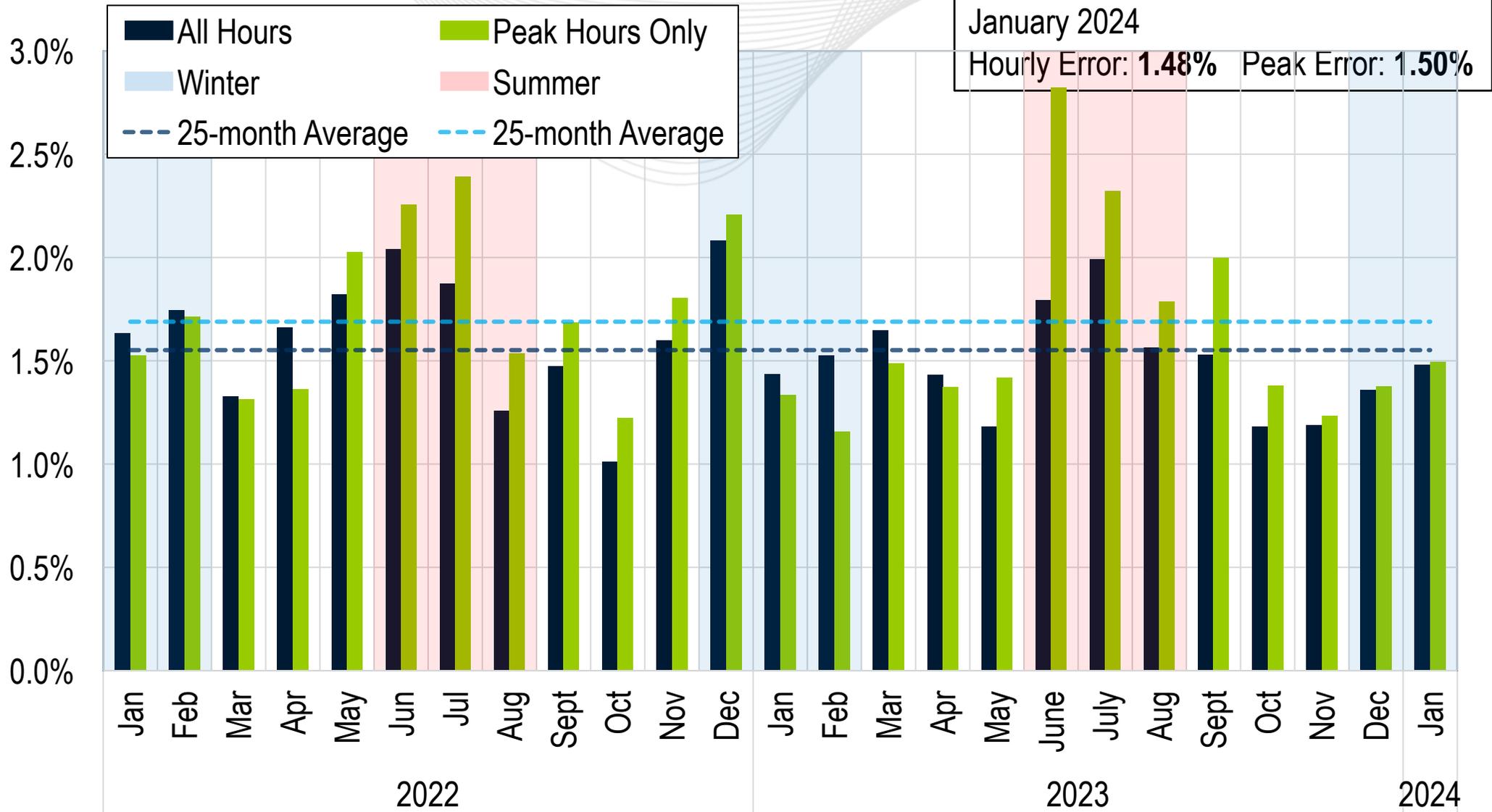




# System Operations Report

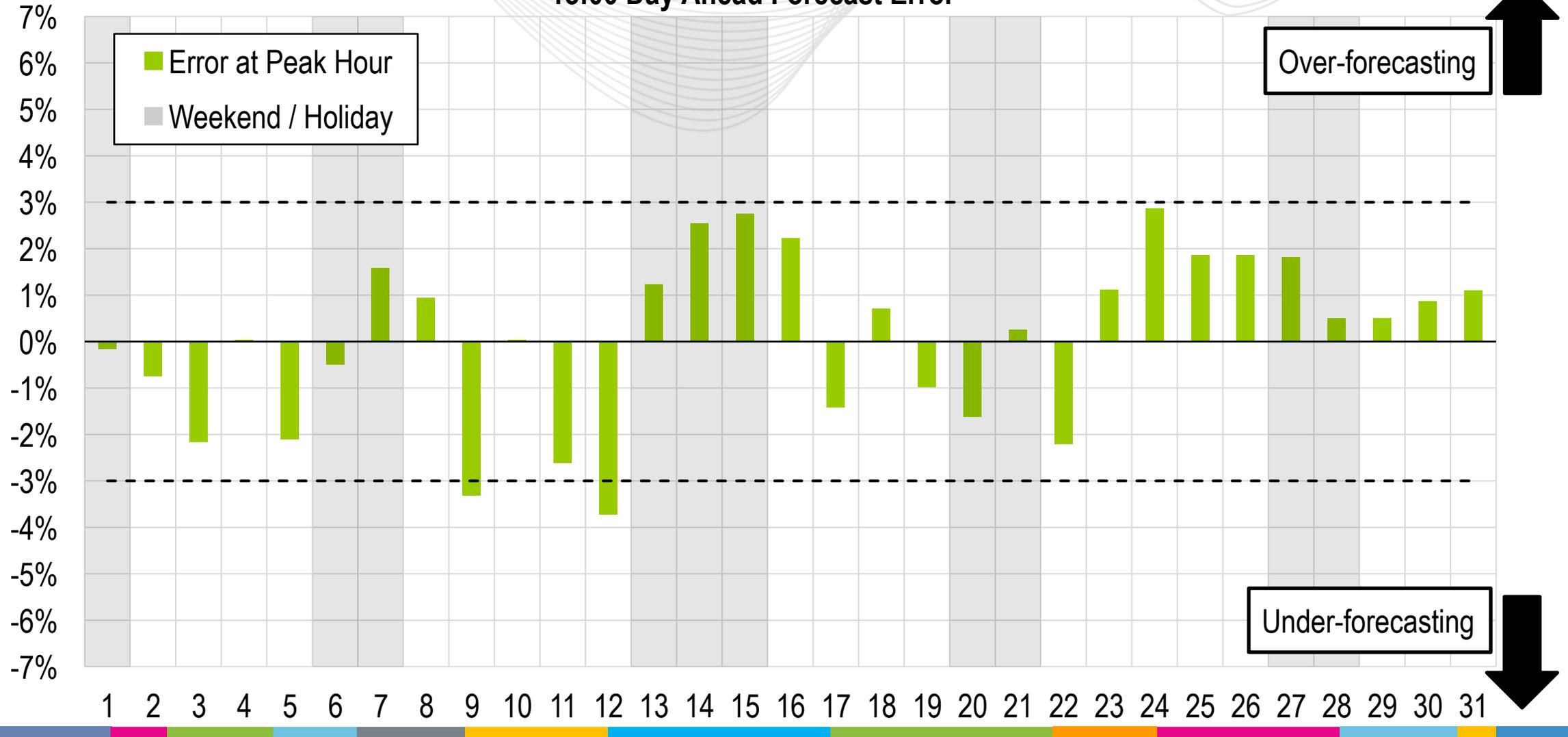
Stephanie Schwarz  
Manager, Markets Coordination  
Operating Committee  
February 8, 2024

