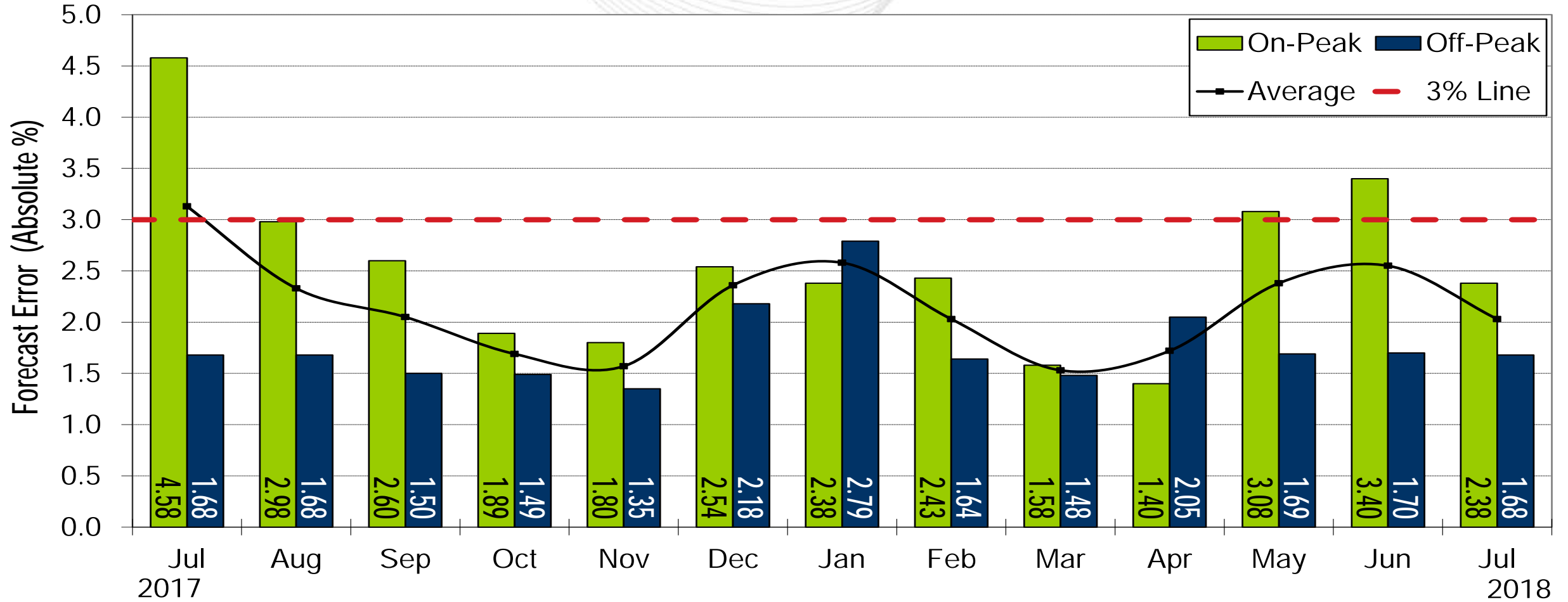




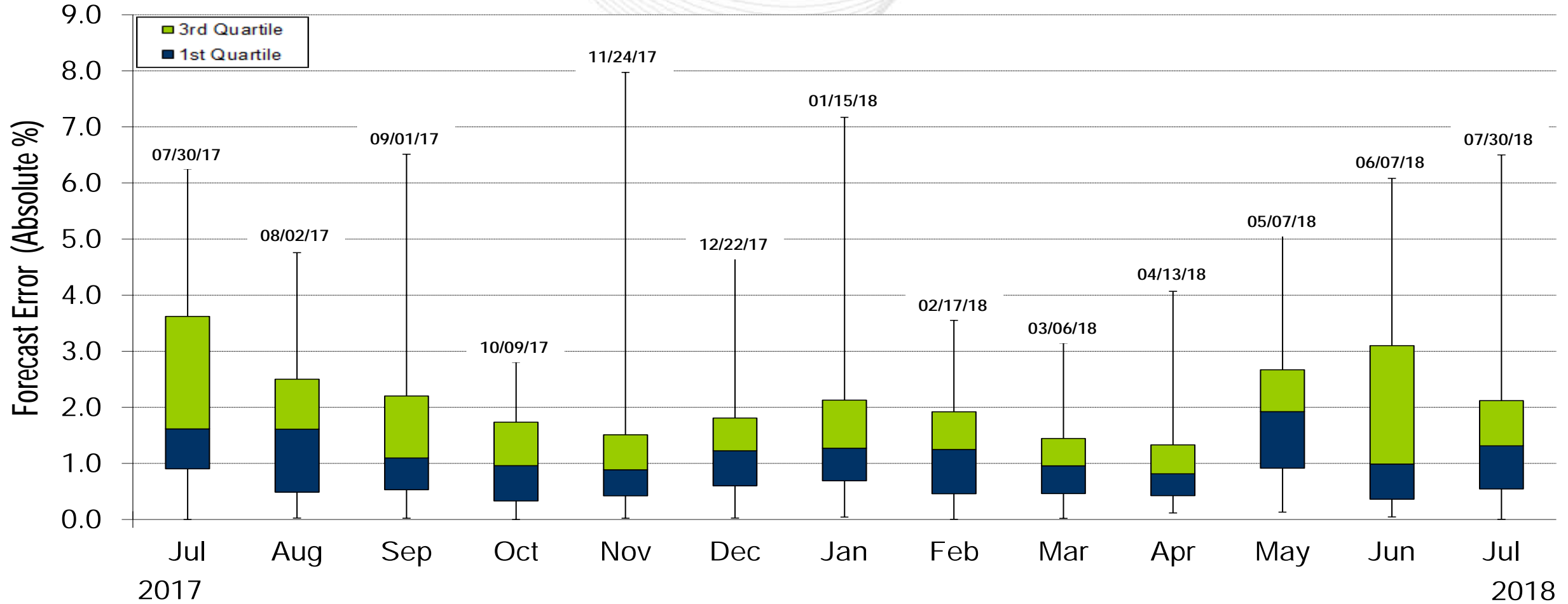
Operations Report

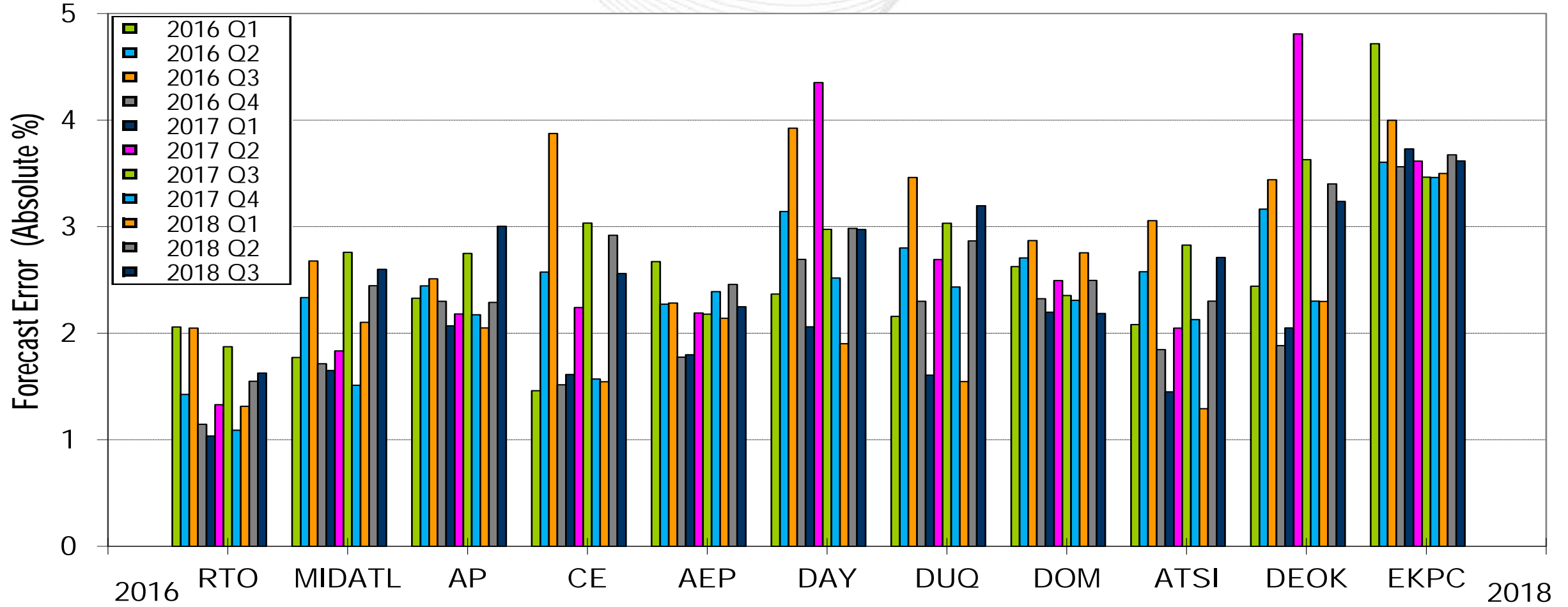
Stephanie Monzon
Manager, Markets Coordination
Operating Committee
August 7, 2018

Load Forecasting Error (Achieved 80% of the Time)



Average RTO load forecast error performance for July was 2.03%, within the goal of 3%.

