MORNINGSTAR | DBRS

Commentary

Impact of Climate Change on Renewable and Natural Gas-Fired Power Generation Assets

DBRS Morningstar
October 4, 2021

Contents

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Focus on green energy is increasing around the world in order to meet carbon dioxide reduction requirements, and, in North America and Europe, a portfolio of renewables supplemented by gas-based power plants is often seen as a significant milestone in the complete transition to green energy. However, in some power markets, increases in green power generation entails risks, such as power supply volatility because of more frequent weather-related outages caused by climate change. For example, the February 2021 cold snap in Texas and the ongoing natural gas supply shortages in Europe have highlighted a few risks for renewable and green power producers; a disruption in the gas supply or a major weather event that puts renewable power sources out of generation can wreak havoc in the energy markets, which are heavily dominated by gas-based generation and renewable power.

This commentary will discuss the potential impact of climate change on portfolios of renewable and gas-based assets. We will specifically discuss weather-related operational and liquidity risks, as well as risks associated with hedges that renewable and gas-based power producers face.

Extreme Weather Is a Double Whammy

When extreme weather hits an area, it can not only affect renewable generation but also disrupt the gas supply chain. As a result, lower renewable power generation and high fuel costs for gas-based power plants can send power prices through the roof.

For example, in February 2021, Texas was hit by a storm that caused unusually low temperatures (the Texas deep freeze). Various gas-based power generators were unable to produce power because of frozen generation equipment, and the lack of power disabled compressors that push gas through the pipelines, further disrupting the gas supply to gas generators. Wind power production was also disrupted by icing on turbine blades. Electricity demand increased because of the electric heating load, while supply decreased significantly. The electricity scarcity drove electricity pricing in Texas up to the $9,000/megawatt hour market cap over a prolonged period.

Impact of Weather on Operations

Unusual weather conditions, such as ice storms or heat waves with low wind speeds, can severely affect wind and solar generation operations. DBRS Morningstar notes that, in the case of unplanned outages, renewable power producers under power purchase agreements or financial hedge contracts may end up paying penalties or having to buy back power at high prices to meet their obligations.

For example, during the Texas deep freeze, Algonquin Power & Utilities Corp. (rated BBB with a Stable trend by DBRS Morningstar) projected a financial impact of $45 million to $55 million because of outages at its Texas-based wind facilities.

Extreme weather conditions can also affect gas supply for gas-based power plants, as gas-based power plants usually don't have long-term storage capacity and heavily rely on uninterrupted gas supply. In the past, coal-based power plants and nuclear power plants acted as baseload power generators; coal-based power plants usually have 30 days of fuel on-site and can provide 24/7 electricity despite short-term disruptions in coal supply, whereas nuclear power plants are typically refueled every 18 months to 24 months. As gas-based power plants are increasingly replacing coal and nuclear power plants as the baseload, any gas supply disruption has a significant impact on the power markets. For example, the current natural gas supply shortage in Europe is a result of the lack of adequate gas supply across the continent. Although the current supply shortage was not directly caused by any severe weather event, it shows the potential disruption that a gas supply interruption can have on power markets.

Impact of Weather on Natural Gas Prices

Extreme weather conditions can also affect natural gas prices. During the winter season, high gas prices are usually expected; however, gas prices can increase substantially because of harsh winter weather, and high gas prices can weaken the margins of generators that operate under fixed-price contracts. In addition, gas-based generators usually set power prices in the merchant market, as they have the highest marginal cost. As a result, high gas prices directly affect the overall market's power prices. When the spot power price is unreasonably high, there will be risks associated with defaults, liquidity crunches, and financial profile deterioration for gas-fired generation producers that are under fixed-price power purchase agreements.

DBRS Morningstar also notes the potential regulatory and political risks associated with a substantial power price hike. Electricity is an essential commodity, and if the price of power rises substantially, governments and/or regulators are incentivized to protect customers. In order to protect customers, governments or regulators may penalize power producers and cut back their profits. For example, Spain's cabinet recently ordered clawbacks on excess profits from Spanish utilities and energy companies in view of the recent rise in power prices.

DBRS Morningstar Outlook

As a result of climate change, the frequency and intensity of extreme weather events have increased in the past few years. As highlighted above, extreme weather can severely affect power markets that have a high concentration of renewables and natural gas power plants. DBRS Morningstar believes that these effects can be particularly harmful for producers that face operational outages, operate under fixed-price contracts, and do not have strong liquidity.

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