

Texas' natural gas production just froze under pressure

Natural gas wells and pipes ill-equipped for cold weather are a big reason why millions of Texans lost power during frigid temperatures this week. As temperatures dropped to record lows across some parts of the state, liquid inside wells, pipes, and valves froze solid.

Ice can block gas flow, clogging pipes. It's a phenomenon called a "freeze-off" that disrupts gas production across the US every winter. But freeze-offs can have outsized effects in Texas, as we've seen this week. The state is a huge natural gas producer – and it doesn't usually have to deal with such cold weather.

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"When we think about what's been going on in the last week and why it's turned the market completely on its head is the fact that the freeze offs are occurring in Texas," says Erika Coombs, director of oil & gas products at research firm BTU Analytics.

Texas relies on natural gas more than any other fuel for its electricity generation. Gas generated nearly half of the state's electricity in 2019, according to the Electric Reliability Council of Texas (ERCOT). Wind and coal each accounted for about 20 percent of electricity generation that year, while nuclear made up about another 10 percent. While nuclear and wind power have been hampered by the storm, neither frigid nuclear plants nor frozen wind turbines bear the largest share of responsibility for Texas' power problems.

"It appears that a lot of the generation that has gone offline today has been primarily due to issues on the natural gas system," Dan Woodfin, senior director of system operations at ERCOT, said during a call with reporters on February 16th, the *Texas Tribune* reported.

While the frigid cold slashed fuel supplies of all sorts, it also drove up demand for natural gas to heat homes. That "mismatch" is what's driving these blackouts, says Coombs. There simply hasn't been enough fuel on hand to power the state's electricity needs. Natural gas production was pretty much halved in Texas and its gas-rich Permian Basin during the recent cold and stormy weather. It fell from 22.5 billion cubic feet of gas produced per day in December to between 10 to 12 billion cubic feet of gas per day this week, according to estimates from BTU Analytics.

That drop-off in production is thanks to freeze-offs at wellheads where oil and gas are pumped out of the ground. But the cold has also stopped equipment from working properly at gas processing plants, Coombs says. Processing plants separate gas from fluid and impurities; when equipment freezes, plants have to heat it up or wait for temperatures to rise before they can resume their work.

While other states invest more in equipment that helps prevent freeze-offs, Texas hasn't seen the need. North Dakota typically sees 20 days a year with freeze-off events, while the Permian Basin would normally have just four days a year with freeze-offs disrupting gas production, according to BTU Analytics.

"With gas prices being low – and storage being full – the risk of 2-3 days of possible freeze-off every several years is a risk that Gulf Coast producers have been willing to take," a report on freeze-offs prepared for ERCOT in 2013 says.

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The last time Texas experienced anything close to the energy crisis it's experiencing this week was probably in 2011, when freezing temperatures lowered monthly gas supplies by about 10 percent. That year, the US Energy Information Administration said that energy disruptions from gas well freeze-offs rivaled interruptions from hurricanes and tropical storms. Since then, average daily gas production in the Permian Basin has more than tripled. That's another reason why freeze-offs are a bigger problem in Texas now.

They aren't the *only* problem when it comes to energy in Texas. The power outages have also stopped natural gas pumping facilities. In fact, over the past few days, just about everything that could go wrong has failed spectacularly. And the finger-pointing is only getting started. Texas Gov. Greg Abbott called for an investigation into why blackouts were so widespread.

"This was a total failure by ERCOT," Abbott told KTRK Houston. "ERCOT stands for Electric Reliability Council of Texas, and they showed that they were not reliable."

Meanwhile, millions of people in Texas remain without power as a second winter storm sweeps through the state. As of Tuesday night, there was still no indication of when the outages would end.

<https://www.theverge.com/2021/2/17/22287130/texas-natural-gas-production-power-outages-frozen>