



CCA Insights

Texas Grid Freeze: Technology Failures, Generator Impacts, and Forecasting

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CCA Group

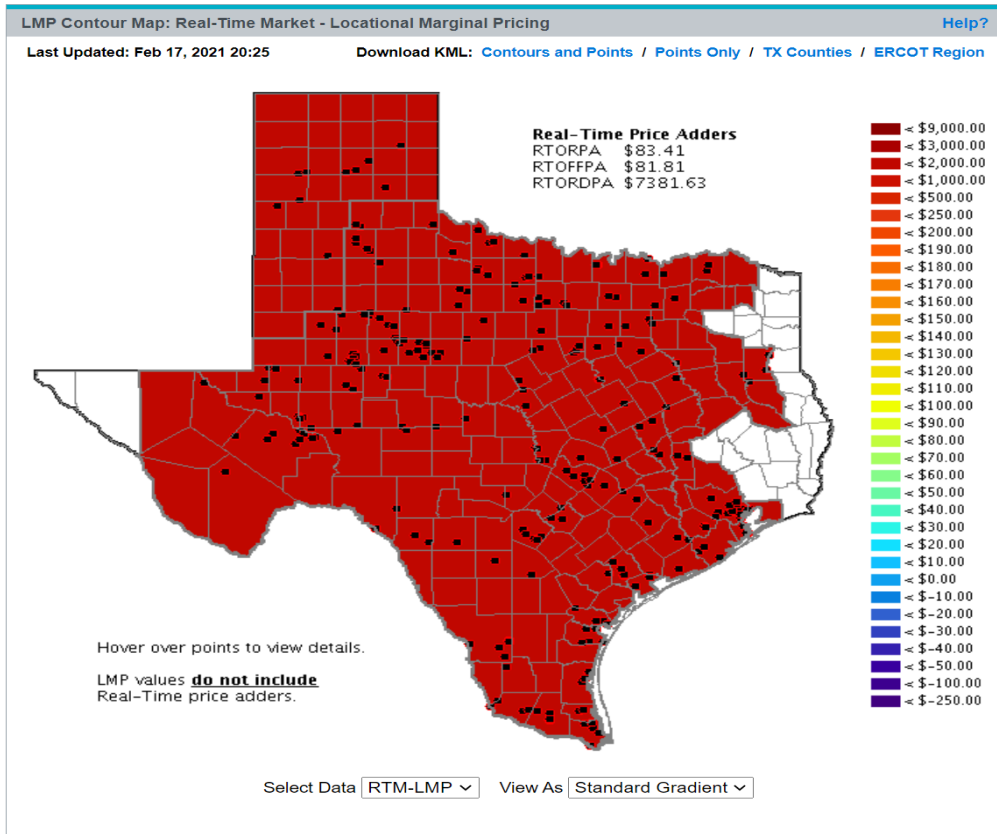
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Rolling Blackouts

Frigid winter weather pushed south into the central United States early this week, straining electricity providers' ability to deliver to customers. Texas, among the states hardest hit by the storm, experienced record low temperatures causing demand for power to far exceed electricity supply. Widespread outages on all generation resources resulting from the extreme weather caused ERCOT to issue Energy Emergency Action (EEA) notices that were still in effect as of noon Friday. EEAs are issued when operating reserves fall below certain targeted thresholds established to protect grid reliability. Rolling Blackouts across the state have occurred since the first EEA was issued as the generators have struggled to bring capacity back online. As the Texas grid is largely isolated from neighboring transmission systems, which complicates importing electricity (especially while neighboring systems are experiencing similar conditions), ERCOT instructed utilities to reduce 14 GW of customer load (roughly equivalent to rolling blackouts for 2.8 million households) as of Wednesday morning. Texas Governor Greg Abbott issued a statewide disaster declaration and successfully sought a federal emergency declaration for the State of Texas.

Some Customers Unscathed. Or Are They?

One wholesale electricity company apparently advised its 29,000 customers to seek service from other providers. Customers who have avoided interruptions in service may feel less fortunate when they receive their monthly electricity bills, with rates rising by more than 100x, in some cases as high as \$9,000/MWh.



<http://www.ercot.com/content/cdr/contours/rtmLmp.html>

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What Technology Failed?

Issues with freezing energy infrastructure have complicated the technology failure because facilities in warmer climates typically are not equipped with robust protection systems for cold weather operation. Surplus natural gas is often stored underground, and bringing it to the surface is difficult in low temperatures that cause condensation to freeze in conveyance equipment, disrupting the supply of natural gas to thermal generation units. Many of Texas' wind turbines have not been operational as they aren't equipped with cold-weather packages like the turbines in the northern United States and Canada. Cold-weather packages generally consist of ice detection systems and heating elements that warm lubrication systems and drivetrain components, pitch and yaw motors, and rotor blades. ERCOT has reported that wind generation has been the least significant factor in the blackouts and that frozen instruments at natural gas, coal, and nuclear facilities, and supplies of natural gas (likely due to competition from residential heating) are the main factors. ERCOT reported that approximately 46 GW of generation had been forced offline as of Wednesday morning, including 28 GW of thermal generation and 18 MW of renewables, although renewable generation exceeded ERCOT's emergency forecast expectations.

Generator Impacts

MISO, SPP, and other areas have also endured similar hardships from these conditions, though certainly with less notoriety. The majority of outages in SPP are more widespread across all of the generation resources. In some respect, this forecasting discrepancy is similar to California's Summer 2020 blackouts, though unique considering ERCOT's isolated and competitive wholesale market. Depending on offtake arrangements, owners and operators of ERCOT generating facilities may be facing significant liabilities due to weather related underperformance, particularly generators who were forced to buy power to settle their firm delivery obligations at scarcity price levels of up to \$9,000/MWh.

Moving Forward

It is clear that certain power markets, particularly ERCOT, were wholly unprepared for such an extreme weather event and lacked back-up generation that could be dispatched in such extreme weather conditions. The current energy infrastructure and generating facilities in ERCOT are not designed for operating in occasional extreme weather. While the resolution is not yet clear and the finger pointing will certainly continue, the best path forward for generation stakeholders is to thoroughly assess the economic, environmental, and social impacts of implementing a strategy for equipping and operating during inclement weather. ERCOT will have to develop market reforms to address reliability and capacity reserves as the generation fleet continues to transition to clean energy resources. CCA has been an active participant in supporting clients in the expansion of renewable resources in the U.S. power market and has the expertise to assist power generators, financial counterparties and other stakeholders in the evaluation and execution of structured finance solutions to mitigate the impact of the recent market dislocation.

Authored by:

Jake Wenger, Director – Technical, CCA Group