



Markets Report

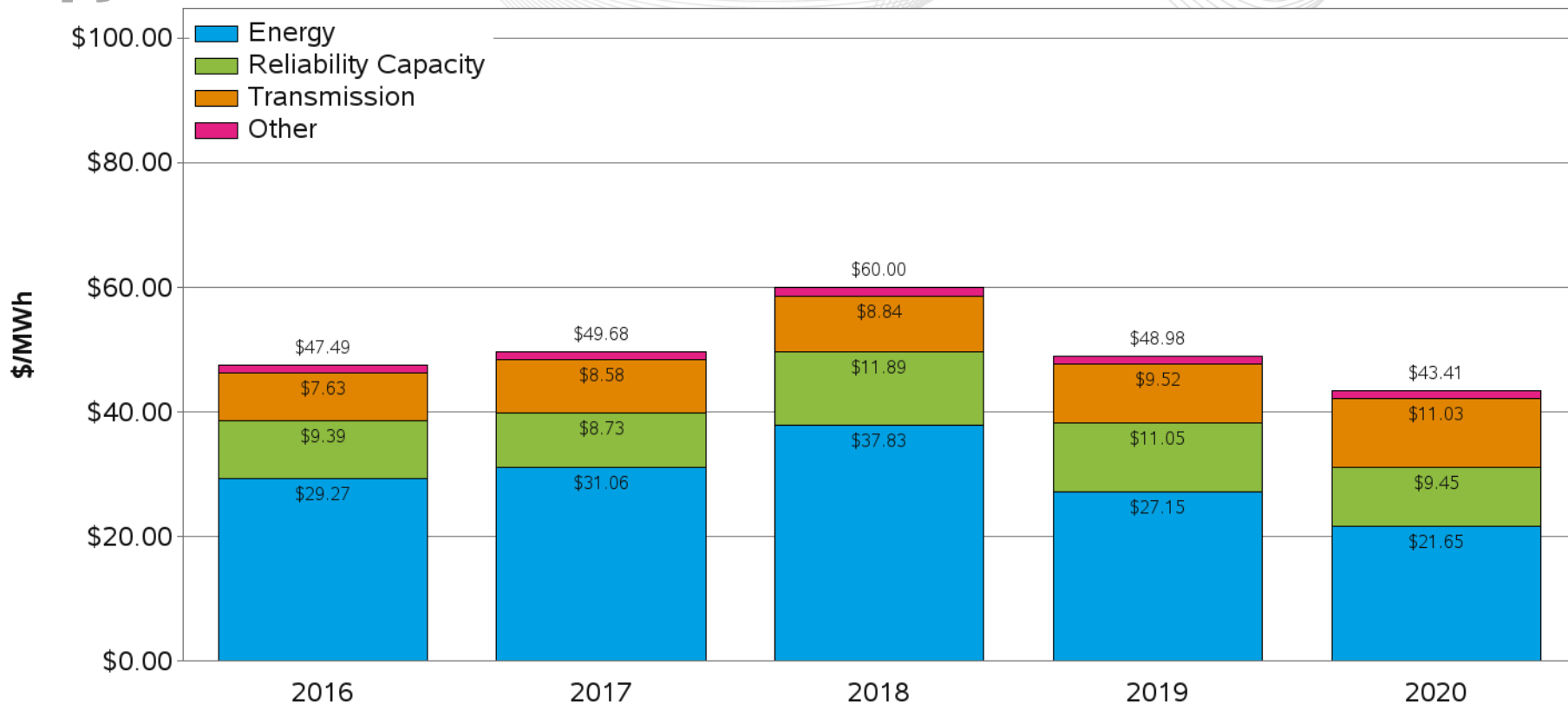
MC Webinar

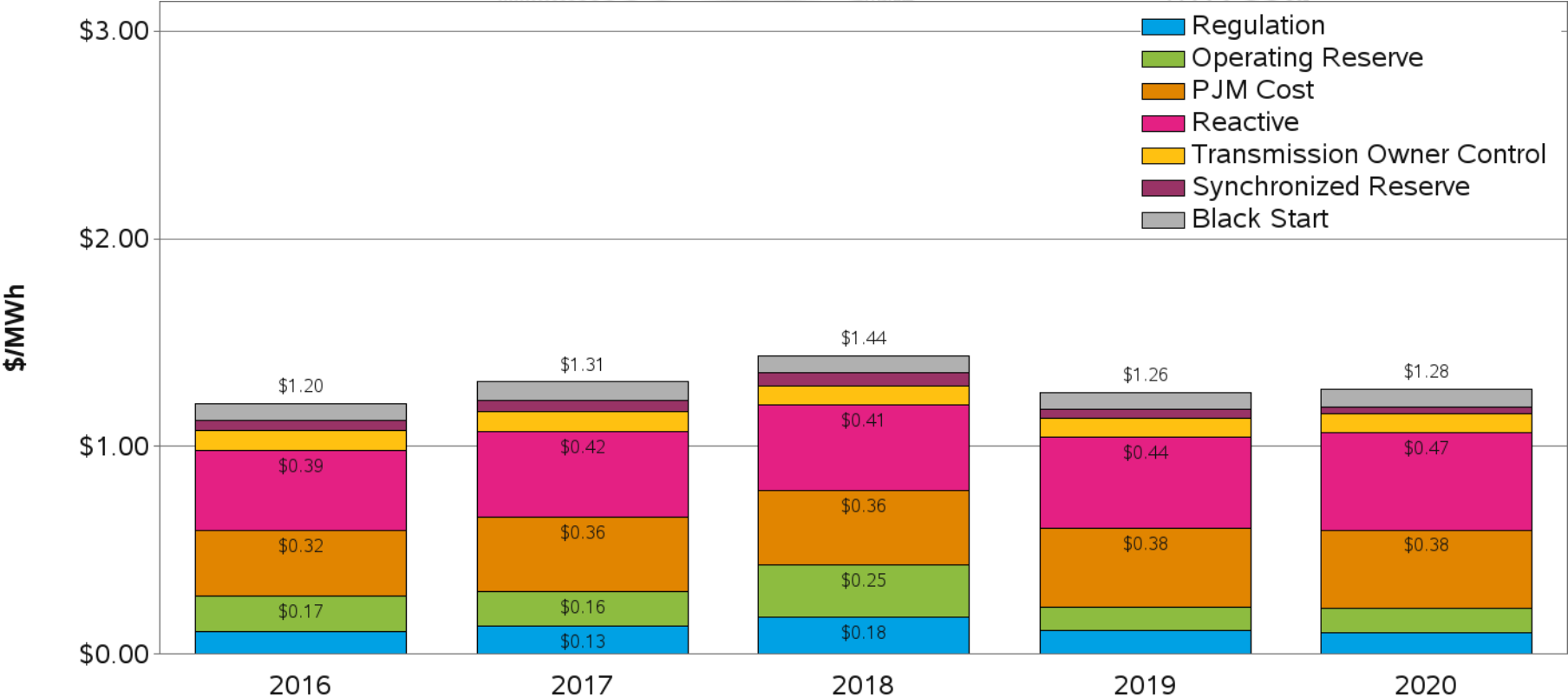
January 25, 2020

- PJM Wholesale Cost for 2020 is \$43.41/MWh, down from full-year 2019 costs of \$48.98/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 December, temperatures fluctuated around average for most of the month. Thus, the sum of Heating and Cooling Degree Days was close its historic average. (Slides 8-10)
- Because of mild weather and continued Corona Virus impacts, Energy use remained below the historic average. (Slides 8-10)

- In December, uplift exceeded \$800,000 on four days – December 7th and December 16th - 18th. (Slides 24 & 25)
- Load-weighted average LMP for 2020 is \$21.65/MWh: (Slides 31 & 32)
 - December 2020 was \$25.50/MWh, which is lower than December 2019 (\$22.50/MWh) and December 2018 (\$31.00/MWh).
- FTR revenue adequacy for the month of December is 88% and the 2020-2021 Planning Year is currently funded at 98%. (Slides 47-50)
- Congestion remains low and similar to the values observed last December. (Slide 48)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 63-65)

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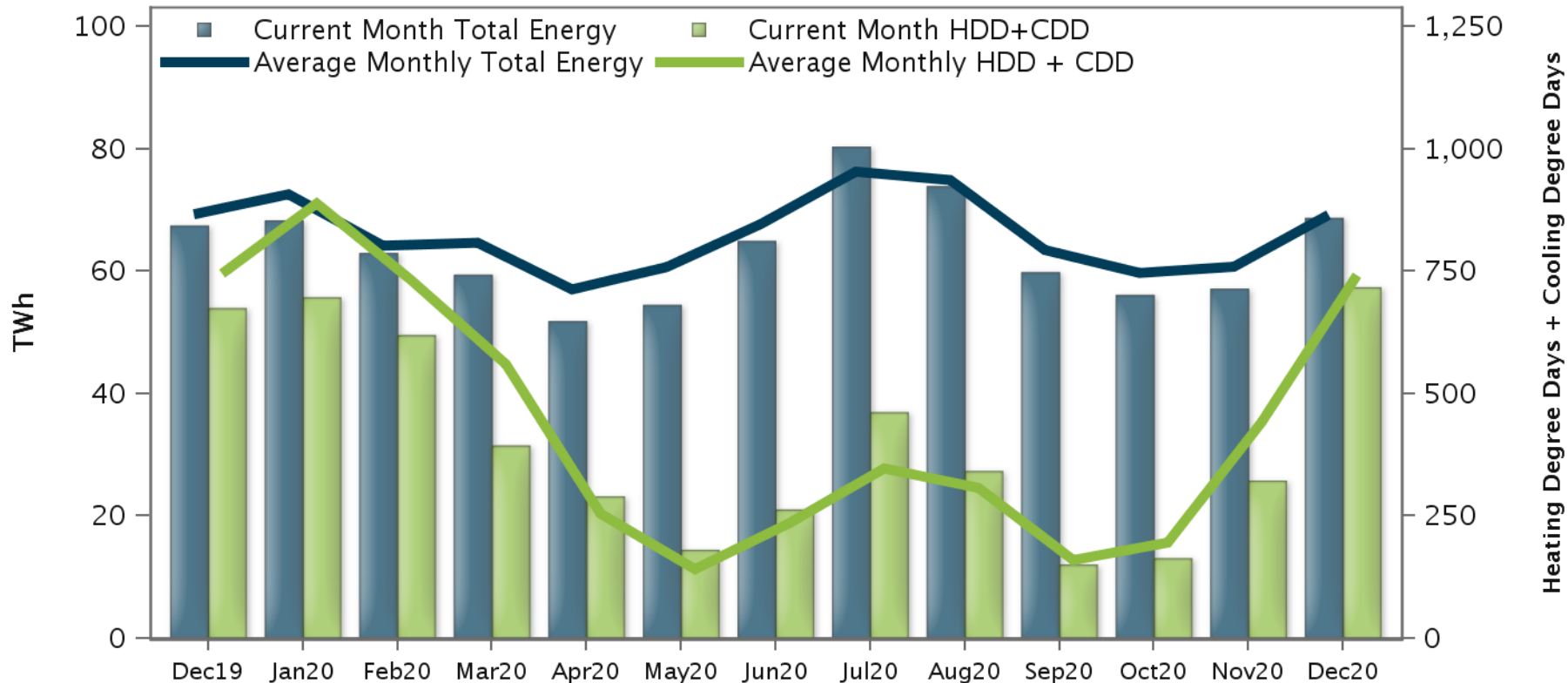




Market Conditions

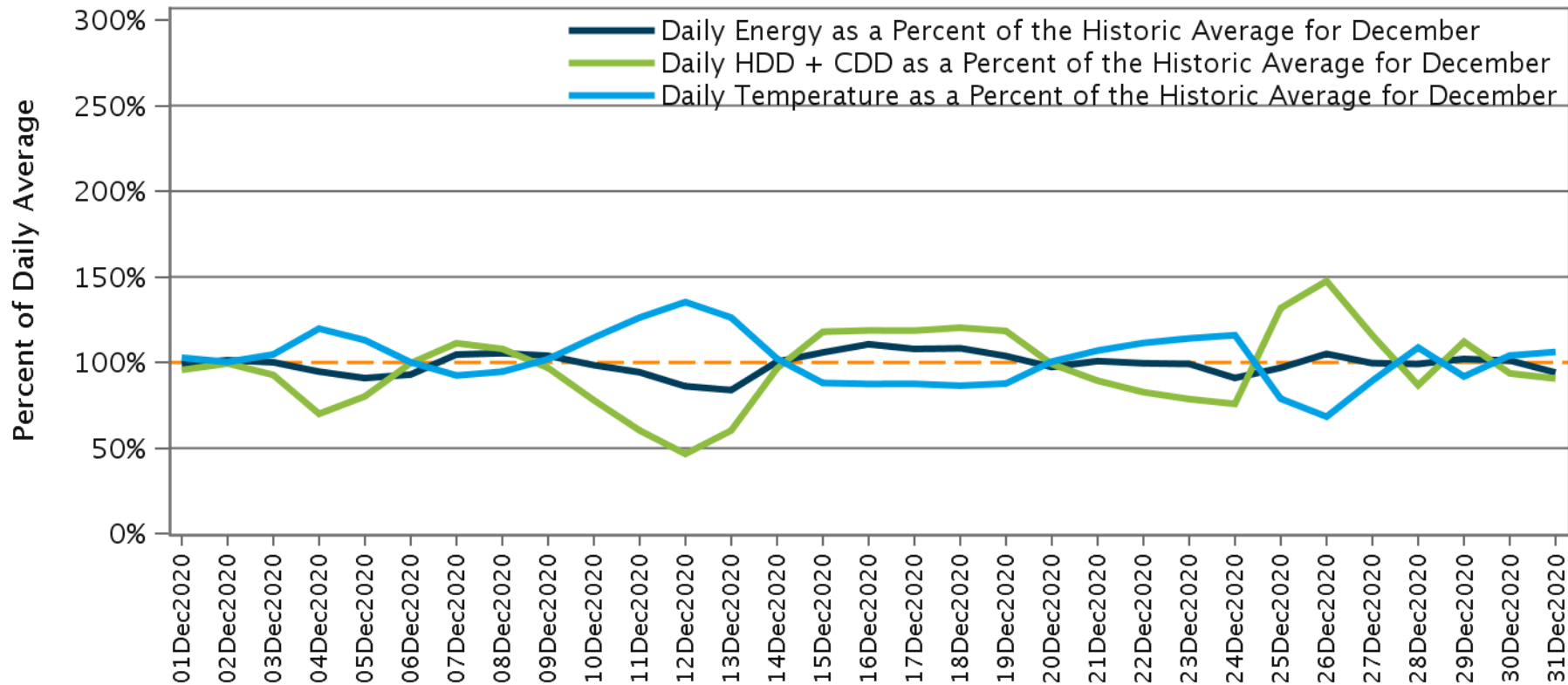
- The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).
- Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or 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, 2019. Averages include load data for all of TO zones in the current RTO footprint.

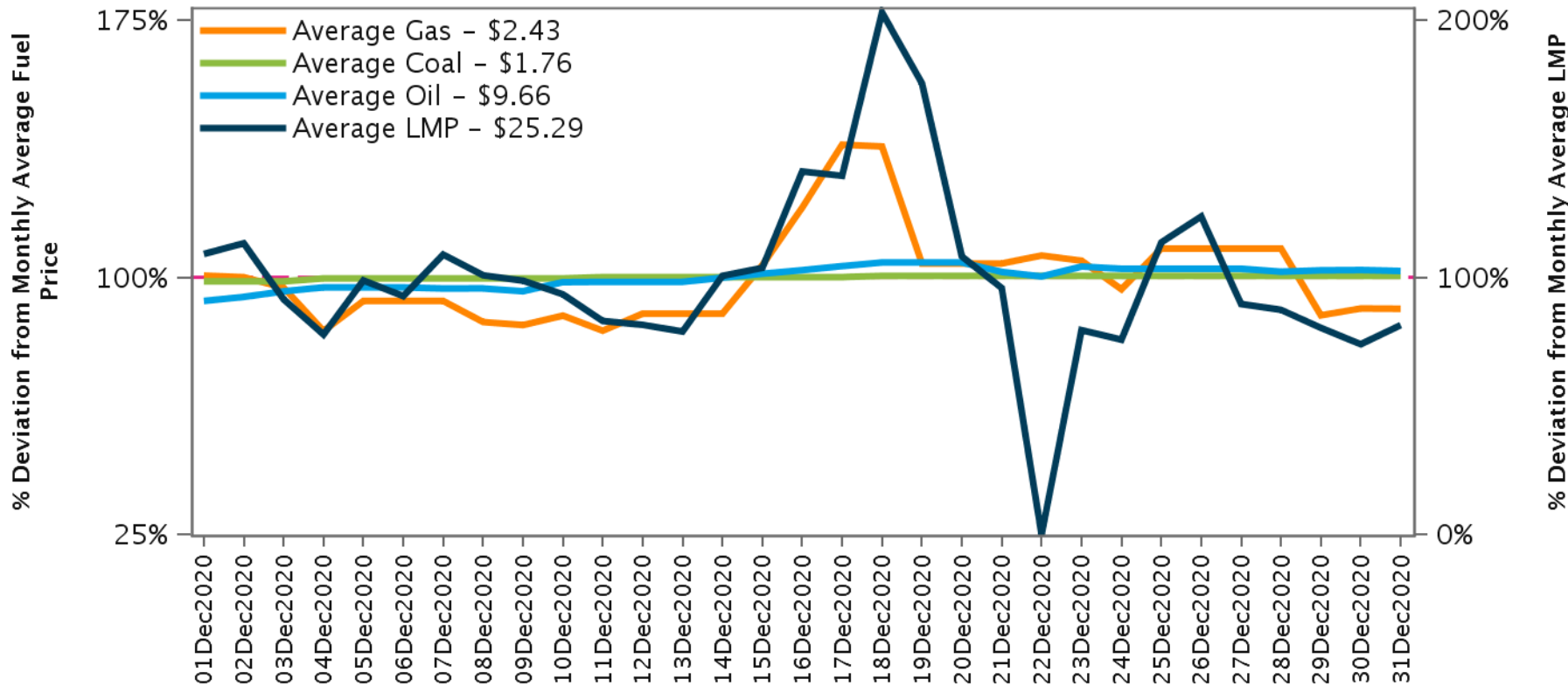
Historic Average Weather and Energy versus Current Month





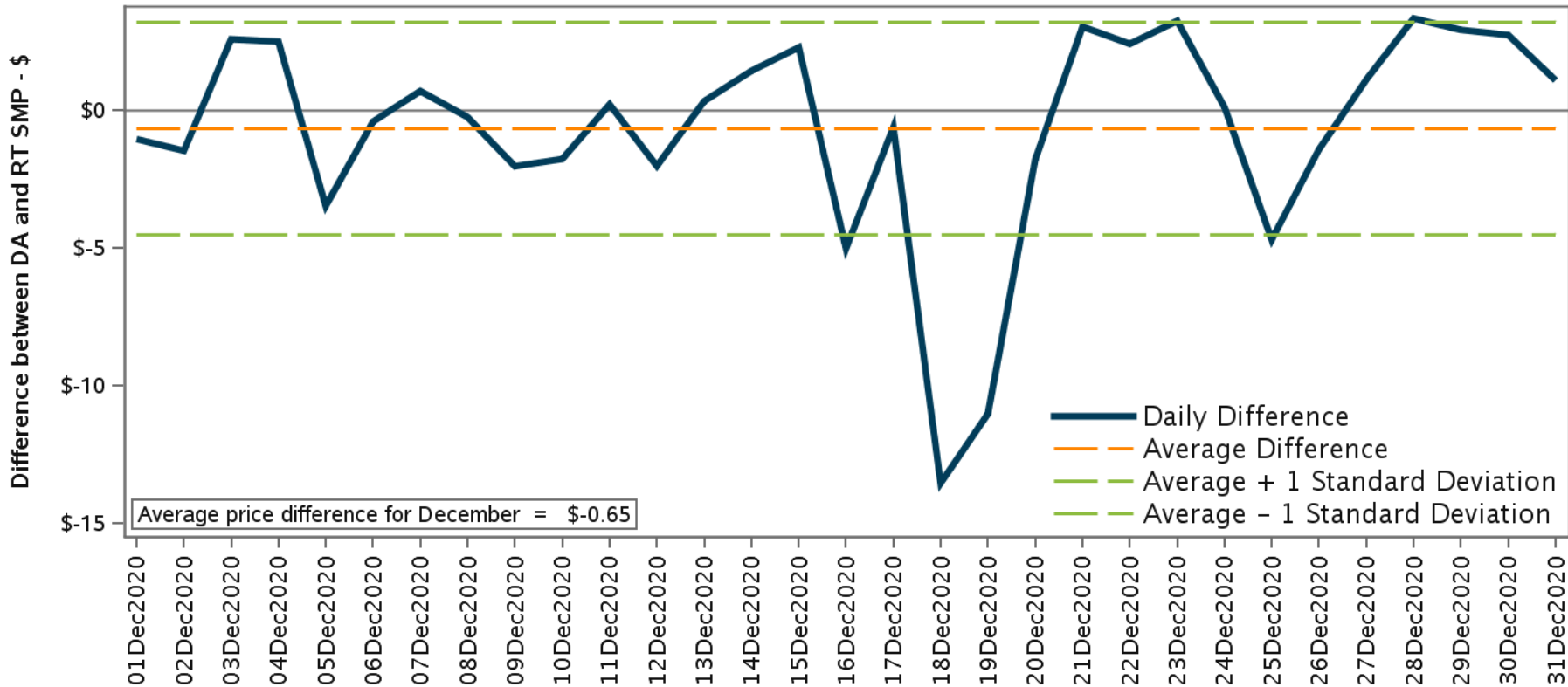
Historic Average Weather and Energy versus Current Month - Daily







