

FERC/NERC/Regional Entity Inquiry

Federal Energy Regulatory Commission

Washington D.C.



FERC - NERC - Regional Entity Staff Report: The February 2021 Cold Weather Outages in Texas and the South Central United States

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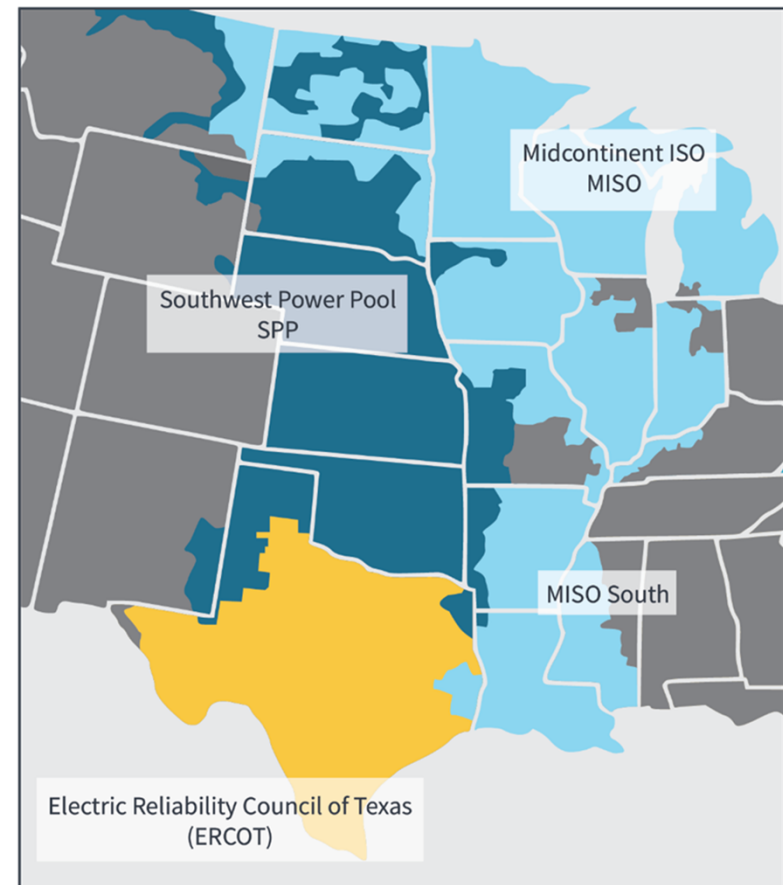
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Inquiry Commencement

- ❑ Largest firm load shed event in U.S. history (**23,418 MW**)
- ❑ **Fourth** event in the past **10** years in which cold weather-related unplanned generating unit outages jeopardized bulk-power system reliability
- ❑ Joint Inquiry initiated on February 16, 2021

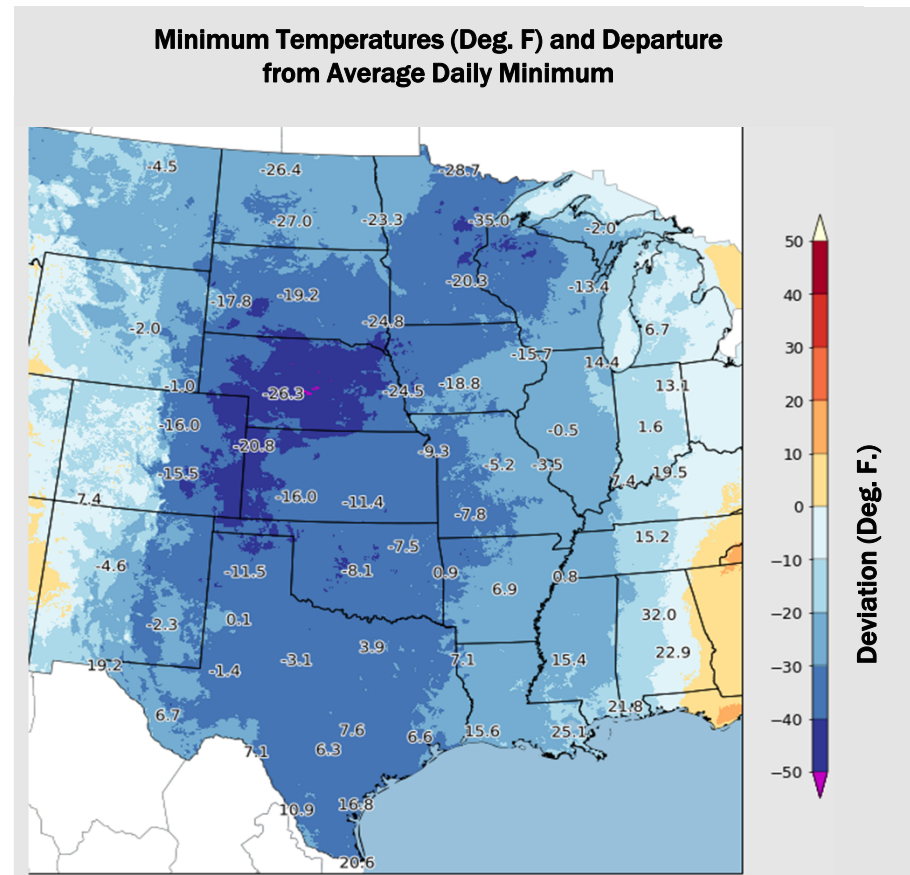




Cold Weather Conditions

February 15, 2021

- ❑ Deviations up to 40-50 degrees from the normal low temperatures -February 15, 2021
- ❑ Actual low temperature values shown on map

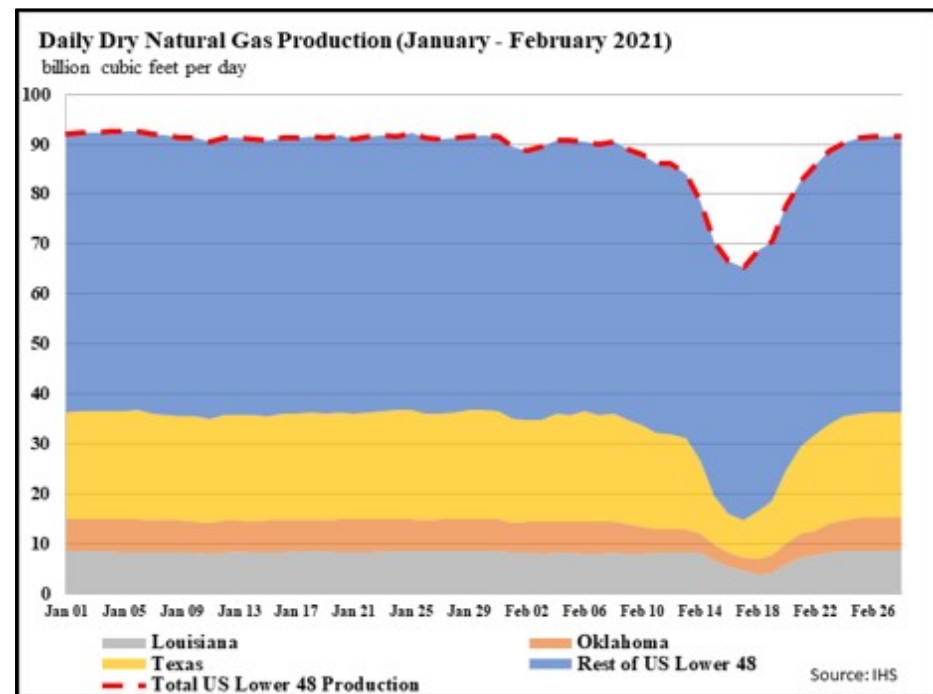


(Source: NOAA)



Effect on Natural Gas System

- ❑ Largest U.S. monthly decline of natural gas production on record.
- ❑ Between February 8 and 17, the total natural gas production in the U.S. Lower 48 fell by 28 percent, while Texas production declined 70.1 percent (as compared to January average).
- ❑ Most producing regions of the U.S. saw a sharp decline and recovery.

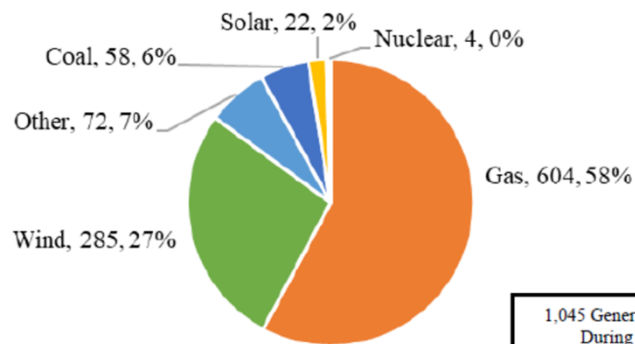




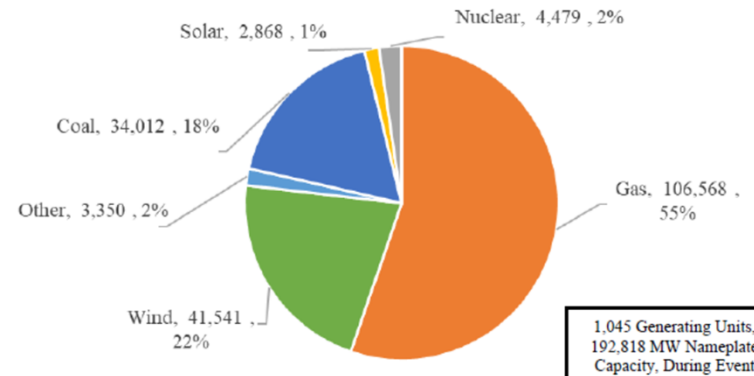
Unprecedented Generation Shortfalls

- ❑ 1,045 individual generating units experienced 4,124 outages, derates or failures to start, of which 604 (58 percent of all units) were natural gas-fired generators.
- ❑ Less than 1% nuclear generation experienced outages or derates.

Fuel Type of Generating Units That Experienced Incremental Unplanned Outages and Derates (by Number of Generators), Total Event Area



Fuel Type of Generating Units That Experienced Unplanned Outages and Derates (by MW of Nameplate Capacity), Total Event Area



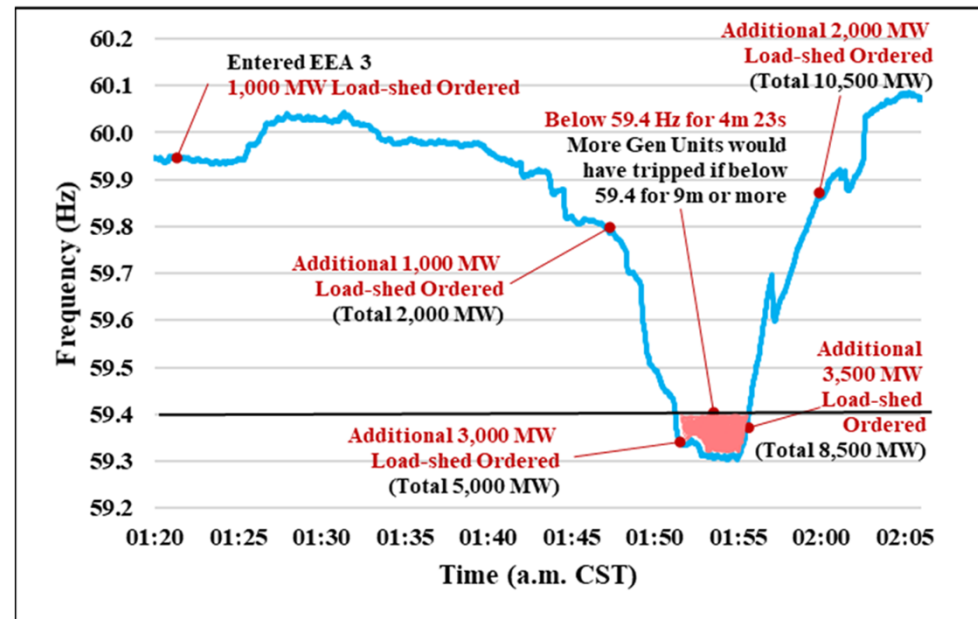


Generation Shortfalls Led to Energy Emergencies

❑ ERCOT, SPP, and MISO Balancing Authorities declared Energy Emergencies and ordered firm load shed at different points of time, in total **23,418 MW**:

- ERCOT: nearly three consecutive days and at its worst point, **20,000 MW**,
- SPP: over four hours total and at its worst point, **2,718 MW**, and
- MISO (MISO South): over two hours and at its worst point, **700 MW**.