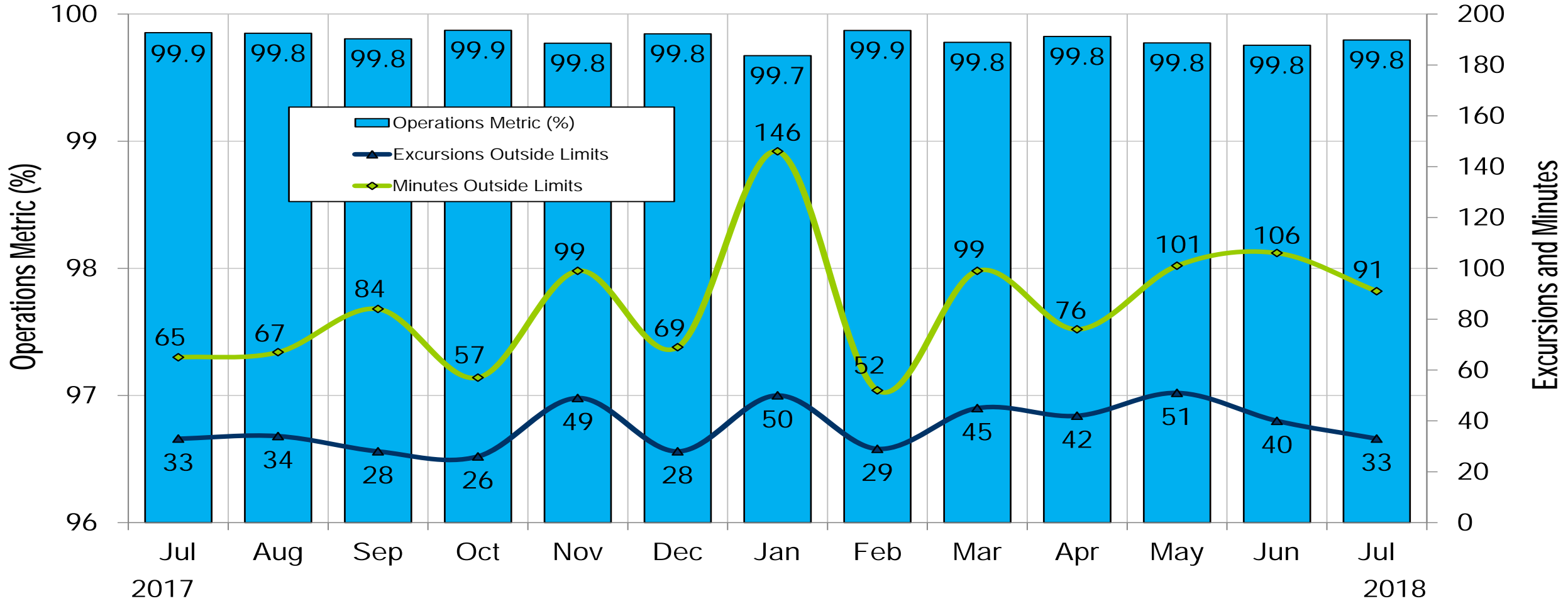






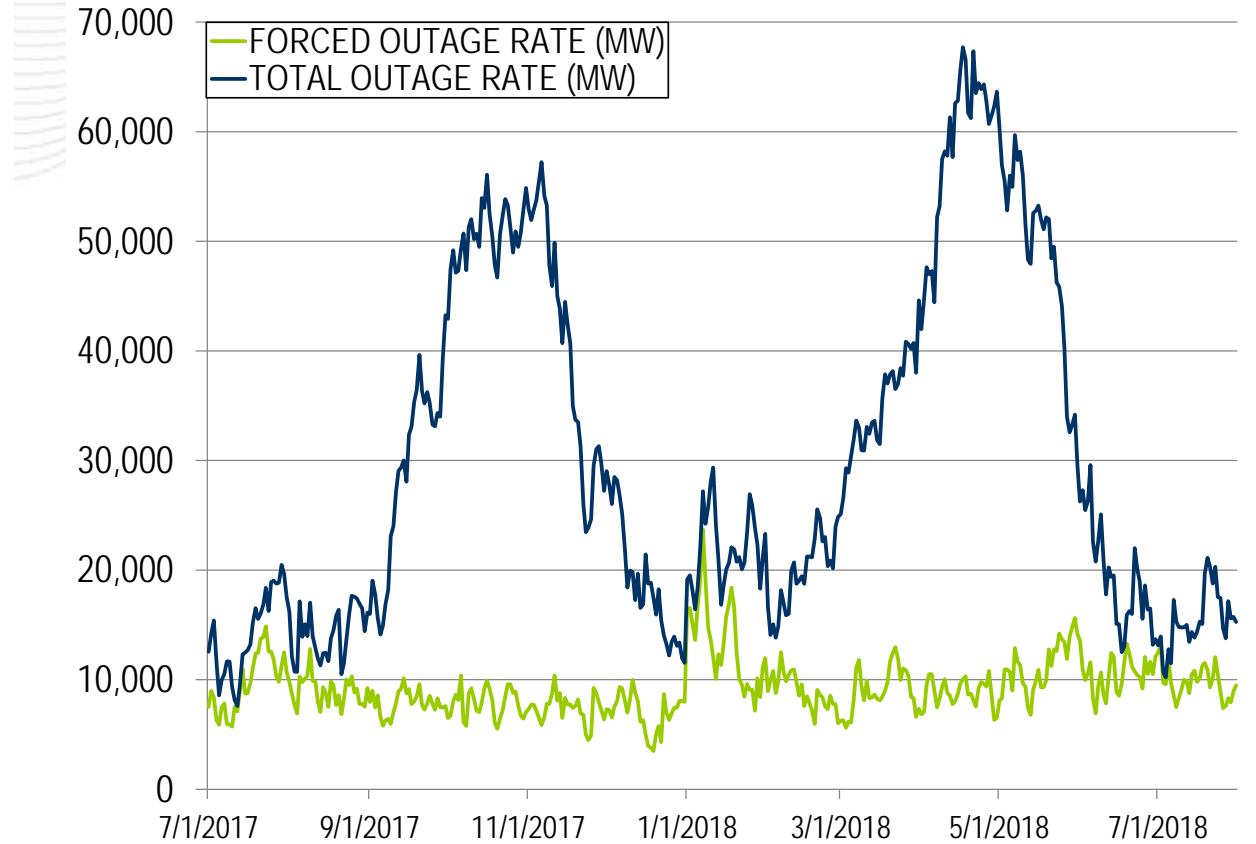
