A decorative graphic consisting of several thin, overlapping, wavy lines in shades of grey and white, positioned at the top of the slide.

COVID-19 Impacts on Generation Planned and Maintenance Outages

Dan Bennett, Sr. Engineer

Operating Committee

February 11, 2021

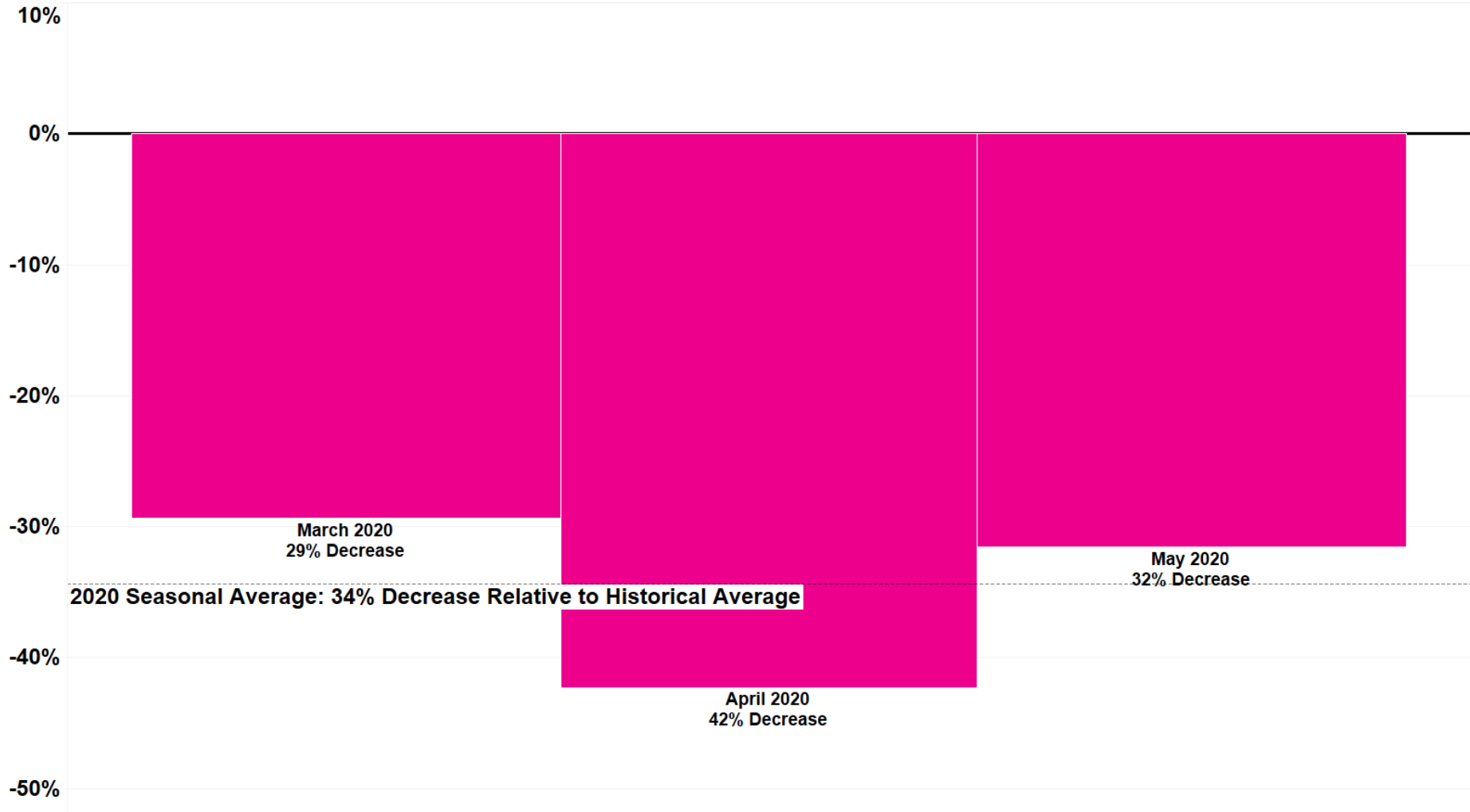
Analysis to evaluate the impact of COVID-19 on the 2020 Planned and Maintenance Outages:

- Comparison of 2020 Planned and Maintenance Outage reductions to the historical average (2015 – 2019) outage reductions.
- The result of the analysis is a percentage increase or decrease for 2020 relative to the historical average for the primary outage seasons:
 - Spring (March – May)
 - Fall (September – December)

