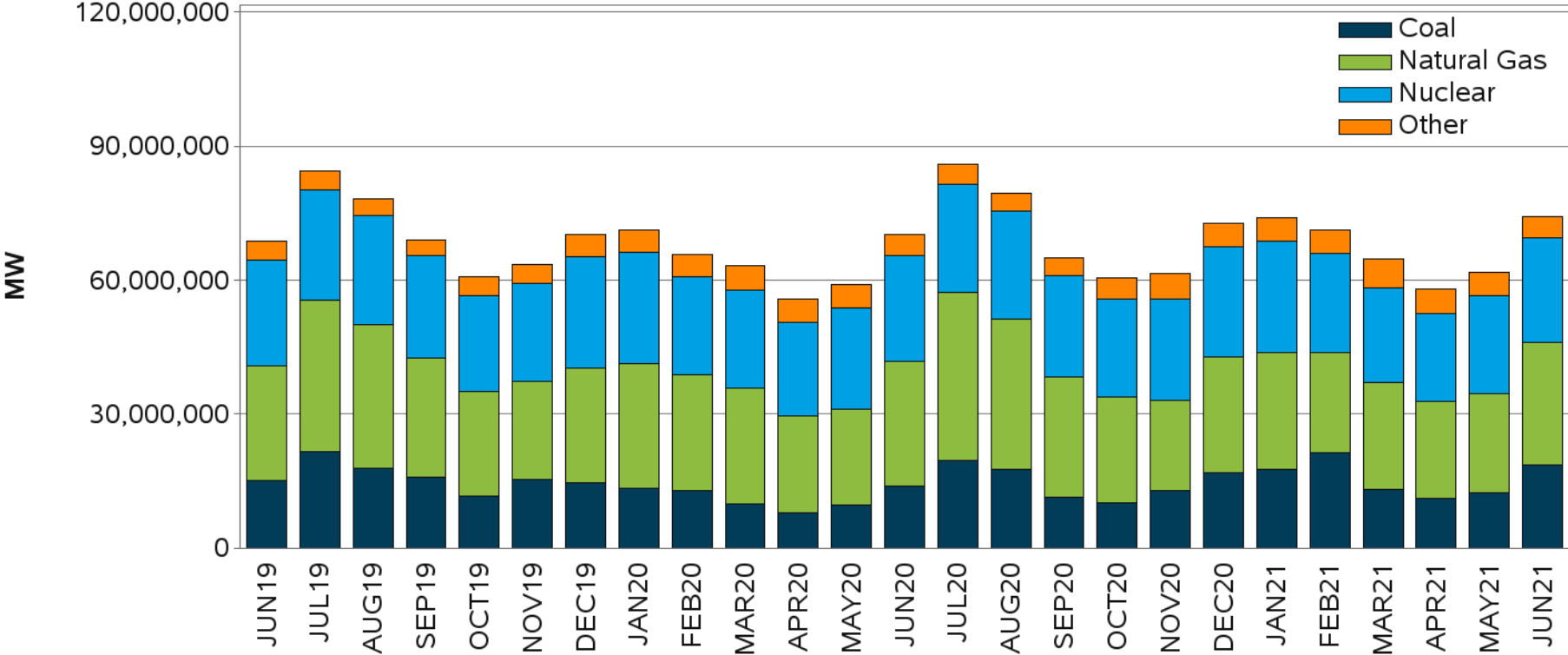
Load Forecast Error – June Daily Peaks, 10:00 Forecast



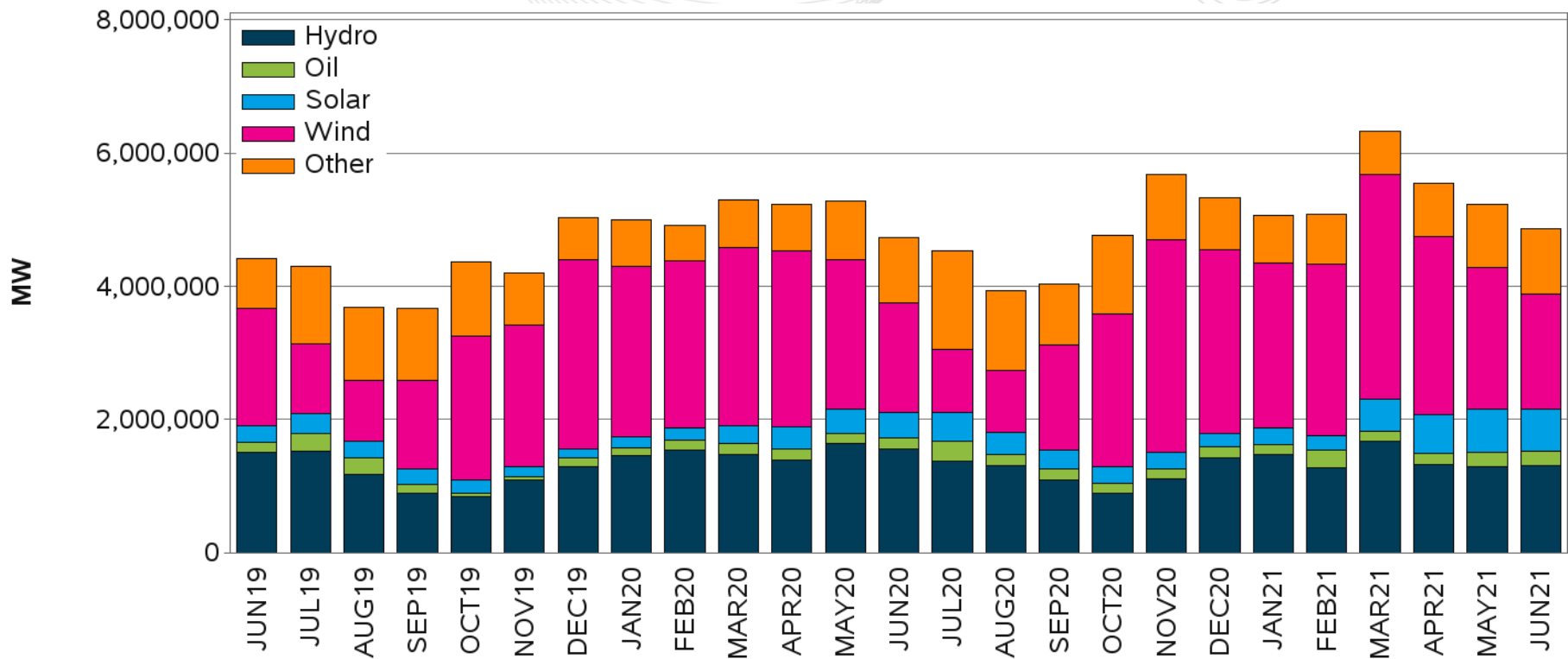
PJM prepares a day-ahead load forecast at 10:00 am for use by our members.

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.

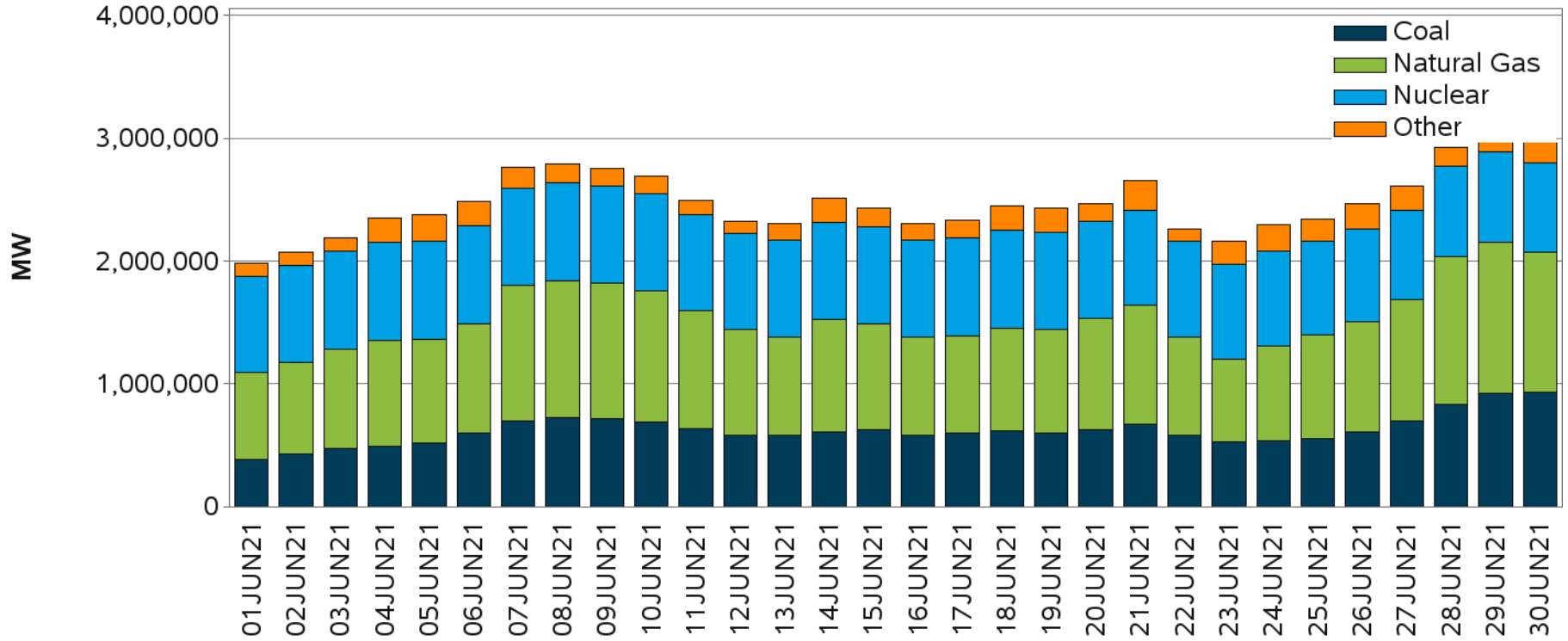
- As we transitioned into true summer weather in June, including the highest temperatures so far this year and periods of very high humidity and THI, load and weather models had a tendency to under-forecast, especially in the first half of the month. A few instances of unseasonably cool weather mixed in with the hotter conditions also caused suboptimal performance of the load forecast models, as they are challenged by these transitional periods. Peak forecasts were within the 3% threshold during our first two stretches of 90+ degree days in the Mid-Atlantic – June 5-7 and 28-30 – despite continued under-forecasting of temperatures, as operators identified the trend and helped mitigate the impact on the load forecast.



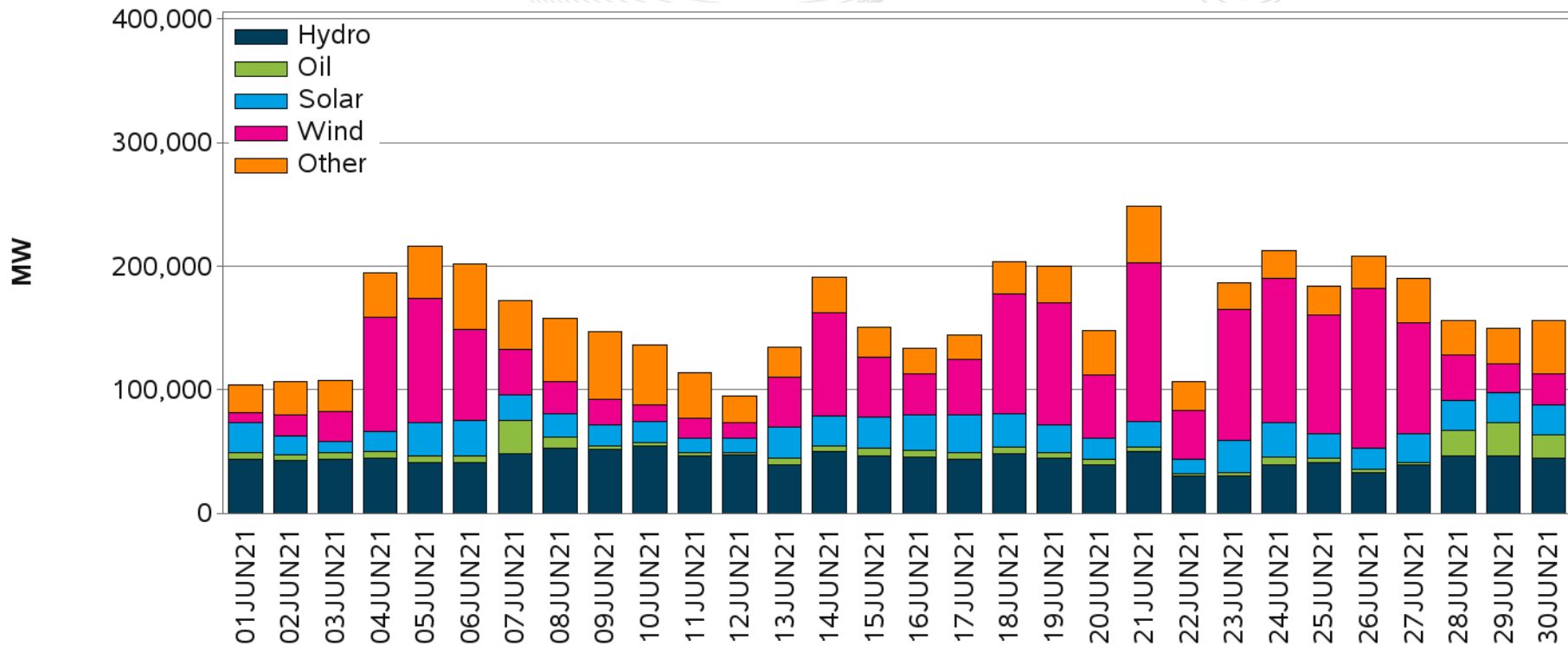
Other includes Hydro, Oil, Solar, Wind, and Other



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

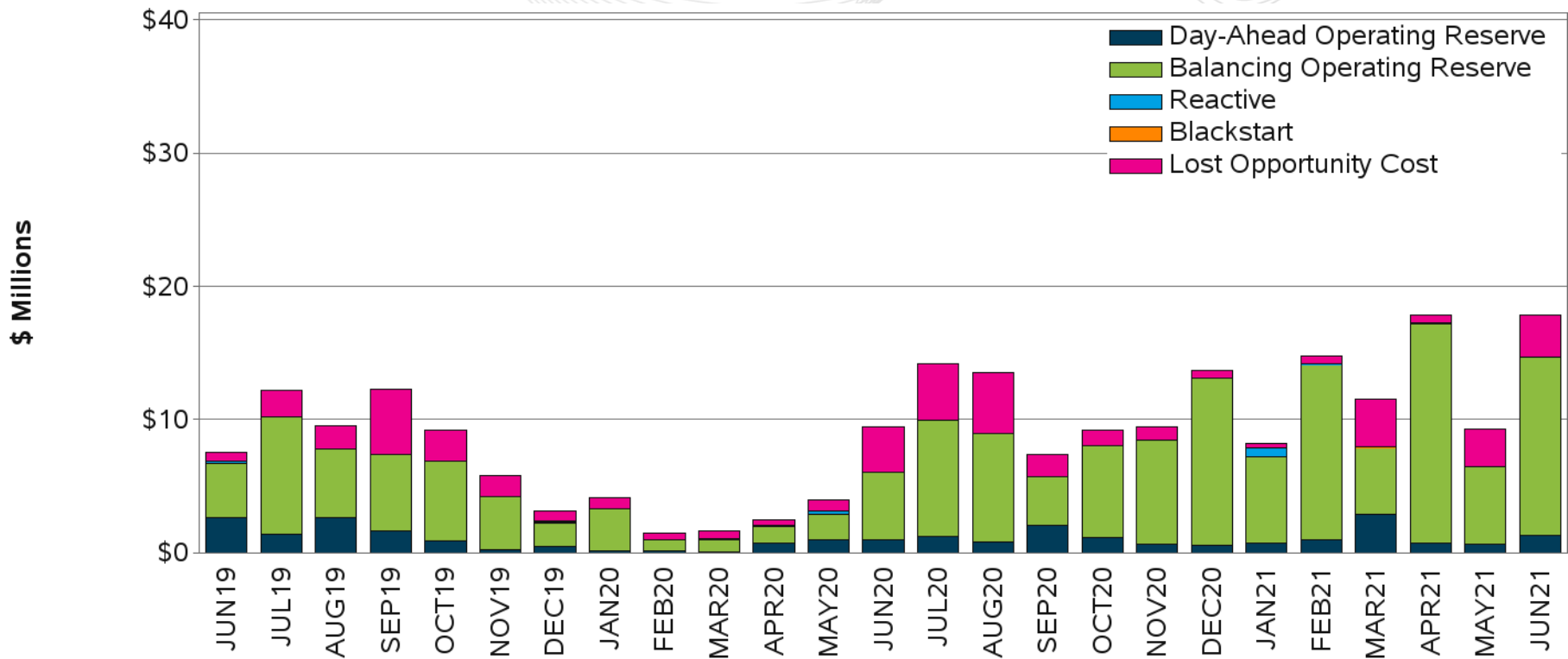


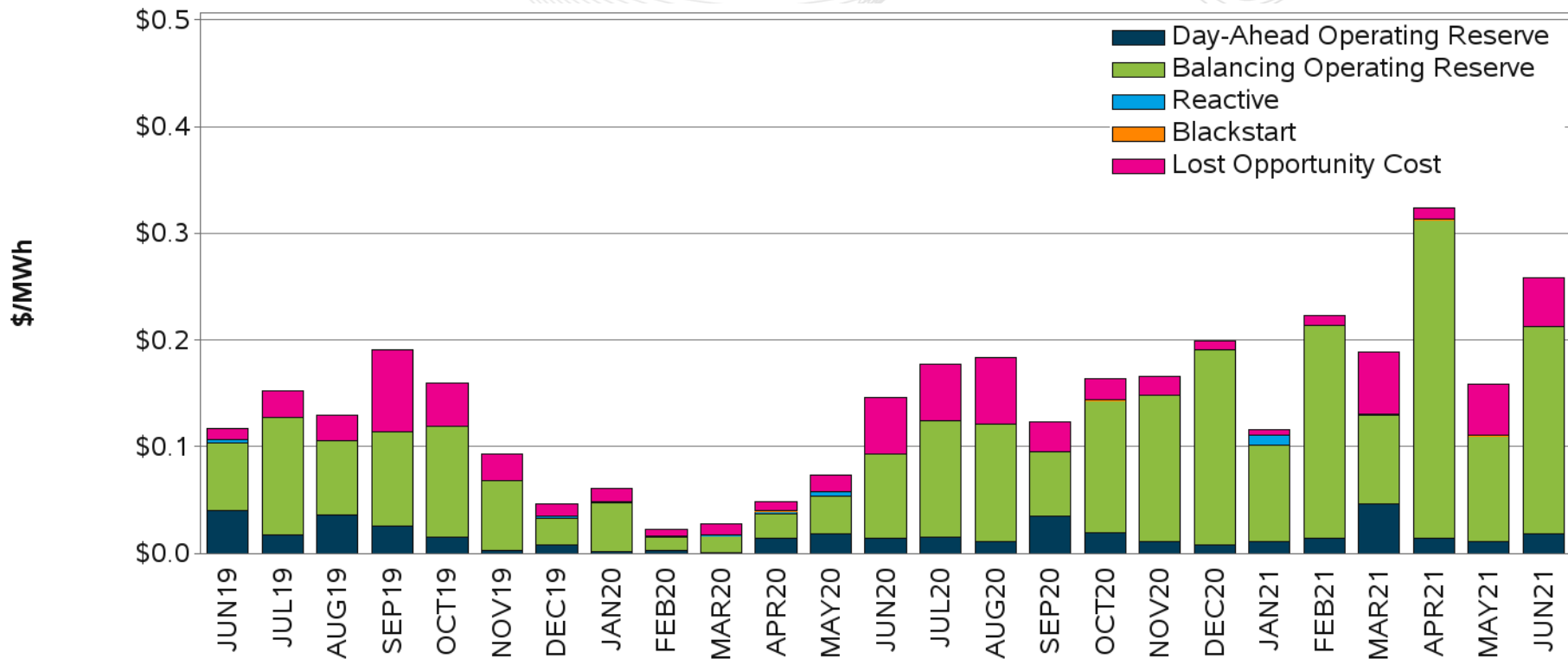
Other includes Hydro, Oil, Solar, Wind, and Other

