



**Item 14: ERCOT Discussion on FERC, NERC
and NERC Regional Entity Staff Final Report
on February 2021 Cold Weather Outages in
Texas and the South Central United States**

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Board of Directors Meeting

ERCOT Public

December 9-10, 2021

Agenda

- Synopsis of Event
- Inquiry Process
- Findings
- Recommendations
- Responsive Activities Within ERCOT Region
- Questions

Synopsis of Event

- In February, Winter Storm Uri brought record-setting, sub-freezing temperatures and wind chills across Texas and the South-Central US
 - Within Texas:
 - Some key locations experienced the coldest 3-day stretch on record
 - The duration of time for temperatures at or below freezing was extraordinarily long
 - Temperatures in Dallas and Austin were continuously at or below freezing temperature for almost 6-7 days straight
- Within ERCOT, approximately 48.6% of generation was forced out at the highest point due to the impacts of various extreme weather conditions
- Controlled outages were implemented to prevent statewide blackout
 - Electric demand had to be limited to available generation supply
- Local utilities were limited in their ability to rotate outages due to the magnitude of generation unavailability and the number of circuits with critical load

Inquiry Process

- On February 16, the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC) announced a Joint Inquiry to “*examine the root causes of the reliability events that have occurred throughout the country, in particular the regions served by ERCOT, MISO, and SPP.*”
- The inquiry team consisted of individuals from FERC, NERC, all 6 NERC Regional Entities, DOE, and NOAA
- Data was collected via requests for information from multiple entities across the impacted regions
- Interviews were held to examine the data more thoroughly
- A draft report was issued in September 2021
- The final report was released on November 16, 2021

Findings (Entire Event Area)

- Natural gas fuel supply issues
- Natural gas/electric fuel interdependency
- Generation freezing issues
- Firm load shed affected natural gas facilities
- Manual and automatic load shed coordination
- SPP, MISO and ERCOT Reliability Coordinators (RCs) coordinated and communicated well with each other

Key Recommendations

- New/Revised Mandatory Reliability Standards Related to:
 - Weatherization
 - Natural gas infrastructure considerations
 - Load shedding considerations
- Funding for generator weatherization
- Natural gas infrastructure winterization
- Natural Gas/Electric Reliability Forum
- Identification/communication of risks related to gas supply contracts
- FERC/NERC hosting of technical conferences to improve generator readiness
- Inspection/maintenance of freeze protection measures prior to and during winter
- Winter reserve margin calculations should consider more extreme scenarios

Other Areas of Recommendations

Fourteen additional recommendations covering issues including:

- Effects of cold weather on mechanical fatigue
- Increasing the flexibility of manual load shedding
- Generation Owner/Operator use of weather forecasts
- Coordination of protective relay settings associated with generator underfrequency relays
- Coordination of underfrequency load shed (UFLS) relay settings with generating unit time-delay protection systems
- Increase real-time monitoring of gas well-heads

Perform additional study in five areas:

- Black start unit reliability
- Additional ERCOT connections to other interconnections
- Potential measures to address natural gas supply shortfalls
- Potential effects of low-frequency events on generators in the Western and Eastern Interconnections
- Guidelines for identifying critical natural gas infrastructure loads



Responsive Activities Within ERCOT Region

- ERCOT has initiated or completed work on nearly all recommendations from the Joint Inquiry that are applicable to ERCOT, as well as a number of other recommendations identified by Texas regulators, legislators, and ERCOT itself
- All of these are designed to improve grid reliability on behalf of Texans
- ERCOT published a Roadmap to Improving Grid Reliability in July
 - Many items are directly related to the Joint Inquiry recommendations

Responsive Activities Within ERCOT Region

ERCOT Roadmap to Improving Grid Reliability

| ID | Description | Status |
|----|---|----------|
| 3 | Propose new market rule requiring generators to report all forced outages and automatically release outage information if there is a grid event. This will allow ERCOT to more quickly communicate about grid conditions. | Complete |
| 4 | Propose a new market rule for generators to provide operational updates more frequently. This will improve situational awareness for grid operators. | Complete |
| 9 | Improve the assessment and communication of extreme low-probability, high-impact weather scenarios, including temperatures, durations, precipitation, humidity, and wind. Propose updated methodologies for the Seasonal Assessment of Resource Adequacy (SARA) for the ERCOT Region and other resource adequacy studies. This will improve public awareness about the potential high impacts of low-probability severe situations. | Complete |
| 10 | Assign a senior staff member to staff the State Operations Center as needed. This will improve the working relationship with state agencies during major events. | Complete |
| 11 | Review energy delivery procedures for controlled outages in the event an energy emergency occurs. This will improve coordination and emergency response. | Complete |
| 12 | Improve government agency alignment through responsiveness to the PUC and a partnership with the Texas Division of Emergency Management, Railroad Commission of Texas Energy Reliability Council, and others, including exchange of ideas, improved communications, and training. | Complete |
| 16 | Improve and expand toolsets to manage short-supply situations. This includes facilitating additional voluntary load reductions and procuring additional ancillary or reliability services from resources with unique capabilities to operate during extreme weather conditions. | Complete |



