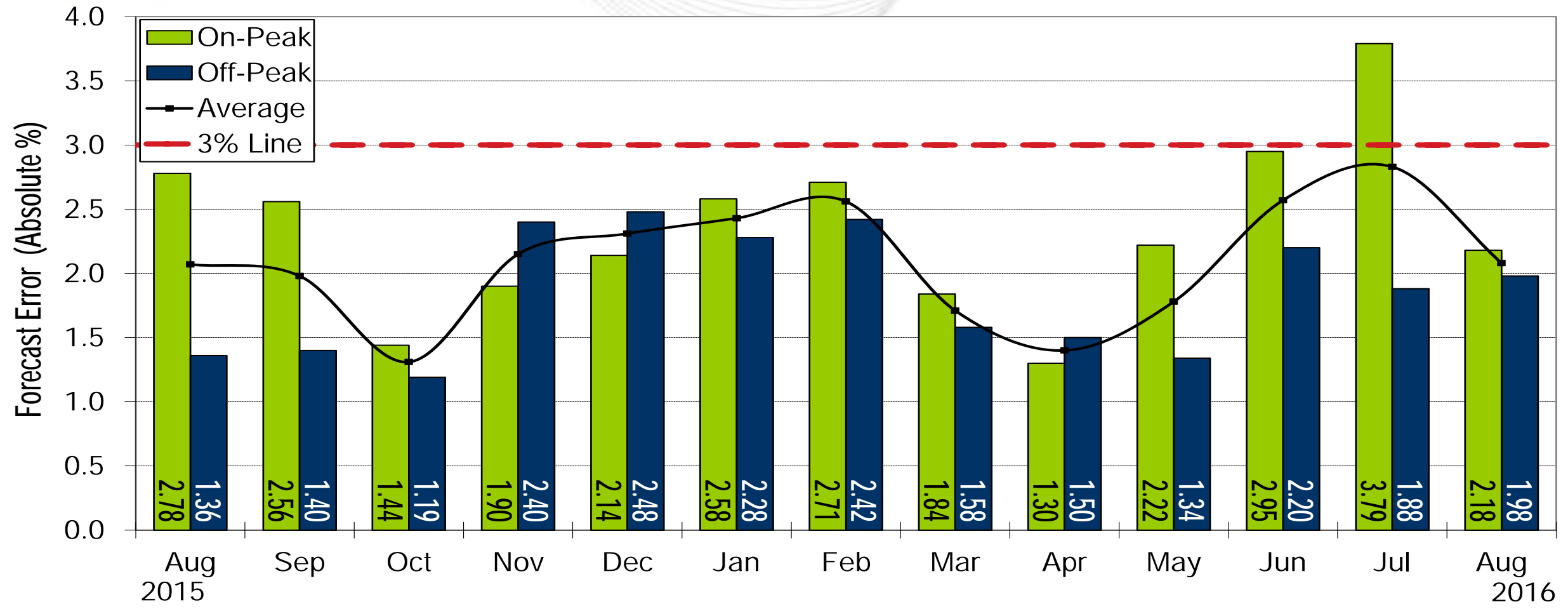




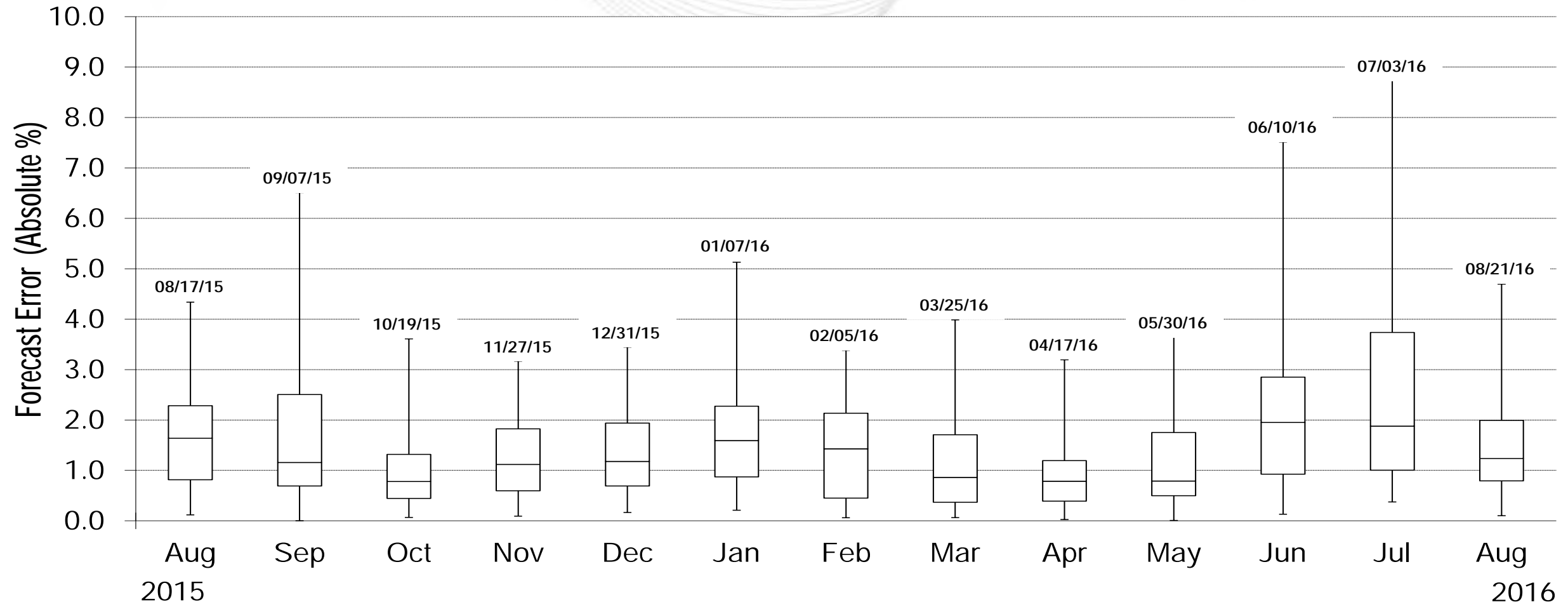
# Operations Report

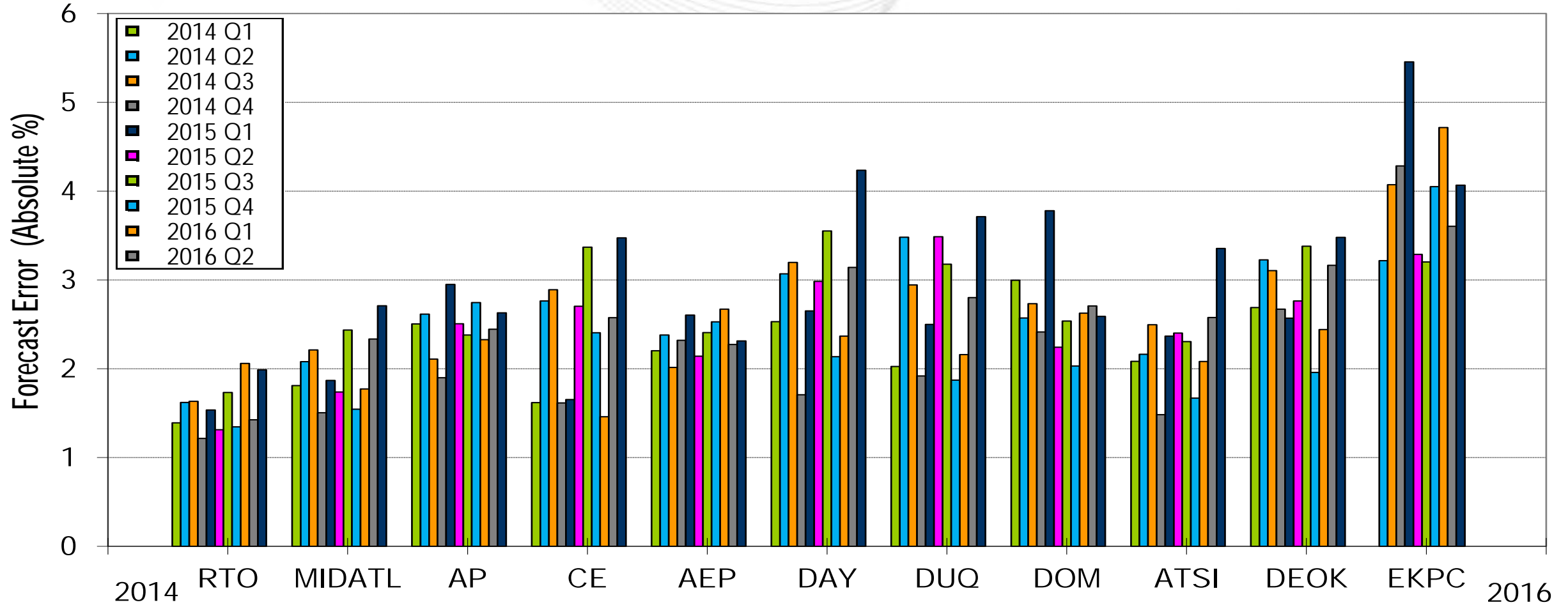
Kenneth Seiler  
Senior Director, System Operations  
Operating Committee  
September 13, 2016

# Load Forecasting Error (Achieved 80% of the Time)



Average RTO load forecast error performance for August was 2.08%, within the goal of 3%.







# Peak Load Average Forecast Error by Zone

Quarter	RTO	MIDATL	AP	CE	AEP	DAY	DUQ	DOM	ATSI	DEOK	EKPC
2014 Q1	1.4%	1.8%	2.5%	1.6%	2.2%	2.5%	2.0%	3.0%	2.1%	2.7%	4.2%
2014 Q2	1.6%	2.1%	2.6%	2.8%	2.4%	3.1%	3.5%	2.6%	2.2%	3.2%	3.2%
2014 Q3	1.6%	2.2%	2.1%	2.9%	2.0%	3.2%	2.9%	2.7%	2.5%	3.1%	4.1%
2014 Q4	1.2%	1.5%	1.9%	1.6%	2.3%	1.7%	1.9%	2.4%	1.5%	2.7%	4.3%
2015 Q1	1.5%	1.9%	2.9%	1.7%	2.6%	2.7%	2.5%	3.8%	2.4%	2.6%	5.5%
2015 Q2	1.3%	1.7%	2.5%	2.7%	2.1%	3.0%	3.5%	2.2%	2.4%	2.8%	3.3%
2015 Q3	1.7%	2.4%	2.4%	3.4%	2.4%	3.6%	3.2%	2.5%	2.3%	3.4%	3.2%
2015 Q4	1.3%	1.5%	2.7%	2.4%	2.5%	2.1%	1.9%	2.0%	1.7%	2.0%	4.0%
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%	2.6%	3.5%	2.3%	4.2%	3.7%	2.6%	3.4%	3.5%	4.1%