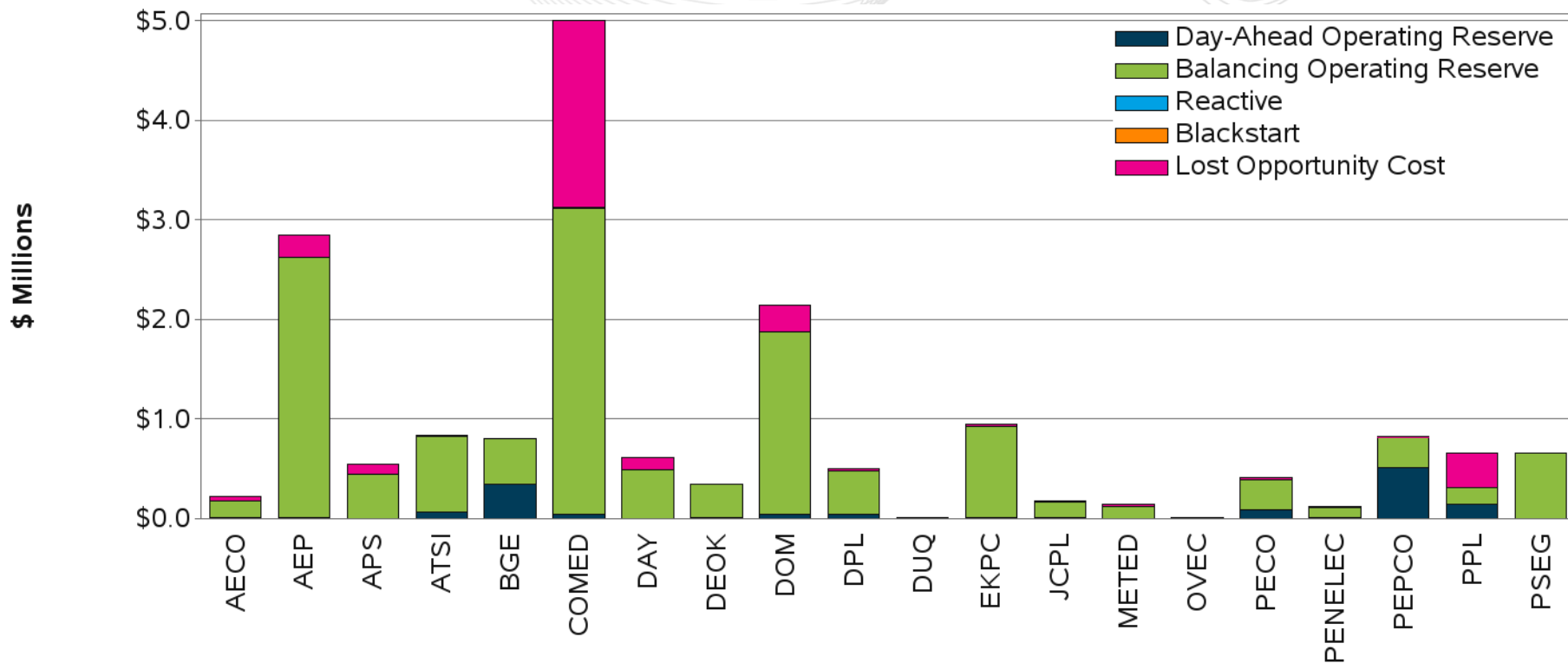


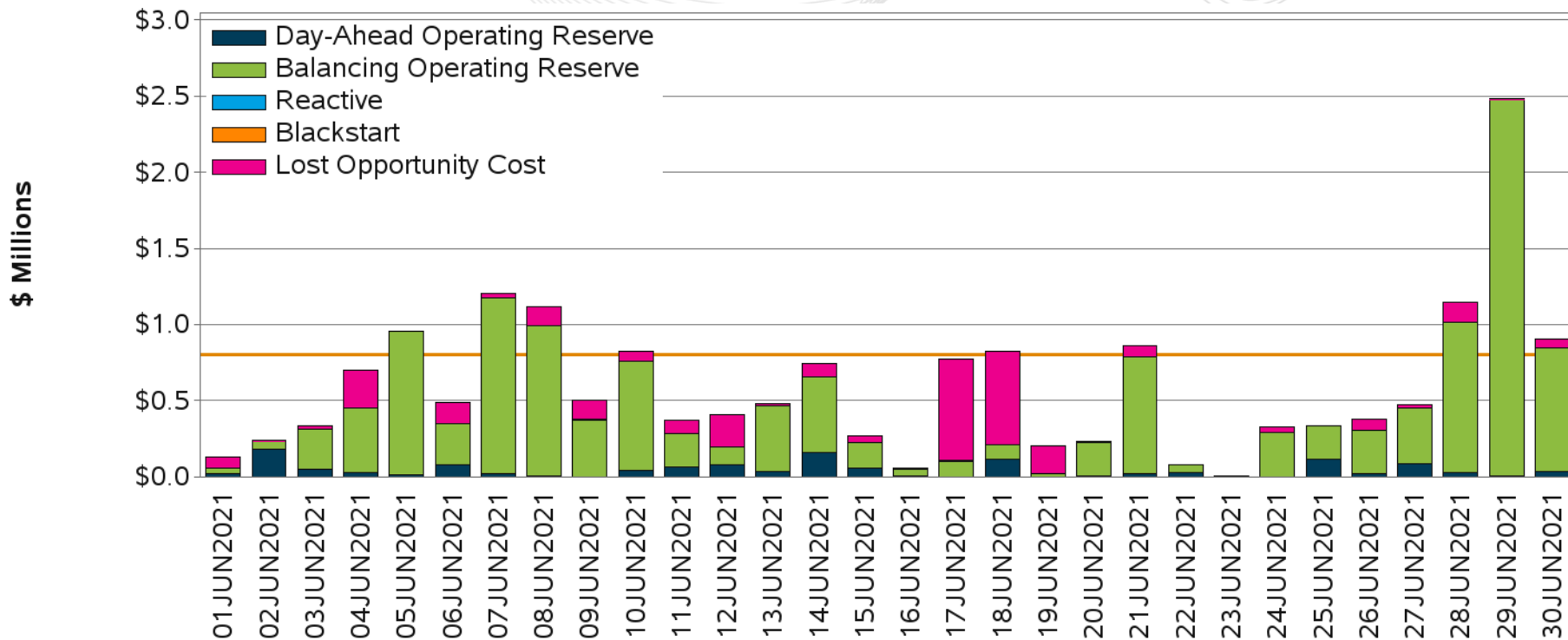
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Operating Reserve (Uplift)









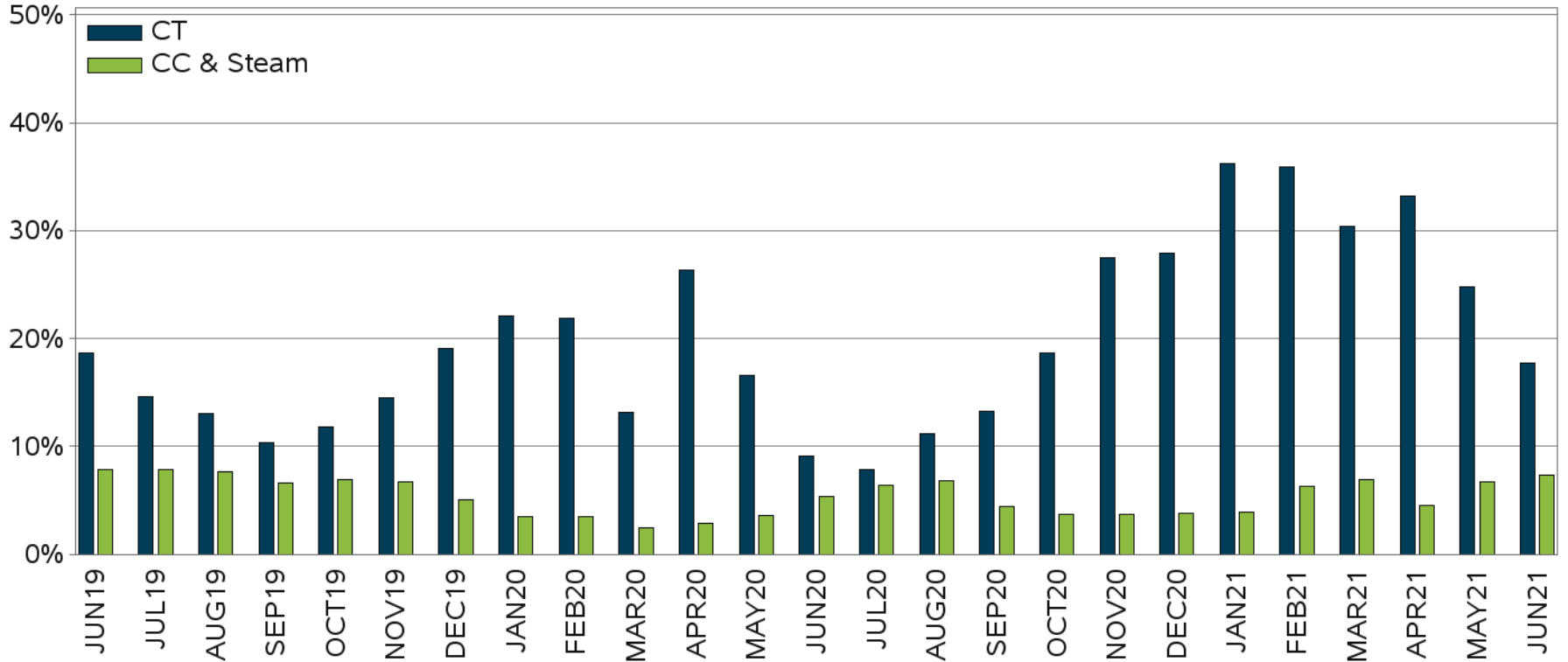
In June, uplift exceeded \$800,000 on nine days – June 5, 7, 8, 10, 18, 21, 28, 29 and 30.

Contributing factors to uplift were:

- In June PJM experienced high temperatures, periods of very high humidity (and THIs), as well as instances of unseasonably cool weather. Resulting load levels, constraint control, and load forecast error directly impacted Balancing Operating Reserve throughout the month. In addition, larger units needed for reliability resulted in increased BOR and Day-Ahead Operating Reserve.

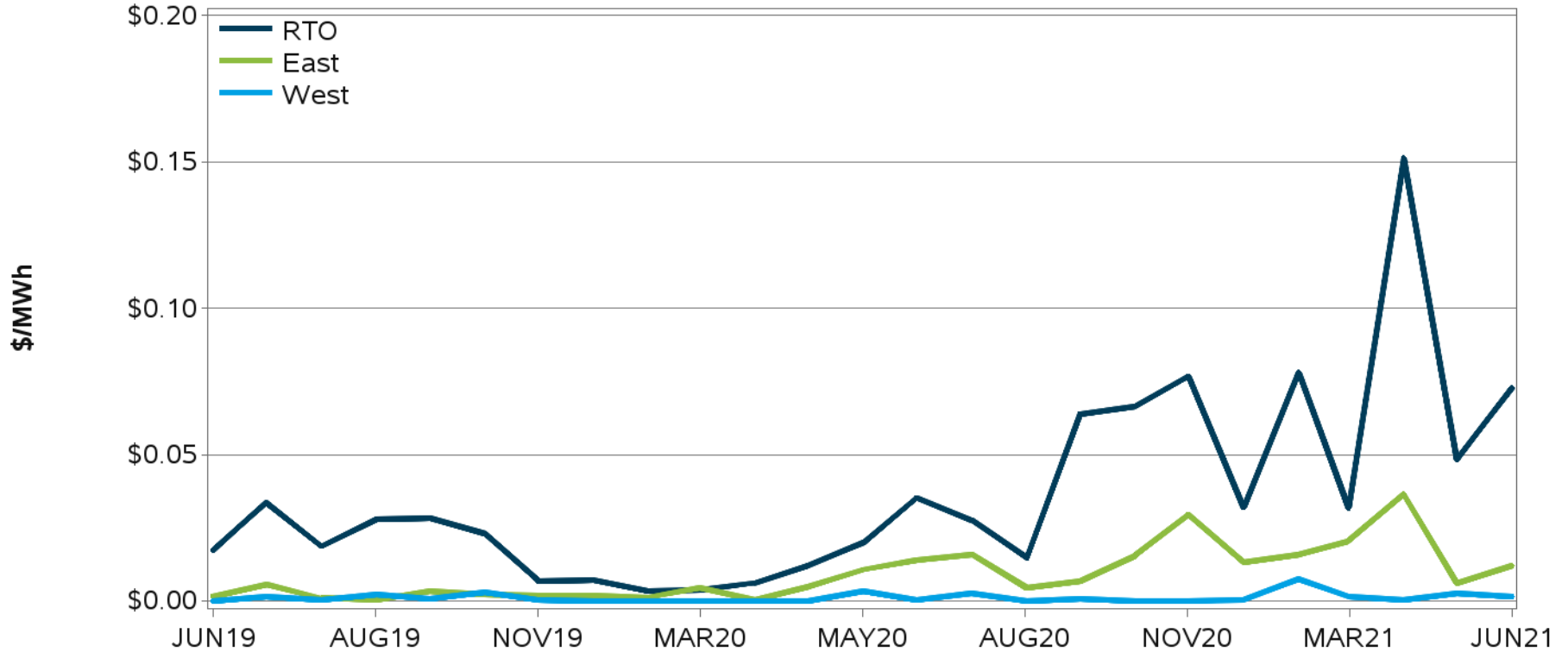
More information on Uplift can be found on PJM's website at [Drivers of Uplift](#)

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

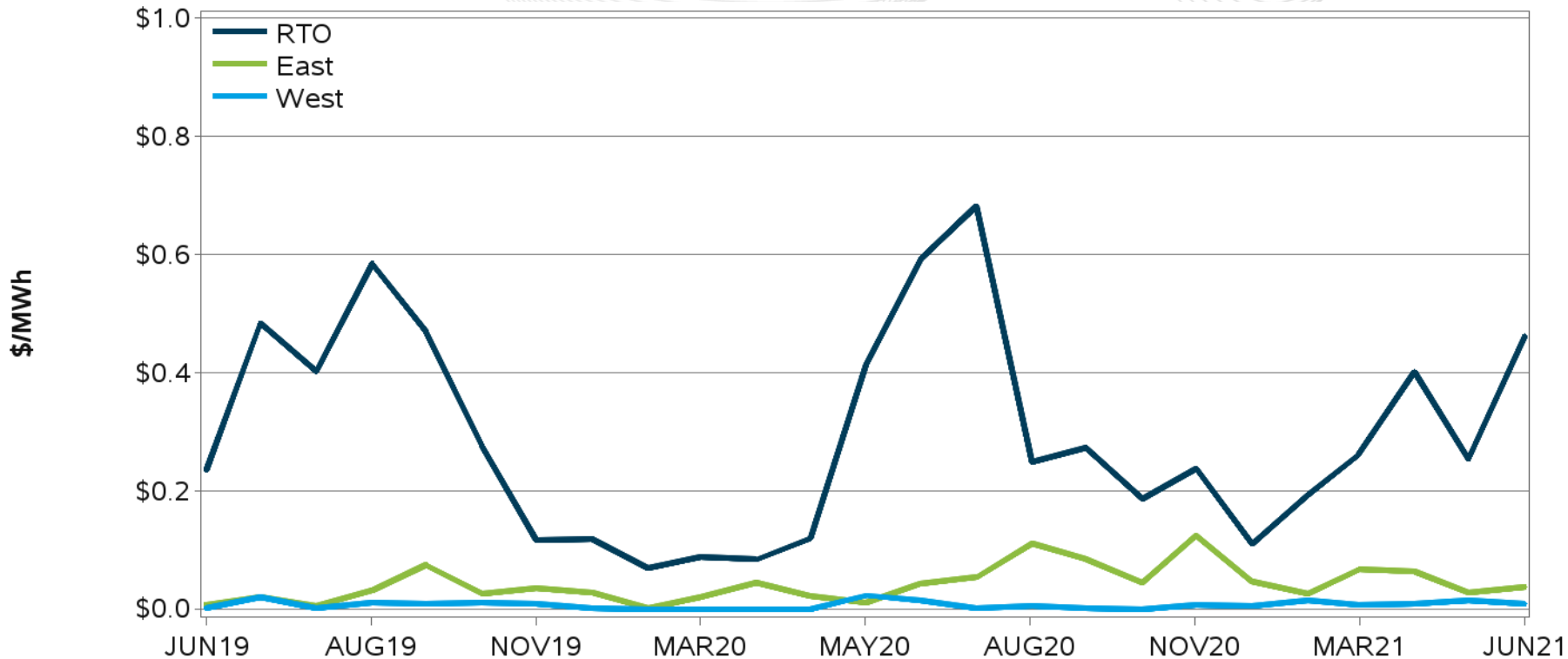


- Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.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



