



# Markets Report

Jennifer Warner-Freeman

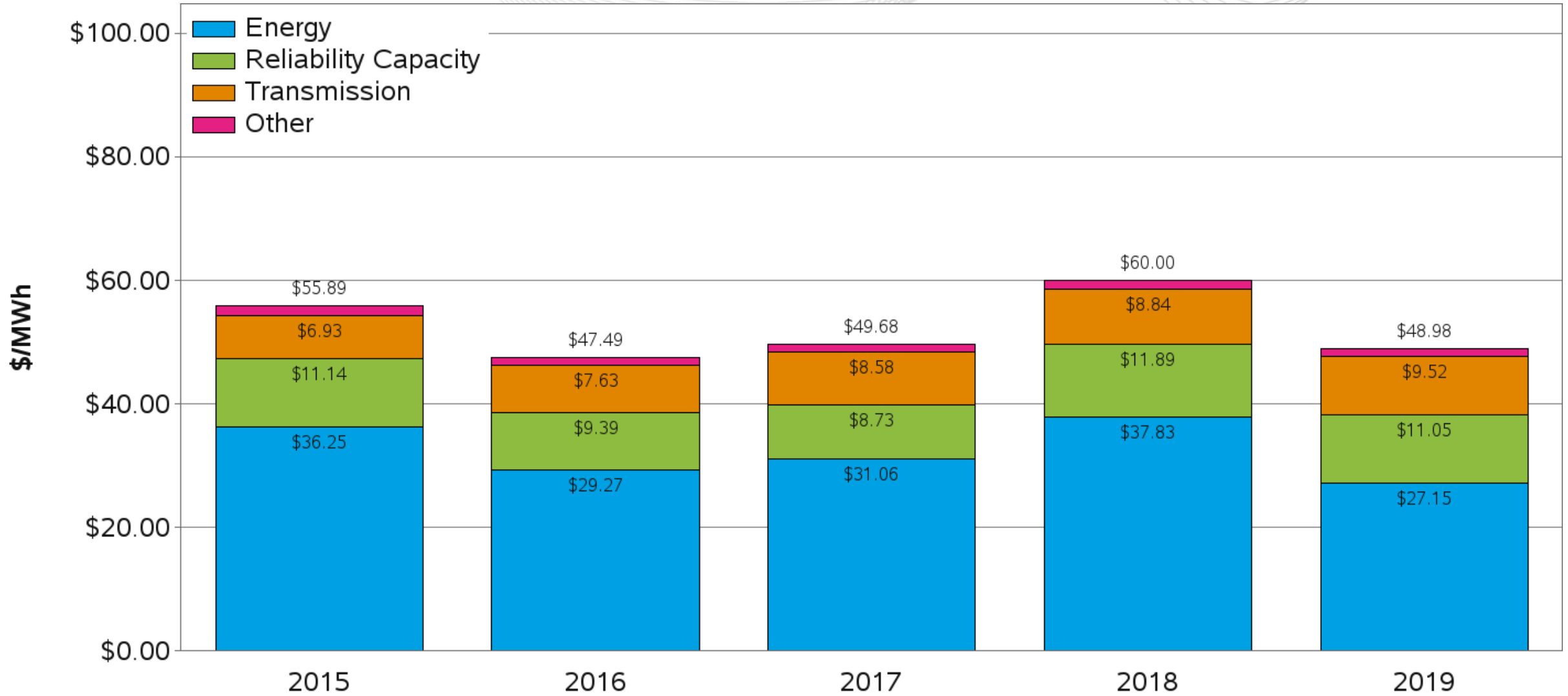
Senior Economist, Operation Analysis & Compliance

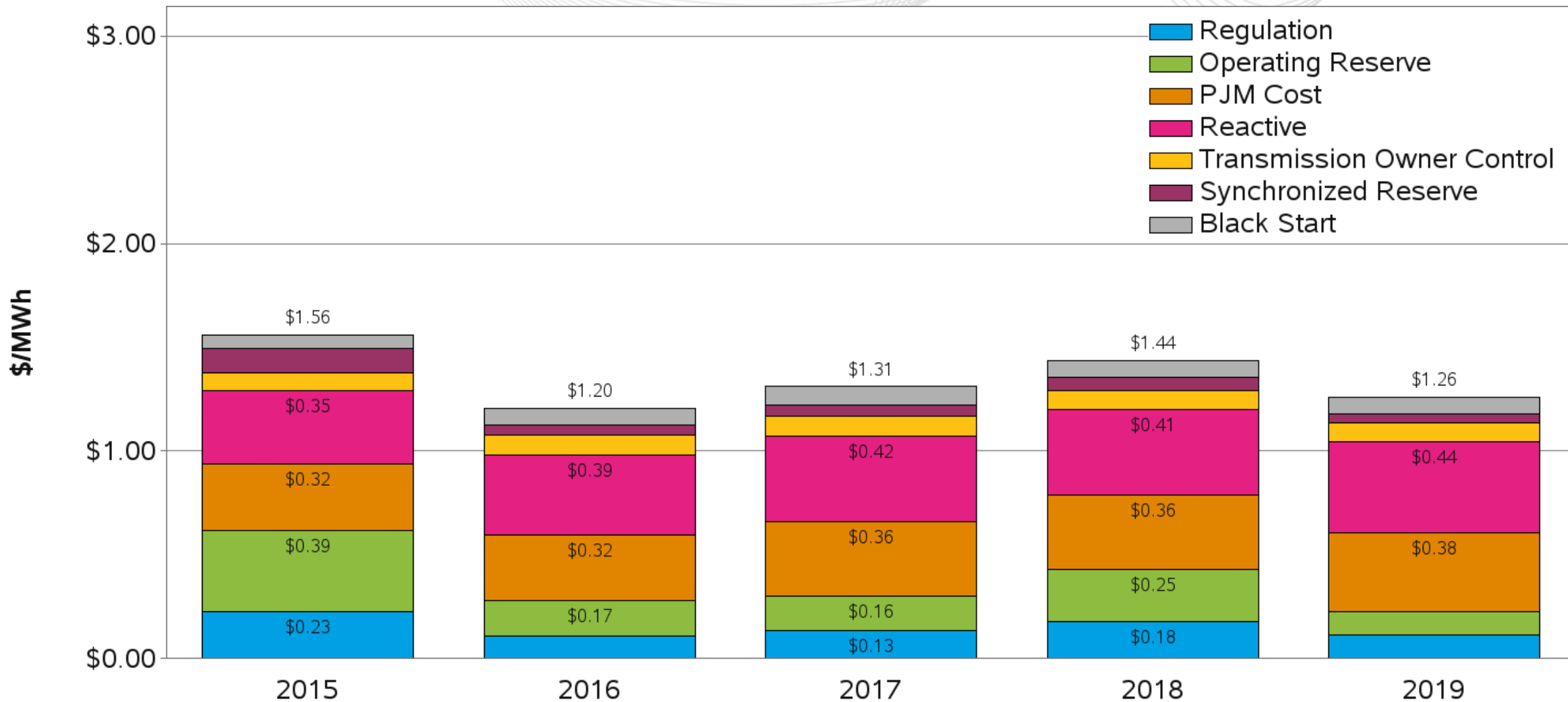
January 21, 2019

- PJM Wholesale Cost for 2019 is \$48.98/MWh, down from full-year 2018 costs of \$60.00/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 7- 16)
- In December, temperatures were mild for most of the month. Thus, the sum of Heating and Cooling Degree Days was below its historic average. (Slides 8-10)
- Because temperatures were mild, Energy use was also below the historic average. (Slides 8-10)
- In December, uplift did not exceed \$800,000 on any days. (Slides 21 & 22)

- Load-weighted average LMP for 2019 is \$27.15/MWh: (Slides 28-29)
  - December 2019 was \$22.50/MWh, which is considerably lower than both December 2018 (\$31.00/MWh) and December 2017 (\$40.80/MWh).
- FTR revenue adequacy for the month of December is 100% and the 2019-2020 Planning Year is currently fully funded. (Slides 44-47)
- Congestion remains low and is in-line with values seen last December. (Slide 45)
- Regulation and Synchronized Reserve market costs have generally tracked with energy prices over time. (Slides 60-62)

# Markets Report



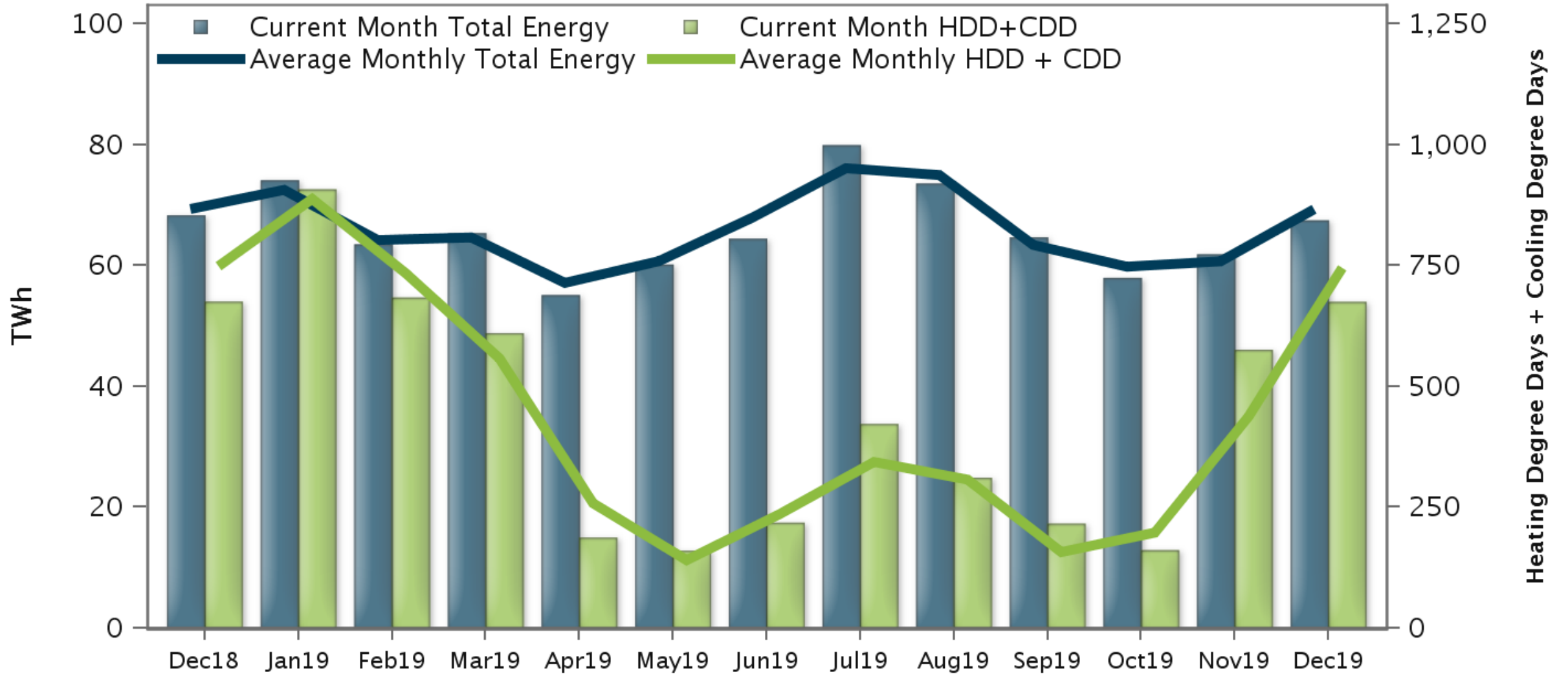


# Market Conditions

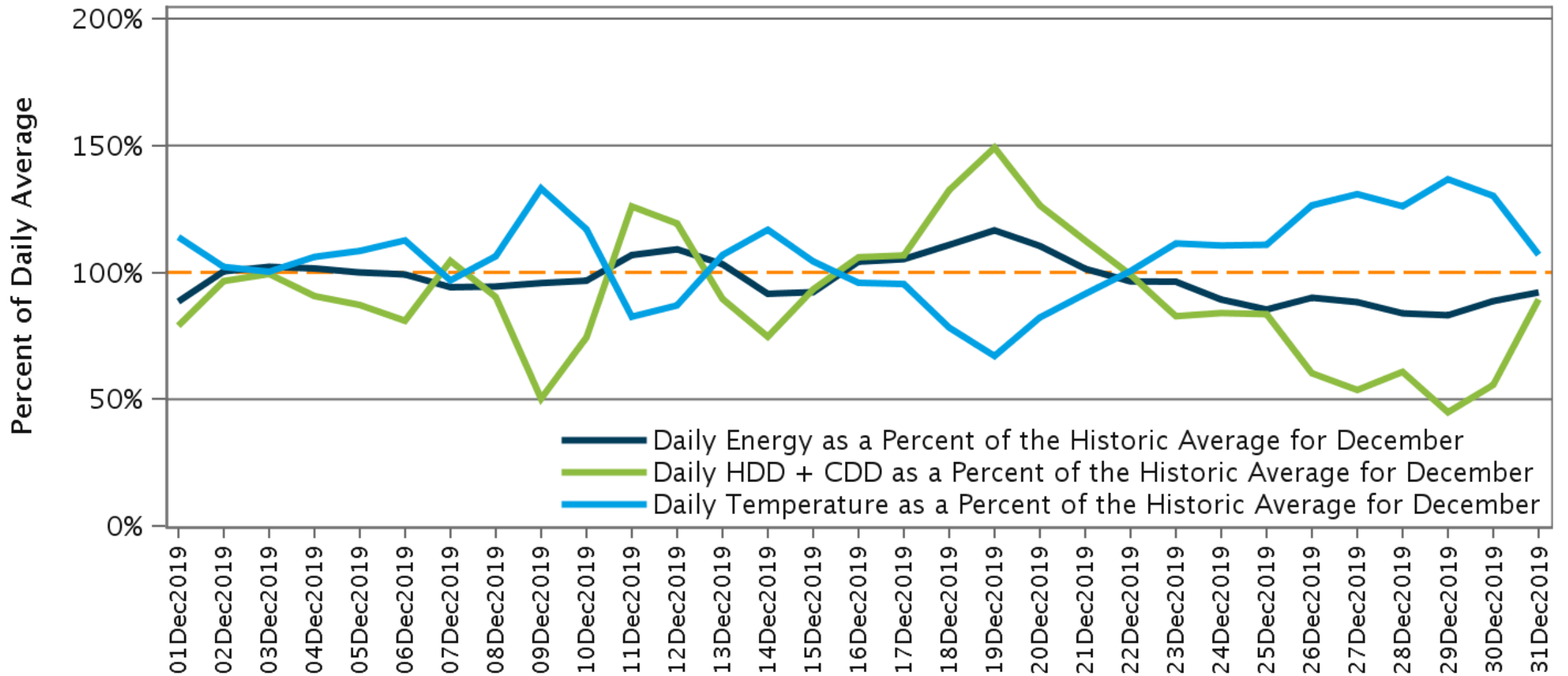
- The weather parameter shown in the following slide is a monthly sum of daily Heating Degree Days (HDD) and Cooling Degree Days (CDD).
- Degree days represent a deviation from a baseline temperature, in this case 60 degrees for HDD and 65 degrees for CDD. As temperatures get more extreme, colder or 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, 2018. Averages include load data for all of TO zones in the current RTO footprint.