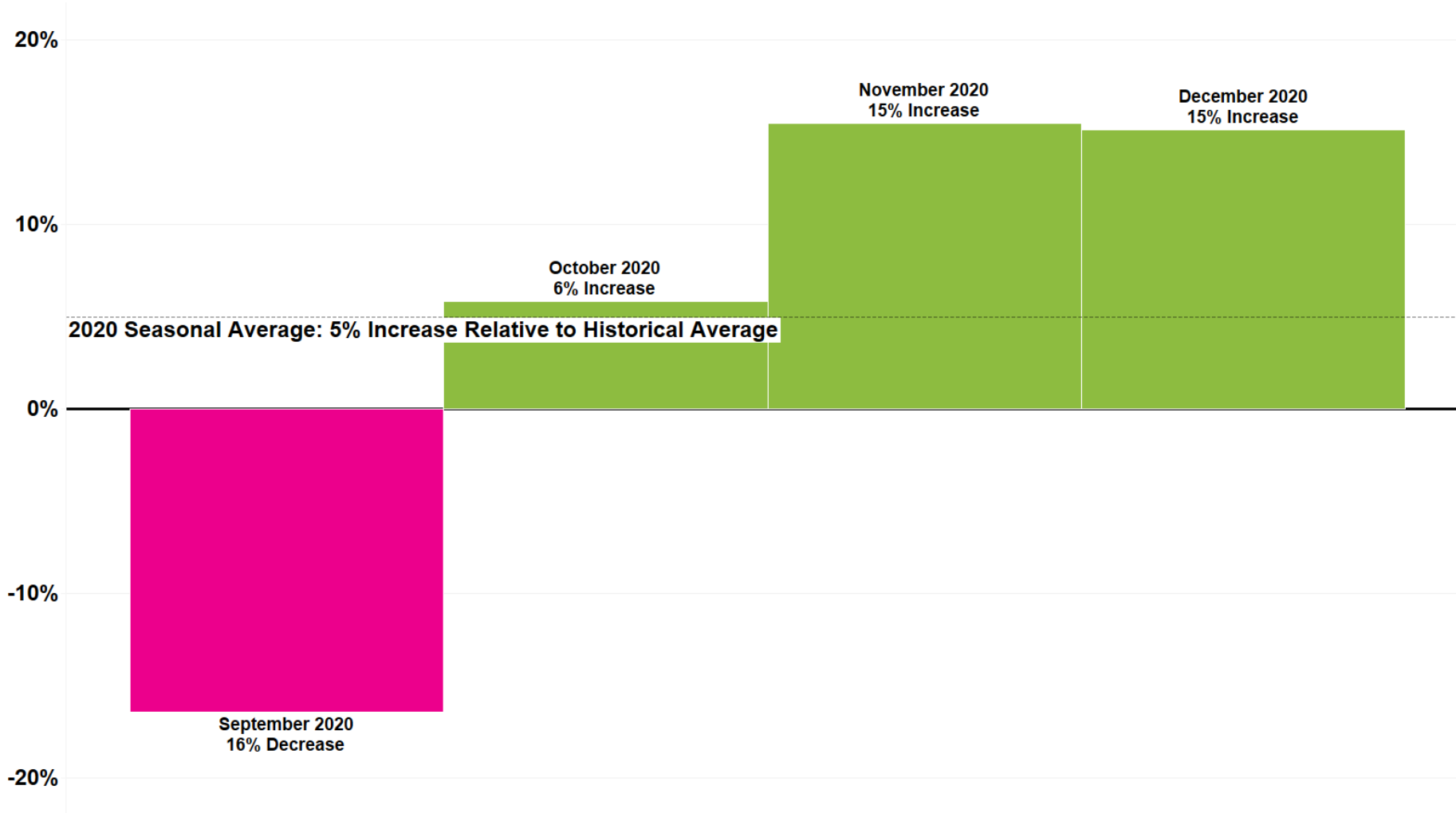
2020 Spring Planned Outages vs. Historical Average

A 34% decrease in Spring POs relative to the historical average was likely driven by:

- Initial response to COVID-19 pandemic
- Need for generators to develop procedures and controls to safely conduct outages



2020 Fall Planned Outages vs. Historical Average



Following a below average September, Q4 of 2020 showed enough of an above average trend in POs to bring the seasonal average to a slight overall increase.