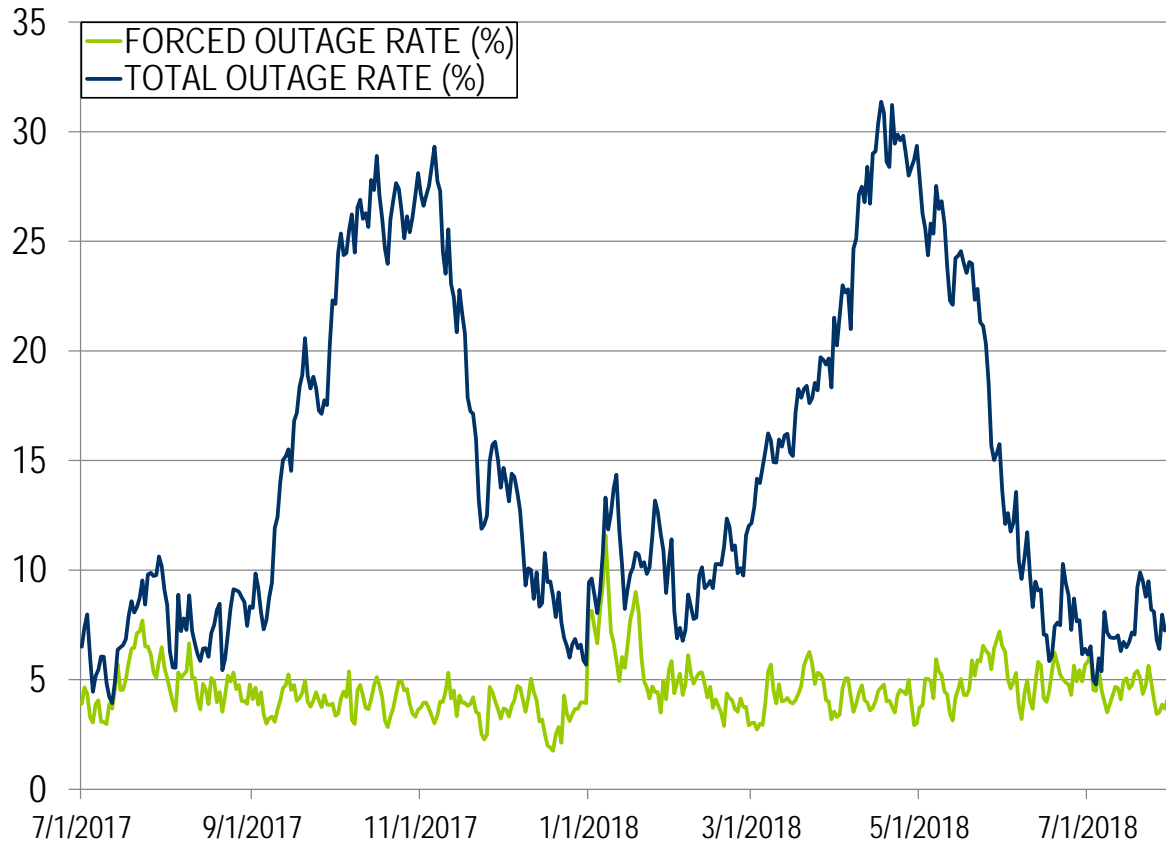
Peak Load Average Forecast Error by Zone