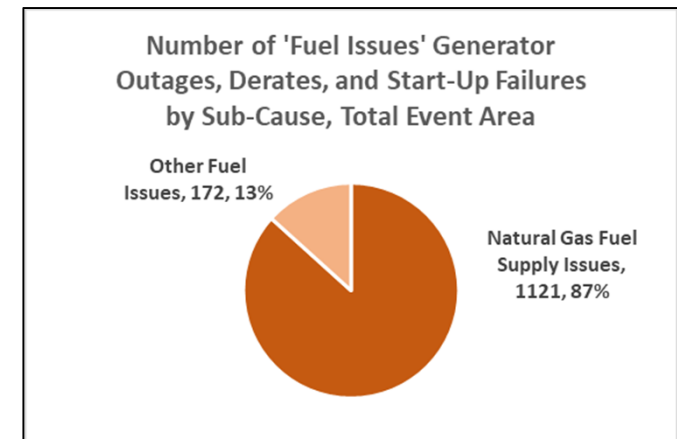
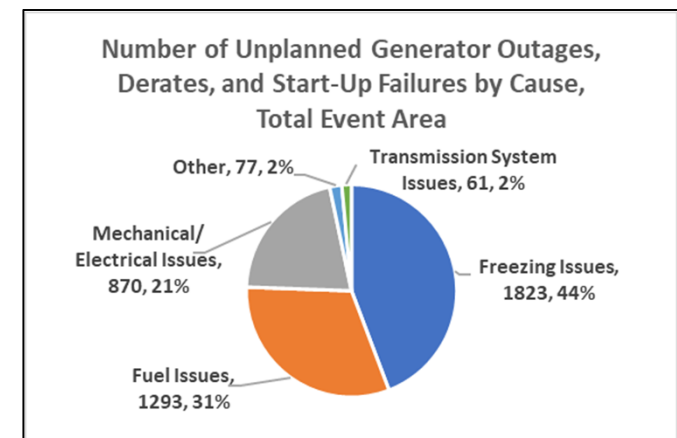
ERCOT Low Frequency Excursion





Causes of Generation Shortfalls

- ❑ 75 percent of the generating unit outages, derates, and failures to start, were caused by:
 - Freezing Issues (44 percent)
 - Fuel Issues (31 percent).
- ❑ Out of all outages and derates caused by Fuel Issues, 87 percent were:
 - Natural Gas Fuel Supply issues (27 percent of total outages, derates, etc.).





28 Recommendations

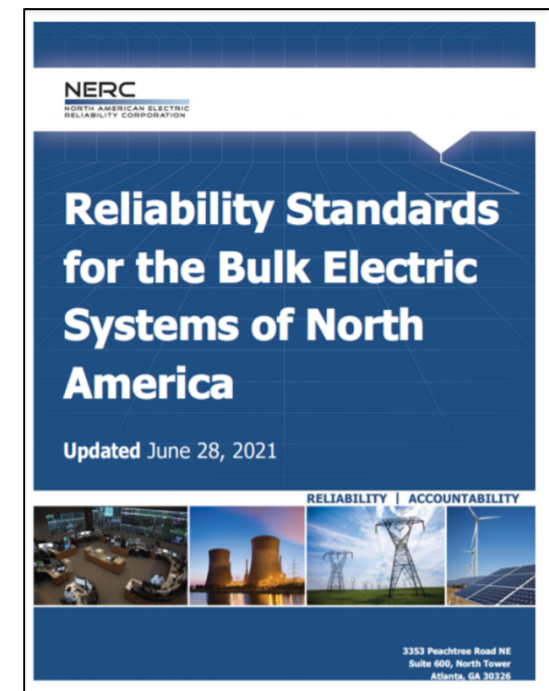
- ❑ Nine key recommendations, including recommendations for NERC Reliability Standards changes that go above and beyond the Reliability Standards revisions to address cold weather accepted by the Commission in August 2021. (See 176 FERC ¶ 61,119 (2021))
- ❑ Five recommendations for further study, which includes study of ERCOT black start unit availability during cold weather
- ❑ Each have recommended timeframes for implementation (e.g., before Winter 2022/2023, before Winter 2023/2024)
- ❑ Some could extend beyond winter 2023-2024, but should be completed as soon as possible