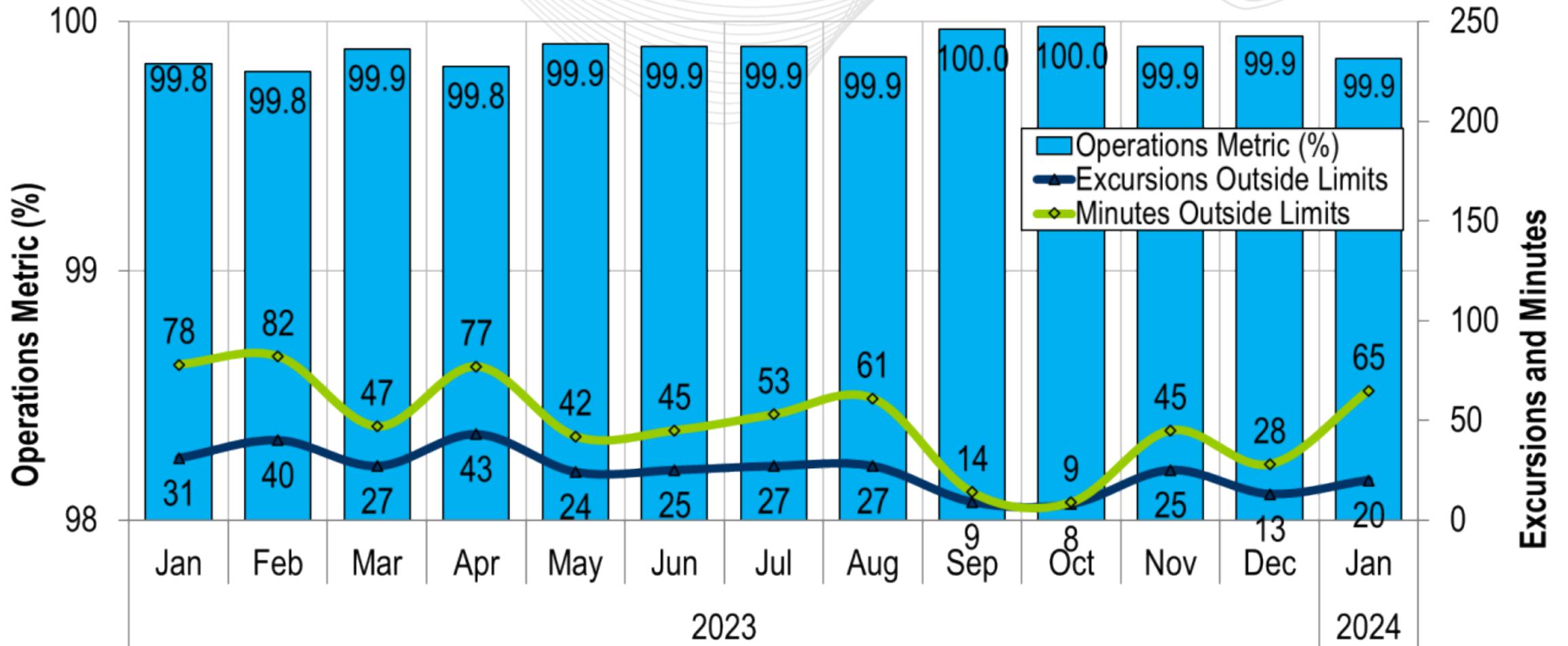
# Average Load Forecast Error



# Daily Peak Forecast Error (January)

## 18:00 Day Ahead Forecast Error

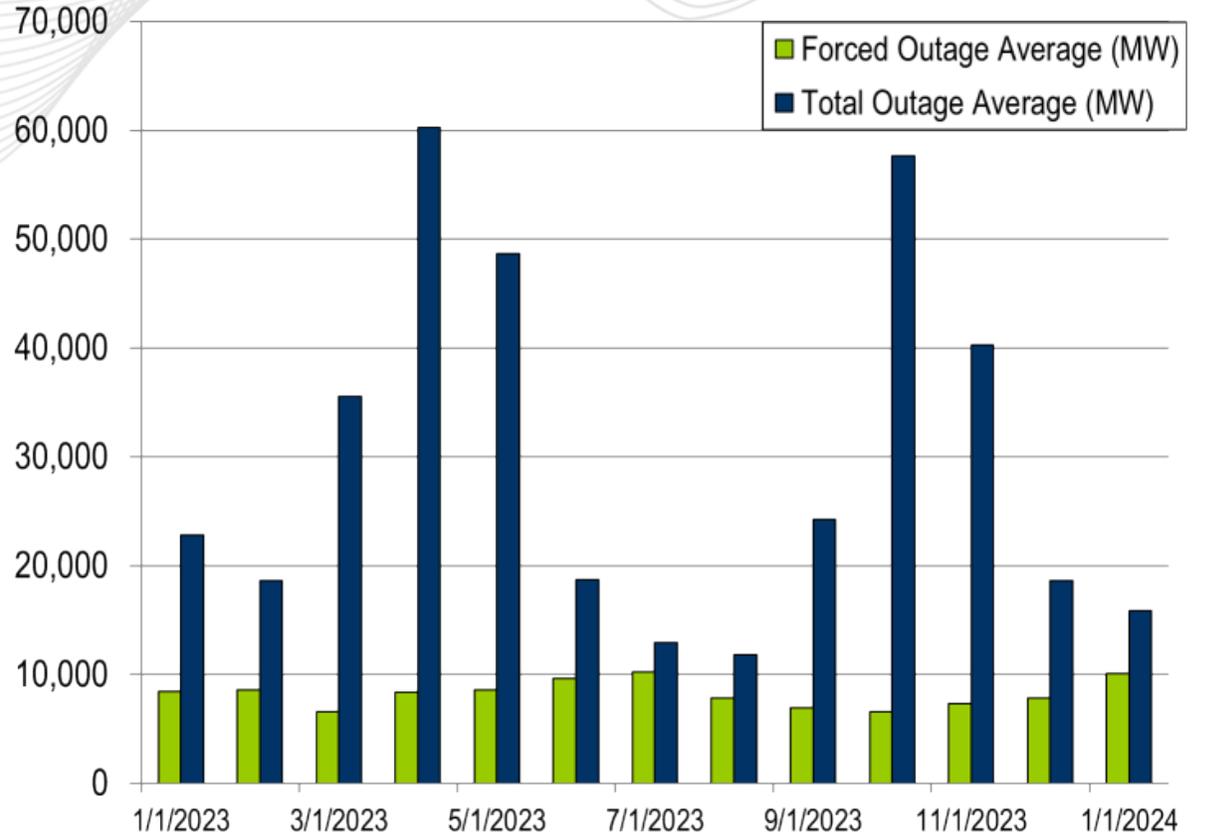
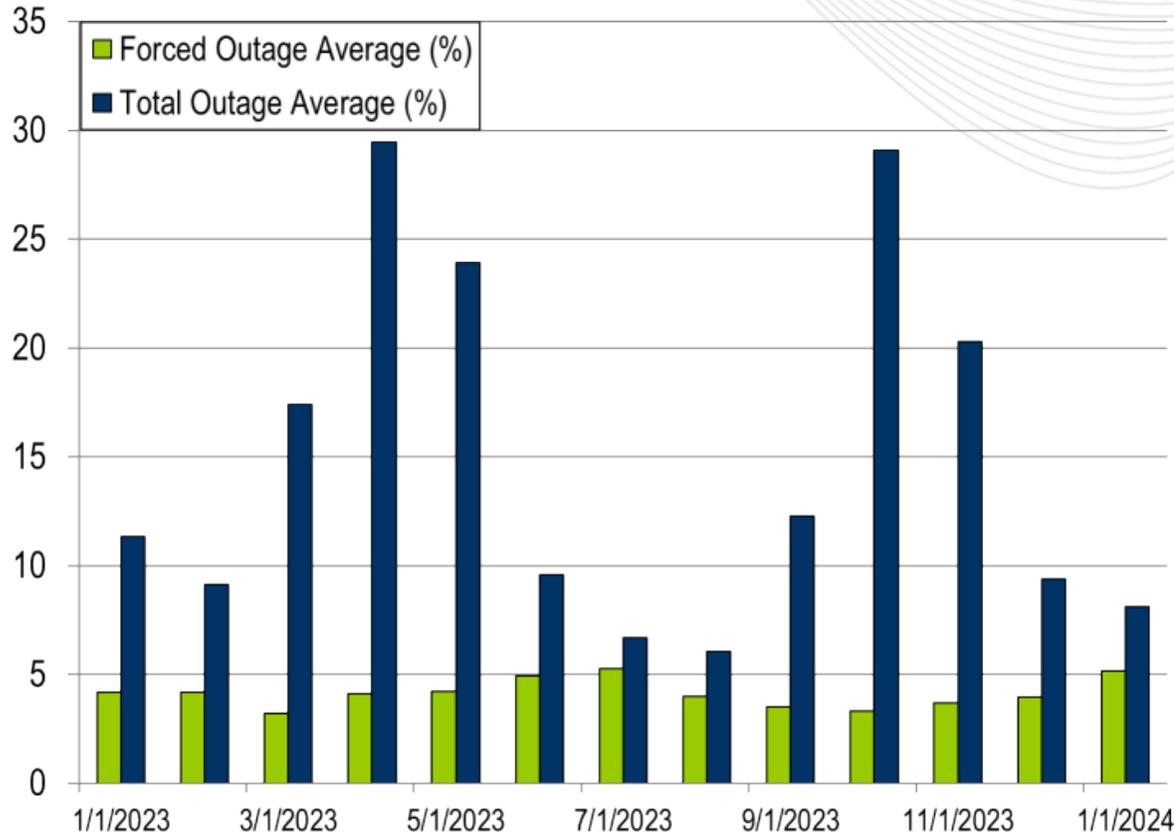




PJM's BAAL performance has exceeded the goal of 99% for each month in 2023 and 2024.