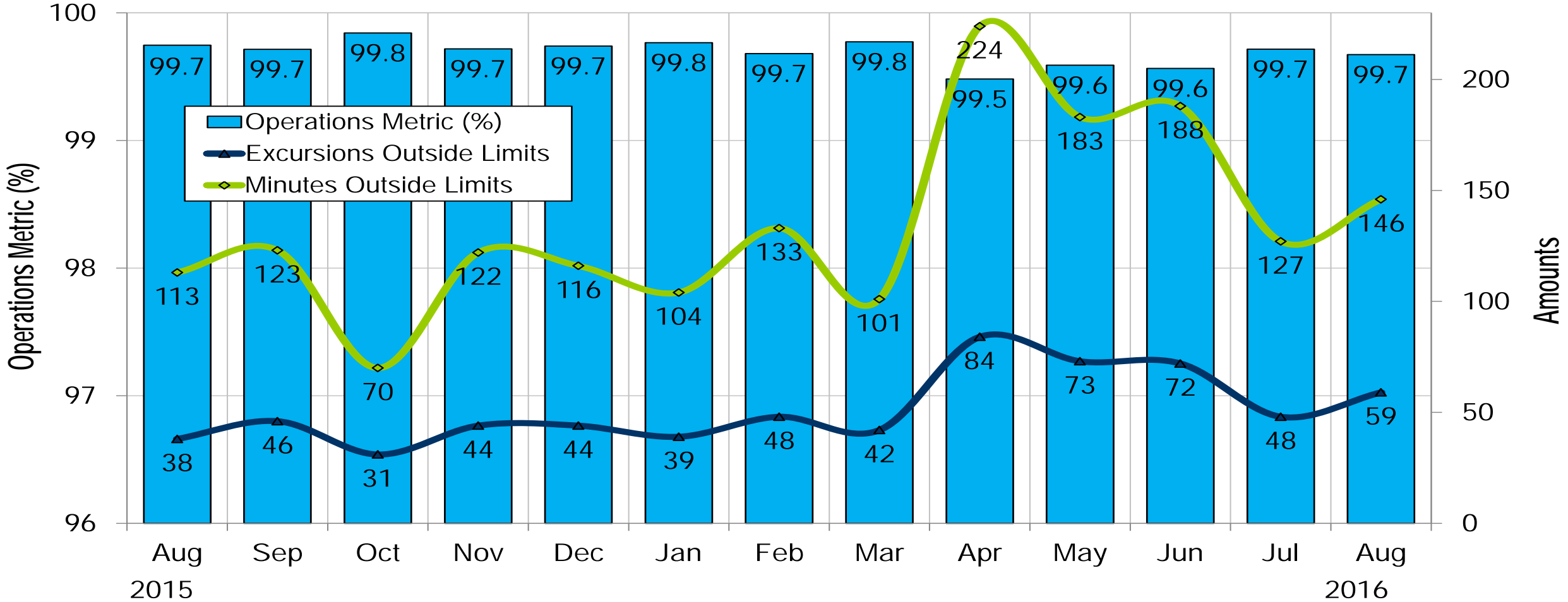


# Transmission Zonal Load Percentage of RTO

Quarter	RTO	MIDATL	AP	CE	AEP	DAY	DUQ	DOM	ATSI	DEOK	EKPC
2014 Q1	100.0%	34.7%	6.5%	11.9%	16.8%	2.2%	1.7%	12.6%	8.4%	3.3%	1.9%
2014 Q2	100.0%	34.5%	6.0%	12.8%	16.3%	2.2%	1.9%	12.5%	8.7%	3.5%	1.6%
2014 Q3	100.0%	35.9%	5.8%	12.6%	15.5%	2.2%	1.8%	12.8%	8.3%	3.5%	1.6%
2014 Q4	100.0%	34.9%	6.3%	12.4%	16.5%	2.2%	1.8%	12.2%	8.6%	3.4%	1.7%
2015 Q1	100.0%	35.1%	6.7%	11.5%	16.5%	2.2%	1.7%	12.9%	8.3%	3.3%	1.8%
2015 Q2	100.0%	35.3%	6.2%	12.1%	16.0%	2.2%	1.8%	12.8%	8.5%	3.5%	1.6%
2015 Q3	100.0%	36.3%	5.8%	12.6%	15.3%	2.2%	1.9%	12.7%	8.2%	3.5%	1.5%
2015 Q4	100.0%	35.0%	6.3%	12.7%	16.4%	2.2%	1.8%	12.0%	8.6%	3.4%	1.6%
2016 Q1	100.0%	34.5%	6.6%	12.2%	17.1%	2.2%	1.7%	12.7%	7.8%	3.3%	1.9%
2016 Q2	100.0%	34.7%	6.1%	12.9%	16.6%	2.3%	1.8%	12.3%	8.1%	3.5%	1.7%
2016 Q3	100.0%	36.3%	5.7%	12.9%	15.1%	2.2%	1.8%	12.8%	8.3%	3.4%	1.5%



