
PJM Outage Season Wake-Up Call

U.S. Power and Gas Weekly

Morningstar Commodities Research
15 March 2018

Dan Grunwald
Associate, Power and Gas
+1 312 244-7135
daniel.grunwald@morningstar.com

Data Sources Used in This Publication
PJM

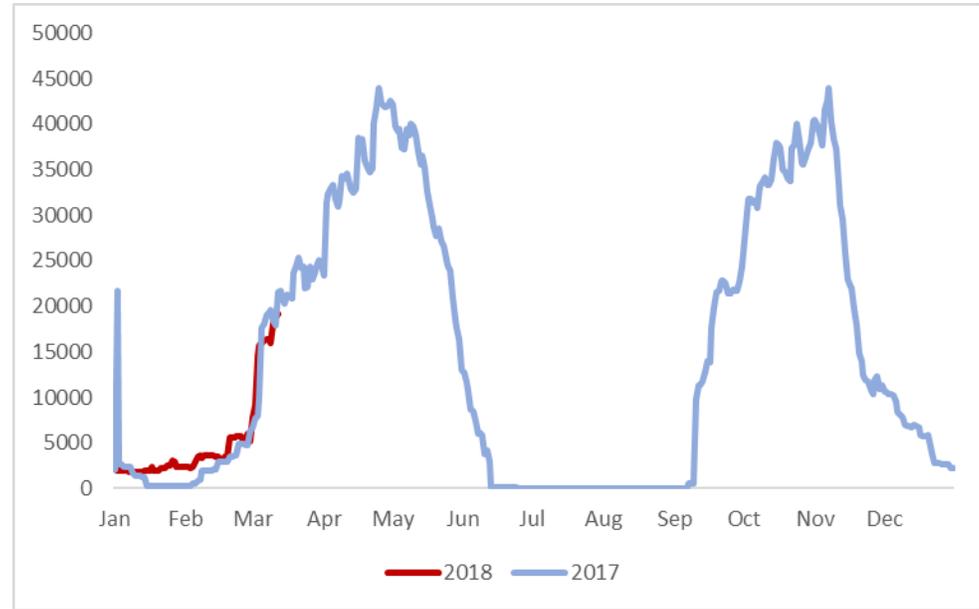
A Monday Morning Wake-Up Call

The annual cycles between winter and summer high-demand seasons and autumn and spring shoulder seasons in PJM are marked by very different outage profiles. Prices in PJM started with a bang this week on Monday morning in the real-time market, reaching triple digits in West Hub, settling around \$255/MWh during HE8, and remaining high into the afternoon. However, while load did linger in the morning to a degree, the pricing was not wholly explained by heating demand—as seen earlier this winter (for example on Jan. 5, which fell into the top 10 days on record for PJM Winter Demand, where demand was at least 27 GWh higher than during every hour this past Monday). This price blowup in real time is explained almost as much by the current level of planned outages which are near 20 GWh, compared with just 2 GWh on Jan. 5. Planned outages have started to rise out of the winter lows as more generators see winter waning and maintenance needs building up to be taken care of before the summer demand season arrives.

Outage Indicator

In the summer and winter months, the market is usually more transparent because a nearly full stack is in operation with limited outages. The offseason months can be trickier to trade around, and deeper market knowledge is key. As transfer capacity and the generation stack shift underneath the surface, the more obvious regional supply-demand variations that drive peak summer and winter seasons no longer provide sufficient signals to explain price movements. A detailed analysis is necessary to avoid pitfalls.

