

Compared Against the Bomb Cyclone

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Data Sources Used in This Publication
PJM
PointLogic
NGI
NOAA

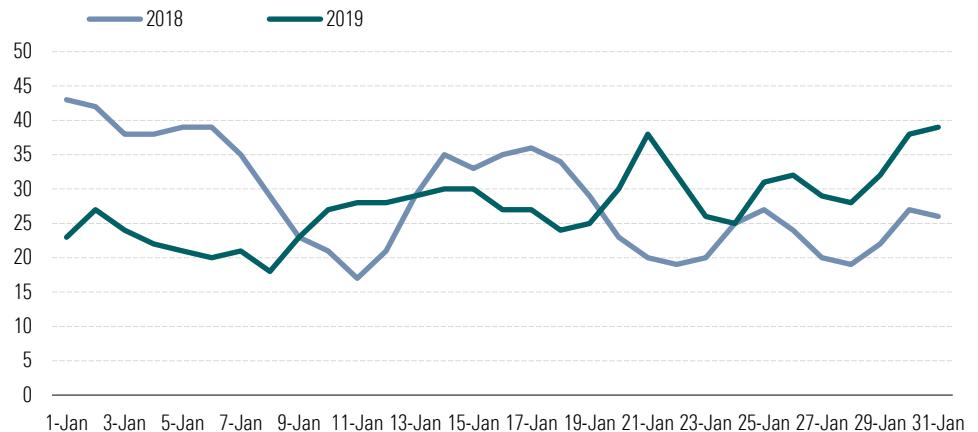
The Bomb Cyclone

In January 2018, large parts of the East Coast were hit with a historic snowstorm called a bomb cyclone. This weather event overlapped in some significant ways with the polar vortex seen last month, providing an opportunity to compare the two events. Last week, [A Tale of Two Polar Vortices](#) analyzed the differences between the polar vortex of 2014 and 2019, and PJM's management of the grid during those extreme weather events. This piece will compare the recent polar vortex to the 2018 bomb cyclone.

Comparing the Two Events

The bomb cyclone started in early January 2018, when snow and ice blanketed large parts of the Southeast, mid-Atlantic, and Northeast, leaving widespread outages and a billion dollars in damages. Heating degree-days in January 2018 for the Lower 48 totaled 888 heating degree-days, which compares with 854 heating degree-days last month (Exhibit 1). The coldest day in January 2018 reached 43 degree-days, as compared to the coldest day in January 2019, where heating degree-days hit 39. Comparing the two events on a regional basis, however, shows a more comparable picture. Heating degree-days in the mid-Atlantic peaked at 58 in January 2018 compared with a 59 peak for the region in January 2019.

Exhibit 1 CONUS Heating Degree-Days in January (Degree-Days)



Source: NOAA

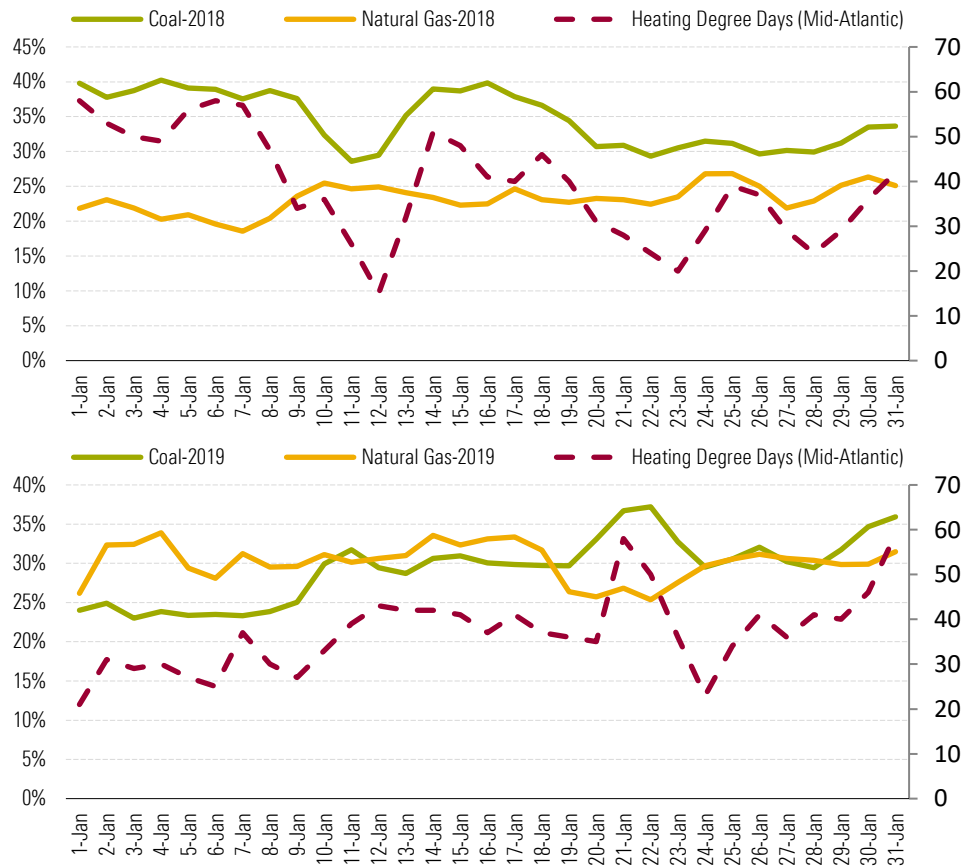
The additional heating demand also brought slightly higher natural gas consumption to the Northeast, which includes most of the PJM system. Natural gas demand from the residential/commercial sector in the Northeast averaged 16.1 billion cubic feet per day in January 2018, which is essentially flat to the