| Quarter | RTO | MIDATL | AP | CE | AEP | DAY | DUQ | DOM | ATSI | DEOK | EKPC |
|---------|------|--------|------|------|------|------|------|------|------|------|------|
| 2016 Q1 | 2.1% | 1.8% | 2.3% | 1.5% | 2.7% | 2.4% | 2.2% | 2.6% | 2.1% | 2.4% | 4.7% |
| 2016 Q2 | 1.4% | 2.3% | 2.4% | 2.6% | 2.3% | 3.1% | 2.8% | 2.7% | 2.6% | 3.2% | 3.6% |
| 2016 Q3 | 2.0% | 2.7% | 2.5% | 3.9% | 2.3% | 3.9% | 3.5% | 2.9% | 3.1% | 3.4% | 4.0% |
| 2016 Q4 | 1.1% | 1.7% | 2.3% | 1.5% | 1.8% | 2.7% | 2.3% | 2.3% | 1.8% | 1.9% | 3.6% |
| 2017 Q1 | 1.0% | 1.6% | 2.1% | 1.6% | 1.8% | 2.1% | 1.6% | 2.2% | 1.4% | 2.0% | 3.7% |
| 2017 Q2 | 1.3% | 1.8% | 2.2% | 2.2% | 2.2% | 4.4% | 2.7% | 2.5% | 2.0% | 4.8% | 3.6% |
| 2017 Q3 | 1.9% | 2.8% | 2.7% | 3.0% | 2.2% | 3.0% | 3.0% | 2.4% | 2.8% | 3.6% | 3.5% |
| 2017 Q4 | 1.1% | 1.5% | 2.2% | 1.6% | 2.4% | 2.5% | 2.4% | 2.3% | 2.1% | 2.3% | 3.5% |
| 2018 Q1 | 1.3% | 2.1% | 2.0% | 1.5% | 2.1% | 1.9% | 1.5% | 2.8% | 1.3% | 2.3% | 3.5% |
| 2018 Q2 | 1.5% | 2.4% | 2.3% | 2.9% | 2.5% | 3.0% | 2.9% | 2.5% | 2.3% | 3.4% | 3.7% |
| 2018 Q3 | 1.6% | 2.6% | 3.0% | 2.6% | 2.2% | 3.0% | 3.2% | 2.2% | 2.7% | 3.2% | 3.6% |