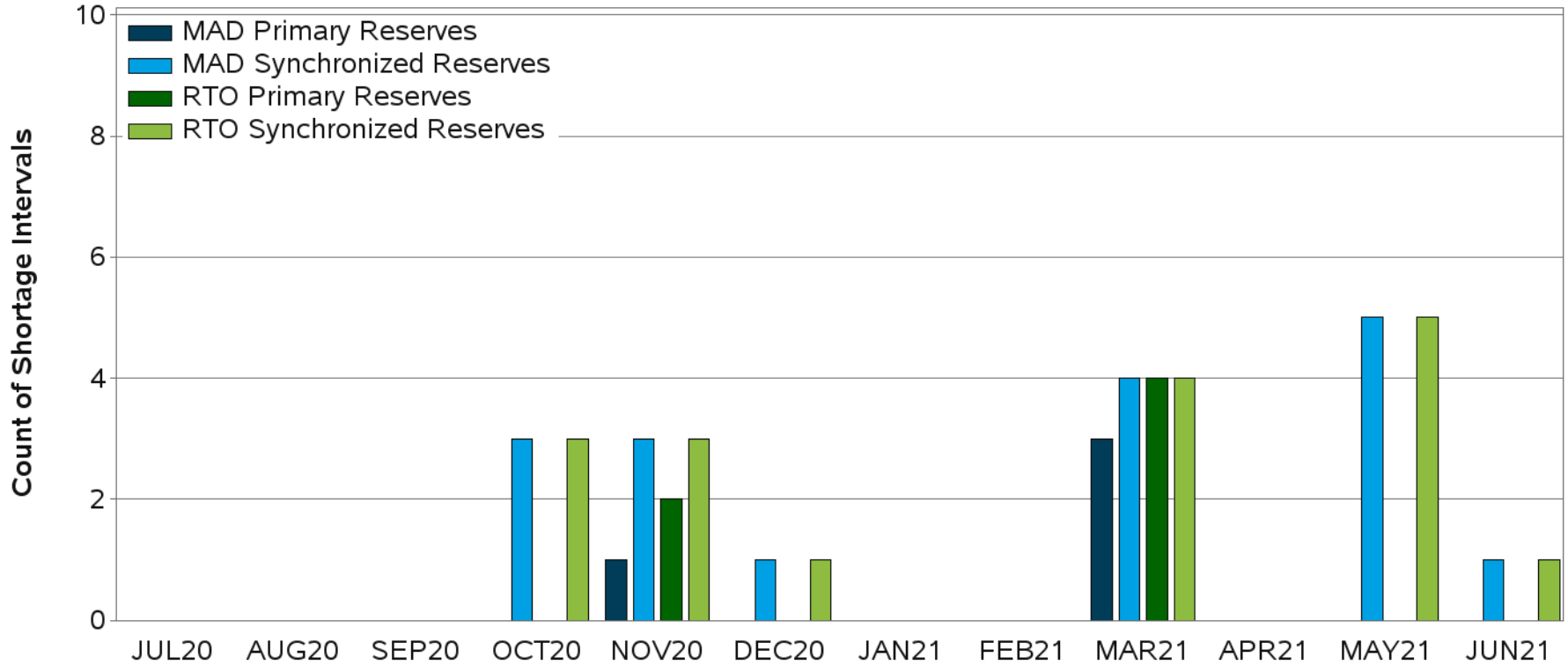
Energy Market

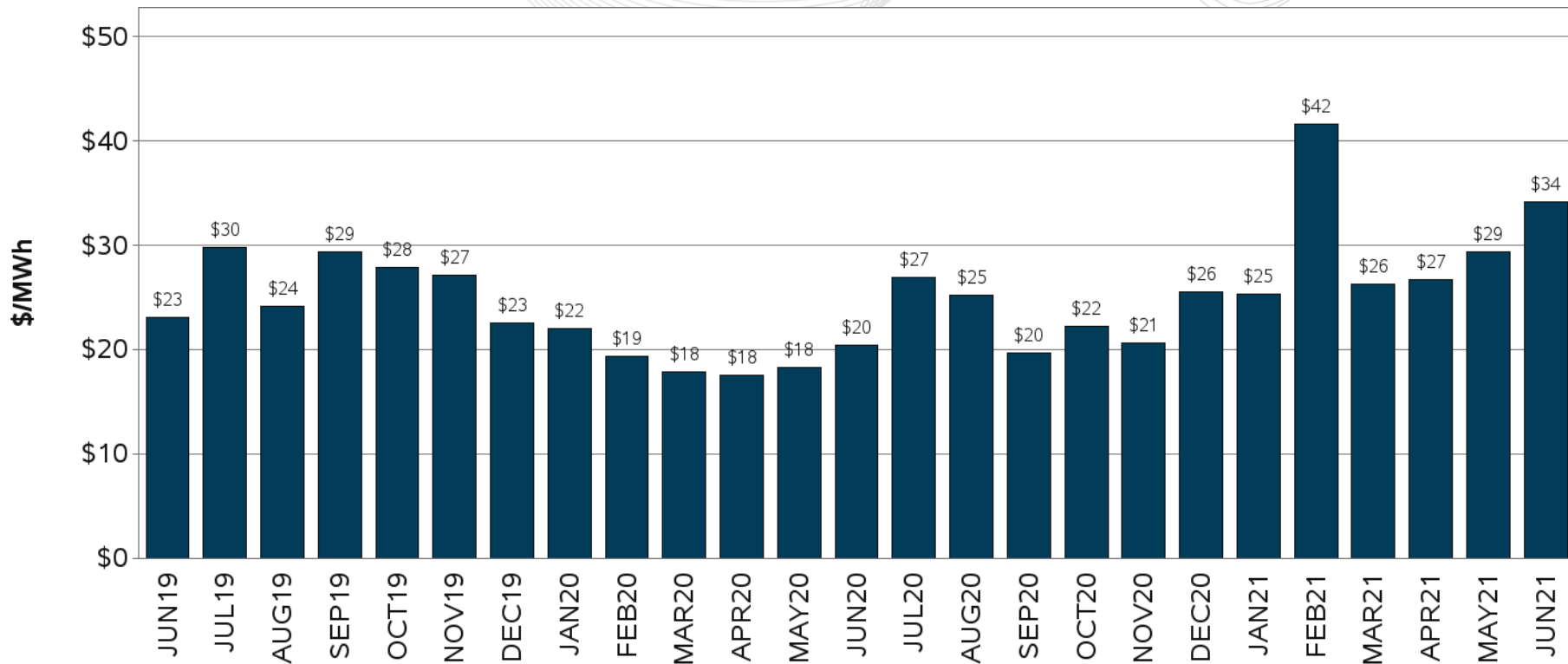
LMP Summary

Date	5-minute Interval	Reserve Penalty Factors	5-minute Interval SMP	Hourly Integrated SMP
Wednesday, June 02, 2021	17:00 - 17:05	2nd step penalty for Synchronized Reserve deficiencies in RTO and MAD	\$704.38	\$88.21

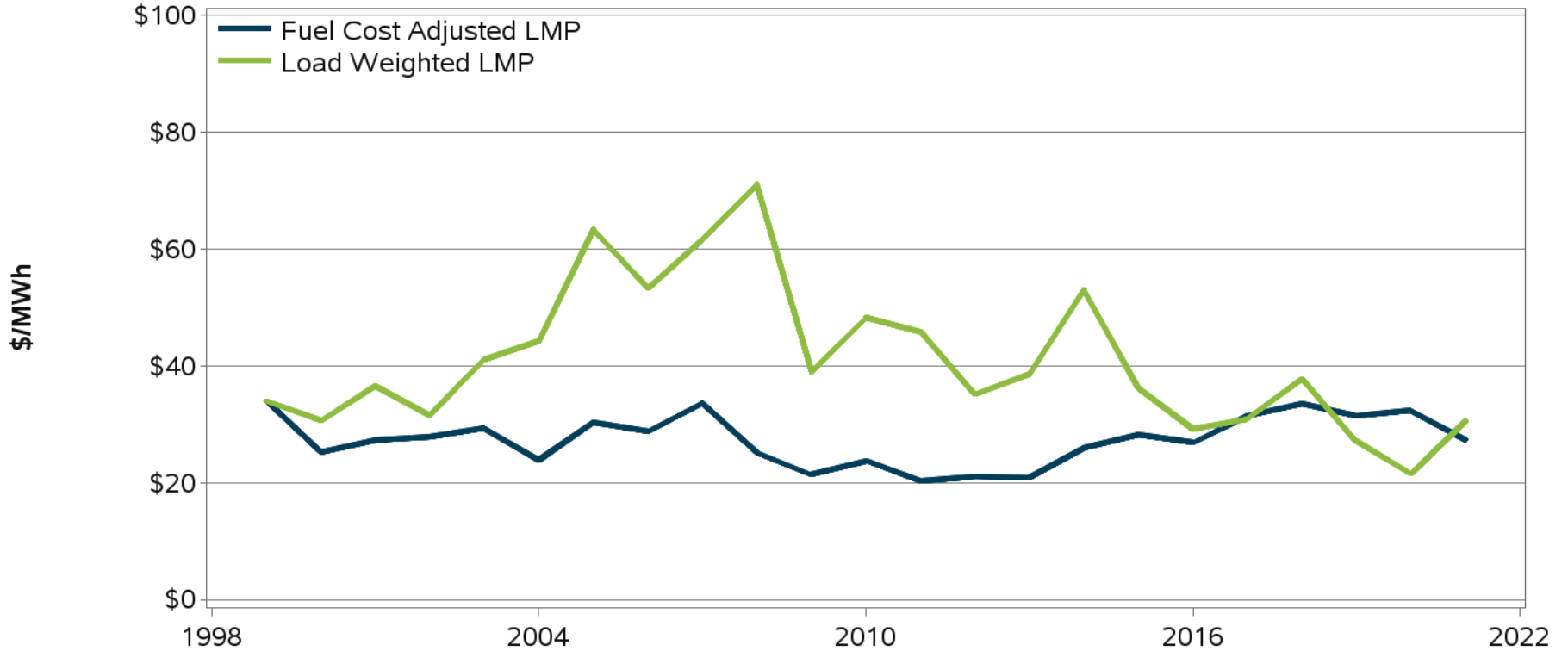
Information on constraints and shadow prices can be found here:

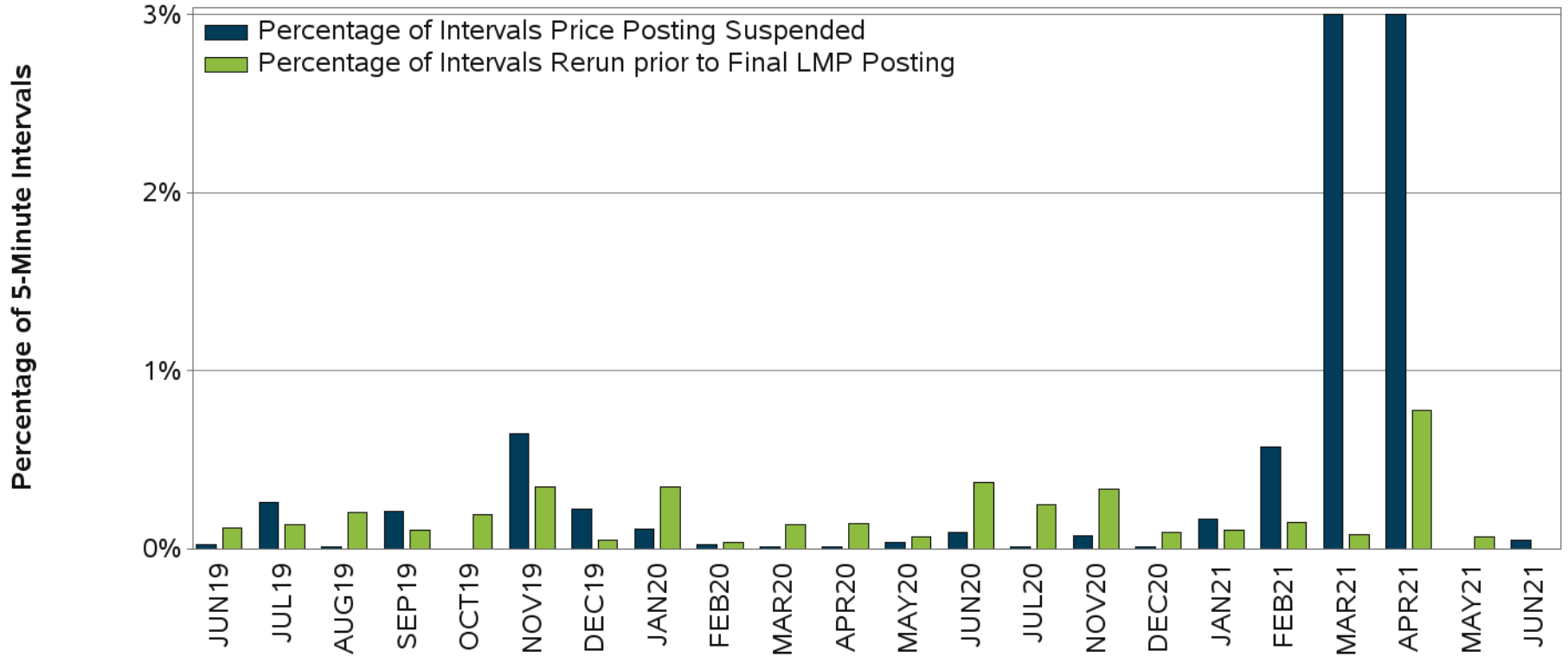
http://dataminer2.pjm.com/feed/rt_marginal_value





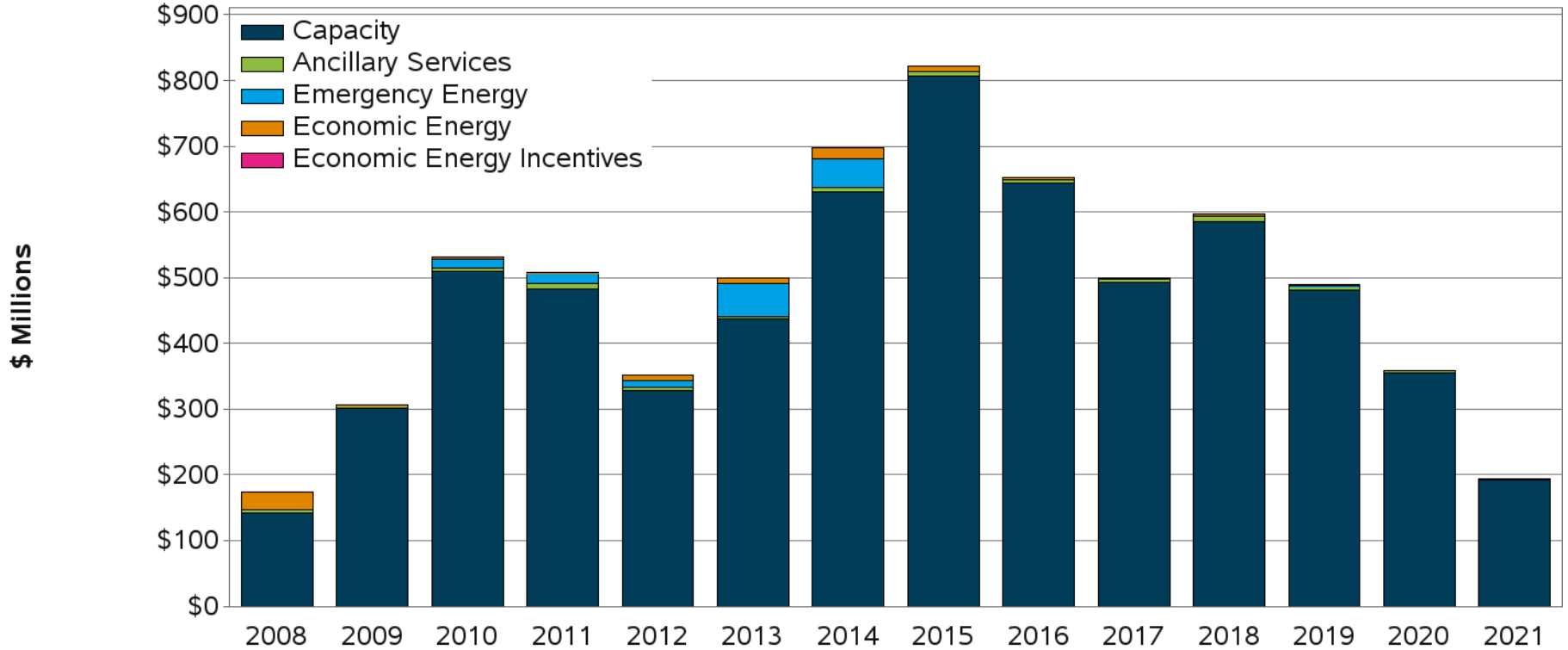
Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)