Responsive Activities Within ERCOT Region

| ID | Description | Status |
|----|---|----------|
| 21 | Add short-term solar forecasts into existing models as solar power expands in Texas. This will improve reliability and help lower costs. | Complete |
| 22 | Launch an initiative to identify when ERCOT forecasts have high variability and consider whether additional reserves need to be procured during that period. This will help limit operational risks. | Complete |
| 24 | Test large industrial customers who are paid to reduce their power during an emergency. These resources help preserve system reliability and it is important to test them to ensure performance. | Complete |
| 26 | Perform unannounced testing to validate maximum sustained energy production from generators. This verifies information that generation owners have provided. | Complete |
| 37 | Promote and endorse PUC actions to begin work on Black Start Plan improvements. While all the work of this plan is designed to prevent the need for a Black Start process, it is incumbent on responsible grid managers to invest appropriately to minimize the length of the process if it is ever needed. This will protect Texans and the Texas economy in the case of the one-in-a-million event. | Complete |
| 52 | Assess and develop a plan to improve the accuracy of generation reporting to ERCOT. Determine whether resource adequacy trips resulted from low frequency require changes to market operations. Review load resource programs and evaluate effectiveness. | Complete |
| 56 | Evaluate market incentives to improve fuel security. | Complete |
| 57 | Consider on-site fuel supply including contracts with remote secured supplies. | Complete |

Responsive Activities Within ERCOT Region

| ID | Description | Status |
|----|---|---|
| 5 | Require all market participants who own or operate generation resources and/or transmission/distribution power lines to submit a letter signed by their CEO twice a year attesting that their companies have completed their weatherization preparations to protect the electric grid for the summer and winter respectively. | In progress – tied to PUCT weatherization efforts |
| 7 | Revise market processes to continuously run planning assessments needed to bring resources back online in anticipation of tight grid conditions. This will allow grid operators to better coordinate generation outages. | In progress |
| 47 | Review weatherization and emergency operation plans for generation resources. Provide information, technical expertise and analysis to the PUC in support of rulemaking and implementation. | In progress – tied to PUCT weatherization efforts |
| 54 | Improve load forecasts in emergency conditions and evaluate accuracy of past predictions. This will help improve reliability. | In progress |
| 59 | Assess the potential costs and benefits of increased transmission both internal and external to ERCOT and increase coordination with other power regions. | In progress |

Responsive Activities Within ERCOT Region

- State Legislature Actions
 - Senate Bill 3 (SB 3)
 - Subchapter A, Chapter 35, Utilities code was amended by adding Section 35.0021 related to Weather Emergency Preparedness
 - Subchapter C, Chapter 81, Natural Resources code was amended by adding Section 81.073 related to critical natural gas facilities and entities
 - Subchapter C, Chapter 86, Natural Resources code was amended by adding Section 86.0044 related to Weather Emergency Preparedness for natural gas supply chain
 - Subchapter D, Chapter 38, Utilities Code was amended by adding Sections 38.074, 38.075, 38.076, and 38.077 related to critical natural gas facilities and entities, weather emergency preparedness, involuntary and involuntary load shedding, and load shedding exercises
 - Subchapter A, Chapter 186, Utilities code was amended by adding Section 186.008 Railroad Commission weather preparedness reports

Responsive Activities Within ERCOT Region

- Public Utility Commission Activities:
 - Adopted 16 Texas Administrative Code Section 25.55 related to weather emergency preparedness as required by SB 3
 - Contemplates 2 phase approach
 - Phase 1
 - Generators must address issues from last winter and meet levels recommended after 2011 event
 - Generators must provide a report to ERCOT attesting they have made changes, and
 - If a generator has not finished the changes they must explain why and give a timeline for the improvements to be complete
 - ERCOT is responsible for implementing a risk-based methodology to inspect selected generators and TDSP substations
 - Phase 2
 - To implement more detailed weatherization standards once an ongoing state weather study is completed
 - ERCOT is working with PUCT on several other activities to improve grid reliability that are not directly related to the recommendations in the Joint Inquiry



Responsive Activities Within ERCOT Region

Protocol Revisions that address recommendations from the Joint Inquiry:

- NPPRR1094, Allow Under Frequency Relay Load to be Manually Shed During EEA3
- NPPRR1105, Option to Deploy Distribution Voltage Reduction Measures Prior to Energy Emergency Alert (EEA)
- NPPRR106, Deployment of Emergency Response Service (ERS) Prior to Declaration of Energy Emergency Alert (EEA)
- NPPRR1108, ERCOT Shall Approve or Deny All Resource Outage Requests
- NPPRR1109, Process for Reinstating Decommissioned Generation Resources

Questions?