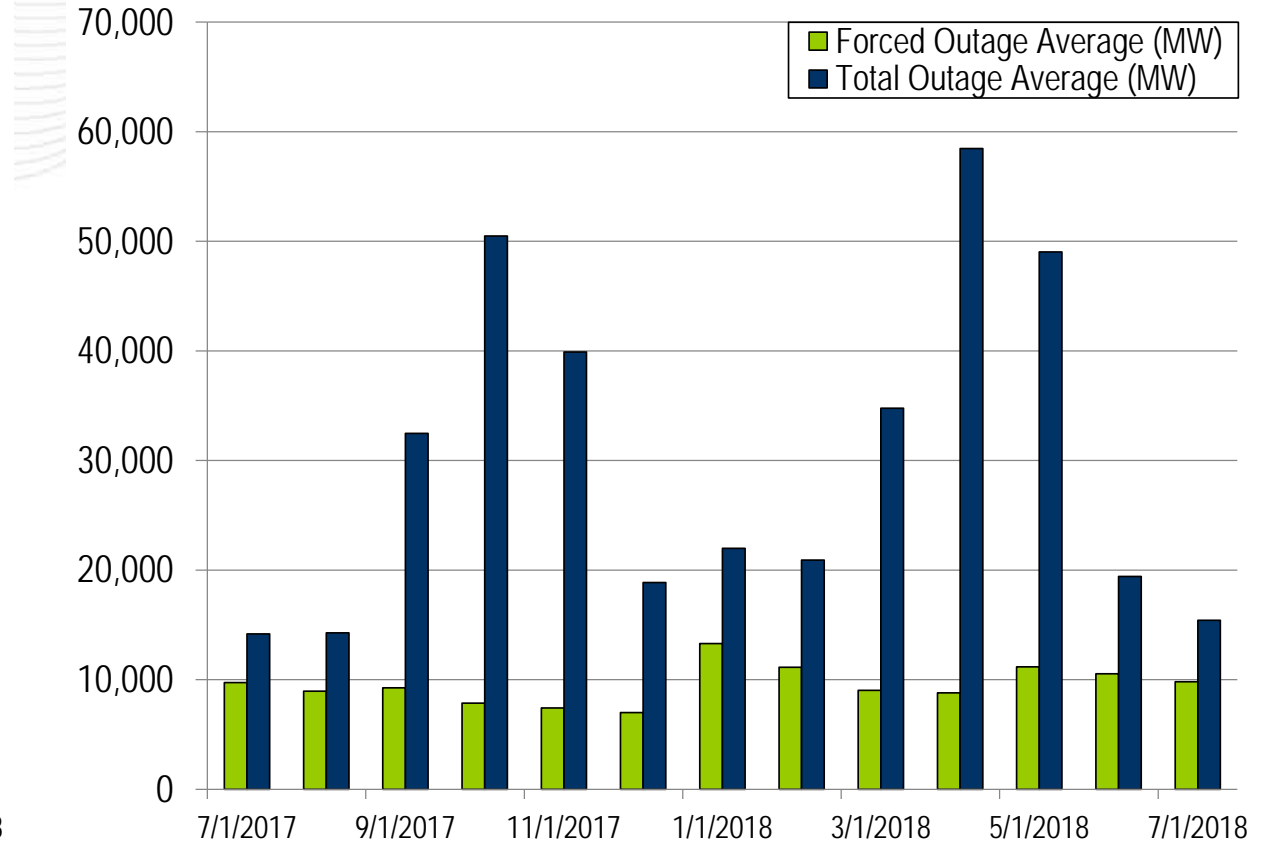
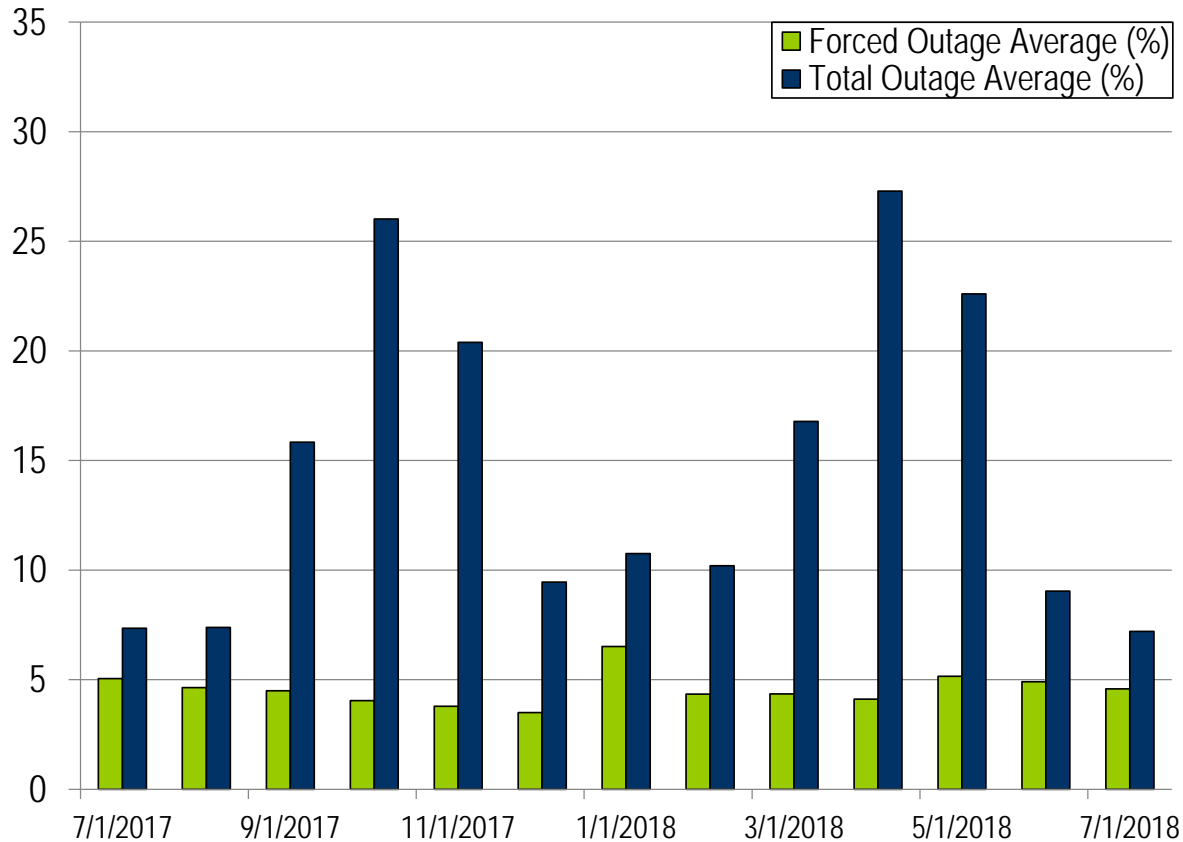


PJM's BAAL performance has exceeded the goal of 99% for each month in 2018.

- Five spinning events in the month of July
- Five reserve sharing events with NPCC
- The following Emergency Procedures occurred in July:
 - 1 Load Shed Directive
 - 30 Post-Contingency Local Load Relief Warnings (PCLLRW)
 - 1 Minimum Generation Alert
 - 7 Hot Weather Alerts