16.0 bcf/d of consumption in January 2019. Unlike residential/commercial demand, natural gas consumption from the electricity sector in PJM grew from 2.1 bcf/d in January 2018 to 2.8 bcf/d in January 2019.

A Changing Regime

The changing landscape between natural gas and coal year over year is evident when looking at daily average generation percentage by fuel type within PJM (Exhibit 2). Between 2018 and 2019, coal generation as a percentage of total generation is down from an average January generation of 35% to 29%. Natural gas over the same period moved up from 23% of generation to 30%. The shift down in coal and the move up in natural gas highlights how much PJM's generation fleet has changed over the course of the year. The visibility of this trend in the winter months, where more pressures are put on the natural gas sector often providing opportunities for coal, is another example that shows the increased prominence of natural gas in the energy sector generally.

Exhibit 2 Daily Average Coal and Natural Gas Generation in PJM (% of Total Generation)



Source: PJM, NOAA

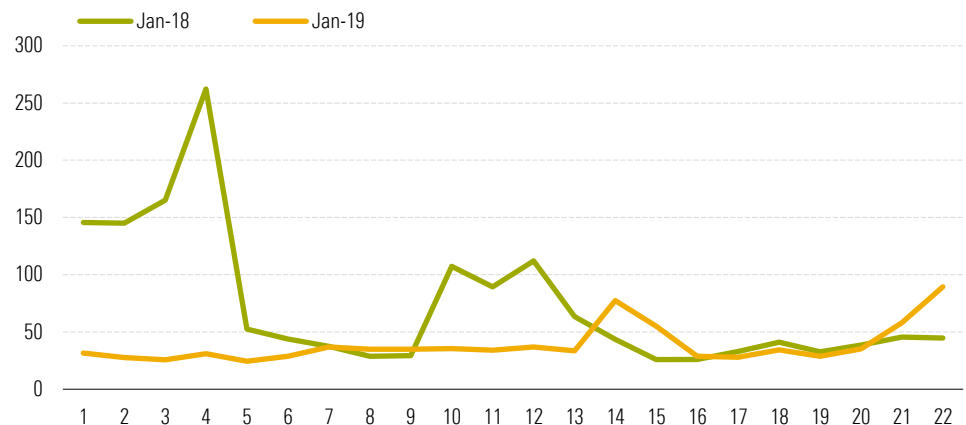
Charting generation by fuel type against heating degree-days for the mid-Atlantic region shows just how far both fuels have come over the last decade (Exhibit 2). Traditionally, coal generation would stay relatively flat with natural gas generation ramping up and down with changes in the short-term

weather. But January 2019 shows a switch, with coal generation attempting to ramp up and down with changes in the weather while natural gas remains steady. While coal played a role in providing reliable electricity to PJM's system in January 2019, its role has been significantly diminished, and with new natural gas plants and additional coal retirements on the horizon, that trend is likely to continue.

Stable Power Prices

Comparing power prices at PJM's West Hub between the bomb cyclone and the recent polar vortex, also supports the theory of flatter prices (Exhibit 3). Last year, day-ahead prices at West Hub settled at around \$73 per megawatt, despite the early strength, where several triple-digit prices were seen. This past month, on-peak day-ahead prices at West Hub settled at \$38/MW, with the highest day-ahead price hitting \$89/MW. Prices in January 2014, when the country last saw a polar vortex, settled at \$168/MW at West Hub. Although the market has seen days with high prints in the day-ahead market, their degree and frequency should continue to fall, and the overall trend toward lower prices will continue minus a significant structural change.

Exhibit 3 Day-Ahead LMP PJM West Hub (\$/MW)



Source: PJM

Conclusion

By comparing the January 2018 bomb cyclone and the January 2019 polar vortex, trends emerge that illustrate how much PJM's grid continues to change year over year. Cold-weather events often provide the market with insights into those changes, and this last month was not an exception. What has become clear is that coal generation is no longer playing its traditional role, with the relationship between natural gas and coal flipping. This transition is also creating an environment where power prices will likely be flatter and lower in both normal and extreme circumstances. Minus significant structural changes to the electricity or natural gas sector, PJM appears to be settling into a regime where lower prices are the norm. ■■■

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