

The Root Cause of the Texas Energy Disaster

Presented to:

**Natural Gas Society of the Permian Basin
Monthly Luncheon**

Midland, TX

April 13, 2021



JOHN HARPOLE
PRESIDENT / FOUNDER
HARP@MERCATORENERGY.COM
303-825-1100



“This is the largest trainwreck in the history of deregulated electricity.”

- Rep. Senator Brandon Creighton



Renewable Energy Mandates & the EPA A “Train Wreck” in the Making?



Presentation to:
14th Annual Wyoming Natural Gas Fair, September 16, 2010
By: John Harpole, Mercator Energy

Where is the RES Train Headed?



 Mercator Energy

“29 Governors ask Obama and Congress for stronger wind power measures”

Tiffany Hsu, *The Los Angeles Times*, March 16, 2010



Photo: Robert Gauthier, Los Angeles Times

 Mercator Energy

Colorado - Tilting to the Left



 Mercator Energy

Colorado as a Laboratory

The Renewable Energy Standard Promise:



2004 Campaign Yard Sign

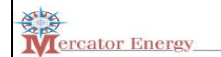
The IPAMS/Bentek Study A Catalyst to Avoid a Train Wreck?



Hang on Colorado...30% Renewables by 2020?



The RES Train Has Left the Station But is it in the right direction?

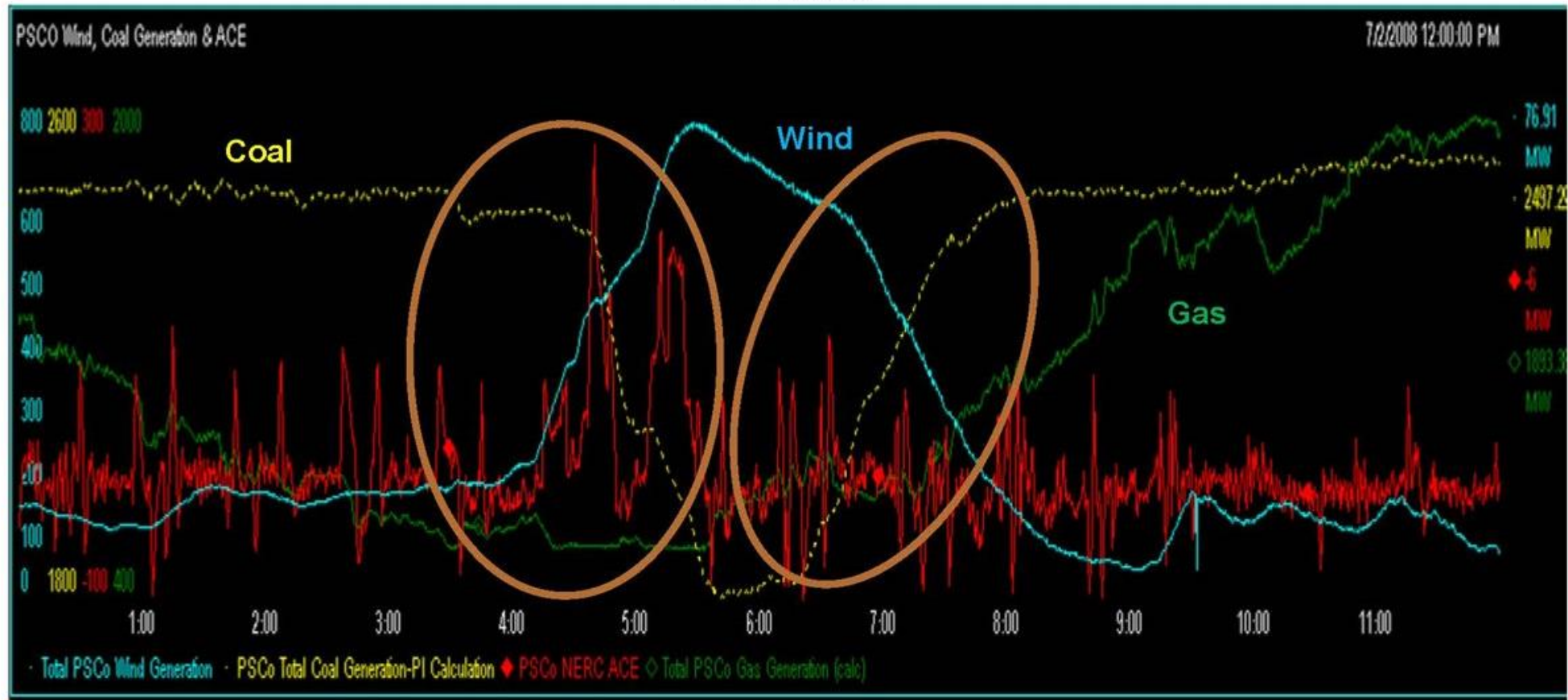


Natural gas: not just a bridge to renewables.
It's a way to avoid a train wreck.



When Wind Blows at Night, Coal Gen Ramps Down

Xcel Defined Wind Event:
7/2/2008



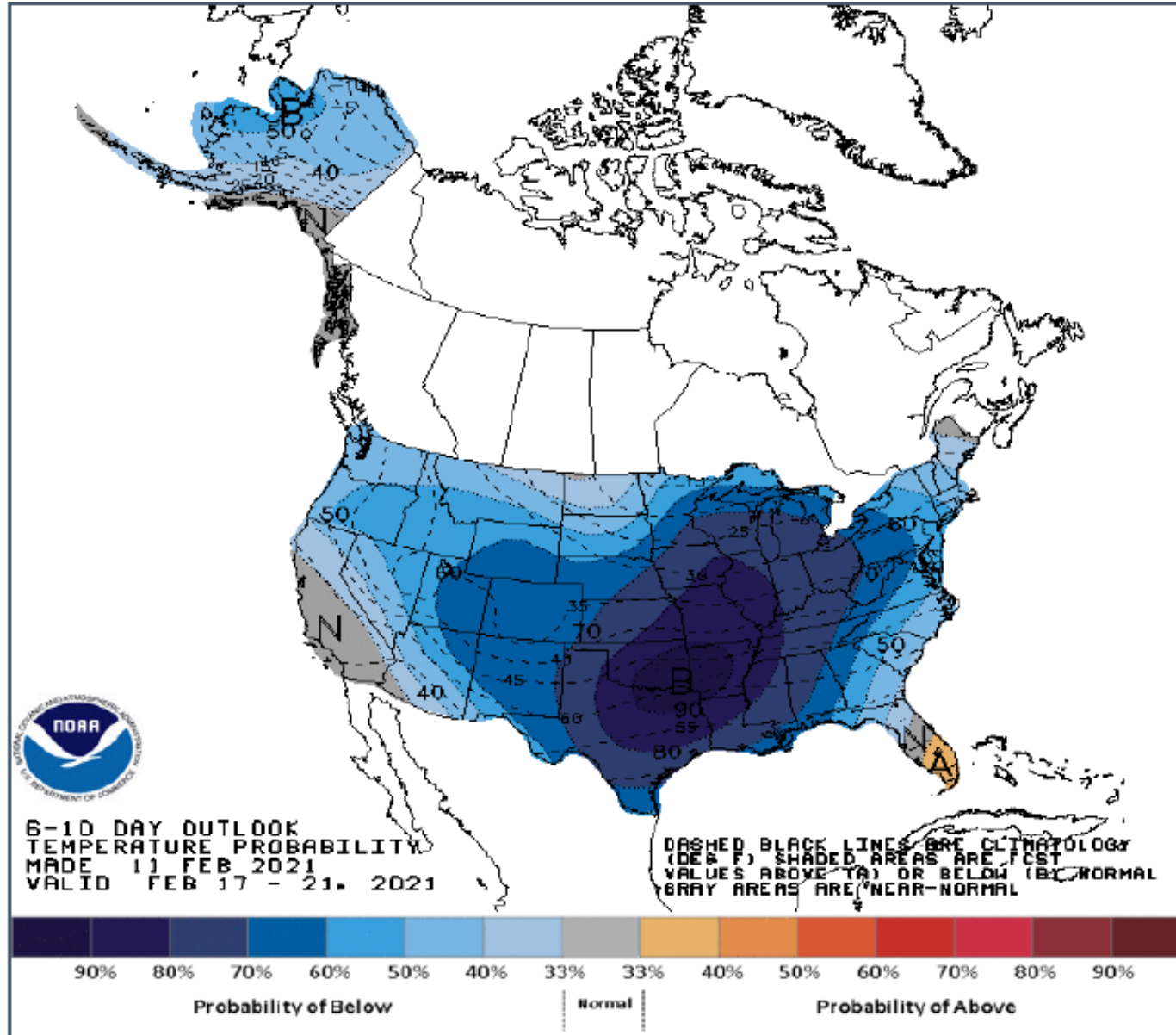
4:00 AM

8:00 AM

Selected Speaking Engagements 2009 - 2011

- **“Natural Gas: Affordable Energy for the Future”**, PLI’s Institute on Energy and Environment, Houston, TX, March 2012
- **“Where Electricity Comes From: Does it Matter to Consumers?”**, National Energy and Utility Affordability Conference, Ft. Lauderdale, Florida, June 2011
- **“Role of Natural Gas in Western Electric Markets”**, West Coast Canadian/US Electric Markets, Law Seminars International, Vancouver, British Columbia, 2010
- **Participant in Natural Gas Supply Workshop**, Sloan Foundation and University of Texas Bureau of Economic Geology, Austin, Texas, May 2010
- **“Renewable Energy Mandates & the EPA: A Train Wreck in the Making?”**, Southern Gas Association Conference, Orlando, Florida, April 2010

6 – 10 Day Outlook on February 12, 2021



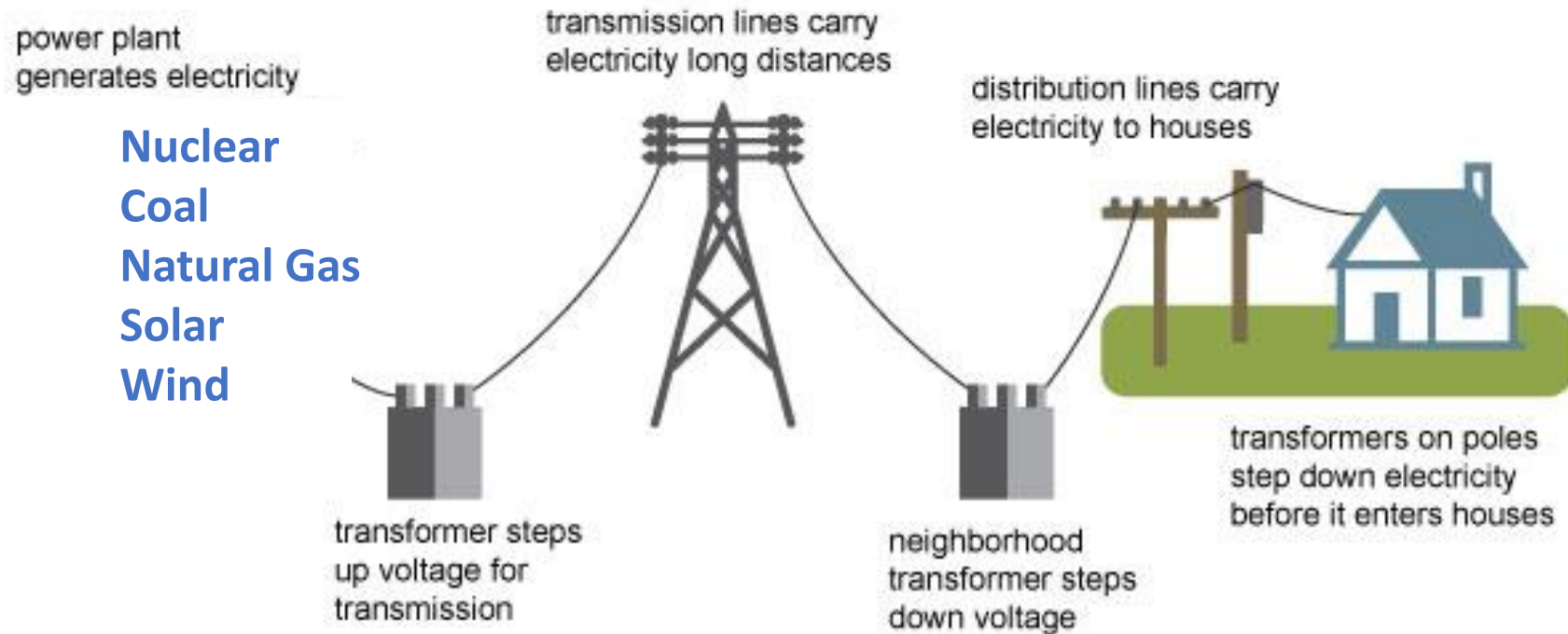
Source: CIMA Daily Weather and Market Report, Friday, February 12, 2021