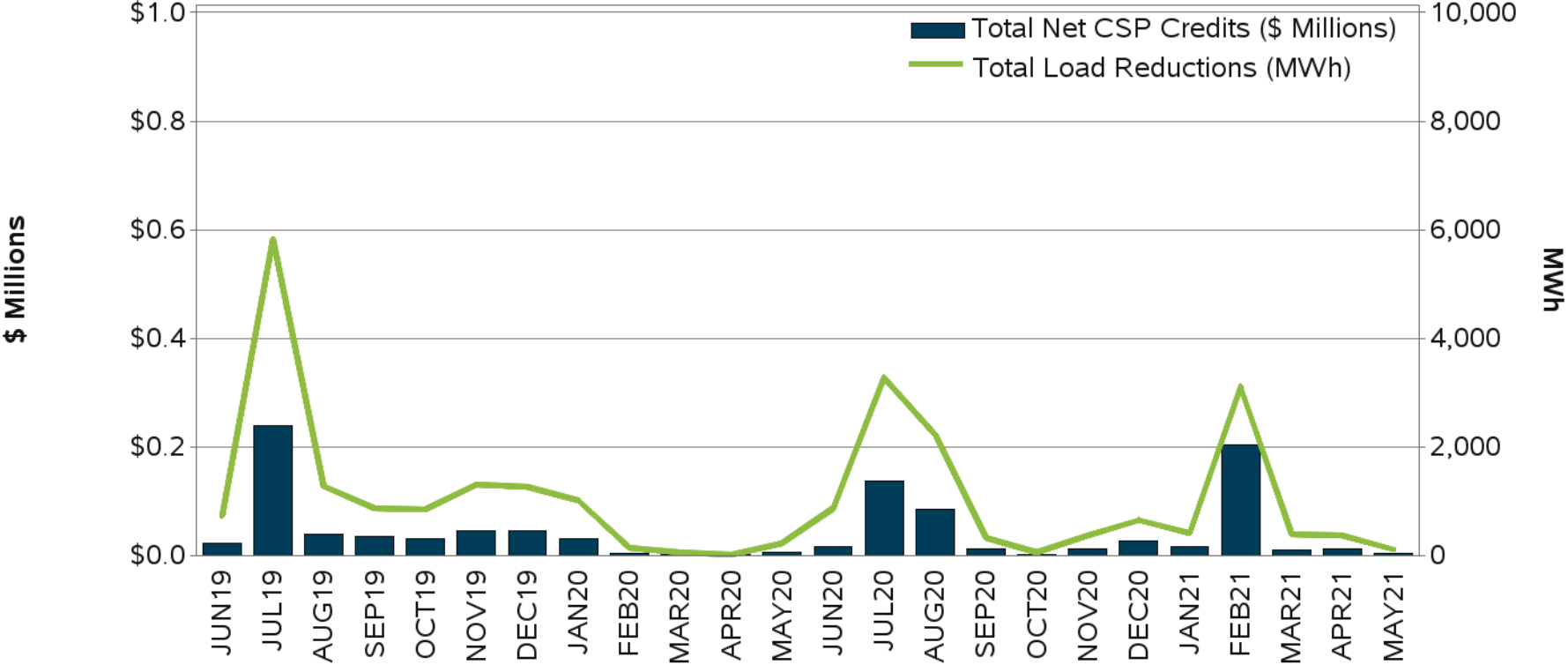




Energy Market

Demand Response Summary

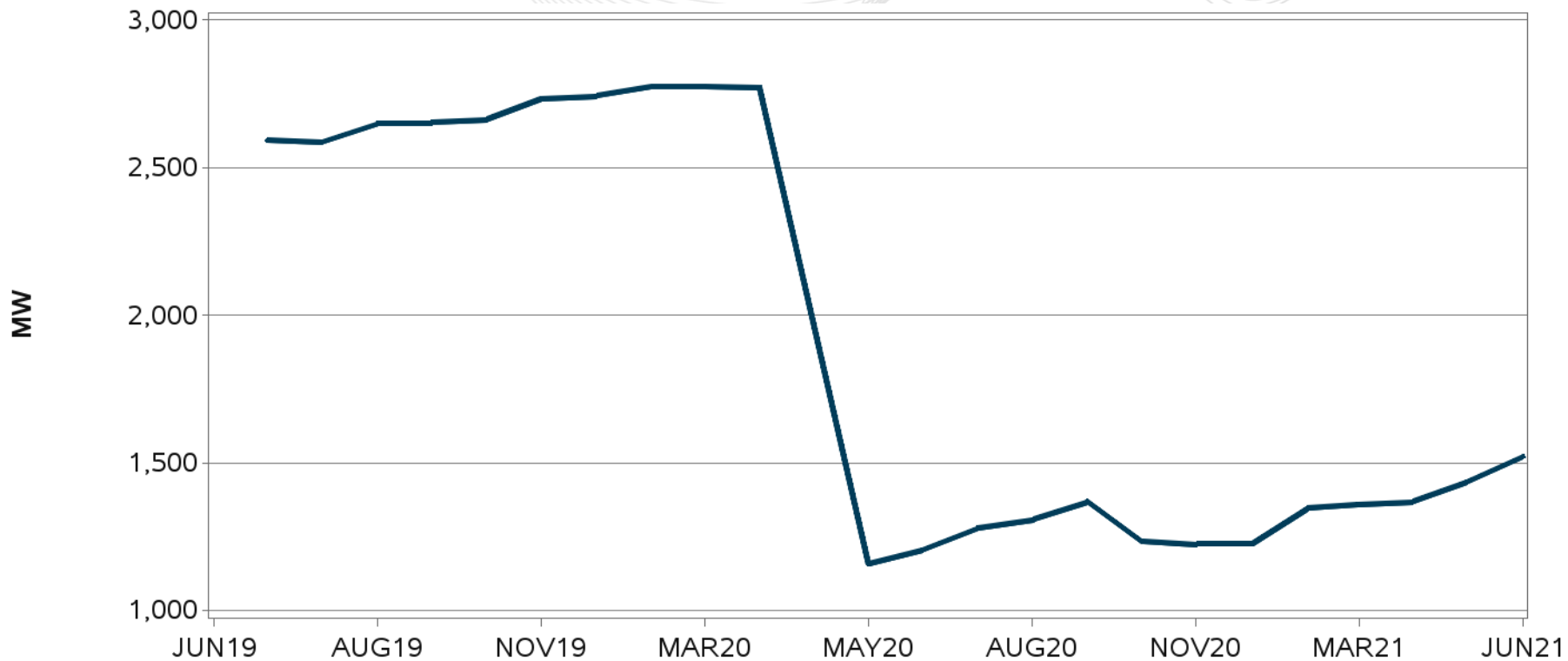




*Data for the last few months are subject to significant change due to the settlement window.



Total Registered MW in PJM's Economic Demand Response

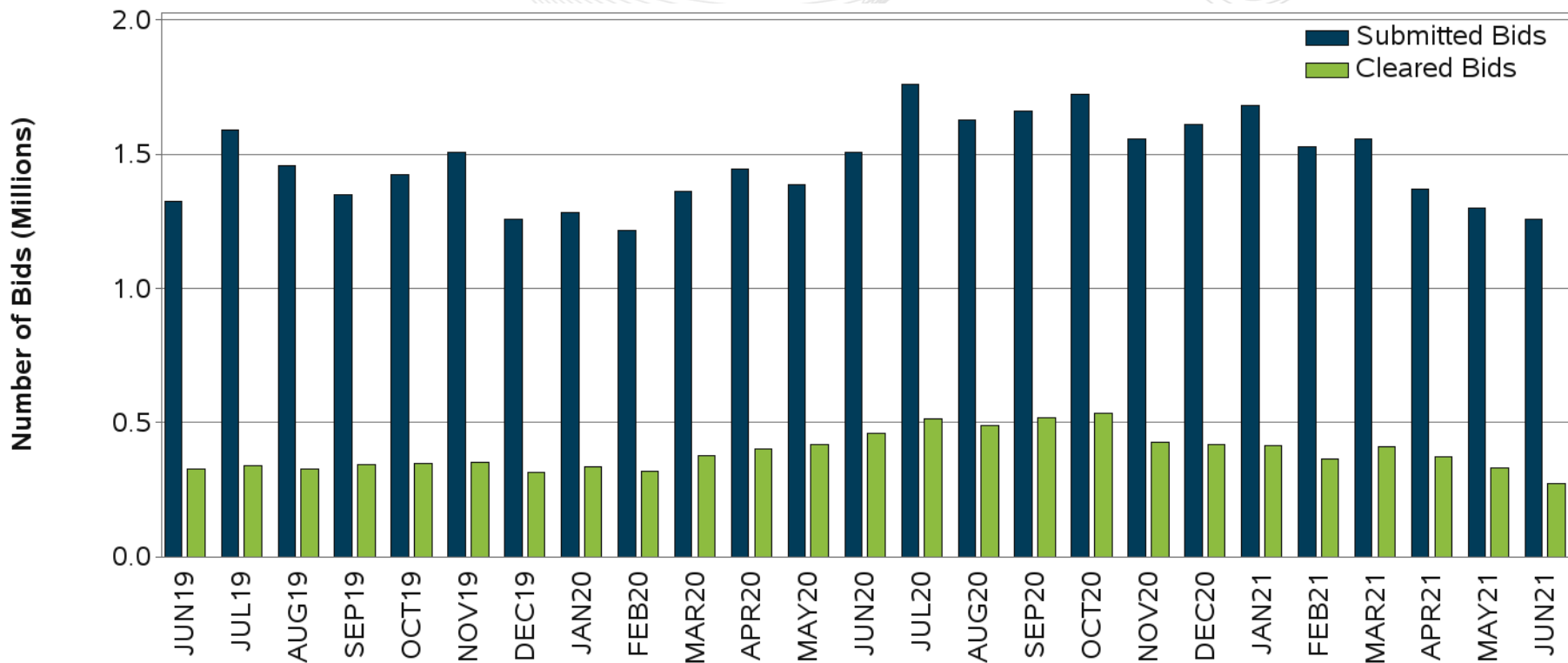


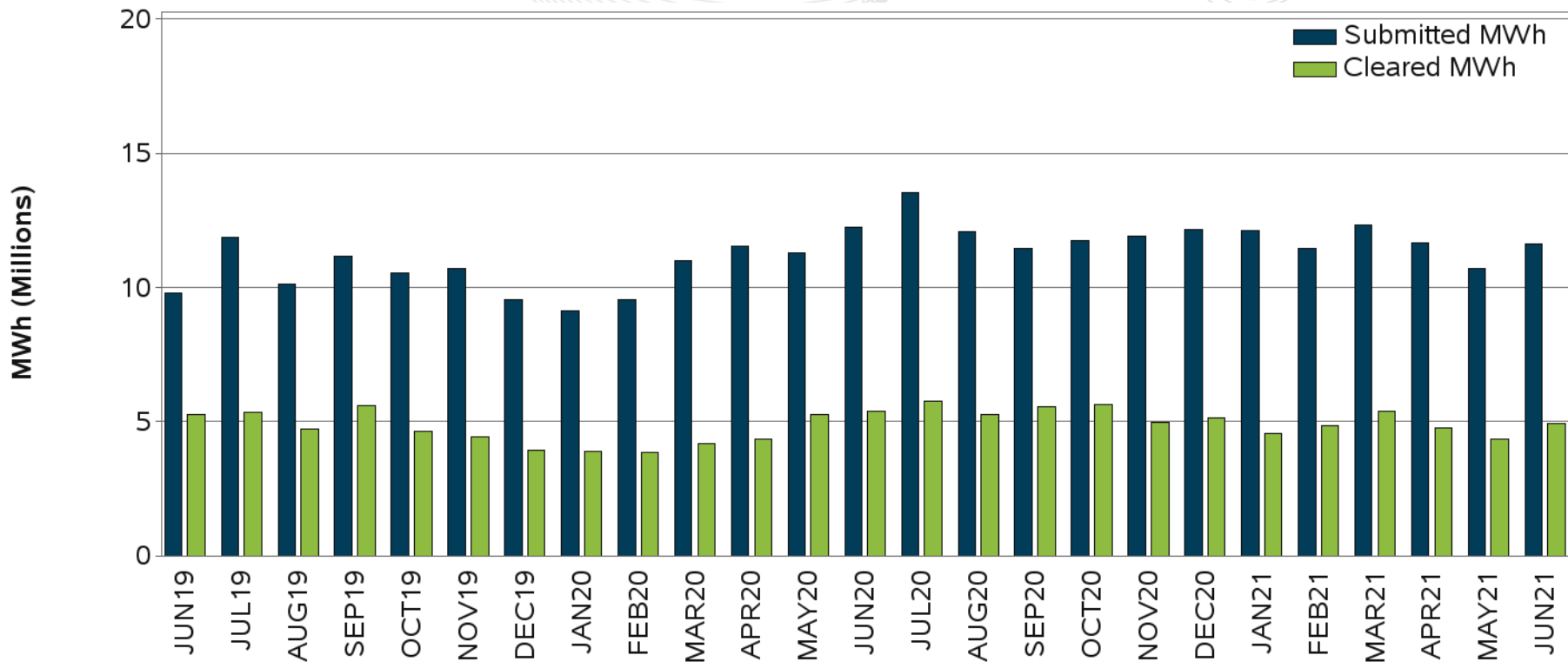
Energy Market

Virtual Activity Summary

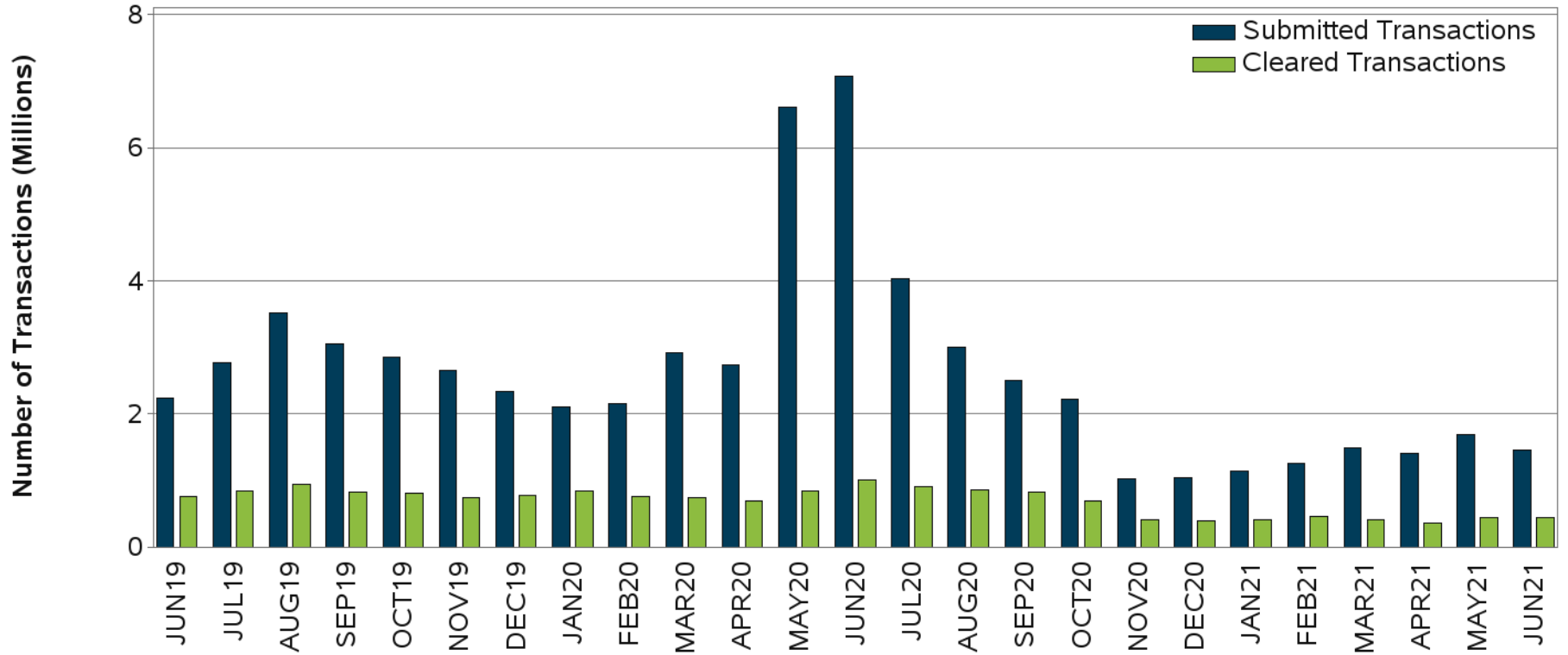
- The following six charts depict trends in submitted and cleared virtual and up-to-congestion transactions, in terms of number and volume, into the PJM Energy Market. The first two of these charts show the submitted and cleared increment and decrement bids (virtual transactions or virtuals) and they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

