

Ensuring the Reliability of the Texas Energy Grid During Extreme Weather Conditions

What happened? During the February 2021 extreme weather event, all sources of electricity in Texas suffered disruptions in production leading to statewide power outages. ERCOT said that generation lost from thermal sources (natural gas, coal and nuclear) was twice that lost from renewables (wind and solar).

<https://www.texastribune.org/2021/02/16/texas-wind-turbines-frozen/>

Was this a one-off event that could not have been anticipated? Extreme weather such as Texas suffered in February 2021 has happened about once a decade beginning in 1989.

Were Texas electricity producers warned that they should do more to weatherize their systems? A 2011 report by the Federal Energy Regulatory Commission identified problems with winterization and recommended that steps be taken to protect generation from cold weather events like the one that happened in 2011.

<https://www.ferc.gov/sites/default/files/2020-04/08-16-11-report.pdf>

What was the response to the FERC's recommendations? The Texas legislature adopted nonmandatory winterization guidelines for Texas energy producers. The changes that the energy producers made were not sufficient to keep many generators on-line in the February event. In addition, many natural gas wells also froze up.

What factors potentially contributed to the outages suffered in Texas?

- A change in the economic structure of the electrical generating industry in Texas. Prior to the late 1990s, energy companies were regulated and received revenues related to what they spent on generation capacity. Backup generation capabilities generated revenue even if they were inactive part of the time. After deregulation, revenues depended only on the amount of energy generated, which meant inactive plants were a costly burden on profits therefore companies operated closer to the margin on production. Also additional costs, such as winterization would have acted to reduce profits.

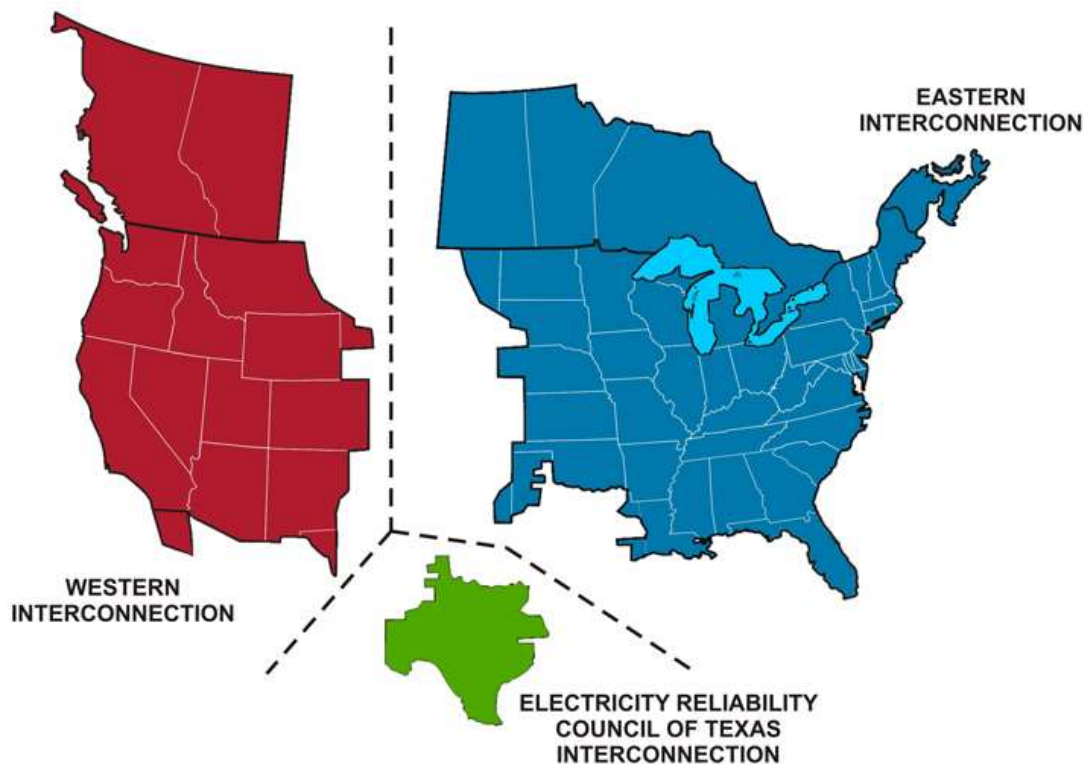
<https://www.houstonchronicle.com/business/energy/article/A-tale-of-two-freezes-How-the-Texas-grid-stayed-16005807.php>

- Inaction on the part of the state legislature and regulatory bodies (the Public Utilities Commission and the Texas Railroad Commission) to followup on the recommendations of the 2011 report by the FERC. While the imposition of regulations regarding weatherization was initially discussed in the legislature, the industry lobbied strongly against them. The result was instead a set of guidelines that generators were expected to implement. The outages in 2021 suggest that the guidelines were not universally adopted.

<https://www.texastribune.org/2021/02/22/texas-power-grid-extreme-weather/>

- After 2011, the structure of the electricity generating industry changed. The generation mix on Texas 'power grid went from 45 percent natural gas, 38 percent coal, 13 percent nuclear and 2 percent wind to 47 percent natural gas, 20 percent coal, 20 percent wind and 11 percent nuclear. The loss of coal plants could have been a factor in the collapse of generating capacity during last month's severe winter weather, Moura said. Those plants keep coal on site, and while coal piles can freeze up, it's not hard to break them up and continue to operate. Also, modern gas-fired plants, while more efficient, are more susceptible to freezing compared with the models of the 1980s. <https://www.houstonchronicle.com/business/energy/article/A-tale-of-two-freezes-How-the-Texas-grid-stayed-16005807.php>
- The lack of an interconnection between the Texas grid and the rest of the United States. Most of Texas, except the El Paso area, the Panhandle and parts of eastern Texas are part of the Texas Interconnection, which has few links to the rest of the country. Areas outside the ERCOT Interconnection experienced fewer and shorter

North American Electric Reliability Corporation Interconnections



outages than the rest of Texas.