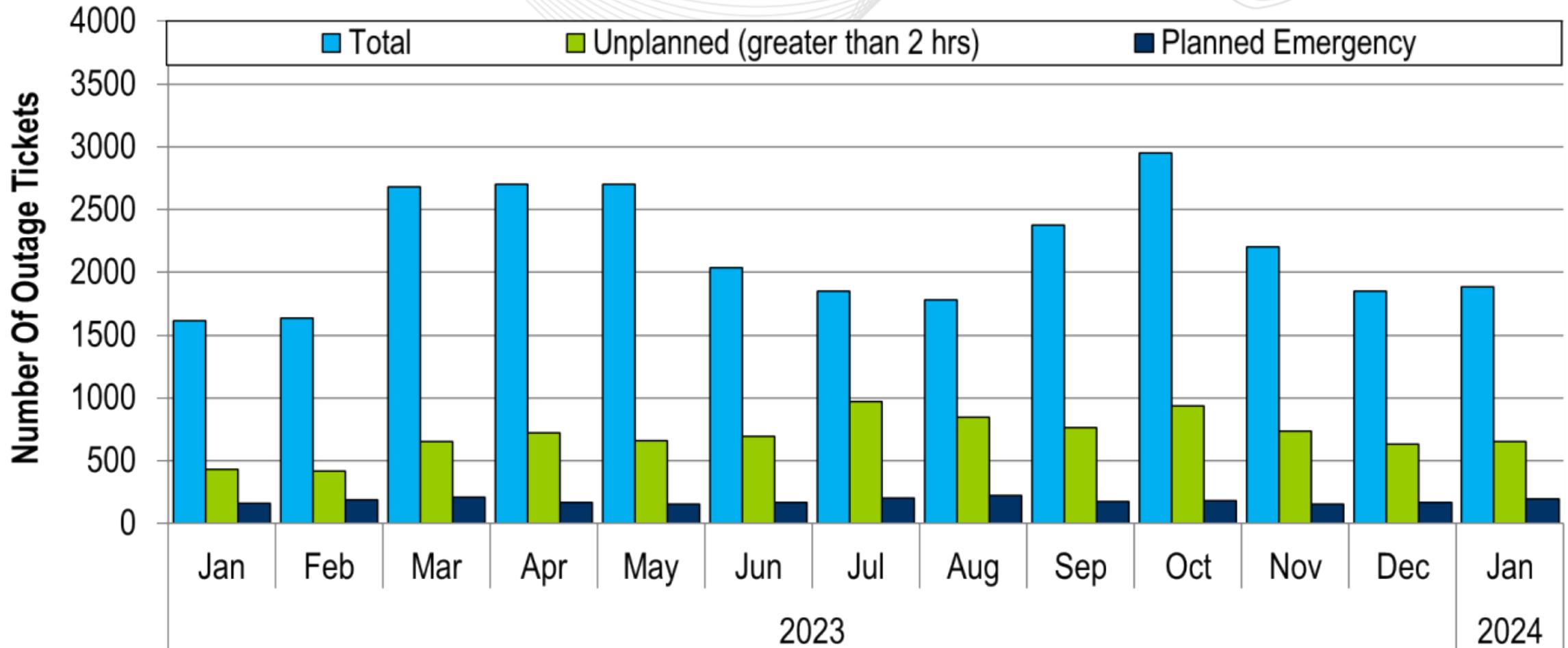
- 1 Shared Reserve event
- 3 Spin Events
- The following Emergency Procedures occurred:
  - 1 Conservative Operations Alert
  - 2 Cold Weather Alerts
  - 22 Post Contingency Local Load Relief Warnings (PCLLRWs)

- 9 Shortage Cases Approved
- The approved Shortage Cases occurred on:
  - 01/20/2024:
    - 3 Shortage Cases for the 17:40, 17:45, and 17:55 intervals
    - Factors: Load, interchange, and transfer interface binding hard
  - 01/21/2024:
    - 1 Shortage Case for the 17:50 interval
    - Factors: Load, interchange, and transfer interface binding hard
  - 01/22/2024:
    - 3 Shortage Cases for the 06:50, 06:55, and 06:59 intervals
    - Factors: Load, interchange, and transfer interface binding hard
  - 01/29/2024:
    - 2 Shortage Cases for the 12:10 and 12:15 intervals
    - Factors: Unit loss and interchange



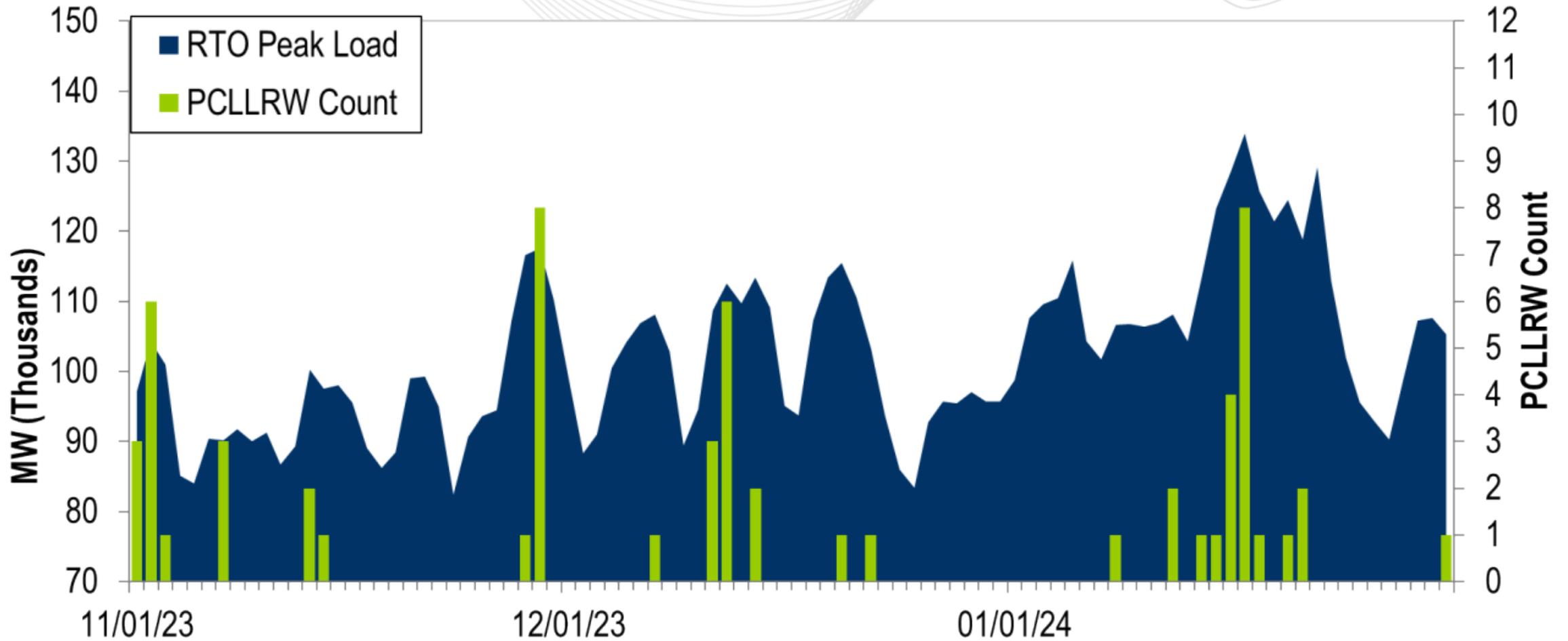
The 13-month average forced outage rate is 4.14% or 8,235 MW.  
 The 13-month average total outage rate is 14.82% or 29,702 MW.