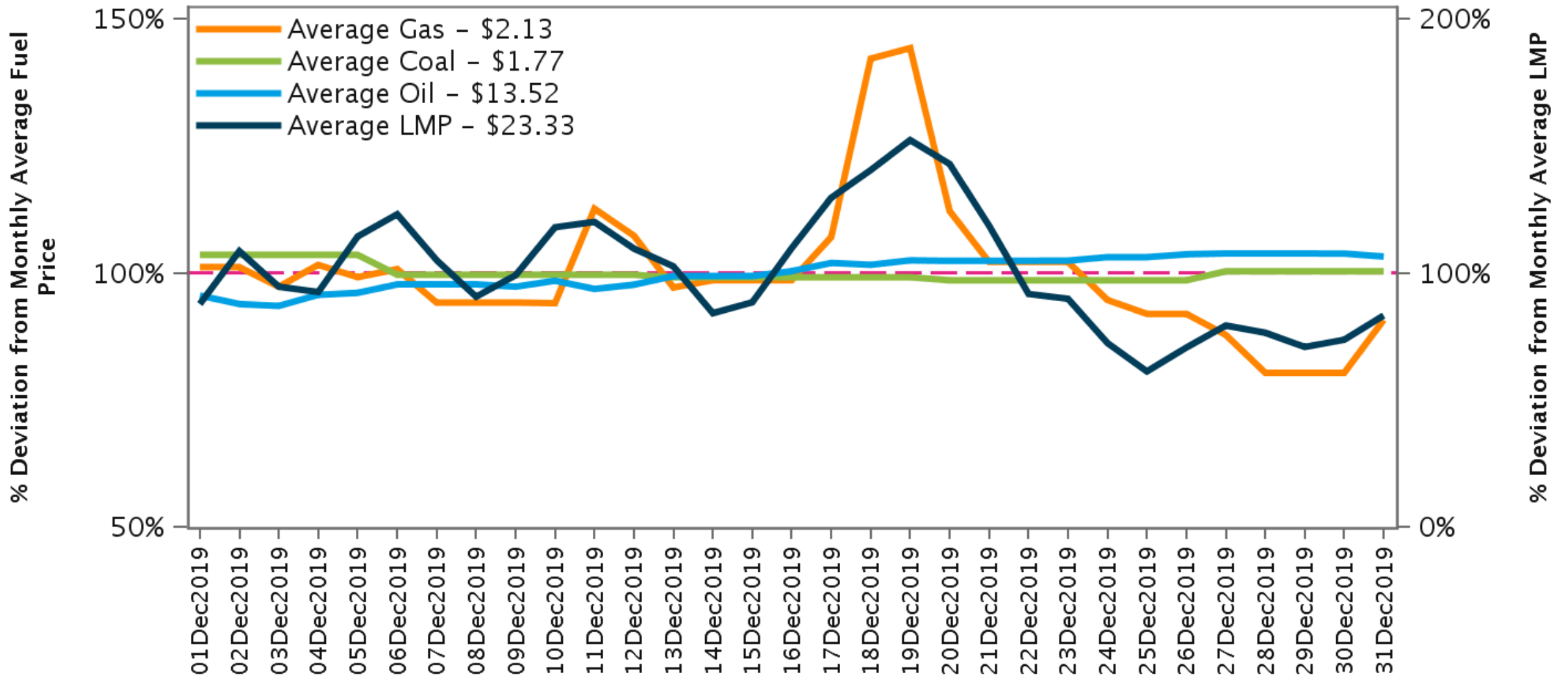


# Historic Average Weather and Energy versus Current Month



# Historic Average Weather and Energy versus Current Month - Daily

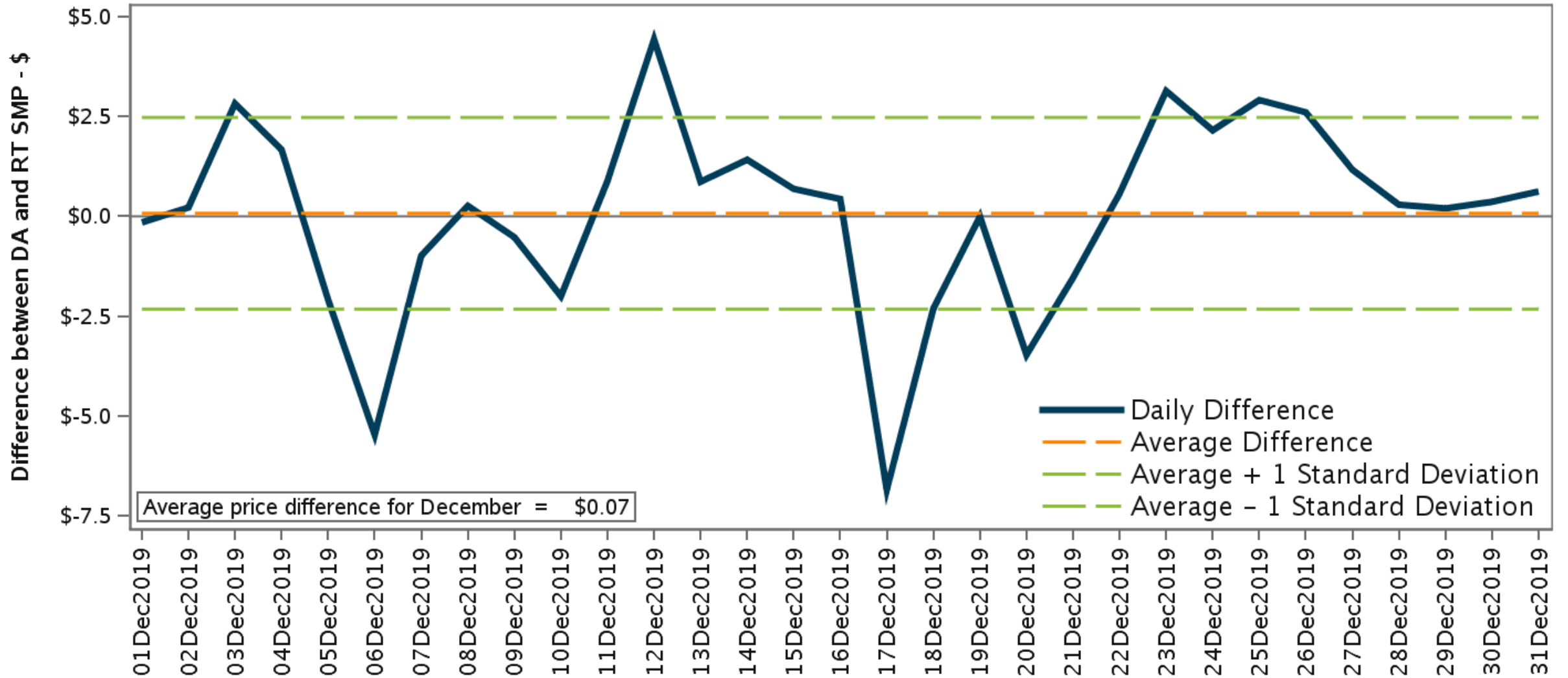




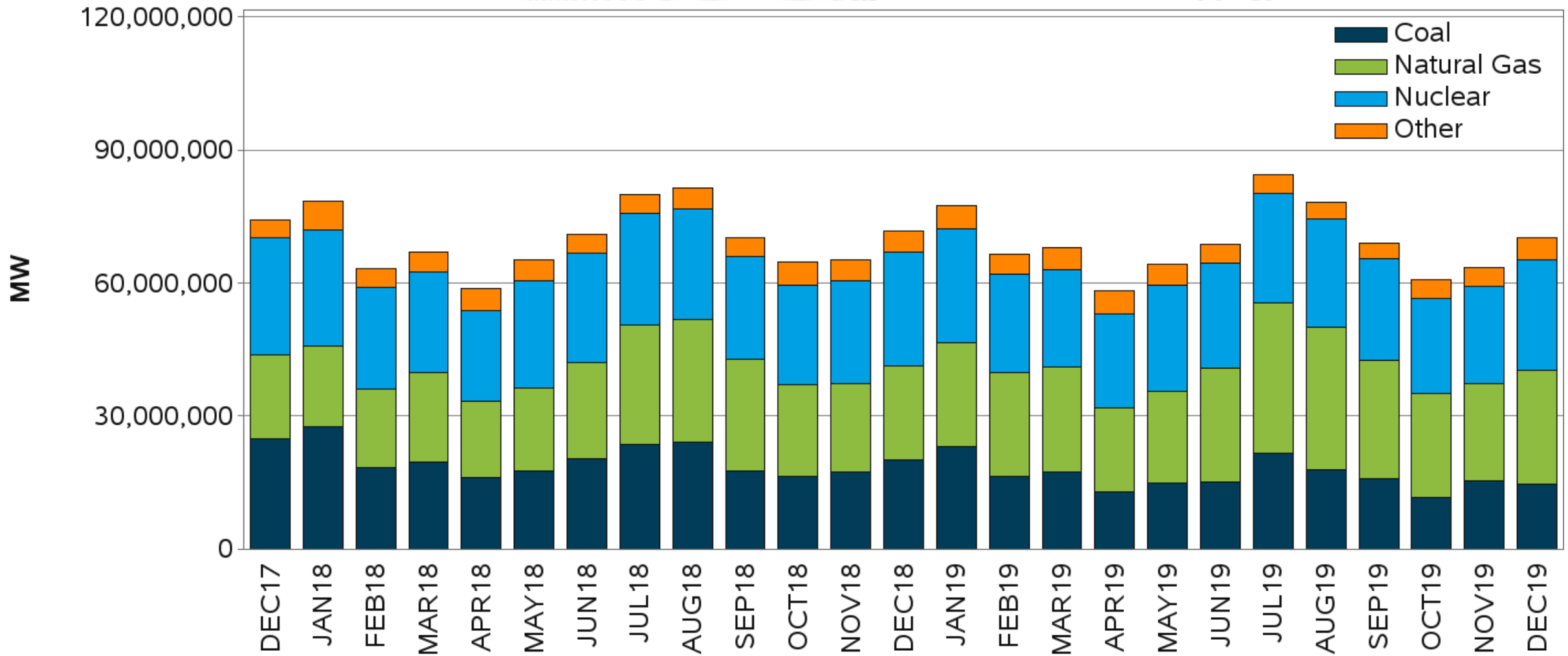
Fuel Price Source: S&P Global Platts



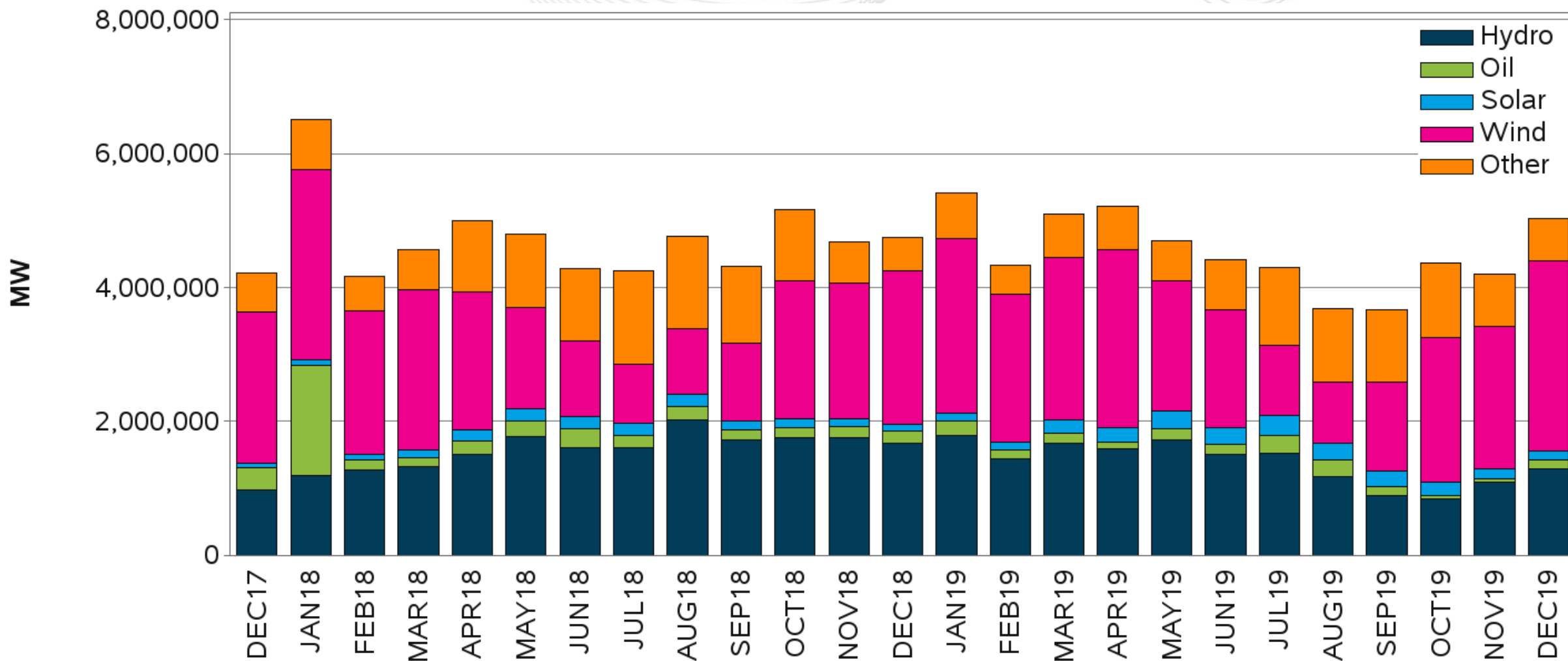
# Daily Difference Between Day-Ahead and Real-Time System Marginal Prices



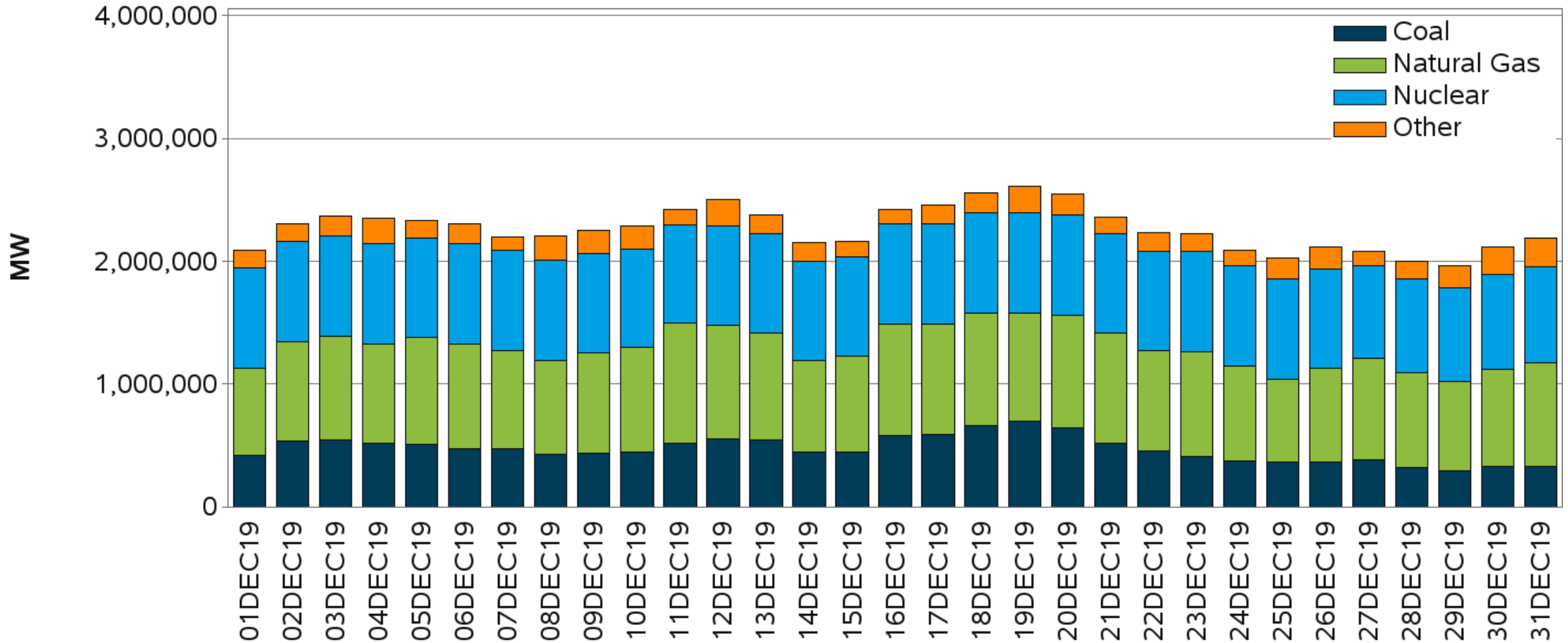
Positive values represent days when the DA daily average price was higher than RT. Negative values represent days when the DA price was lower.