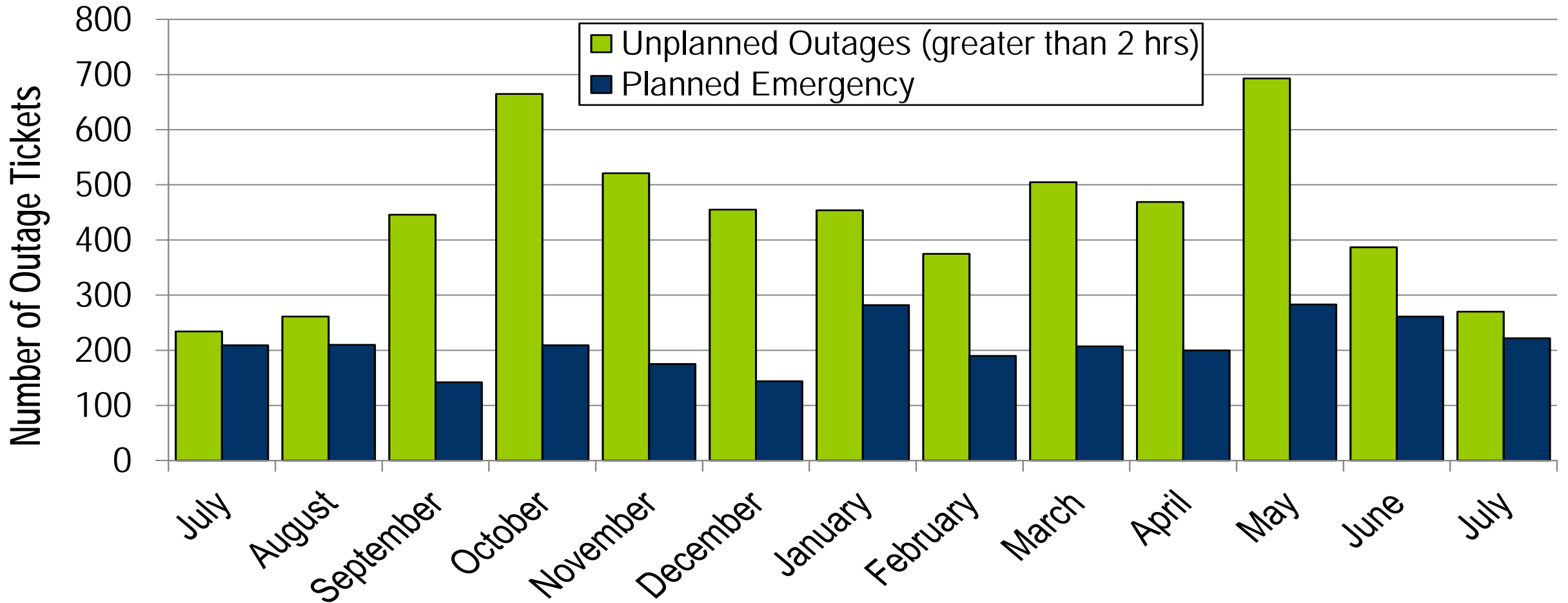


The 13-month average forced outage rate is 4.55% or 9,271 MW.
 The 13-month average total outage rate is 14.50% or 29,602 MW.



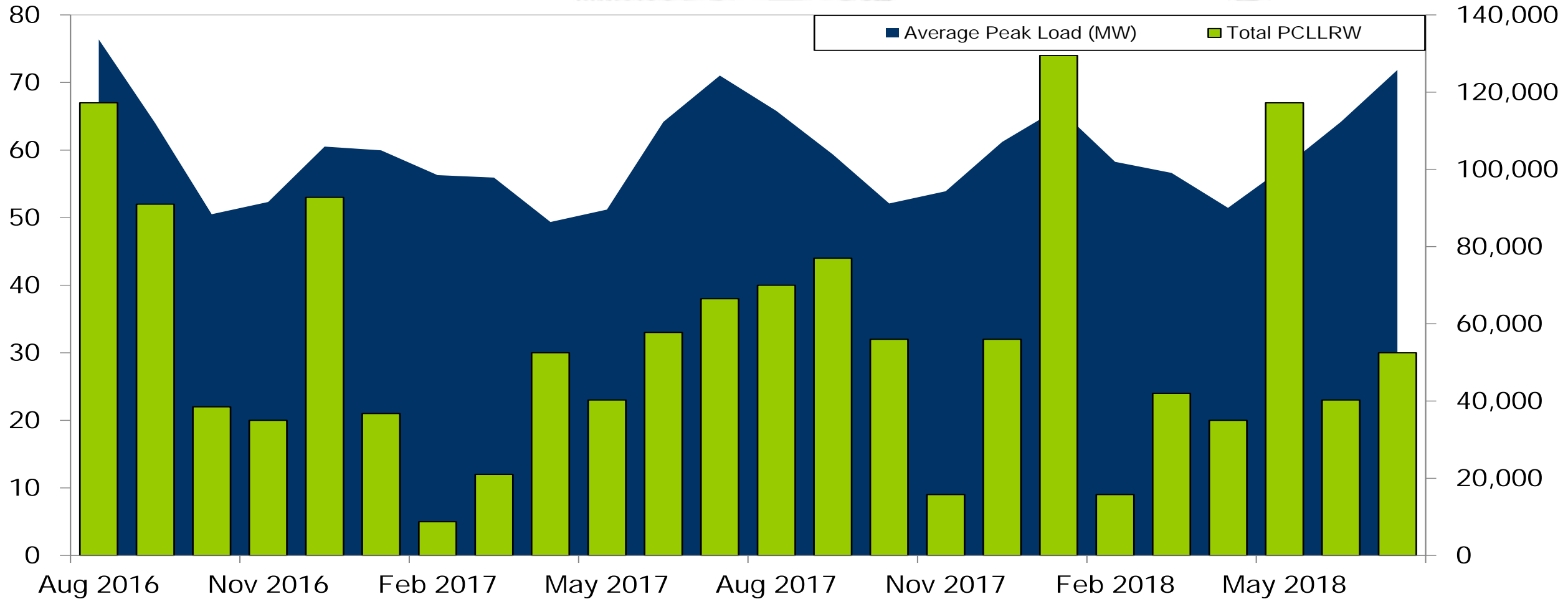
The 13-month average forced outage rate is 4.55% or 9,271 MW.
 The 13-month average total outage rate is 14.50% or 29,602 MW.