- **15 consecutive days** with below average temperatures
- At least **3,000 cold temp records** broken from February 12-17, 2021
- **First ever wind chill warning** issued by NWS offices in Lake Charles, Houston & Dallas



- Electricity cannot be stored on a utility scale
- Demand must be met perfectly by supply – **it must balance constantly**

Electricity generation, transmission, and distribution



Source: Adapted from National Energy Education Development Project (public domain)

Source: <https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php>

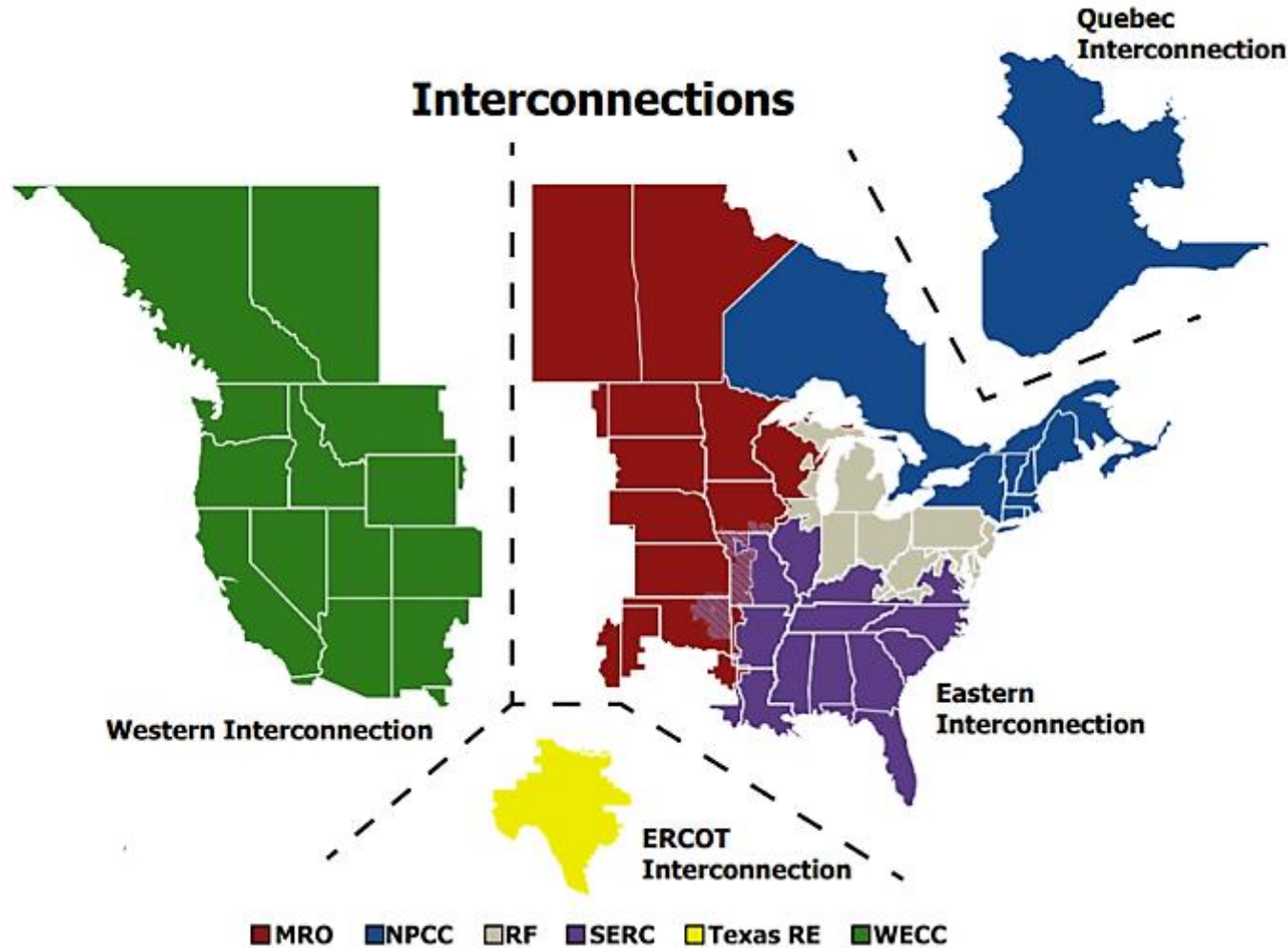
- ERCOT is the only grid operator that **does not operate a capacity market** that rewards reliability during peak usage days
- ERCOT relies solely on an “energy-only market” where **generators compete on the price of the energy they produce**
- For power producers in an “energy-only market”, there is **no penalty for failure to deliver** during a peak day emergency
- This market structure resulted in the **largest forced power outage in US history between February 12 – 18, 2021**
- Why would politicians choose this type of purpose-driven “energy-only” market that places **no extra value on dispatchable generation during peak hours?**
- I believe it was one of many incentives granted to wind energy



- Electric Reliability Council of Texas (ERCOT) is a membership based, 501(c)(4) non-profit **independent system operator (ISO)**
- It is NOT a government agency and **has no regulatory authority**
- ERCOT has **four primary responsibilities**:
 1. Maintain system reliability
 2. Facilitate a competitive wholesale market
 3. Facilitate a competitive retail market
 4. Ensure open access to transmission



- ERCOT manages the flow of electric power to more than **26 million Texas customers** - representing about **90 percent of the state's electric load**.
- ERCOT is **regulated by the Public Utility Commission of Texas** and the Texas Legislature. The PUC is an agency that regulates the state's "electric, telecommunication, and water and sewer utilities"
- ERCOT schedules power on an electric grid that connects more than **46,500 miles of transmission lines and 680+ generation units**.
- To avoid federal regulations, ERCOT is an island and is not connected to other independent system operators and regional transmission organizations



“Officially, there are three U.S. systems, but, in Texas, we like to say that there are two: The Texas system and the non-Texas system.”

- Professor Wei-Jen
(University of Texas at Arlington)

There are 2 Types of Electric Grid System Operators:

- A **regional transmission organization (RTO)** in the United States is an electric power transmission system operator (TSO) that coordinates, controls, and monitors a multi-state electric grid.
- An **independent system operator (ISO)** is similarly an organization formed at the recommendation of FERC.

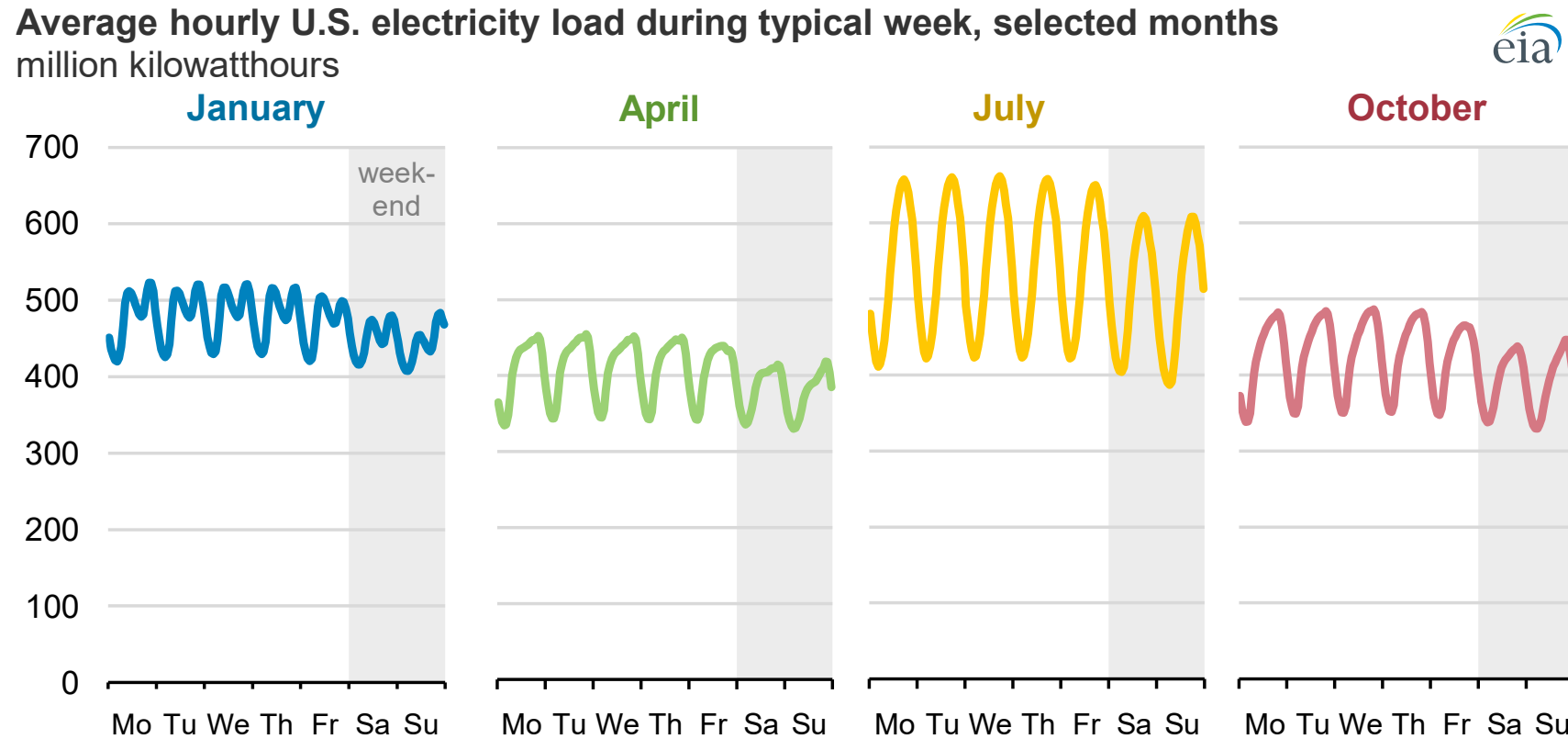
ERCOT officials spent 40 seconds on winter storm preparedness at a February 9, 2021 meeting:

“It is actually going to be winter here pretty soon. As those of you in Texas know, we do have a cold front coming this way. We’ll probably see our winter peak later this week or in the very early part of next week. And Operations has issued an operating condition notice just to make sure everyone is up to speed with their winterization and we’re ready for the several days of pretty frigid temperatures to come our way.”

