

Responses to questions received at June FSSTF meeting

NOTE: The content below cites slides from a presentation made at the June FSSTF available at <https://www.pjm.com/-/media/committees-groups/task-forces/fsstf/20190626/20190626-item-03-item-05-education.ashx>

Item: Definition of seasons and peak-load weeks in approach to develop the Empirical RTO-wide Forced Outage Rates (Slide 7)

Response: The seasons were defined as follows:

Winter: Dec – Feb

Spring: Mar – May

Summer: Jun – Aug

Fall: Sep – Nov

The peak load weeks of each season for each delivery year in the period (2007 – 2017) were determined using the logic in the following example.

Let's assume that:

In 2007, the winter peak occurred during the second week of January. Therefore we collect the RTO-wide forced outages information during the peak load hours of Mon-Fri of that week. We have 5 observations so far for Winter Week 1

In 2008, the winter peak occurred during the first week of February. Therefore we collect the RTO-wide forced outages information during the peak load hours of Mon-Fri of that week. We add these 5 observations to set of observations from 2007; now we have 10 observations so far for Winter Week 1

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In 2017, the winter peak occurred during the third week of February. Therefore we collect the RTO-wide forced outages information during the peak load hours of Mon-Fri of that week. We add these 5 observations to the set of observations from 2007 through 2016; now we have 55 observations so for Winter Week 1.

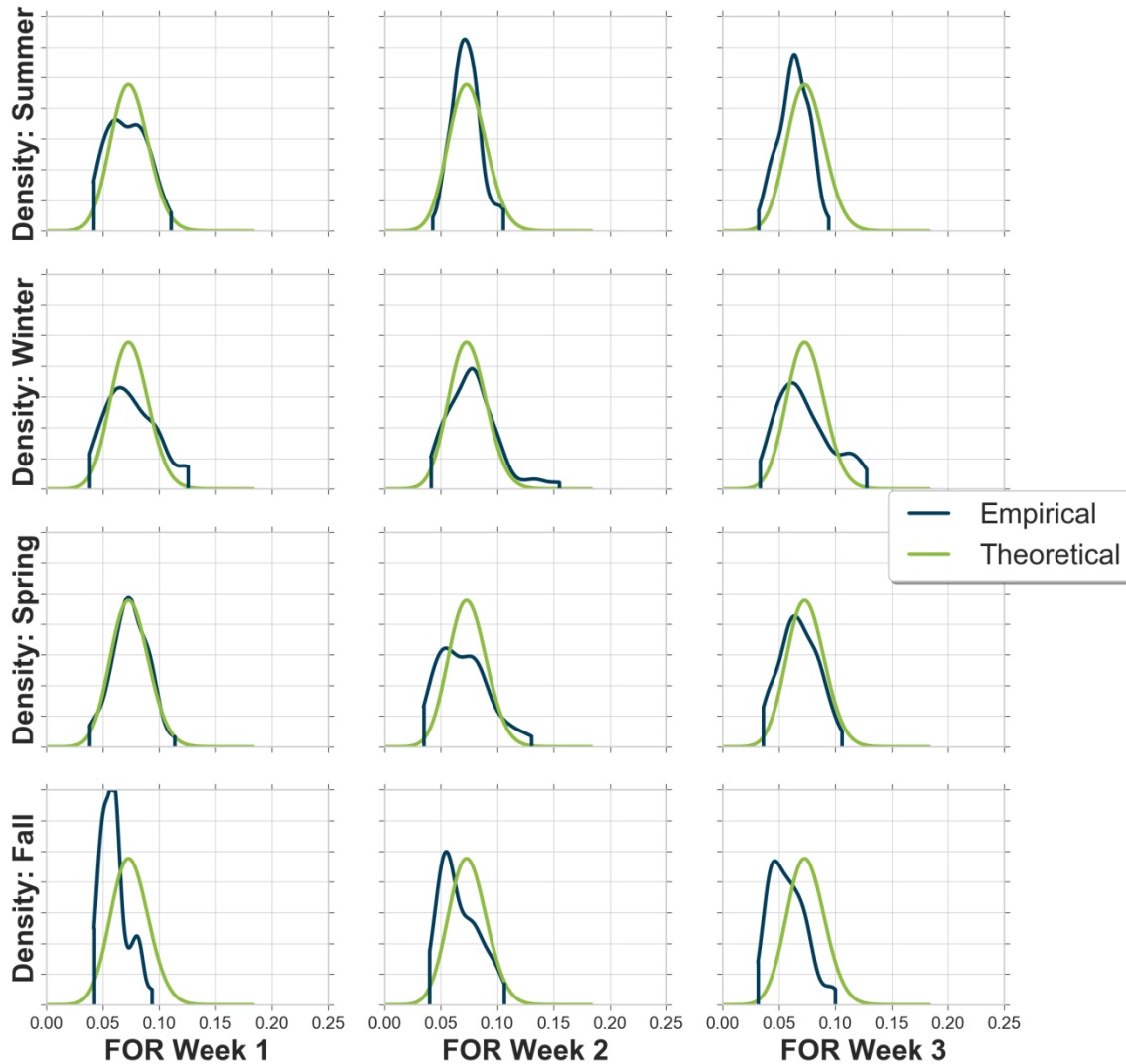
The same approach described in the example above is used to collect the observations for all the other season-peak load weeks combinations

