

# Review of previous Day Ahead Scheduling Reserve (DASR) calculation and proposed minimum operating reserve calculation

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## **DASR Req. = LFE + FOR Components**

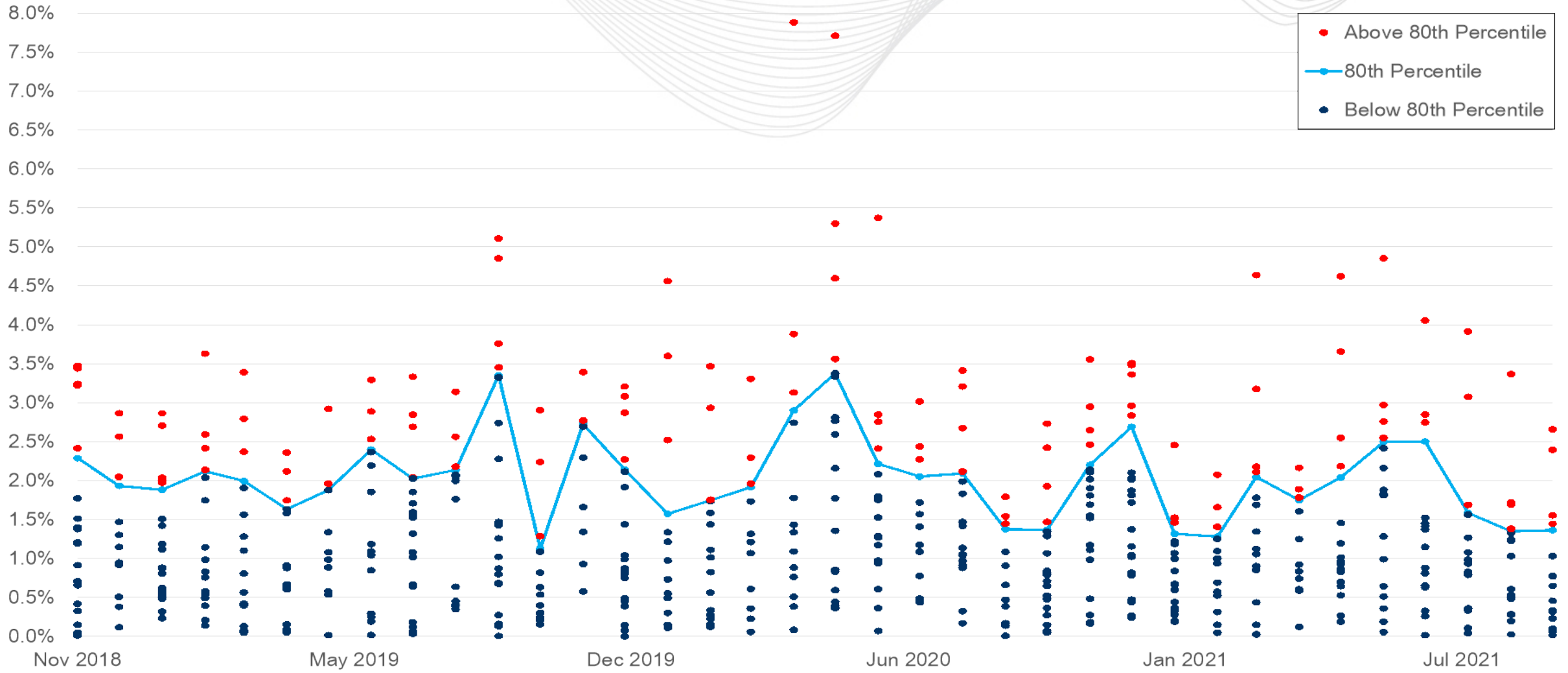
- Time November through October for 3 year period