2017-2018 Planned Emergency & Unplanned Transmission Outage Summary



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

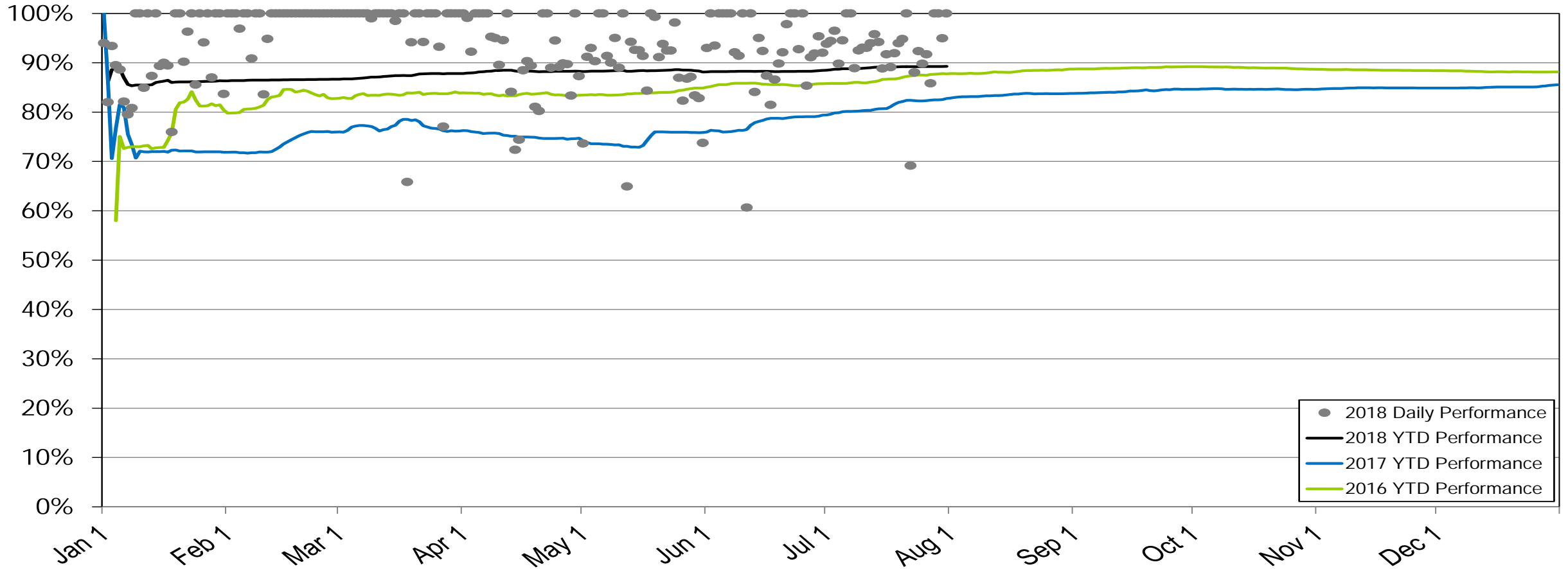
PCLLRW Count Vs. Average Load – 24 Months



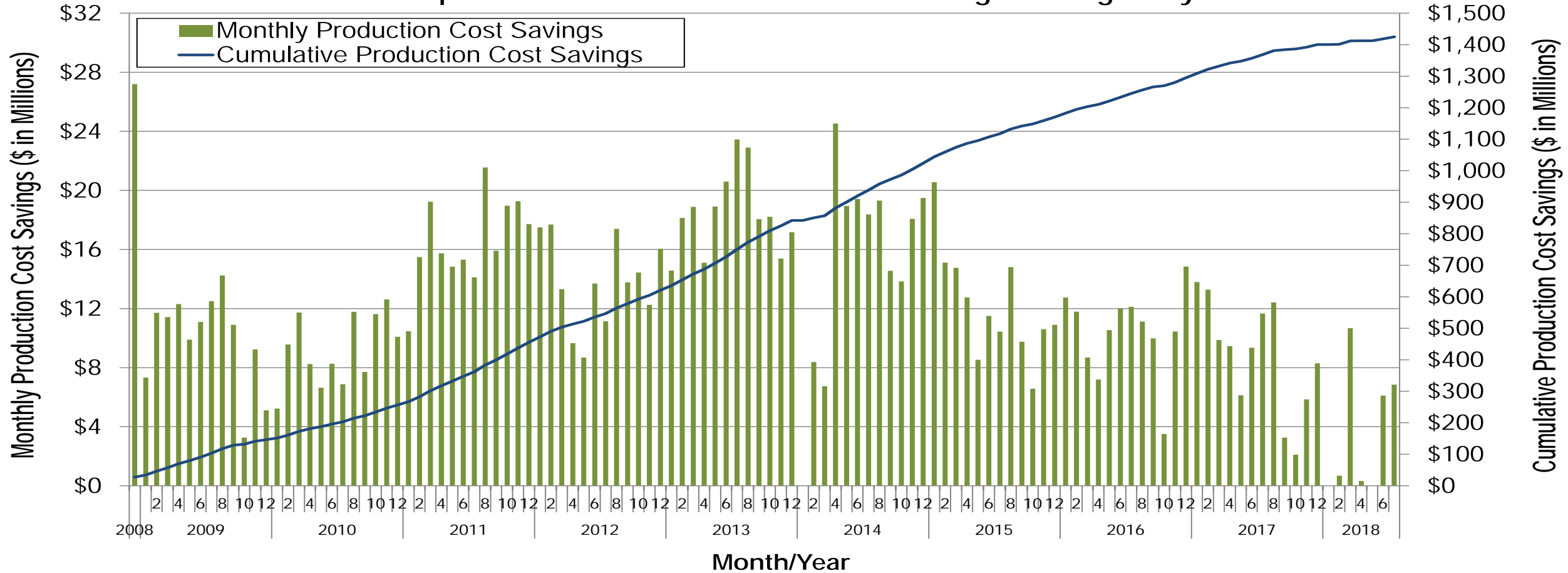
| Event | Date | Start Time | End Time | Duration | Region | Tier 1 Estimate (MW) | Tier 1 Response (MW) |
|-------|----------|------------|----------|----------|--------|----------------------|----------------------|
| 1 | 07/04/18 | 10:56 | 11:03 | 00:06 | RTO | 1202.1 | 580.7 |
| 2 | 07/10/18 | 15:45 | 15:58 | 00:13 | RTO | 784.3 | 524.9 |
| 3 | 07/23/18 | 09:02 | 09:10 | 00:08 | RTO | 1087.9 | 875.5 |
| 4 | 07/23/18 | 15:43 | 15:49 | 00:06 | RTO | 635.6 | 342.6 |
| 5 | 07/24/18 | 16:17 | 16:24 | 00:07 | RTO | 666.4 | 268.9 |

| Event | Date | Start Time | End Time | Duration | Region | Tier 2 Assigned (MW) | Tier 2 Response (MW) | Tier 2 Penalty (MW) |
|-------|----------|------------|----------|----------|--------|----------------------|----------------------|---------------------|
| 1 | 07/04/18 | 10:56 | 11:03 | 00:06 | RTO | 279.2 | 279.2 | 0.0 |
| 2 | 07/10/18 | 15:45 | 15:58 | 00:13 | RTO | 494.6 | 308.8 | 185.8 |
| 3 | 07/23/18 | 09:02 | 09:10 | 00:08 | RTO | 427.6 | 427.6 | 0.0 |
| 4 | 07/23/18 | 15:43 | 15:49 | 00:06 | RTO | 425.6 | 425.6 | 0.0 |
| 5 | 07/24/18 | 16:17 | 16:24 | 00:07 | RTO | 794.6 | 794.6 | 0.0 |