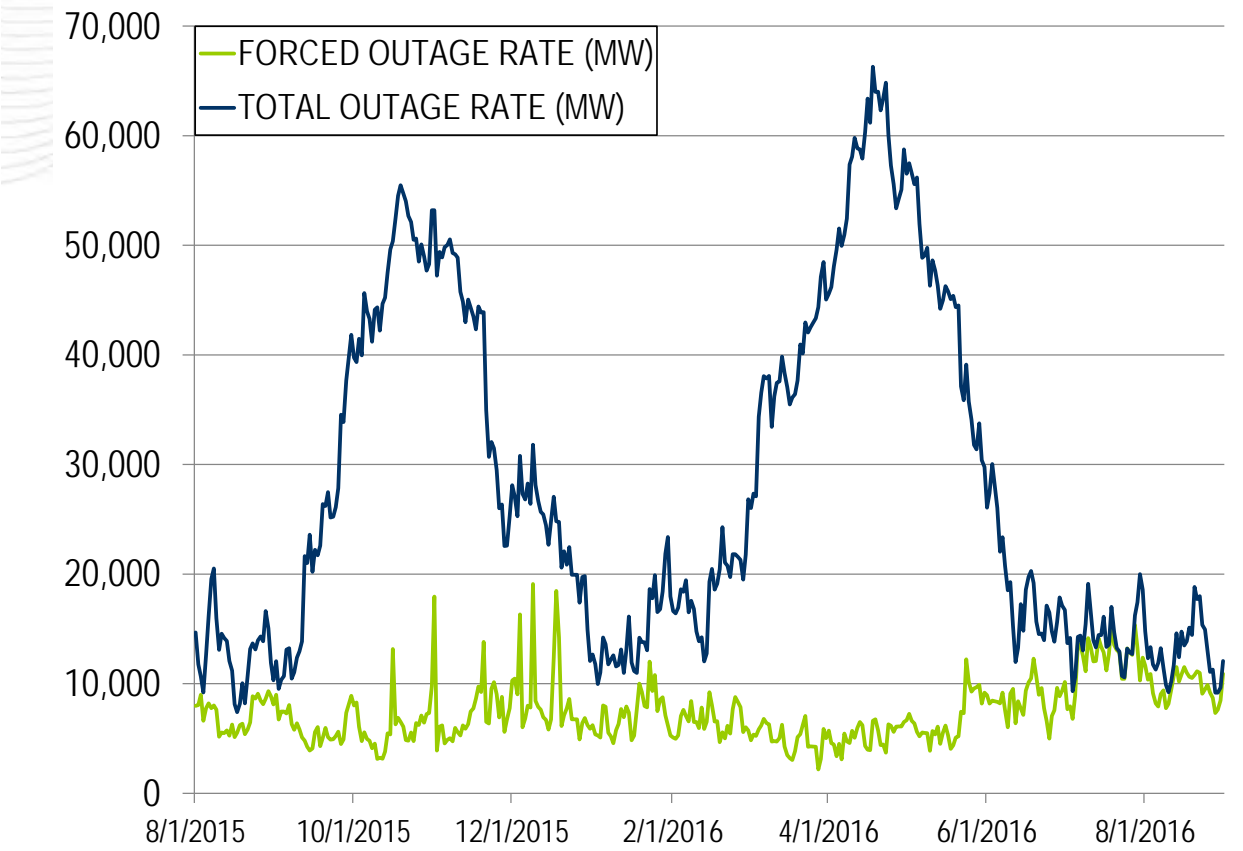
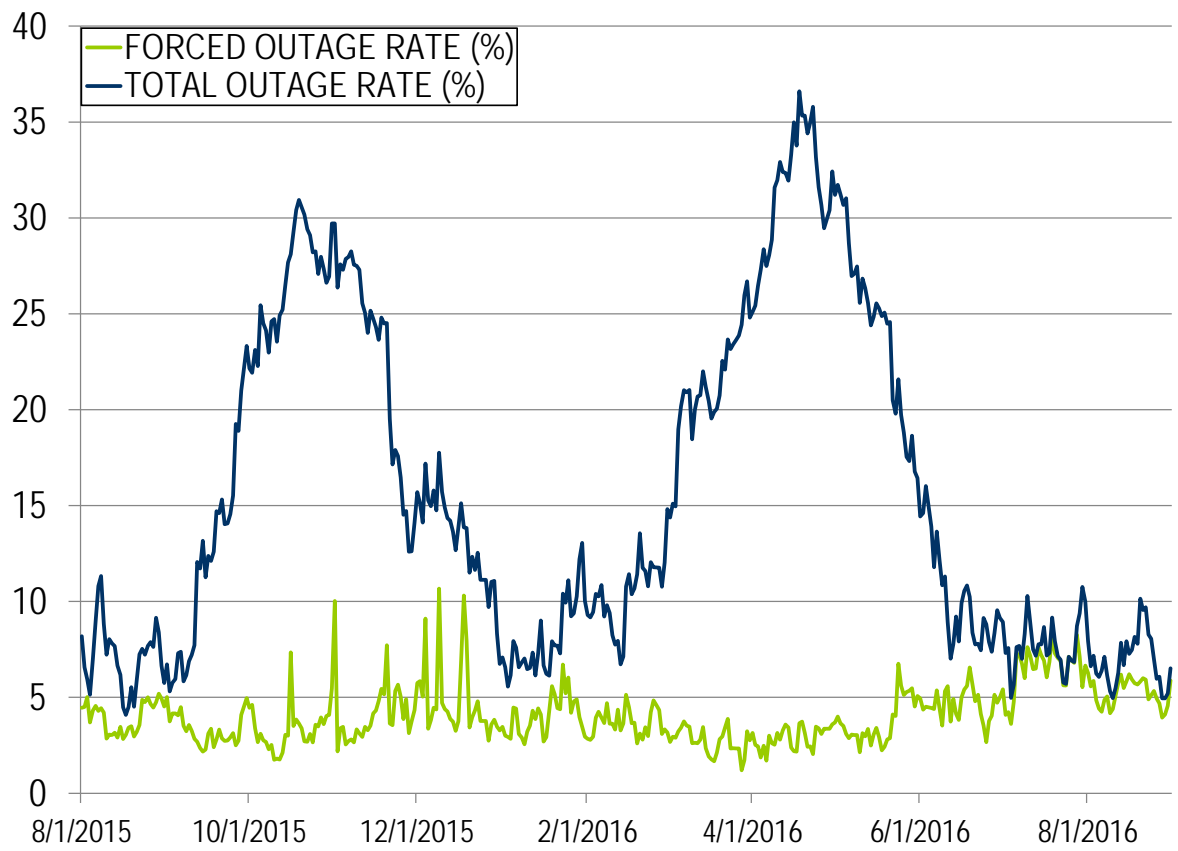
# Monthly BAAL Performance Score