We took this approach because we want to capture the potential relationship between load levels and forced outage levels.

Item: Forced Outage Distribution if data from 2014 Polar Vortex is removed.

Response: If the data from the Winter Peak Week of January 2014 is removed and replaced with the data from the Winter Peak Week of February 2015, the table in Slide 8 and the graph in Slide 9 looks as follows:

Season	Load-Magnitude Ordered Week	RTO-Wide Forced Outage Rate		
		Mean	StDev	90th perc
Summer	1	7.1%	1.8%	9.3%
Summer	2	7.2%	1.3%	8.5%
Summer	3	6.3%	1.3%	7.9%
Winter	1	7.3%	2.2%	10.0%
Winter	2	7.8%	2.3%	10.2%
Winter	3	7.3%	2.4%	11.3%
Spring	1	7.4%	1.6%	9.2%
Spring	2	7.0%	2.3%	10.1%
Spring	3	6.7%	1.7%	8.8%
Fall	1	6.0%	1.2%	8.0%
Fall	2	6.6%	1.7%	9.3%
Fall	3	5.8%	1.6%	7.6%



In the table above, the only row that changes is highlighted in yellow. In the matrix of graphs above, the only different graph is the one located in the second row, first column. The conclusion PJM reached in the previous FSSTF does not change when the data from the 2014 polar vortex is removed and replaced with the data from the 2015 polar vortex. The top 3 winter weeks still exhibit the largest deviations from the theoretical forced outages distribution (green line in charts above), especially in the right-hand side tail of the distribution. Similarly, as shown in the table above, the winter period has the largest forced outages standard deviation and 90th percentile values.

In addition, the table in Slide 11 showing RTO-wide Forced Outage MW due to Lack of Fuel looks as follows when the data from the 2014 polar vortex is removed and replaced with the data from the 2015 polar vortex

RTO-Wide Forced Outage MW due to Lack of Fuel				
Load-Magnitude Ordered				
Season	Week	Mean	StDev	90th perc
Winter	1	1,969	1,983	5,477
Winter	3	1,744	2,307	4,572
Winter	2	1,600	1,640	3,404
Spring	2	794	1,448	1,648
Spring	1	570	651	1,284
Spring	3	563	516	1,351
Fall	3	476	497	1,219
Fall	2	307	486	1,170
Summer	3	194	368	871
Fall	1	172	307	654
Summer	1	131	300	339
Summer	2	113	308	317

The only row that changes is highlighted in yellow. The largest amount of RTO-Wide Forced Outage MW due to Lack of Fuel remains concentrated in the Top 3 Winter Weeks.

Item: GADS Cause Codes included to derive RTO-Wide Forced Outage MW due to Lack of Fuel table in Slide 11.

