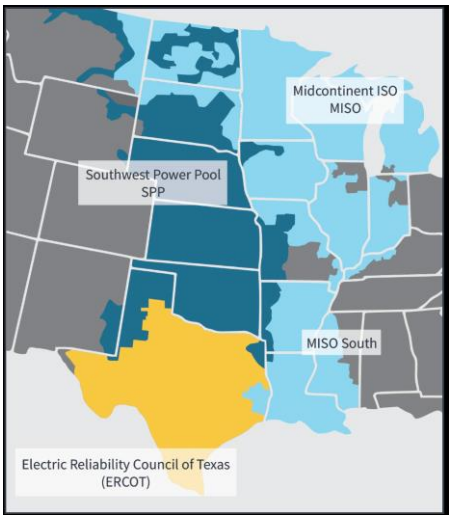
# FERC and NERC finally call for action on grid resilience, but is it enough?

Last February's extreme cold weather event known as Winter Storm Uri caused significant strain to the bulk power system in south-central states, causing grid emergencies that ultimately led to substantial load-shedding or blackouts in the region. These power system failures sparked numerous inquiries into the **resilience** of the nation's electricity grid. The most extensive, and likely definitive study of these February events was undertaken jointly by FERC and NERC in a recently-released report.[i] The report provides a detailed analysis of the events of February 8-20 and what caused them and offers **28 detailed recommendations** to avoid similar catastrophes in the future.

While these recommendations focus on what went wrong during Uri, they are silent with respect to what went well, such as the **performance of the region's coal fleet**.

Although Uri's cold weather increased electricity demand, it was generator outages that drove grid emergencies in the electricity regions of ERCOT, SPP, and MISO-South. The scale of these outages is staggering. Across the three regions, more than 65,000 megawatts (MW) of generating capacity was rendered unavailable due to the weather, as generator outages reached 37% of installed capacity.[ii] This was the largest wave of **weather-related outages** on record and led to the largest controlled load shedding (rolling blackouts) in U.S. history—totaling 23,418 MW.[iii]

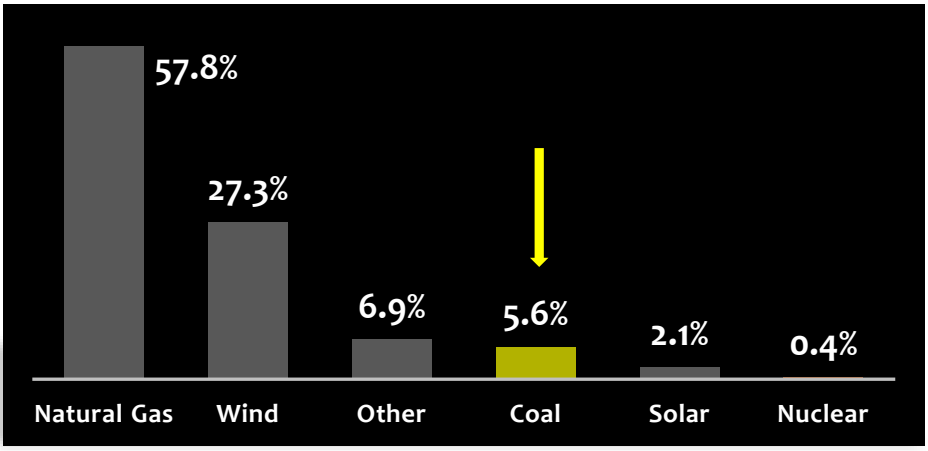



The report concluded that the event had two primary causes, both triggered by cold weather:

- Generating units that were **insufficiently prepared** for cold weather failed in large numbers.
- The **natural gas** fuel supply system was unable to meet demand from electricity generators due to an increase in residential demand for gas, weather-related declines in gas production, and a lack of firm fuel supply contracts by generators.