- Bill Magness (President and CEO of ERCOT)

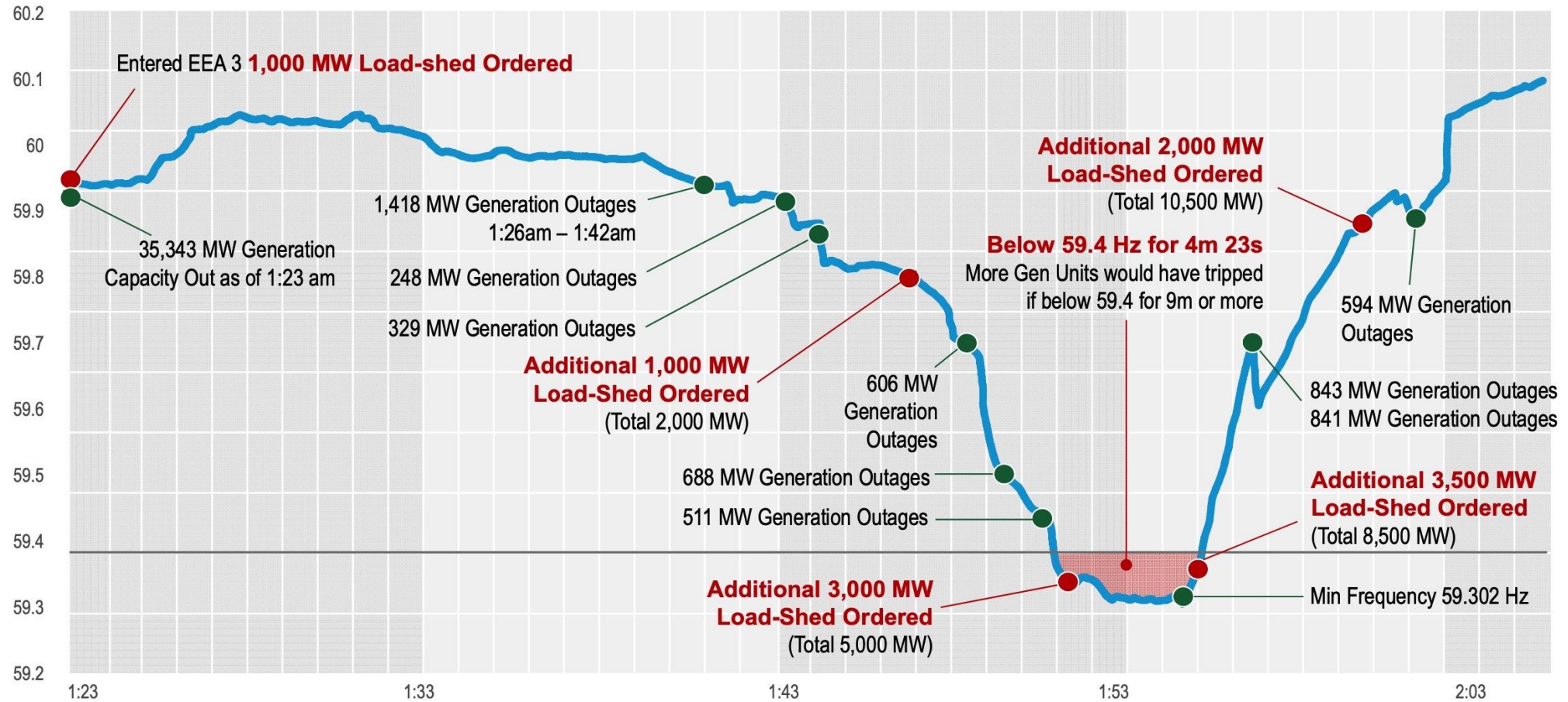
What is a Peak Day?

- For ERCOT, a peak day generally occurs in the summer

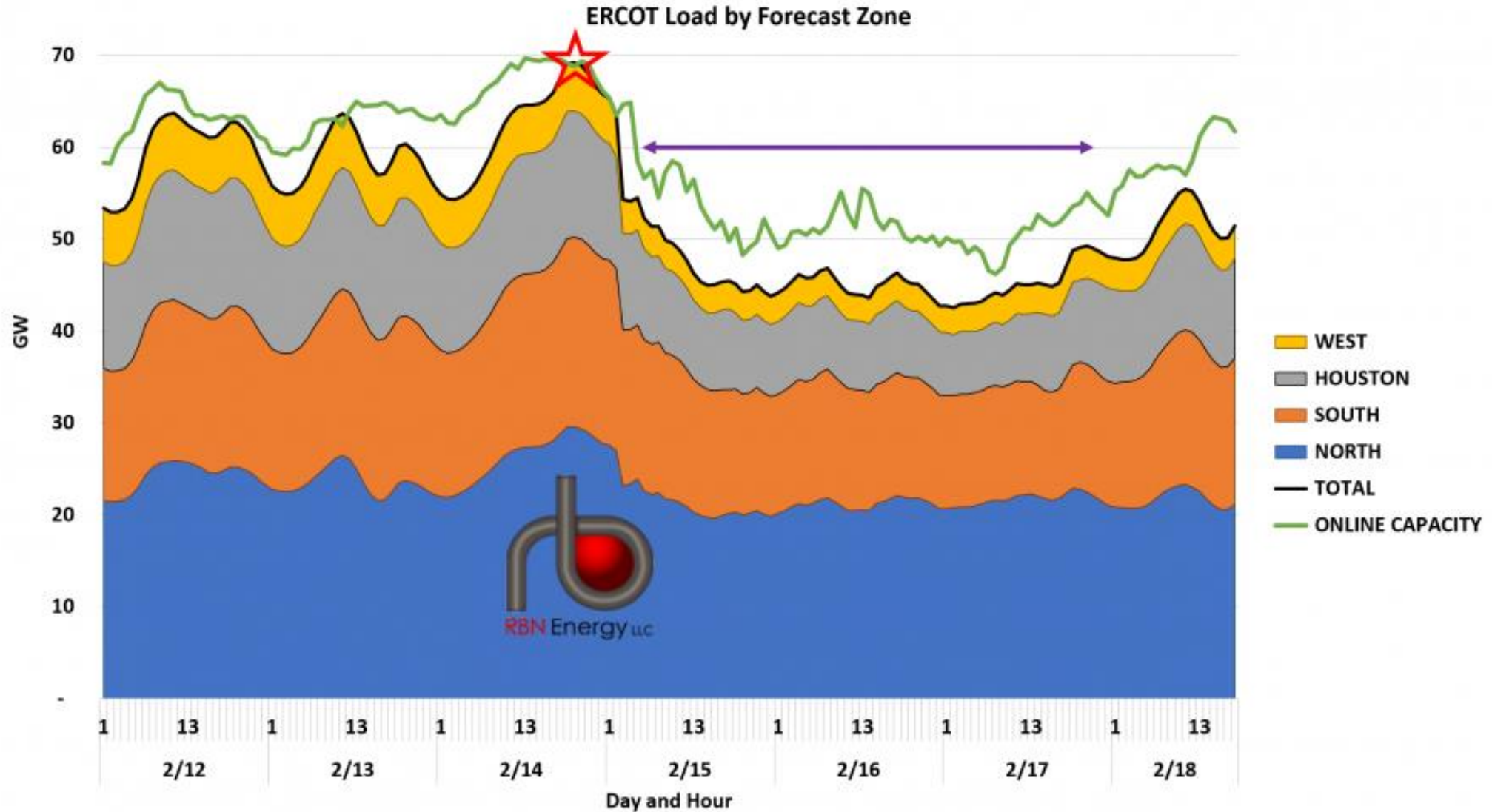


- However, 10 days ago, Mother Nature had something else in mind for Texas
- Why not experience a peak day in the winter?

Rapid Decrease in Generation Causes Frequency Drop



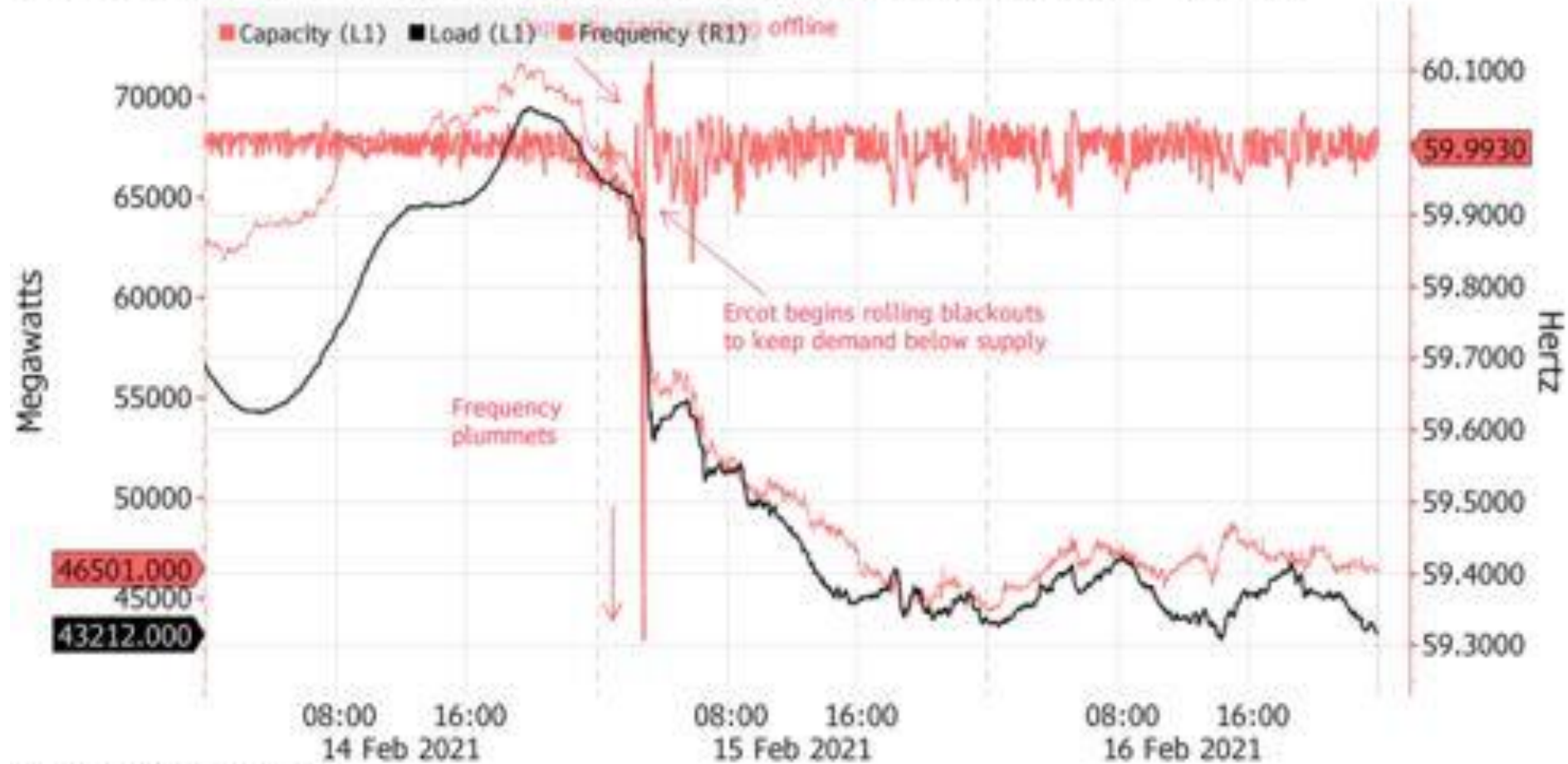
The Perfect Storm: February 12 – 18, 2021