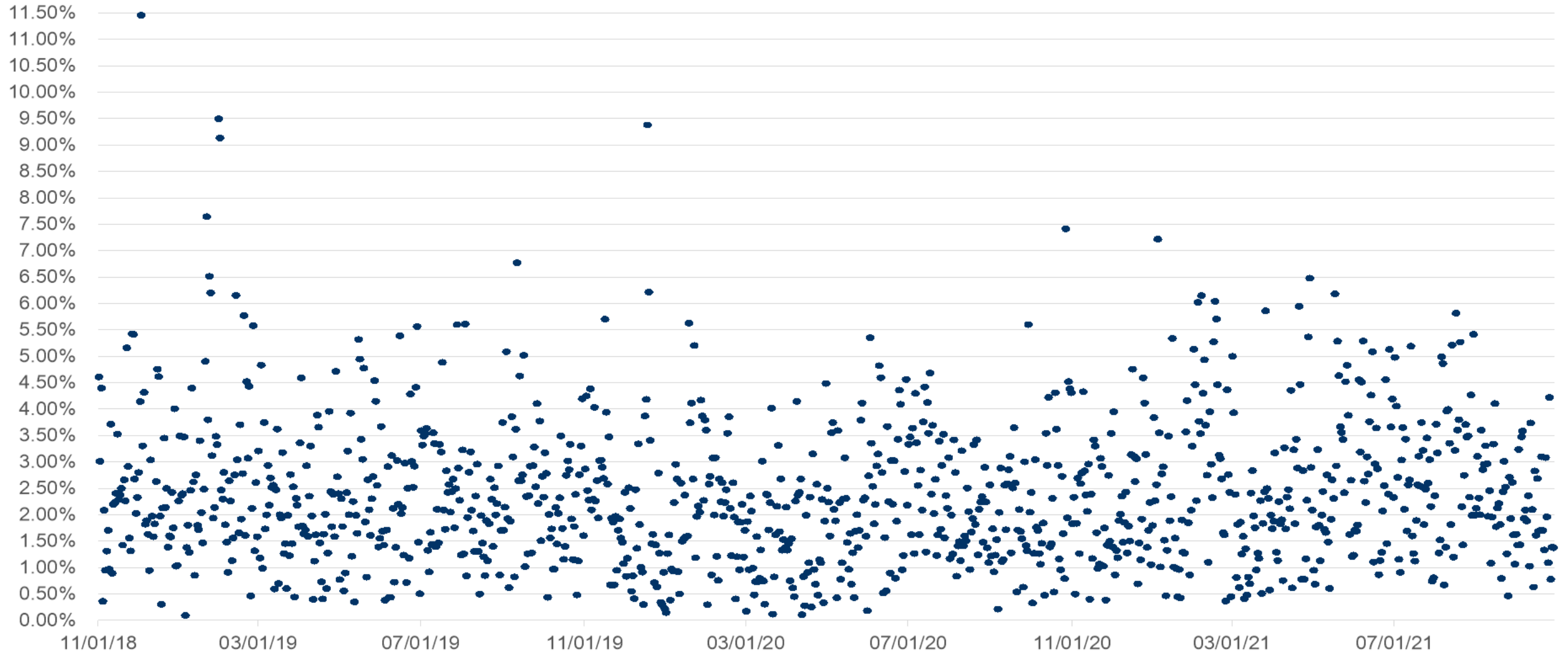
### Load Forecast Error (LFE) Component

- 3 year average of 80<sup>th</sup> percentile of Under forecasted LFE based on forecast generated 8 hours prior to expected peak

### Forced Outage Rate (FOR) Component

- 3 year average of eDART Forced Outages, submitted after D-1 18:00, effective after D 8:00 ending before D 20:00





## Seasons:

- Winter: November, December, January, February
- Spring: March, April, May
- Summer: June, July, August, September
- Fall: October

Season	Load Forecast Error Component 80th Percentile Absolute Error				Forced Outage Rate Component All Forced Outage Tickets				Day Ahead Scheduling
	2019	2020	2021	Rollup	2019	2020	2021	Rollup	Req.
Winter	2.06%	2.05%	1.87%	1.99%	2.81%	2.19%	2.50%	2.50%	4.49%
Spring	1.84%	2.73%	1.95%	2.17%	2.24%	1.71%	2.35%	2.10%	4.27%
Summer	2.48%	1.94%	1.98%	2.13%	2.43%	2.34%	2.73%	2.50%	4.63%
Fall	1.13%	1.37%	1.36%	1.29%	2.08%	2.38%	2.12%	2.20%	3.48%
Annual				2.03%				2.38%	4.40%

- 2022 LFE component was 2.03%
- 2022 FOR component was 2.38%
- Final 2022 DASR Requirement was 4.40%