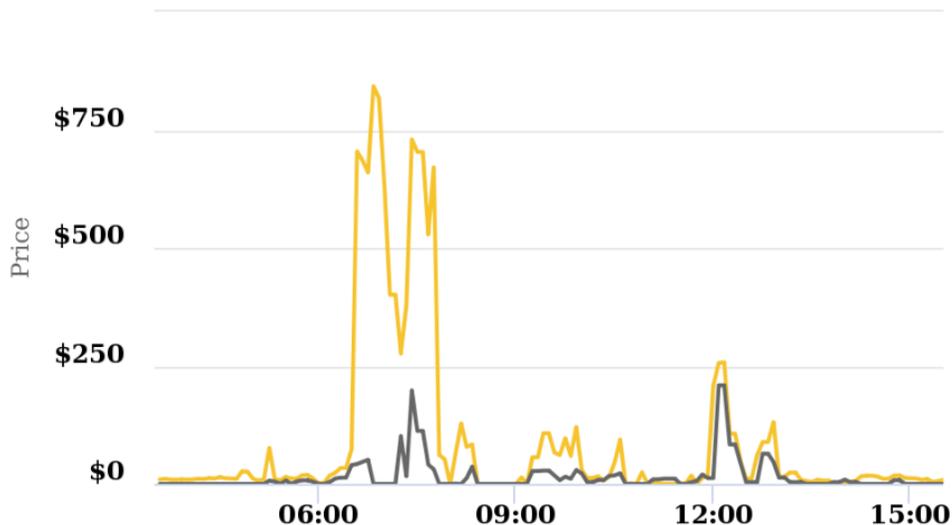
That was the case Monday morning in PJM. During peak seasons, planned outage levels don't typically exceed 3,000 MWh and often fall to zero (see Exhibit 1). Outages at the end of February rose above the 3,000 MWh threshold to around 5,000 MWh, and at the beginning of March they got into the teens. Current outages just shy of 20,000 MWh indicate the outage season proper is under way. We should see this number start to rise even further as we approach April, with at least another 10,000 MWh more capacity off line.

Exhibit 1 PJM Planned Outages (MW)

Source: PJM, Morningstar

Flexibility Versus Reliability

While high-demand seasons test the limits of overall capacity, it's more important to look at the available generation stack on an hourly and daily basis to understand market price dynamics during the shoulder months. While a few days of elevated prices can be expected early in outage seasons, like those seen on Sept. 20 and Sept. 21, when daily real-time prices averaged over \$54 and \$92, respectively, they do not always materialize. The ability to clear the market at a lower price is contingent on the flexibility of resources on the grid. In Monday's case, although not as heavy as earlier winter levels, load gave a late winter surprise to the upside by 3,000 MWh compared with PJM's original forecast. As a result, the ISO had to call on considerable Regulation Capability and Synchronized Reserves to maintain grid stability.

Exhibit 2 PJM RTO Regulation Capability and Synchronized Reserves (MW)

Source: PJM, Morningstar

Reliability Increasingly Expensive

This example highlights some of the issues currently to be expected in PJM because of coal and nuclear retirements. Eliminating coal and nuclear capacity, typically found in the middle of the generation stack, pushes higher-cost plants down the dispatch order. As a result, outage seasons experience a higher likelihood of price spikes, resulting from forecast misses on both variable supply and demand. With electricity storage currently limited at best, reliability becomes an increasingly expensive resource. The future expected use and increased implementation of storage technology may be able to fill this void at scale. In the meantime, the gap between retirements and installed capacity may require some form of reliability pricing, not only for meeting reserve requirements but also for basic daily peak load.

Several solutions have been proposed, such as providing subsidies to keep older plants operating, in the form of energy and capacity price incentives. However, FERC's Order No. 841 offers a hint to another approach by making energy storage projects eligible to receive energy, capacity, and ancillary payments. Such market incentives for storage, coupled with improving efficiencies in technology and wider-scale adoption, may be the best way to keep market pricing stable in the wake of increasing reliability and congestion issues.