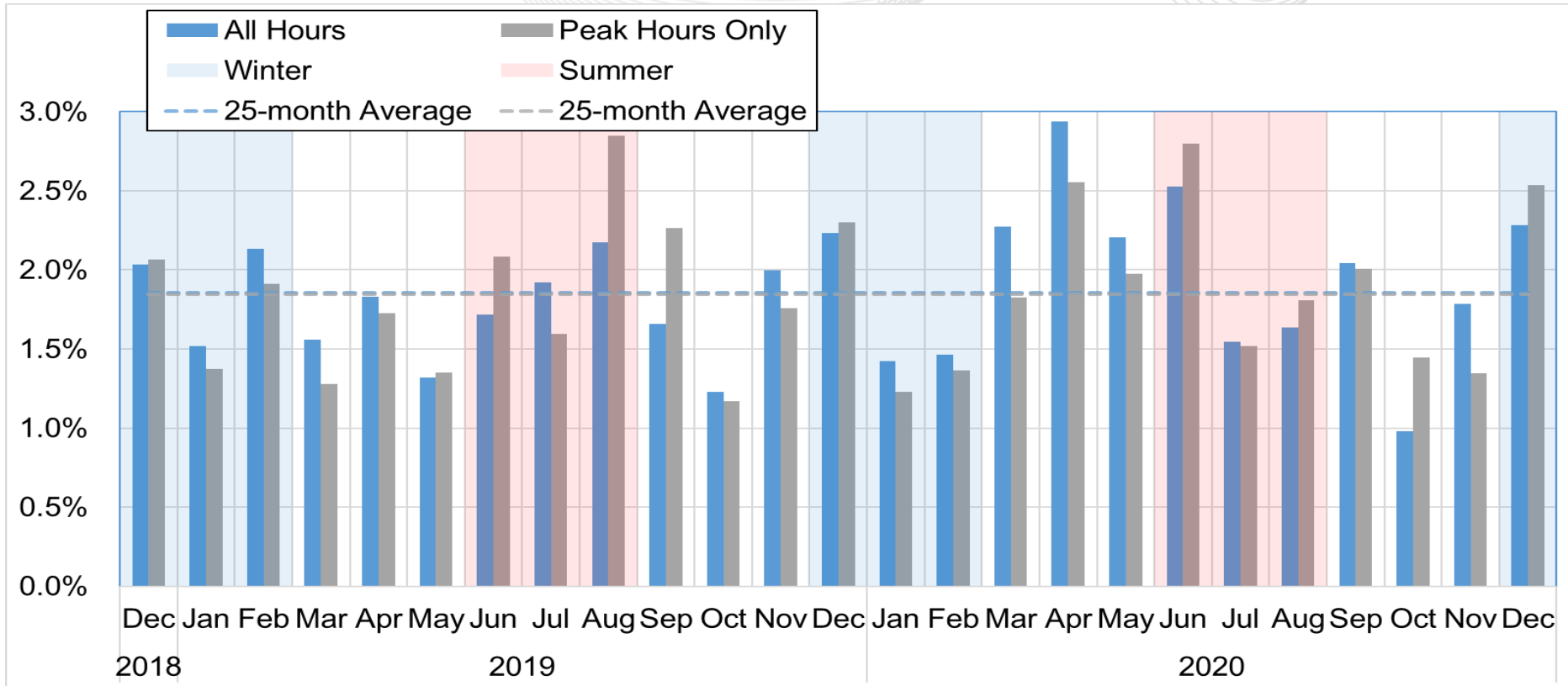
Daily Difference Between Day-Ahead and Real-Time System Marginal Prices



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

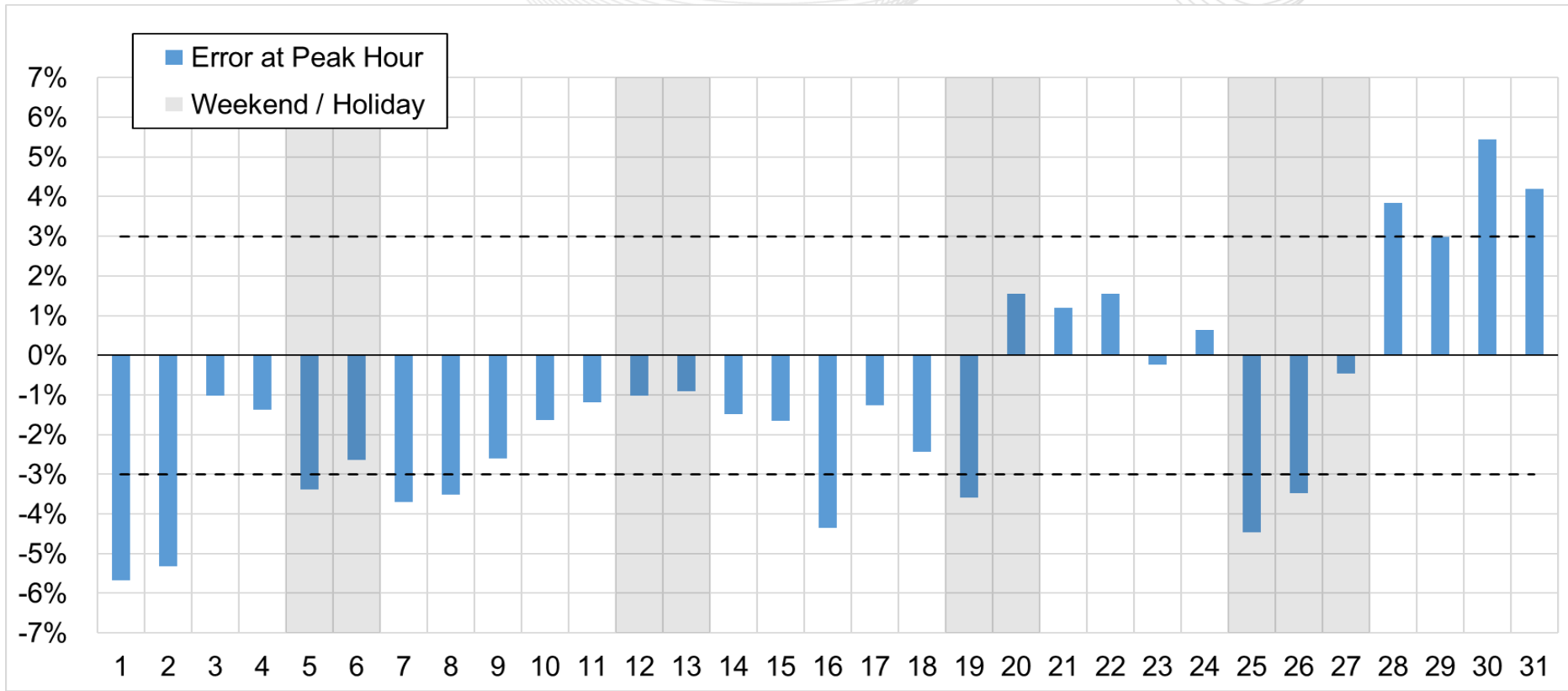


Load Forecast Error – Monthly Absolute Error, 10:00 Forecast





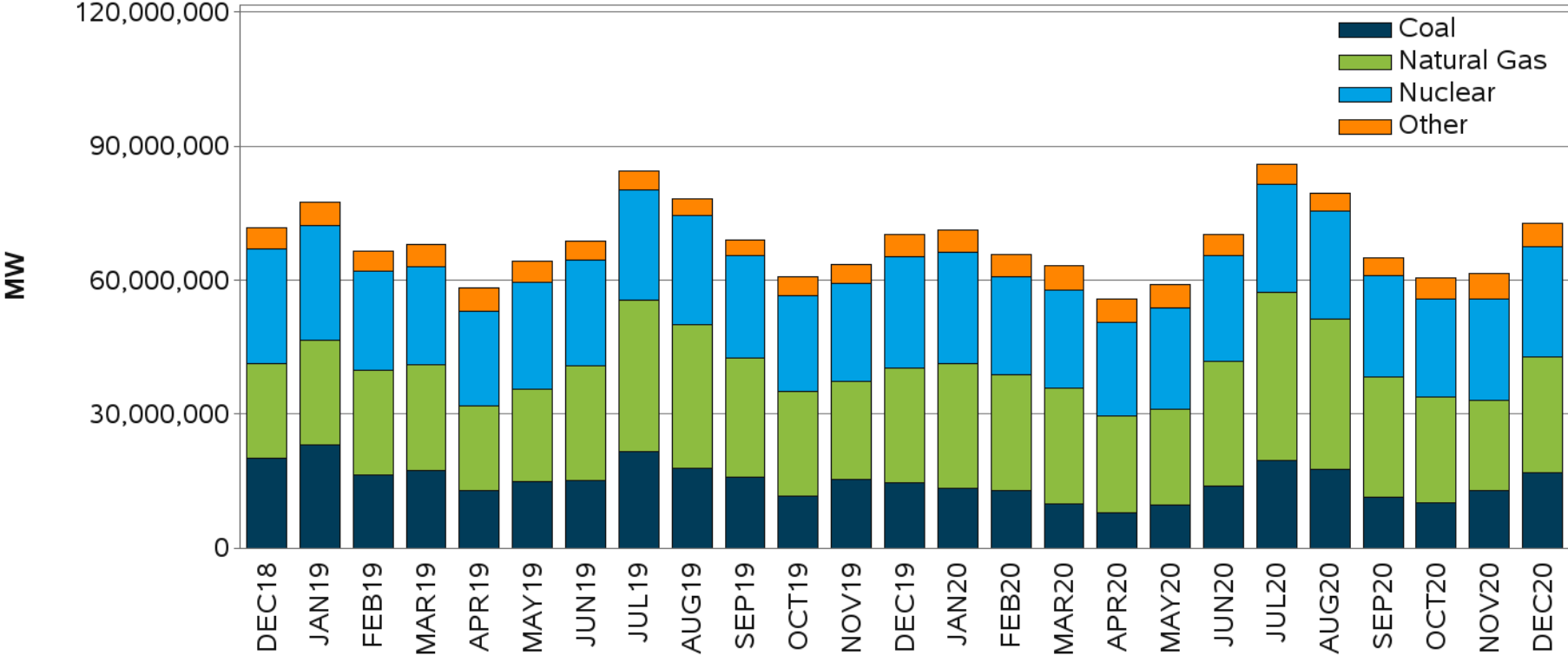
Load Forecast Error – December Daily Peaks, 10:00 Forecast



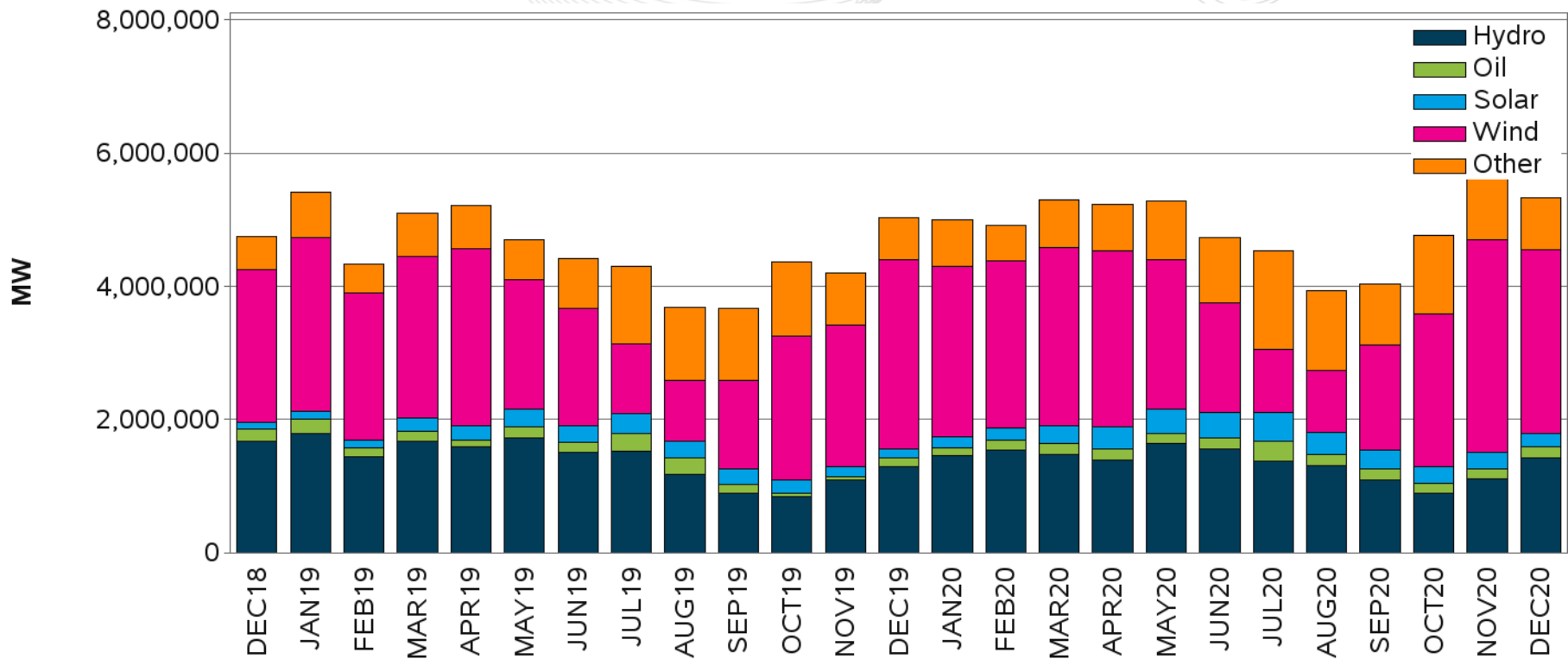
PJM prepares a day-ahead load forecast at 10:00 am for use by our members.

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.

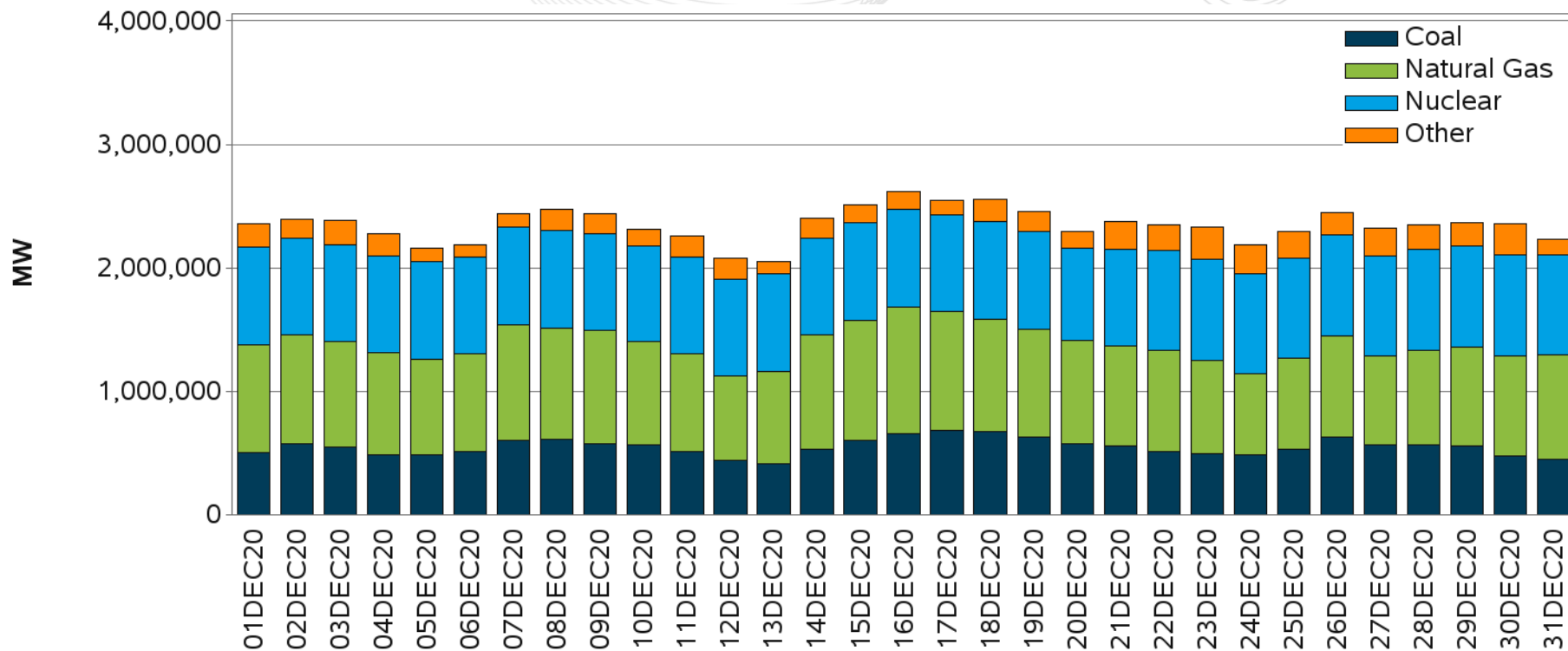
- During first three weeks of the month, the day ahead forecast generally underestimated loads. Weather model error and load forecast model error contributed to this roughly equally. This timeframe experienced some of coldest temperatures since last winter, as well as significant snowfall, which together likely hindered accuracy of both model types.
- The holiday week, beginning Dec. 25, experienced higher-than-average forecast error, likely due to human behavior and some abnormal weather patterns. In addition to being a holiday, Christmas (and some hours extending into the morning of Dec. 26) was severely impacted by the rapid onset of a cold front.
- Much of the over-forecasting at the end of the month is likely related to shifts in behavior of humans and institutions, such as work vacations and school breaks.