Response: The Cause Codes included were 9130 and 9131.

Item: Quantity of Planned and Maintenance Outages assumed in Phase 1 analysis

Answer: No Planned or Maintenance Outages were assumed in Phase 1

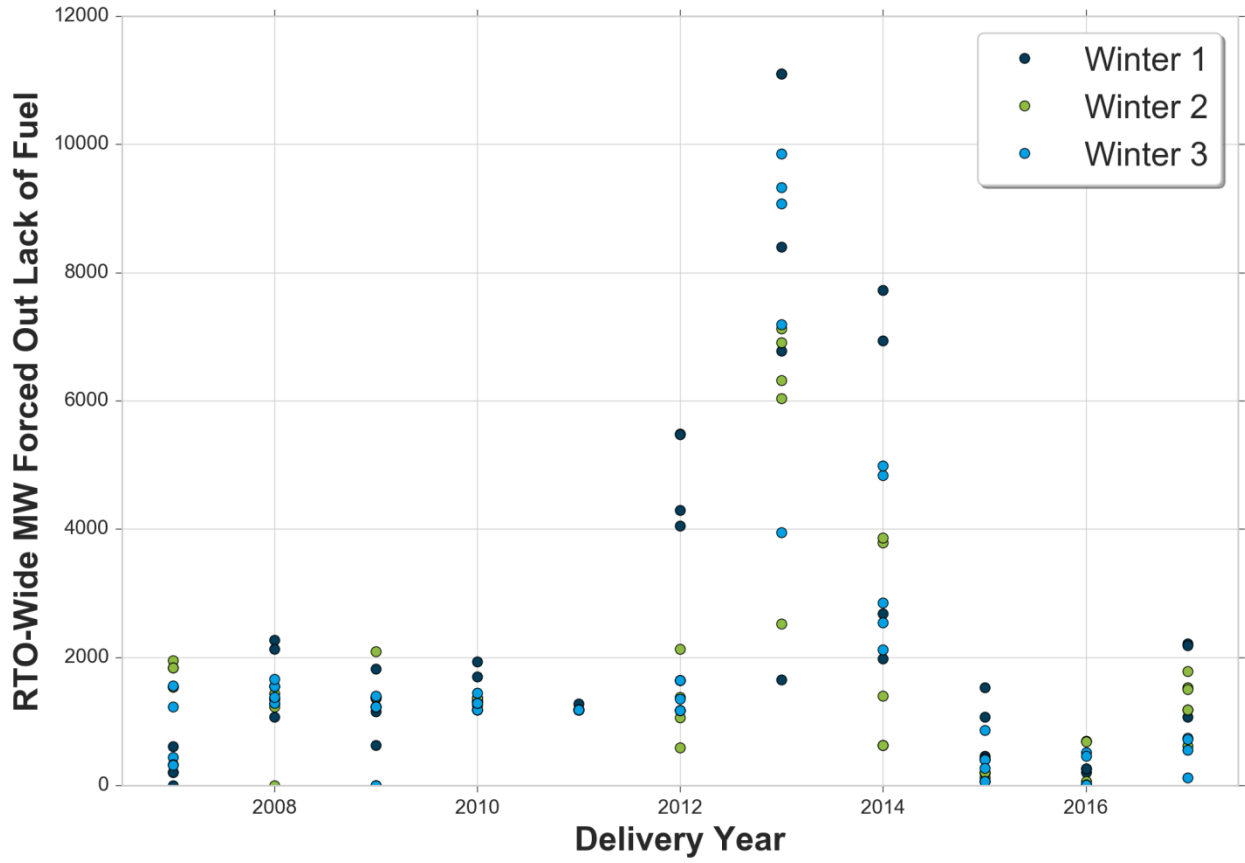
Item: Time series of RTO-Wide Forced Outage Rate for Top 3 Winter Weeks

Response:



Item: Time series of RTO-Wide Forced Outage MW due to Lack of Fuel

Response:



Item: Time series of RTO-Wide Forced Outage MW due to Lack of Fuel as a Share of RTO-Wide Forced Outage MW

Response:

