MEMORANDUM

TO: Council Members and Power Staff
FROM: Brian Dekiep, Senior Energy Analyst: Montana office
SUBJECT: Update on February 2021 Power and Weather events in Texas

BACKGROUND:

Presenter: Beth Garza: Former Independent Market Monitor Electric Reliability Council of Texas. Senior Fellow with R Street’s Energy & Environmental Policy Team.

Summary: In February 2021, the state of Texas suffered a major power crisis as a result of a series of severe winter storms sweeping across the United States.

As Texas faced record-low temperatures this February, the state’s electric grid operator Electric Reliability Council of Texas (ERCOT) had to implement emergency operations and extremely high-power prices as the power supply and load became unbalanced. These conditions resulted in forced curtailment of load and blackouts in many areas of the state, leaving millions without access to electricity during record cold conditions. Blackouts extended from several hours for some and days for others. Many have called for investigations into ERCOT and the root cause of the power outages. Many factors contributed to the events and outages including, record cold temps, inaccurate load forecasts, lack of equipment weatherization leading to frozen (generation, supply lines and production equipment).
ERCOT which is independent from other parts of the US grid, manages the flow of electric power to more than 26 million Texas customers -- representing about 90 percent of the state’s electric load. As the independent system operator for the region, ERCOT schedules power on an electric grid that connects more than 46,500 miles of transmission lines and 710+ generation units. It also performs financial settlement for the competitive wholesale bulk-power market and administers retail switching for 8 million premises in competitive choice areas. ERCOT is a membership-based 501(c)(4) nonprofit corporation, governed by a board of directors and subject to oversight by the Public Utility Commission of Texas and the Texas Legislature. Its members include consumers, cooperatives, generators, power marketers, retail electric providers, investor-owned electric utilities, transmission and distribution providers and municipally owned electric utilities. (http://www.ercot.com/about)

Beth Garza is a senior fellow with R Street’s Energy & Environmental Policy Team. Prior to joining R Street, Beth served as the director of the Electric Reliability Council of Texas Independent Market Monitor from 2014 through 2019 after serving as the deputy director since 2008. In this role, she was responsible for monitoring market participant activity, evaluating wholesale market operations and recommending improvements to the wholesale market design. Over the course of her 35-year career in the electric utility industry, Beth has held a variety of leadership roles in generation and transmission planning, system operations, regulatory affairs and market design for both regulated and competitive entities. Her previous employers include Nextera and Austin Energy. Beth is a graduate of the University of Missouri and is a registered professional engineer in the State of Texas. (https://www.rstreet.org/)
What Happened in Texas?
NWPCC
May 5, 2021

Beth Garza
R Street Institute
Weather
Weather - Electricity
Weather – Electricity – Water
Weather – Electricity – Water – Financial
Key aspects of the ERCOT region

- Limited interties
- No FERC jurisdiction over market operations or outcomes
- FERC/NERC/TRE oversight of reliability standards
- Retail competition for most of the region since 2002.
  - Municipals and Co-operatives are exempt (~25% of total load)
- Large consumers of electricity across customer classes
  - Typical residential consumption: 10-12 MWH/year, ~ 10cents/kWh total cost
Key aspects of the ERCOT market and organization

- Energy only
  - No market for installed capacity
  - Load serving entities have no requirement to own or procure installed capacity

- Decentralized capacity commitment

- Relatively large Ancillary Service requirements
  \[ \sim 5 \text{GW +/- 10\%} \]

- Potential for very high wholesale electricity prices
  - Offer cap set at $9,000 per MWh

- 1800+ market participants in one of seven segments – including consumers: Res / Comm / Ind

- Hybrid Board of Directors, includes ERCOT CEO, and PUC Chair, reps from each market segment, and unaffiliated members.
Sunday, February 14 – Monday, February 15