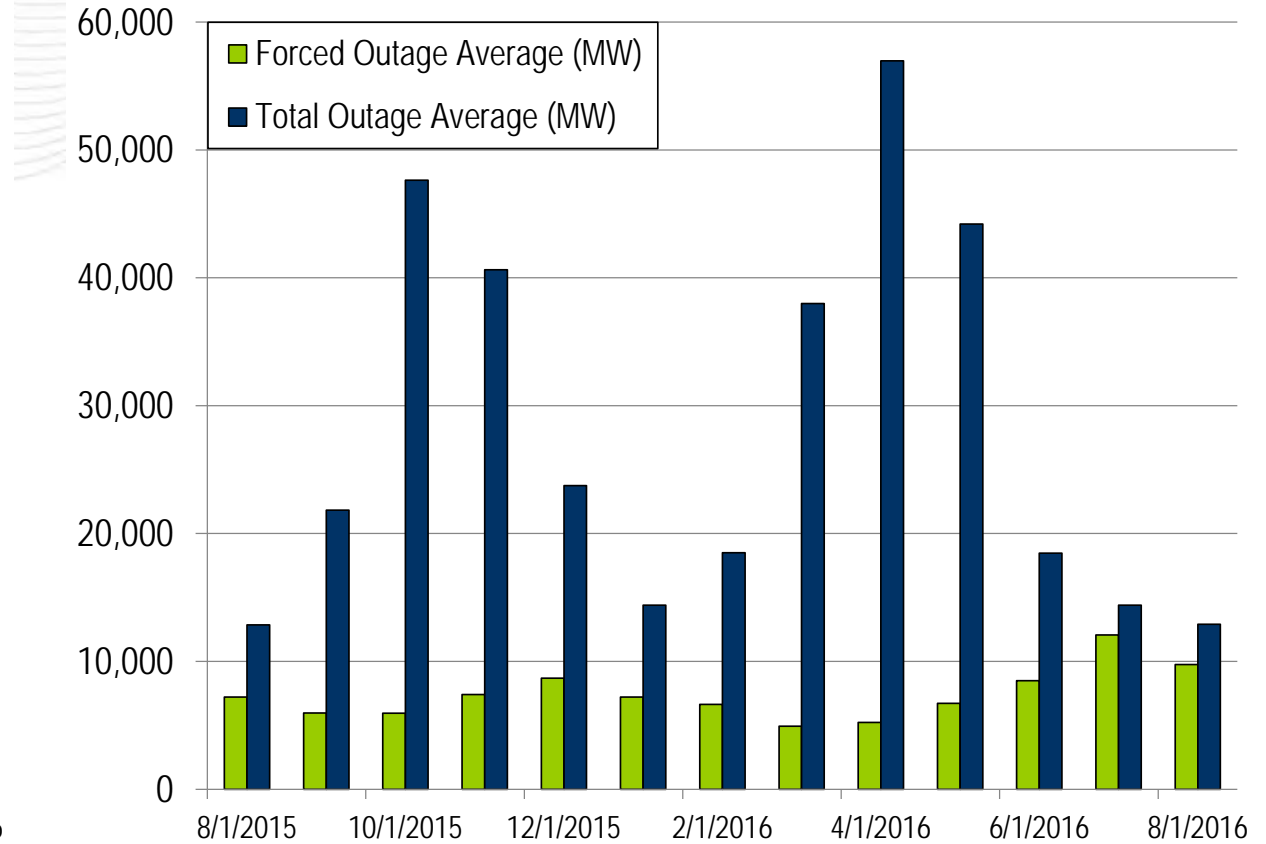
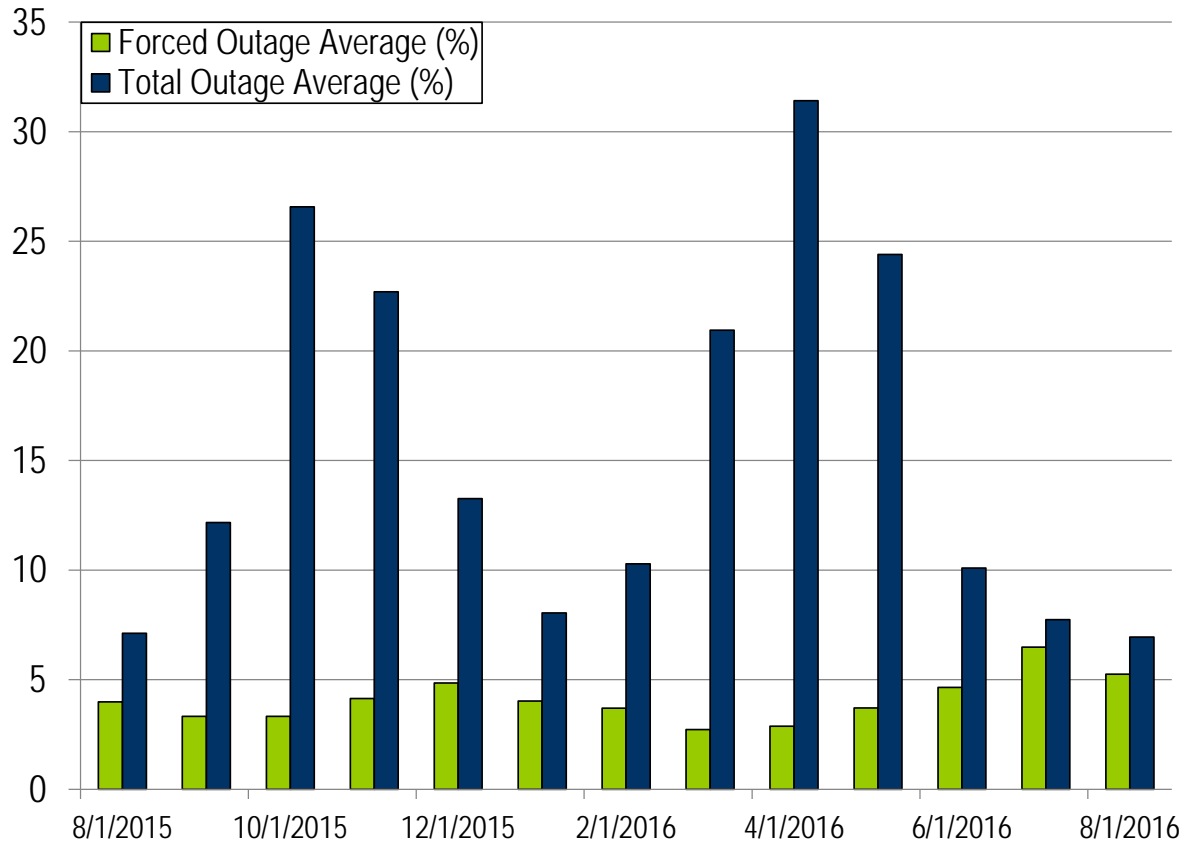
PJM's BAAL performance has exceeded the goal of 99% for each month in 2016.



- One spinning event in the month of August
- Five reserve sharing events with NPCC
- The following Emergency Procedures occurred in August:
  - 67 Post-Contingency Local Load Relief Warnings (PCLLRW)
  - 1 Minimum Generation Alert
  - 8 Hot Weather Alerts

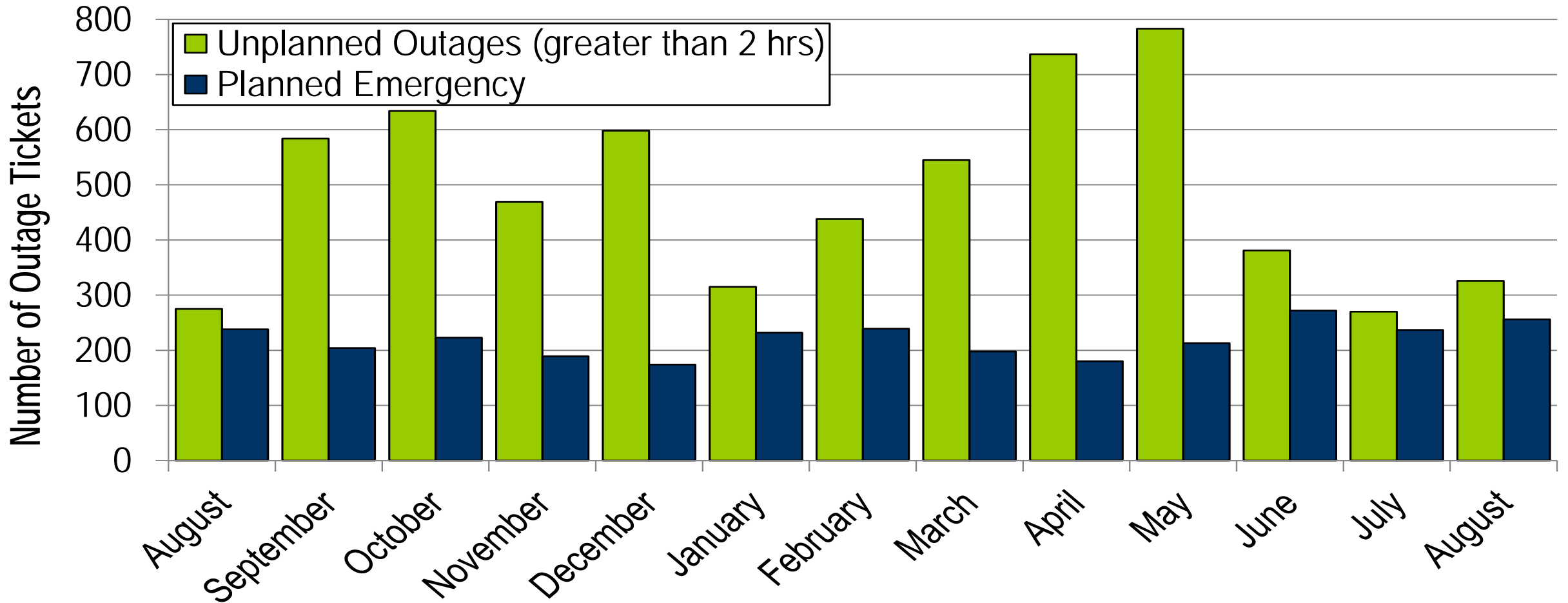


The average forced outage rate YTD is 4.18% or 7,640 MW.  
 The average total outage rate YTD is 15.00% or 27,251 MW.