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

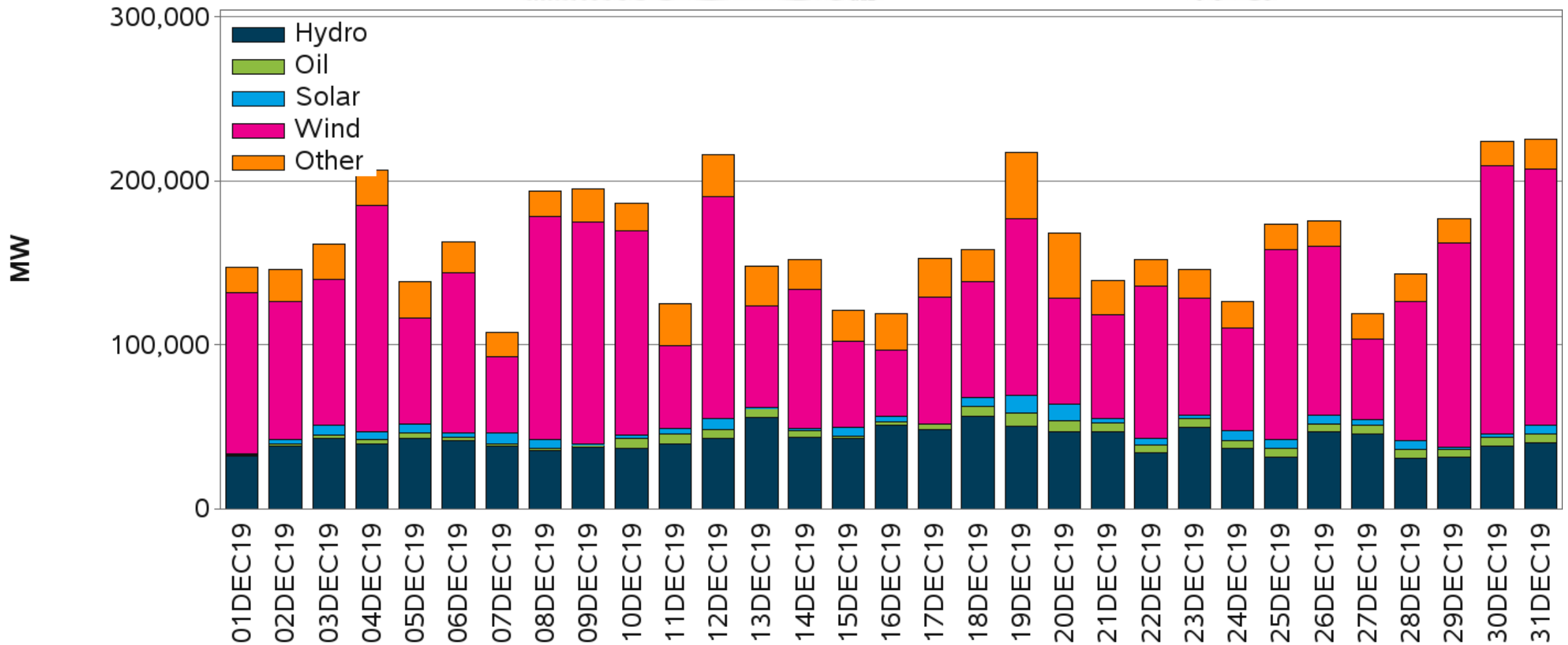


'Other' includes Flywheels, Multiple Fuels, Storage, and Other Renewables



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

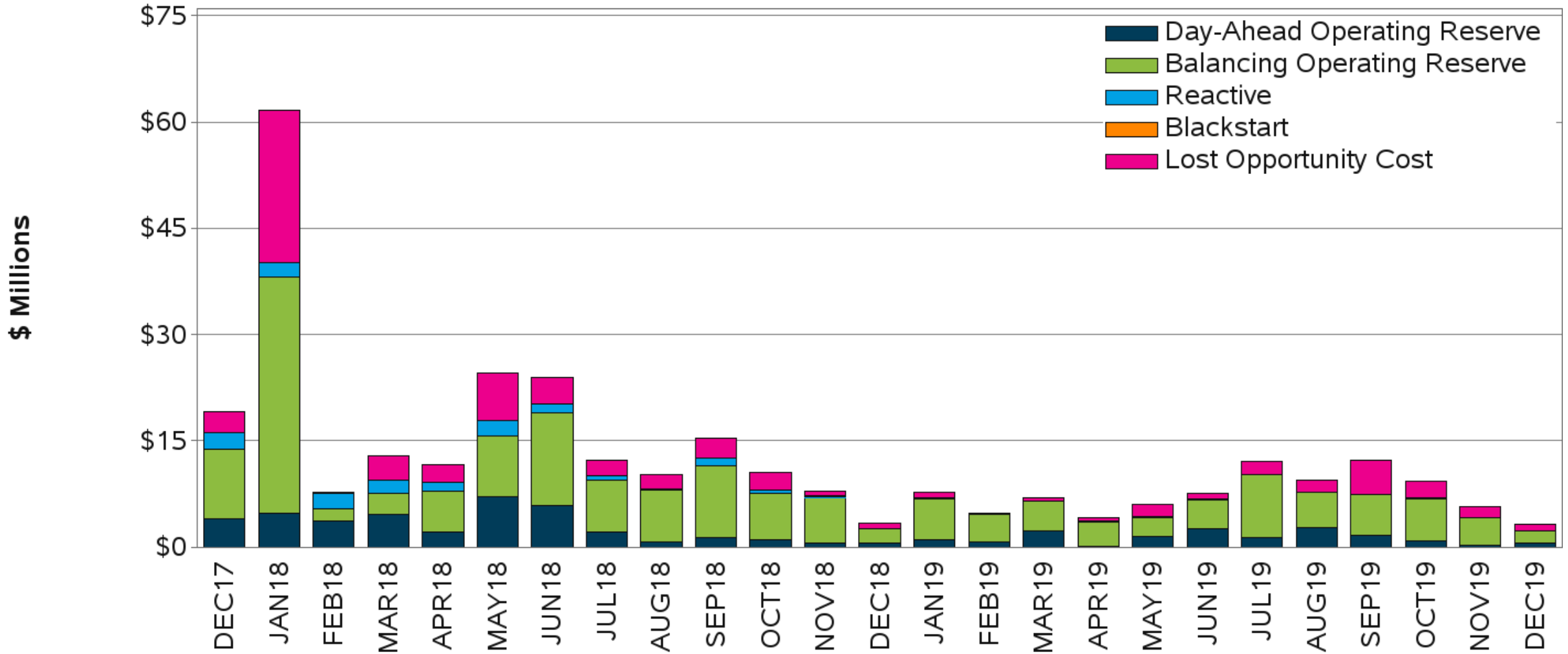


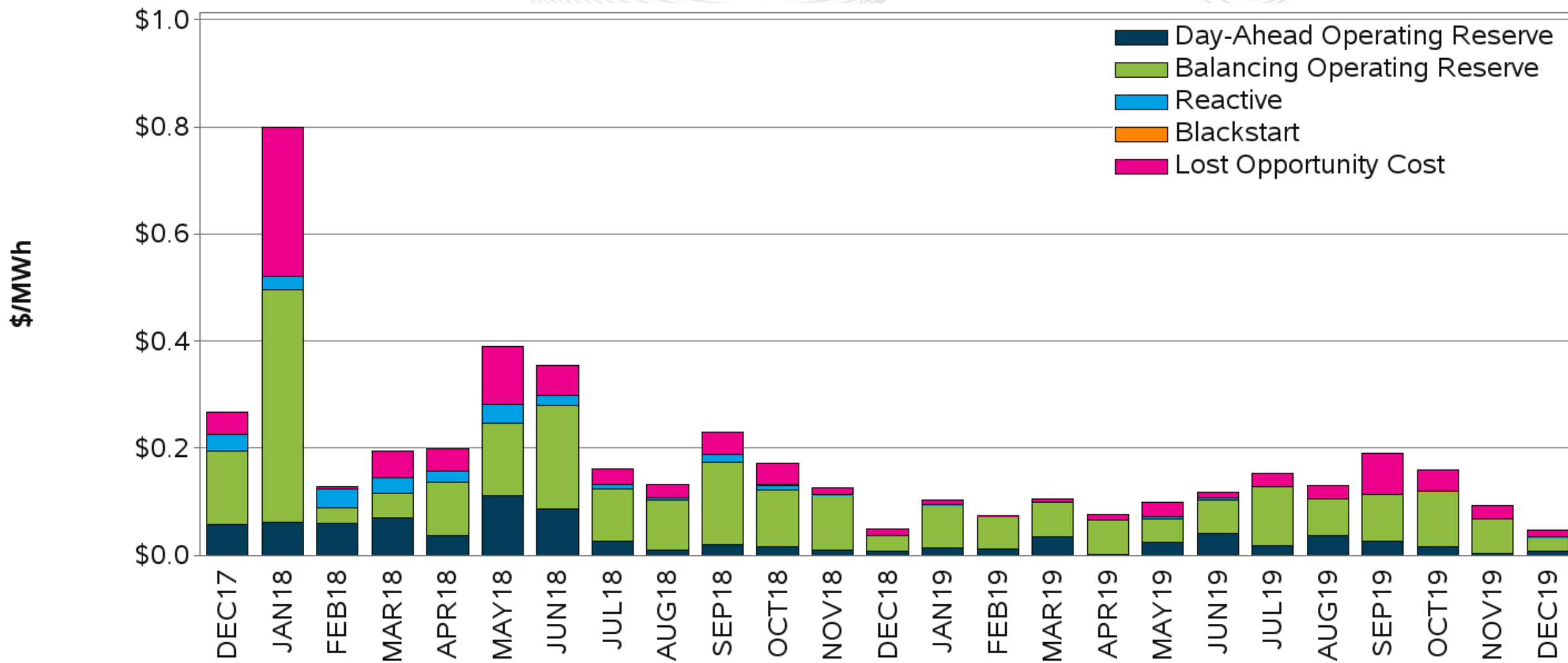


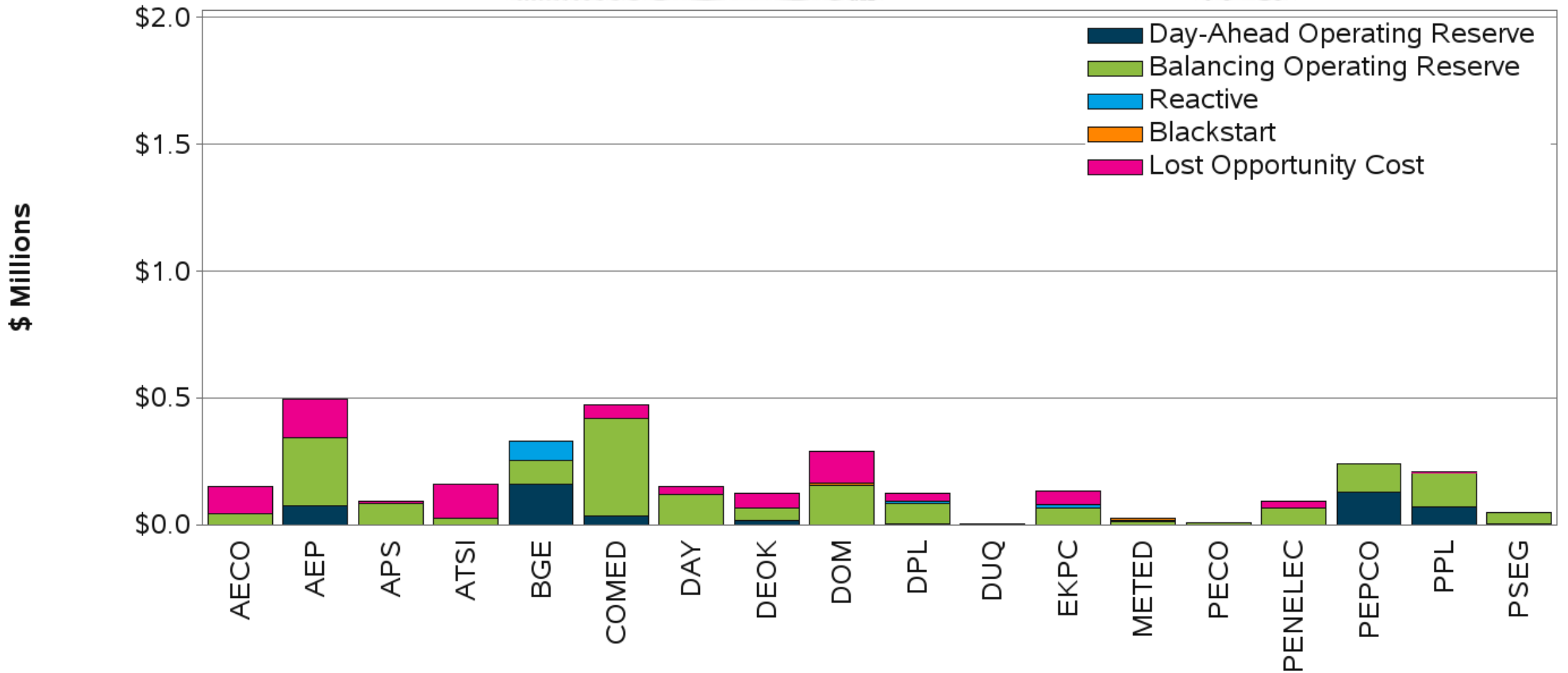
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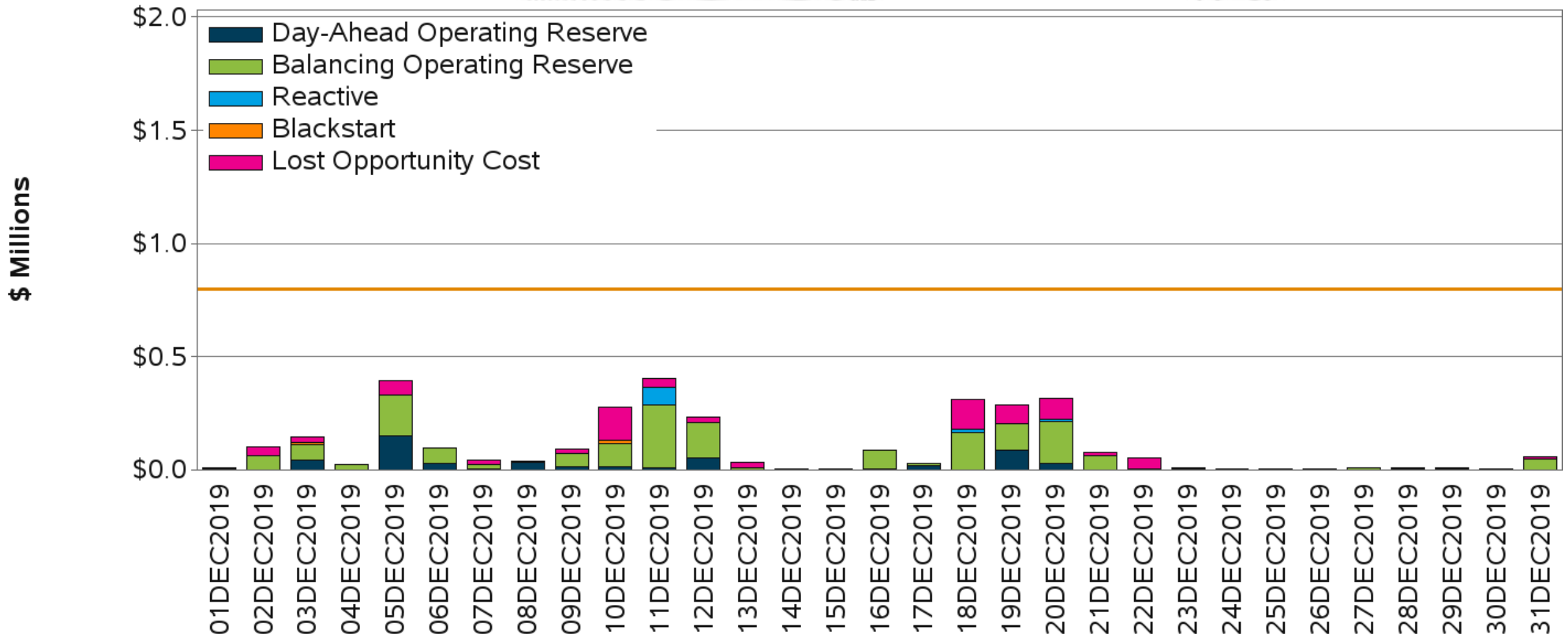


# Operating Reserve (Uplift)

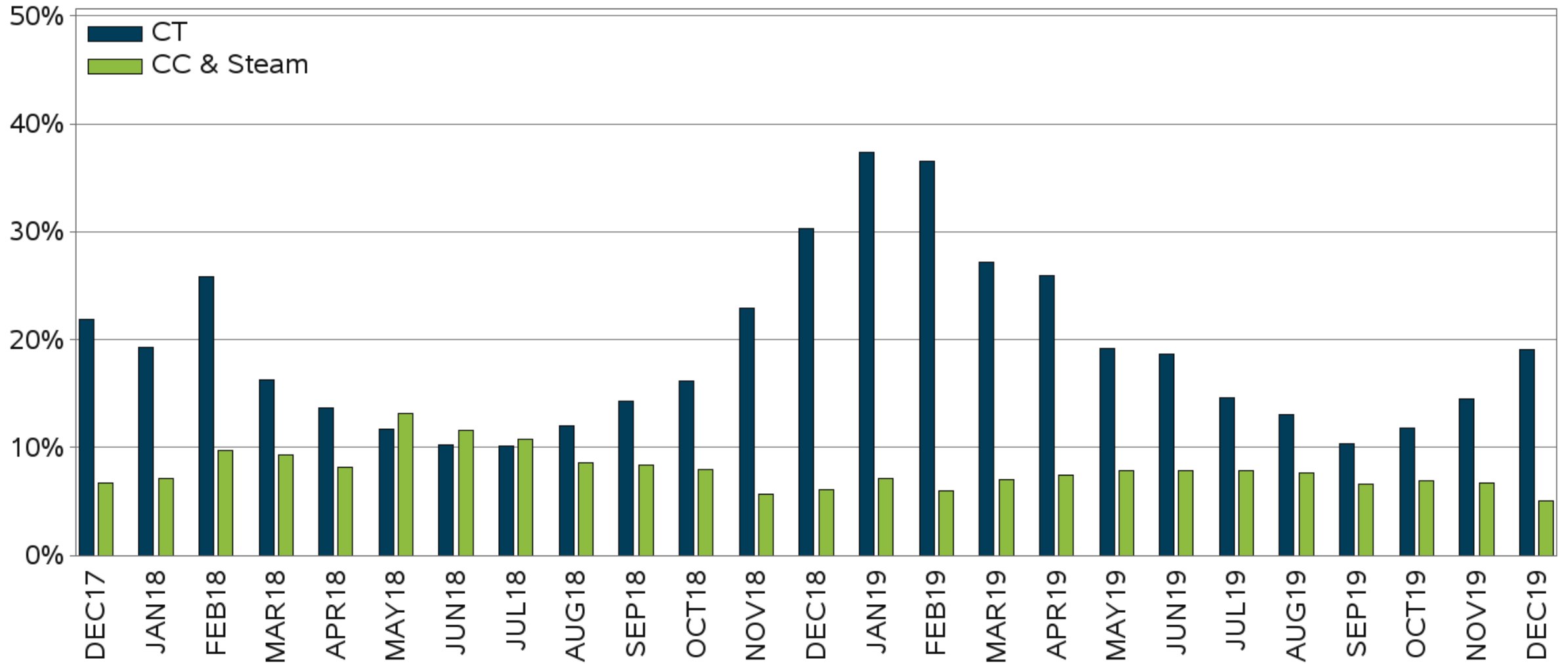




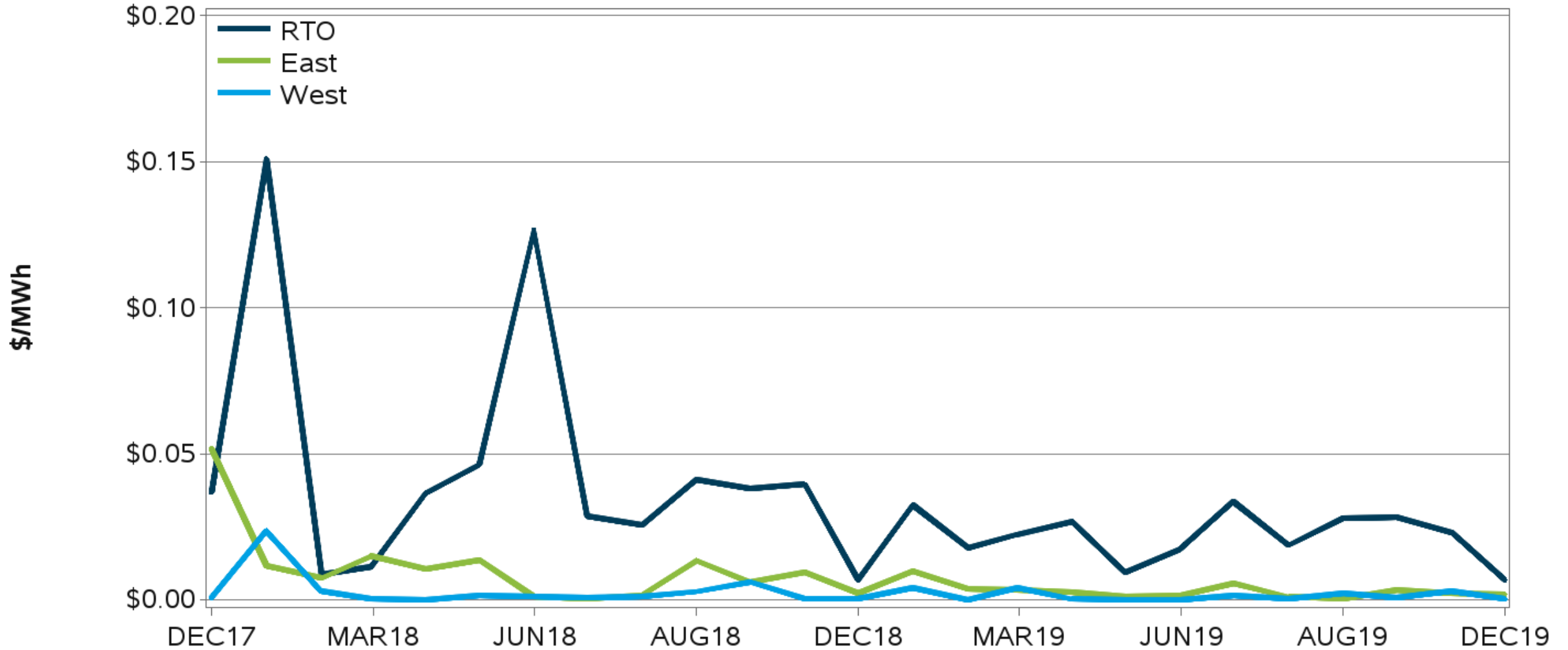




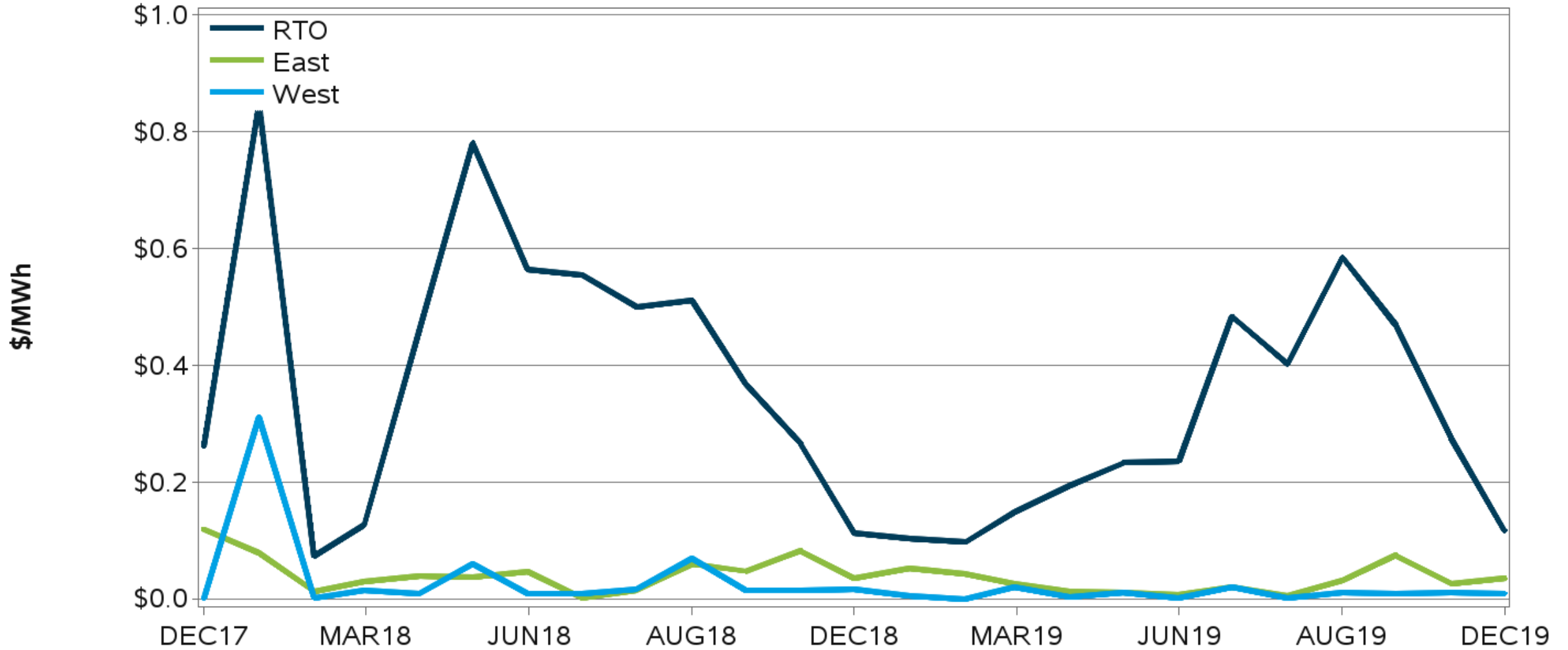
# Percent of Total CT, CC and Steam Hours with LMP < Offer



- 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.