# 2022-2023 Planned Emergency, Unplanned, and Total Outages by Ticket



Note: "Unplanned Outages" include tripped facilities. One tripping event may involve multiple facilities.

# PCLLRW Count Vs. Peak Load – Daily Values For 3 Months



Event	1			2			3		
Date	01/13/24			01/25/24			01/29/24		
Start Time	01:59:39			12:39:20			12:03:07		
End Time	02:04:54			12:47:57			12:12:01		
Duration	00:05:15			00:08:37			00:08:54		
Region	RTO			RTO			RTO		
Resource Type	Gen	DR	Total	Gen	DR	Total	Gen	DR	Total
Assigned (MW)	2456	80	2536	2173	668	2841	2085	579	2664
Estimated Expected Response of Assigned Resources (MW)	1289	42	1331	1872	576	2448	1855	515	2371
Actual Response of Assigned Resources (MW)	396	65	461	1102	541	1643	1433	507	1940
Output Increase of Resources without Assignment (MW)	2125	0	2125	605	0	605	1607	0	1607
Percent Response To Estimated Expected Response (%)	31%	154%	35%	59%	94%	67%	77%	98%	82%
Penalty (MW)	0	0	0	0	0	0	0	0	0



# Operational Flexibility Metrics

Scott Benner

Principal Engineer, Advanced Analytics

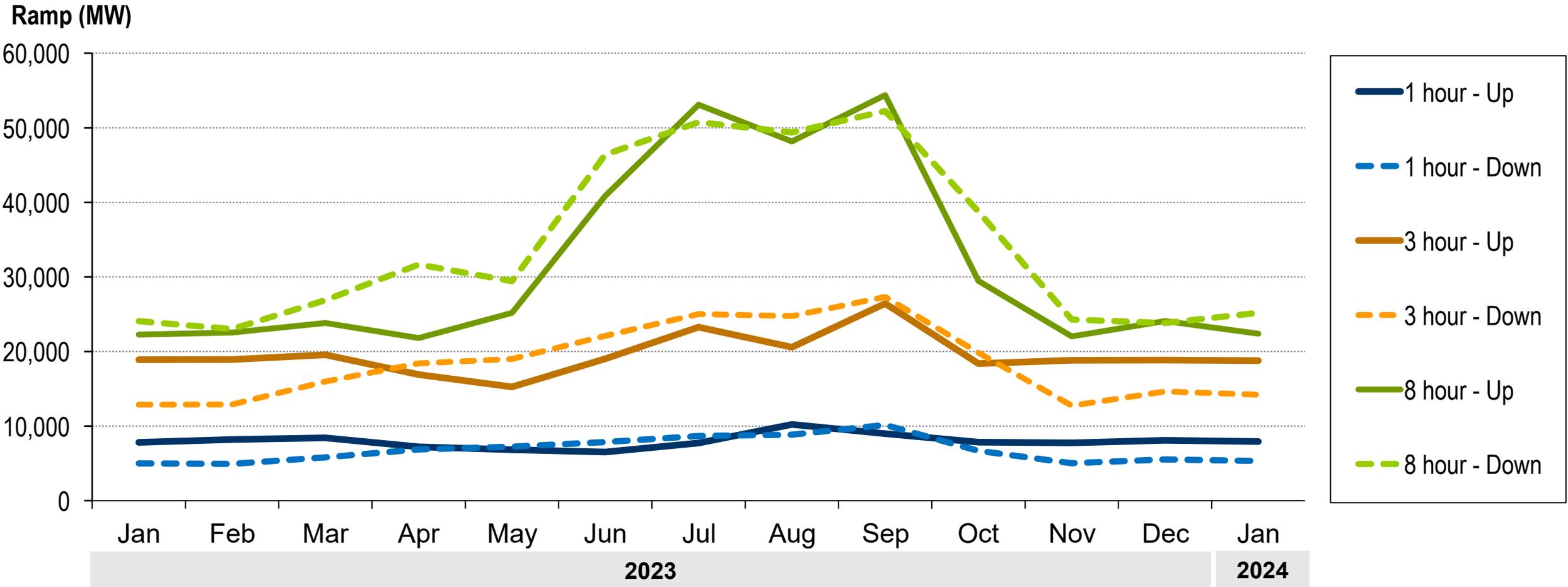
Operating Committee

February 8, 2024

- This metric shows the monthly maximum net load ramps for various time frames (1, 3 and 8 hours) for both ramp up and ramp down.
- Metered Load = Total Electric Distribution Company demand, calculated from real-time telemetry
- Gross Load = Metered Load + BTM Solar
- Net Load = Gross Load – FTM & BTM Solar – FTM Wind

(BTM = Behind-the-meter, FTM = Front-of-the-meter)

# 1) Monthly Maximum Net Load Ramp

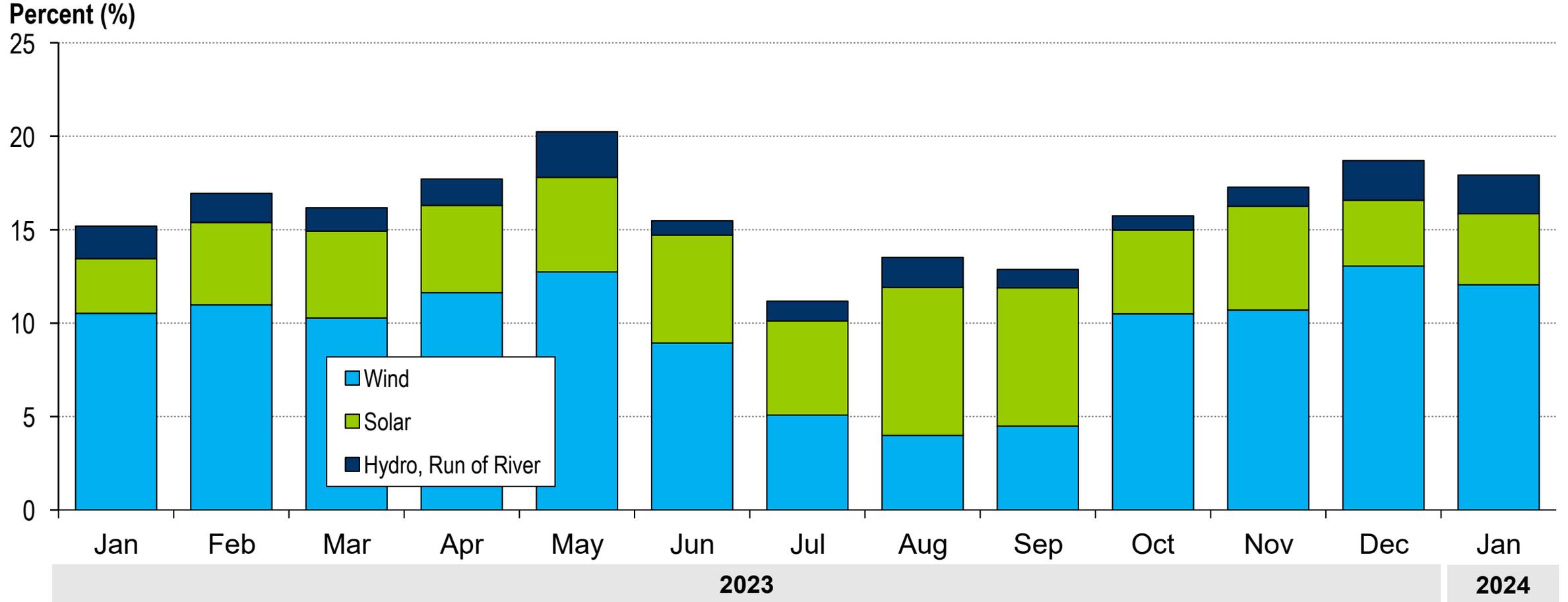


- This metric shows the hourly maximum percent of metered load served by the total of three different renewables in PJM for each month: wind (FTM), solar (FTM) and hydro, run of river.
- Metered Load = Total Electric Distribution Company demand, calculated from real-time telemetry

(FTM = Front-of-the-meter)