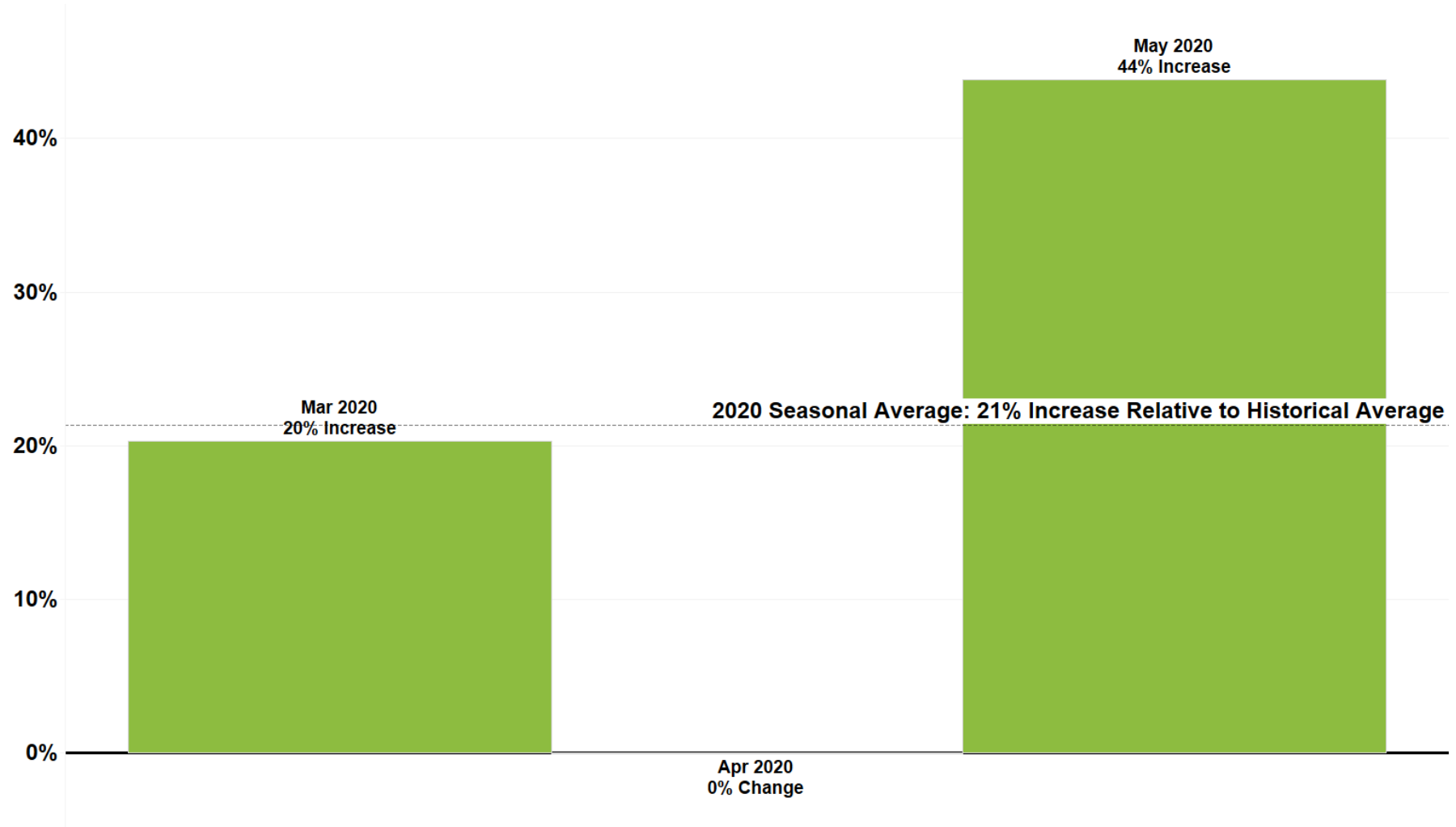
This was an indicator that generators were catching up on work that was deferred in the Spring.

2020 Spring Maintenance Outages vs. Historical Average

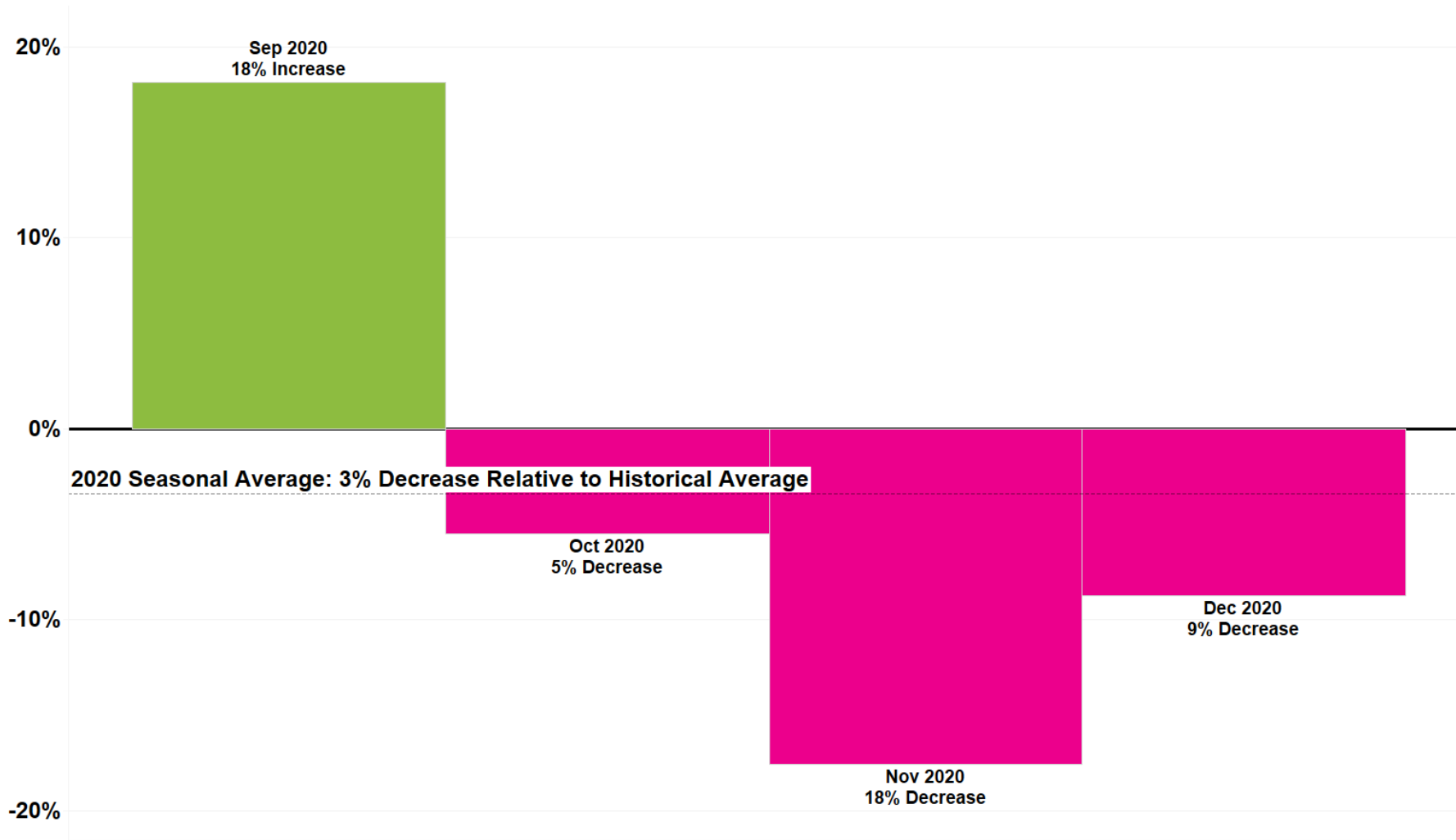
March: Higher volume of MOs early in the month, but as COVID-19 led to restrictions across the PJM footprint those numbers dropped

April: Flattening out, which included a decrease early in the month, but by the end of April MO amounts increased

May: Significant increase in MOs relative to the historical average as generators worked to perform maintenance prior to summer operations



2020 Fall Maintenance Outages vs. Historical Average



MOs in the Fall of 2020 were roughly the inverse of POs during that season.

As warm temperatures continued in September, generators relied more on MOs, but in Q4 they took fewer MOs and began taking more POs.