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

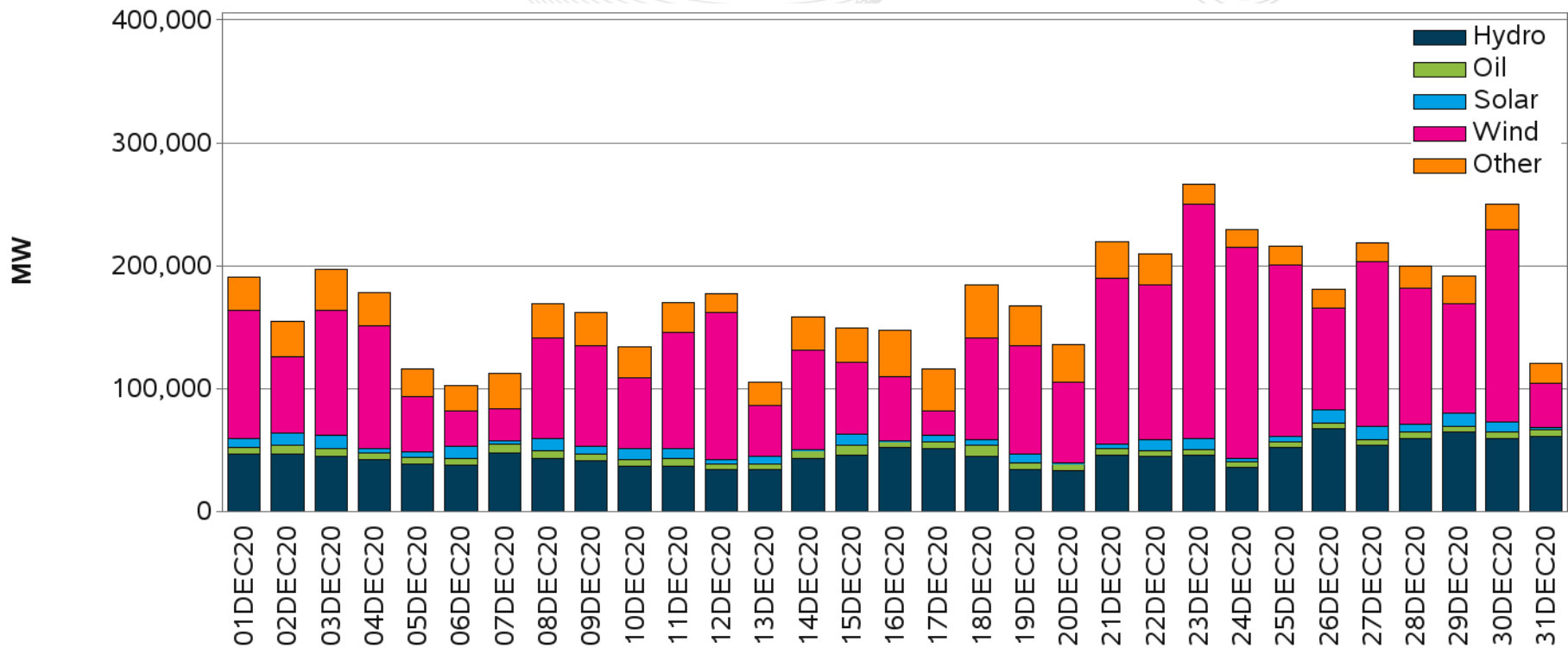


'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables



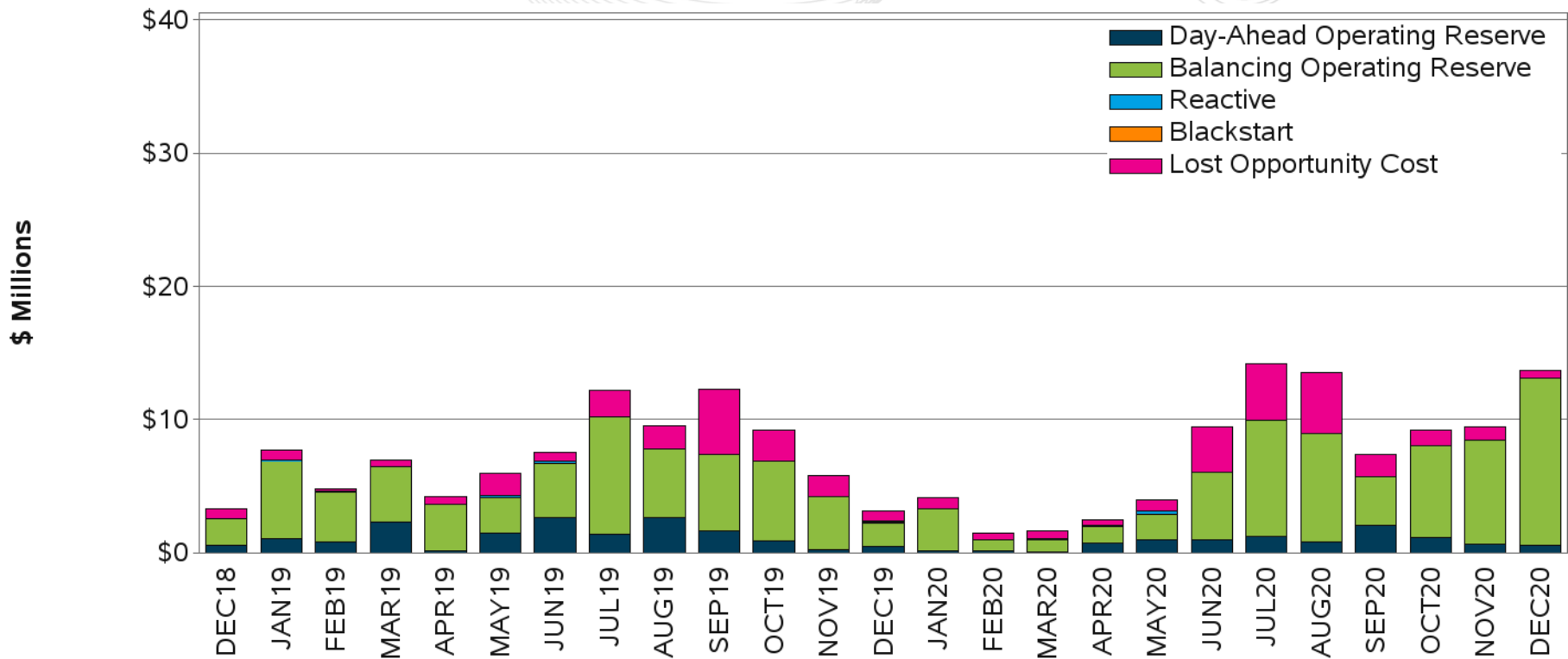
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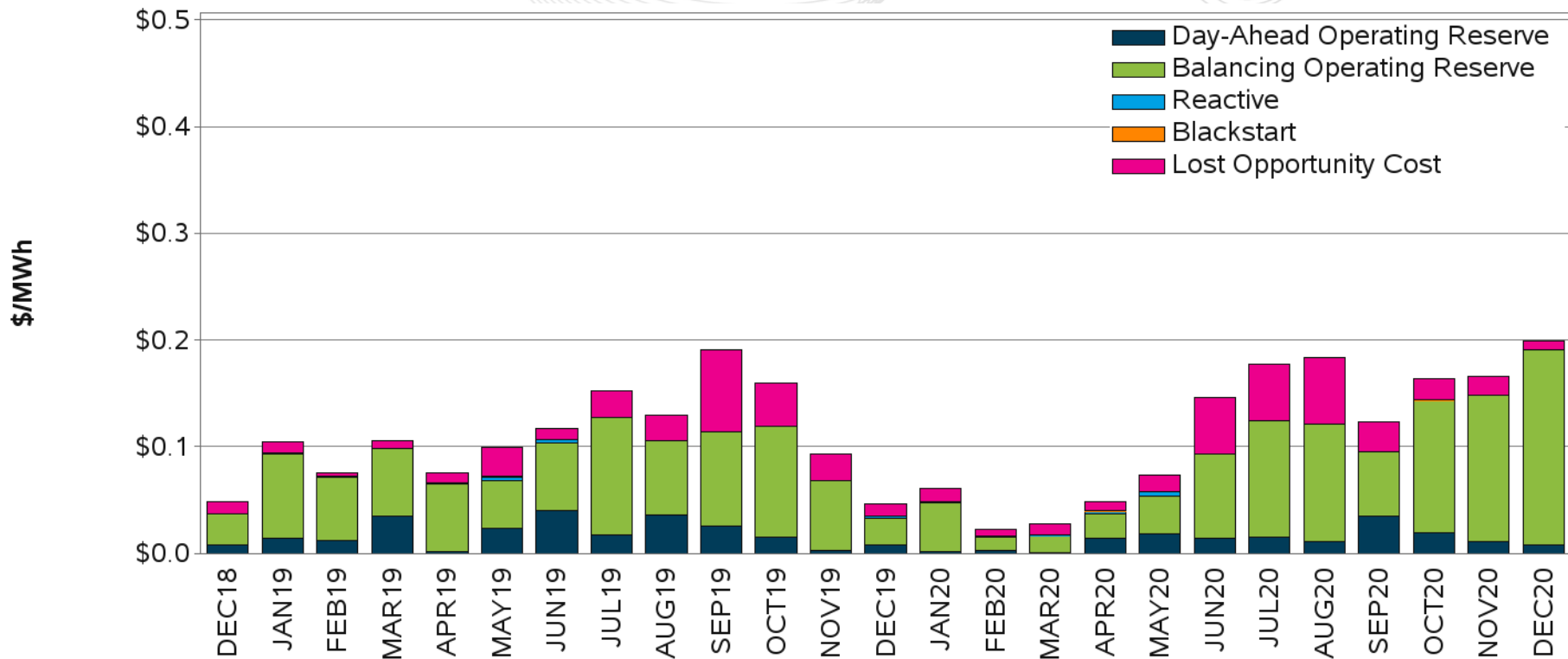
Daily Generation by Fuel, Other - December

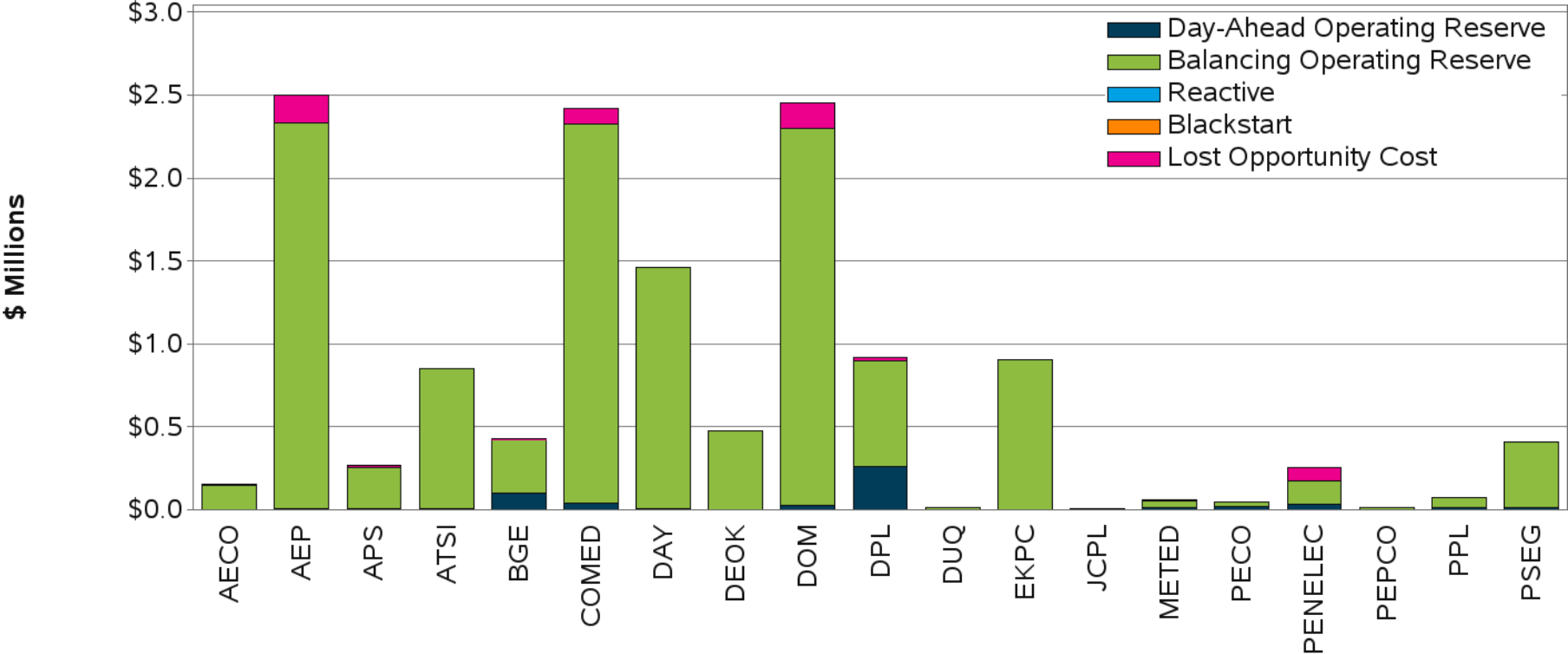


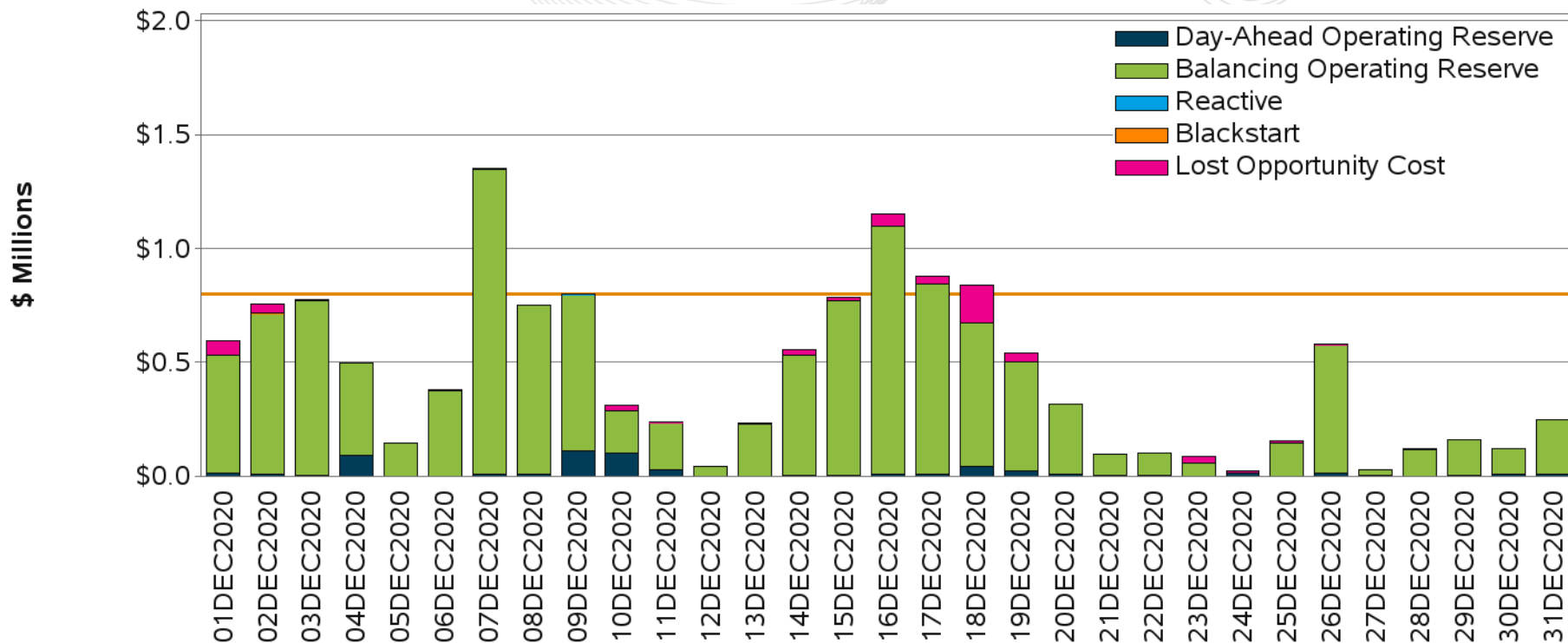
'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables

Operating Reserve (Uplift)









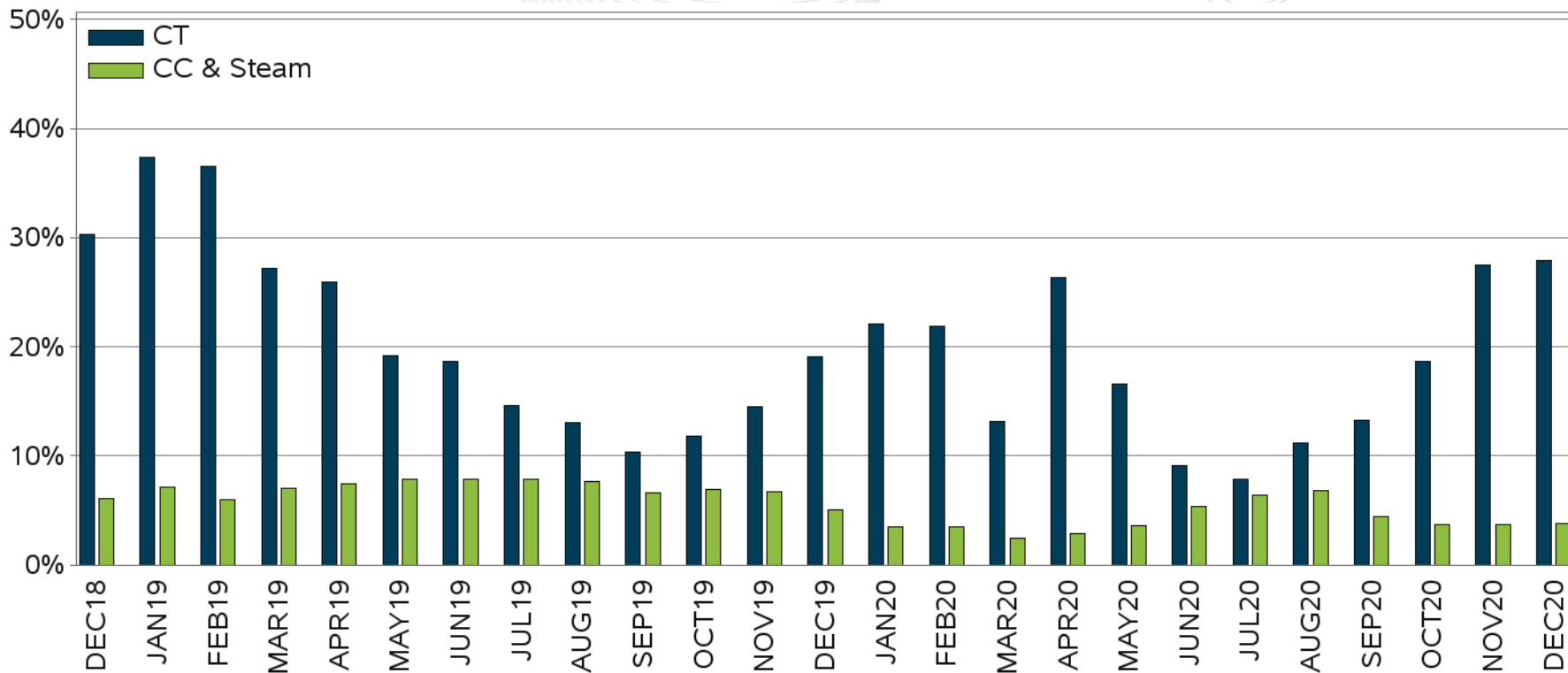
In November, uplift exceeded \$800,000 on four days – December 7th and December 16th - 18th.

Contributing factors to uplift were:

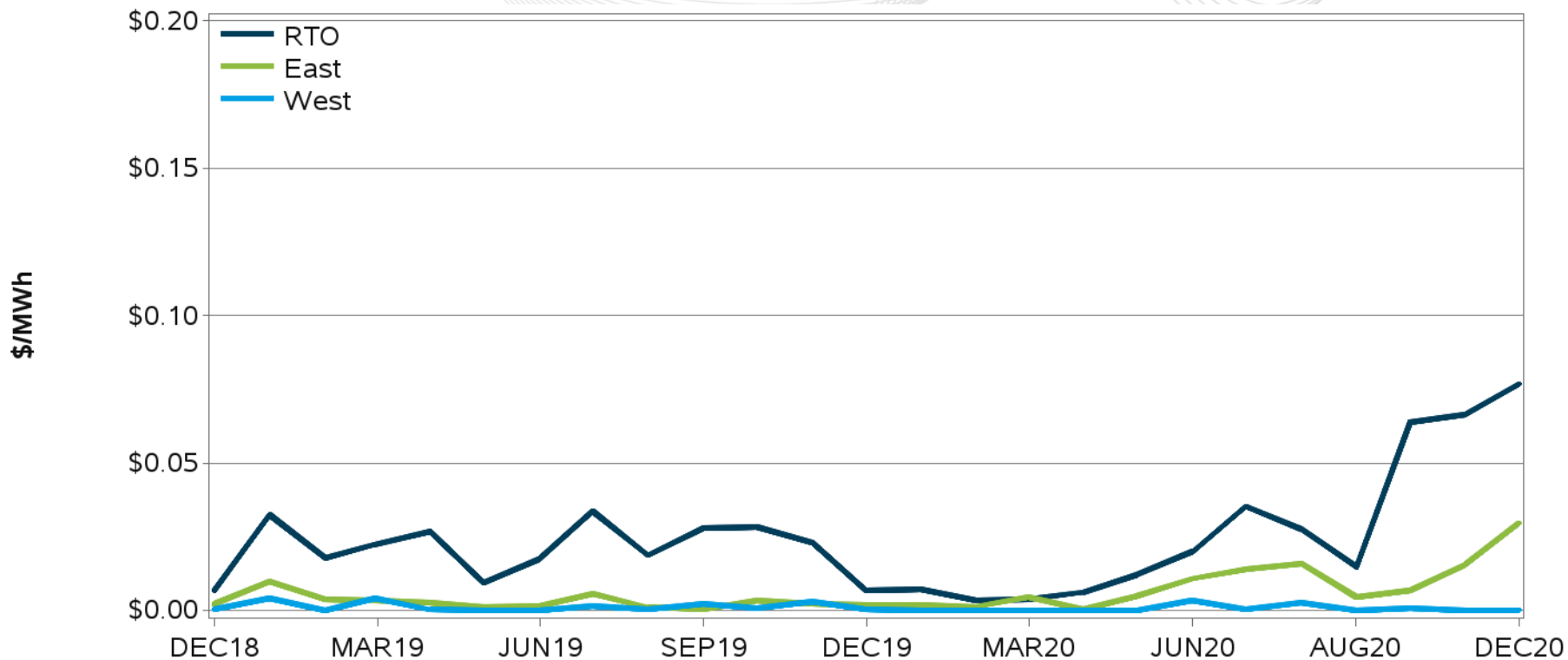
- Load forecast error
- Weather forecast error
- Localized congestions