The Perfect Storm: February 12 – 18, 2021

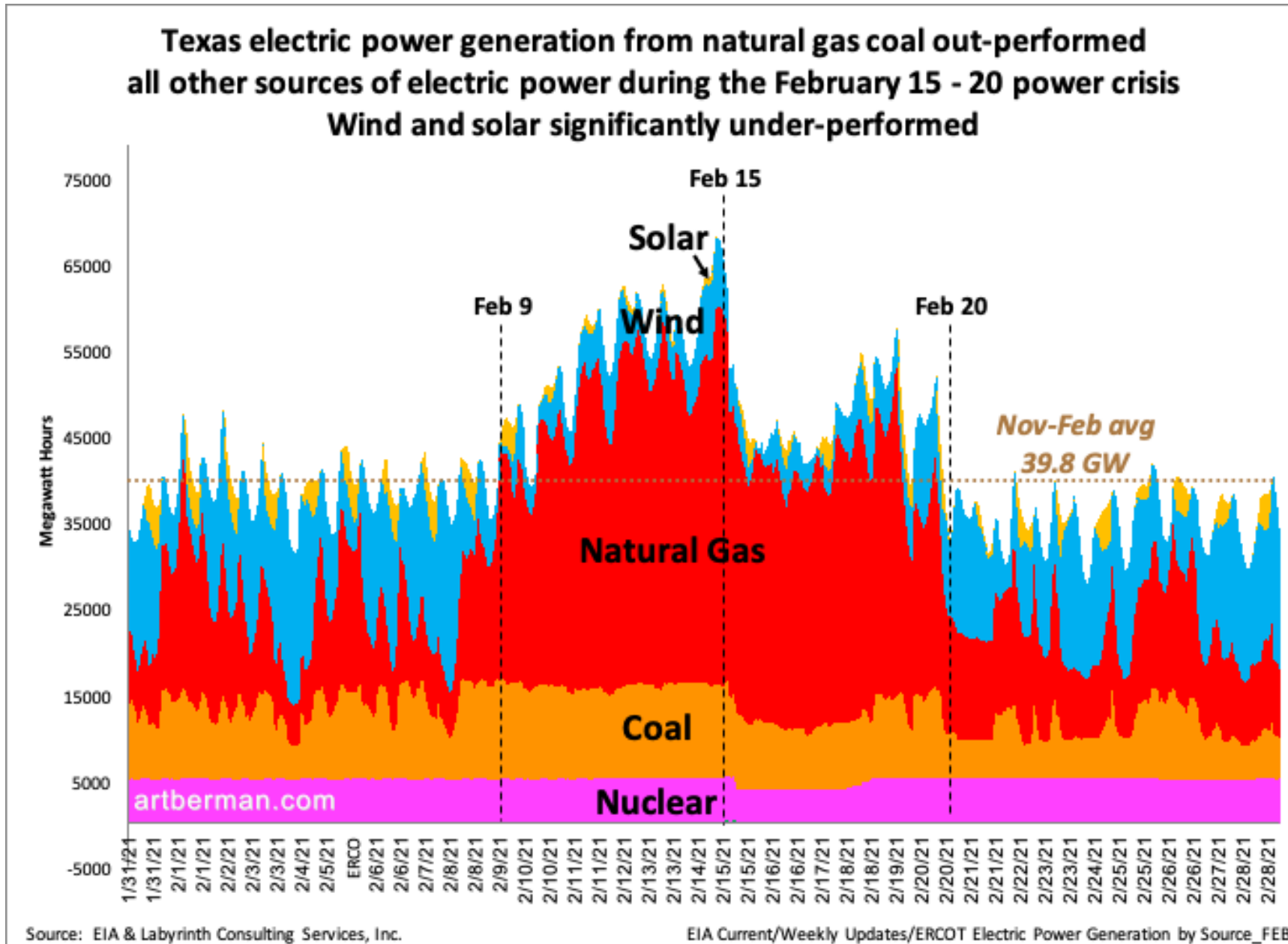
Perfect Storm

Cold weather started forcing plants offline two hours before blackouts

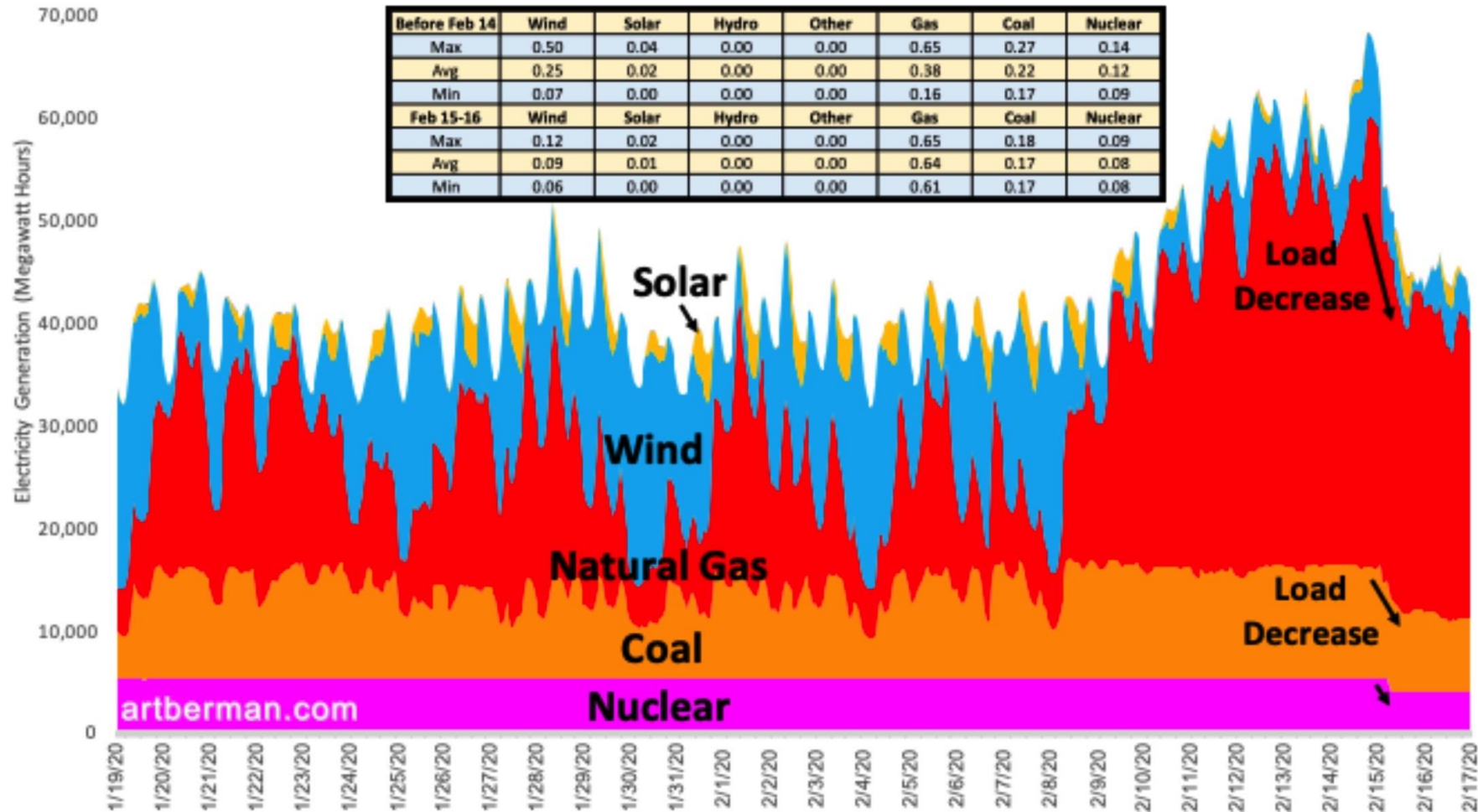


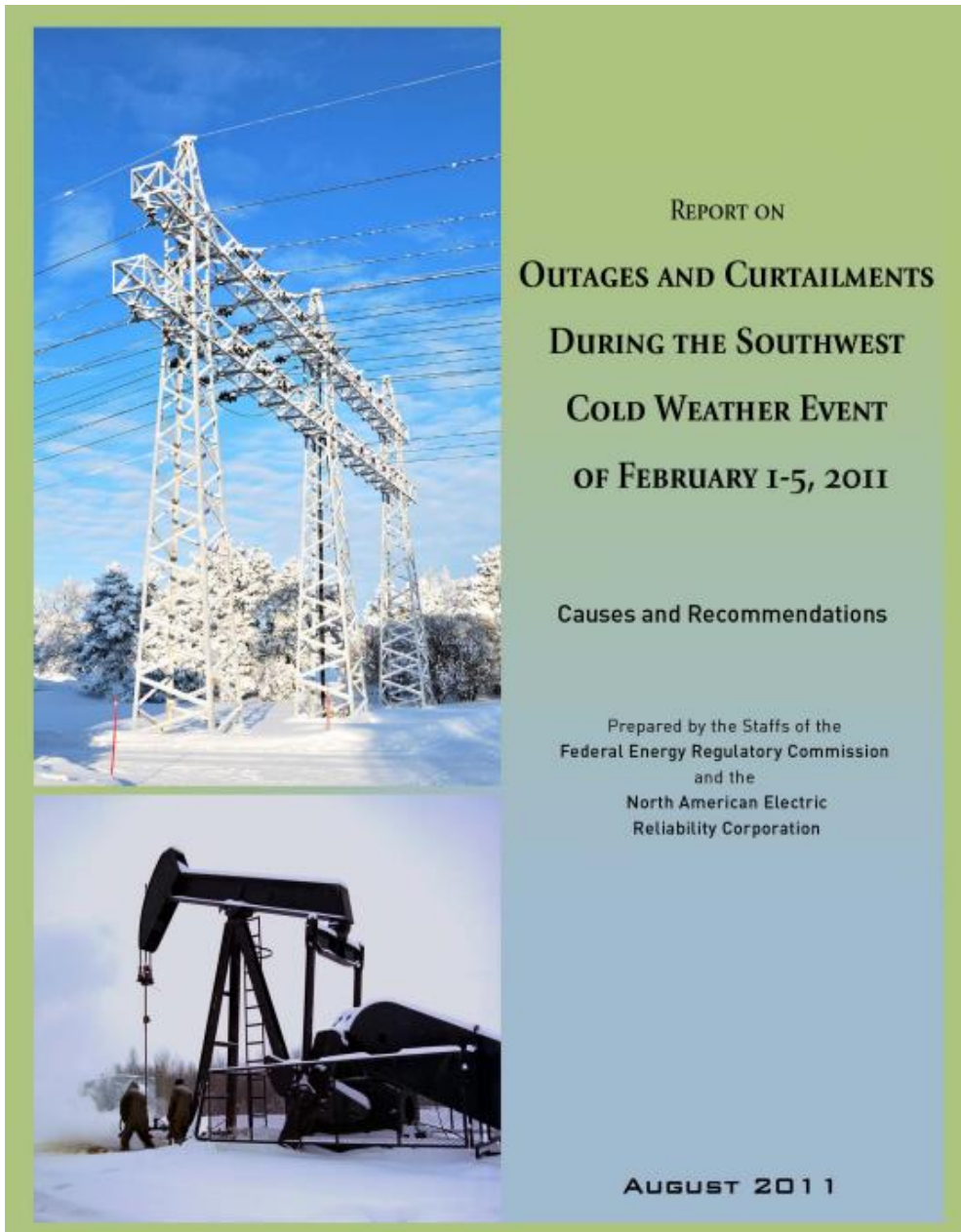
Source: Ercot, Bloomberg

The Perfect Storm: February 12 – 18, 2021



All Texas electric power feedstocks decreased early Monday February 15
Wind + Solar accounted for 27% and natural gas, 38% of power before the power crisis
Wind + Solar accounted for 10% and natural gas 64% during the crisis





Problem Identified:

Transmission operators and distribution providers generally did not identify natural gas facilities such as gathering facilities, processing plants, compressor stations or storage fields as critical and essential loads”

Recommendation:

“Transmission Operators and Distribution Providers should conduct critical load review for gas production and transmission facilities, and determine the level of protection such facilities should be accorded in the event of system stress or load shedding.”

Monday, February 8th through Tuesday February 16th:

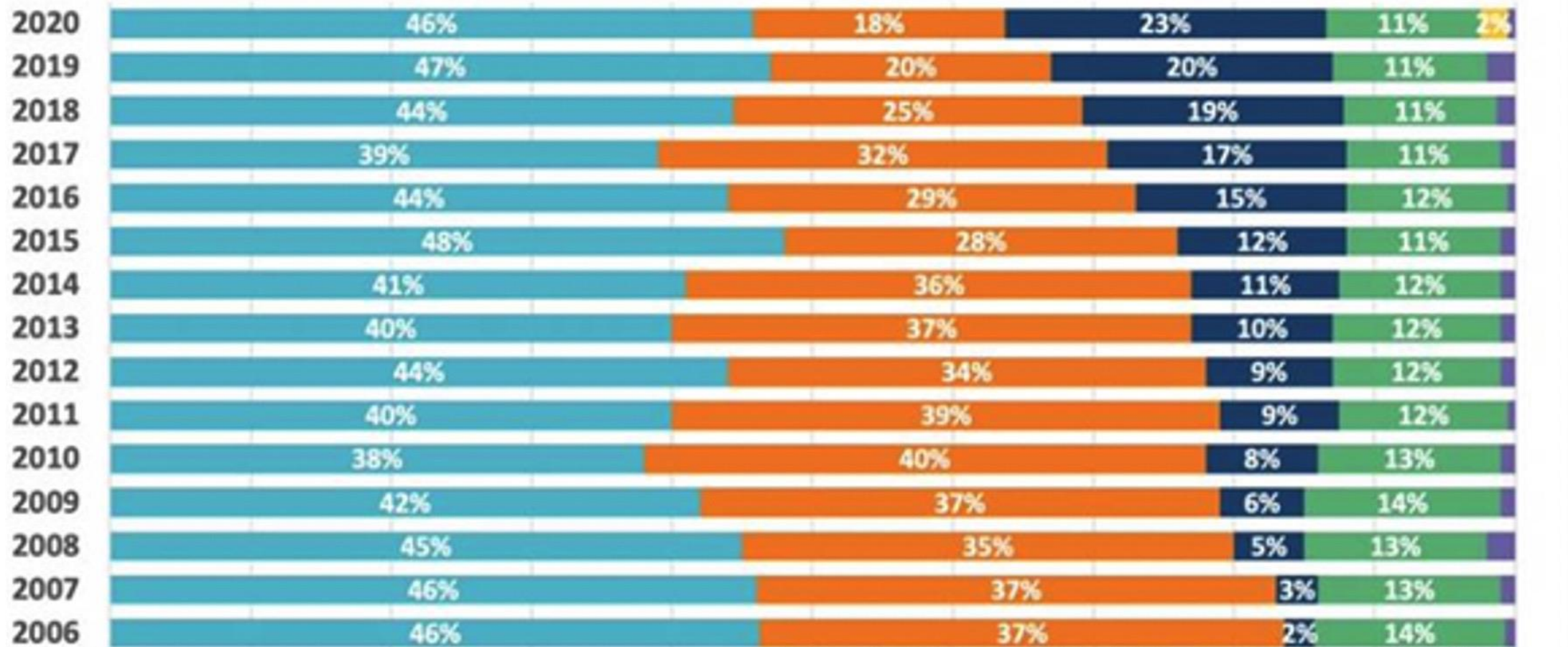
Wind  93%

Coal  47%

Natural Gas  450%

“All performed as expected...”