The report's presentation of generating unit data supports these conclusions. Of the outages, de-rates, and start-up failures that occurred, 44% were the result of "freezing issues," and 31% were the result of "fuel issues."[iv] Of generators failing due to fuel issues, 87% were natural gas units.[v] Overall, **58% of generator outages were natural gas units and 27% were wind turbines.** Coal generators accounted for **less than 6%** of unit outages that occurred during Winter Storm Uri.[vi]

**Generating Units that Experienced an Outage or Derate by Fuel Type, February 8-20, Share of Total**




Generator failures due to freezing issues arose from a number of sources, such as frozen instrumentation, sensors, and transmitters. The single largest cause of outages due to frozen equipment in the region was **frozen wind turbine blades**, which accounted for 27% of all freezing issues.[vii]

Generator failures due to **natural gas fuel supply issues** were found to have causes throughout the supply chain. These include weather-related reductions in natural gas production, low pipeline pressure and pipeline outages, and the lack of firm fuel delivery contracts by natural gas power plants. As the report succinctly put it, "Natural gas fuel supply issues alone caused 27.3 percent of the generating unit outages."[viii]

It is telling that in the 300+ page report detailing the causes of one of the nation's most devastating power system failures, there is little discussion of the region's coal generators and no mention of any systemic reliability risks to be addressed by the coal fleet. In fact, details of the performance of the region's coal capacity are relegated to an appendix[ix] where we learn that of the coal capacity that became unavailable during the event, only 11% was out due to "fuel issues." Most coal outages arose from "freezing issues" (52%).

We have been here before. As the report notes, the weather-induced generator outages that jeopardized bulk power system reliability are "part of a recurring pattern for the last ten years." Similar events occurred in 2011, 2014, and 2018. After each of these events, FERC and NERC also issued reports detailing causes and providing recommendations.[x] Whether due to poor implementation, lack of accountability, or insufficient scope, those recommendations did not lead to a grid resilient enough to withstand Winter Storm Uri.

In this new report, NERC and FERC again offer recommendations to enhance the resilience of the grid to cold weather events. The 28 recommendations include modifying reliability standards to require that generators identify cold weather-critical components and maintain or retrofit those components to operate reliably in cold conditions. Several recommendations are targeted at the **natural gas supply chain**, calling for the **winterization** of natural gas production and distribution infrastructure and for electricity generators to enact **firm natural gas supply contracts**.

These recommendations, if implemented, would enhance the resilience of the power supply, but each of them has associated costs that must be paid for. The report recommends that, "ISOs/RTOs (market operators) and/or public utility commissions should identify how best to ensure Generator Owners have the opportunity to be compensated for making these infrastructure investments."[xi] This will be a difficult task, as different power generators will have different cold weather and fuel supply risks to mitigate. Regulators may balk at the prospect of paying for investments in cold weather resilience for power plants that have chosen not to make those investments on their own.

At the same time, the report demonstrates the resilience already provided by the nation's coal generators during cold weather events. Maintaining existing coal capacity is a simple and cost-effective way to promote grid resilience, yet many coal plants remain at risk of retiring prematurely. FERC, NERC, and the ISO/RTOs should retain resilient coal generation while they are considering the more complicated and expensive task of making other forms of generation resilient during cold weather events.

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[i] Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC), and Regional Reliability Entities, *FERC—NERC—Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States*, November 2021, https://cms.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and.

[ii] See Figure 66a of the Report. For individual regions, outages in ERCOT peaked at 47,744 MW (38.8% of installed capacity), SPP at 31,238 MW (33.2%), and MISO-South at 16,846 MW (40.2%).

[iii] Report, p.9.

[iv] Report, Figure 92. These data are based on a count of individual generating units. When weighted by capacity, freezing issues account for 51% of outages and fuel issues account for 22% of outages (Figure 93).

[v] Report, Figure 95.

[vi] Report, Figure 91. When weighted by the amount of capacity that is out or derated (Figure 90), these values are 56% for natural gas, 23% for wind, and 18% for coal.

[vii] Report, Figure 94.

[viii] Report, p. 172.

[ix] Appendix D, where coal is presented alongside nuclear, solar, and "other" generators.

[x] FERC and NERC, *Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011, Causes and Recommendations*, August 2011, https://www.ferc.gov/sites/default/files/2020-07/OutagesandCurtailmentsDuringtheSouthwestColdWeatherEventofFebruary1-5-2011.pdf;
NERC, *Polar Vortex Review*, September 2014, https://www.nerc.com/pa/rrm/January%202014%20Polar%20Vortex%20Review/Polar_Vortex_Review_29_Sept_2014_Final.pdf;
FERC and NERC, *The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018*, July 2019, https://www.ferc.gov/sites/default/files/2020-07/SouthCentralUnitedStatesColdWeatherBulkElectricSystemEventofJanuary17-2018.pdf.

[xi] Report, Key Recommendation #2, p. 191.