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

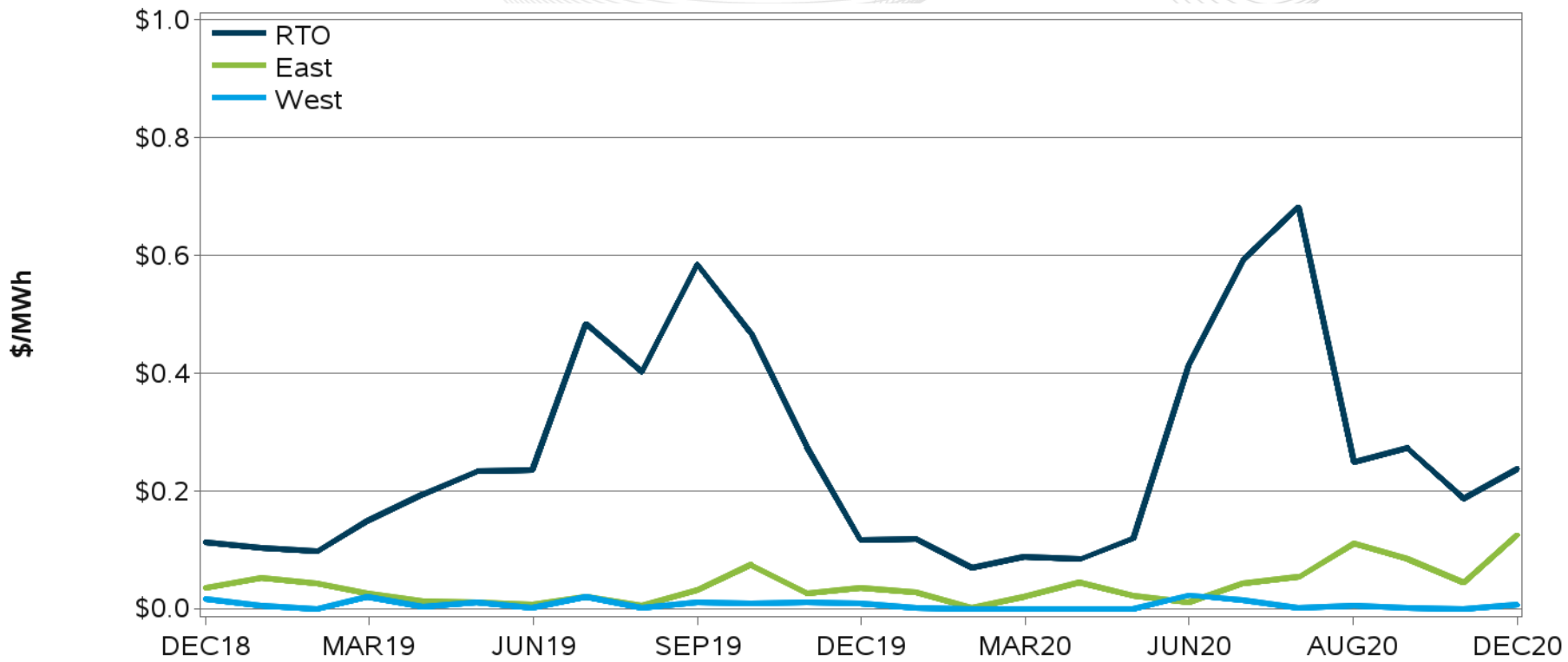
Percent of Total CT, CC and Steam Hours with LMP < Offer



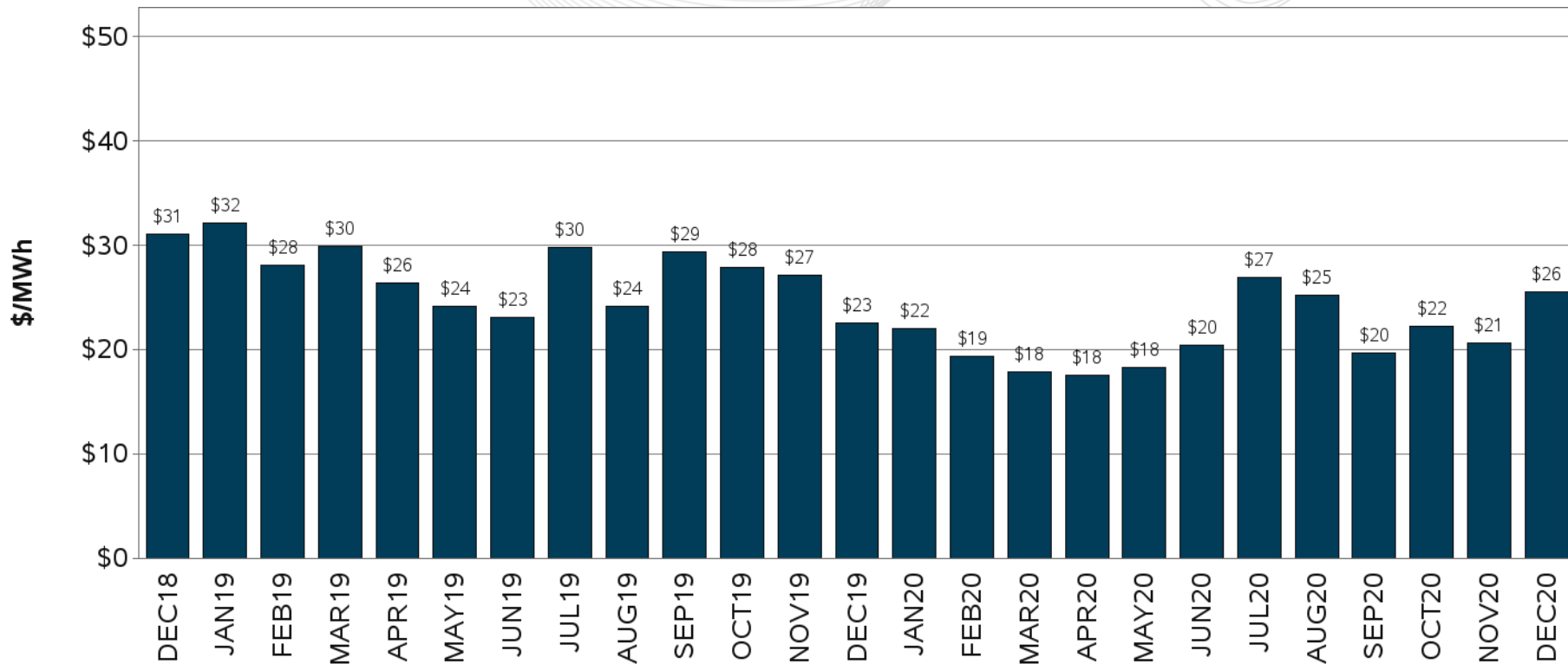
- Beginning in December 2008, the daily Balancing Operating Reserves (BOR) rate was replaced with six different BOR rates: RTO BOR for Reliability Rate, RTO BOR for Deviations Rate, East BOR for Reliability Rate, East BOR for Deviations Rate, West BOR for Reliability Rate, West BOR for Deviations Rate.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



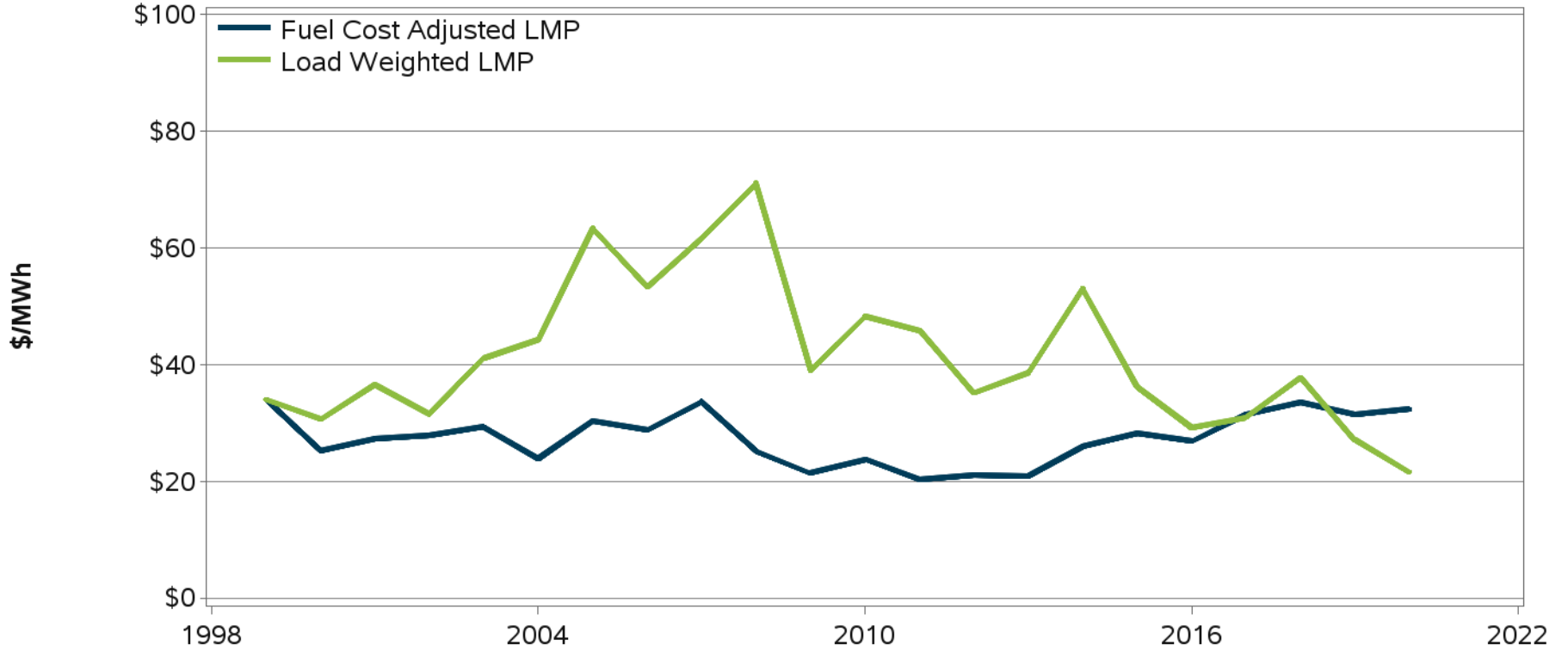
Deviations Balancing Operating Reserve Rates

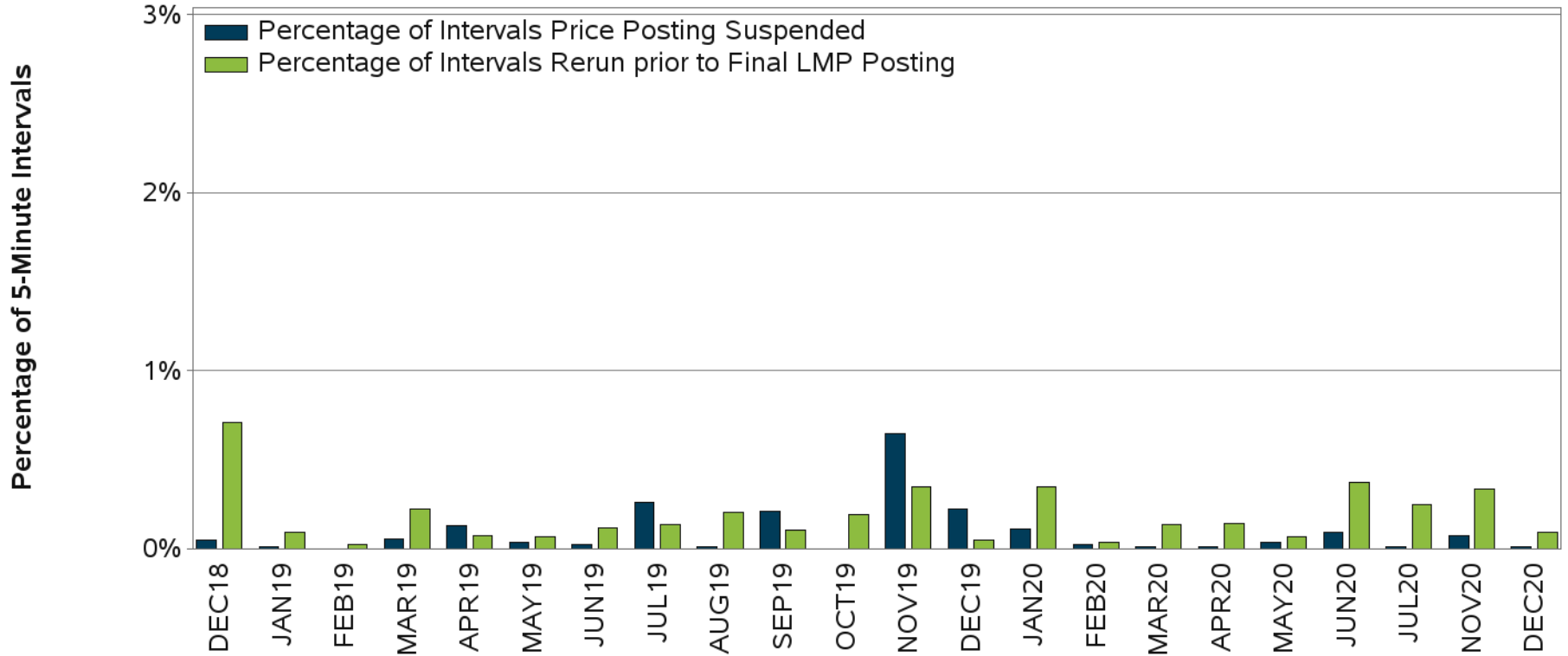


Energy Market LMP Summary



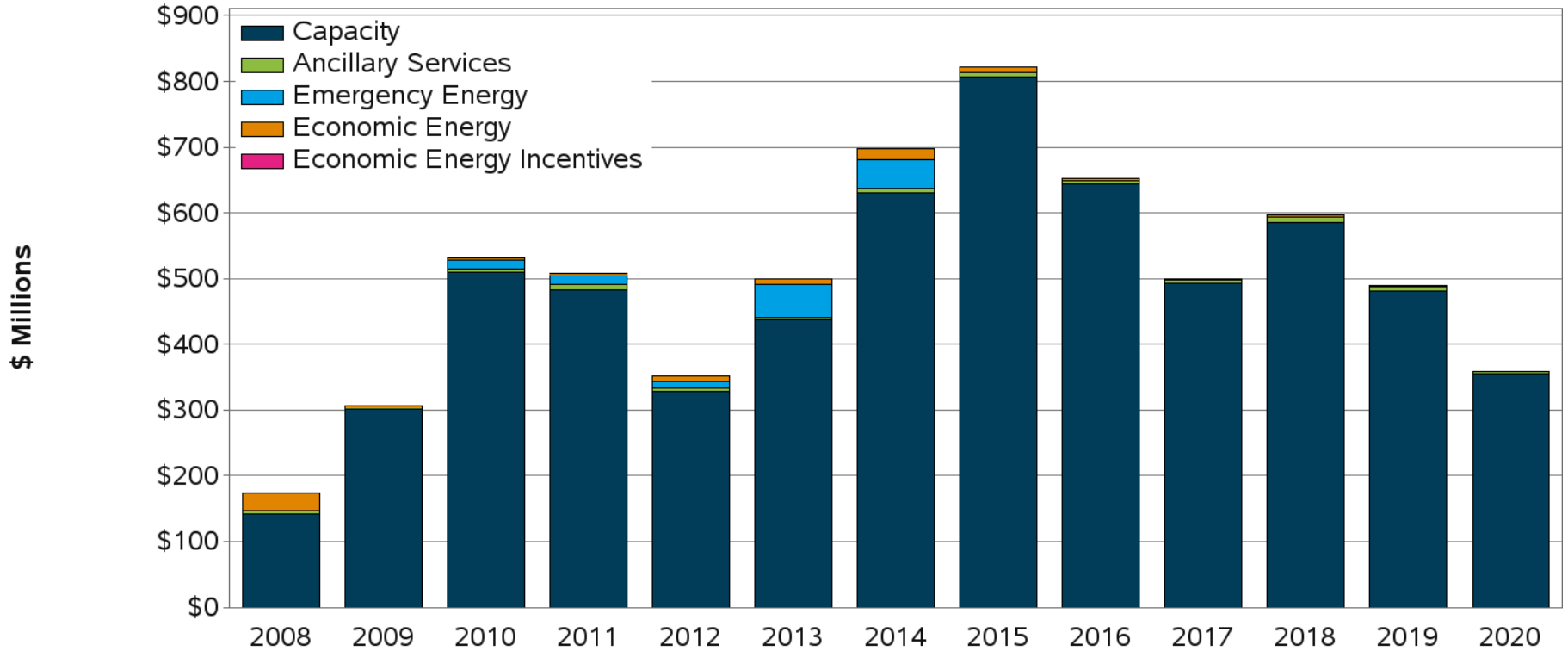
Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)

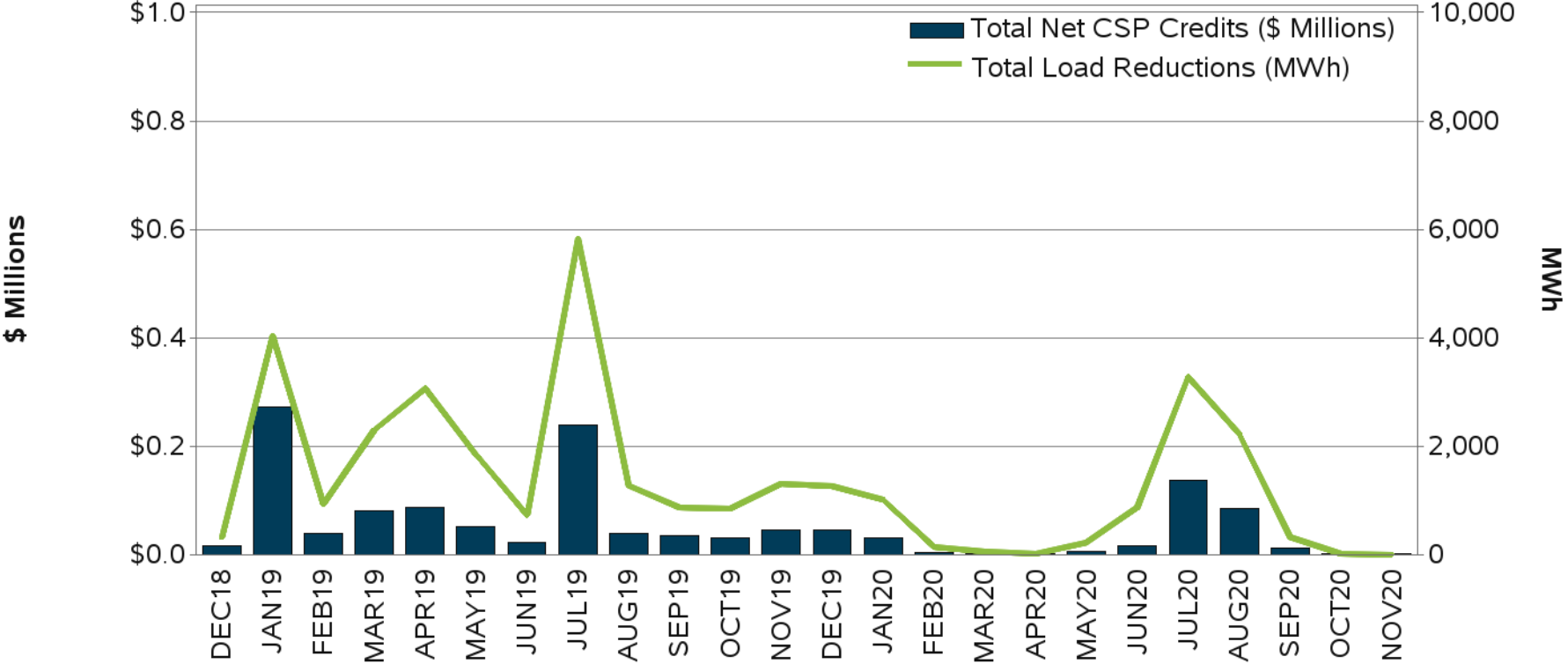




Energy Market

Demand Response Summary

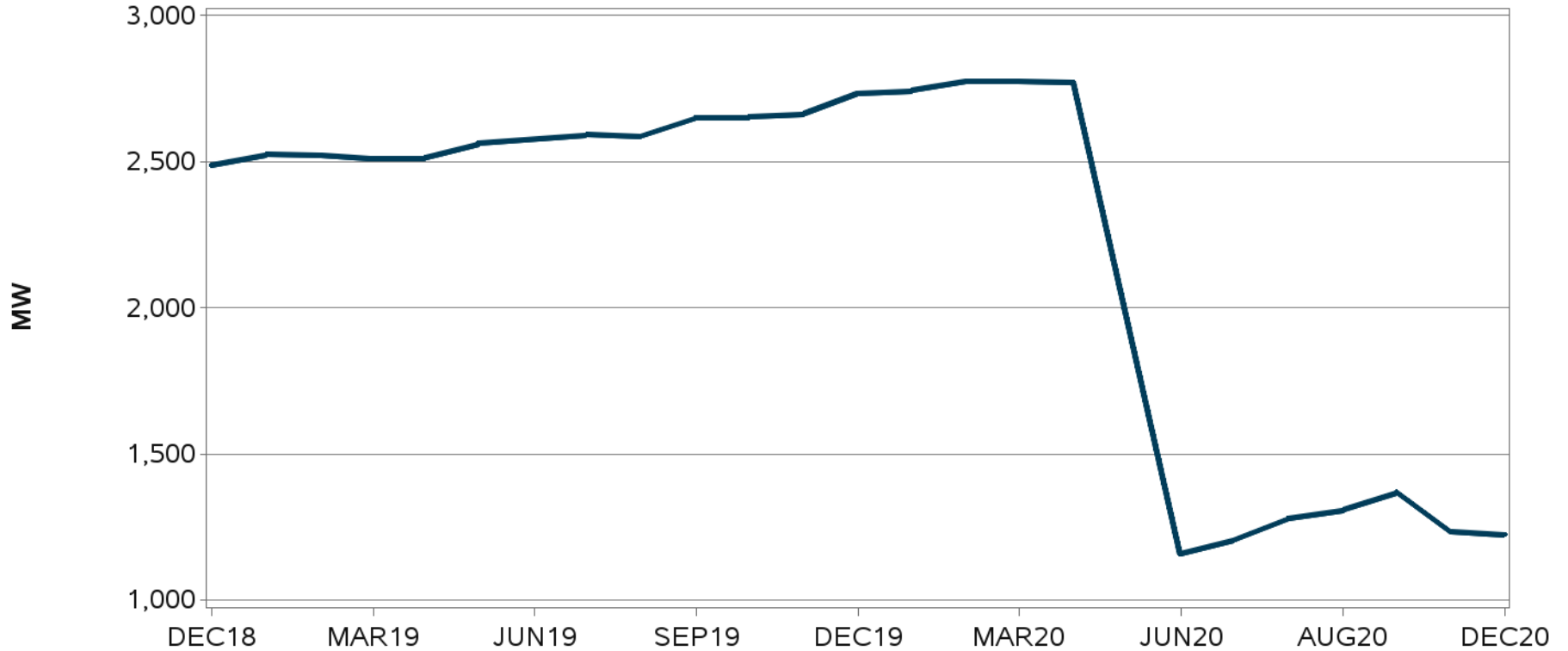




*Data for the last few months are subject to significant change due to the settlement window.