8 AM
Conservation Alert & Media Appeal

10:00 am
Texas Energy Reliability Council meeting: Focus on natural gas supply

10:54 am
WATCH: Insufficient Ancillary Services Offers for Responsive Reserve

12 PM
News Conference: Forecast Emergency Operations

2:00 pm
WATCH: Freezing Precipitation Forces Transmission Outages

3:17 pm
WATCH: Projected Reserve Capacity Shortage

5:19 pm
Afternoon NWS Issues Wind Chill Warnings

9:58 pm
CANCELLED: Projected Reserve Capacity Watch

11:17 pm
Deployed Responsive Reserve

11:32 pm
ADVISORY: Physical Response Reserve Less Than 3,000 MW

12:15 am
EMERGENCY OPERATIONS LEVEL 1:
Reserves Below 2,300

1:07 am
EMERGENCY OPERATIONS LEVEL 2:
Reserves Below 1,750 Load Resources Deployed Conservation Urged

1:20 am
EMERGENCY OPERATIONS LEVEL 3:
Rotating Outages:
10,800 MW Load Dropped

7:06 pm
New Winter Peak
69,222 MW

Note: All times are approximate
Rapid Decrease in Generation Causes Frequency Drop

- Entered EEA 3 1,000 MW Load-shed Ordered
- 35,343 MW Generation Capacity Out as of 1:23 am
- 1,418 MW Generation Outages 1:26am – 1:42am
- 248 MW Generation Outages
- 329 MW Generation Outages
- Additional 1,000 MW Load-Shed Ordered (Total 2,000 MW)
- Below 59.4 Hz for 4m 23s
- More Gen Units would have tripped if below 59.4 for 9m or more
- Additional 2,000 MW Load-Shed Ordered (Total 10,500 MW)
- 594 MW Generation Outages
- 843 MW Generation Outages
- 841 MW Generation Outages
- Additional 3,500 MW Load-Shed Ordered (Total 8,500 MW)
- 688 MW Generation Outages
- 511 MW Generation Outages
- Additional 3,000 MW Load-Shed Ordered (Total 5,000 MW)
- Min Frequency 59.302 Hz
Generation Capacity Out February 14 – 19, 2021

Peak Generation Out: 48.6%
(52,277 MW out of 107,514 MW total installed capacity)

- 25,000 MW of forced outages, including 14,000 MW of wind and solar
- 2,800 MW of planned outages, including seasonally mothballed capacity
Net Generator Outages and Derates by Fuel Type (MW)

Wind and solar MW values based on estimated lost output due to outages and derates from slides 15 and 16.
Available Generation and Estimated Load Without Load Shed

Available Generation shown is the total HSL of Online Resources, including Quick Starts in OFFQS. The total uses the current MW for Resources in Start-up, Shut-Down, and ONTEST.
Simple Explanations

- Winter preparation was insufficient
  - Electricity, natural gas, water, roads, individuals
- Increased co-dependence of electricity and natural gas systems
- Inability for distribution utilities to rotate electricity outages, forcing curtailment burden to not be broadly shared
- Inappropriate reliance on market forces for the duration of emergency operations
Personnel Fallout

• All three PUC Commissioners resigned
  • Two new appointees now seated
• All five unaffiliated Board members ‘resigned’
  • Chair and Vice Chair vacant
• ERCOT CEO ousted
  • Interim now in place
Financial Fallout

• ERCOT owed ~$3B / participants short-paid
  • Current default uplift process insufficient ($2.5M / month)
• Countless lawsuits and bankruptcies
  • Brazos Co-op: Chapter 11, ~$1.8B owed to ERCOT
  • Rayburn Co-op teetering, ~$0.6B owed to ERCOT
  • PUCT Complaints / Appeals of PUCT action(s)
  • Suits against ERCOT / Sovereign immunity unclear
  • Contractual disputes of all types
    • San Antonio sued 16 natural gas suppliers “price gouging”
Possible Legislative Changes

- ERCOT Board members must live in Texas
  - Unaffiliated members -> political appointees
- More stringent winterization requirements
  - Funded?
  - Penalties
  - Natural gas fuel facilities included?
- Securitization
  - Natural gas utilities / electric co-ops / broader
- Additional costs assigned to Intermittent Renewable Generators
- Weather Alert / Improved Communications
- Dispatchable generation requirement
Better Changes

- Increased investment in demand side – insulation & repair
- Shared legislative oversight of natural gas and electricity
- PUCT consider installed capacity requirement of some type
- PUCT consider when and how to stop and restart electricity market
- ERCOT require all entities to have securitized collateral
Thank you!

Beth Garza
bgarza@rstreet.org

www.rstreet.org