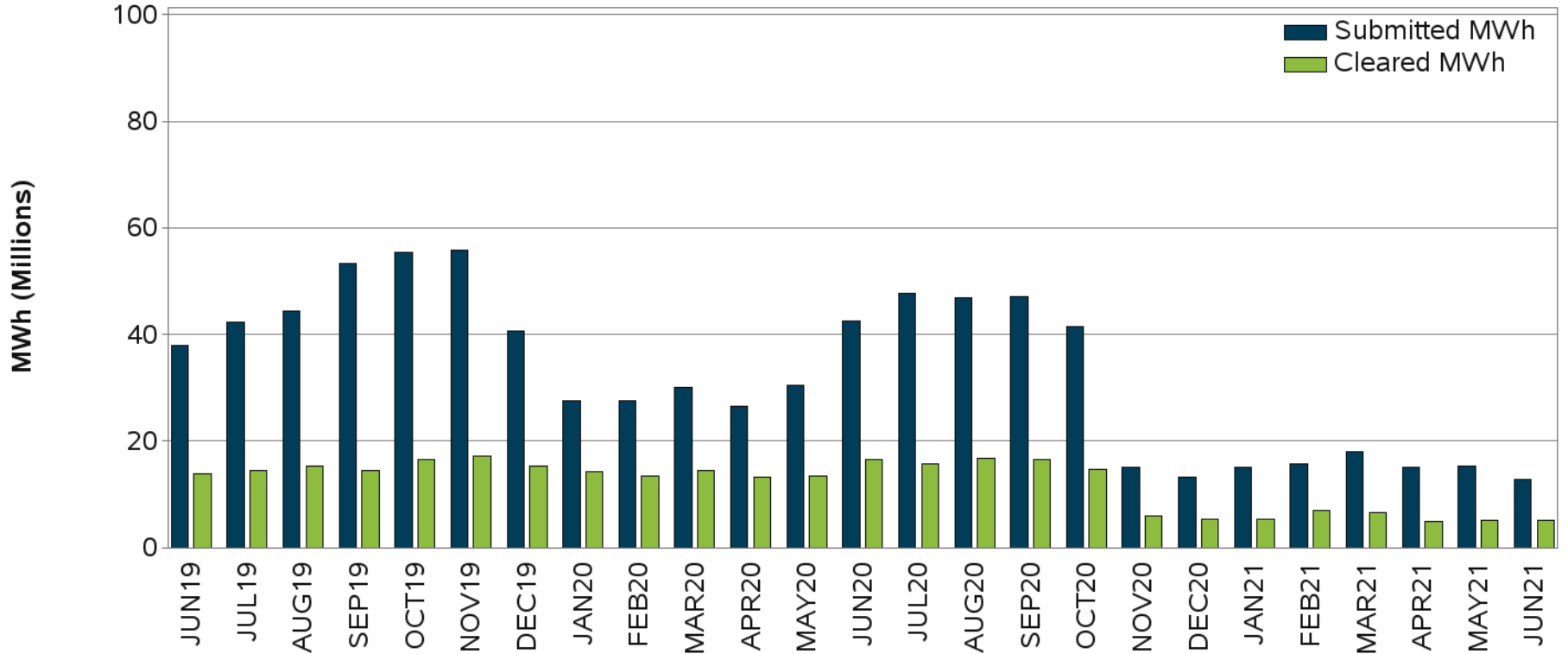




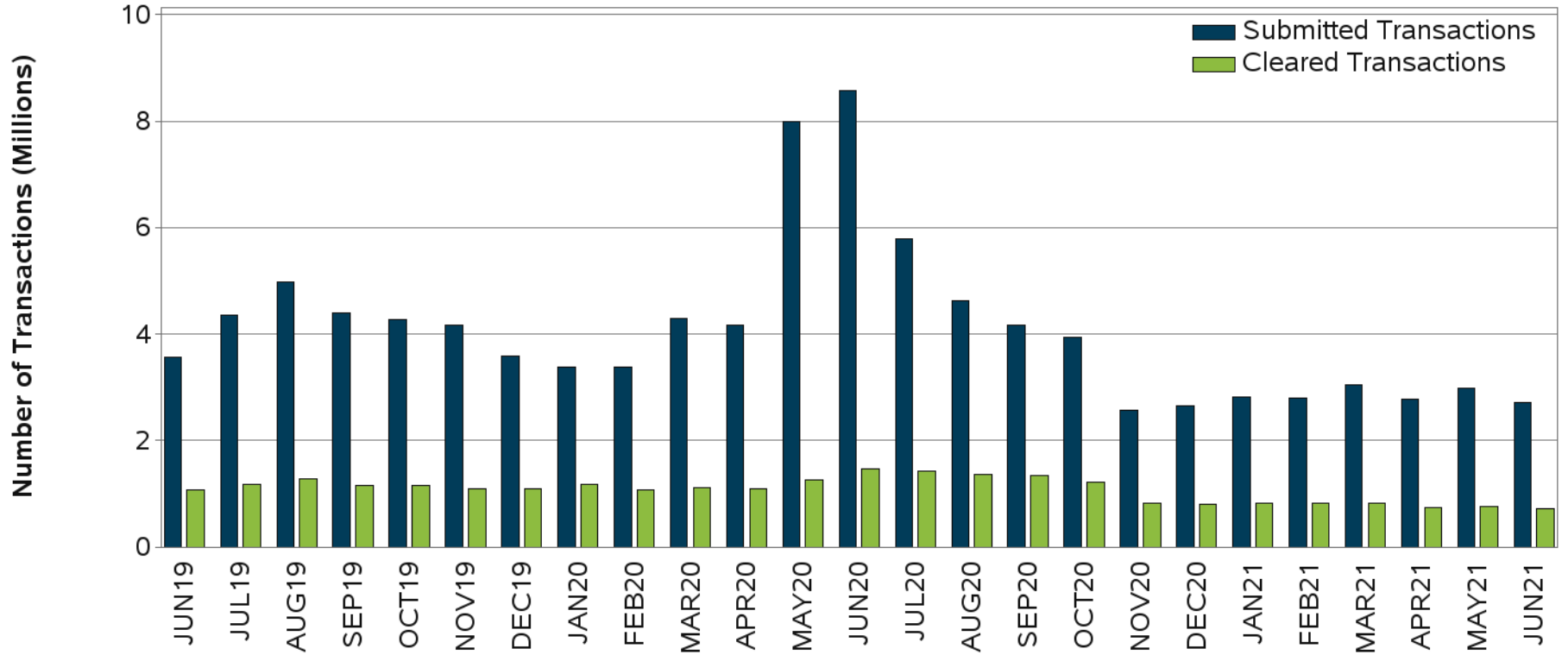
Up-To-Congestion Transactions - Total Number



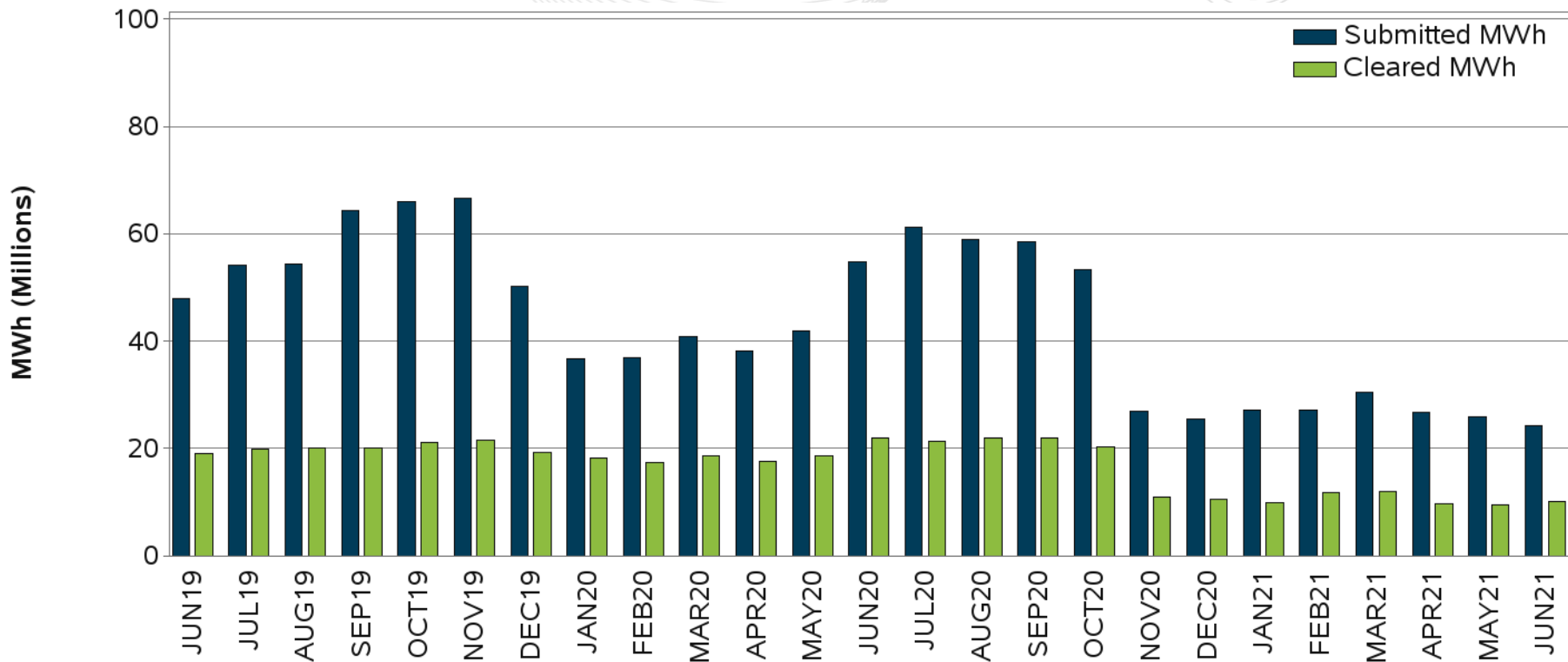
Up-To-Congestion Transactions - Total Volume



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



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

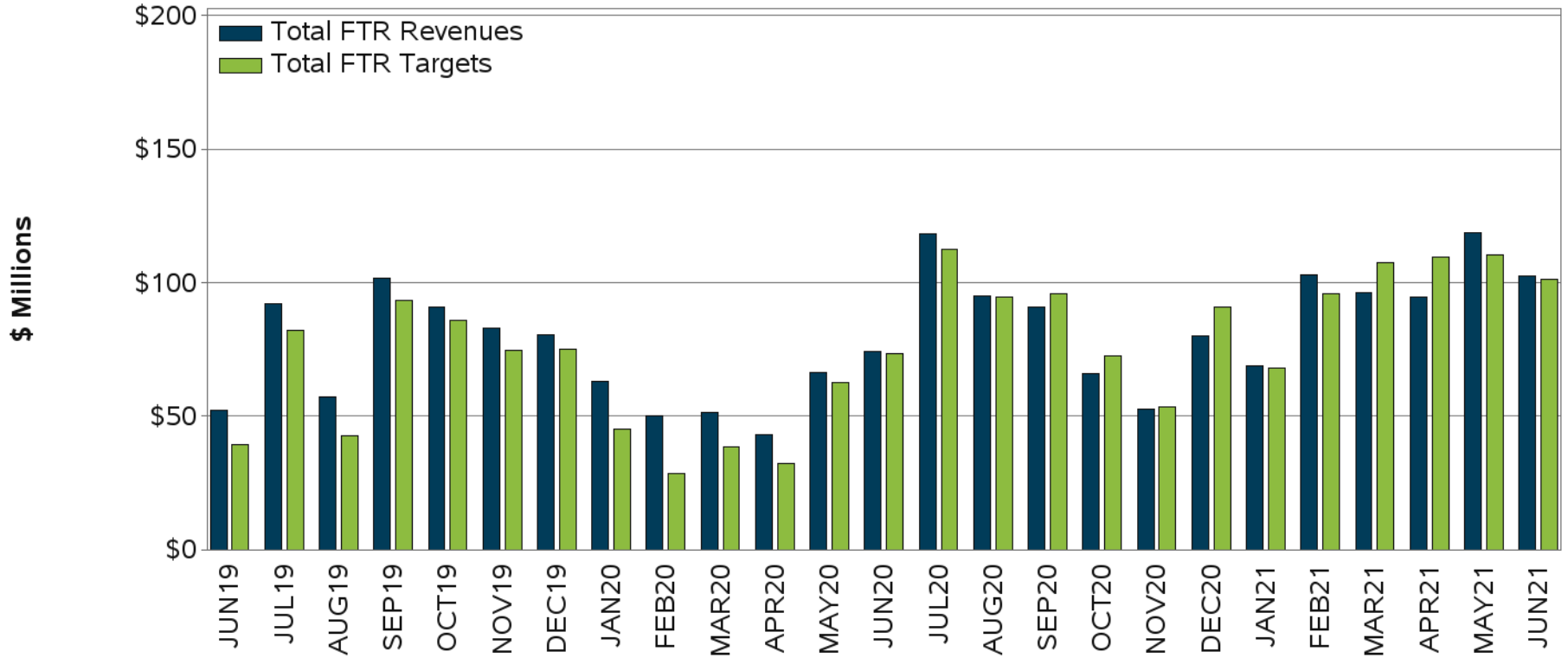


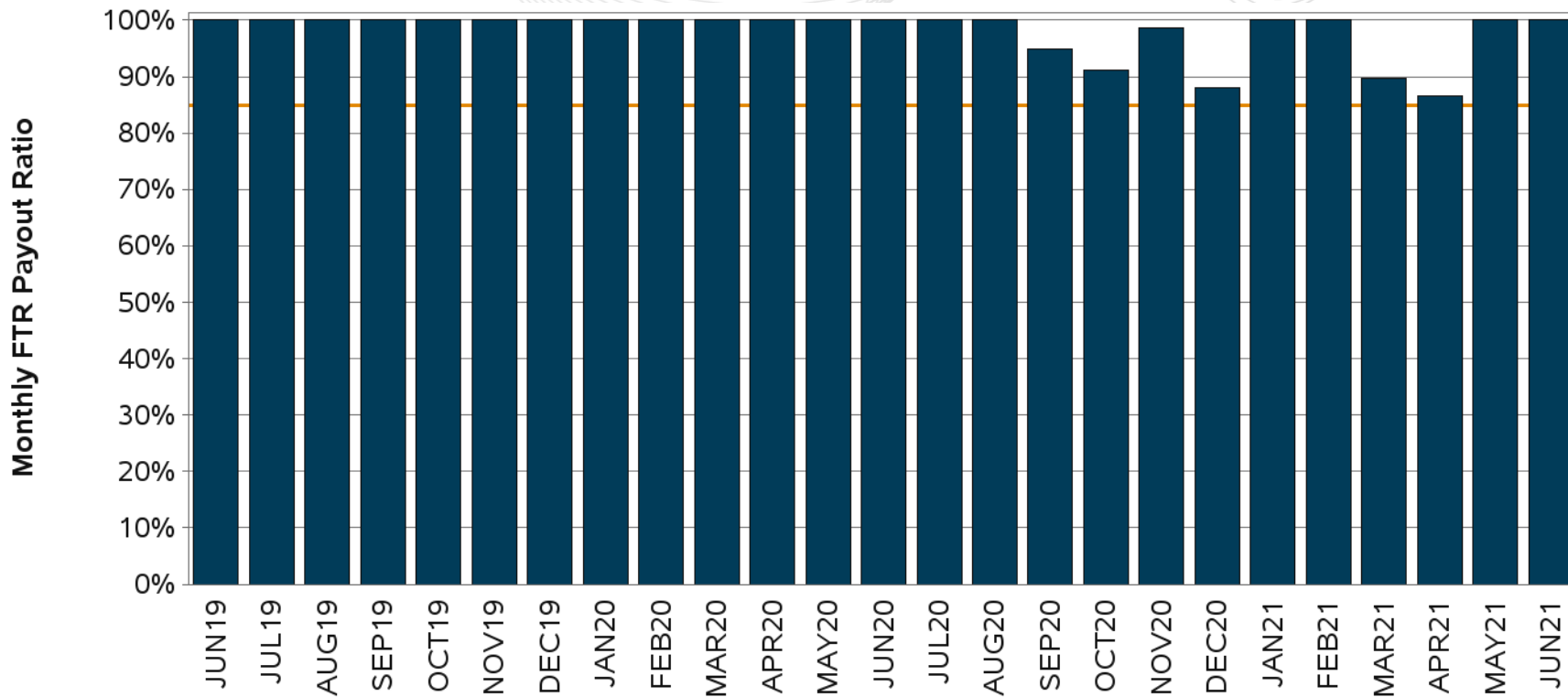
Energy Market

Congestion and FTR Summary

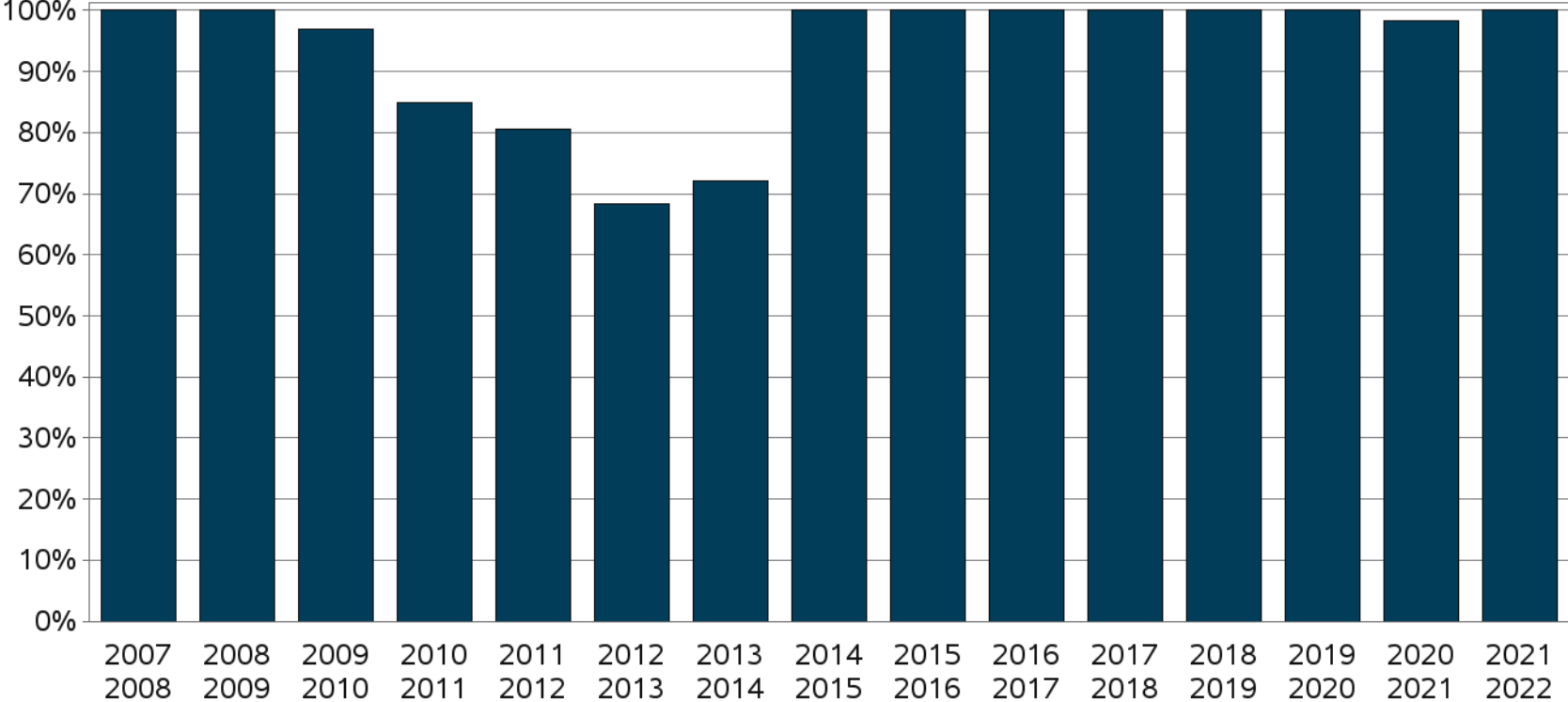
Period	Surplus / Underfunding	Payout Ratio
June, 2021	\$981,647	100%
2021	\$-5,415,923	99%
2021/2022	\$981,647	100%