Recommendations:

New or revised Reliability Standards

- ☐ Identification and protection of cold weather critical components
- ☐ Account for effects of precipitation and cooling effect of wind
- ☐ Corrective action plans for generating units that fail due to freezing issues
- ☐ Annual training for cold weather preparedness
- ☐ Retrofit or design (if building new) generating units to operate to specific extreme cold weather conditions

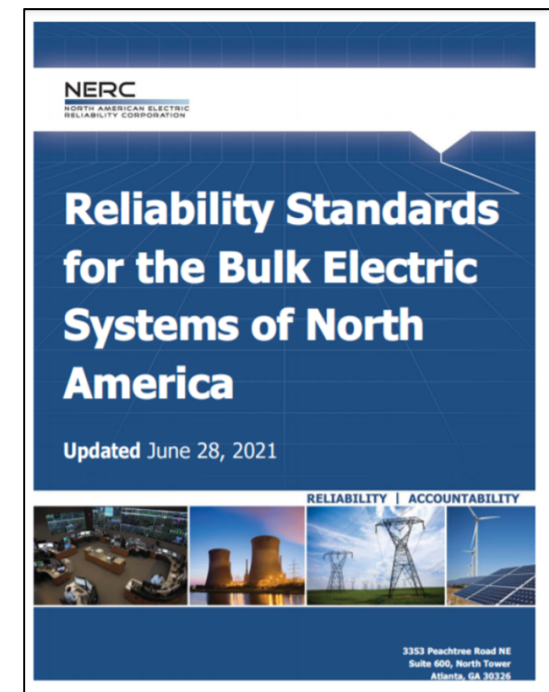




Recommendations:

New or revised Reliability Standards

- ❑ GOs/GOPs to provide percentage of total unit capacity that BA can rely on during local forecasted cold weather, including reliability risks related to natural gas fuel contracts
- ❑ Entities involved in load shedding to take actions to protect critical natural gas infrastructure from losing power during demand response and load shedding events
- ❑ Separation of circuits used for manual load shedding from UFLS/UVLS circuits, use UFLS/UVLS circuits for manual load shedding as last resort





Recommendations:

Natural Gas Infrastructure Reliability

- ❑ Congress, state legislatures and regulators with jurisdiction over natural gas infrastructure should require those natural gas infrastructure facilities to have cold weather preparedness plans, including measures to prepare to operate during a weather emergency. (Key Rec. 5)
- ❑ Natural gas infrastructure entities undertake voluntary measures to prepare for cold weather (Report provides a list of measures that can be performed with long- or short-lead-times) (Key Rec. 6)



Recommendation:

Natural Gas – Electric Forum

- Team proposed a forum in which representatives of state legislatures and/or regulators with jurisdiction over natural gas infrastructure, in cooperation with FERC, NERC, and the Regional Entities, and with input from the grid operators and gas infrastructure entities, identify concrete actions (consistent with the forum participants' jurisdiction) to improve the reliability of the natural gas infrastructure system necessary to support bulk-power system reliability.
(Key Rec. 7)



Other Recommendation Areas

- ❑ 24 other recommendations, including:
 - Identify and communicate reliability risks of natural gas fuel contracts.
 - Conduct technical conference to discuss how to improve generator winter readiness - planned for **April 27-28, 2022**.
 - Inspection and maintenance of freeze protection measures at specific winter weather timeframes.
 - Improve reserve margin projections for winter peak conditions.



Questions?

The full report can be found at:

<https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and>