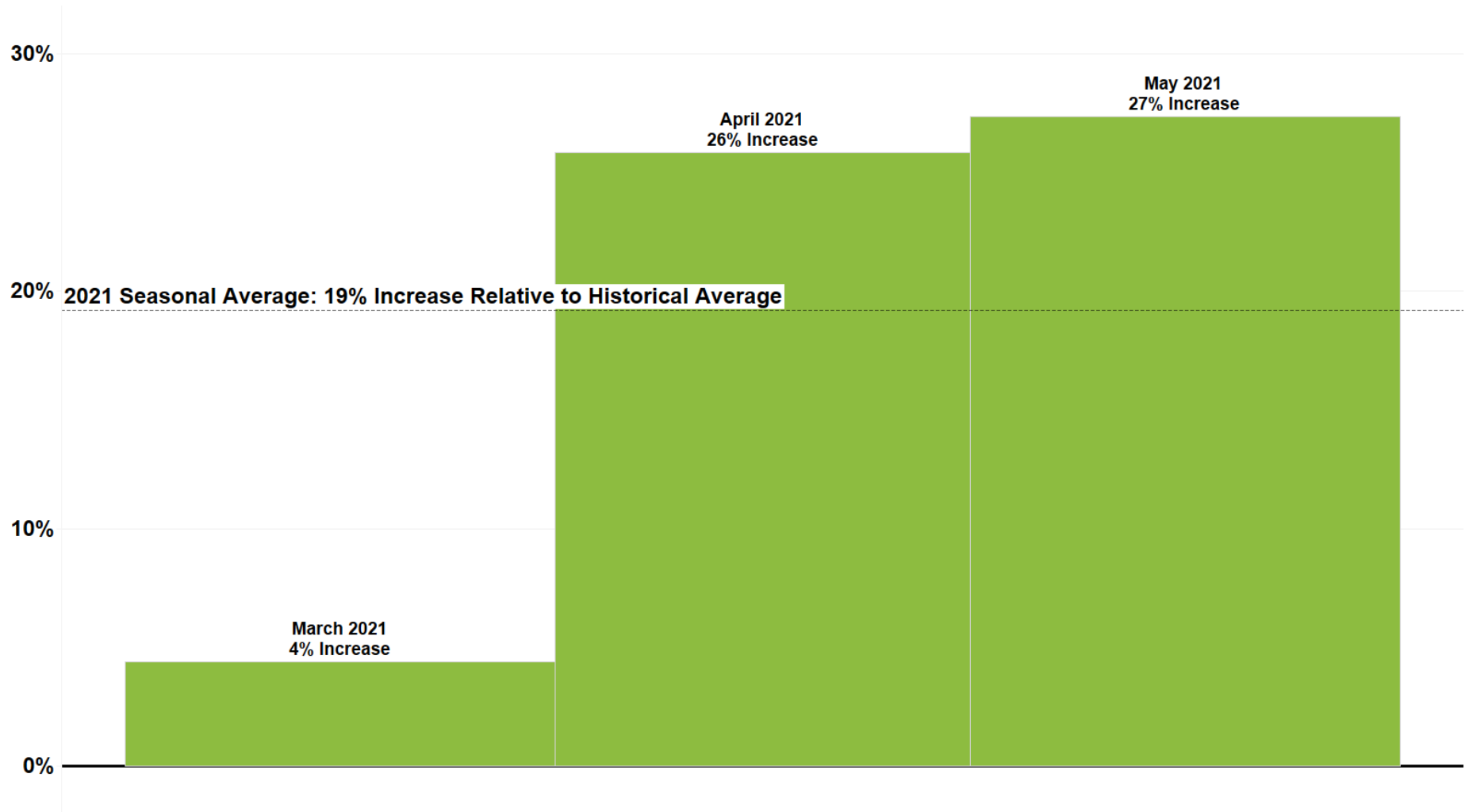
2021 Spring Planned Outage Projections

Analysis of Planned Outage projections compared the projection for the 2021 Spring Outage Season as of 01/01/2021 with similar projections as of January 1st of the previous years (2015 – 2020).

The following chart compares the 2021 Planned Outage projection against the historical average (2015 – 2020) projection to show percentage changes in Planned Outage numbers.

2021 Spring Planned Outage Projections vs. Historical Average Projections

PJM is already projecting a higher than average amount of POs for Spring 2021. However, this number will continue to change as we approach the outage season.



For 2020, overall the patterns in Planned and Maintenance Outages show:

- Even with the initial decreases in outages during the onset of COVID-19, resource owners were still able to accomplish significant amounts of outage work on their equipment

For Spring 2021, as the Spring Outage Season nears:

- PJM continues to encourage generators to submit their outage tickets for the Spring Outage Season as early as possible
- PJM will keep working with generators to schedule Planned Outages while avoiding reliability concerns

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 Planned and Maintenance Outages**



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