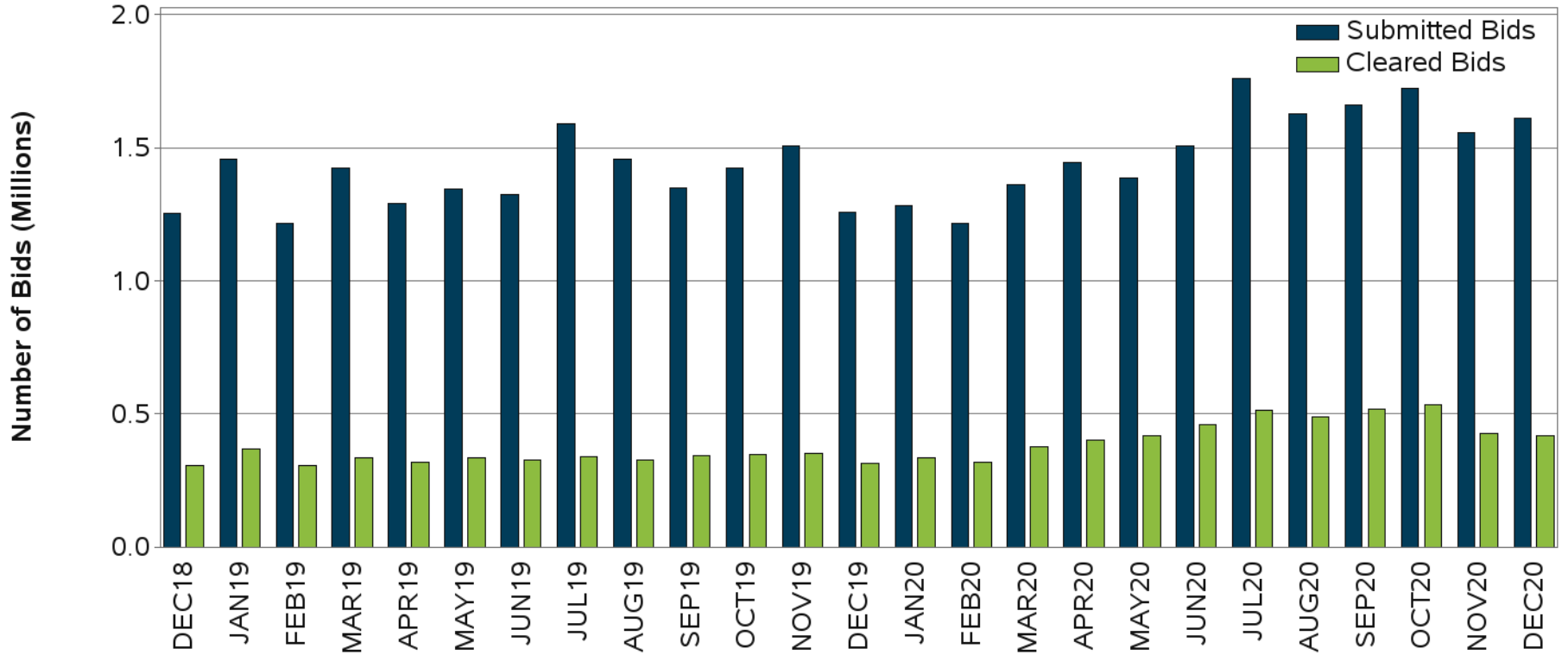
Total Registered MW in PJM's Economic Demand Response

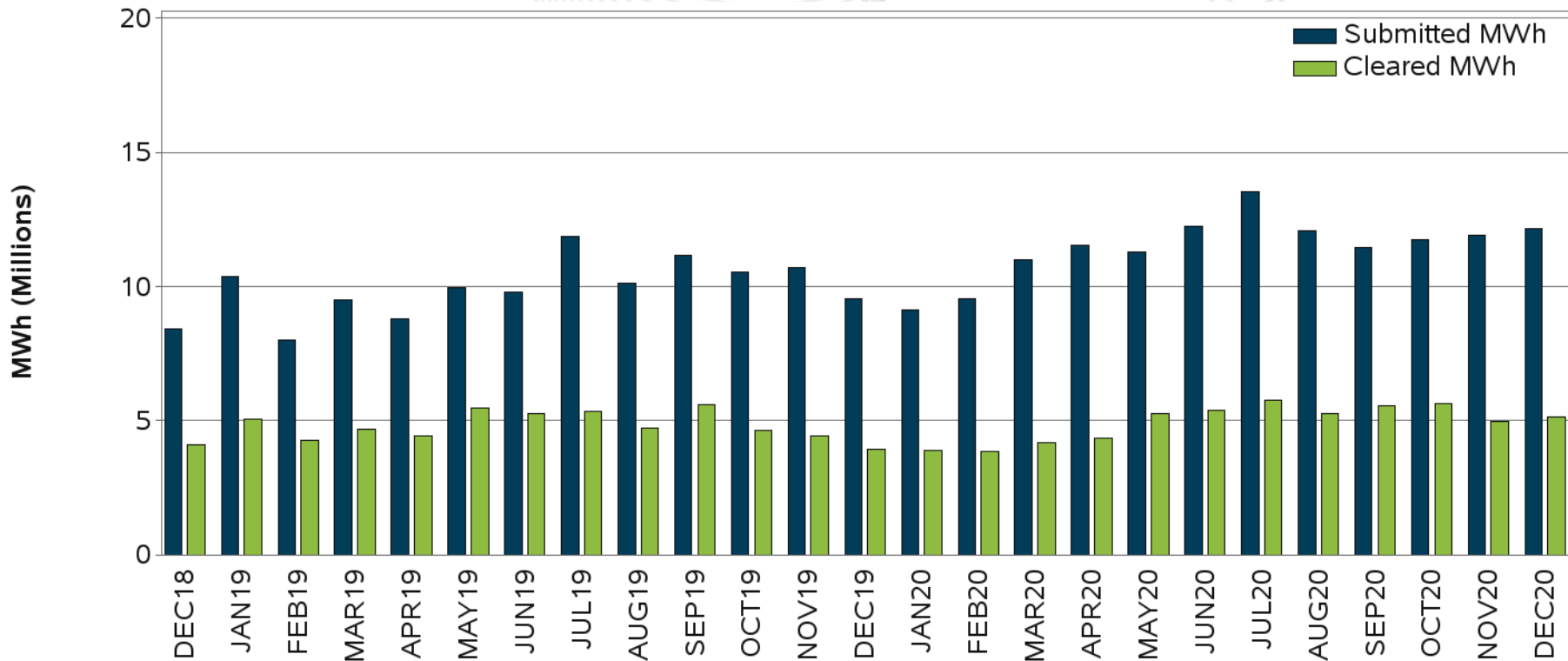


Energy Market

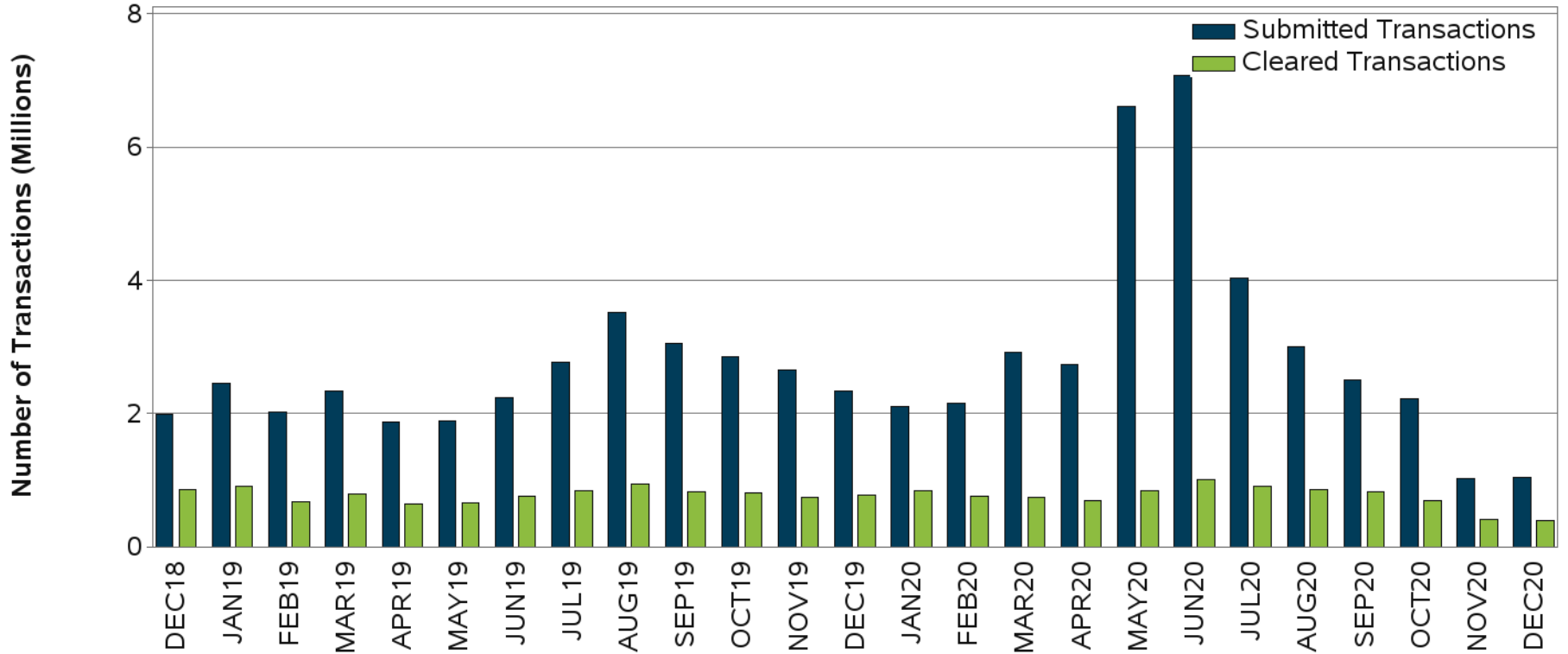
Virtual Activity Summary

- 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.

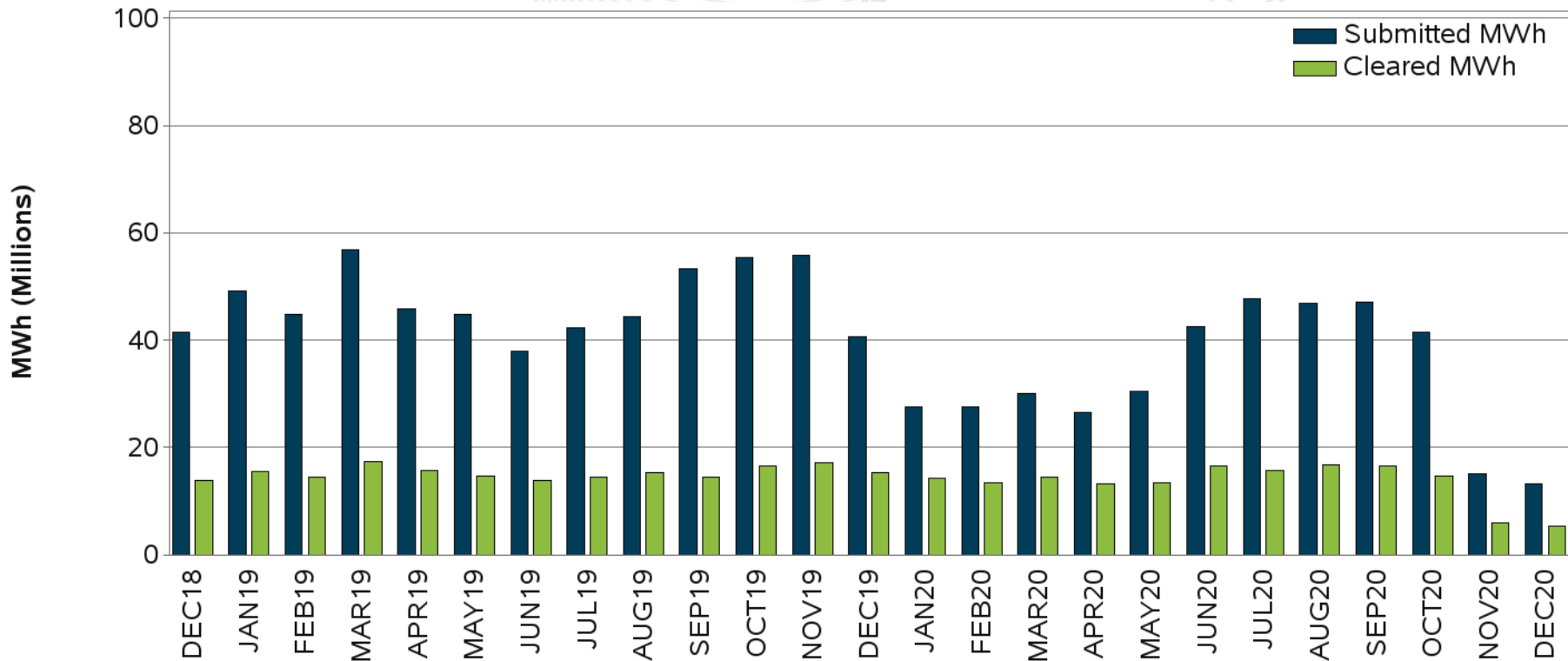




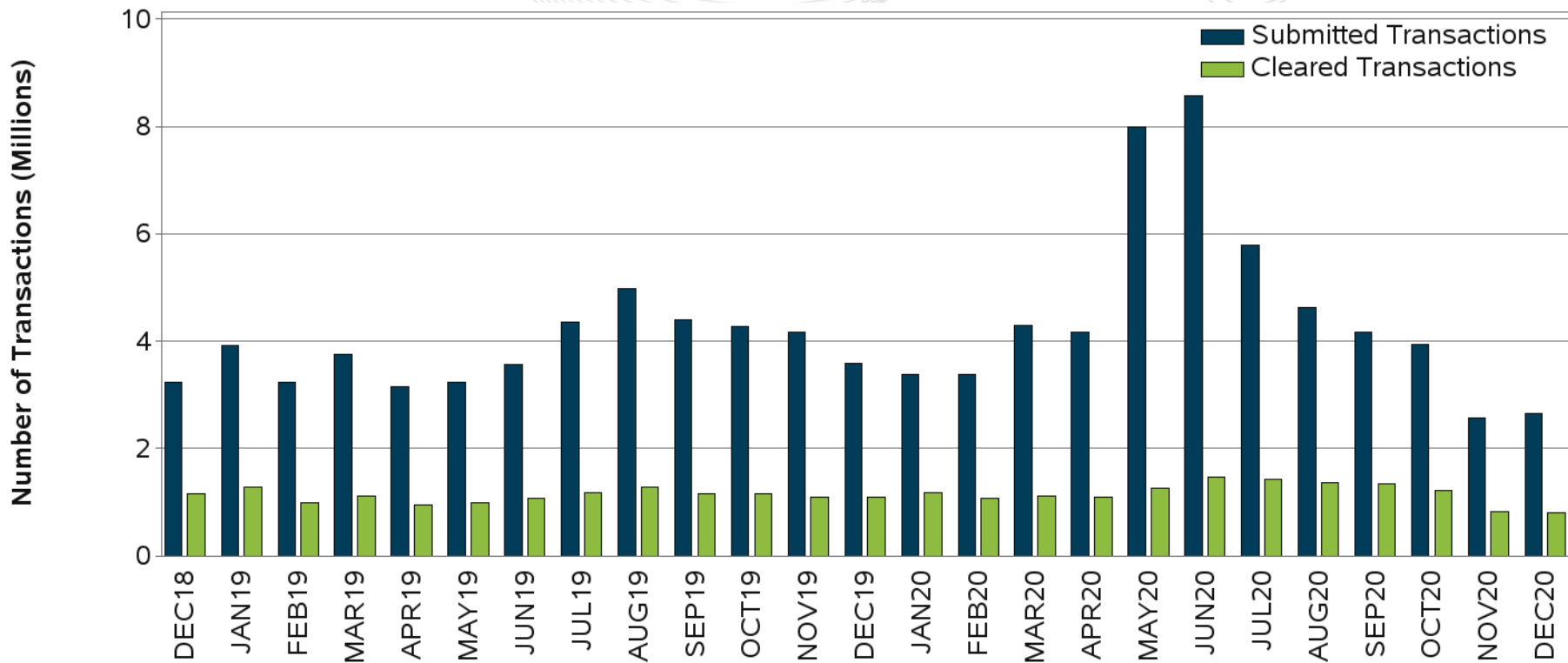
Up-To-Congestion Transactions - Total Number



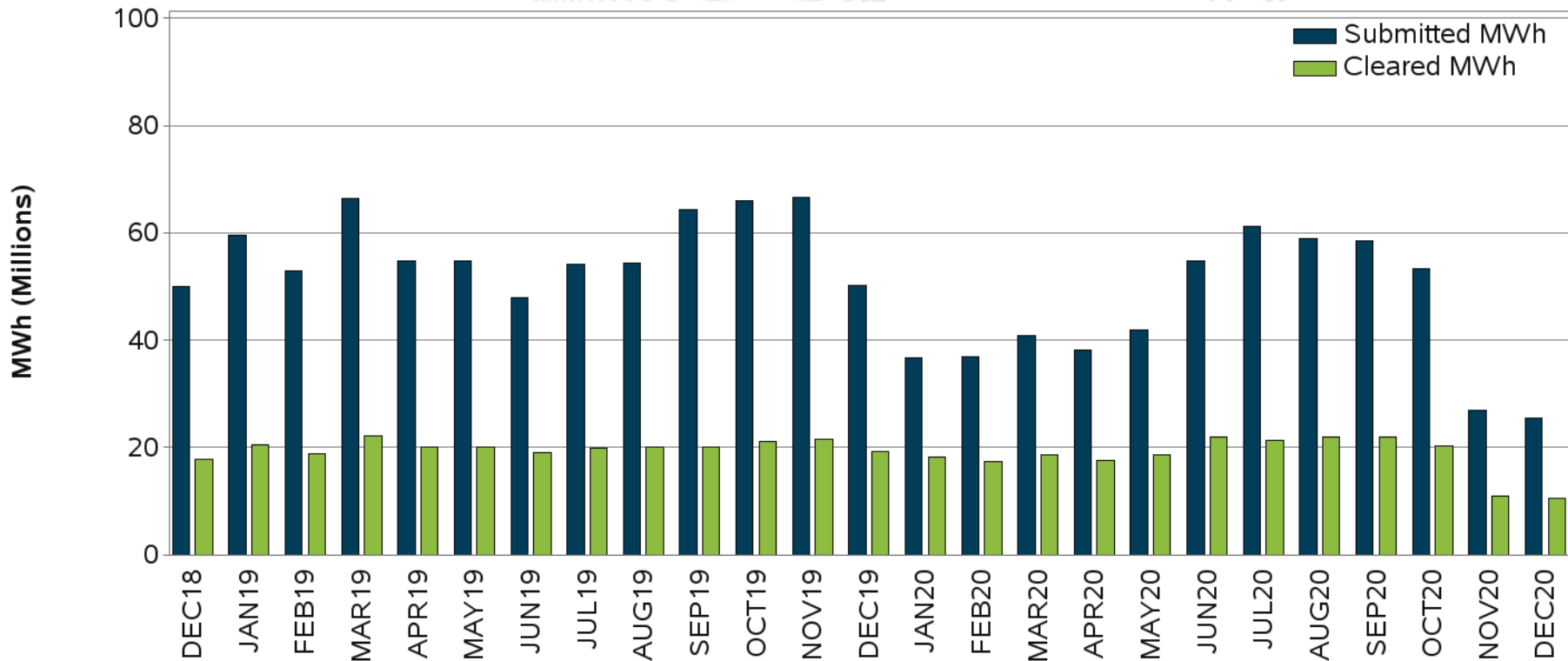
Up-To-Congestion Transactions - Total Volume



