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NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION



NAESB Gas-Electric Harmonization Forum: Response to Recommendation 7 from the Staff Report on the February 2021 Cold Weather Outages

Kick-Off Meeting, August 30, 2022



This report was prepared by the staff of the Federal Energy Regulatory Commission in consultation with staff from the North American Electric Reliability Corporation and its Regional Entities. The report and this presentation do not necessarily reflect the views of the Commission.

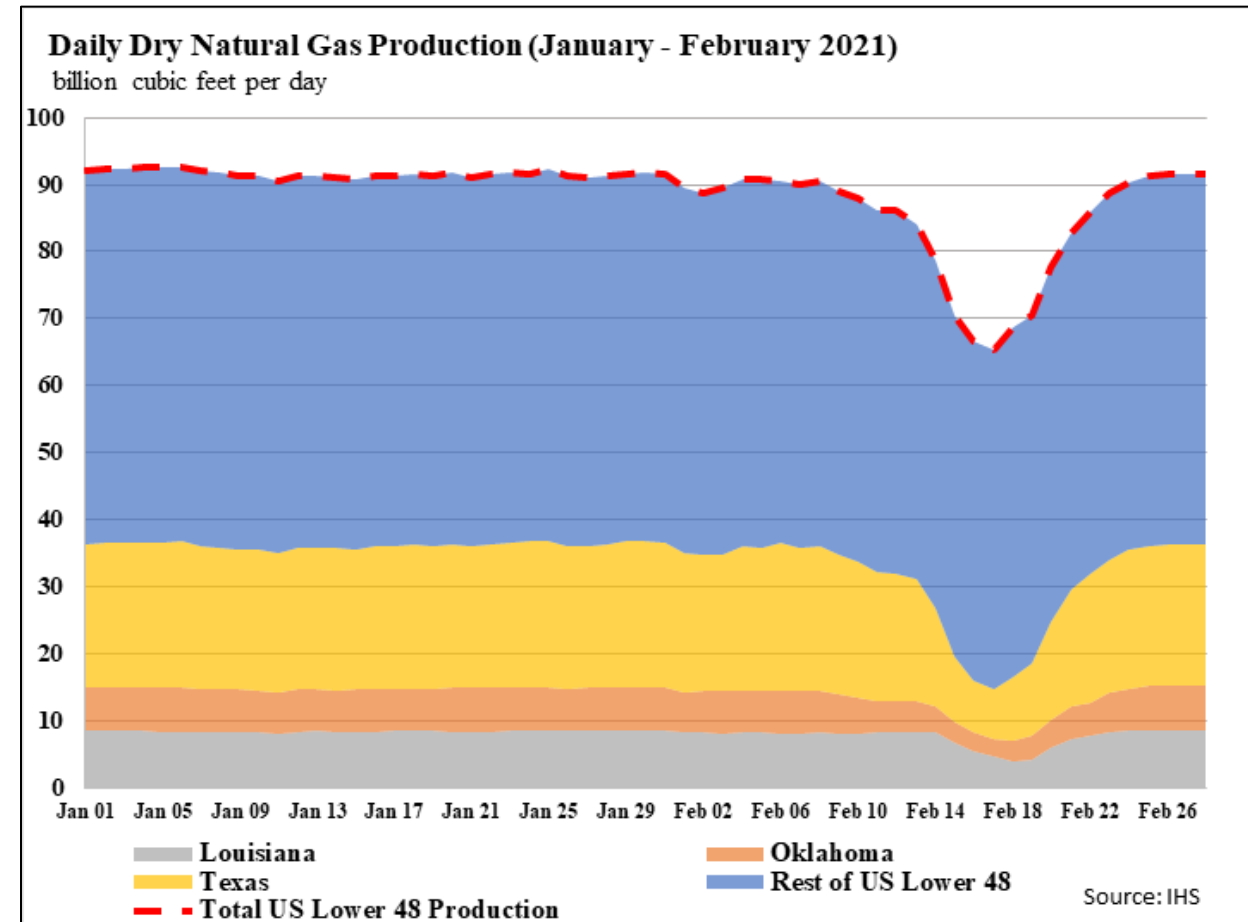
What Happened in February 2021?