FTR Revenue vs. FTR Target Allocation

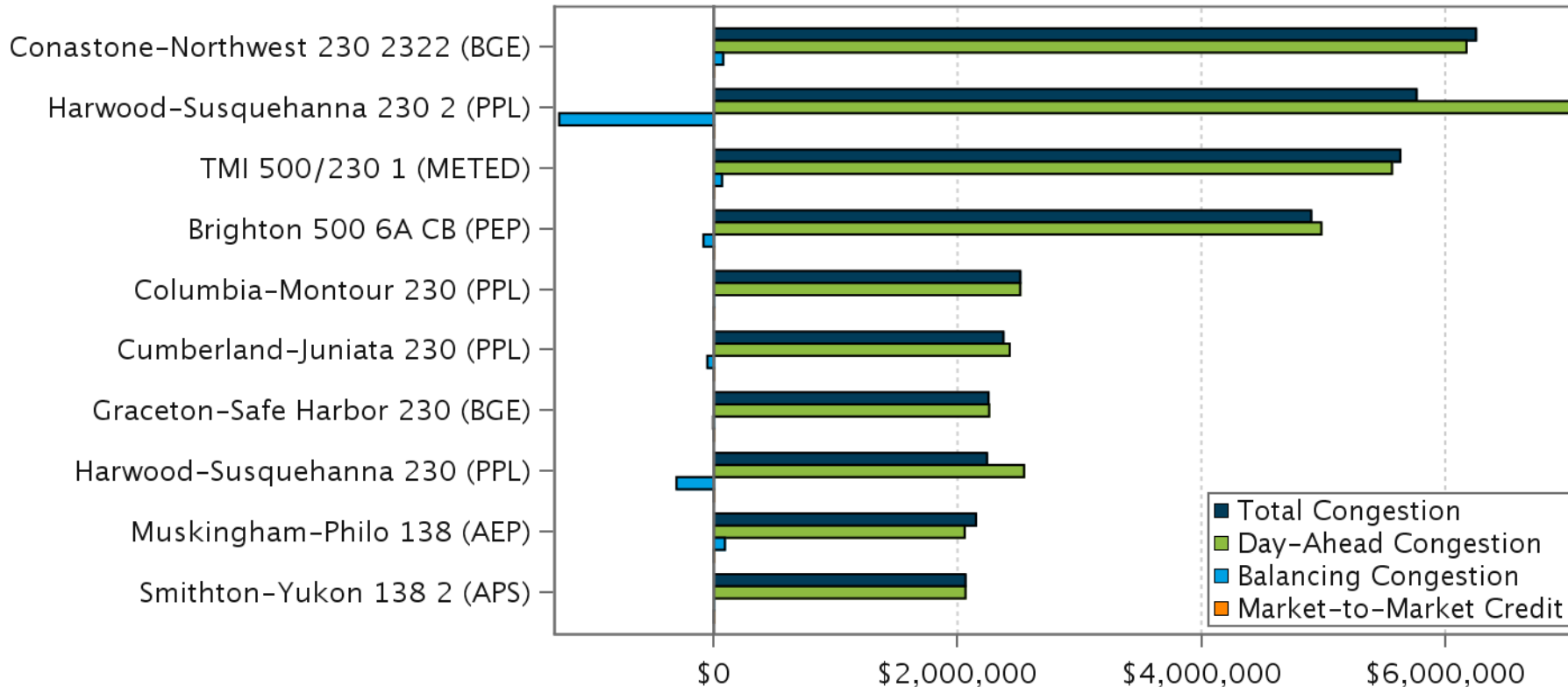




Planning Period FTR Payout Ratio

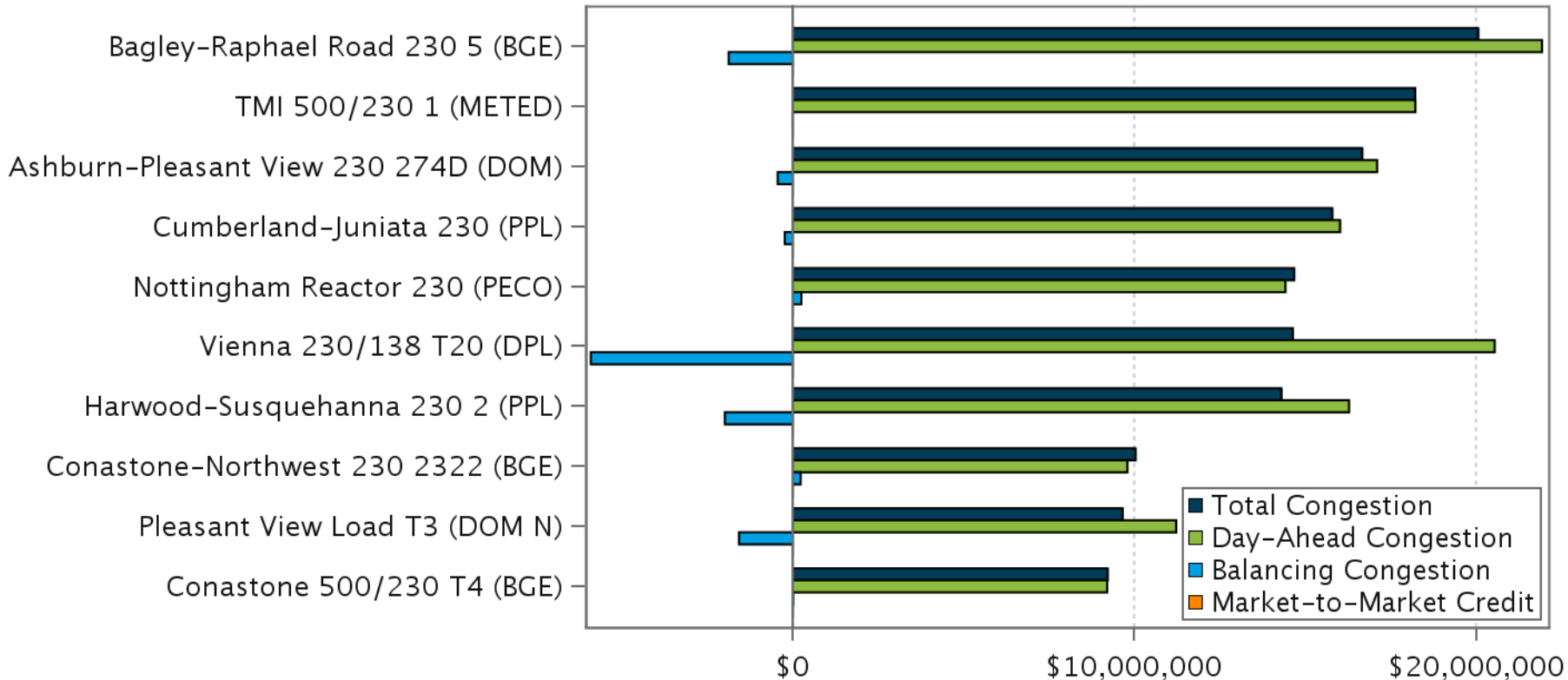


Ten Most Heavily Congested Transmission Facilities - Overall, June



The ten most heavily congested facilities account for 46% of total congestion for June.

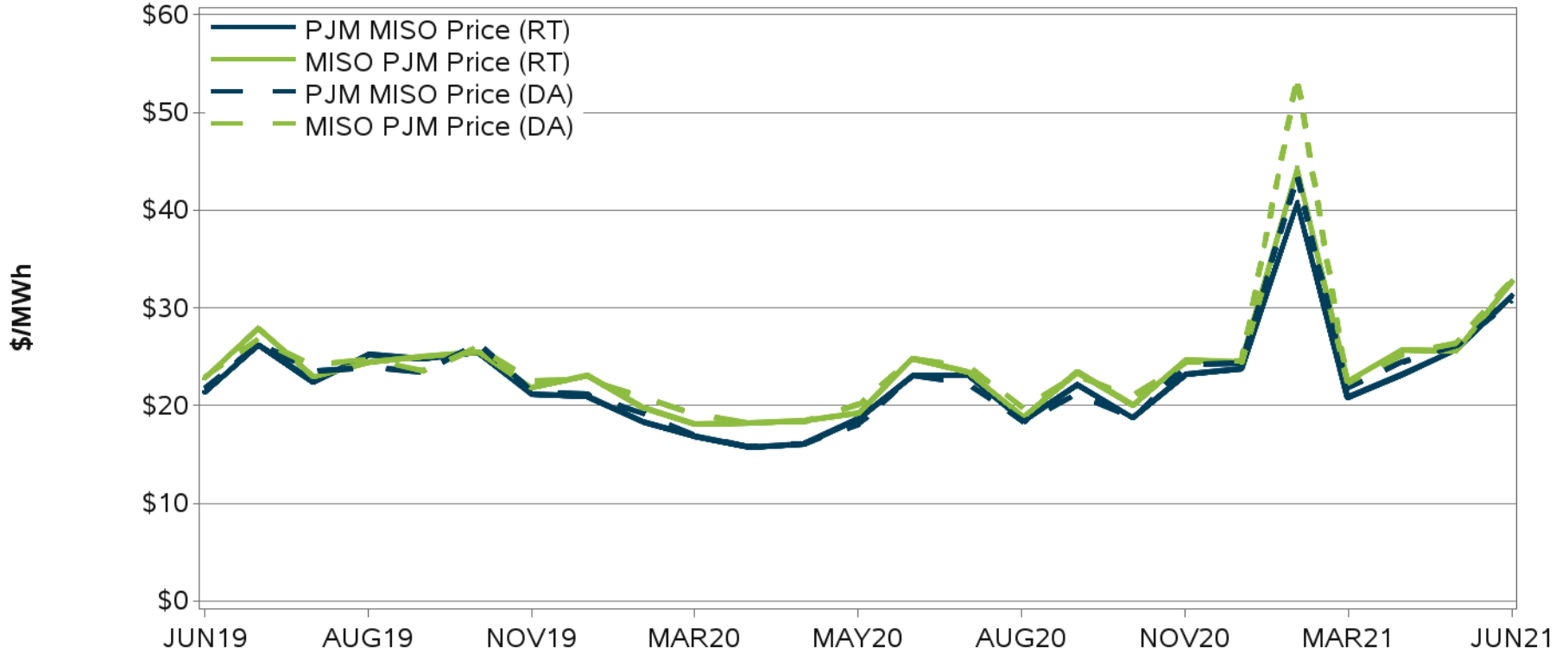
Ten Most Heavily Congested Transmission Facilities - Overall, 2021

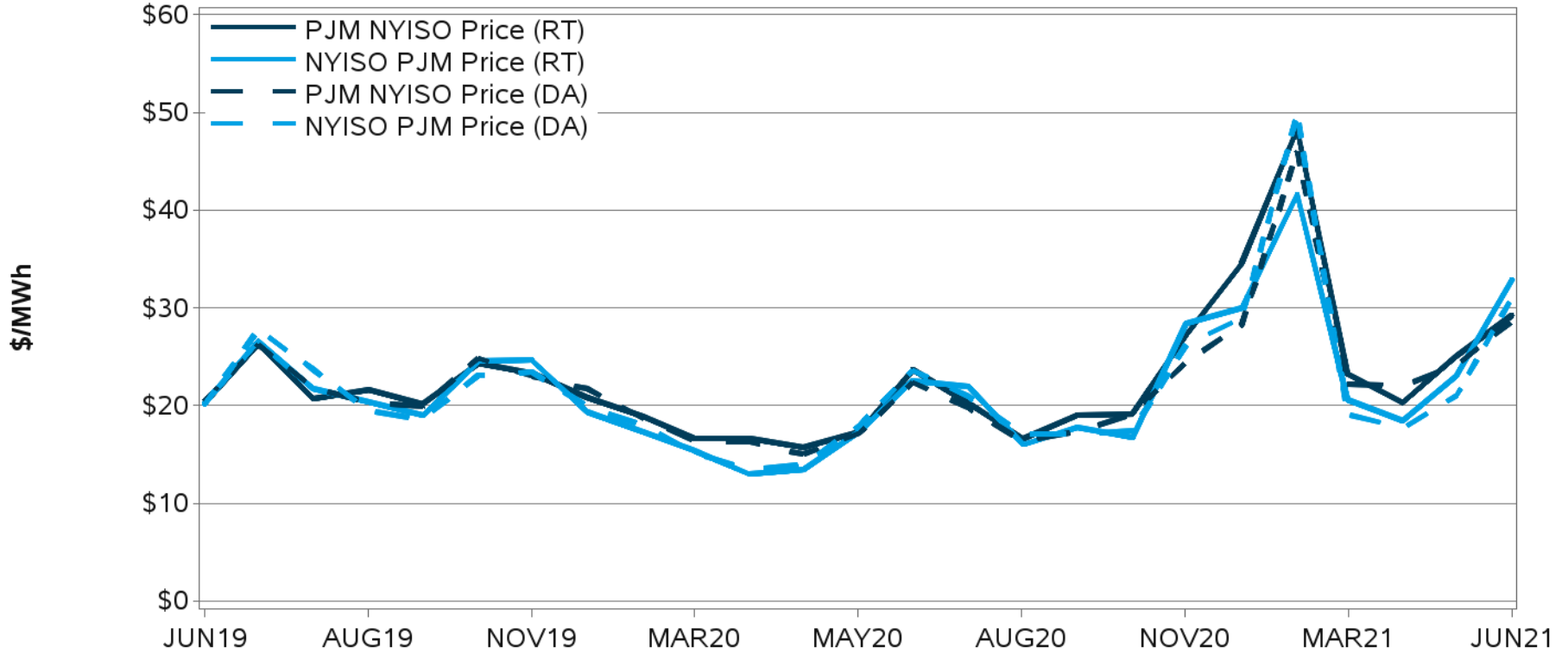


The ten most heavily congested facilities account for 39% of total congestion for 2021.