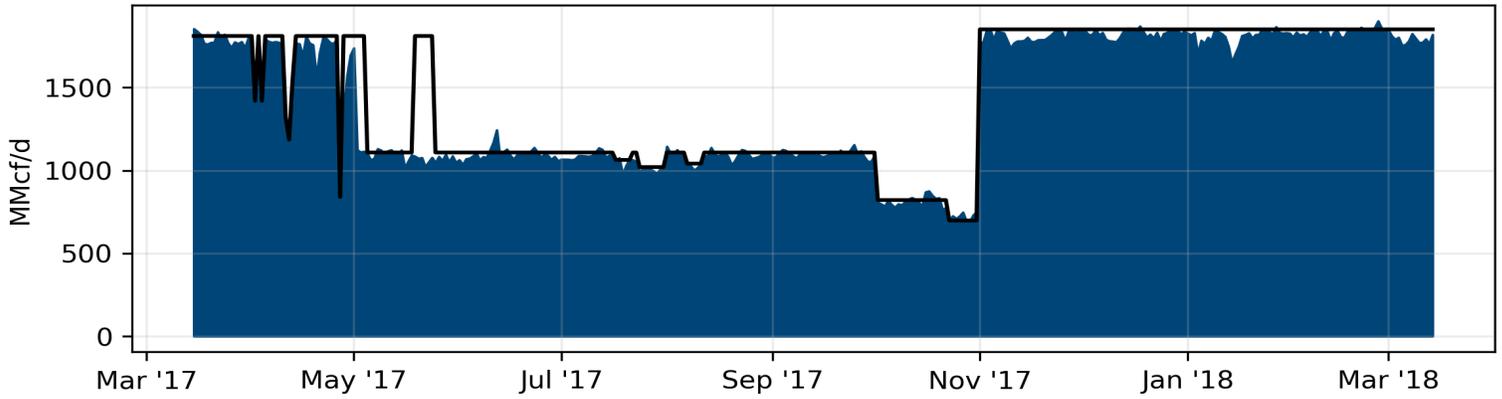
PJM This Year

We expect the coming year to provide a glimpse into how the market decides to resolve this reliability issue over the long run. Greater adoption of electric storage projects and pricing reform to bail out old technologies can create improved price stability. PJM seems to be pushing for price reform for sure due to its still considerable coal stack. In the short term, we expect price volatility to remain common at the start of PJM shoulder seasons in particular and quite possibly throughout the season. When generation outages exceed 20,000 MW, a price spike such as that seen this week is often required to wake the market up to the new paradigm. Jumps throughout the season will keep the market on its toes. After a

day or two, the market adjusts to the new underlying shift and responds accordingly by bringing price spreads between day ahead and real time back to reasonable levels. ■■

Natural Gas Important Points

Algonquin: Stony point Compressor



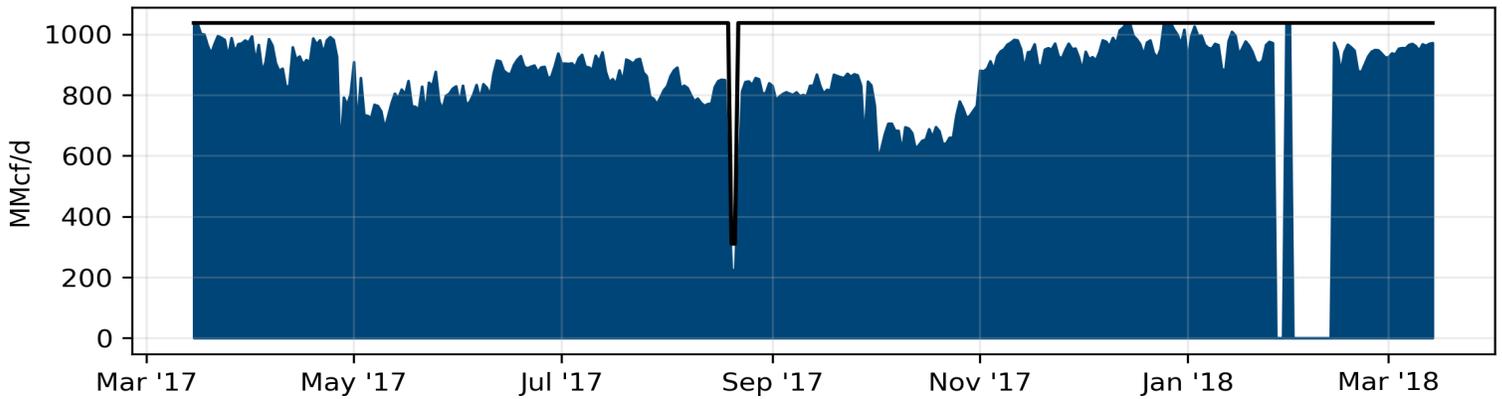
Transcontinental: Leidy Line Station 505