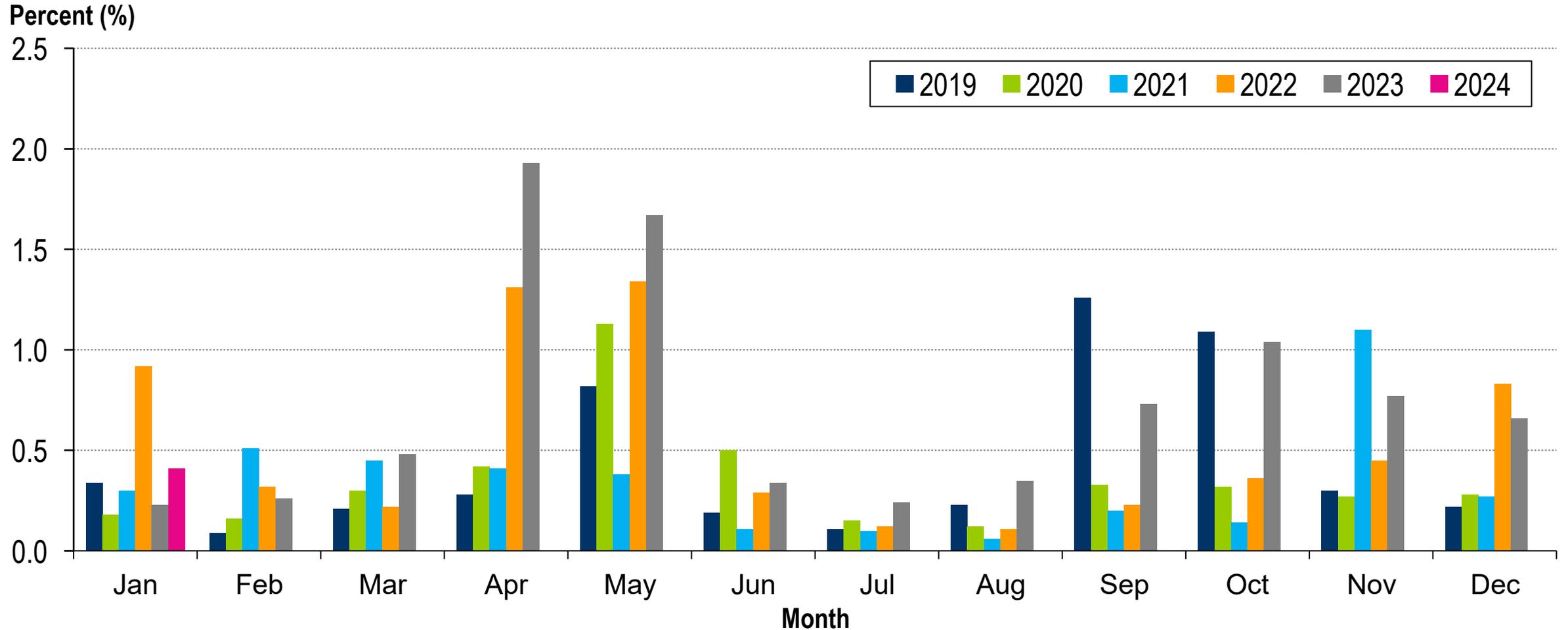


## 2) Hourly Maximum Percent of Metered Load Served by Renewables



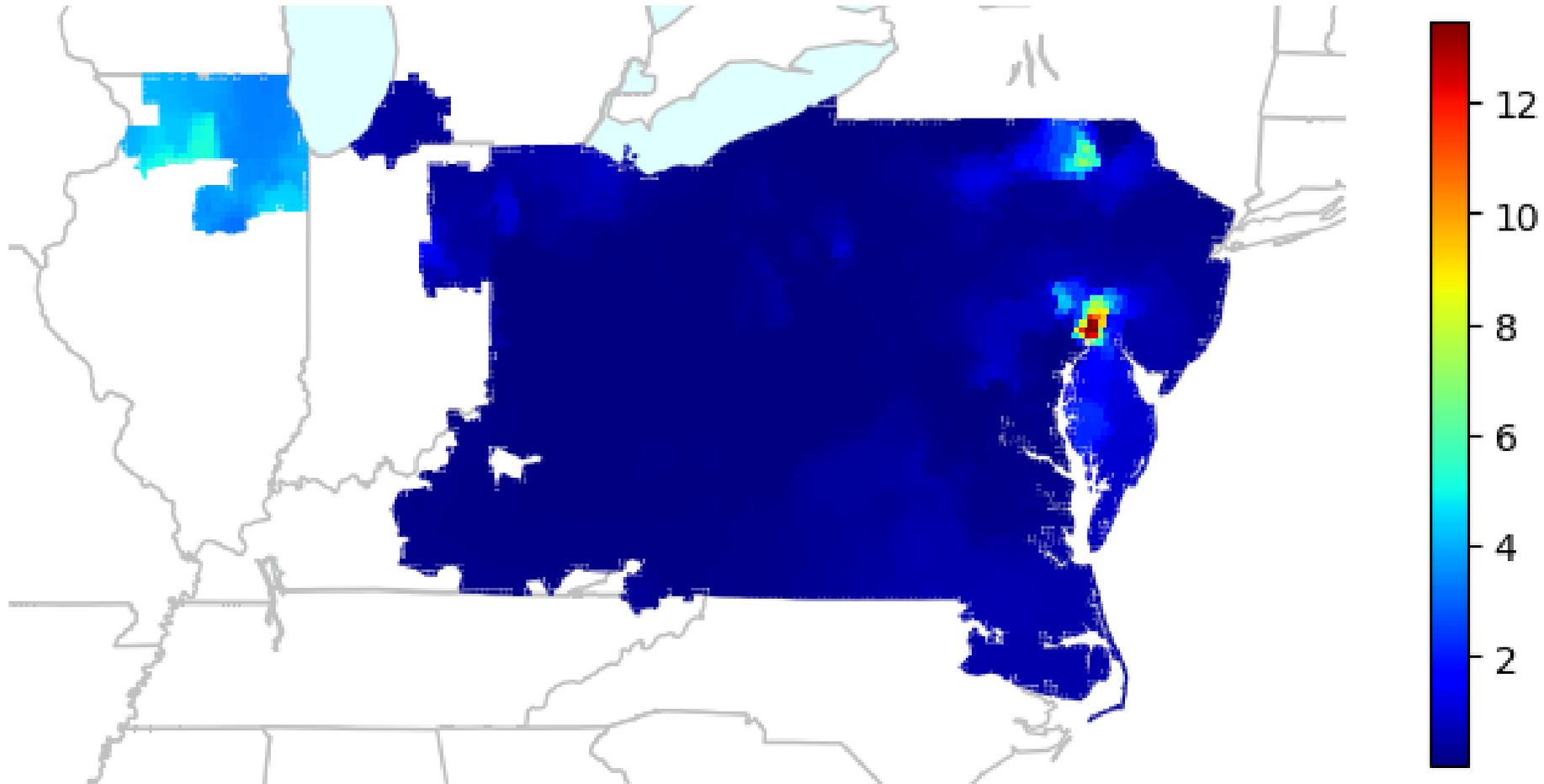
- This metric shows the percentage of bus-intervals across a month having a negative real-time total LMP. A qualified bus may be a generator, load, or other type of pricing node as defined by PJM Settlements.

# 3a) Monthly Percent of Negative Pricing Interval-Busses



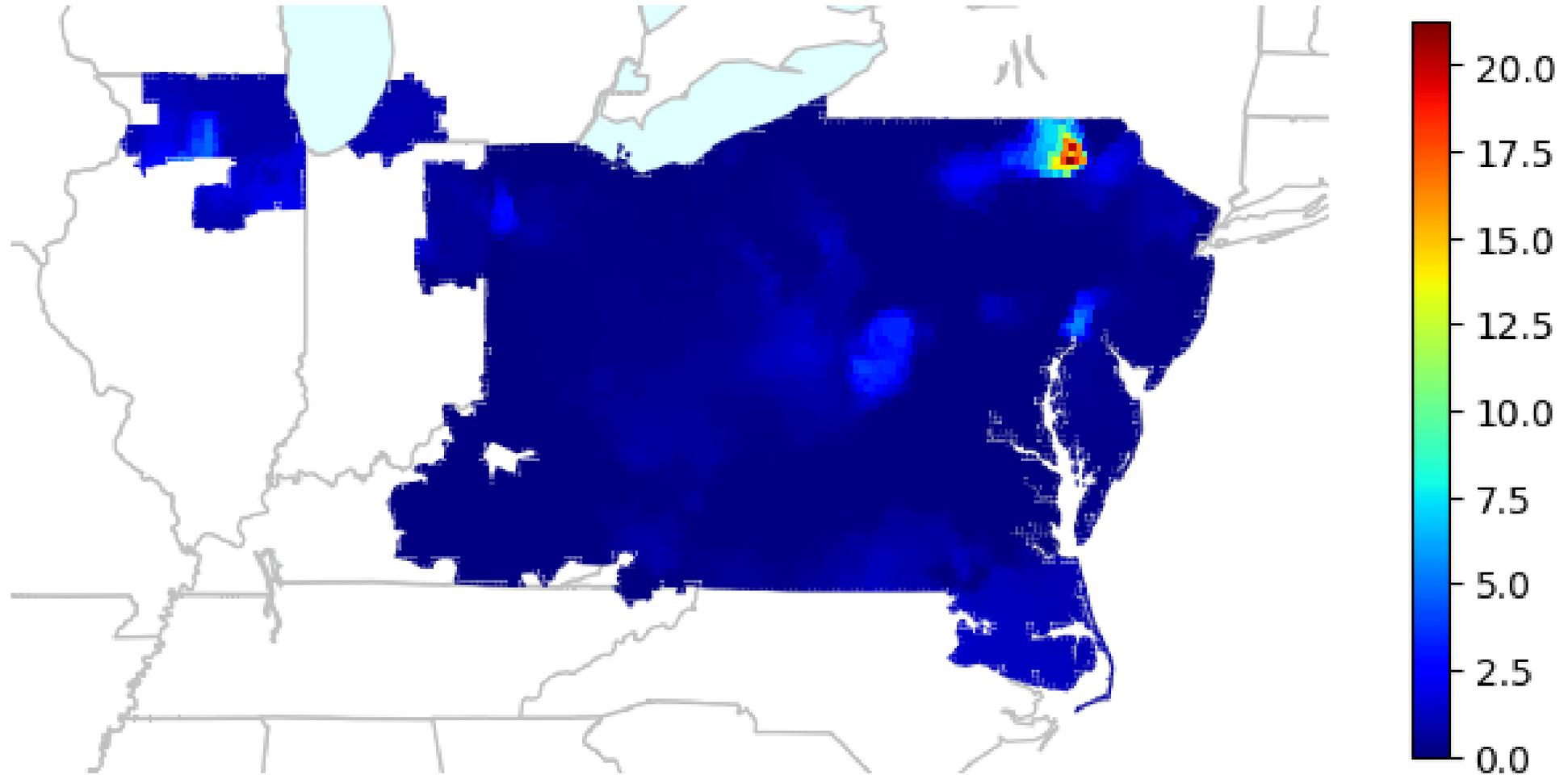
- This metric shows the percentage of bus-intervals year-to-date (YTD) (2023 and 2024 through January 2024) having a negative real-time total LMP by location. A qualified bus may be a generator, load, or other type of pricing node as defined by PJM Settlements.
- Mapped to DIMA station longitude and latitude
- Rasterized to five square mile blocks

## 2023 Annual % Negative Bus-Intervals



### 3b) YTD Percent of Negative Pricing Interval-Busses by Location

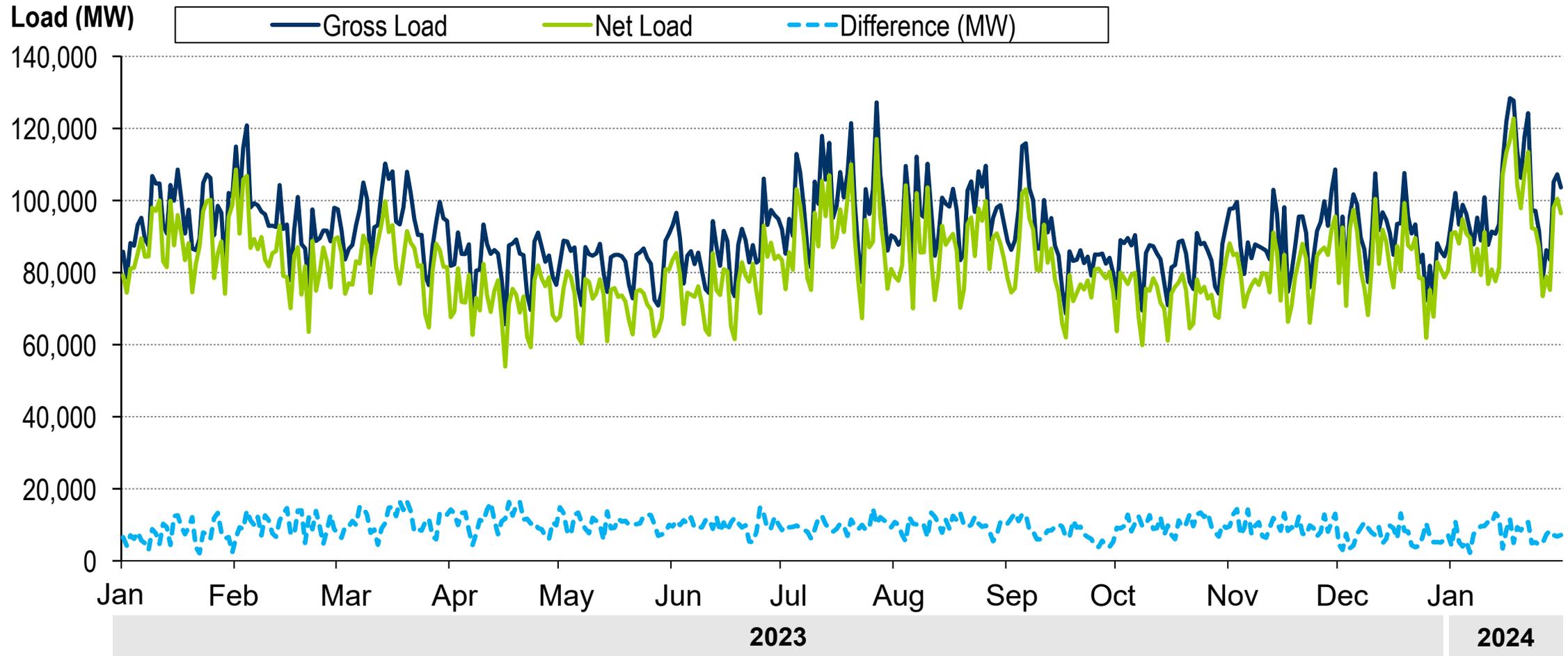
#### 2024 YTD % Negative Bus-Intervals



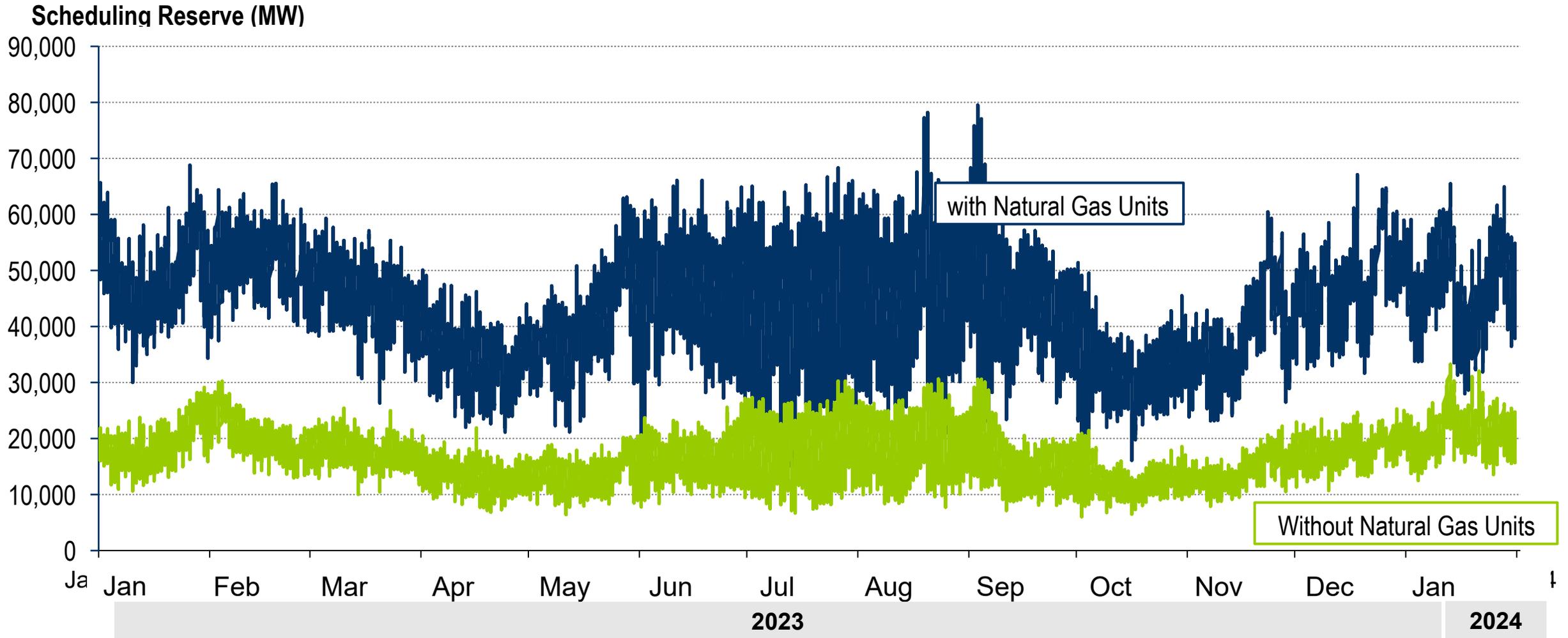
- This metric shows the gross load and net load during the hour of each day with the largest difference between the two.
  - Metered Load = Total Electric Distribution Company demand, calculated from real-time telemetry
  - Gross Load = Metered Load + BTM Solar
  - Net Load = Gross Load – FTM & BTM Solar – FTM Wind
- (BTM = Behind-the-meter, FTM = Front-of-the-meter)