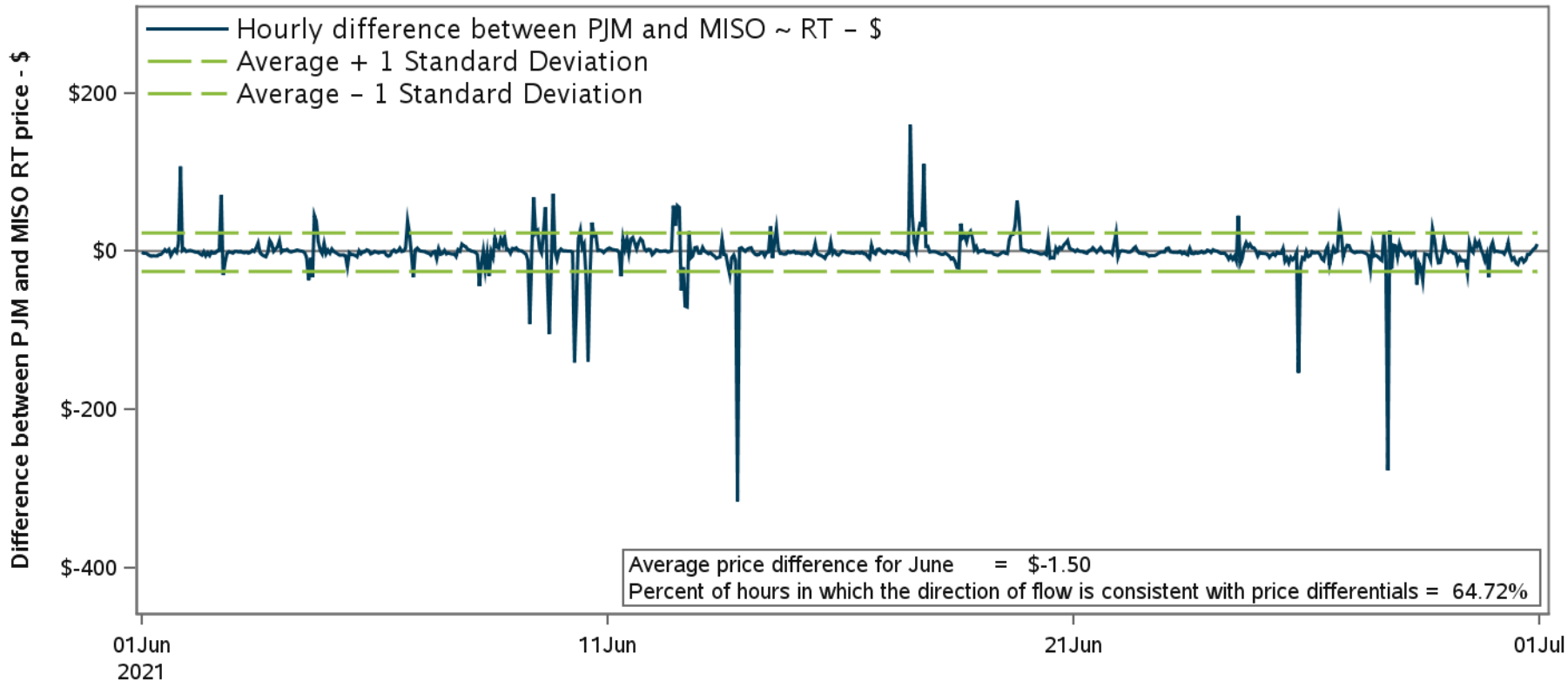
Energy Market

Interchange/Seams Summary



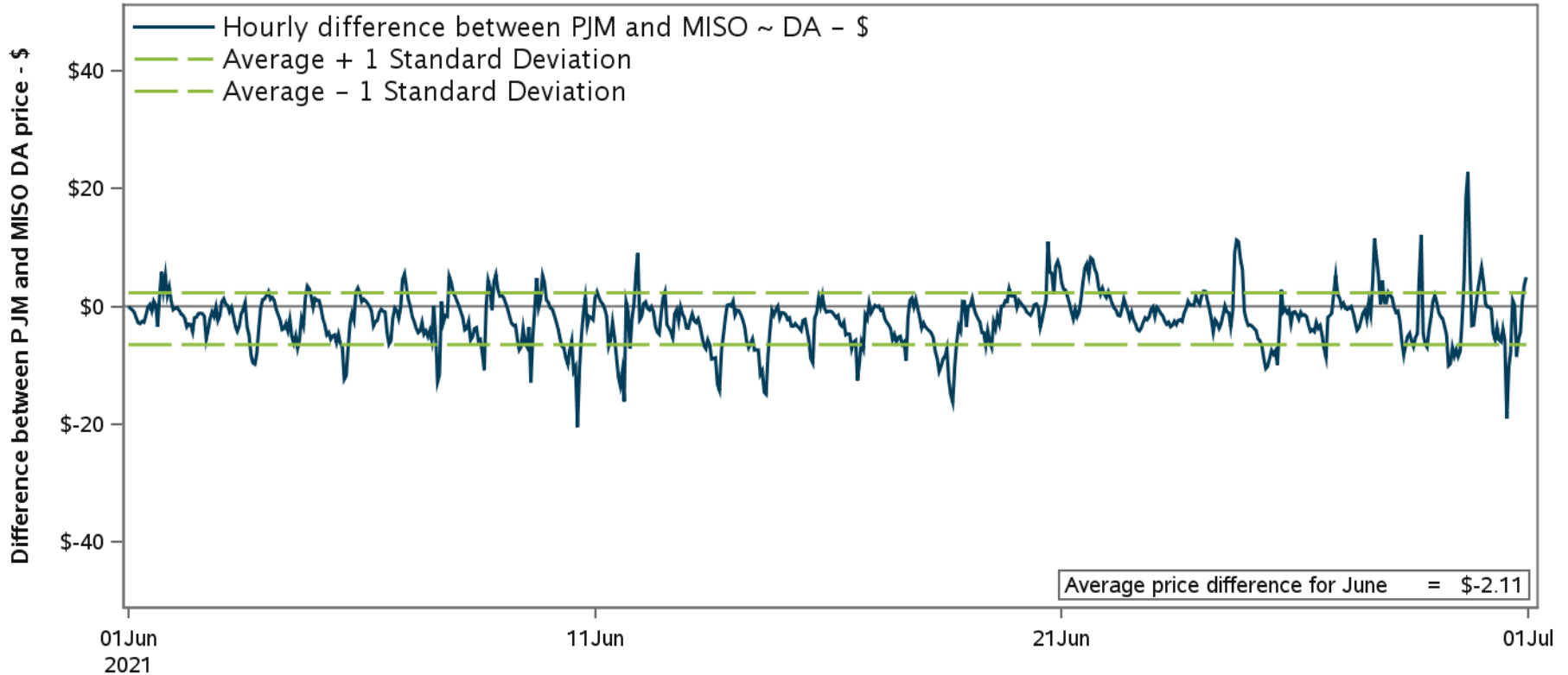


Hourly Difference Between PJM and MISO Real-Time Prices



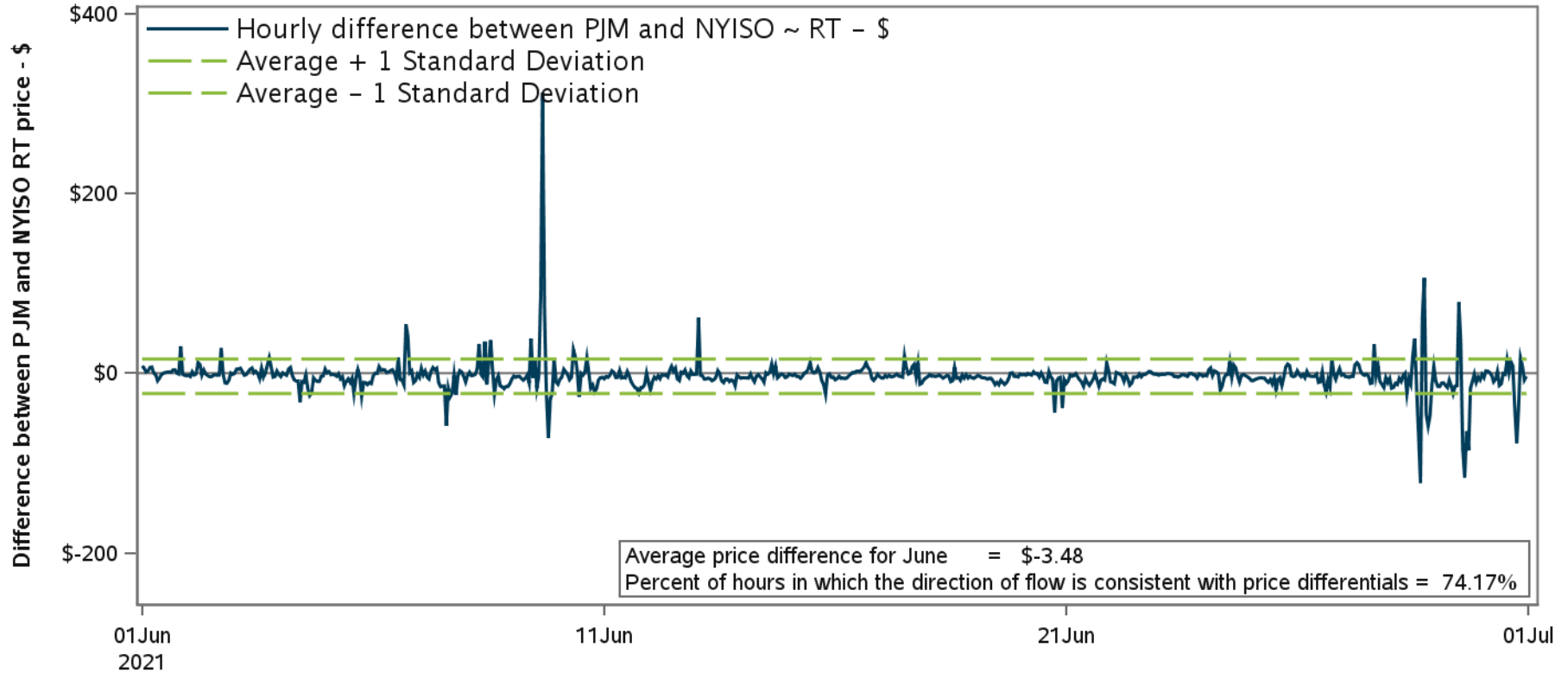
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and MISO Day-Ahead Prices



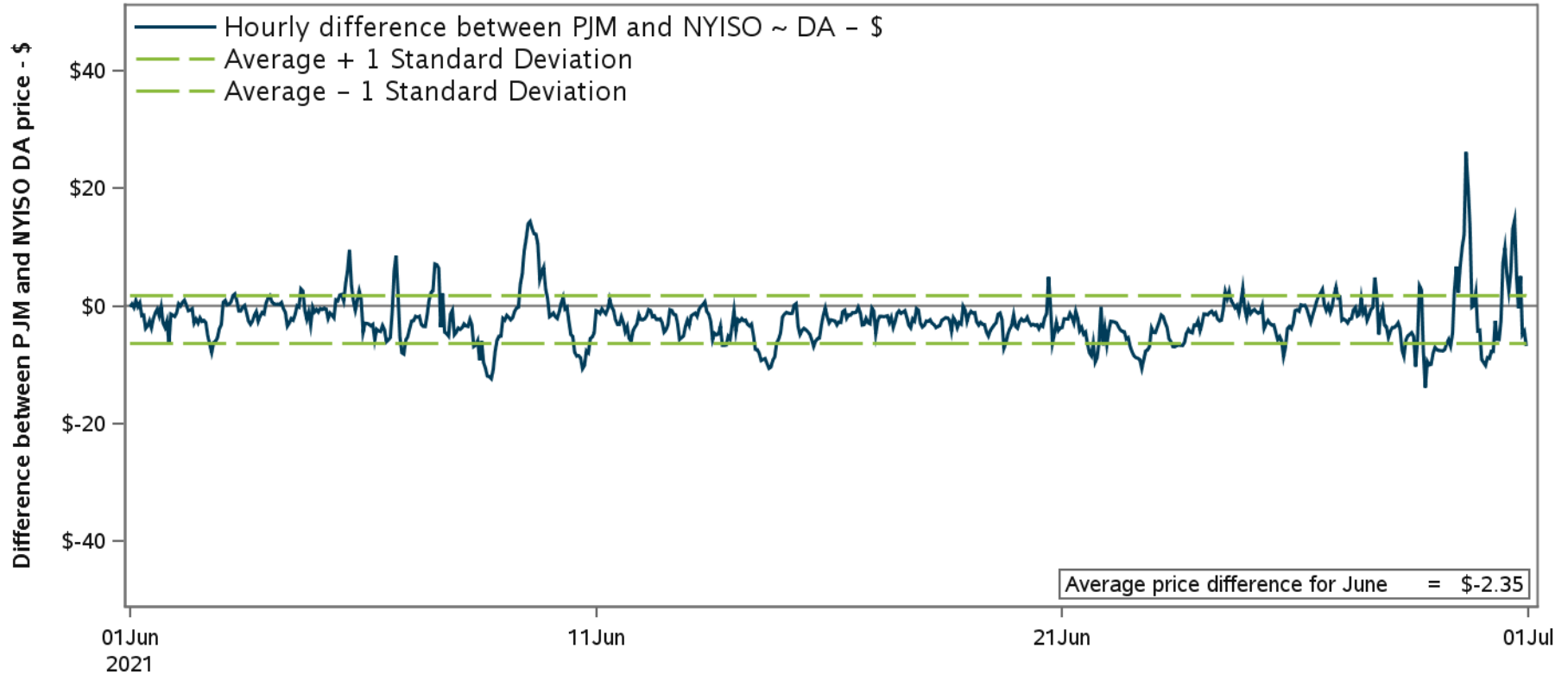
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Real-Time Prices

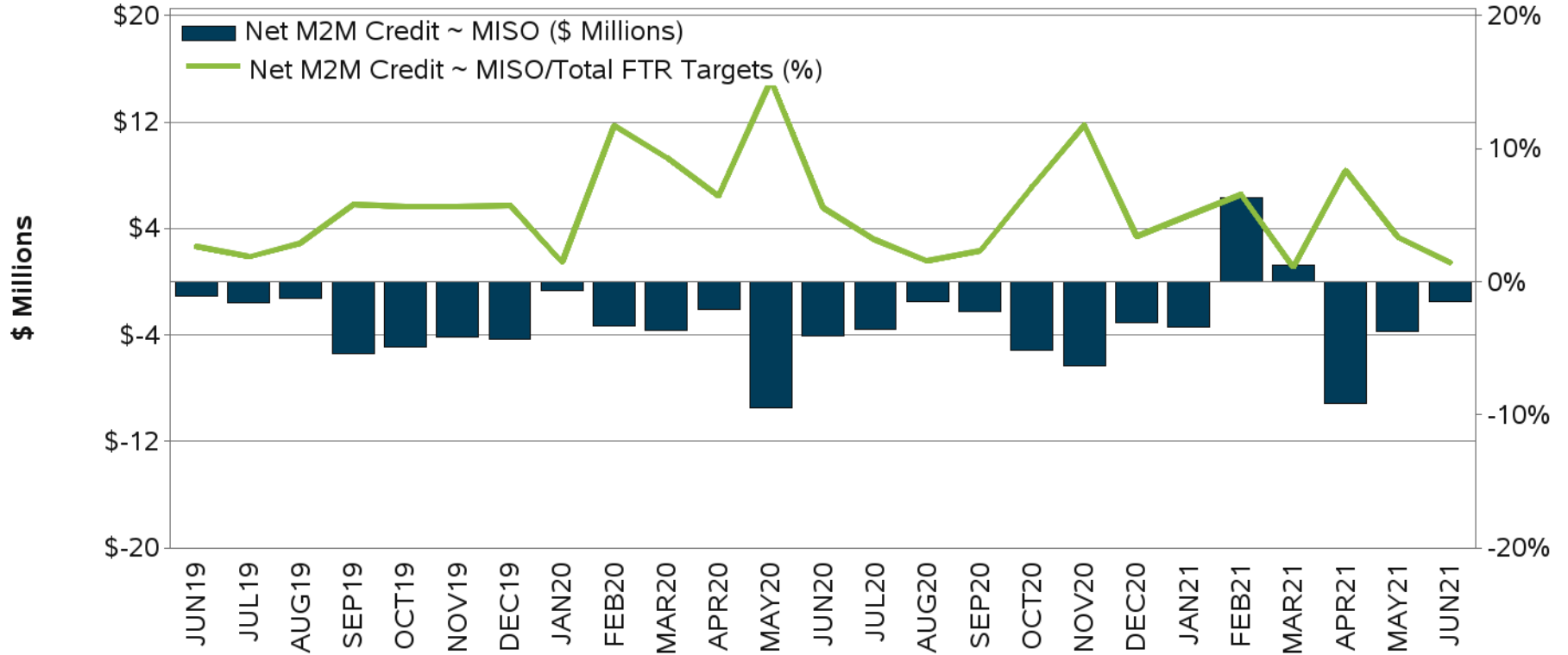


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Day-Ahead Prices

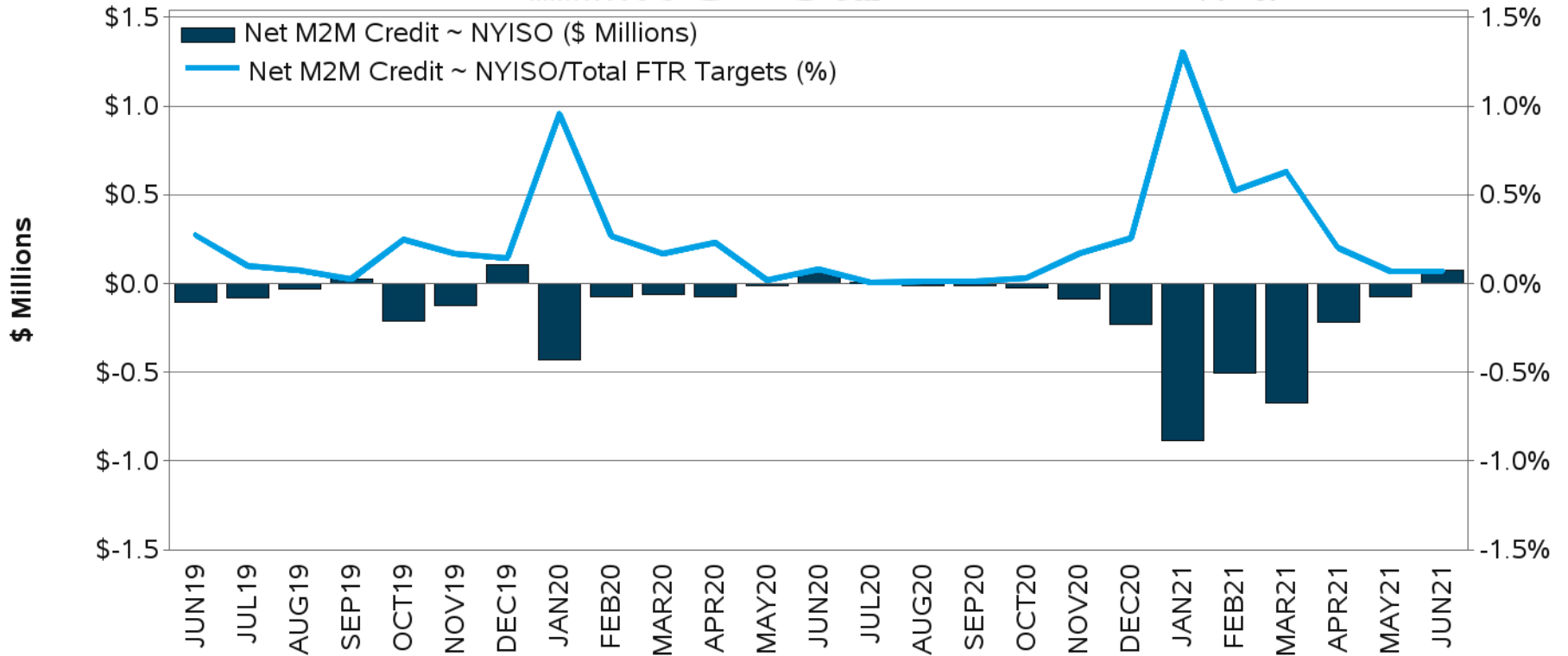


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.



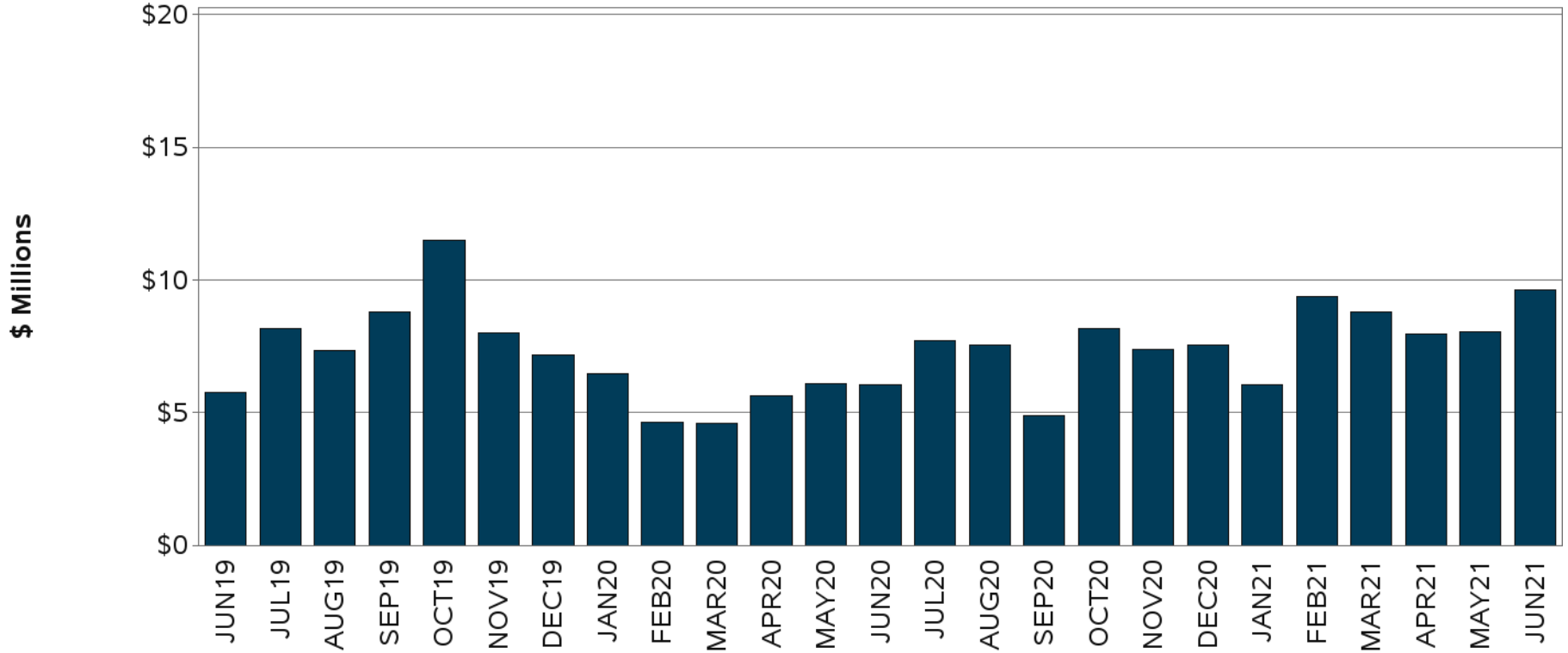
Negative M2M Credit represents PJM payment to MISO