ERCOT fuel mixes for the past 15 years



Joshua D. Rhodes, PhD | @joshdr83 | The University of Texas at Austin & IdeaSmiths LLC

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Percent energy (MWh) generated in ERCOT by fuel type

■ Natural Gas ■ Coal ■ Wind ■ Nuclear ■ Solar ■ Other

Coal Plant Retirements in Texas 2012 – 2020

Plant Name	Capacity (MW)	Year Retired
<u>Norit Americas Marshall Plant</u>	2.0	2012
Welsh	558.0	2016
Big Brown	1,186.8	2018
Monticello	1,186.8	2018
<u>Sandow No 4</u>	590.6	2018
<u>Sandow No 5</u>	661.5	2018
Gibbons Creek	453.5	2019
<u>Oklaunion</u>	720.0	2020
Total	6,152.4	

- The following segments of the natural gas chain rely on electricity to operate:
 - LACT (Lease Automatic Custody Transfer) units on oil wells that have associated gas production (what component of total Texas production is associated gas?)
 - Wellhead, gathering pipeline, and gas storage compression (EPA air permit avoidance... producers chose “pole power” over natural gas compression to avoid EPA air issues)
 - Natural gas processing plant facilities rely on electricity to run control systems
 - Inter and Intrastate pipelines that run electric power compression
- Many of these critical natural gas infrastructure assets were impacted by rolling blackouts
- Issues related to electricity supply for natural gas infrastructure were identified in 2011 and no priority was given to those critical assets

ERCOT officials responding to the power outages on February 17th

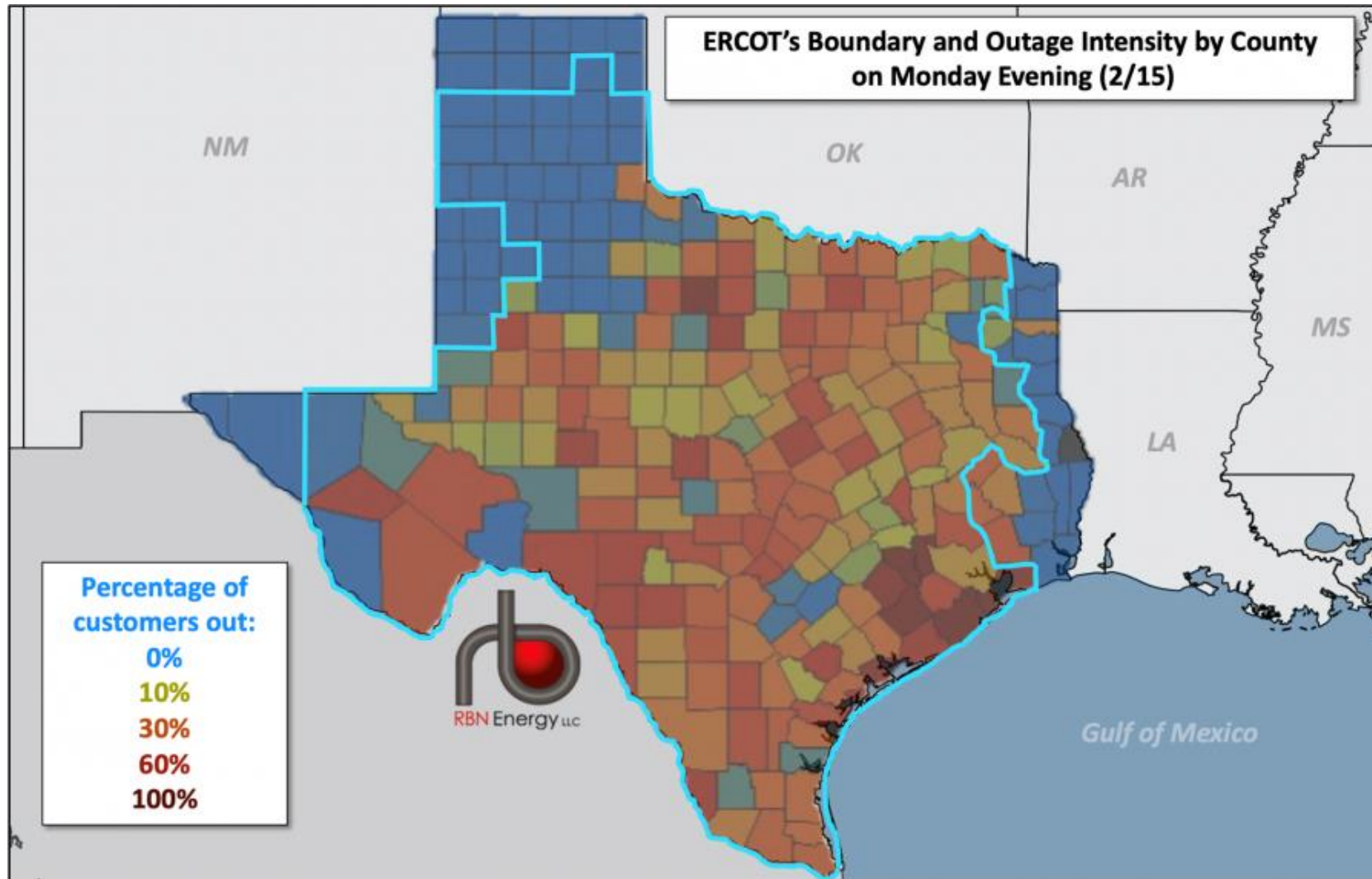
“It needed to be addressed immediately,” said Bill Magness, president of ERCOT. “It was seconds and minutes [from possible failure] given the amount of generation that was coming off the system.”

If operators had not acted in that moment, the state could have suffered blackouts that “could have occurred for months,” and left Texas in an “indeterminately long” crisis.

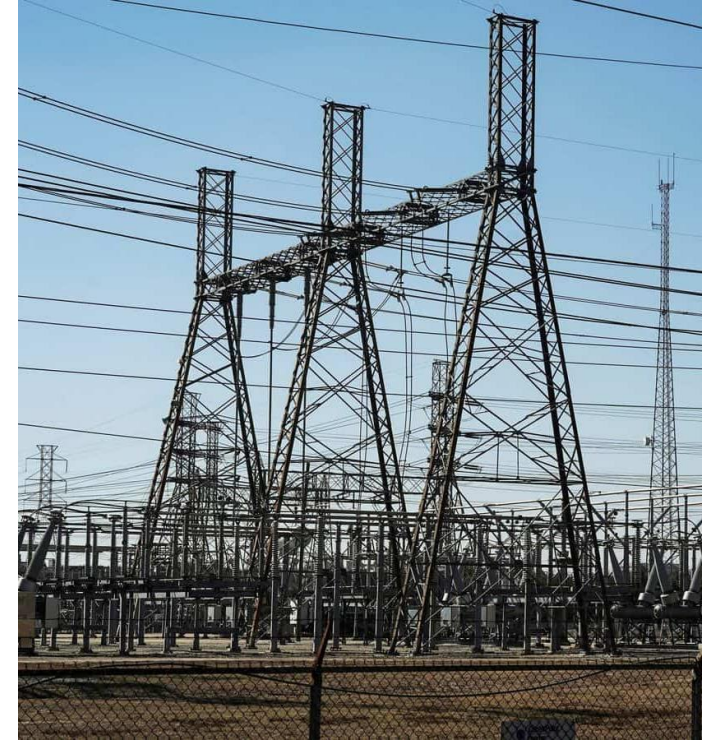
- **Bill Magness (President and CEO of ERCOT)**

Should they have been surprised?

TX Outage Intensity by County



- ERCOT has set up the grid/market in such a way that it **acquires a large amount of power through continuous auctions.**
- Every five minutes, power generators in the state electronically bid into ERCOT's real-time market, **offering to provide chunks of energy at particular prices.**



- ERCOT fills the open needs by selecting the bids that are cheapest and that make the most sense from a grid-management perspective—i.e., the power is being fed into the grid at points where the distribution and transmission systems can handle it.
- Every 15 minutes, the bids settle—at the *highest* price paid for electricity accepted in the round.
- If sufficient supply is not available, **no power producer is penalized**



“So if 100 MW of electricity are needed, and some producers offer 60 MW at \$50 per megawatt-hour, some offer 30 MW at \$80 per megawatt-hour, and others offer 40 MW at \$100 per megawatt-hour, *all the bidders* will receive the highest price of \$100.”

- In an energy-only market, some experts claim that **the short answer is “no one”**
- Under traditional utility models (capacity models) **generators who do not perform are penalized... severely**
- Capacity-driven markets (every other RTO and ISO in the US) account for the **value of reliability** in generation resources

- Nuclear plants have **18+ months of fuel onsite** (higher reliability)
- Coal plants can have **6+ months of fuel onsite** (higher reliability)
- Natural gas power generation with **pipeline firm transportation** agreements to ensure deliverability (higher reliability)
- Wind reliability... not so much
- Wind is an energy resource **NOT a capacity resource** – it can only be turned down and off, it is not dispatchable like fossil fuel resources

Friday, February 12th, 2021

Until such time as the Commission has specifically approved a utilities curtailment program, the following priorities in descending order shall be observed:

- A. Deliveries of gas by natural gas utilities to residences, hospitals, schools, churches, and other **human needs customers**, and deliveries to Local Distribution Companies which serve human needs
- B. Deliveries of gas to **electric generation facilities which serve human needs customers**
- C. Deliveries of gas to **small industrials and regular commercial loads**
- D. Large **users of gas for fuel or as a raw material** where an alternate cannot be used
- E. Large **users of gas for boiler fuel** or other fuel users

Ed Hirs Has Been Predicting This Mess for Years

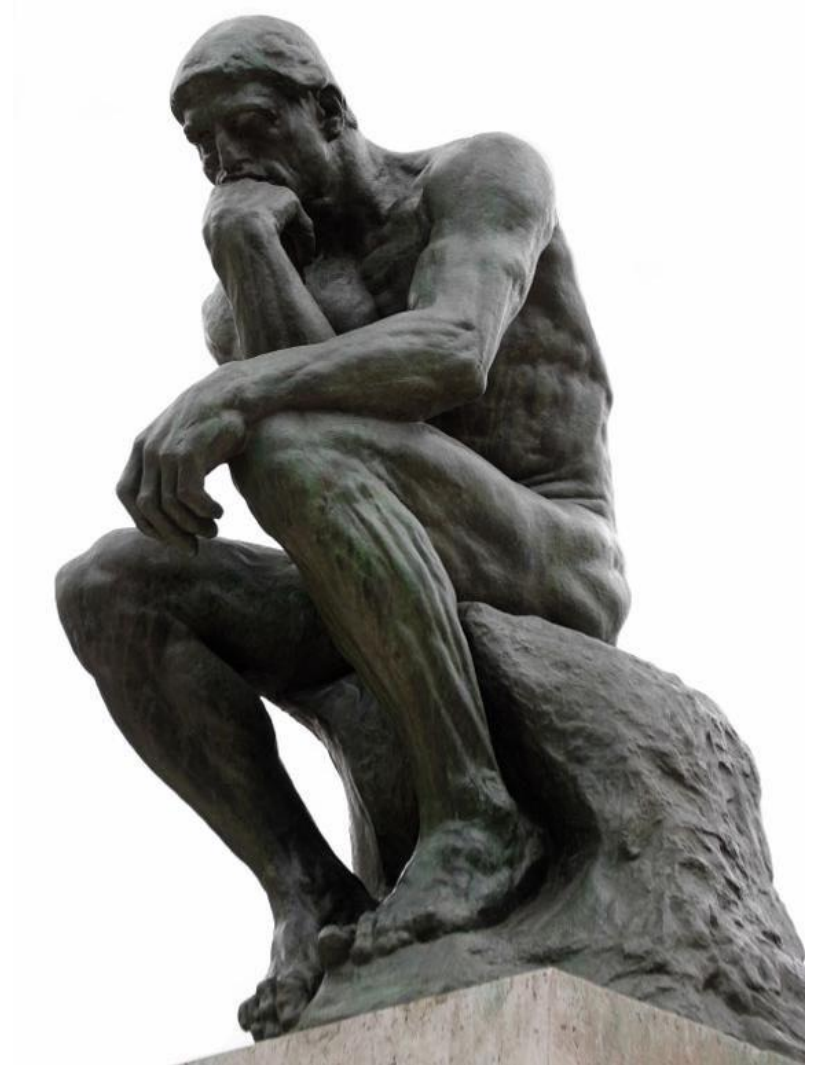
- Ed Hirs, an energy economist at the University of Houston, has **repeatedly tried to raise public awareness** about Texas's **vulnerable electric grid**.
- When one prominent Texas politician called for a commission to study the causes of the power failures that led to the current crisis, Hirs, not to mince words, had this to say: **“No you dumb bastard. You don’t have to go any farther than the bathroom mirror to figure it out.”**



“The nature of electricity markets, instantaneous matching of supply and demand, means that intermittent technologies are not perfect substitutes for any one of dispatchable technology.

Source: Government Support for Intermittent Renewable Generation Technologies, Arthur Campbell, April 6, 2009, MIT Department of Economics

- What is the difference between an **energy-only market** and a **capacity market**?
- Will that answer explain who is to blame for the Texas Energy Disaster?

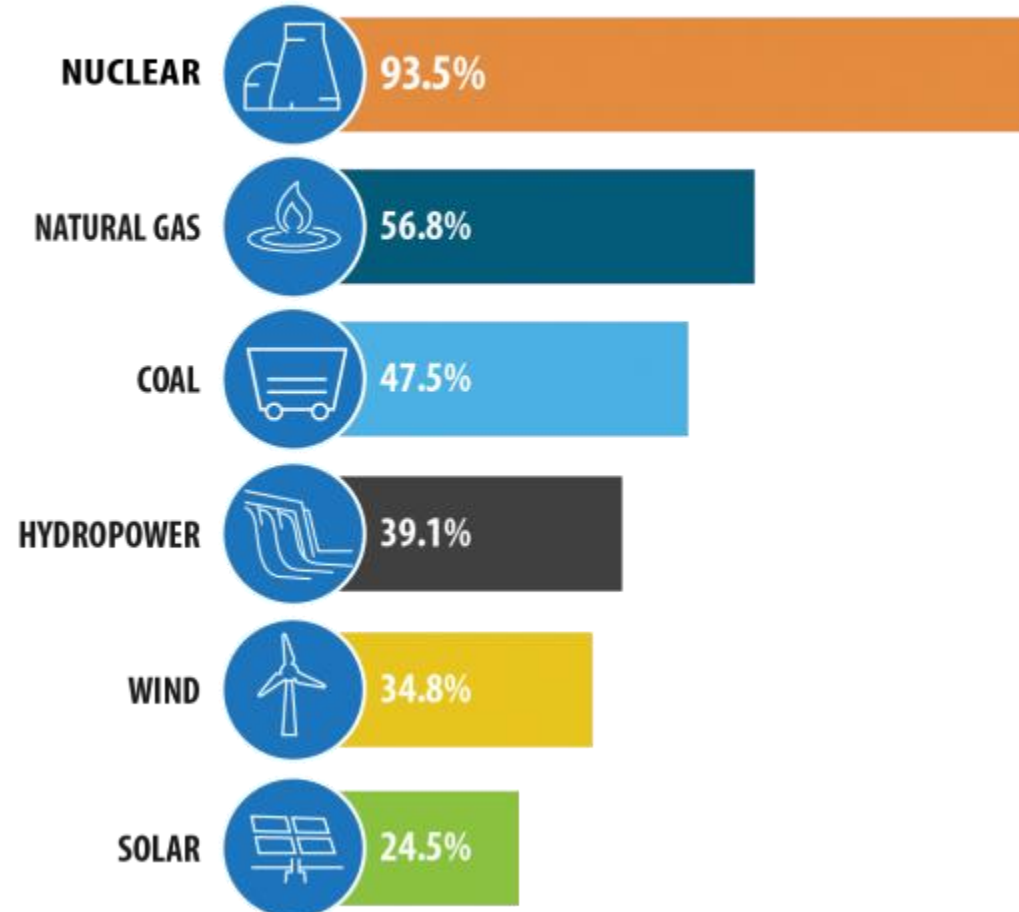


- The **capacity factor (CF)** of an electric power plant is the **ratio of its actual output** over a period of time **to its potential output** if the plant could operate 100 percent of the time
- The CF for a power plant is calculated by **dividing** the **actual amount of electricity generated** by the plant by how much electricity the plant could have generated the same amount of time at 100% capacity

Not All Megawatts are Created Equal



Capacity Factor by Energy Source – 2019



- Electricity production in the US is predicated on **reliability, affordability, and security**
- Large amounts of electricity **cannot be stored efficiently or economically**
- **Wind is an energy resource**, not a capacity resource
- Wind can only be **turned down or off**
- Did Texas politicians **stack the deck for wind energy?**



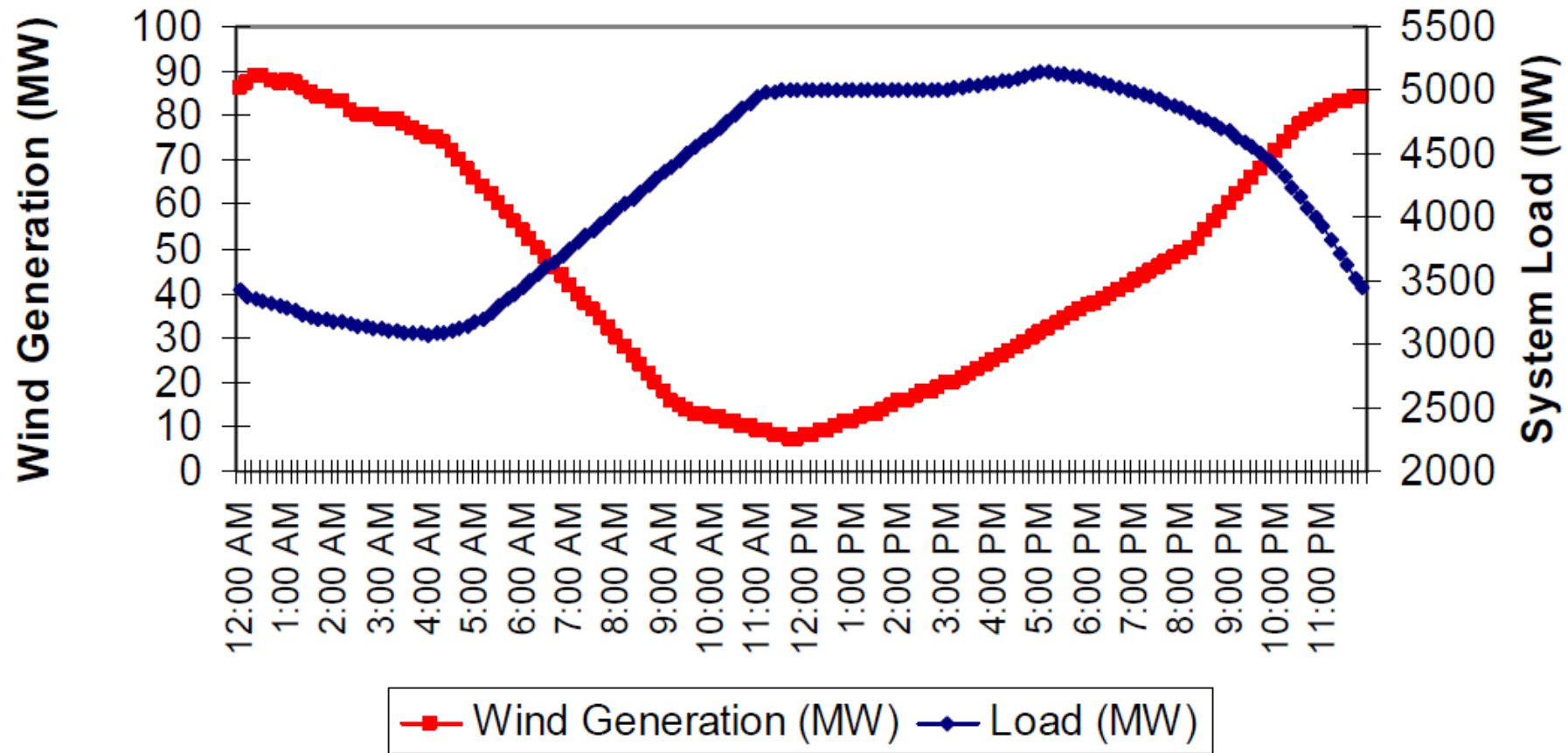
“The operation of generation facilities to produce energy at the **lowest cost to reliably serve consumers**, recognizing any operational limits of generation and transmission facilities.”

- Energy Policy Act of 2005

Not All Megawatts are Created Equal

Output is NOT Correlated with Load

Typical 100 MW Wind Plant Generation vs. Hourly System Load



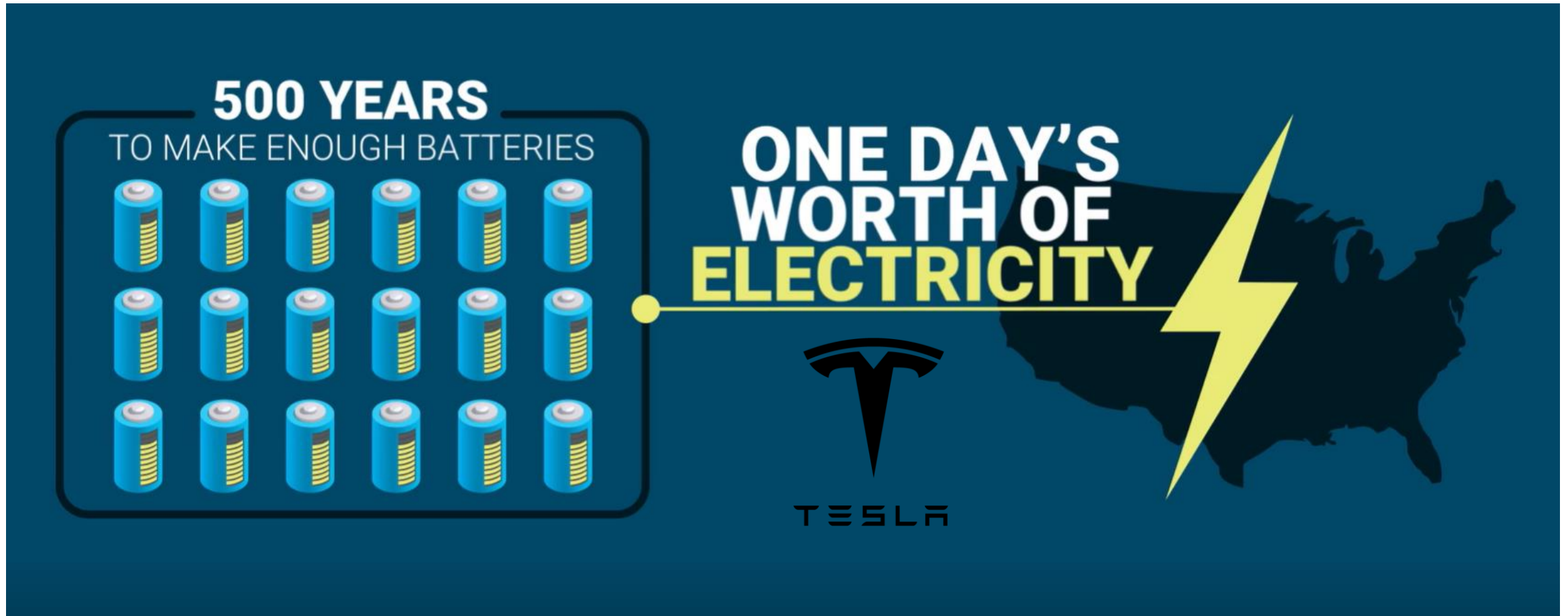
Storage Cost Comparison: Natural Gas vs. Wind