# 4) Maximum Daily Difference Between Gross Load and Net Load

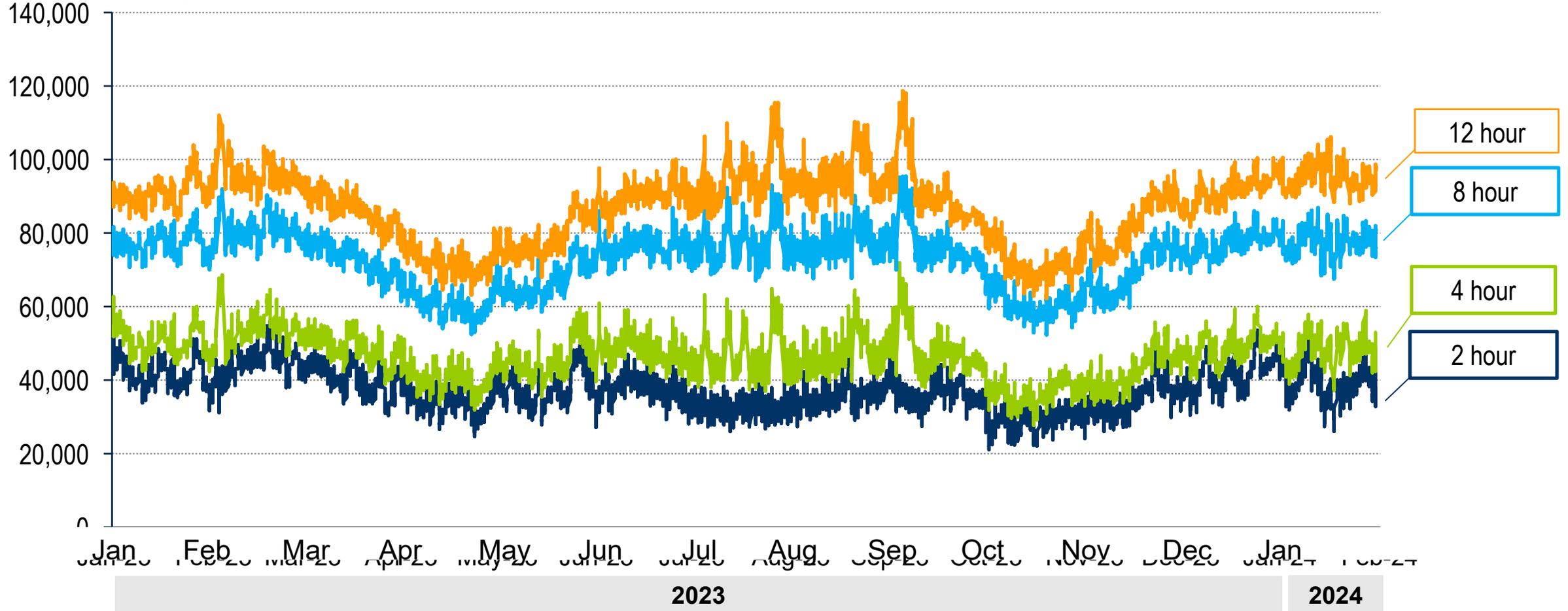


- This metric shows the offline/unscheduled generation that is capable of being scheduled and coming online in a future interval.
- For each hourly interval, it shows the calculated potential generator scheduling reserve available in a 2-hour-forward horizon.
- Measured at the RTO level
- The metric includes the following unit types: Coal, Hydro, Hydro Pumped Storage, Landfill, Natural Gas, Oil, Waste



- This metric shows the amount of currently online generation that can shut down and return in a forward horizon
  - Complement to scheduling reserve
- For each hourly interval, it shows the calculated potential generator cycling reserve available in 2-hour, 4-hour, 8-hour and 12-hour-forward horizons (values are inclusive and not additive, i.e. 2-hour values are included in the 4-hour, 8-hour and 12-hour values).
- Measured at the RTO level
- The metric includes the following unit types: Coal, Hydro, Hydro Pumped Storage, Landfill, Natural Gas, Oil, Waste

Cycling Reserve (MW)



## System Operations Report

Presenter:

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Presenter/SME:

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## Member Hotline

(610) 666 – 8980

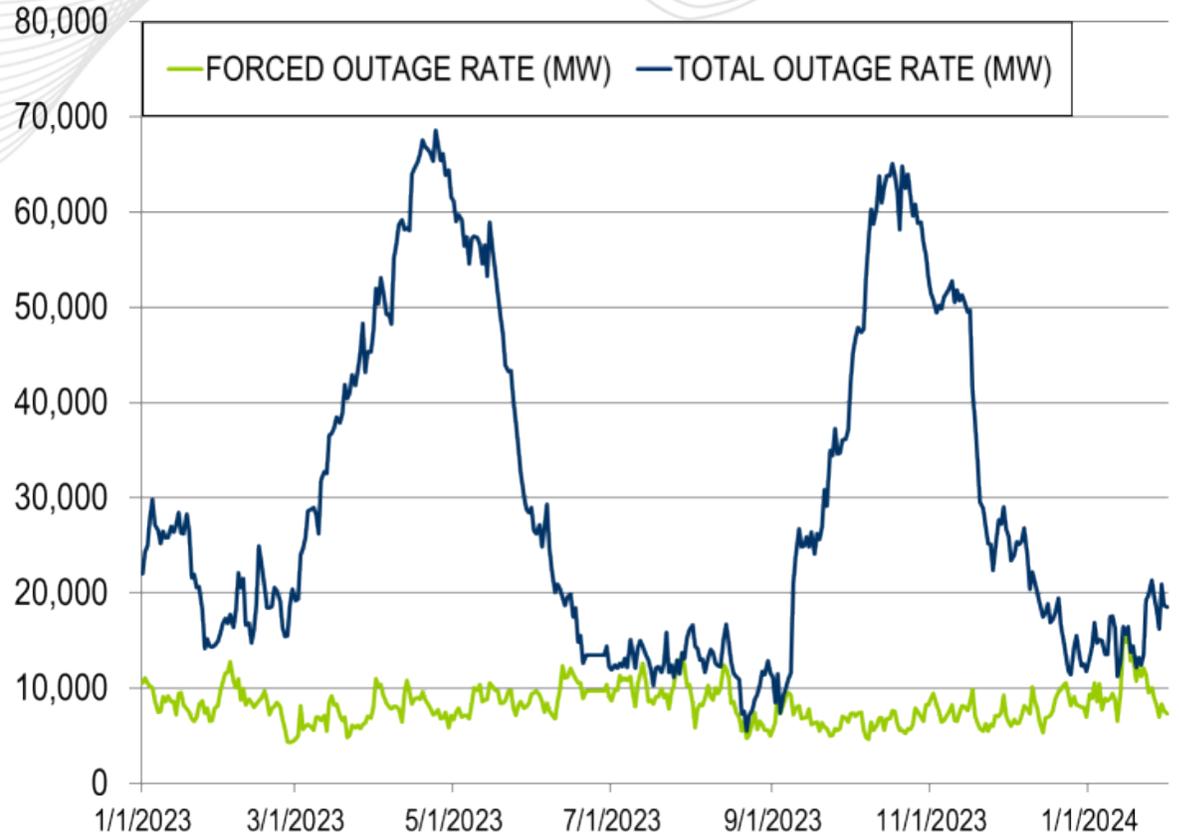
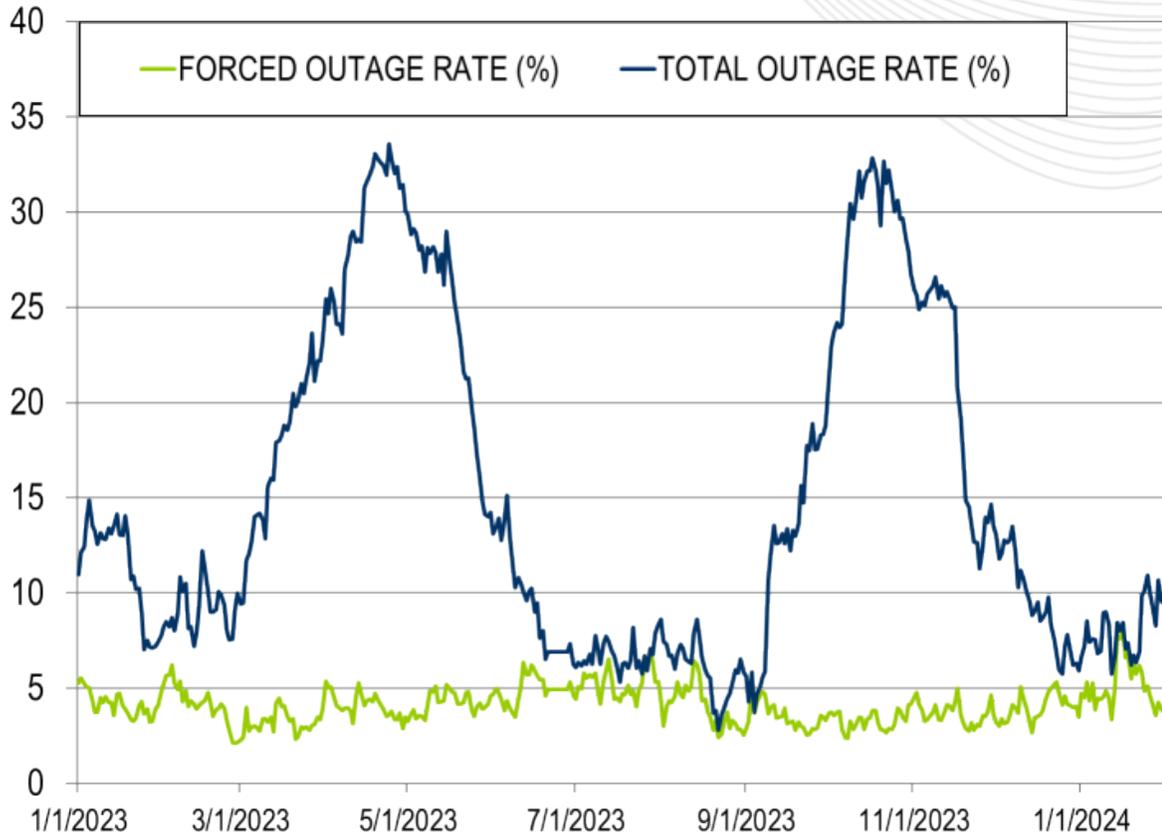
(866) 400 – 8980

[custsvc@pjm.com](mailto:custsvc@pjm.com)

# Appendix

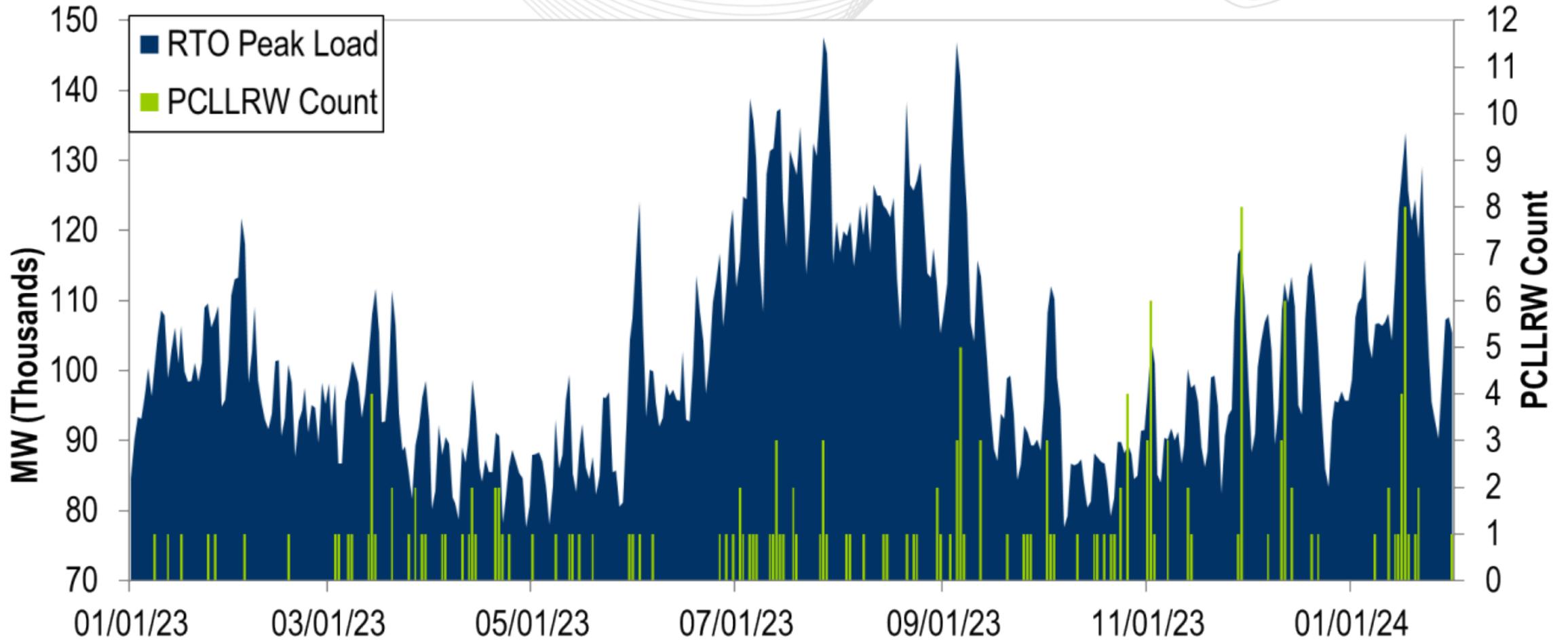
## Goal Measurement: Balancing Authority ACE Limit (BAAL)

- The purpose of the new BAAL standard is to maintain interconnection frequency within a predefined frequency profile under all conditions (normal and abnormal), to prevent frequency-related instability, unplanned tripping of load or generation, or uncontrolled separation or cascading outages that adversely impact the reliability of the interconnection. NERC requires each balancing authority demonstrate real-time monitoring of ACE and interconnection frequency against associated limits and shall balance its resources and demands in real time so that its Reporting ACE does not exceed the BAAL ( $BAAL_{LOW}$  or  $BAAL_{HIGH}$ ) for a continuous time period greater than 30 minutes for each event.
- PJM directly measures the total number of BAAL excursions in minutes compared to the total number of minutes within a month. PJM has set a target value for this performance goal at 99% on a daily and monthly basis. In addition, current NERC rules limit the recovery period to no more than 30 minutes for a single event.



The 13-month average forced outage rate is 4.14% or 8,235 MW.  
 The 13-month average total outage rate is 14.82% or 29,702 MW.

# PCLLRW Count Vs. Peak Load – Daily Values For 13 Months



**PROTECT THE  
POWER GRID  
THINK BEFORE  
YOU CLICK!**



Be alert to  
malicious  
phishing emails.

**Report suspicious email activity to PJM.**  
(610) 666-2244 / [it\\_ops\\_ctr\\_shift@pjm.com](mailto:it_ops_ctr_shift@pjm.com)