# Operating Reserve Requirement Components

Season	Load Forecast Error Component 80th Percentile Absolute Error				Forced Outage Rate Component All Forced Outage Tickets				Minimum Operating Reserve
	2021	2022	2023	Rollup	2021	2022	2023	Rollup	Req.
Winter	1.87%	1.92%	1.92%	1.90%	2.50%	2.77%	2.77%	2.68%	4.58%
Spring	1.95%	2.48%	1.82%	2.08%	2.35%	2.62%	2.06%	2.34%	4.43%
Summer	1.98%	2.05%	2.39%	2.14%	2.73%	2.40%	2.13%	2.42%	4.57%
Fall	1.36%	1.29%	1.27%	1.31%	2.12%	2.48%	2.00%	2.20%	3.51%
Annual				1.98%				2.38%	4.35%

- 2024 LFE component is 1.98%
- 2024 FOR component is 2.38%
- Proposed 2024 minimum operating reserve requirement is 4.35%

- The minimum operating reserve will be calculated November to October over 3 year period
  - Initial values are calculated each October
  - Final values are calculated each November
  - Final values will be presented at committees during December and posted on PJM.com
  - Final value is implemented on January 1
  
- This value is to be used in the calculation of the minimum operating reserve, which is used in the 30-Minute Reserve requirement:
  - 30-Minute Reserve requirement = MAX(minimum operating reserve, Primary Reserve Requirement, Active Gas Contingency)
    - Minimum operating reserve = Load Forecast Peak \* (Average Under-forecasted Load Forecast Error + Average Forced Outage Rate)



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## Review of Day Ahead Scheduling Reserve (DASR)



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# Appendix

## November 2019 Under-forecasted Load Forecast Error:

- 0.580%
  - 0.929%
  - 1.344%
  - 1.661%
  - 2.297%
  - 2.694%
  - 2.772%
  - 3.395%
- Calculate 80% = 8 values X 0.80 = 6.4
  - Round down the calculated 80% = 6
  - Round up the calculated 80% = 7
  - Find the percentage value for the rounded down calculation (6<sup>th</sup> value) = 2.694%
  - Find the percentage value for the rounded up calculation (7<sup>th</sup> value) = 2.772%
  - Calculate difference of percentage values = 2.772% - 2.694% = 0.078%
  - Calculate remainder from calculated 80% = 0.4
  - Multiply calculated difference by calculated remainder = 0.078% X 0.4 = 0.031%
  - Add the rounded down calculation (6<sup>th</sup> value) + multiplied calculated difference = 2.694% + 0.031% = 2.725%



# Forced Outage Rate Calculation

## November 2019 Forced Outage Rate:

Date	Rounded Peak Load MW	Forced Outage MW	Forced Outage Rate
11/1/2019	78,000	2,236	2.867%
11/2/2019	73,000	3,102	4.249%
11/3/2019	73,000	1,796	2.460%
11/4/2019	80,000	1,824	2.280%
11/5/2019	80,000	3,508	4.385%
11/6/2019	80,000	1,675	2.094%
11/7/2019	83,000	1,904	2.294%
11/8/2019	86,000	3,470	4.035%
11/9/2019	79,000	1,786	2.261%
11/10/2019	74,000	1,961	2.650%
11/11/2019	82,000	1,590	1.939%
11/12/2019	95,000	2,873	3.024%
11/13/2019	97,000	2,944	3.035%
11/14/2019	93,000	2,696	2.899%
11/15/2019	89,000	2,394	2.690%
11/16/2019	80,000	4,562	5.703%
11/17/2019	80,000	3,154	3.943%
11/18/2019	86,000	2,220	2.581%
11/19/2019	84,000	2,918	3.474%
11/20/2019	84,000	565	0.673%
11/21/2019	84,000	1,625	1.935%
11/22/2019	82,000	1,526	1.861%
11/23/2019	79,000	531	0.672%
11/24/2019	80,000	1,577	1.971%
11/25/2019	84,000	797	0.949%
11/26/2019	83,000	1,416	1.706%
11/27/2019	80,000	1,540	1.925%
11/28/2019	74,000	1,153	1.558%
11/29/2019	77,000	1,138	1.478%
11/30/2019	77,000	829	1.077%
Total Average Forced Outage Rate			2.489%

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