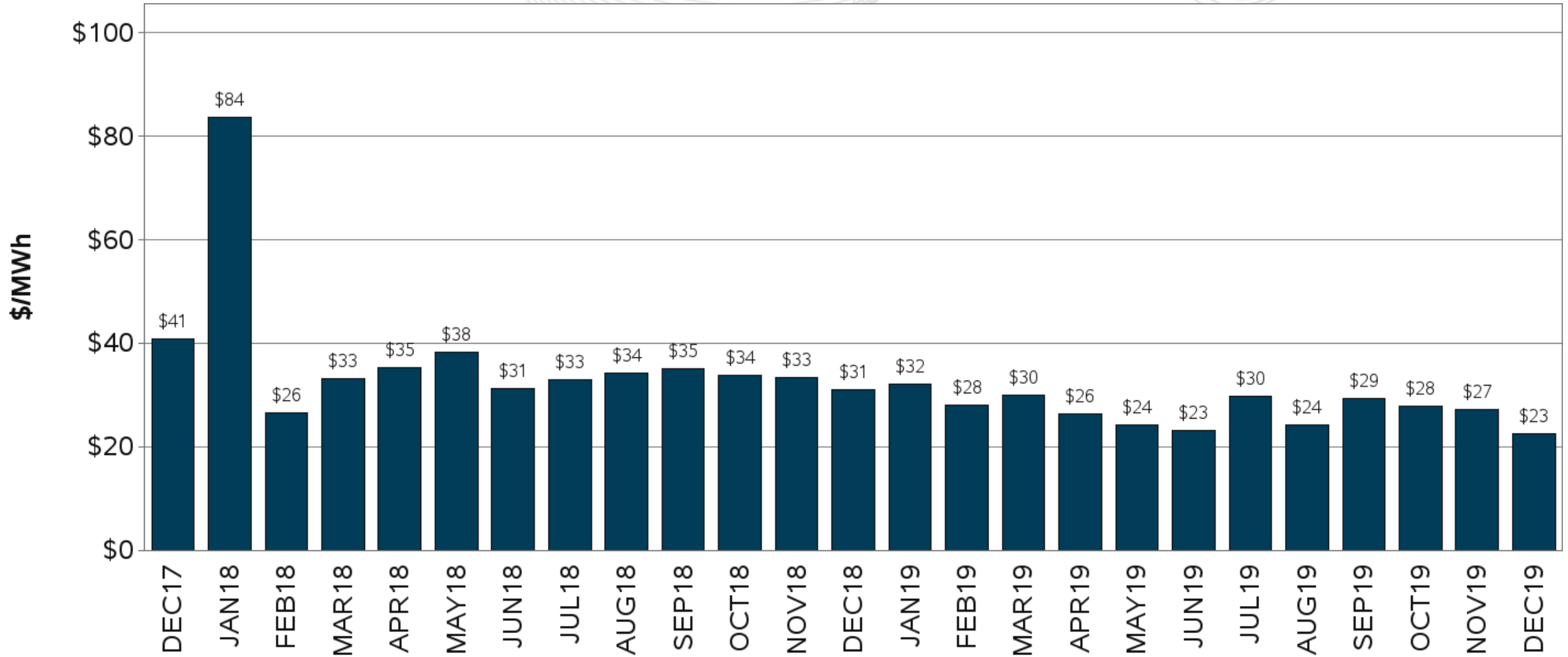




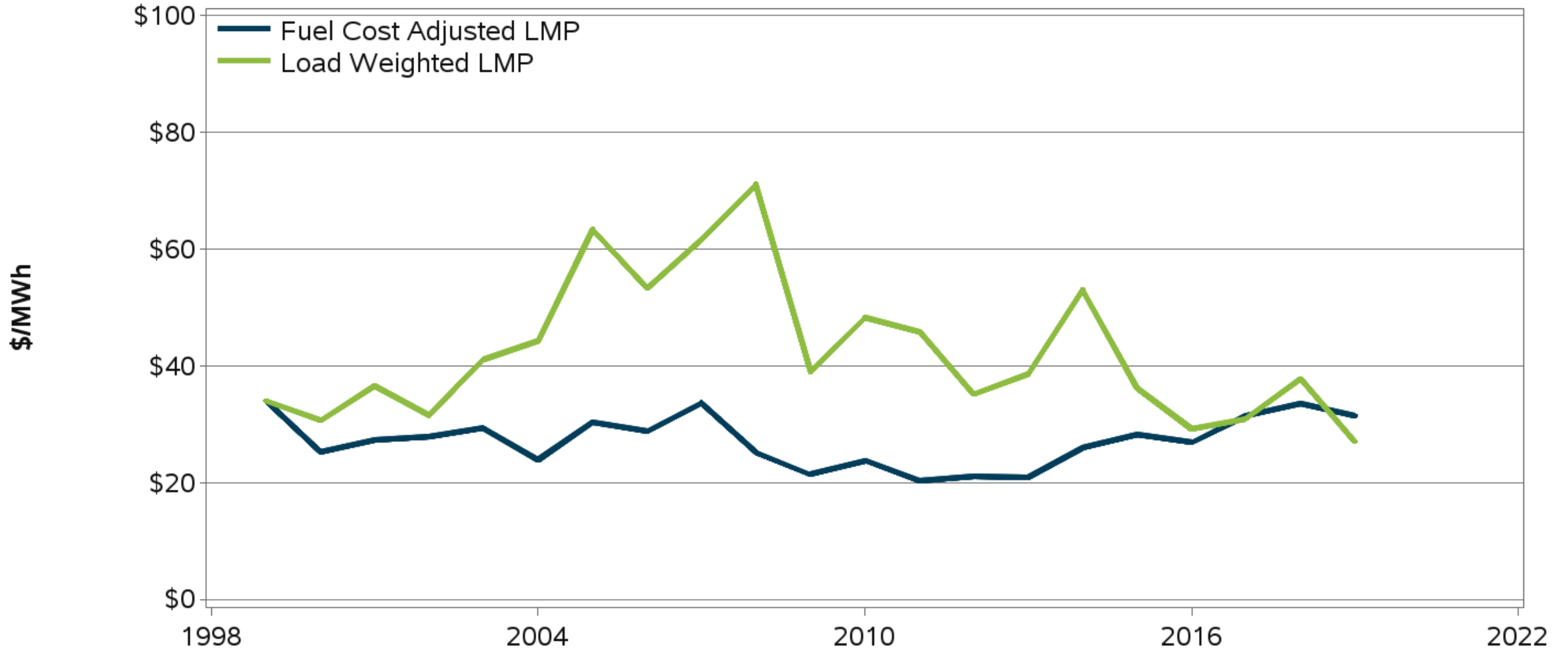


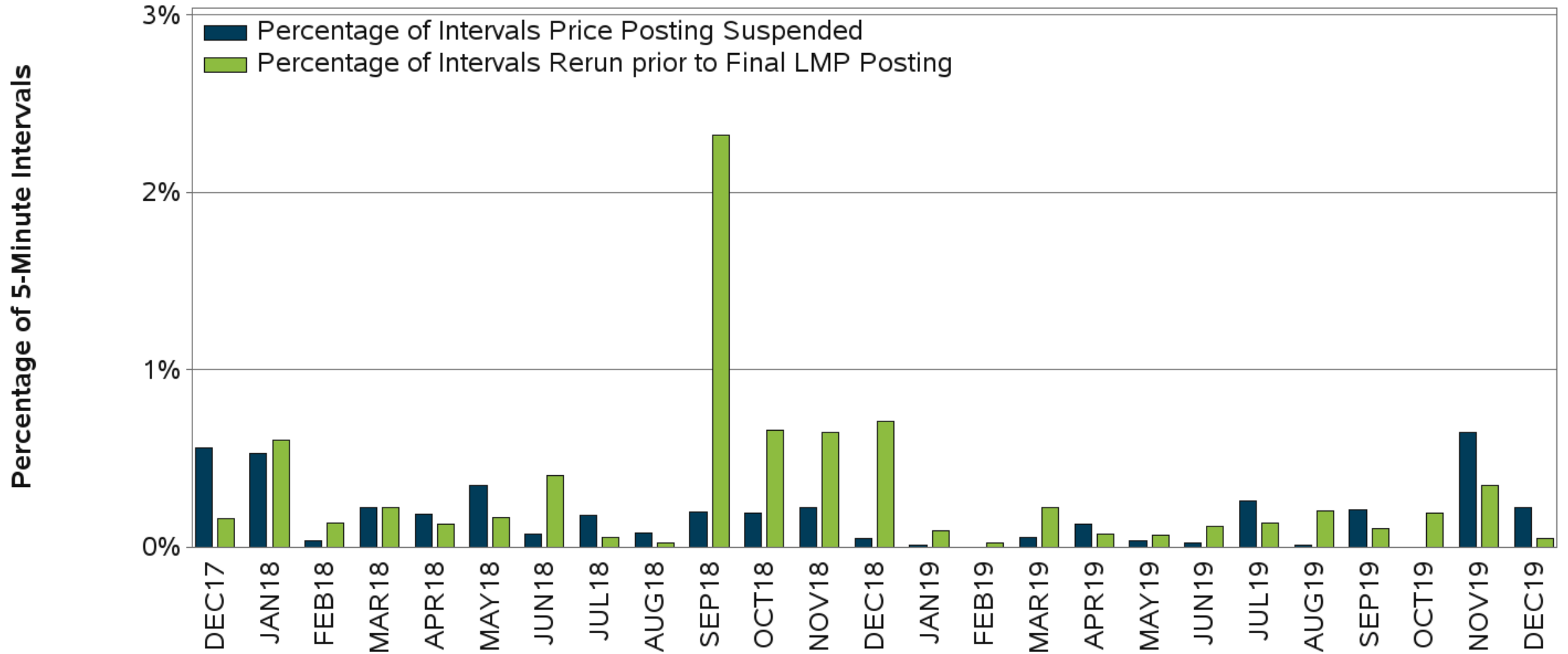
# Energy Market

# LMP Summary



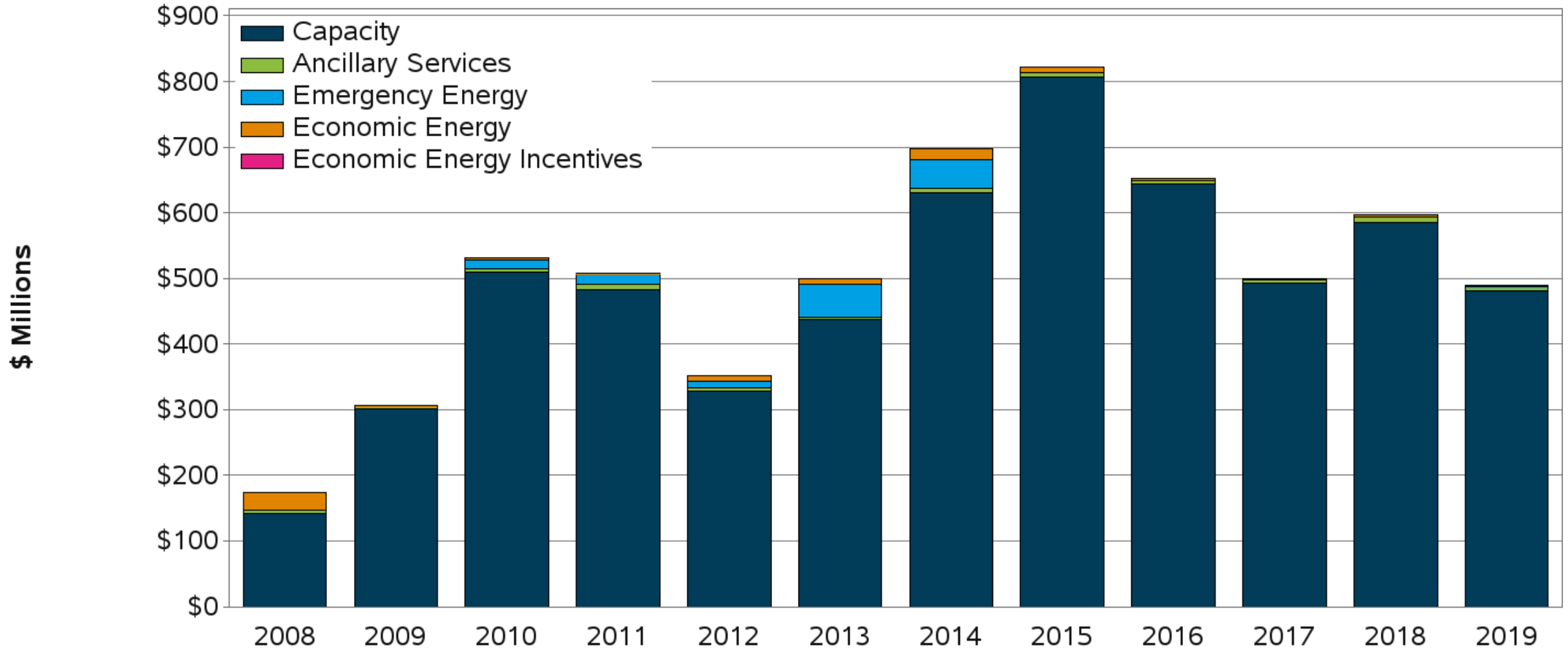
# Fuel Cost Adjusted LMP (Referenced to 1999 Fuel Prices)

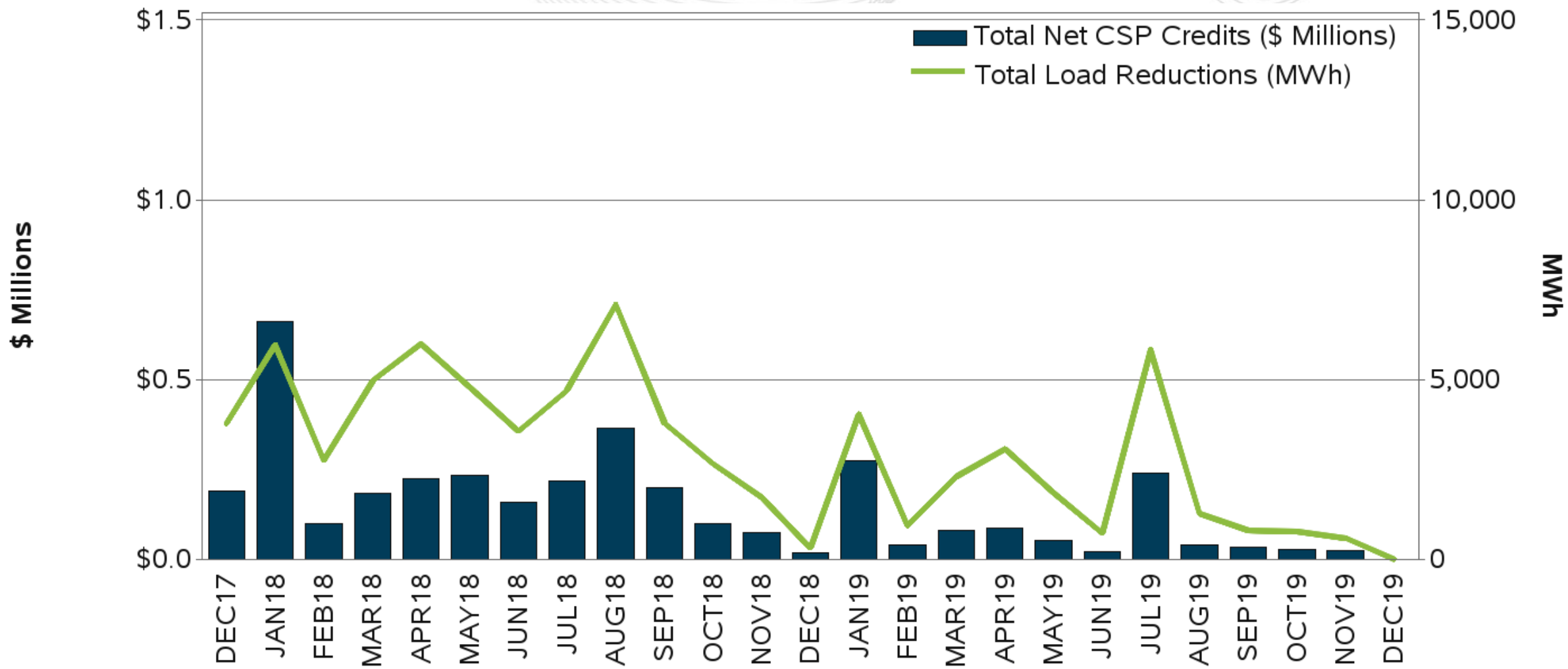




# Energy Market

# Demand Response Summary



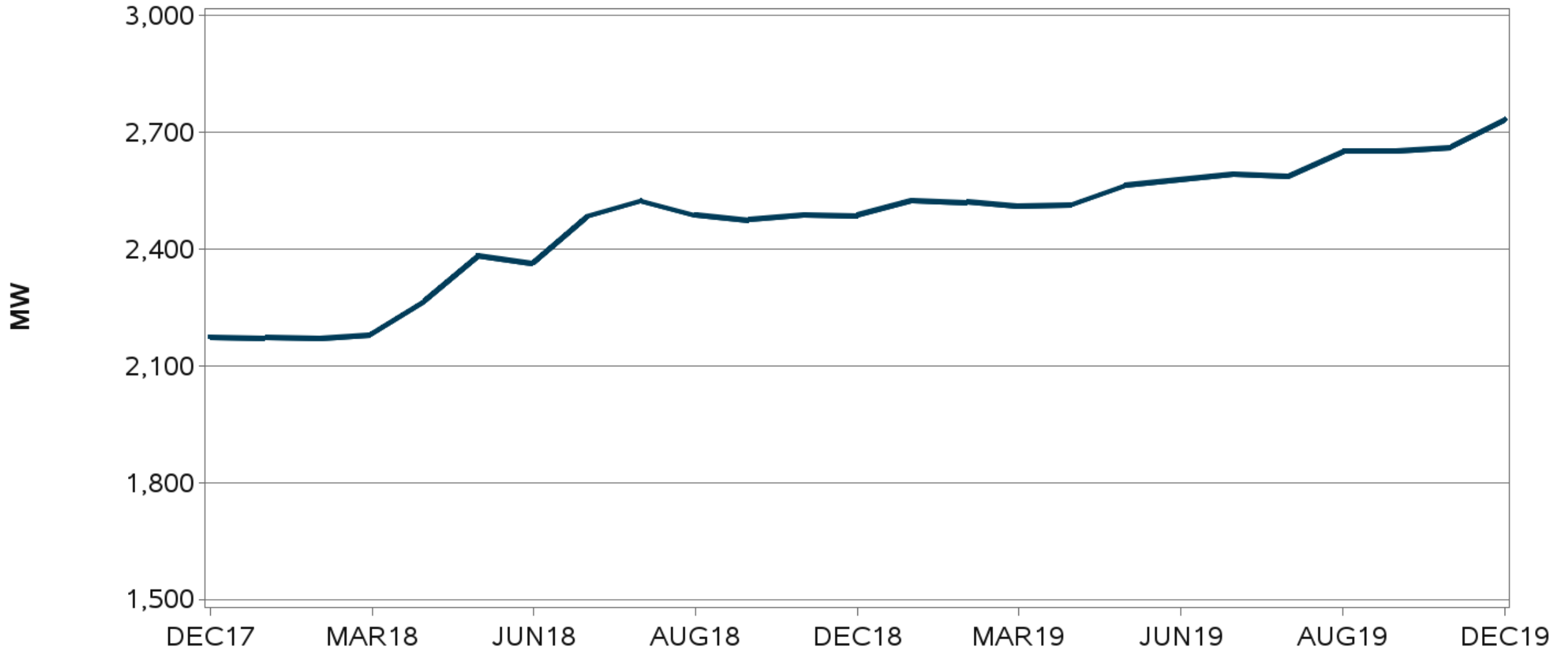


\*Data for the last few months are subject to significant change due to the settlement window.





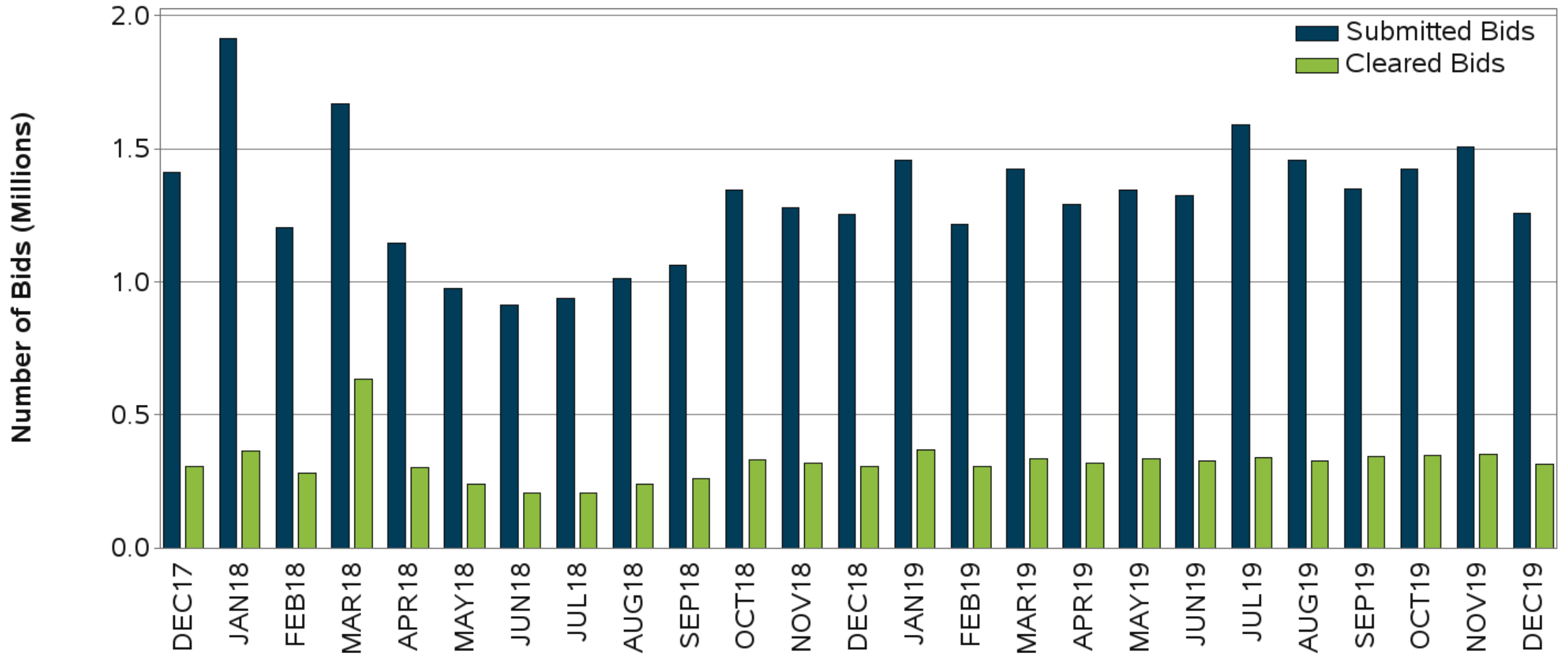
# Total Registered MW in PJM's Economic Demand Response

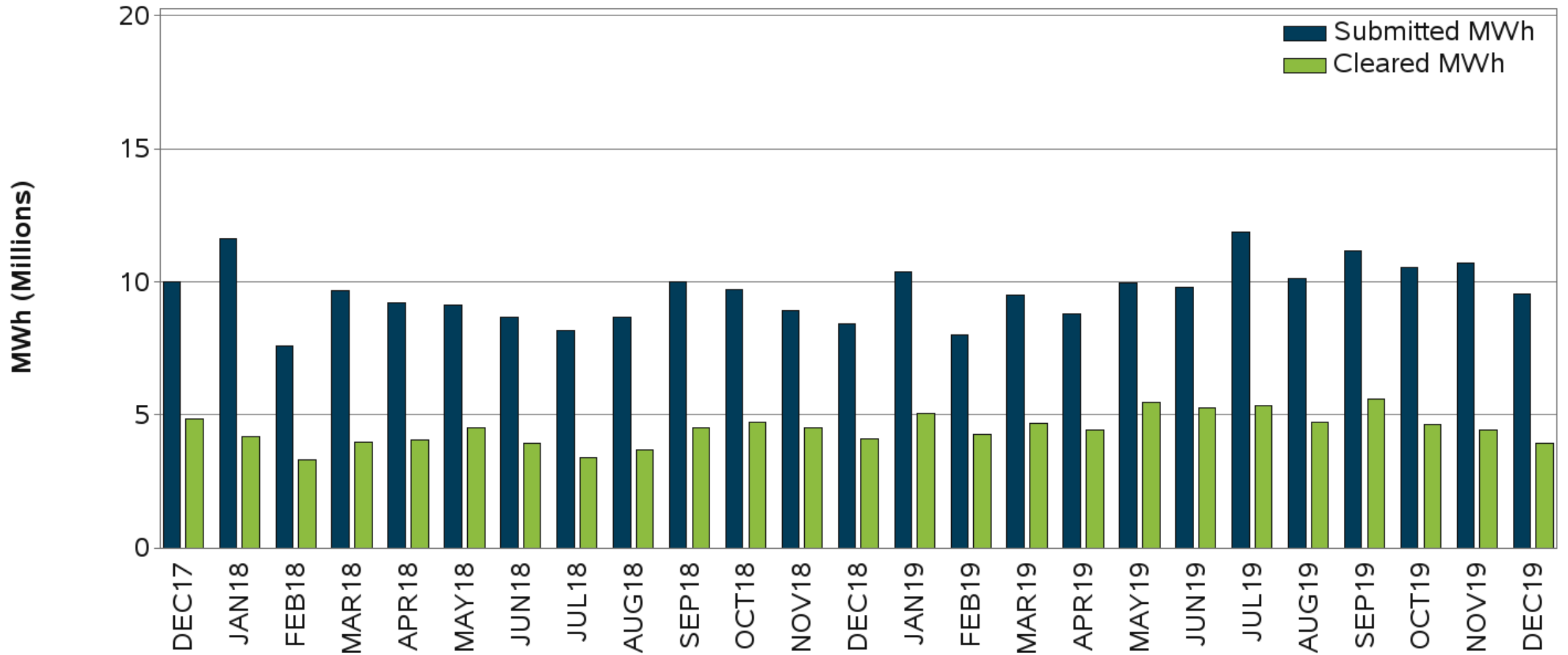


# Energy Market

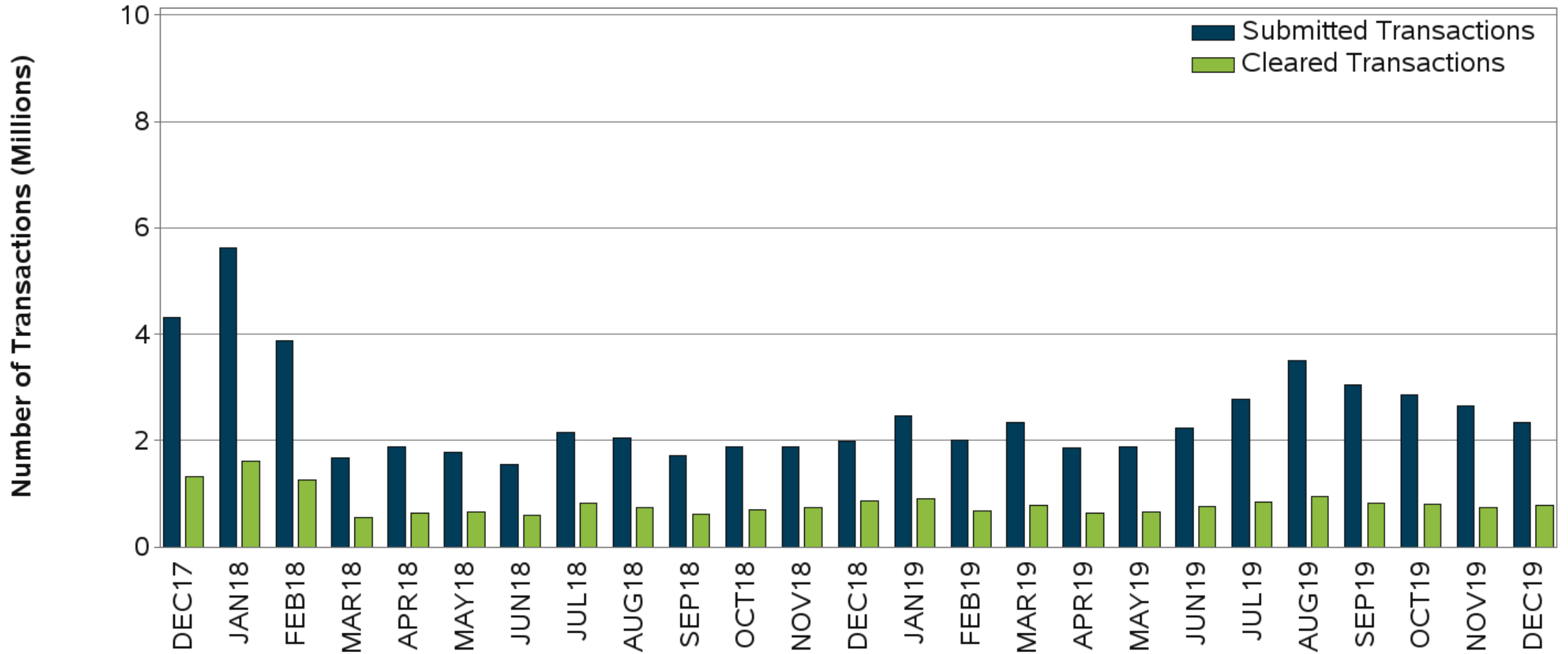
# Virtual Activity Summary

- 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.

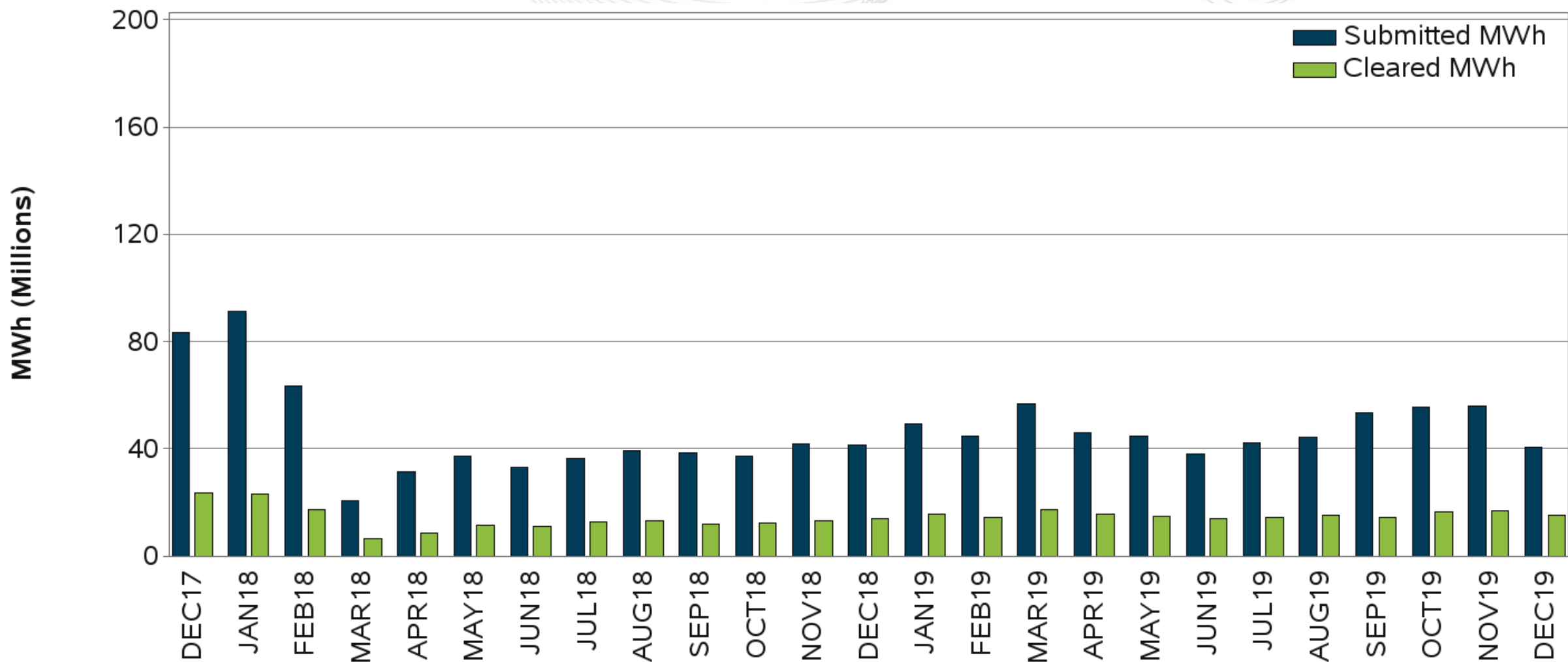




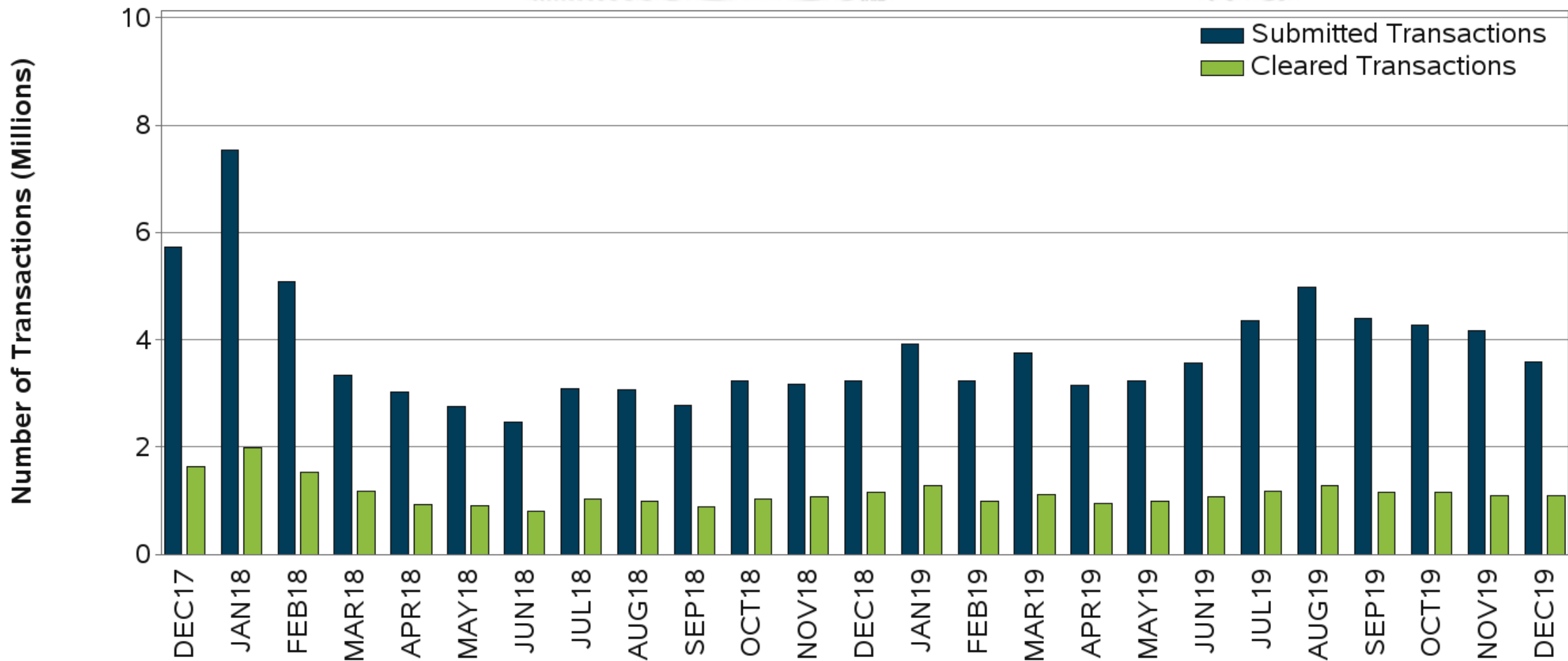
# Up-To-Congestion Transactions - Total Number



# Up-To-Congestion Transactions - Total Volume

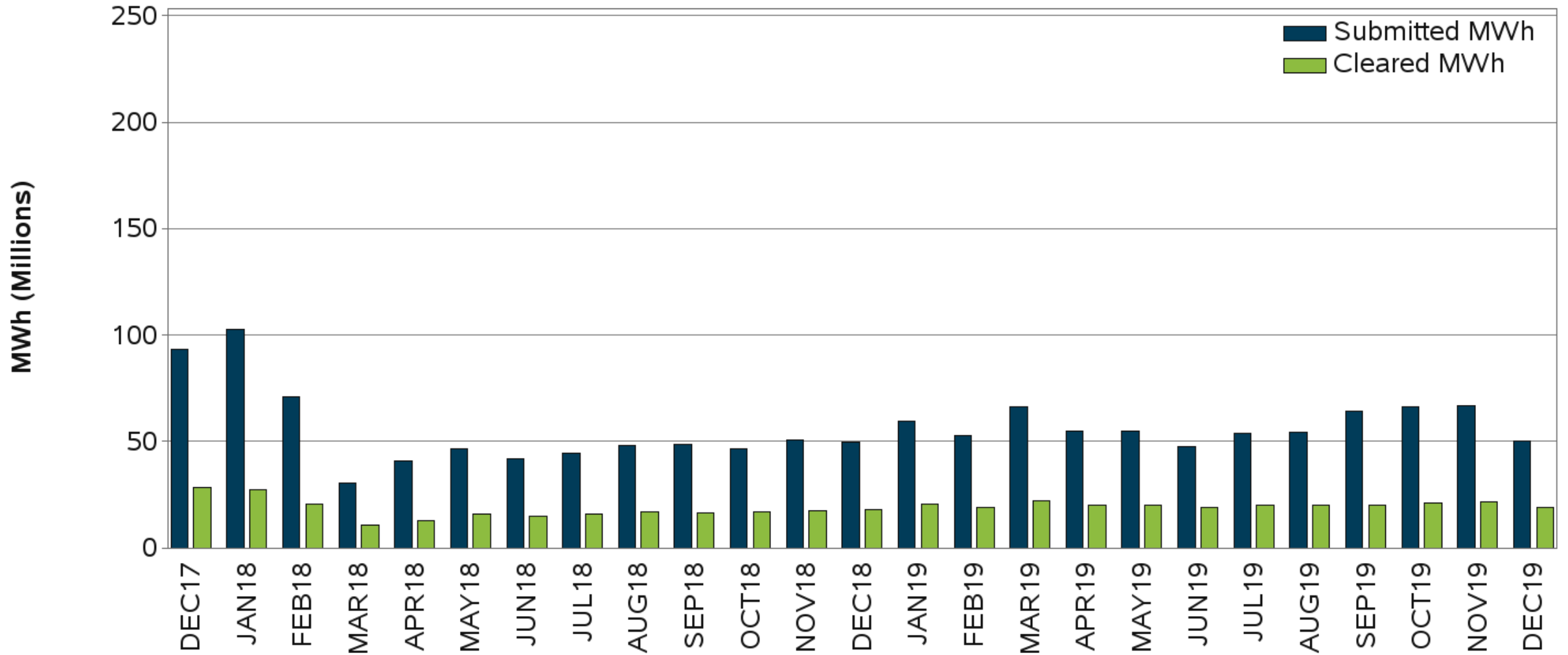


# INCs, DECIs and Up-To-Congestion Transactions - Total Number





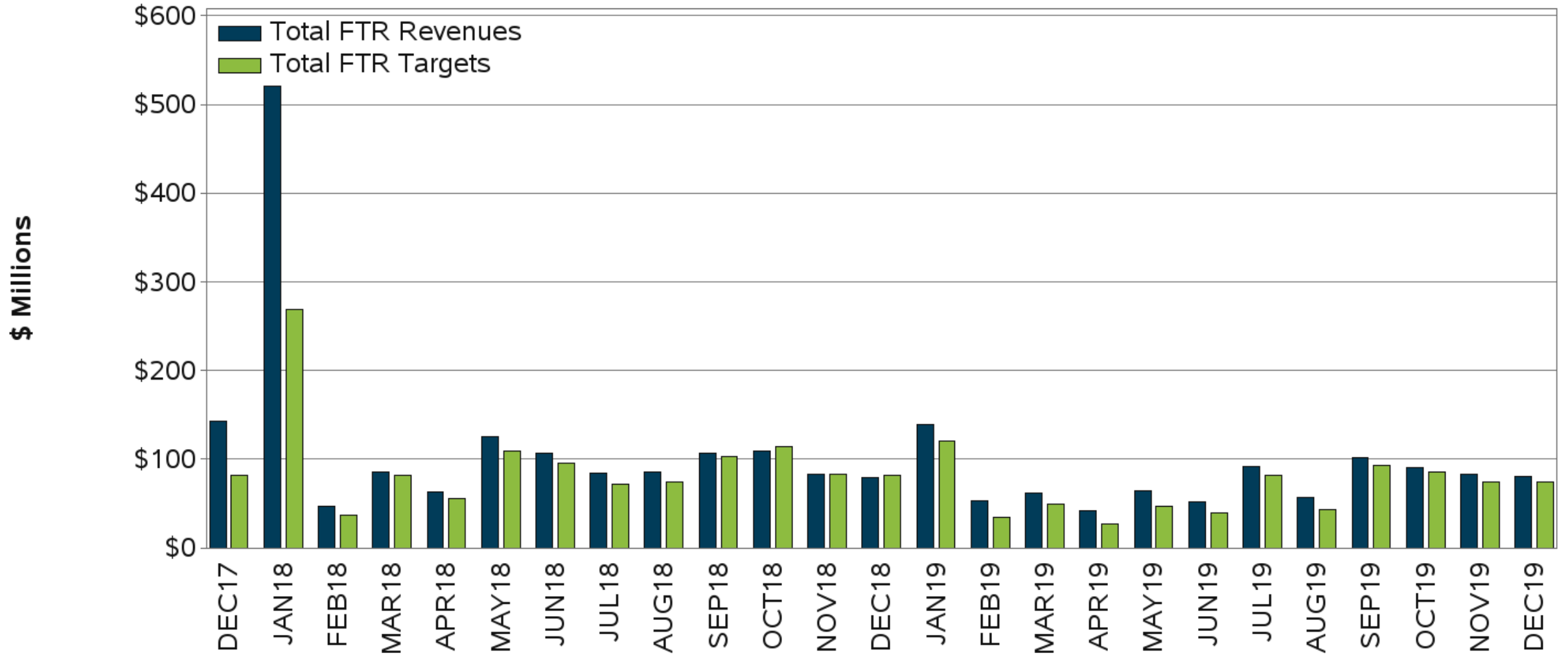
# INCs, DECIs and Up-To-Congestion Transactions - Total Volume

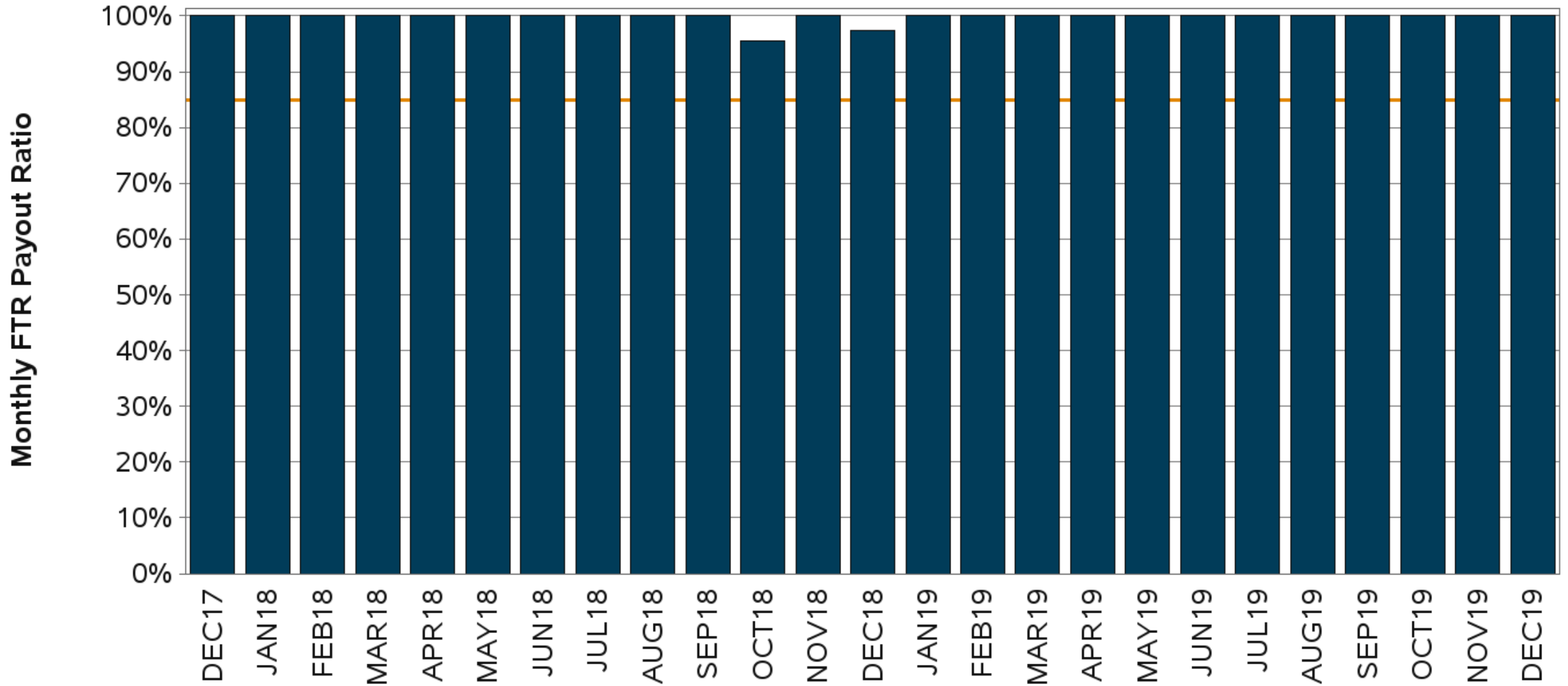


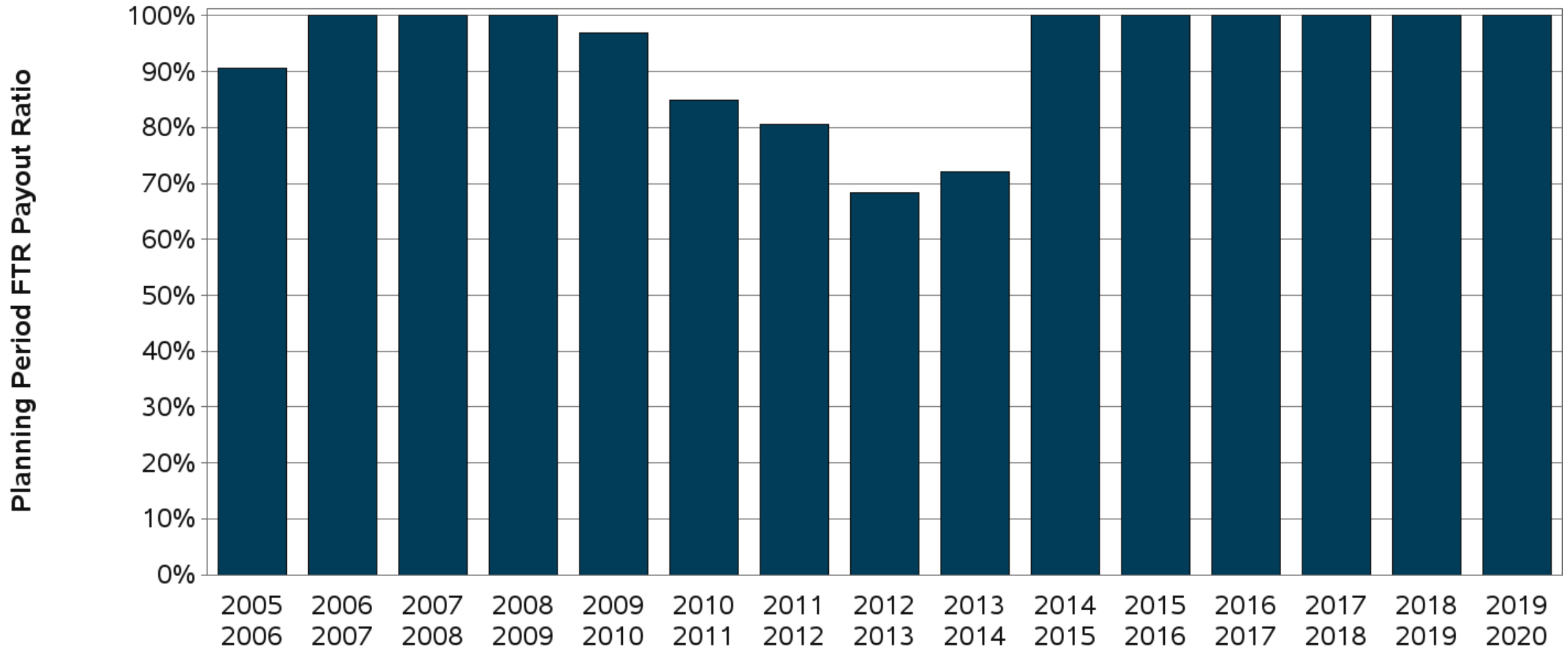
# Energy Market

# Congestion and FTR Summary

Period	Surplus / Underfunding	Payout Ratio
December, 2019	\$5,657,313	100%
2019	\$145,651,550	100%
2019/2020	\$65,851,713	100%

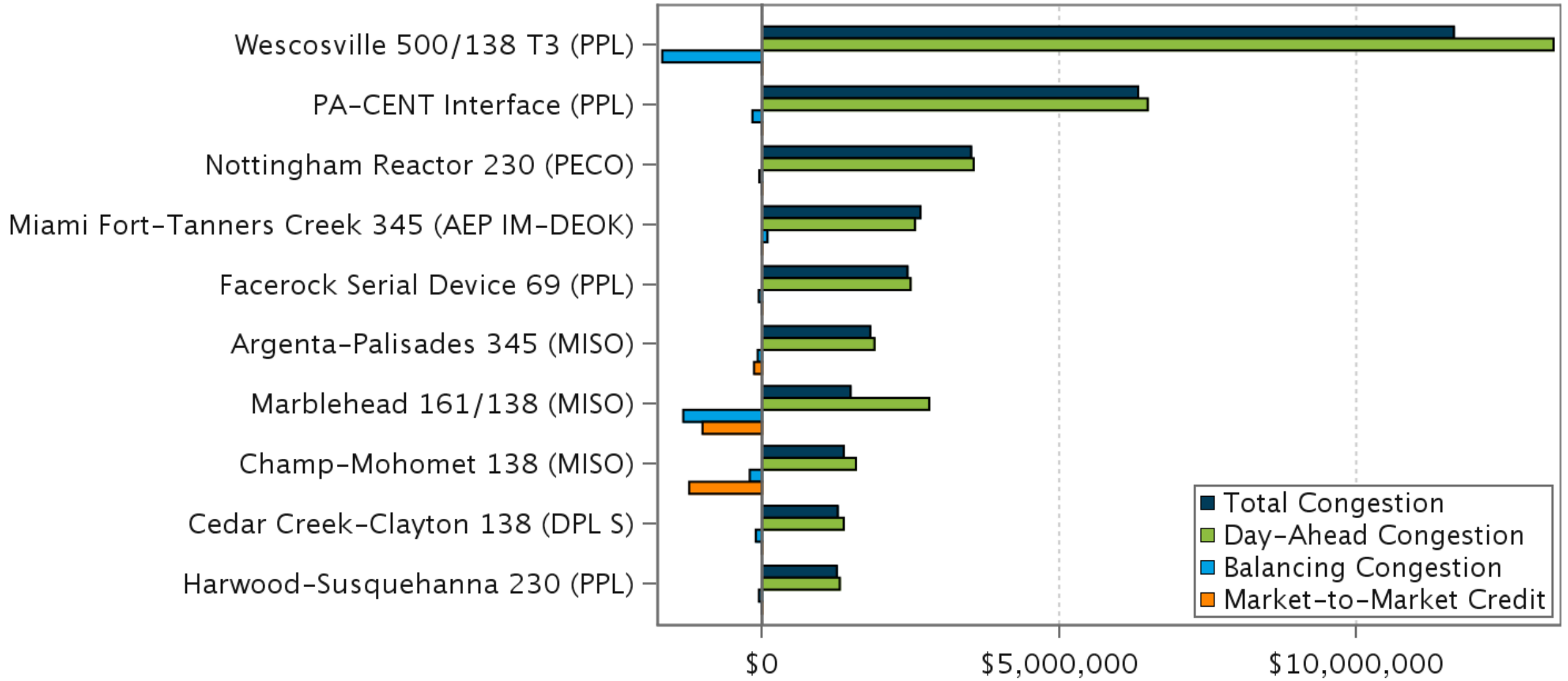






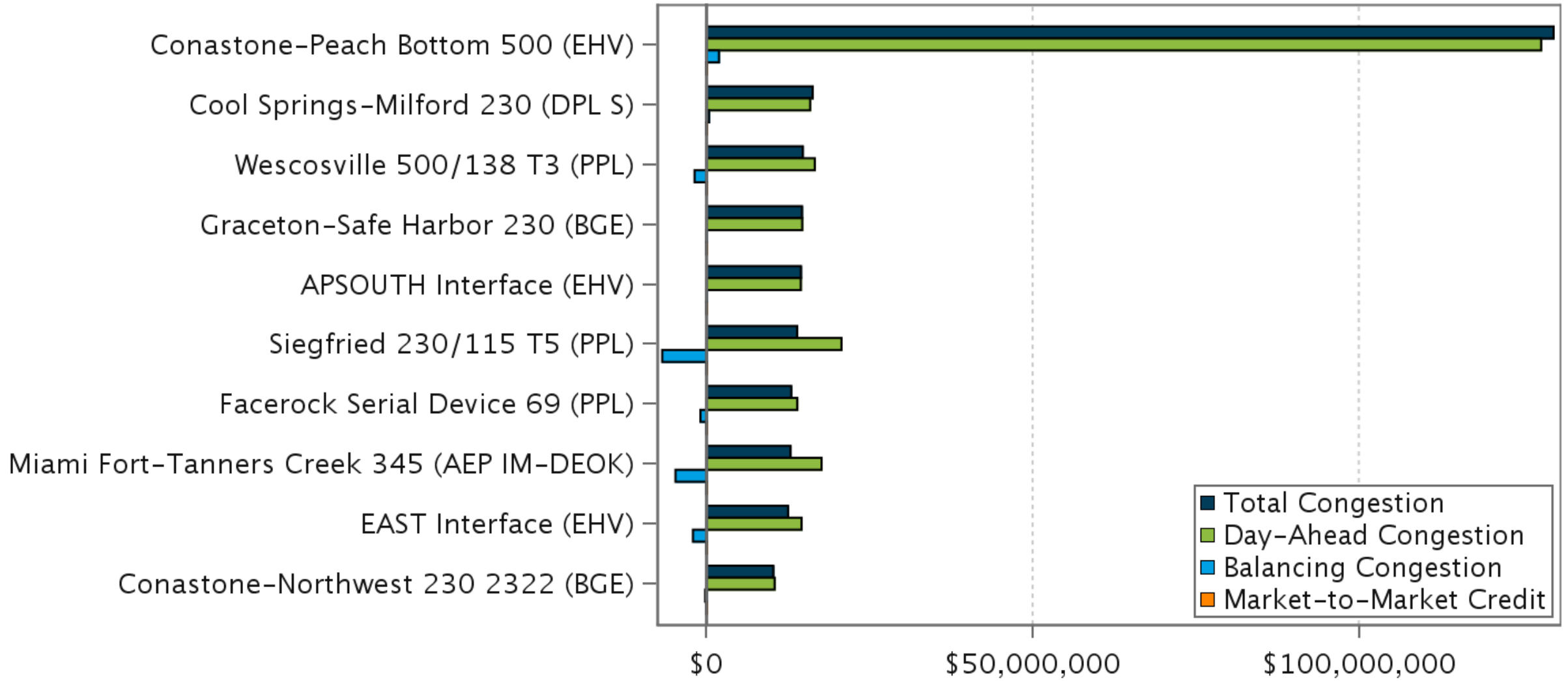


# Ten Most Heavily Congested Transmission Facilities - Overall, December



The ten most heavily congested facilities account for 61% of total congestion for December.

# Ten Most Heavily Congested Transmission Facilities - Overall, 2019

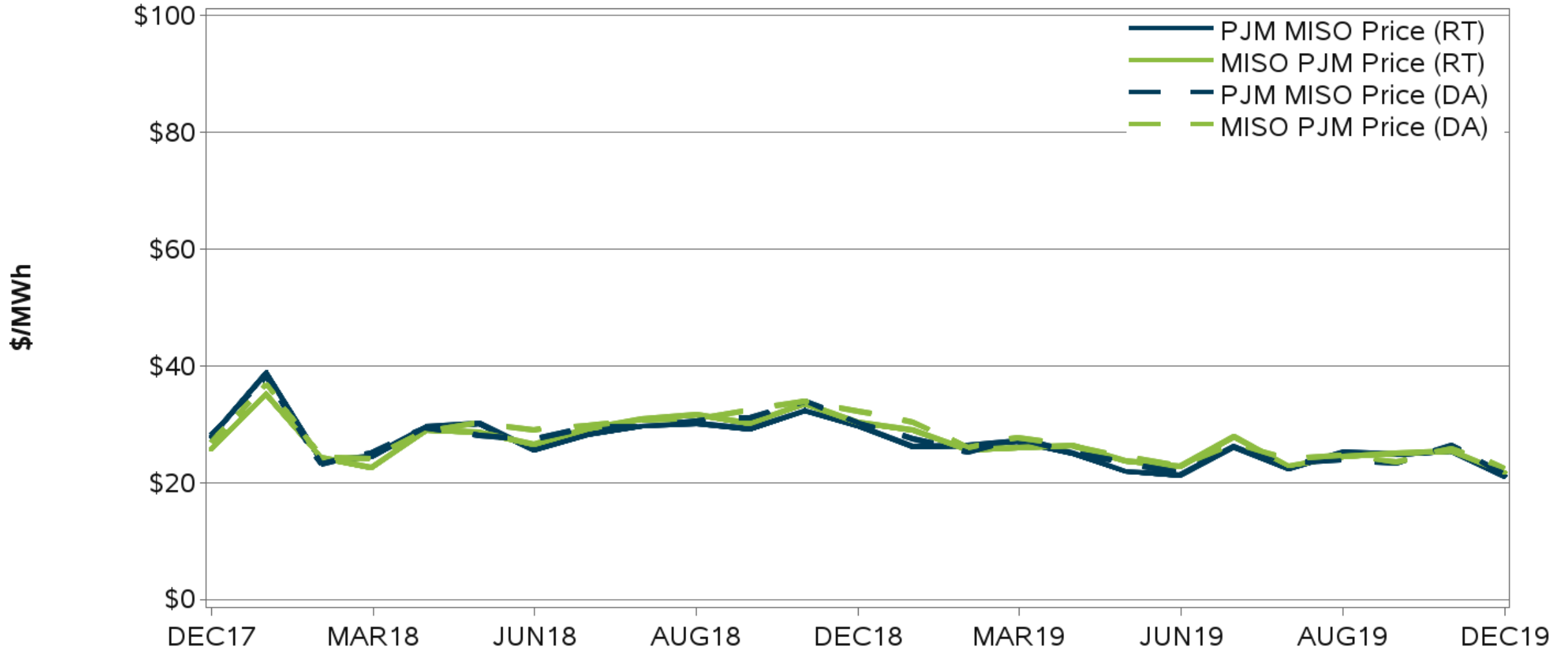


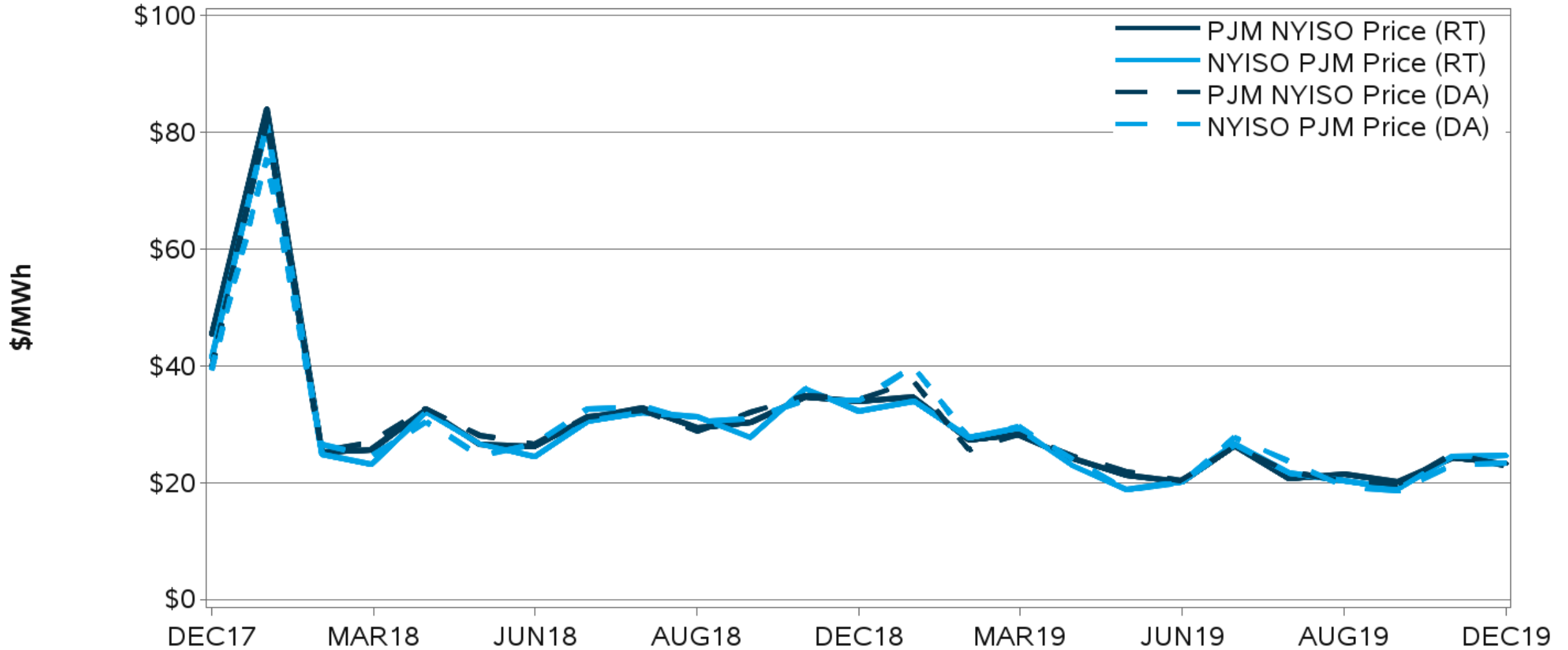
The ten most heavily congested facilities account for 43% of total congestion for 2019.



# Energy Market

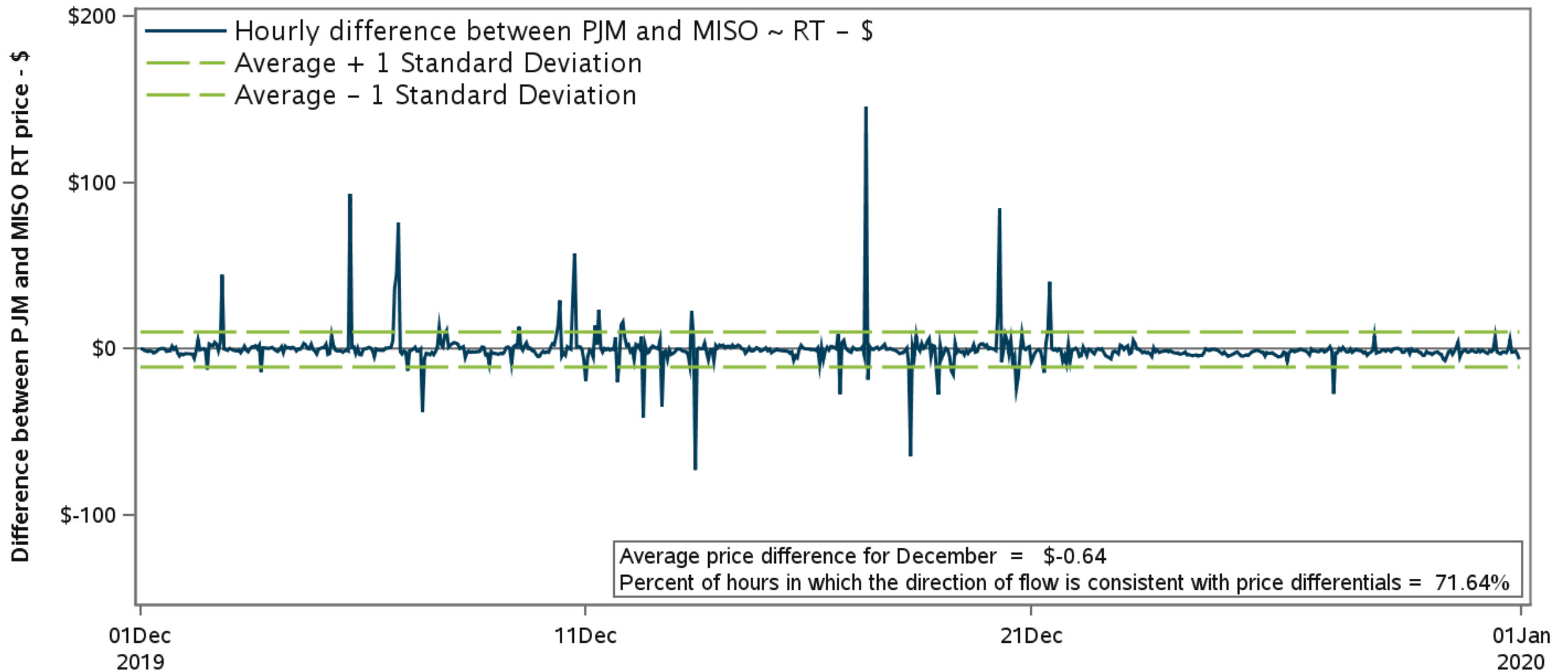
# Interchange/Seams Summary







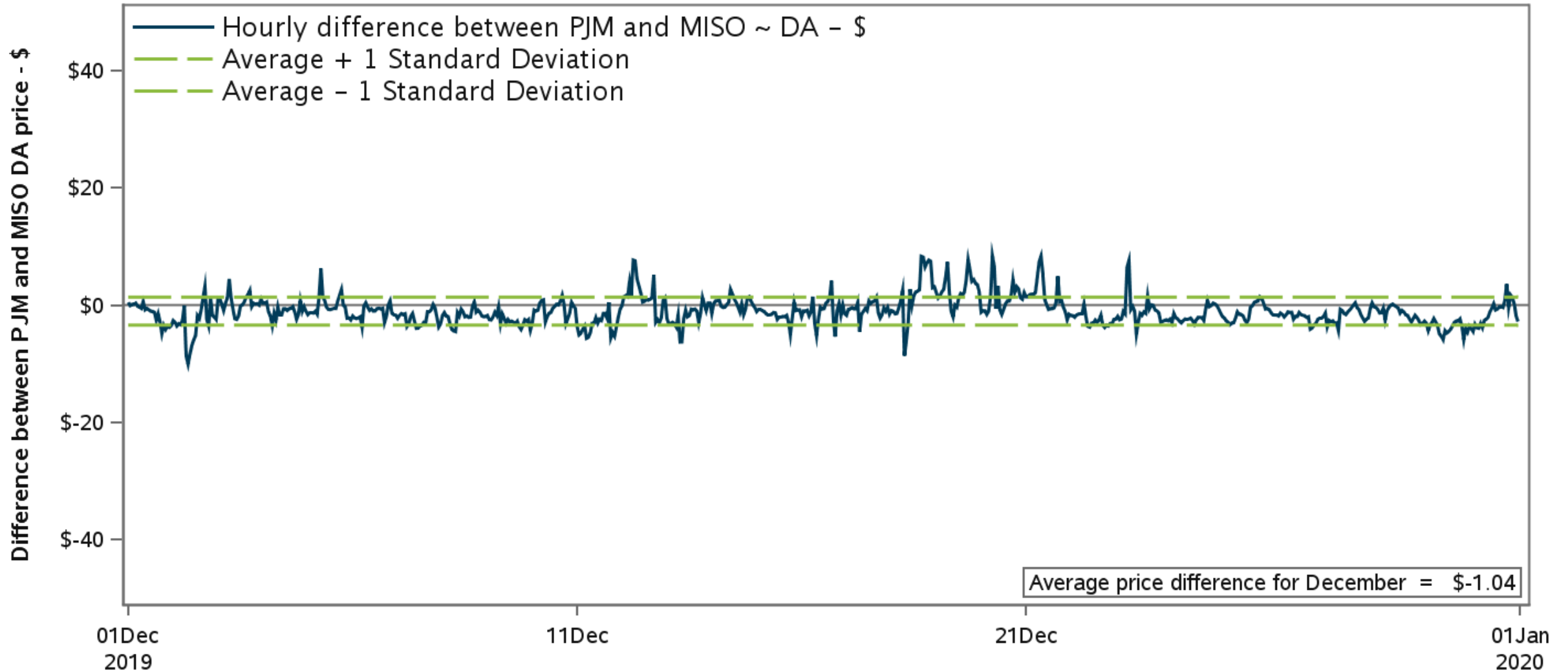
# Hourly Difference Between PJM and MISO Real-Time Prices



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



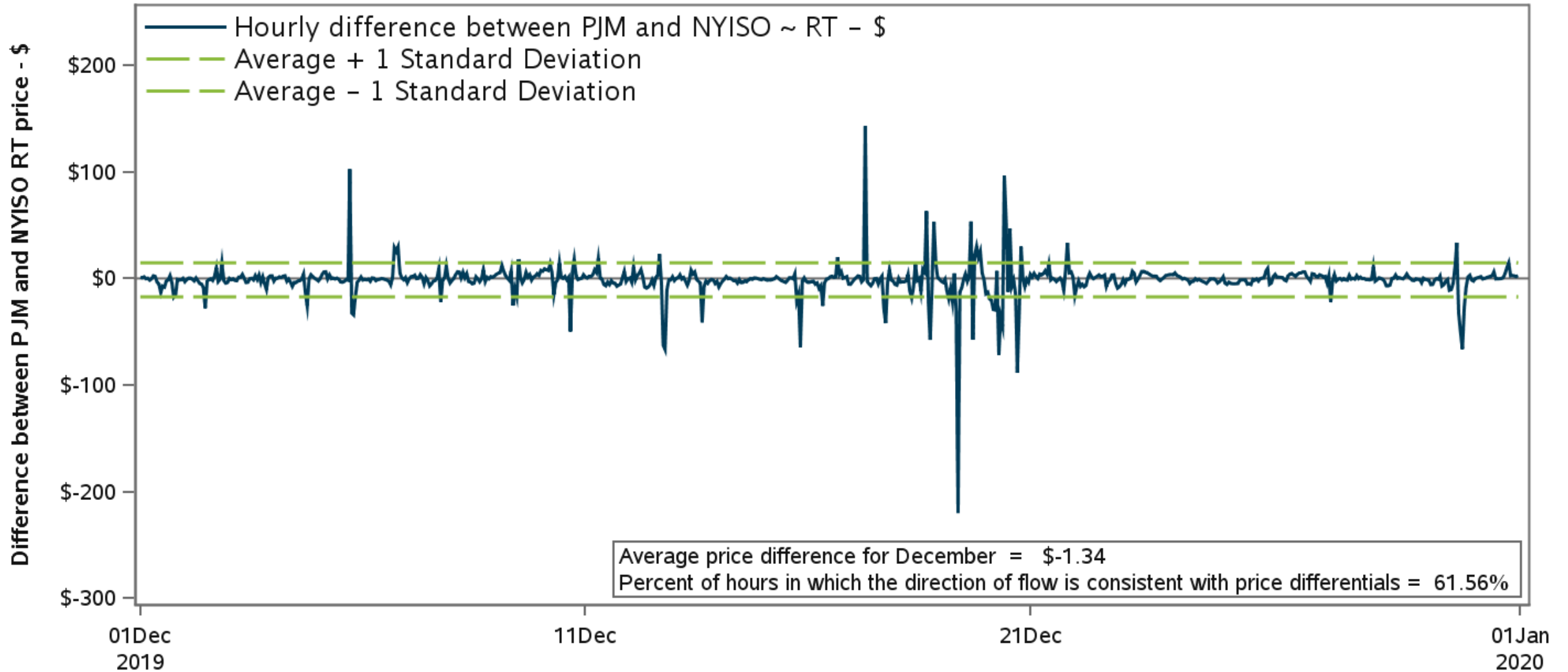
# Hourly Difference Between PJM and MISO Day-Ahead Prices



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

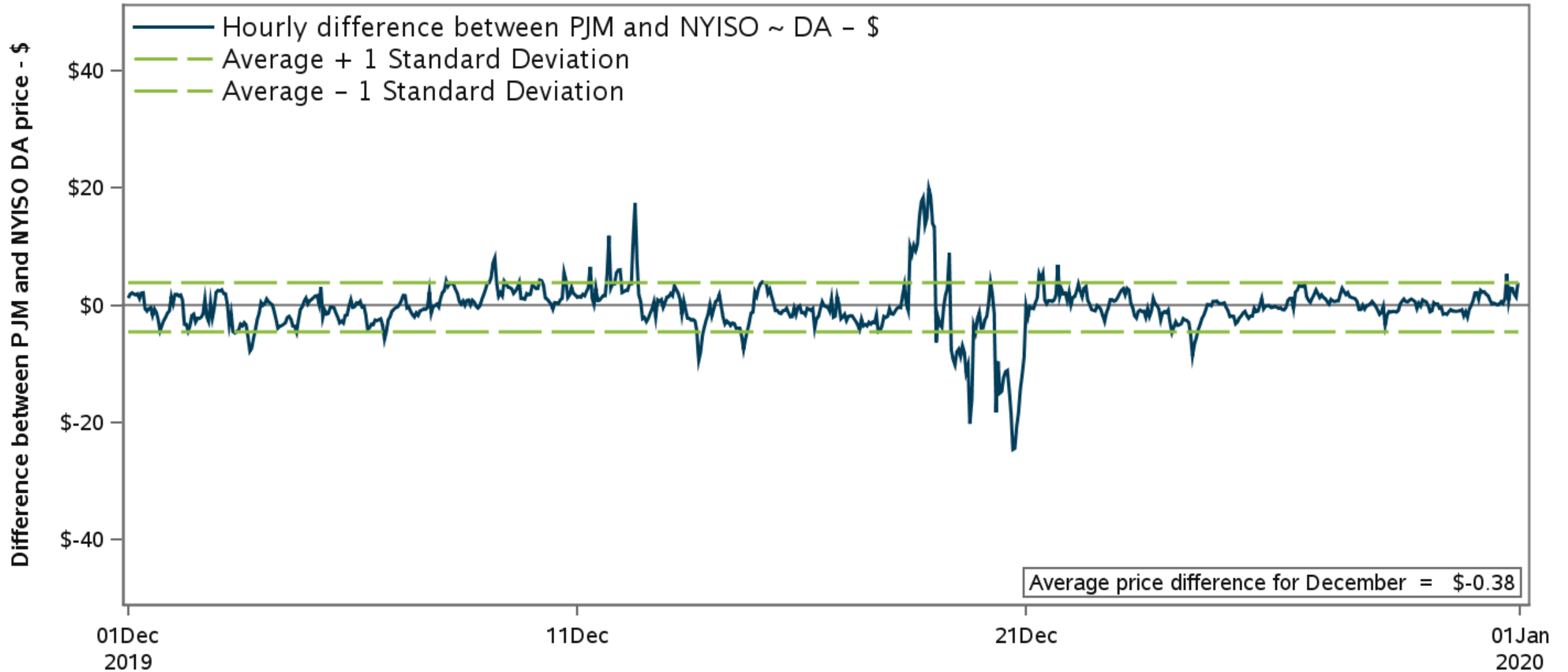


# Hourly Difference Between PJM and NYISO Real-Time Prices

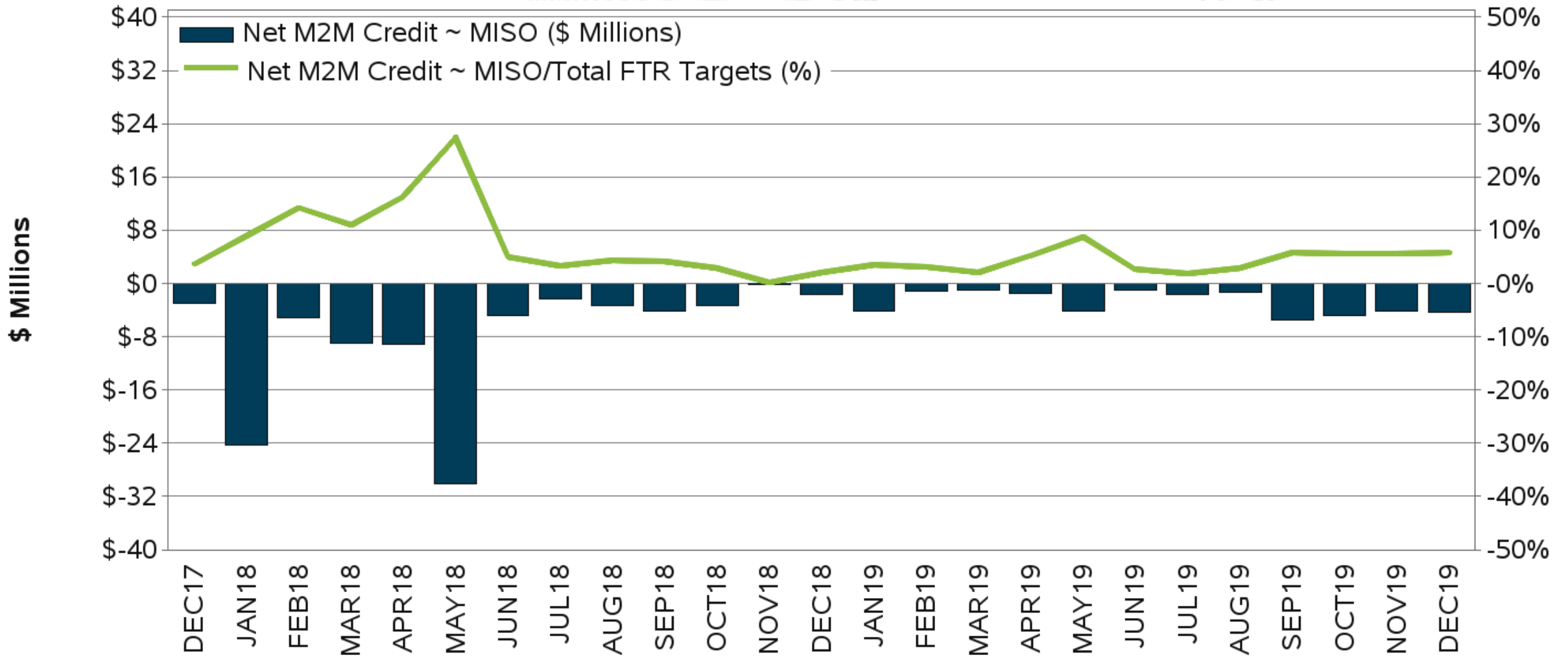


Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.

# Hourly Difference Between PJM and NYISO Day-Ahead Prices



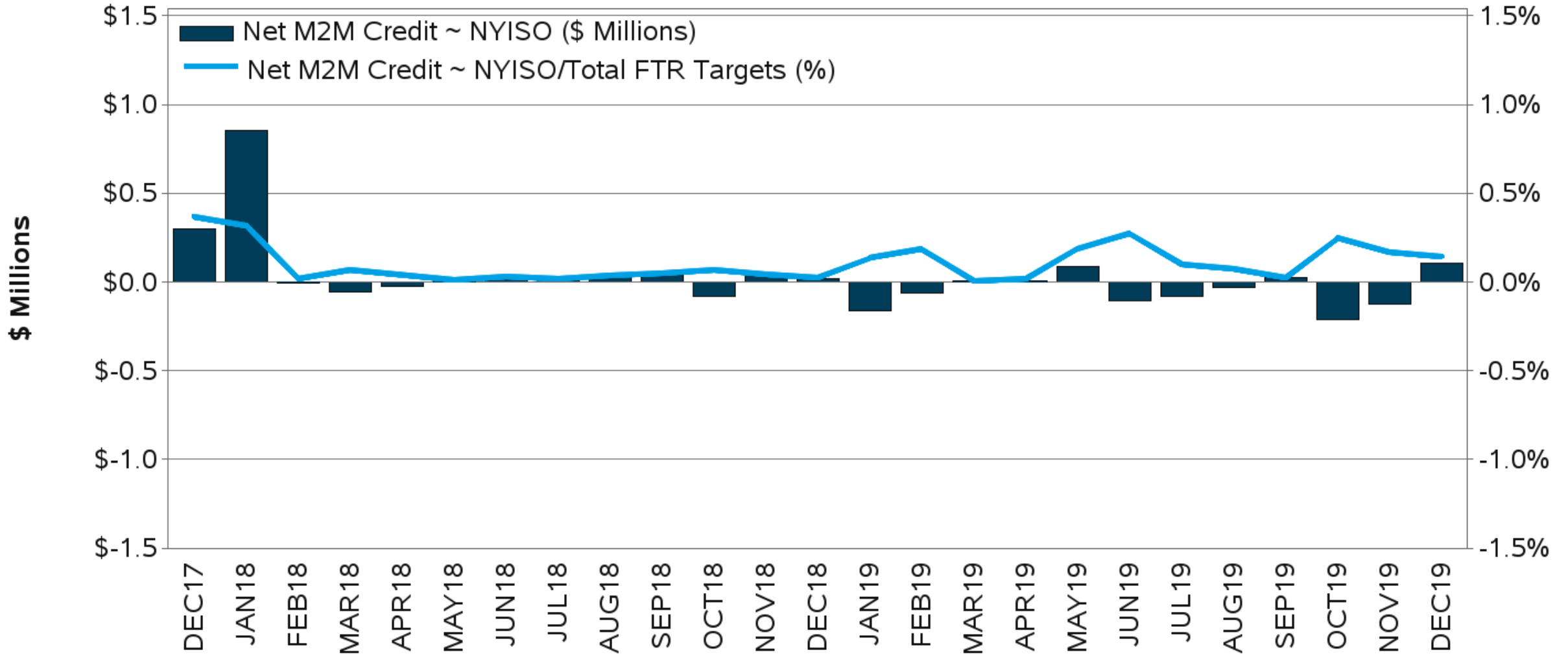
Positive values represent hours when the PJM price was higher. Negative values represent hours when the PJM price was lower.