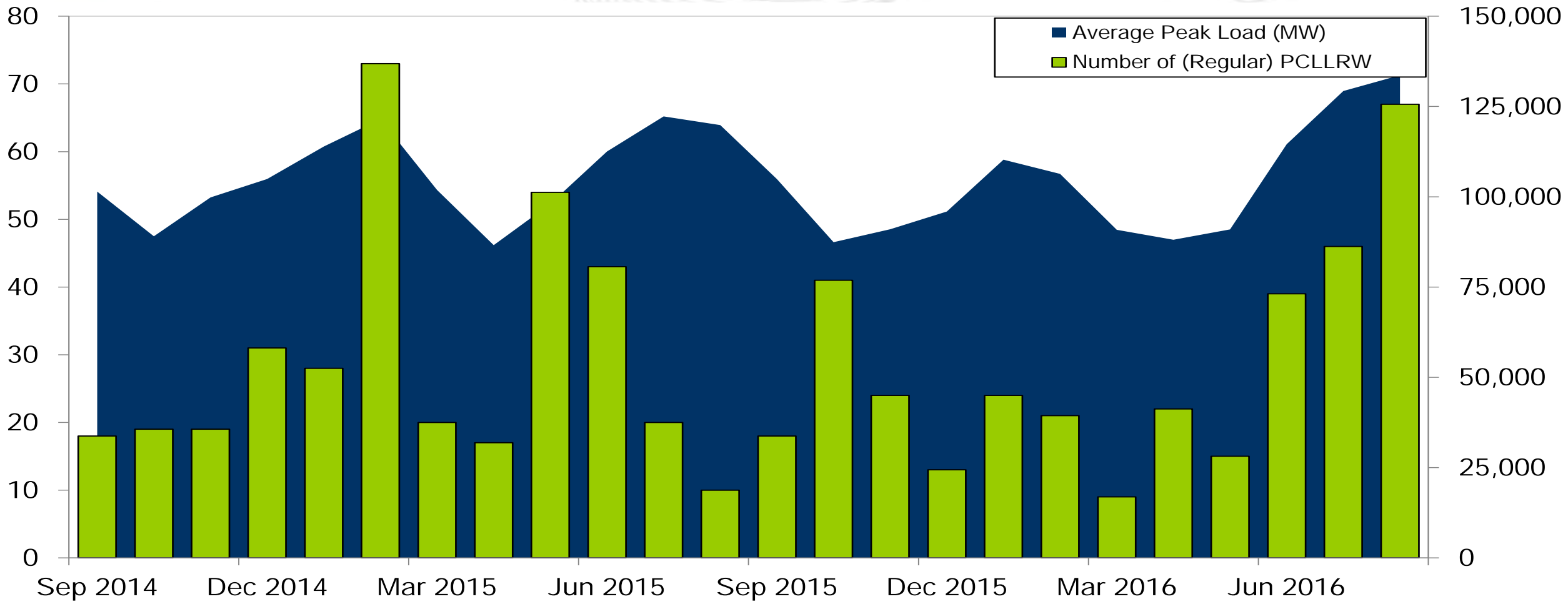
The average forced outage rate YTD is 4.18% or 7,640 MW.  
 The average total outage rate YTD is 15.00% or 27,251 MW.

# 2016 Planned Emergency & Unplanned Transmission Outage Summary



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

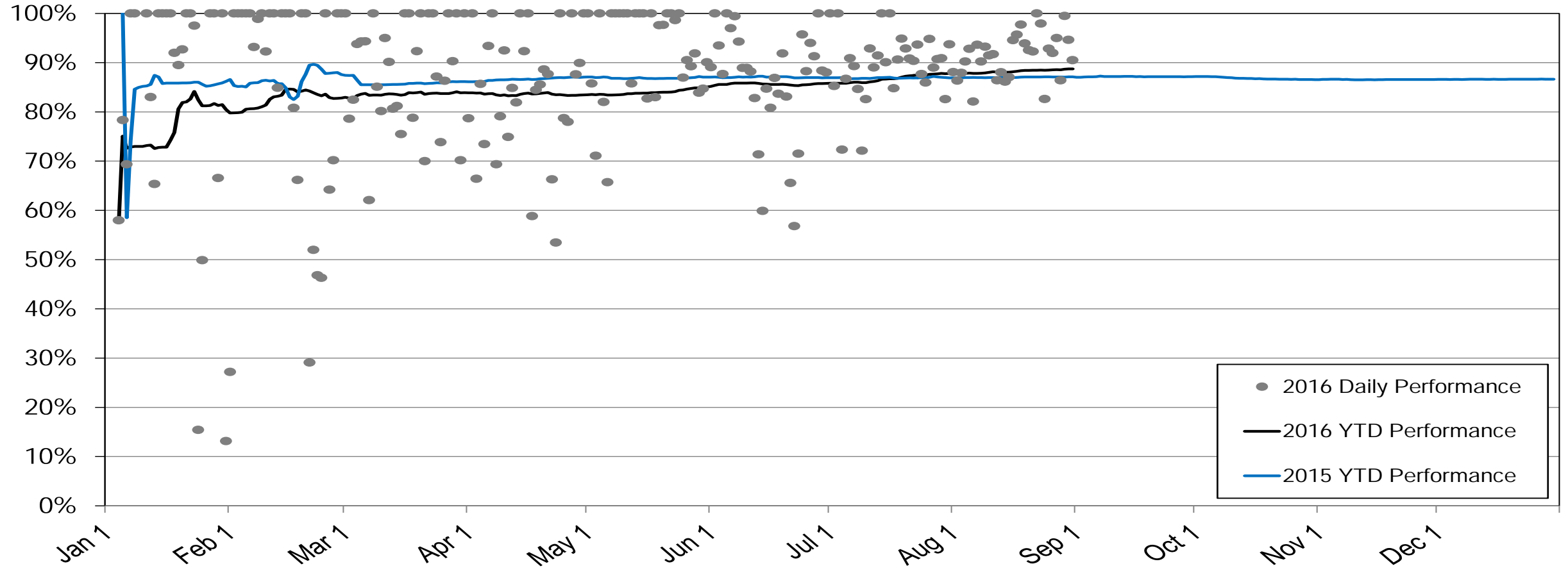
# PCLLRW Count Vs. Average Load – 24 Months