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



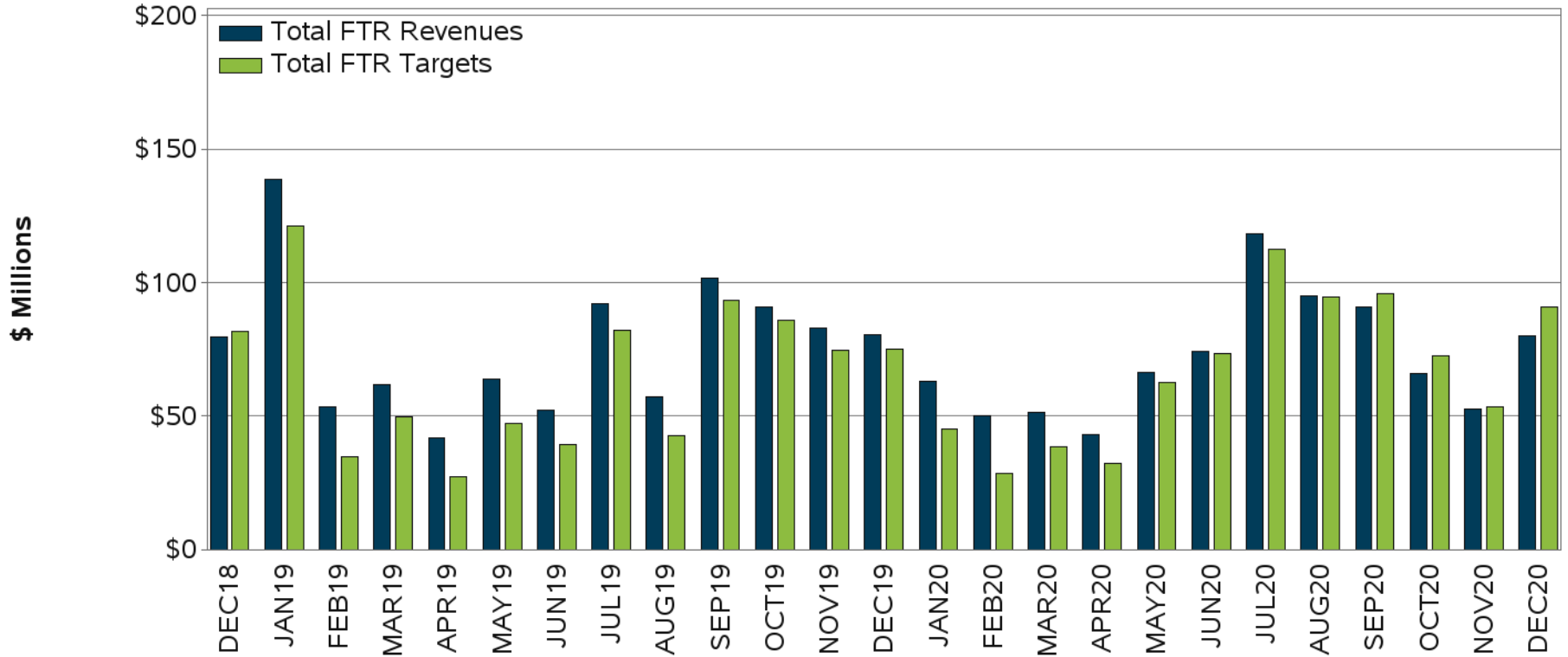
INCs, DECs and Up-To-Congestion Transactions - Total Volume

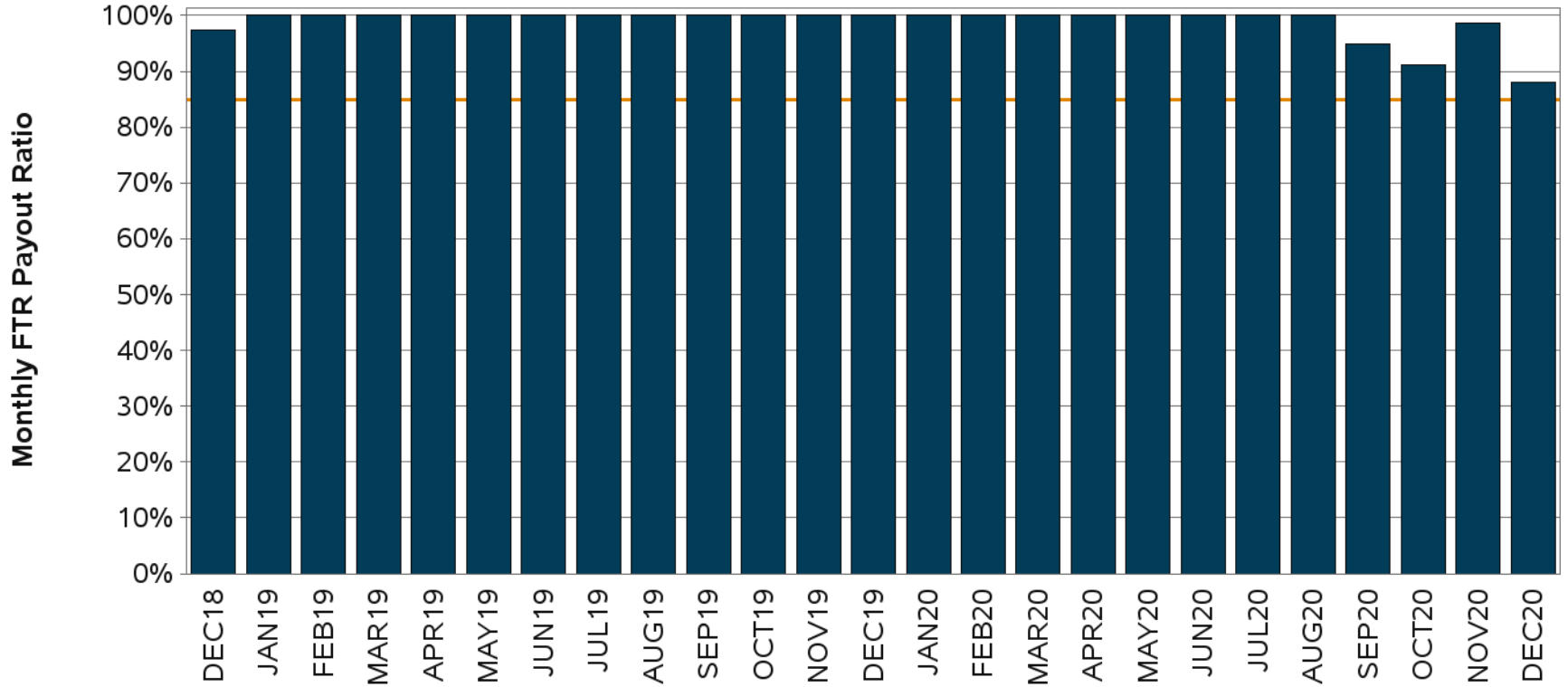


Energy Market

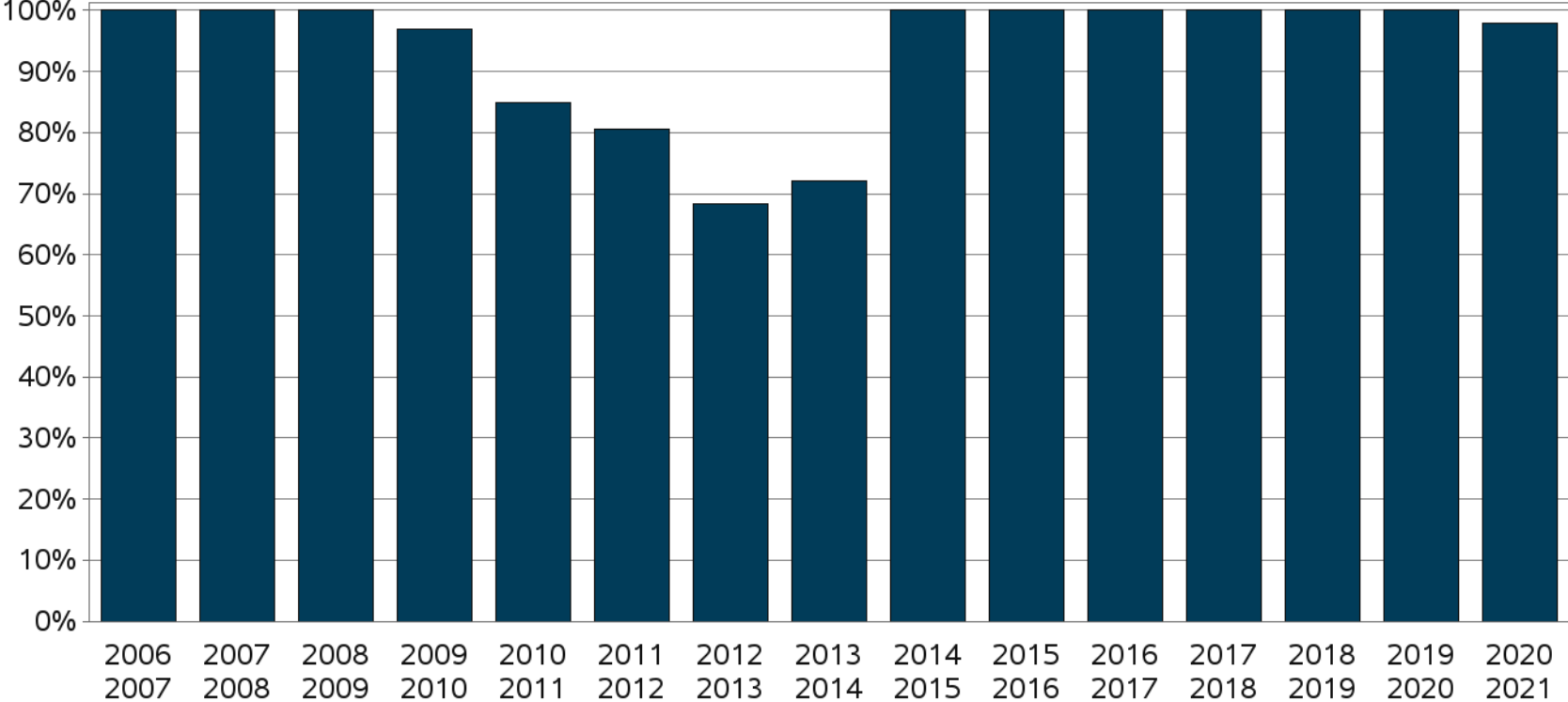
Congestion and FTR Summary

Period	Surplus / Underfunding	Payout Ratio
December, 2020	\$-10,925,356	88%
2020	\$54,735,331	100%
2020/2021	\$-12,172,158	98%

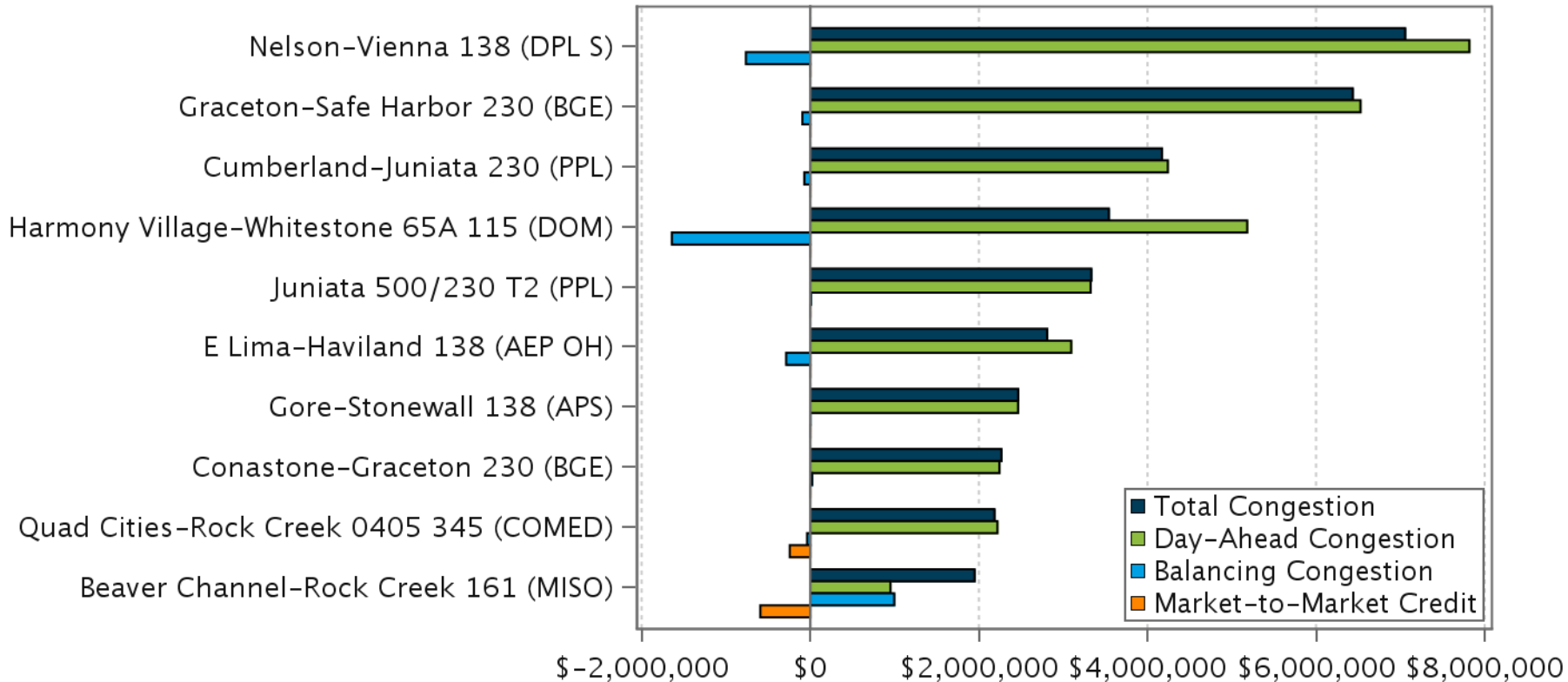




Planning Period FTR Payout Ratio

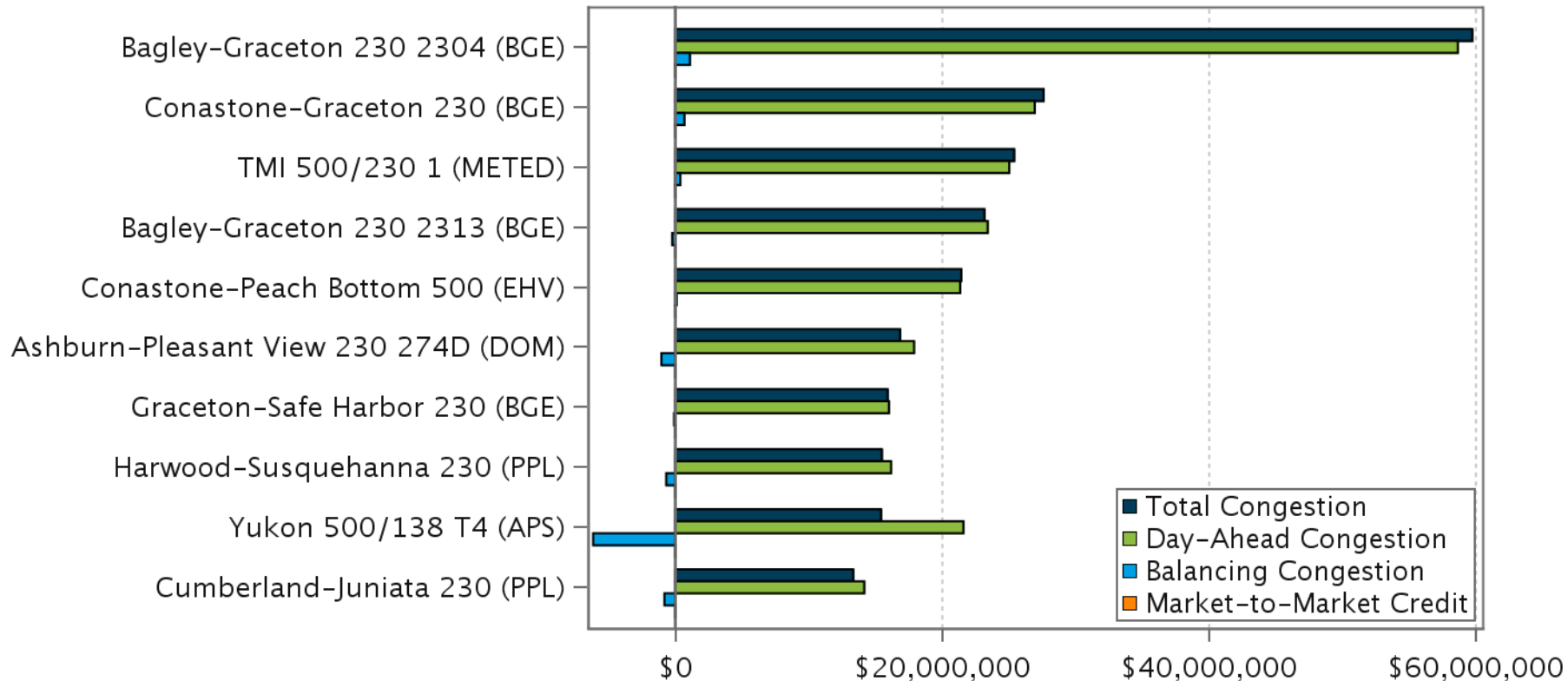


pjm Ten Most Heavily Congested Transmission Facilities - Overall, December



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

Ten Most Heavily Congested Transmission Facilities - Overall, 2020

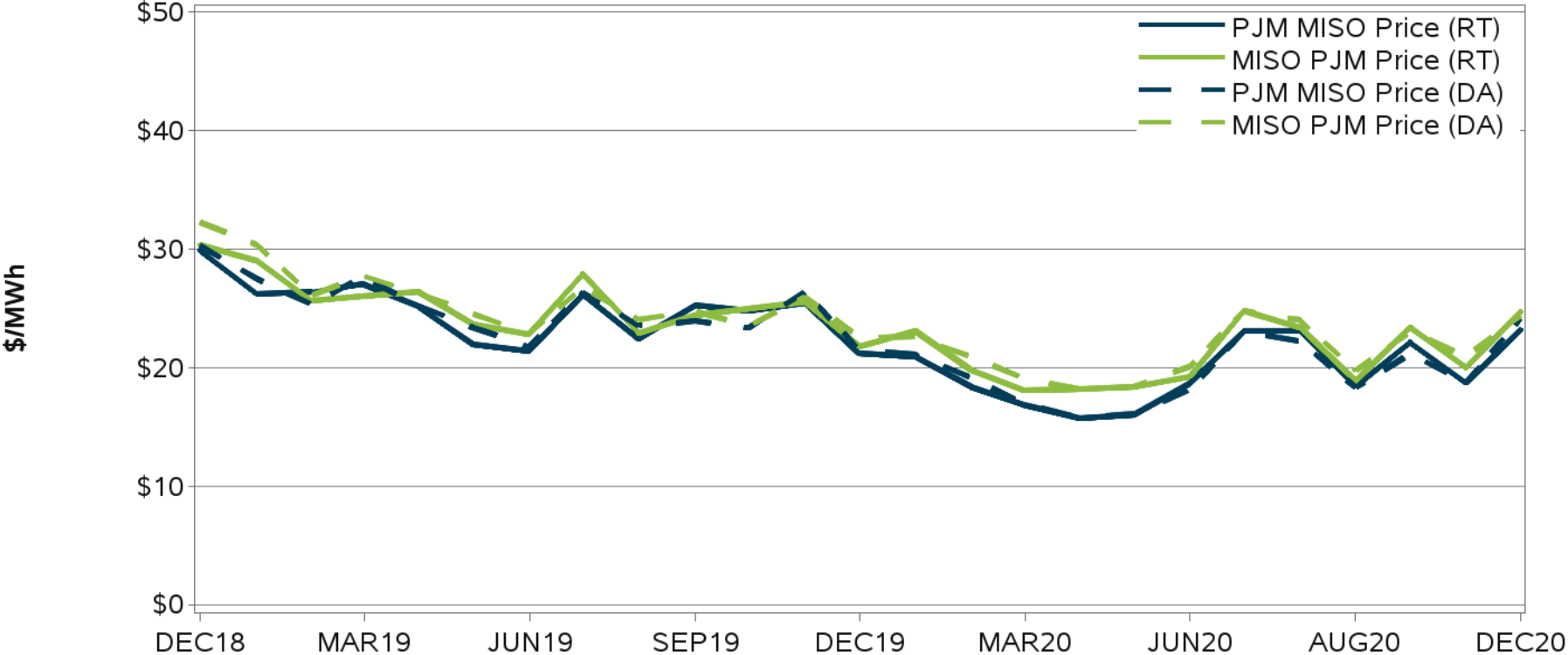


The ten most heavily congested facilities account for 43% of total congestion for 2020.