Source: "What's Wrong with Wind and Solar?", PragerU, Mark Mills, September 14, 2020

Limited Battery Production and Capacity

- **It would take 500 years** for Tesla's new factory in Nevada, the largest battery factory in the world, to make enough batteries to store **one day's worth of electricity needs for the US**



Source: "What's Wrong with Wind and Solar?", PragerU, Mark Mills, September 14, 2020

World's Largest Utility Scale Battery in Operation

- The **world's largest battery**, located in Fairbanks, Alaska, weighs **1,300-metric tons** and is **larger than a football field**
- It can only provide enough electricity for about 12,000 residents, or 38 percent of Fairbanks' population, for **seven minutes**
- That's useful for short outages, which happen a lot in Alaska, but isn't effective enough to act as a reserve for solar and wind.



Limited Natural Resources Drive “Green” Energy

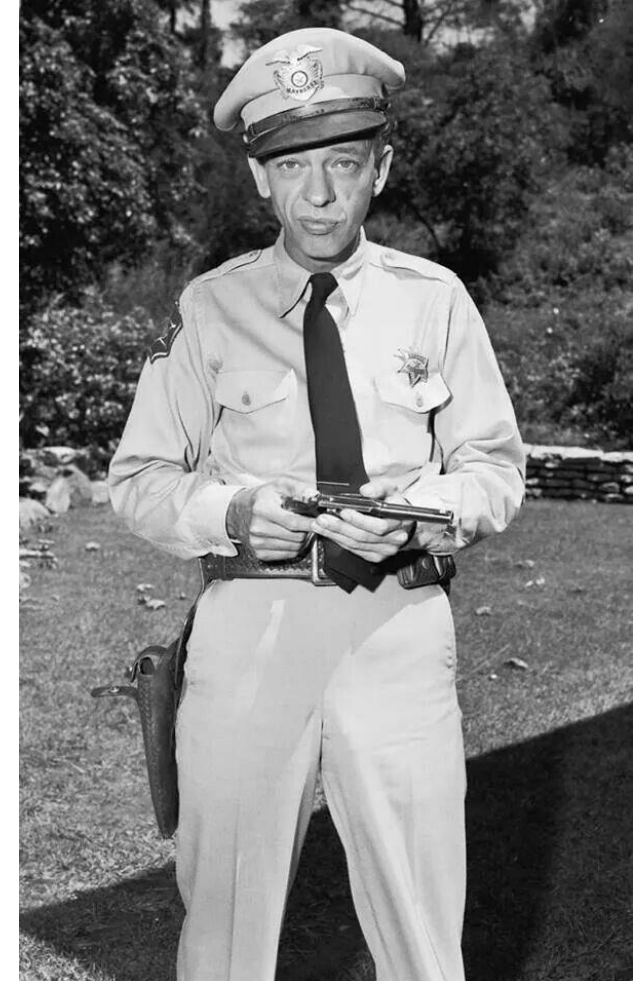
- A 200% - 2,000% increase in mining for rare earth metals will be required to keep up with planned developments in battery production – almost none of which will occur in the US



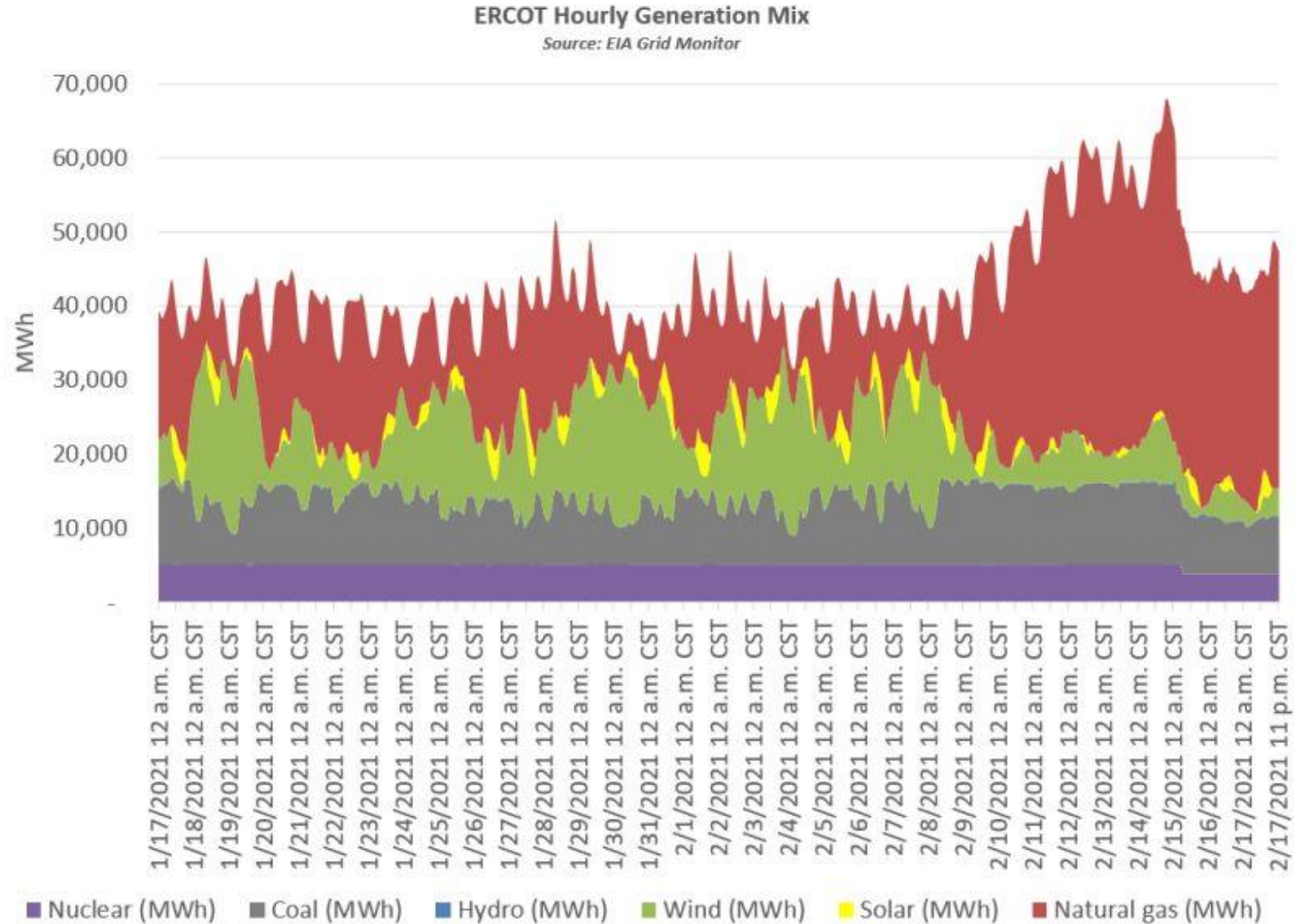
Source: “What’s Wrong with Wind and Solar?”, PragerU, Mark Mills, September 14, 2020

Don't Texans Deserve the Same Electric Reliability as Data Centers?

- Data centers require that their power have **“five-nine reliability”**
- Power must be available 99.999%
- That only allows for **5 minutes of interruption in one calendar year**
- Friends of mine in Austin were **without power for 45 consecutive hours**
- How would you recharge a 4-hour battery during that time?



Hourly Generation Mix



Source: Ryan Zorn LinkedIn post, US EIA

In ERCOT parlance, the “planning **reserve margin**” signifies in percentage terms an amount of installed generation capacity on the system beyond projected peak **electricity** demand. Although more expensive to maintain, comparatively higher **reserve margins** typically equate to comparatively lower risk for blackouts.

December 5, 2019

ERCOT has the Lowest Planning Reserve Margins in North America

“The North American Electric Reliability Corporation (NERC) was tasked by the 2005 Energy Policy Act to address America’s electric reliability issues. Their most recent report shows that ERCOT – the Electric Reliability Council of Texas – has the lowest level of reserves of any area in North America:

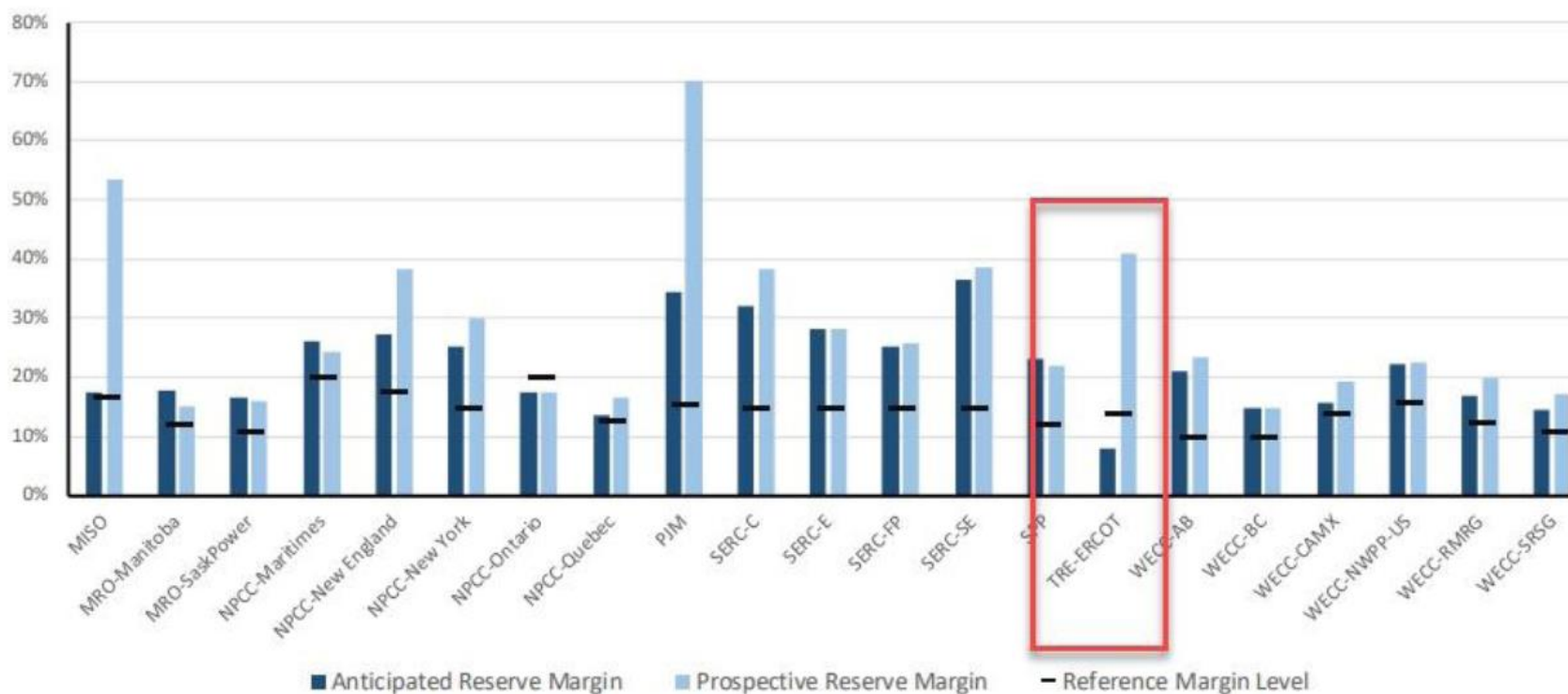


Figure 1: Anticipated and Prospective Reserve Margins for 2024 Peak Season by Assessment Area