Negative M2M Credit represents PJM payment to MISO



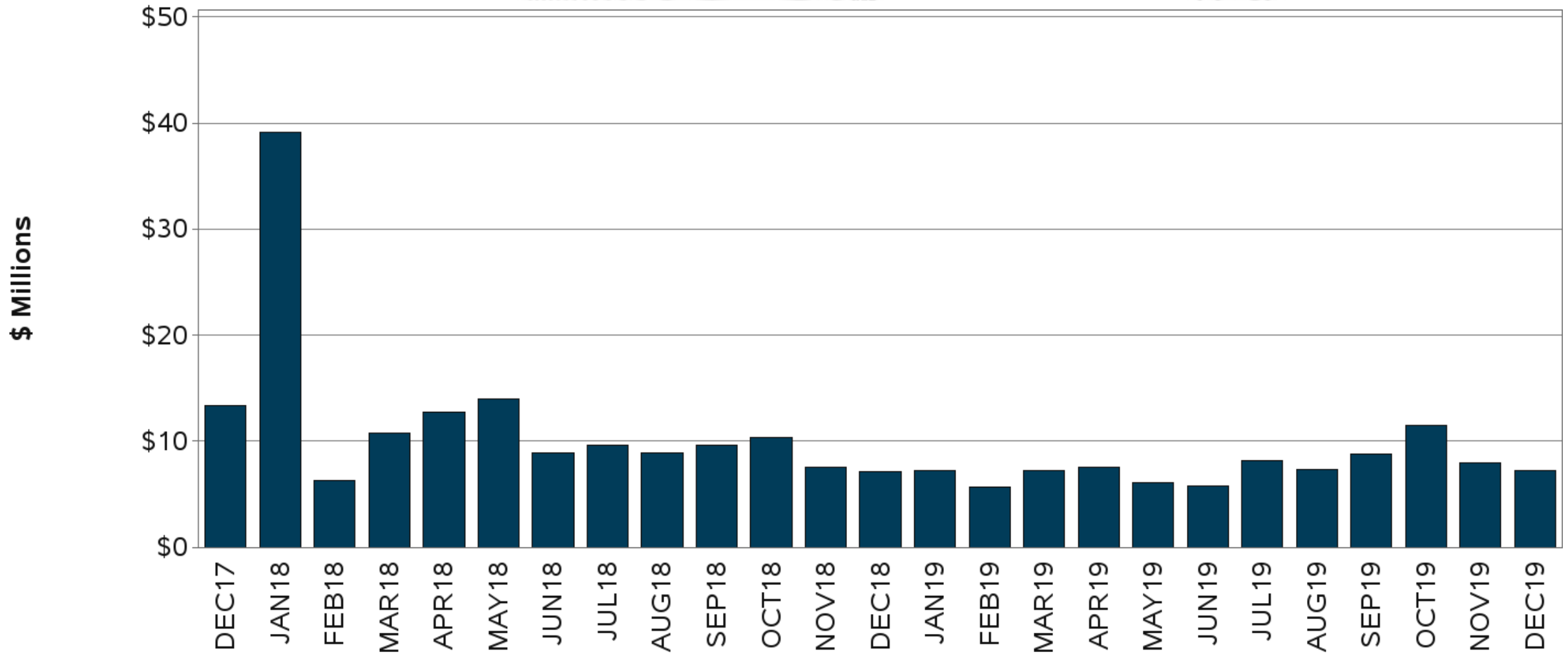
# PJM-NYISO Market-to-Market Coordination Settlement



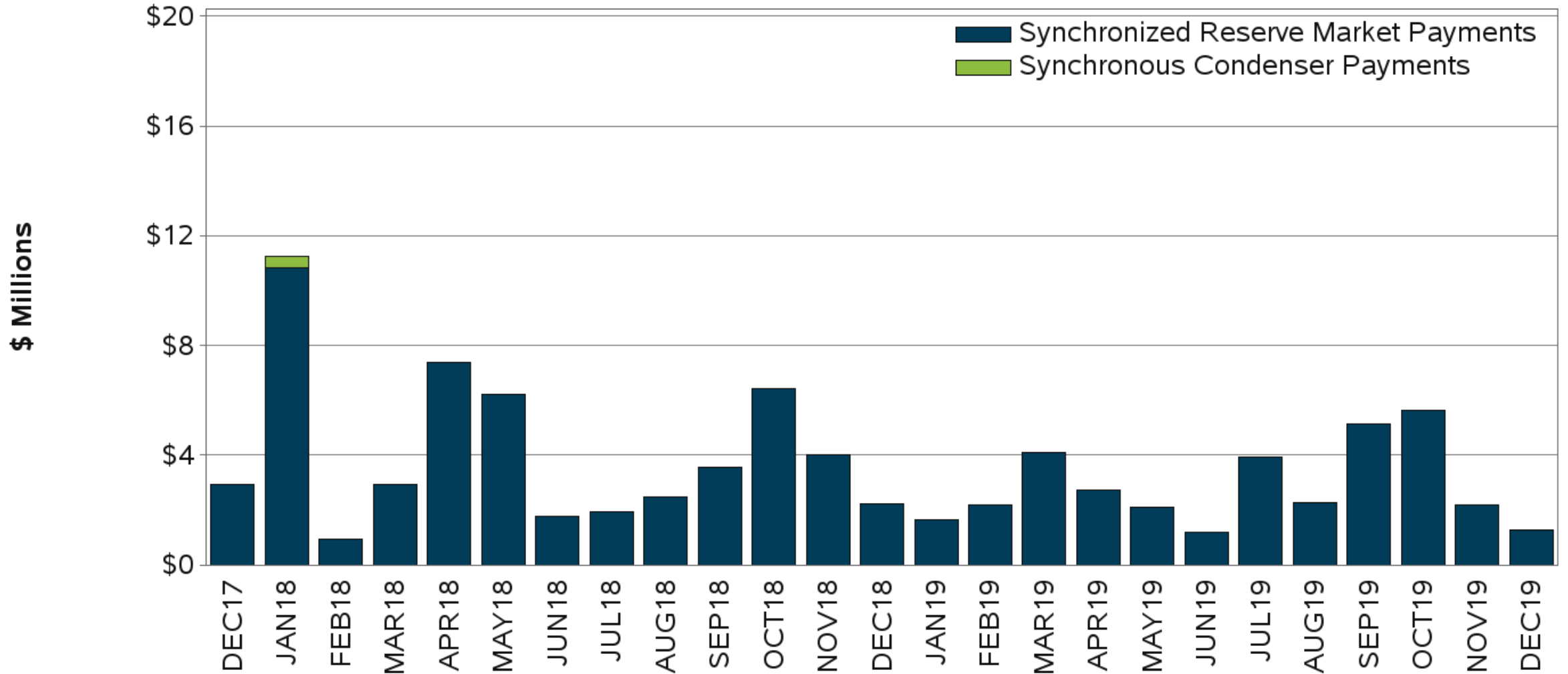
Negative M2M Credit represents PJM payment to NYISO

# Ancillary Service Market

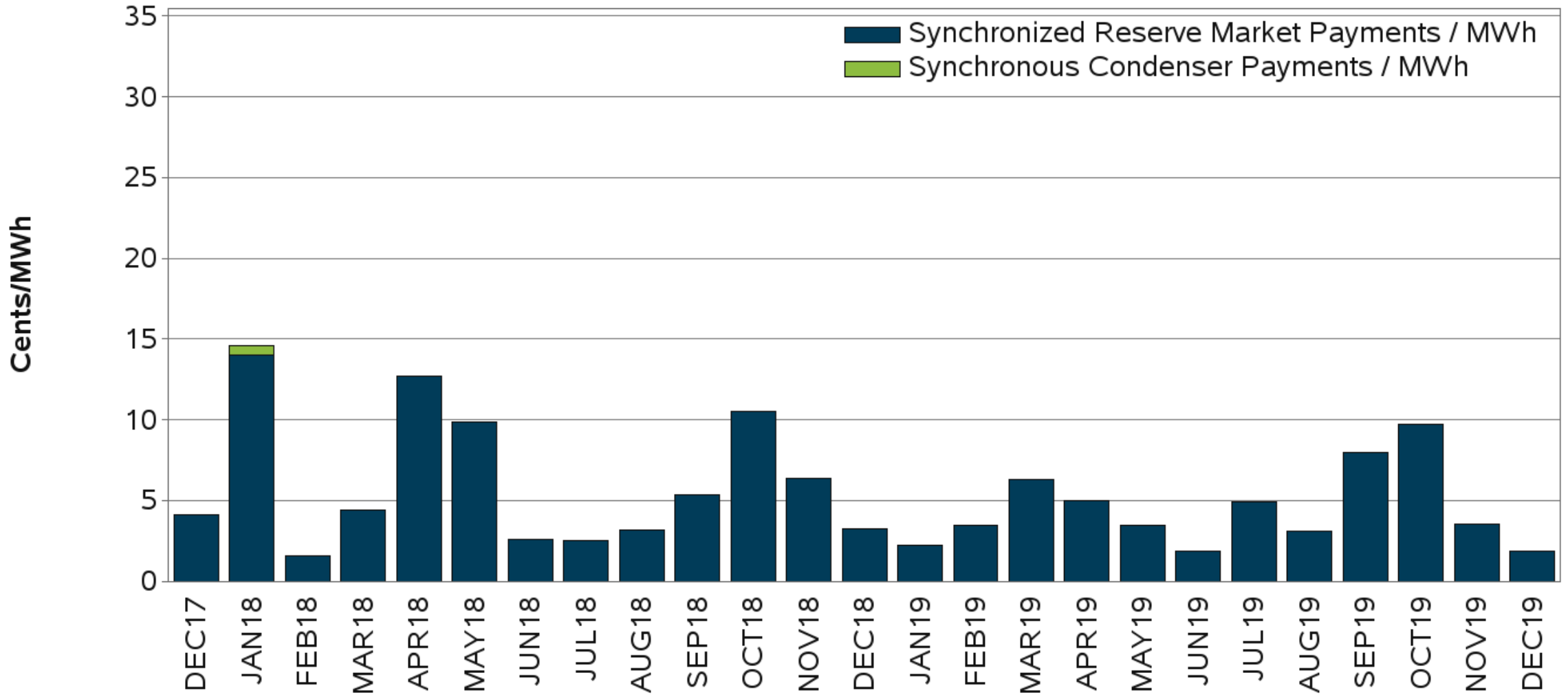
## Summary

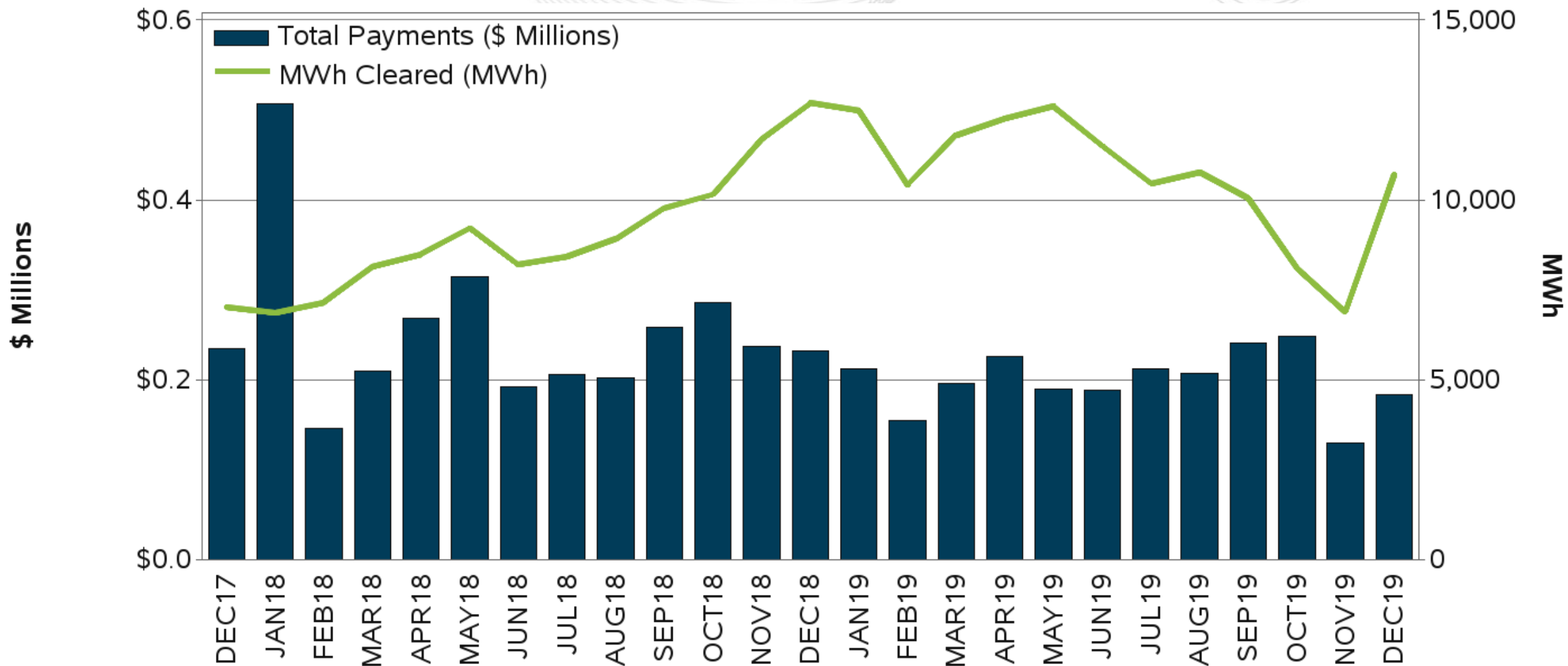


# Synchronized Reserve and Synchronous Condenser Costs

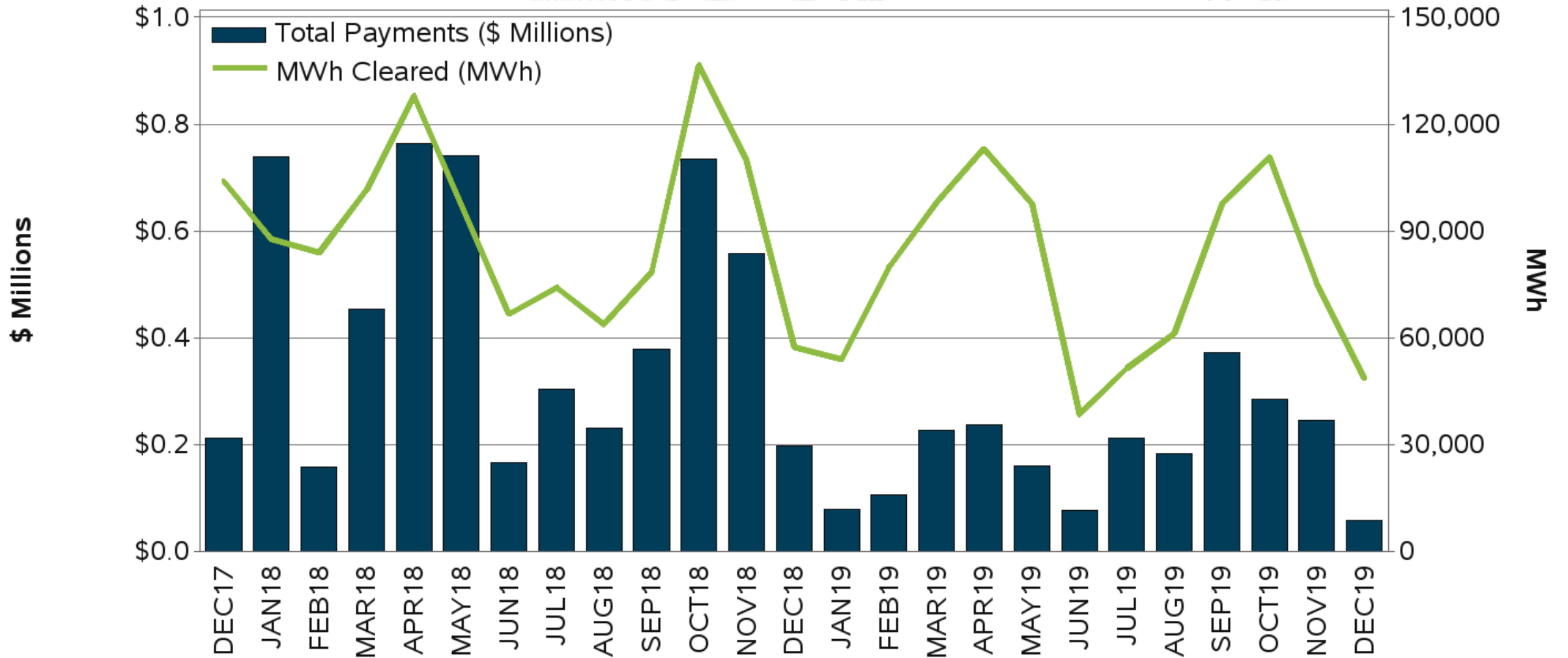


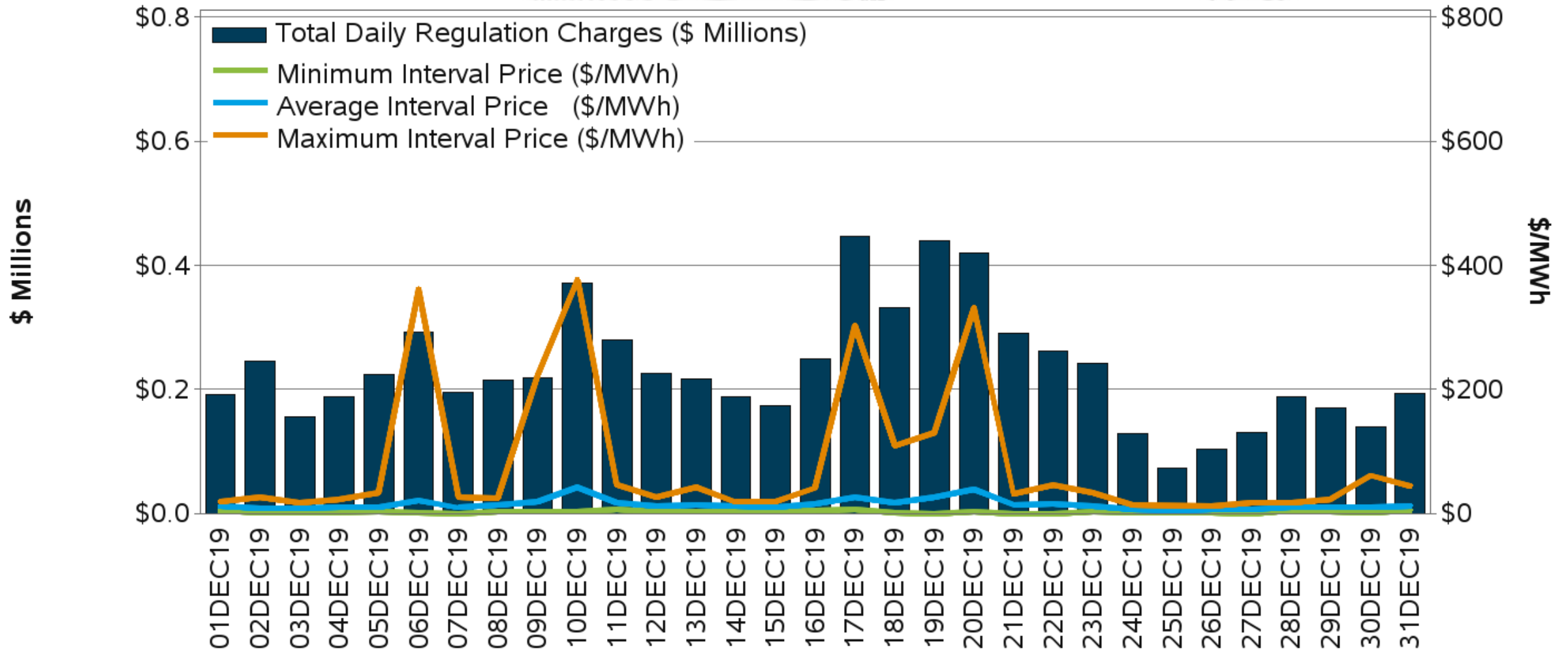
**pjm** Load-Adjusted Synchronized Reserve and Synchronous Condenser Costs





# DR Participation in PJM Synchronized Reserve Markets







# Synchronized Reserve Market Daily Prices and Charges