PJM-NYISO Market-to-Market Coordination Settlement

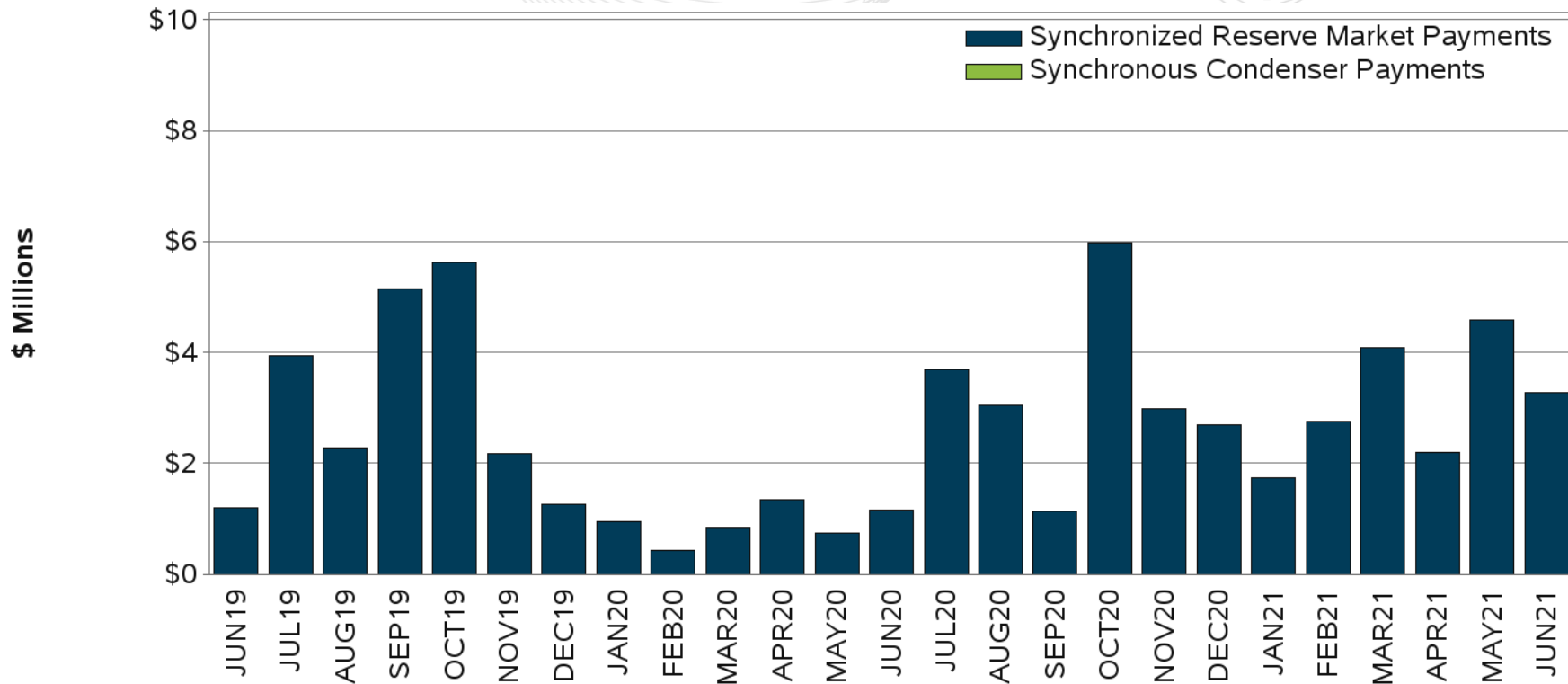


Negative M2M Credit represents PJM payment to NYISO

Ancillary Service Market Summary

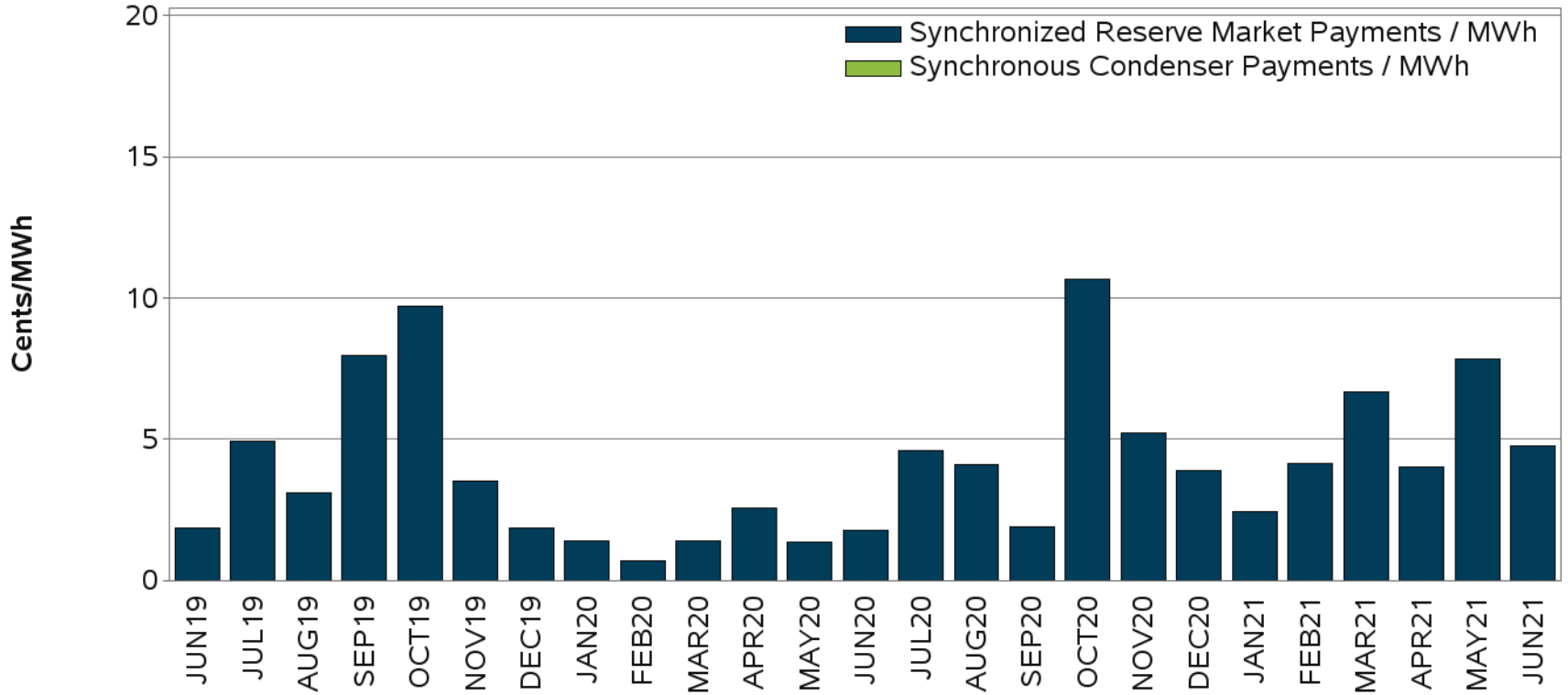


Synchronized Reserve and Synchronous Condenser Costs

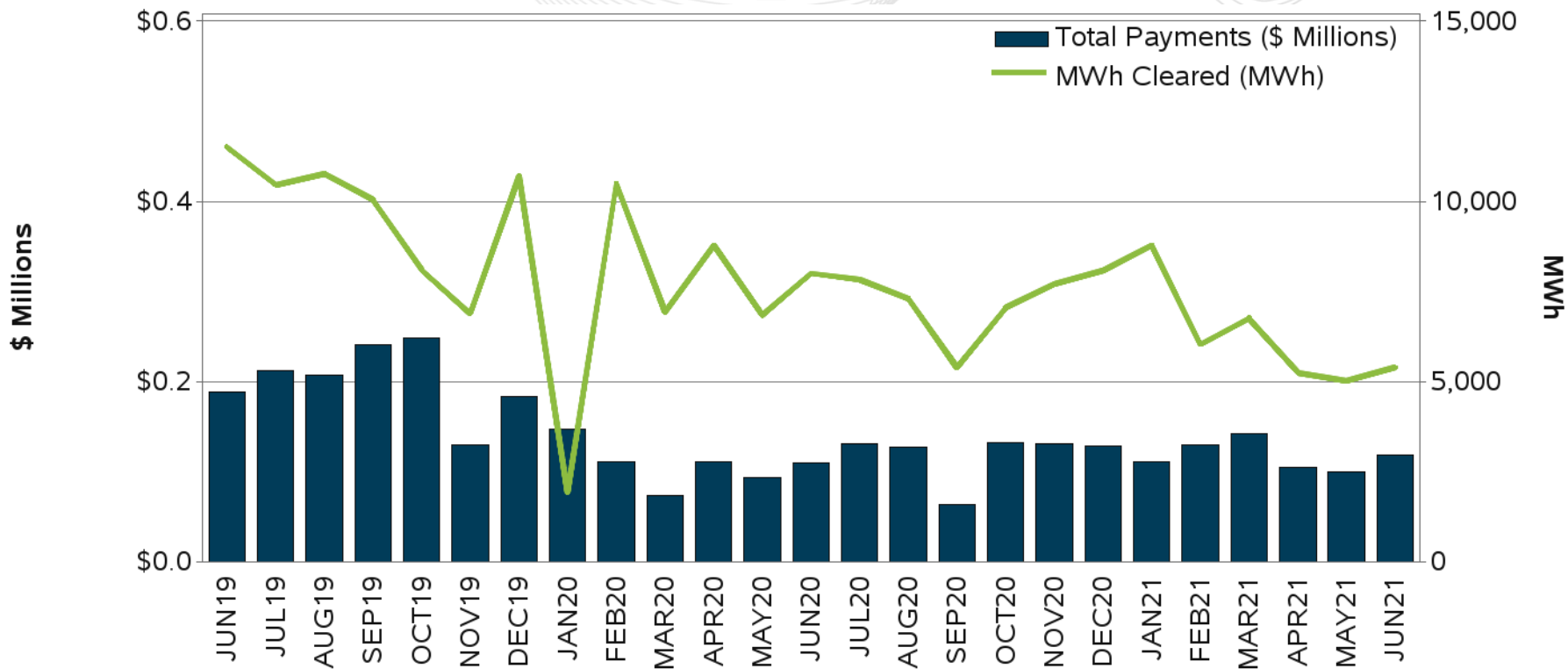




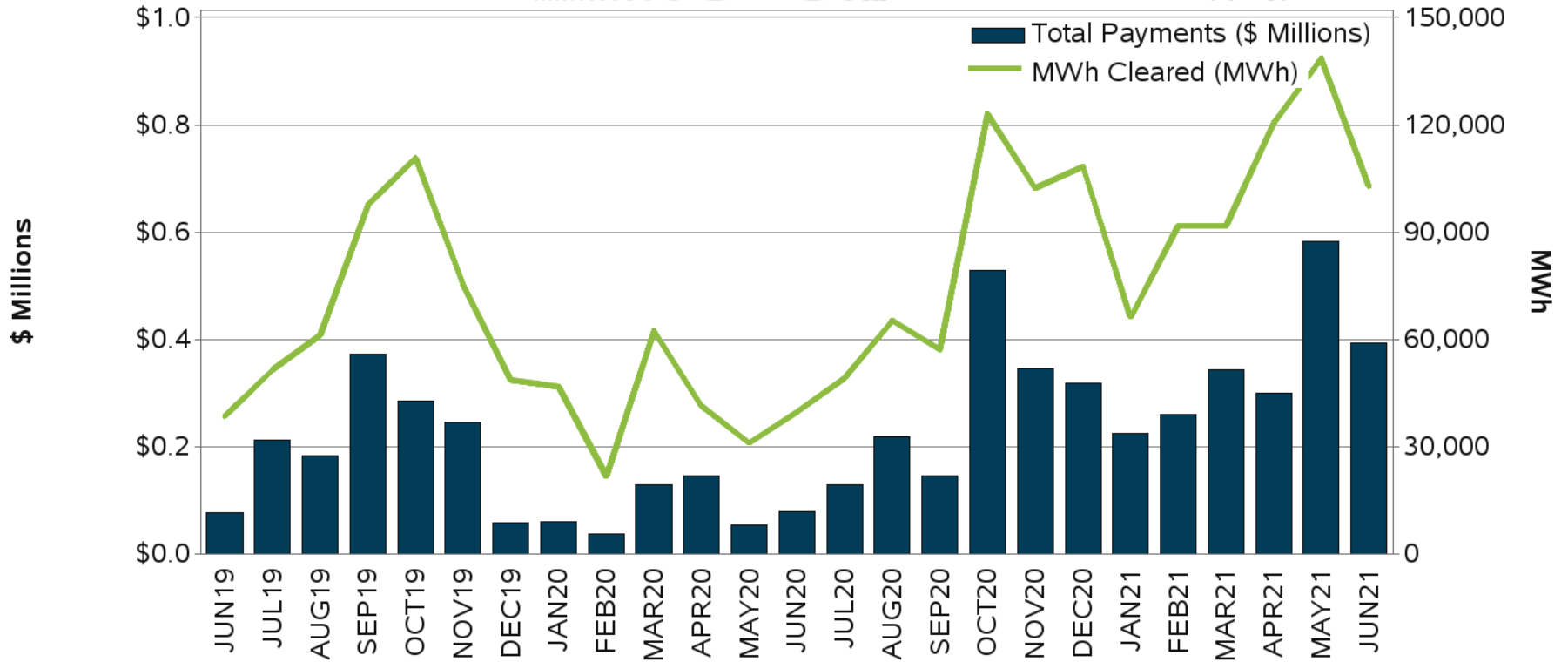
Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs

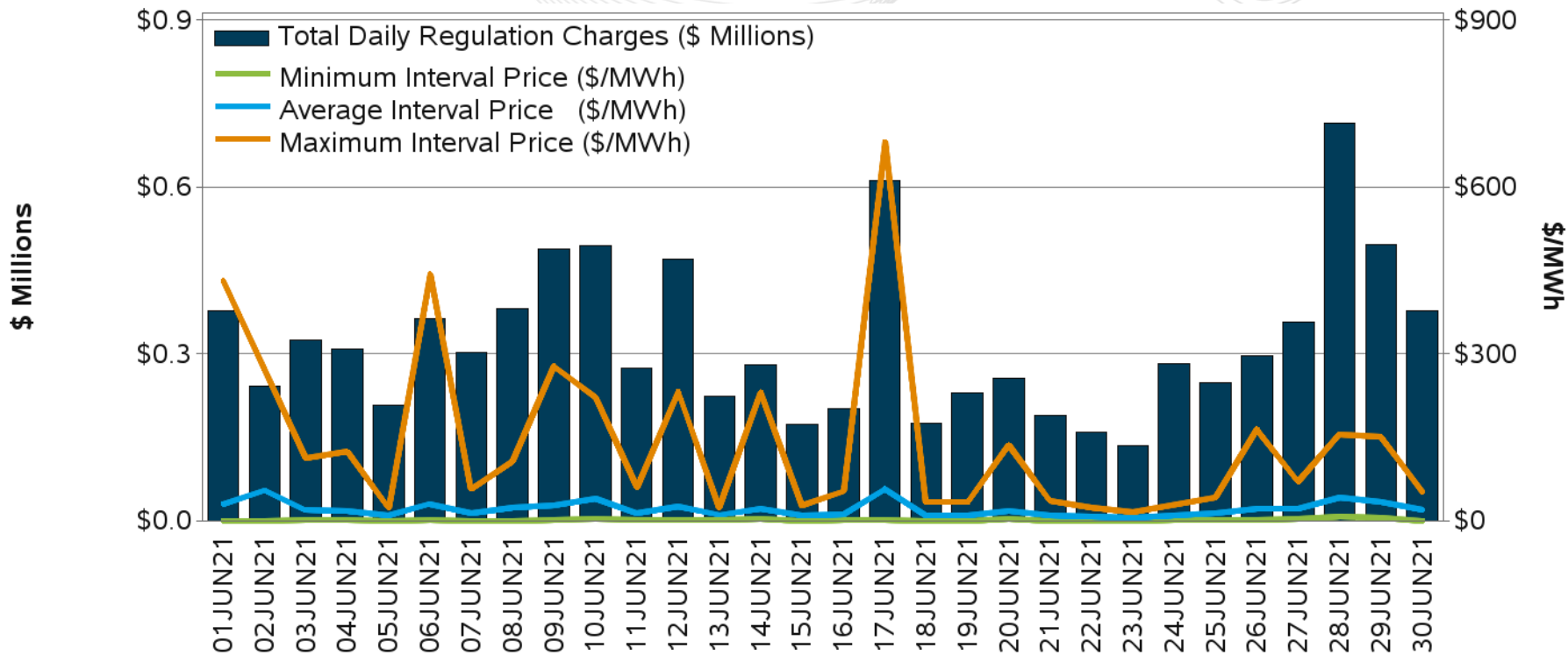


DR Participation in PJM Regulation Markets

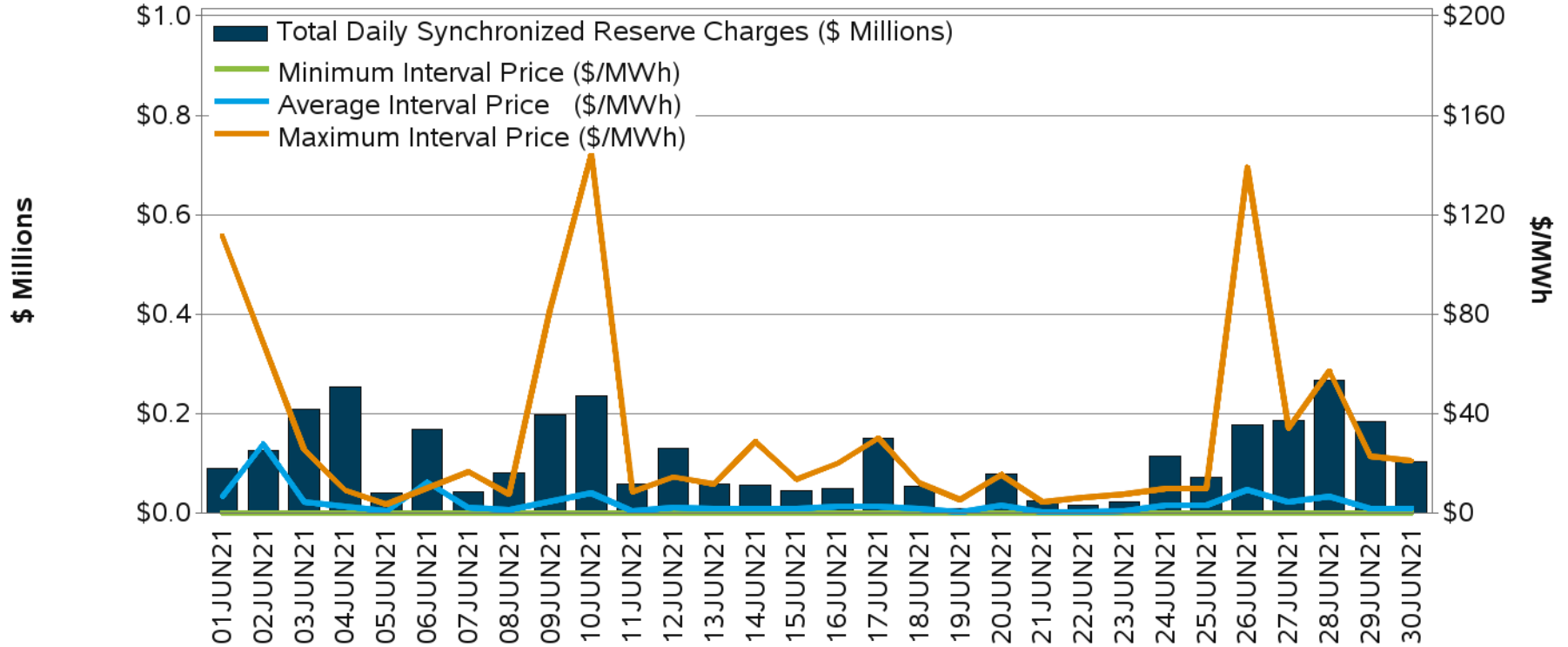


DR Participation in PJM Synchronized Reserve Markets





Synchronized Reserve Market Daily Prices and Charges



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