2018 Perfect Dispatch Performance - July 2018



Perfect Dispatch Estimated Production Cost Savings Through July 2018

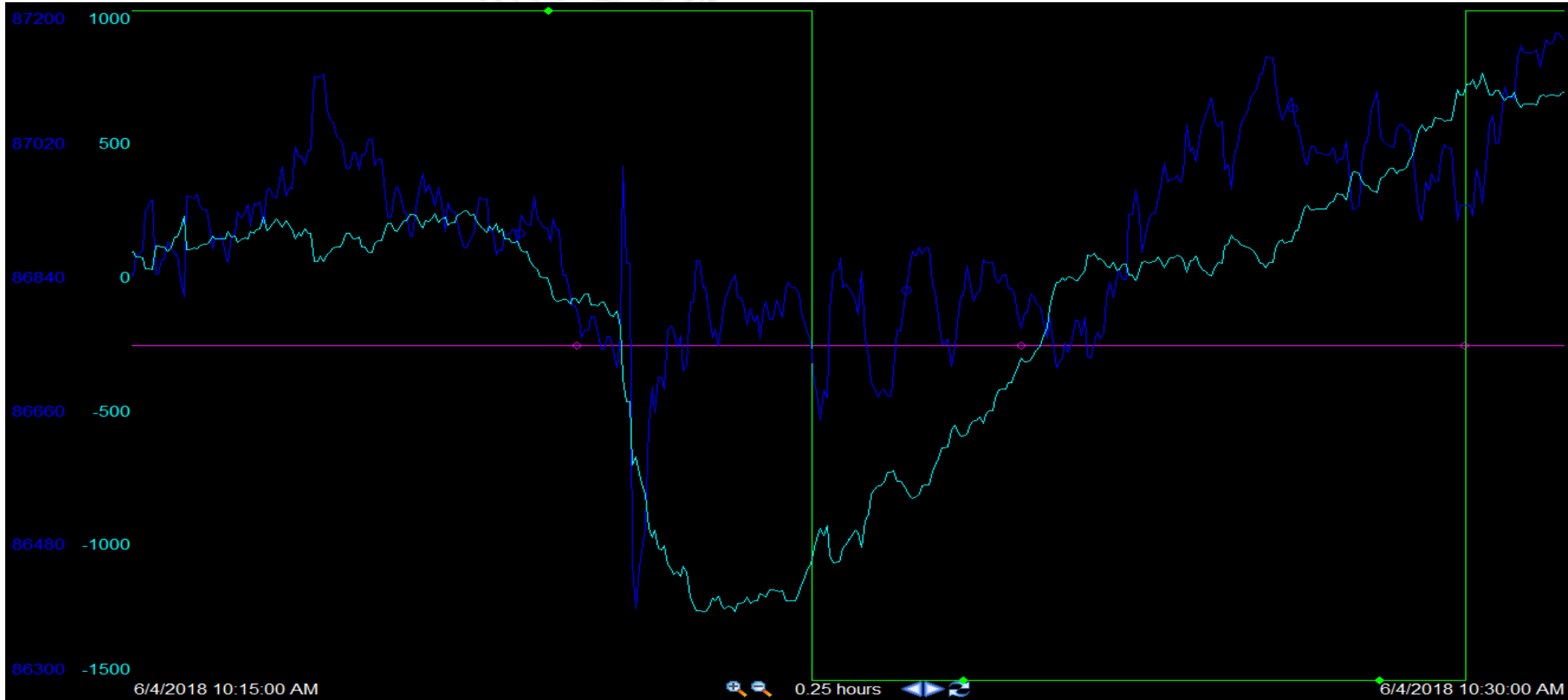


The year-to-date Perfect Dispatch performance score through July 2018 is 89.27%.

The estimated cumulative production cost savings through July 2018 is over \$1.4 billion with over \$24 million in savings in 2018.

| Event | Date | Start Time | End Time | Duration | Region | Tier 1 Estimate (MW) | Tier 1 Response (MW) |
|-------|------------|------------|----------|----------|--------|----------------------|----------------------|
| 1 | 06/04/2018 | 10:22 | 10:28 | 00:06 | RTO | 1584.5 | 533.6 |

- ACE in light blue
- RTO Load in dark blue
- Spin Event called in green
- Zero (for reference with ACE) in purple



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 ACE does not exceed the BAAL (BAALLOW or BAALHIGH) 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.

Perfect Dispatch refers to the hypothetical least production cost commitment and Dispatch, achievable only if all system conditions (load forecast, unit availability / performance, interchange, transmission outages, etc.) were known and controllable in advance. While being hypothetical and not achievable in reality, this is useful as a baseline for performance measurement.

The Perfect Dispatch performance goal is designed to measure how well PJM commits combustion turbines (CTs) in real time operations compared to a calculated optimal CT commitment profile.

The Perfect Dispatch performance measure is calculated as $100\% \times (\text{The accumulative year-to-date optimal CT production cost in Perfect Dispatch} / \text{The accumulative year-to-date actual real-time CT production cost})$.

The Perfect Dispatch performance goal was removed as a goal beginning in 2015. Currently Perfect Dispatch does not have a performance goal, but the metric will continue to be tracked.

The cumulative Estimated Production Cost Savings helps to demonstrate the savings that result from PJM's process changes since the inception of the Perfect Dispatch analysis in 2008. This estimate is determined by comparing the Perfect Dispatch performance for all resources to benchmarks set at the beginning of the Perfect Dispatch analysis. A benchmark of 98.18% is used for comparison of the 2018 metric which is 98.49% through the end of July.