- During the week of February 14, 2021, for over two consecutive days, ERCOT averaged 34,000 megawatts (MW) of generation outages, nearly half of ERCOT's 2021 all-time winter peak load of 69,871 MW.
- Largest firm load shed event in U.S. history (23,418 MW), third largest in quantity of outaged MW of load (August '03 and August '96 blackouts).
- Fourth event in the past 10 years which jeopardized bulk-power system reliability due to unplanned generating unit outages which escalated due to cold weather.



Effect on Natural Gas System

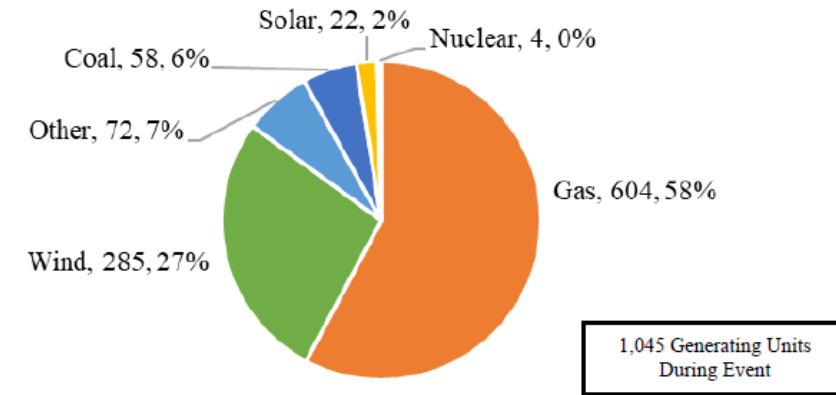
- Largest U.S. monthly decline of natural gas production on record.
- Between February 8 and 17, the total natural gas production in the U.S. Lower 48 fell by **28 percent**, while Texas production declined **70.1 percent** (as compared to January average).
- Most producing regions of the U.S. saw a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



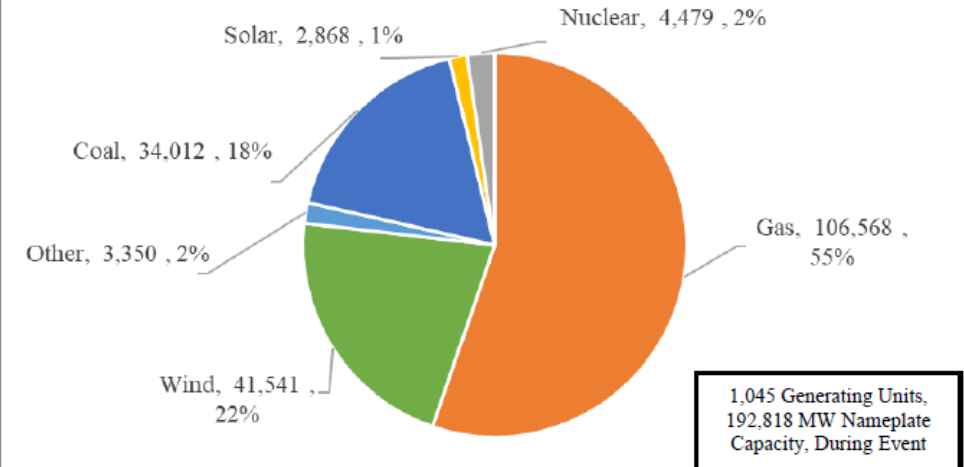
Unprecedented Electric Generation Shortfalls Due to Cold Weather Conditions

- **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.