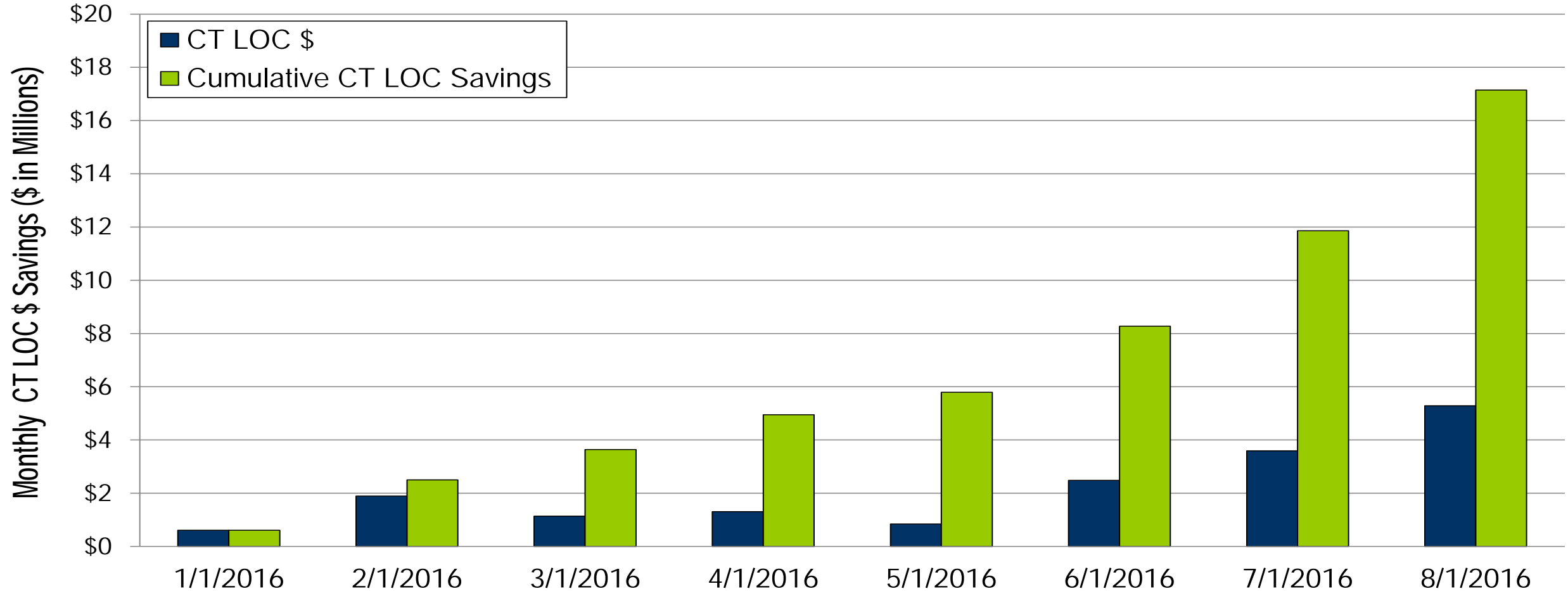


Event	Date	Start Time	End Time	Duration	Region	Tier 1 Estimate (MW)	Tier 1 Response (MW)
1	08/31/2016	15:14	15:22	00:08	RTO	1096.8	837.9

Event	Date	Start Time	End Time	Duration	Region	Tier 2 Assigned (MW)	Tier 2 Response (MW)	Tier 2 Penalty (MW)
1	08/31/2016	15:14	15:22	00:08	RTO	556.1	556.1	0.0

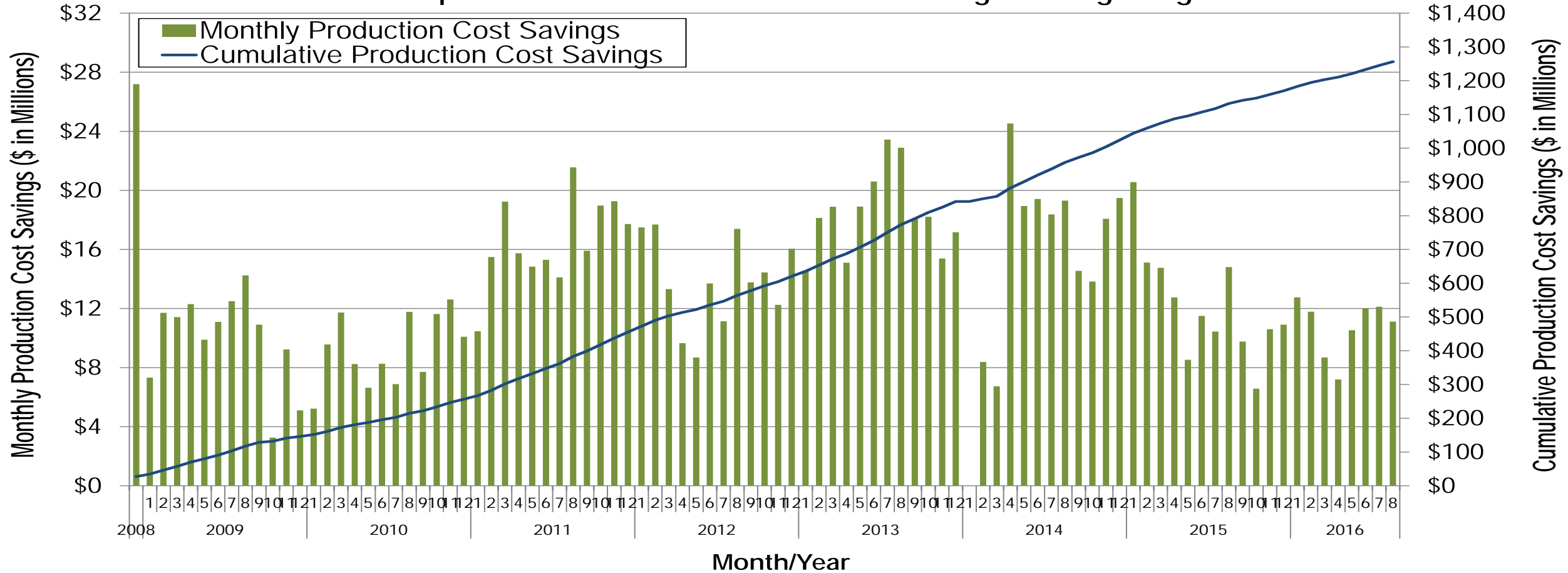
## 2016 Perfect Dispatch Performance - August 2016







## Perfect Dispatch Estimated Production Cost Savings Through August 2016



The year-to-date Perfect Dispatch performance score through August 2016 is 88.74%.

The estimated cumulative production cost savings through August 2016 is over \$1.2 billion with over \$86 million in savings thus far in 2016.

# 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 – Performance Measure

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 2016 metric which is 99.18% through the end of August.