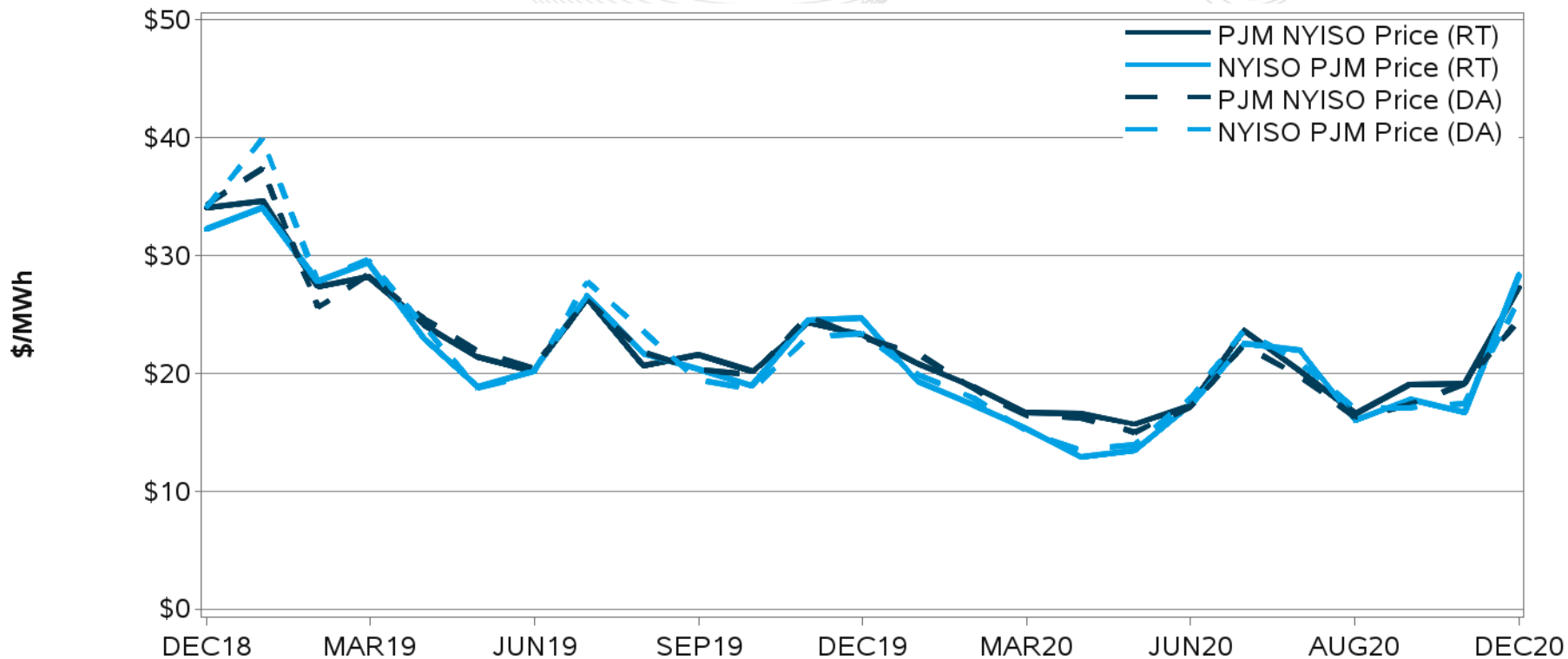
Energy Market

Interchange/Seams Summary

Monthly Average MISO Interface Pricing

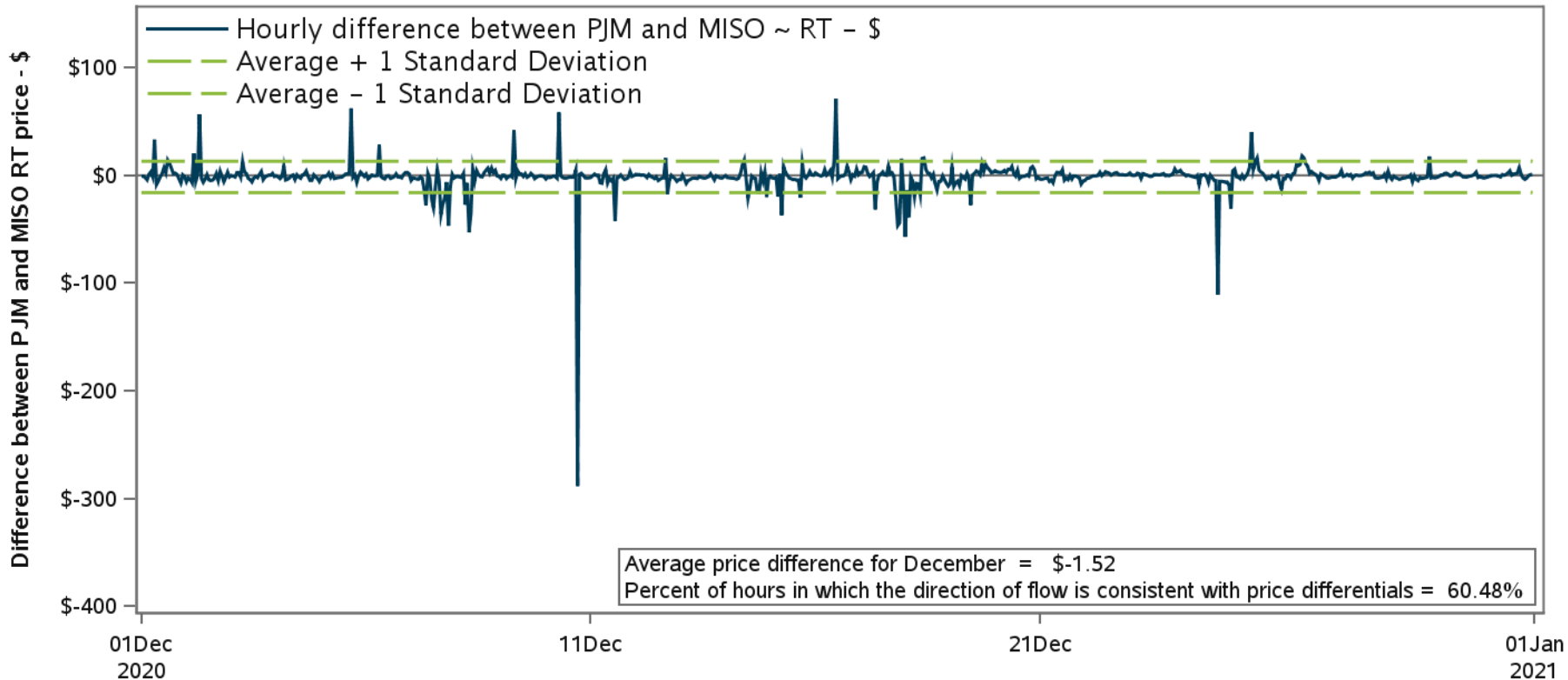


Monthly Average NYISO Interface Pricing



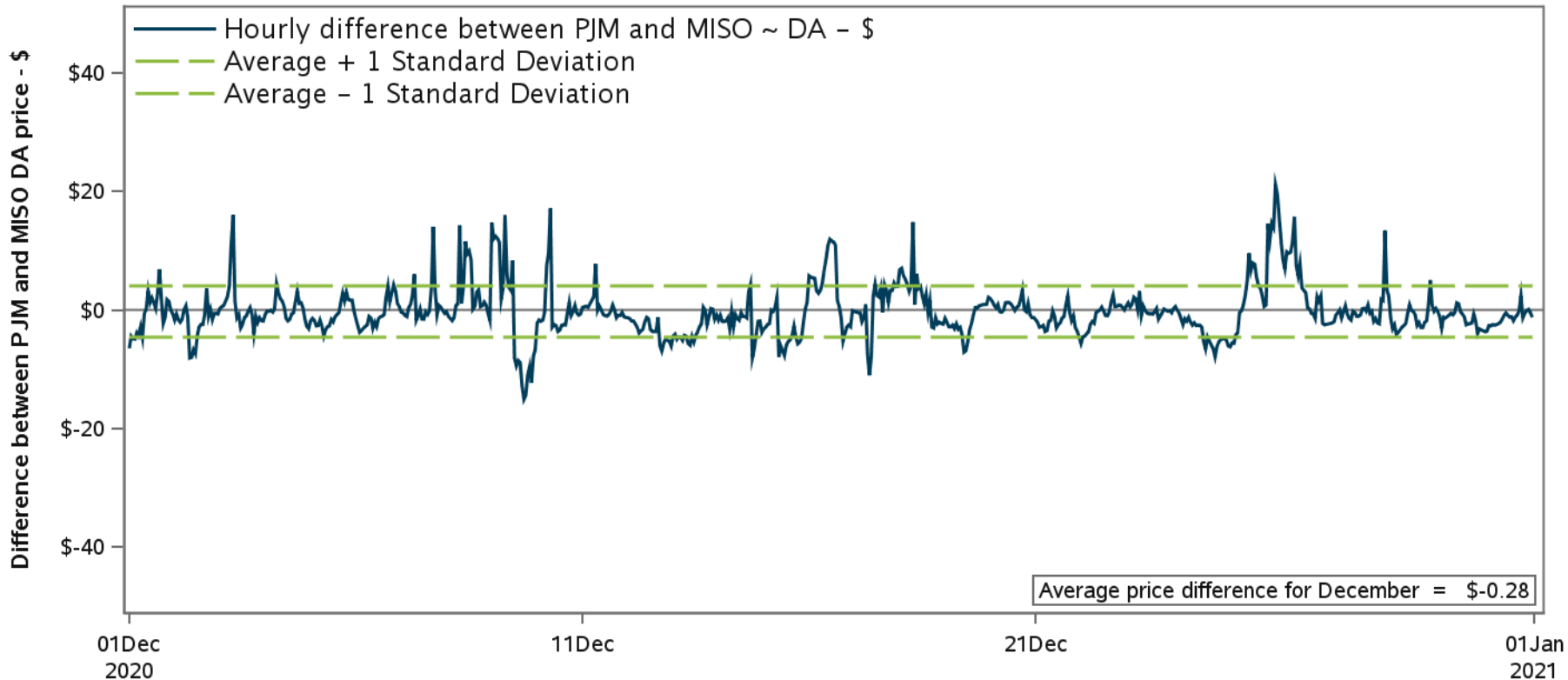


Hourly Difference Between PJM and MISO Real-Time Prices



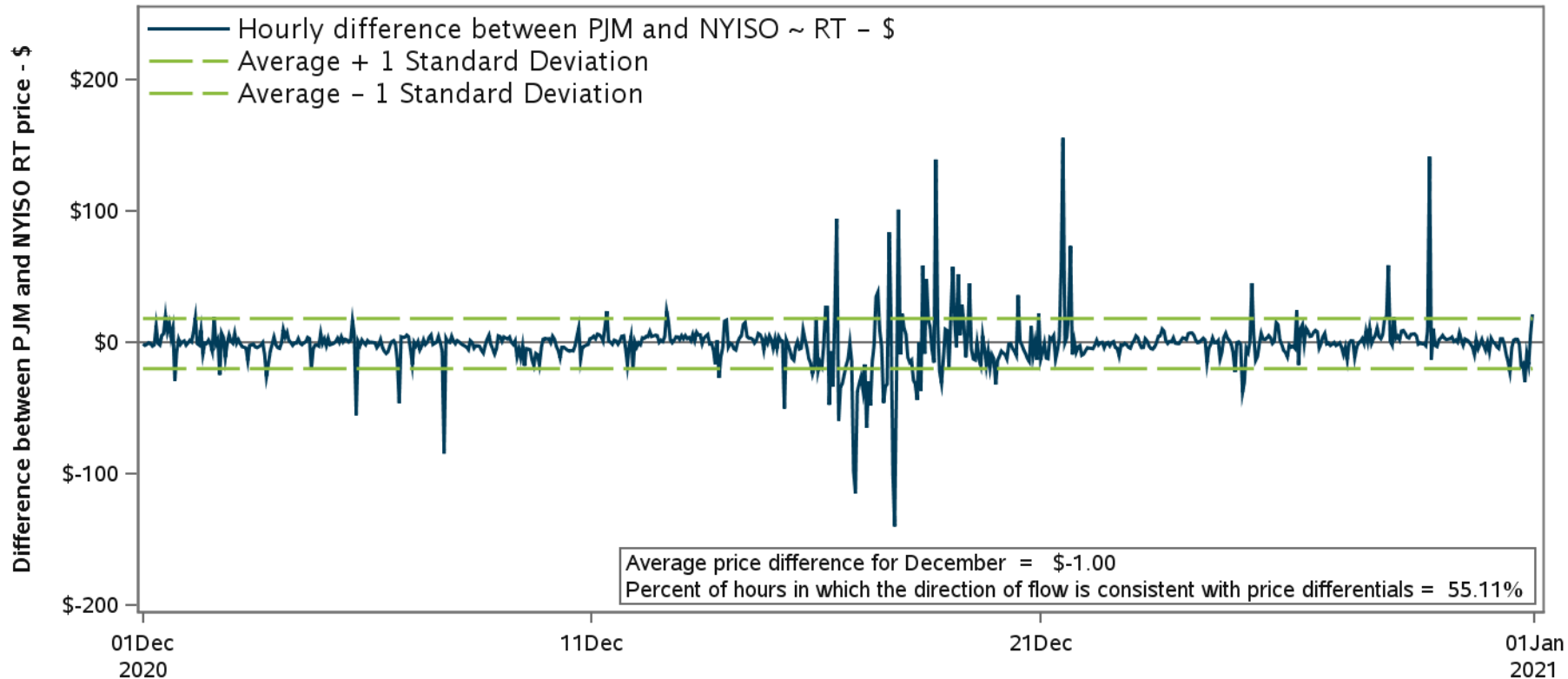
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and MISO Day-Ahead Prices



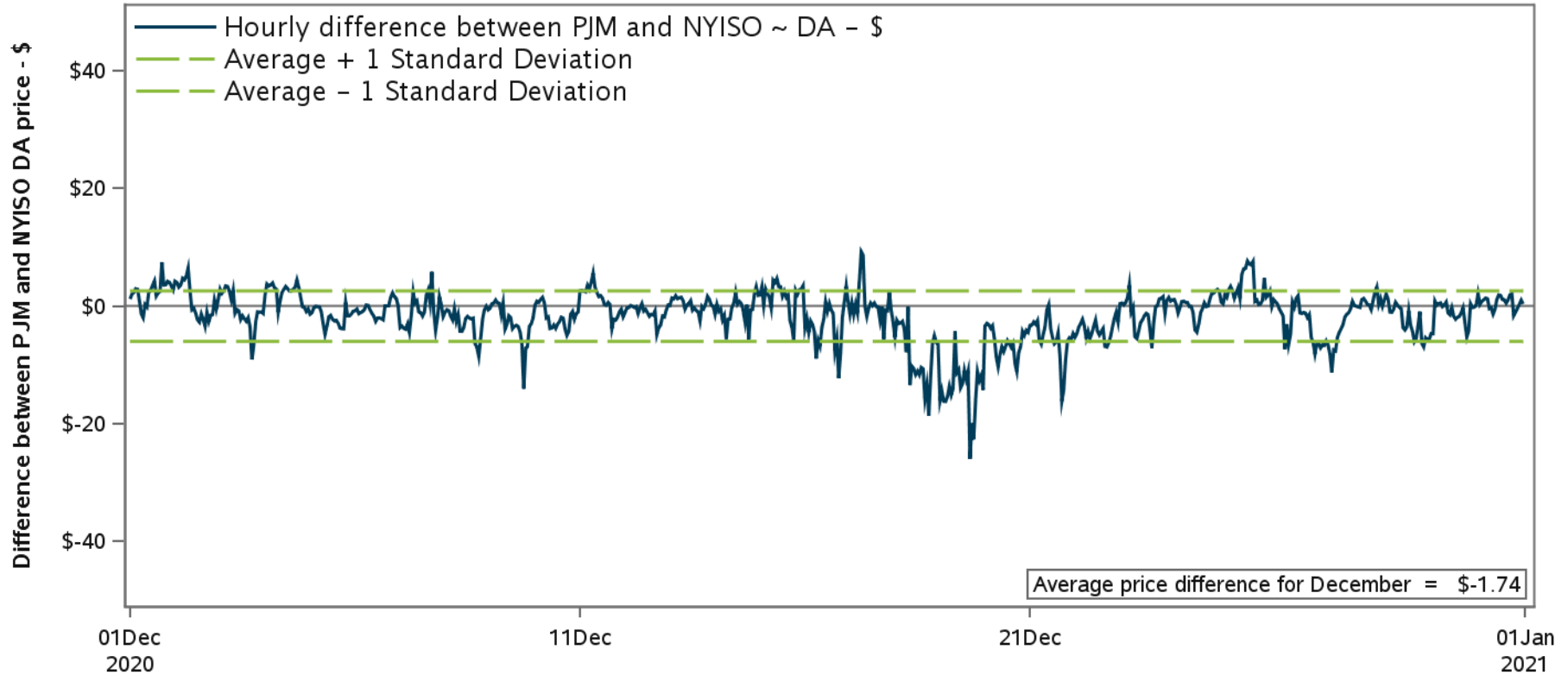
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Real-Time Prices

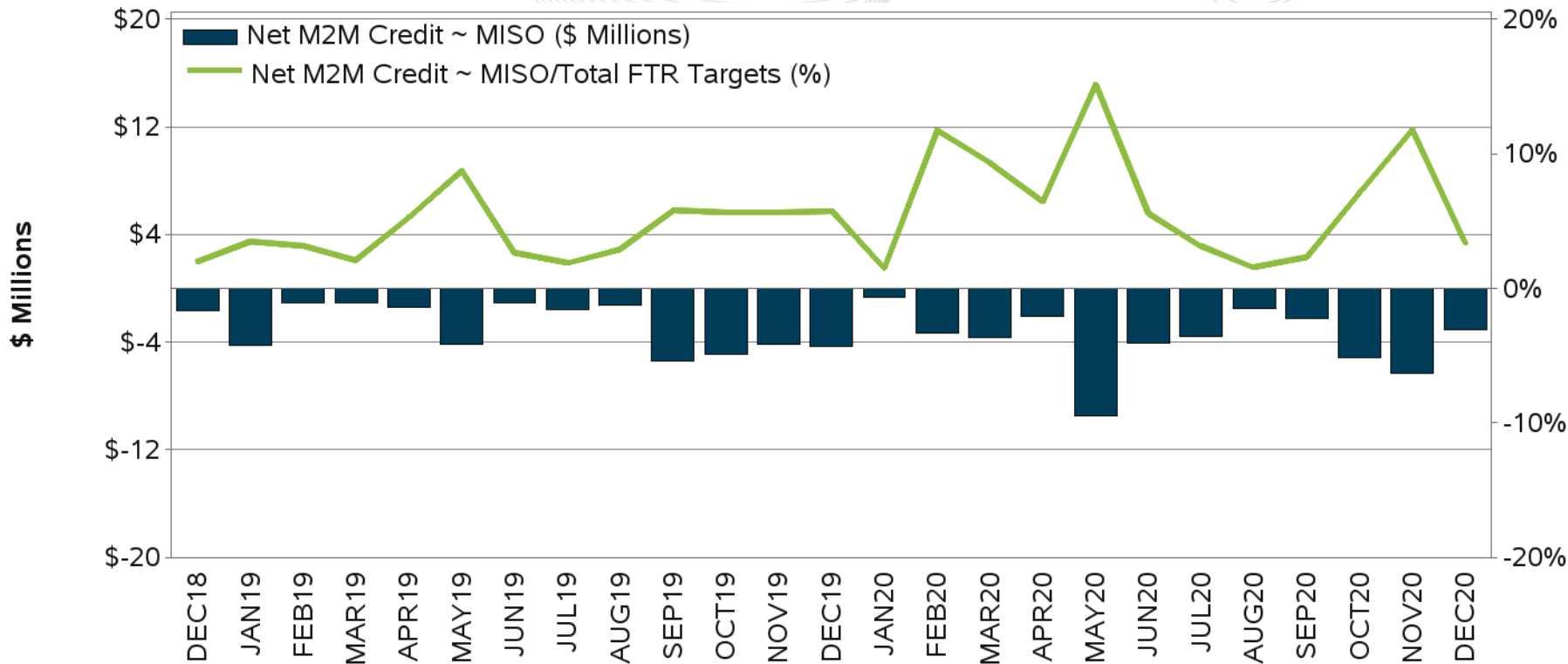


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

Hourly Difference Between PJM and NYISO Day-Ahead Prices



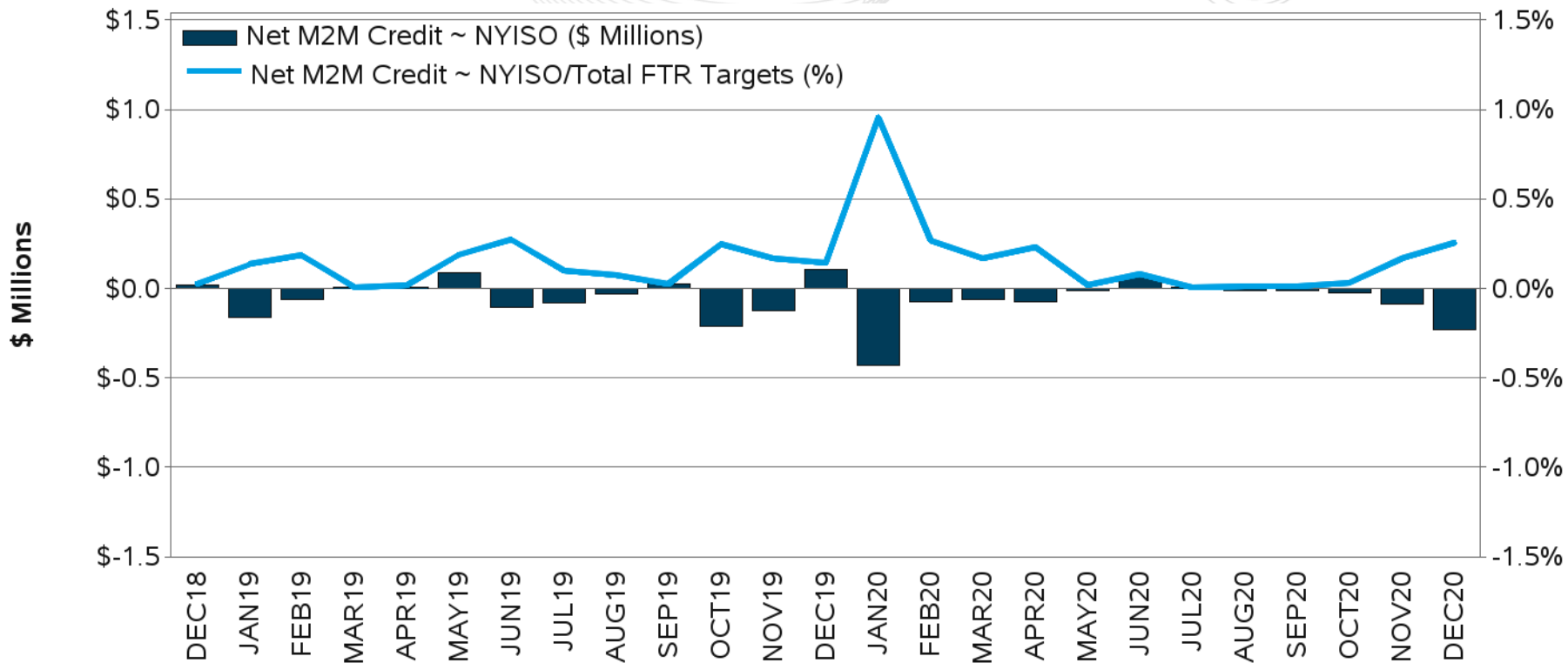
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Negative M2M Credit represents PJM payment to MISO