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

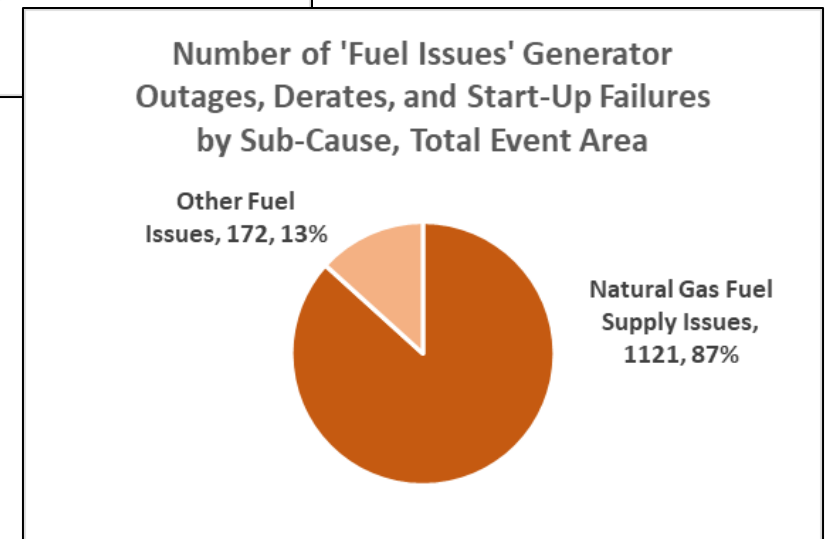
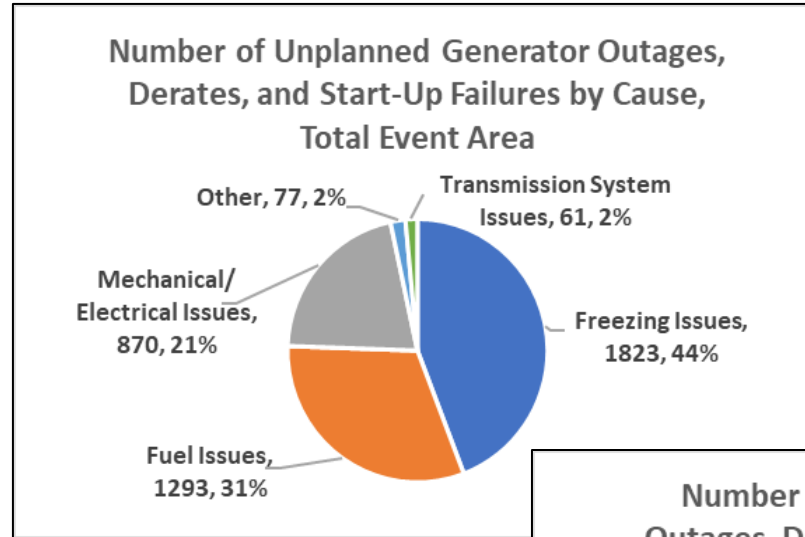


Fuel Type of Generating Units That Experienced Unplanned Outages and Derates (by MW of Nameplate Capacity), Total Event Area



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 overall)**.



Causes of Generation Shortfalls

Natural Gas Fuel Supply Issues

- **Natural Gas Fuel Supply Issues** root cause: natural gas production declines at wellheads, gathering, and processing facilities, due to:
 - Wellhead shut-ins to prevent freezing issues **18.0 percent**
 - Freezing issues (wellhead, midstream, roads) **25.3 percent**
 - Power outages **21.5 percent**
- Natural gas production facility loss of power was primarily due to weather-related power line outages and firm load shed.
- The percentage of production declines caused by power outages on February 14, which only included part of ERCOT's load shed (**18 percent**), varied little from the overall Event, (**21.5 percent**), and the day of maximum production decline, February 17, (**21.5 percent**).



Causes of Generation Shortfalls

Natural Gas Fuel Supply Issues

- “Natural gas fuel supply issues” included decreased natural gas production, the specific terms and conditions of natural gas commodity and pipeline transportation contracts, and other issues like low pipeline pressure
- Only 29% of generating units with unplanned outages had both firm transportation and firm commodity contracts (29% was the average for the Event Area, varied from 24% in ERCOT to 33% in SPP)



Recommendation: Natural Gas-Electric Reliability 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 Recommendation 7)



Recommendation:

Natural Gas-Electric Reliability Forum

- Forum outcome goals:
 - **Concrete actions** to increase reliability of natural gas infrastructure system necessary to support Bulk Electric System
 - **Plans** for implementing actions
 - **Deadlines** for implementing actions
 - Identifying entities **responsible** for implementing actions



Recommendation:

Natural Gas-Electric Reliability Forum

- Team suggested 13 topics (plus four in Rec. 24, for further study)
- Team also acknowledged that it did not mean to be “prescriptive as to ... the topics addressed”
- Topics fall into one of 3 categories:
 - Measures to improve gas-electric information-sharing for improved system performance during extreme cold weather emergencies
 - Measures to improve reliability of natural gas facilities during cold weather (freeze protection, electric supply)
 - Measures to improve the ability of generators to obtain fuel during extreme cold weather events when natural gas heating load & natural gas-fired generators are both in high demand for natural gas, at the same time that natural gas production may have decreased



Information Sharing/System Performance Topics

- Whether and how natural gas information could be aggregated on a regional basis for sharing with electric system operators in preparation for and during events in which demand is expected to rise sharply for both electricity and natural gas, including whether creation of a voluntary natural gas coordinator would be feasible
- Expanding/revising natural gas demand response/interruptible customer programs to better coordinate the increasing frequency of coinciding electric and natural gas peak load demands and better inform natural gas consumers about real-time pricing
- Electric and natural gas industry interdependencies (communications, contracts, constraints, scheduling)



Measures to improve reliability of natural gas facilities during cold weather (freeze protection, electric supply)

- Additional state actions (including possibly establishing an organization to set voluntary standards) to enhance the systemic reliability of intrastate natural gas pipelines and other intrastate natural gas facilities
- Methods to streamline the process for, and eliminate barriers to, identifying, protecting and prioritizing critical natural gas infrastructure load [[See also Recommendation 28-guidelines to identify critical natural gas facility loads](#)]
- Programs to encourage and provide compensation opportunities for natural gas facility winterization/[Possible financial incentives for the natural gas infrastructure system necessary to support the BES to winterize or otherwise prepare to perform during extreme cold weather events](#)



Improving the Ability of Generators to Obtain Natural Gas During Extreme Cold Weather Events

- How to identify those instances where requirements for certain natural gas-fired generating units to obtain either firm supply and/or transportation or dual fuel capability would be cost-effective, how such requirements could be structured, including associated compensation mechanisms, and whether additional infrastructure buildout would be needed and consumer cost impacts of such a buildout/**market/public funding for generators to have firm transportation and supply and invest in storage contracts. Such funding may need to finance infrastructure necessary to provide additional firm transportation capacity, because many existing pipelines were financed and constructed to serve LDCs and may not have sufficient additional firm capacity**



Improving the Ability of Generators to Obtain Natural Gas During Extreme Cold Weather Events (cont'd.)

- Which entity has authority, and under what circumstances, to take emergency actions to give critical generators pipeline transportation priority second only to residential heating load, during cold weather events when natural gas supply and transportation is limited but demand is high
- Whether resource accreditation requirements for certain natural gas generating units should factor in the firmness of a unit's gas commodity and transportation arrangements as well as the potential for correlated outages for units served by the same pipeline(s)
- Possible investments in strategic natural gas storage facilities, which could be located to serve the majority of pipelines supplying natural gas-fired generating units, and preserved for use during extreme cold weather events



Improving the Ability of Generators to Obtain Natural Gas During Extreme Cold Weather Events (cont'd.)

- Whether there are barriers to the use of dual fuel capability that could be addressed by changes in state or federal rules or regulations, as well as considering the use of other resources which could help mitigate the risk of loss of natural gas fuel supply
- Increasing access to/utilization of market-area and behind-the-city-gate natural gas storage
- Whether or how to increase the number of “peak-shaver” gas-fired generating units that have on-site LNG storage
- Possible options for increased regasification of liquid natural gas, including possible Jones Acts waivers





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**The full report can be found at links below.
Key Recommendation 7 begins on page 196.**

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

or

<https://www.nerc.com/news/Pages/Final-Report-on-February-2021-Freeze-Underscores-Winterization-Recommendations.aspx>



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