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Texas Blackout Hearings Highlight Intertwined Risks of Natural Gas, Power Grid and Deregulated Market

Winter storms have revealed the threat of cascading system breakdowns, while the financial fallout looms ahead.

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FEBRUARY 26, 2021

As Texas lawmakers seek source of blame for last week's energy crisis, experts point to interconnected failures in natural gas, power grid and market constructs.

The catastrophic breakdown of Texas' natural gas and electricity system last week (https://www.greentechmedia.com/articles/read/texas-energy-system-faces-a-winter-reckoning) lacks a single villain to blame for it all. Instead, the widespread constraints in natural-gas supply and the shutdown of core power plant capacity that left millions without power can be chalked up to cascading failures between these two interdependent systems — and any solutions (https://www.greentechmedia.com/squared/dispatches-from-the-grid-edge/looking-for-fixes-to-what-broke-the-texas-power-grid) will need to take these interdependencies into account to avert a similar crisis in the future.

That's the emerging consensus from a wide range of energy experts examining the cause and effect of last week's crisis, which caused dozens of deaths, a breakdown in the state's water systems, and more than $120 billion in economic damages which have yet to be fully played out.

"In the movies or on TV, there's always one villain or one schmuck whose ineptitude caused the problem," Alison Silverstein, a former senior adviser at the Federal Energy Regulatory Commission and the Public Utility Commission of Texas, said during a Wednesday event hosted by Advanced Power Alliance and Conservative Texans for Energy Innovation.

But "there are no villains" to blame for last week's crisis, she said. Instead, "it's all of us" in Texas "not pushing our regulators and politicians" to take steps to protect the grid and natural-gas network from temperature drops that, while rare in the past, may be far more prevalent in a future of climate-change-driven weather extremes.

"We set up rules very deliberately to say, 'Give us the cheapest gas, power and water you can get, and don't bother me about all that other stuff,'" she said.

Lawmakers ask who's to blame

In Thursday hearings before the Texas legislature, executives with power companies NRG Energy, Vistra and Calpine pointed to natural-gas shortages for forcing more than half of the state's winter peaking generation fleet to shut down over the first half of last week. That loss of generation capacity forced state grid operator ERCOT to institute rolling blackouts to prevent a broader grid collapse.

"If natural gas is compromised, the power system is going to be compromised," NRG President Mauricio Gutierrez told lawmakers.

Politicians and regulators have highlighted power plant operators' failure to winterize equipment against cold temperatures, despite guidance to do so after similar, if much smaller-scale, winter rolling blackouts in 2011. Freezing instrumentation and cooling systems caused outages at coal plants and one of Texas's nuclear power plants, as well as at natural-gas plants.

At the same time, freeze-ups of natural-gas production in a state responsible for roughly a quarter of the nation's supply constrained a system being asked to simultaneously supply heating and power generation needs. But Thursday's hearing saw disputes over whether failure to winterize the state's natural-gas infrastructure was primarily to blame for the shortages, as opposed to a surge in demand for the fuel for both generation and heating.

Joshua Rhodes, a research associate at the Webber Energy Group at the University of Texas at Austin, highlighted during Wednesday's event that ERCOT has largely planned its system around meeting summer peaks in electricity demand for air conditioning. There's no corresponding peak in natural gas demand during heat waves, he said.

But, he added, "Both of those energy systems are interrelated in the wintertime because we're losing gas for both — and both were pushed beyond the limits of what they were designed for."

Loss of electricity also compounded natural-gas supply shortages by shutting off power to run key natural-gas infrastructure, according to Christi Craddick, chair of the Texas Railroad Commission, which regulates the state's oil and gas industries.

"Time and time again, the No. 1 problem we heard from operators was the lack of power at their production sites," she said.

State politicians including Gov. Greg Abbott have cast blame on ERCOT for failing to plan for winter events or to communicate the depth of the crisis. Six members of ERCOT's board of directors resigned this week amid the criticism. Texas Republicans also sought early in the crisis to blame lost supply from frozen wind turbines for the blackouts, despite the fact that natural-gas power plants made up the single biggest share of generation losses.

But ERCOT CEO Bill Magness said the rolling blackouts that eventually left millions without power for days averted an even more catastrophic total breakdown in grid service, one that could have taken weeks or months to restore. He also emphasized that ERCOT lacks the authority to enforce winterization measures on power plants serving its grid.

Magness and lawmakers also pointed fingers at the Public Utility Commission of Texas, which regulates the state's energy sector, for failing to take steps to

protect the state's energy systems from the cascading failures that gripped it last week. PUCT Chair DeAnn Walker pushed back, noting that the commission operates within the regulatory systems set in place by state lawmakers.

As Silverstein said during Wednesday's event, "the state legislature has passed the bulk of the statutes and policy directives that these agencies implement. If the legislature fails to mandate winterization of pipelines or power plants, there are limits to how these agencies can step beyond" those mandates.

Deregulated energy market fallout

Underlying these technical failures are questions about the role of the state's deregulated energy market structure. As the operator of a grid without synchronous interconnections to other power grids beyond its state borders, ERCOT is the only major grid that operates outside the federal regulatory authority that sets maximum market prices. For the past two decades, its energy markets have lacked the capacity and resource-adequacy constructs that other states and grid operators use to secure resources to cover rare but potentially disastrous imbalances between electricity supply and demand.

Instead, Texas relies on scarcity pricing of up to $9,000 per megawatt-hour during times of peak grid stress to incentivize power plant owners to invest in resources to cover those emergencies. Meanwhile, the state's average wholesale energy prices of $20 to $40 per MWh can make it difficult to earn money back during the vast majority of the year, making the system akin to "forcing generators to sell their power for lottery tickets," Dan Cohan, an associate professor of civil and environmental engineering at Rice University, said during Wednesday's event.

ERCOT's scarcity prices remained at that $9,000 maximum throughout much of last week's crisis, despite the fact that much of the generation capacity that could have supplied power at those prices was forced offline. The resulting spike in overall power costs for the week appears to have reached roughly $50 billion, according to a Thursday report from Larry Kellerman, managing director of I Squared Capital, and Robert McCullough, principal of McCullough Research.

These unexpected costs have put immense financial pressure on some energy retailers in the state's competitive markets, as well as on public utilities and rural electric cooperatives that buy power from ERCOT, two groups placed on "Ratings Watch Negative" status by credit ratings agency Fitch this week.

Power suppliers unable to serve the market also stand to bear losses, such as Chicago-based Exelon, which reported (https://www.greentechmedia.com/articles/read/exelon-to-split-generation-business-from-its-regulated-utilities) this week that it expects first-quarter earnings to take a $510 million to $710 million hit. At the same time, merchant generators and natural-gas suppliers selling on spot markets and speculators purchasing electricity or gas for delivery last week are likely to see a substantial profit, Kellerman and McCullough wrote.

Texas lawmakers are calling for measures to relieve these excessive costs, which in some rare cases were borne by customers who had signed up for offerings that pegged their costs to wholesale market prices, as retail energy provider Griddy does.

But ERCOT CEO Magness noted during Thursday's hearings that any steps that interrupted the flow of money from electricity purchasers to sellers could lead to generators being unable to collect on the money owed to them for last week's power.

"If a generator doesn't get paid, we may lose generation on system," he said. "Then that becomes an operational problem."