Texas Eastern: Lambertville Compressor

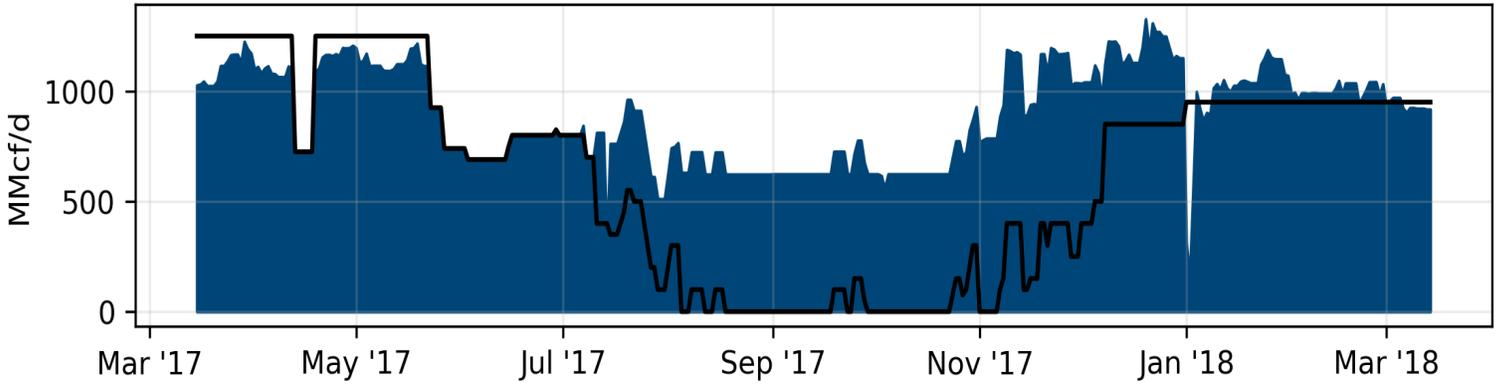


Millennium: Wagner West Compressor

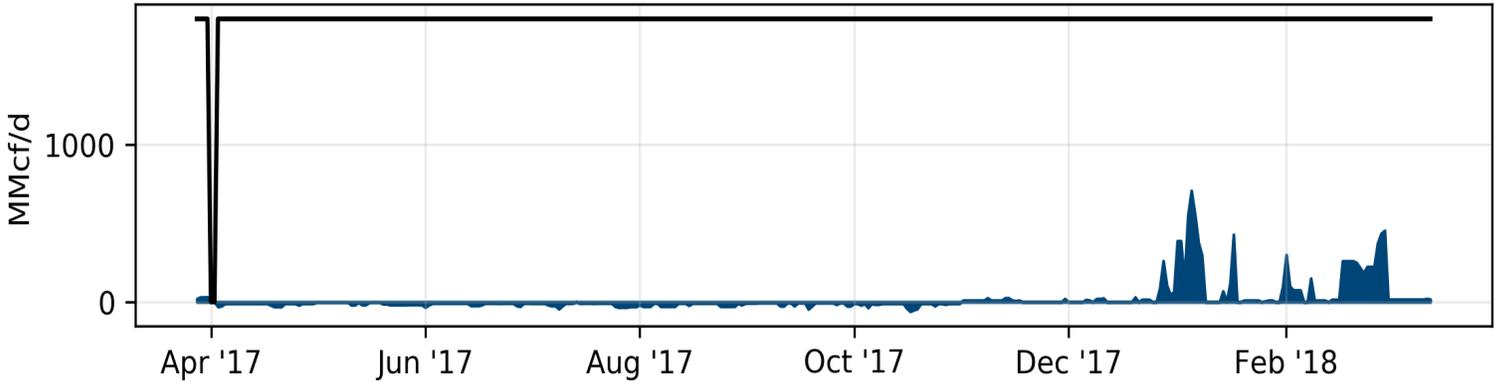


■ Volume — Capacity

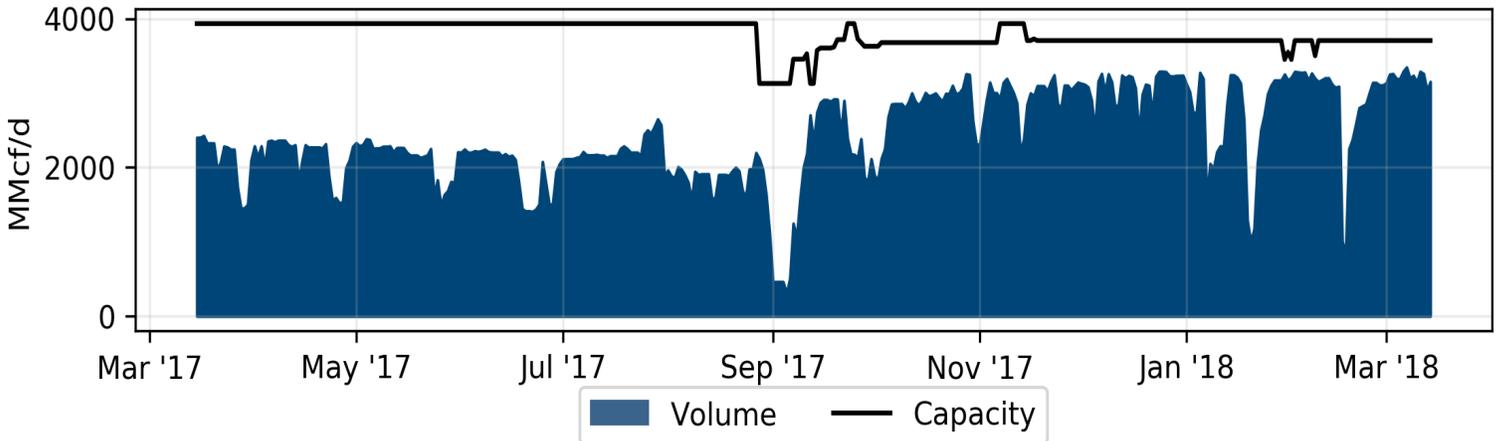
Columbia Gas Trans: Braxton-Stonewall



LNG: Cove Point



LNG: Sabine



■ Volume — Capacity

About Morningstar® Commodities Research

Morningstar Commodities Research provides independent, fundamental research differentiated by a consistent focus on the competitive dynamics in worldwide commodities markets. This joint effort between Morningstar's Research and Commodities & Energy groups leverages the expertise of Morningstar's 23 energy, utilities, basic materials, and commodities analysts as well as Morningstar's extensive data platform. Morningstar Commodities Research initially will focus on North American power and natural gas markets with plans to expand coverage of other markets worldwide.

Morningstar, Inc. is a leading provider of independent investment research in North America, Europe, Australia, and Asia. The company offers an extensive line of products and services for individuals, financial advisors, and institutions. Morningstar's Commodities & Energy group provides superior quality market data and analytical products for energy data management systems, financial and agricultural data management, historical analysis, trading, risk management, and forecasting.

For More Information

+1 800 546-9646 North America

+44 20 3194 1455 Europe

commoditydata-sales@morningstar.com



22 West Washington Street
Chicago, IL 60602 USA

© Morningstar 2014. All Rights Reserved. The information, data, analyses and opinions presented herein do not constitute investment advice; are provided solely for informational purposes and therefore are not an offer to buy or sell a security; and are not warranted to be correct, complete or accurate. The opinions expressed are as of the date written and are subject to change without notice. Except as otherwise required by law, Morningstar shall not be responsible for any trading decisions, damages or other losses resulting from, or related to, the information, data, analyses or opinions or their use. The information contained herein is the proprietary property of Morningstar and may not be reproduced, in whole or in part, or used in any manner, without the prior written consent of Morningstar. To order reprints, call +1 312-696-6100. To license the research, call +1 312-696-6869.