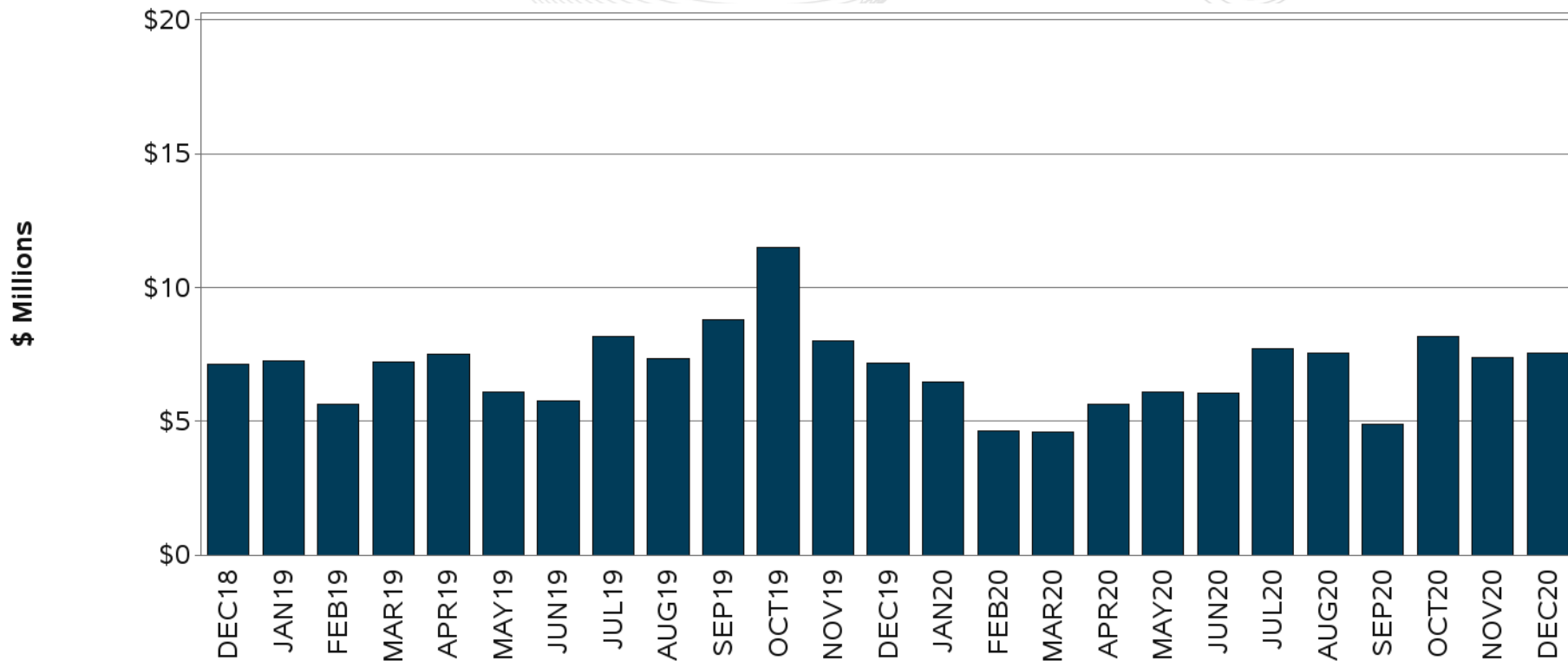


PJM-NYISO Market-to-Market Coordination Settlement

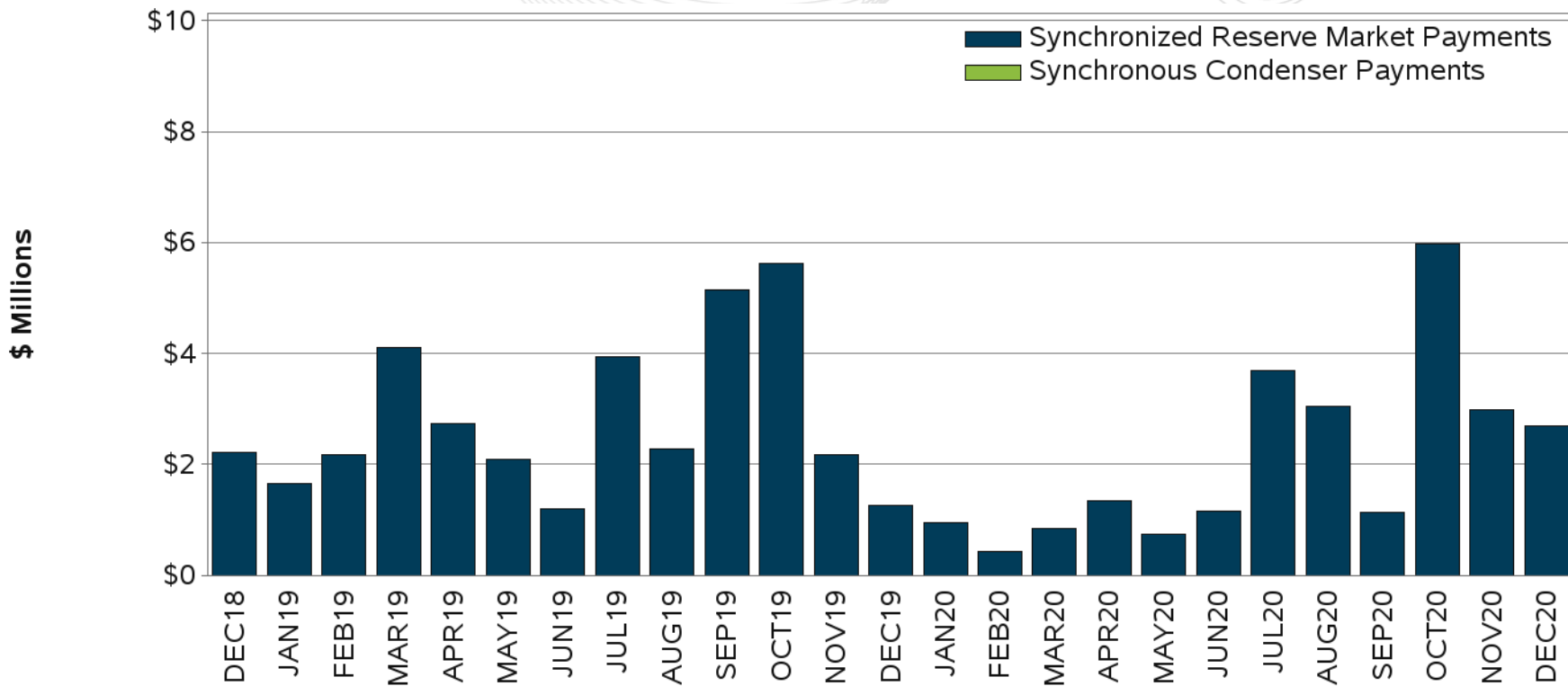


Negative M2M Credit represents PJM payment to NYISO

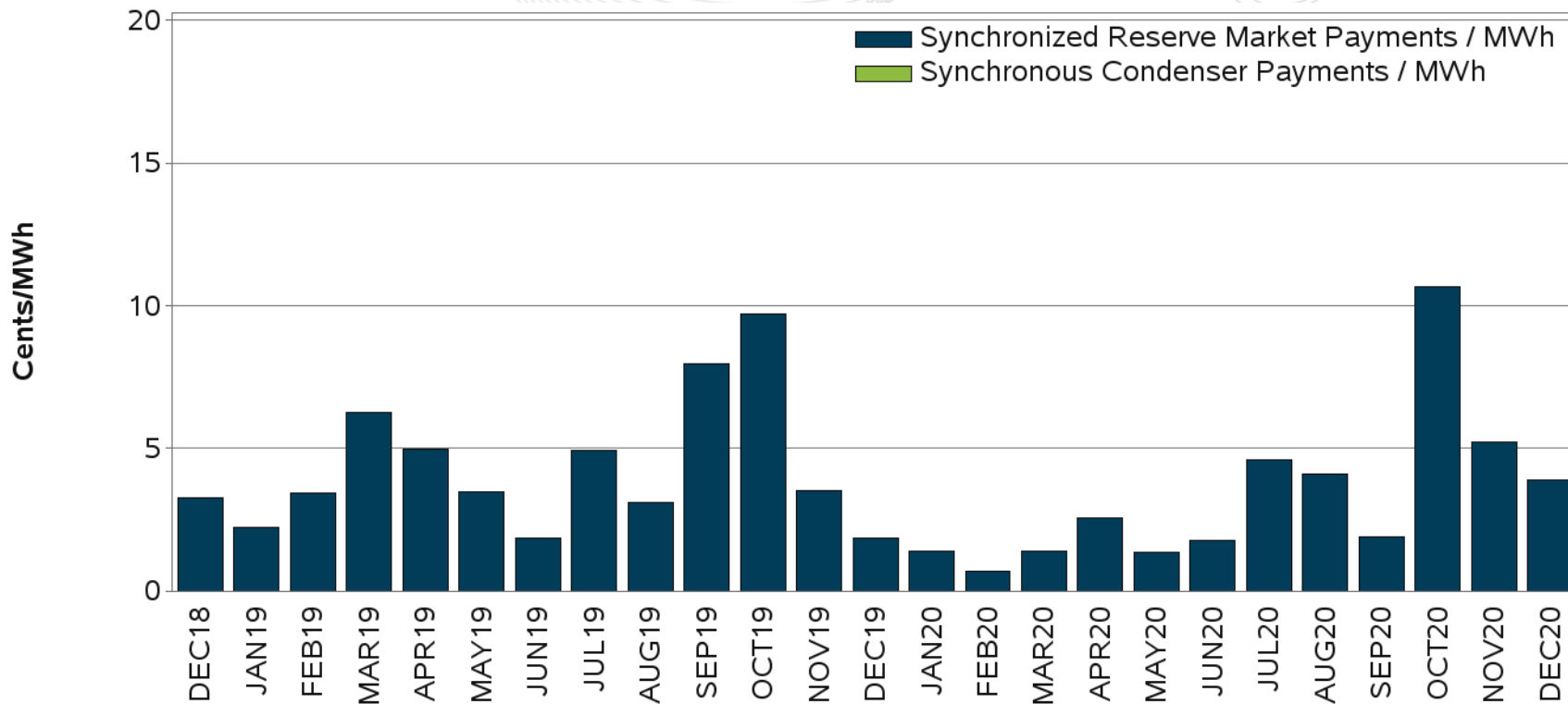
Ancillary Service Market Summary



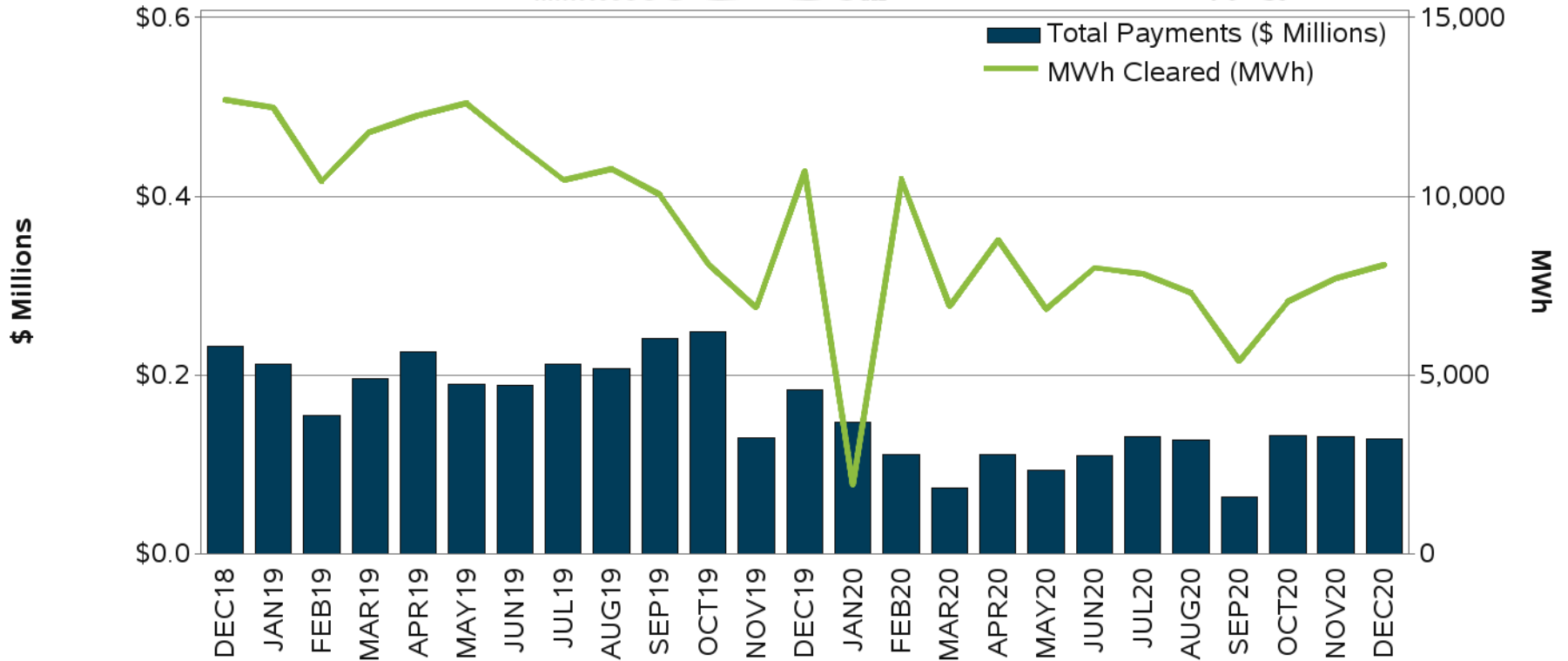
Synchronized Reserve and Synchronous Condenser Costs



pjm Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs

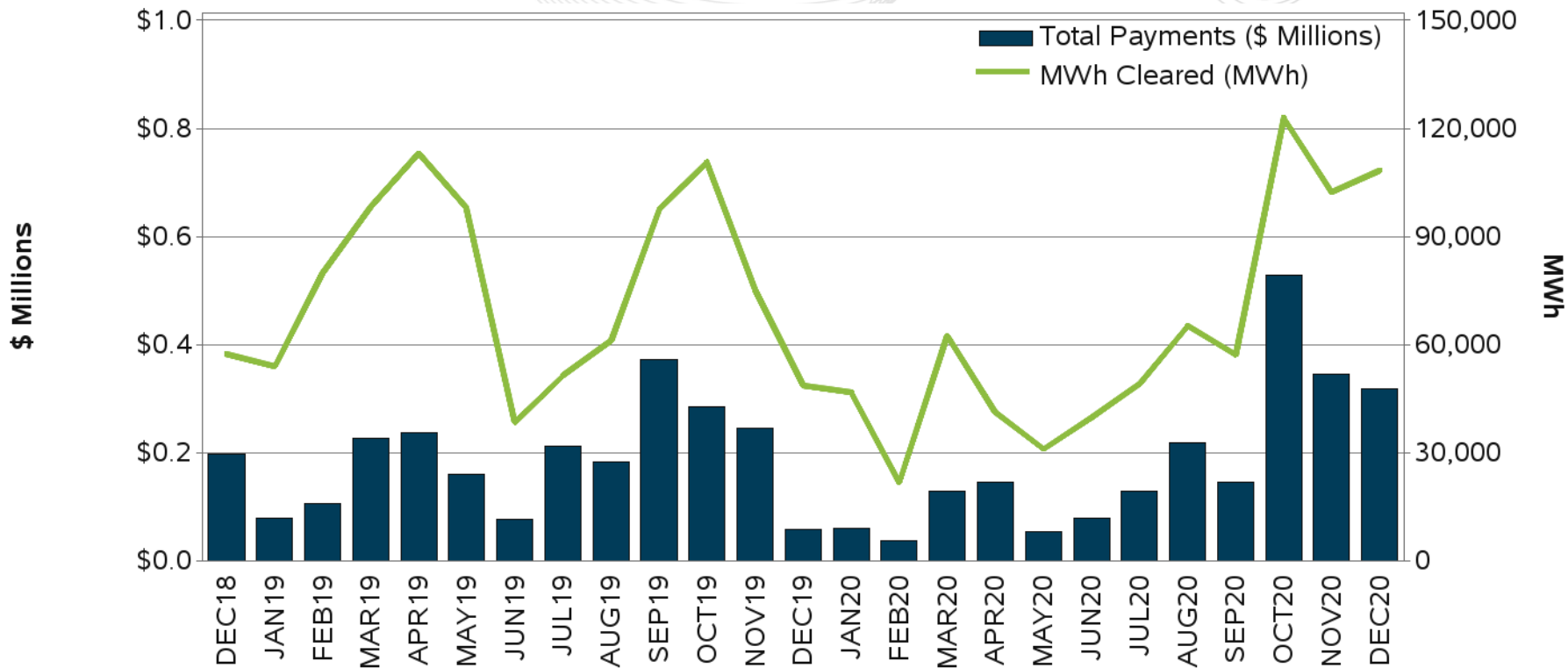


DR Participation in PJM Regulation Markets

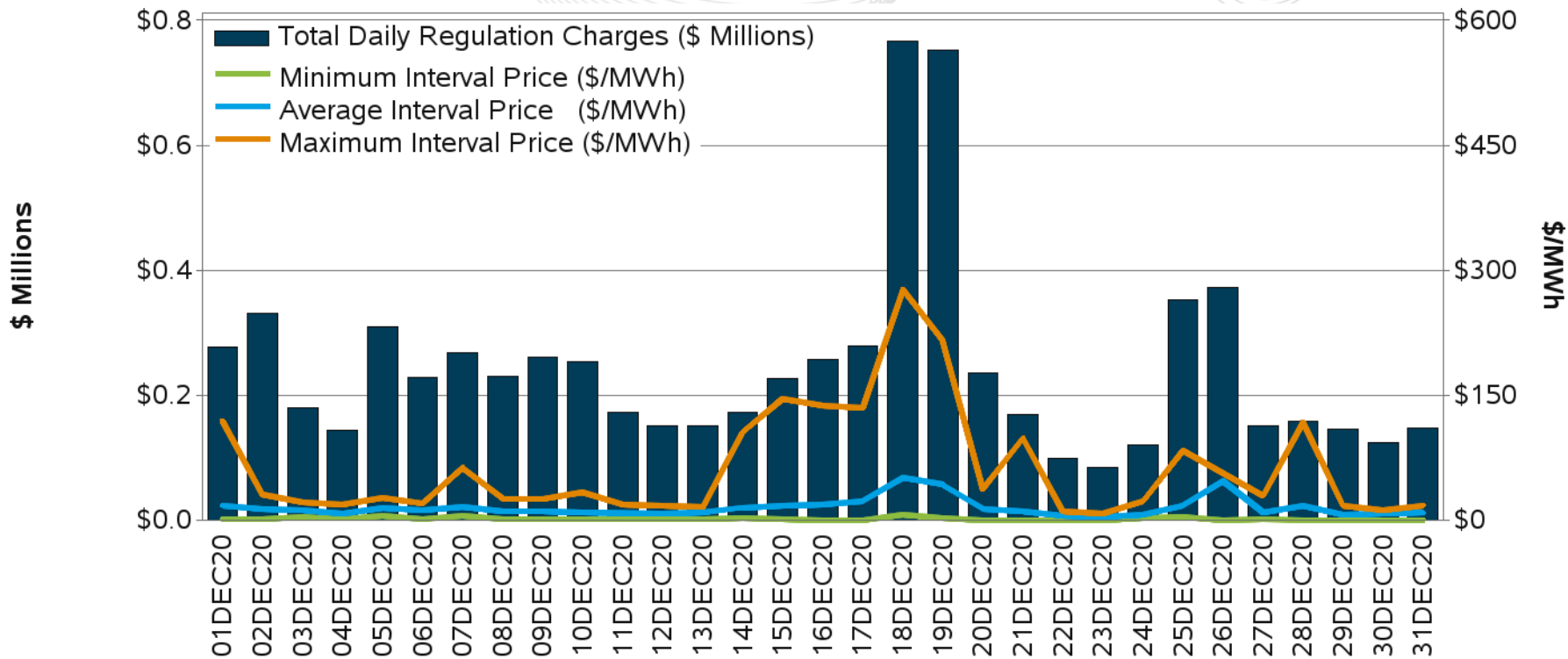




DR Participation in PJM Synchronized Reserve Markets



Regulation Market Daily Prices and Charges



Synchronized Reserve Market Daily Prices and Charges