National Energy Reliability Council's Risk Determination



**Table 1: NERC's Risk Determination of All Assessment Areas
5-Year Projected Reserve Margins**

Assessment Areas	2024 Peak Anticipated Reserve Margin	2024 Reference Margin Level	Expected Capacity Surplus or Shortfall (MW)	Assessment Result Through 2024
MISO	17.5%	16.8%	877	Adequate
MRO-Manitoba	17.6%	12.0%	269	Adequate
MRO-SaskPower	16.6%	11.0%	219	Adequate
NPCC-Maritimes	26.0%	20.0%	320	Adequate
NPCC-New England	27.3%	17.8%	2,261	Adequate
NPCC-New York	25.3%	15.0%	3,152	Adequate
NPCC-Ontario	17.3%	20.1%	-615	Marginal
NPCC-Quebec	13.7%	12.8%	324	Adequate
PJM	34.3%	15.7%	26,779	Adequate
SERC-C	32.0%	15.0%	3,862	Adequate

Source: ERCOT Reliability: Systematic Unpreparedness, A Twentieth Century Solution for a Twenty-First Century Problem, Larry Kellerman and Robert McCullough

National Energy Reliability Council's Risk Determination



**Table 1: NERC's Risk Determination of All Assessment Areas
5-Year Projected Reserve Margins**

Assessment Areas	2024 Peak Anticipated Reserve Margin	2024 Reference Margin Level	Expected Capacity Surplus or Shortfall (MW)	Assessment Result Through 2024
SERC-E	28.1%	15.0%	6,828	Adequate
SERC-FP	25.3%	15.0%	4,827	Adequate
SERC-SE	36.5%	15.0%	9,875	Adequate
SPP	23.0%	12.0%	5,966	Adequate
TRE-ERCOT	7.8%	13.75%	-4,859	Marginal
WECC-AB	20.9%	10.1%	1,326	Adequate
WECC-BC	14.8%	10.1%	577	Adequate
WECC-CAMX	15.7%	13.9%	958	Adequate
WECC-NWPP-US	22.1%	15.8%	3,288	Adequate
WECC-RMRG	16.7%	12.4%	590	Adequate
WECC-SRSG	14.5%	11.0%	916	Adequate

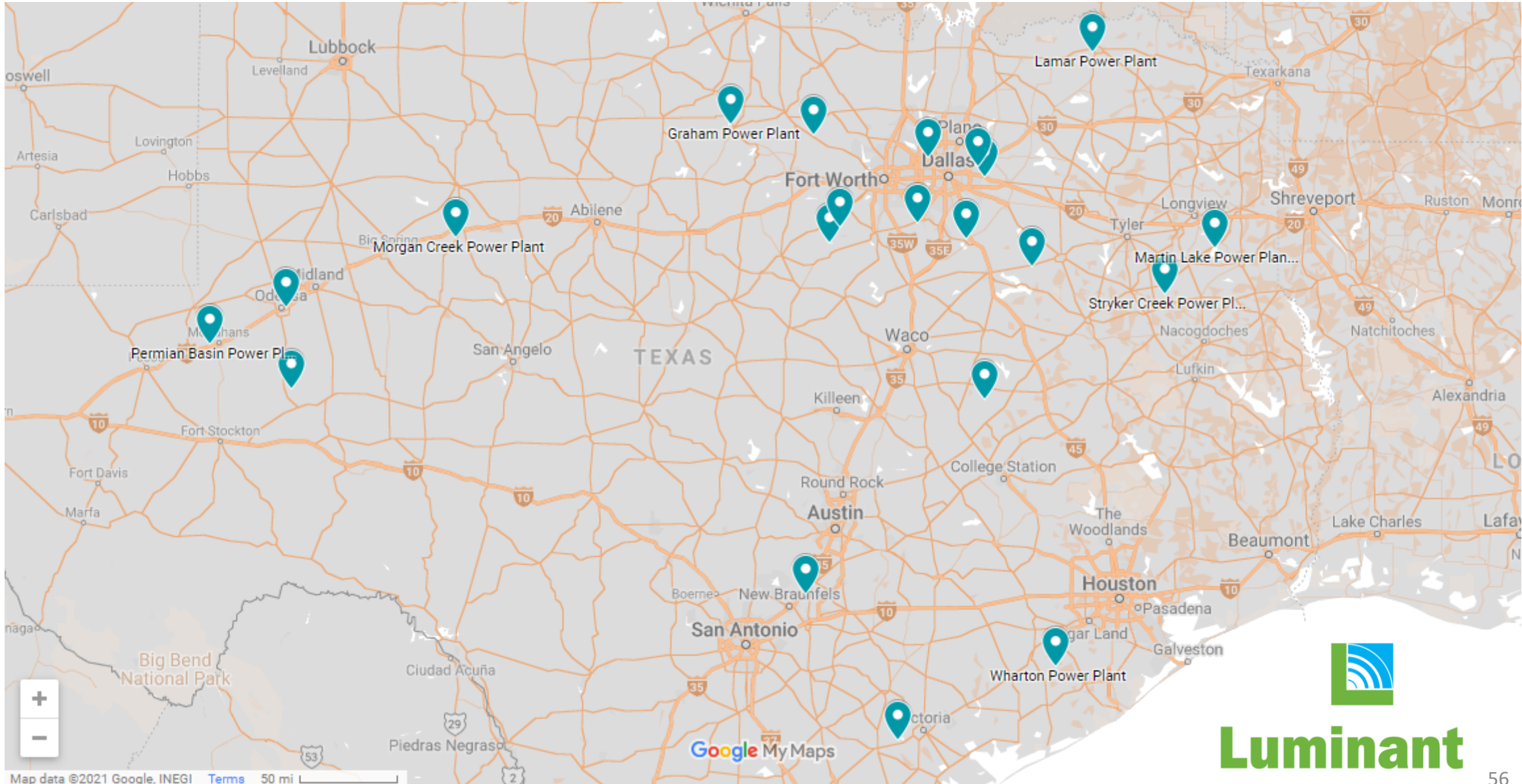
Source: ERCOT Reliability: Systematic Unpreparedness, A Twentieth Century Solution for a Twenty-First Century Problem, Larry Kellerman and Robert McCullough

An Example of One Gas Fired Generator on ERCOT

Luminant Gas Fired Generators in Texas (2021)

#	Power Plant	Capacity (MW)	Location
1	Morgan Creek	390	Colorado City, TX
2	Odessa – Ector	1,054	Odessa, TX
3	Permian Basin	325	Monahans, TX
4	Graham Power	630	Graham, TX
5	Wise	787	Poolville, TX
6	DeCordova	260	Granbury, TX
7	Lake Hubbard	921	Sunnyvale, TX
8	Lamar	1,076	Paris, TX
9	Forney	1,912	Forney, TX
10	Midlothian	1,596	Midlothian, TX
11	Ennis	366	Ennis, TX
12	Trinidad	244	Trinidad, TX
13	Stryker	685	Jacksonville, TX
Total Capacity		10,246 Megawatts	

Luminant (Subsidiary of Vistra) Texas Facilities Map



Luminant

- How much natural gas supply is required on a daily basis to fuel the needs of Luminant gas-fired power plants in Texas (Assuming 7,000 heat rate)?
 - **1,721,333 MMBTU / Day**
- If you assume that natural gas pipeline Firm Transportation delivery contracts would be \$0.40 / MMBTU for each MMBTU of Luminant demand...
- **For approximately \$700,000 per day, Luminant through pipeline Firm Transportation contracts could guarantee deliveries of natural gas during peak time periods**

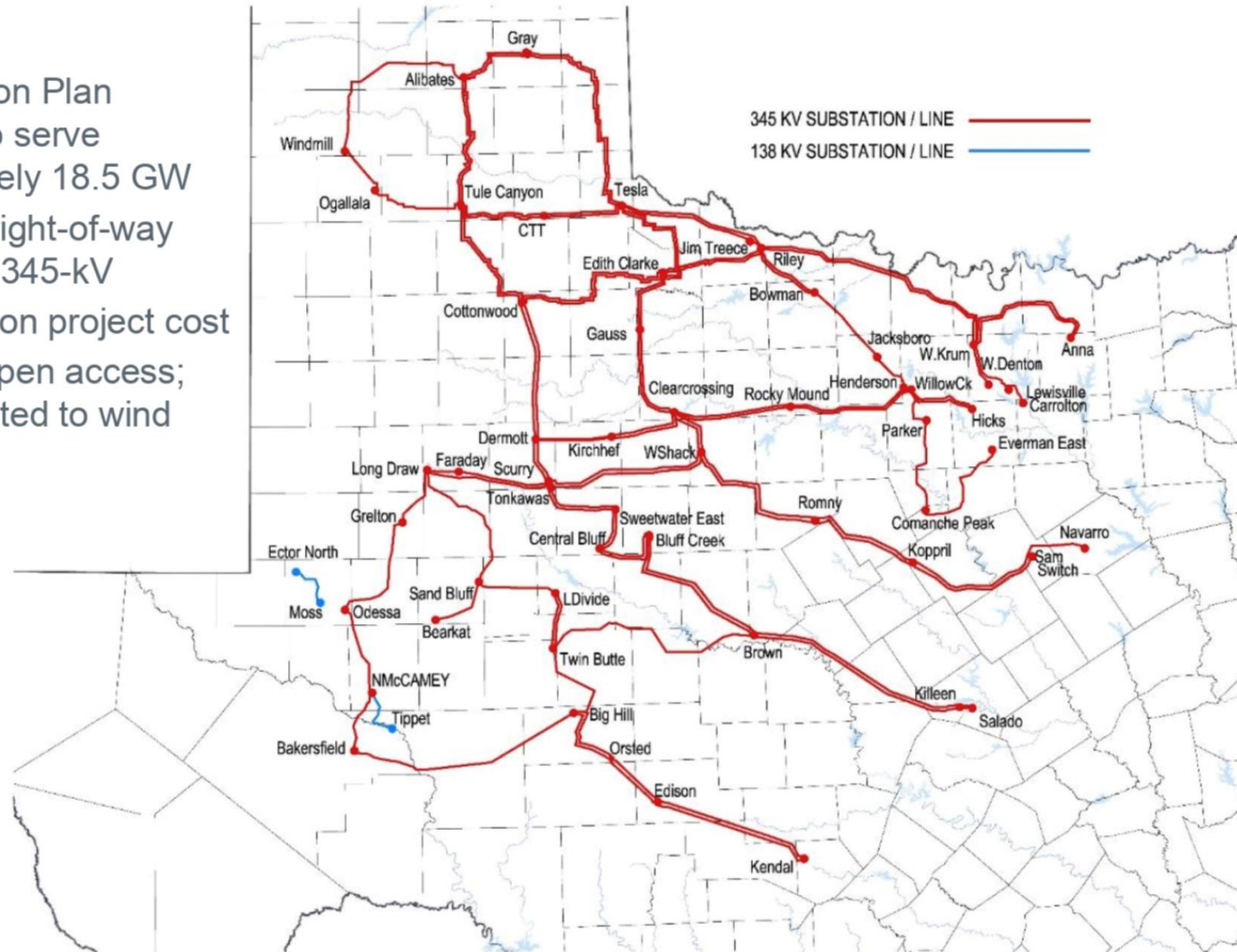


Imagine the conversation...?

- Luminant starts in the hole in any 5-minute auction if they have to guarantee pipeline deliveries by holding a Firm transportation contract 24/7/ 365 days a year
- Wind energy producers **didn't have to worry about connectivity issues**
- In fact, the Texas State Legislature proposed the CREZ (Competitive Renewable Energy Zones) **3,000-mile transmission project to connect 18,500 MW of electricity from the Panhandle/West Texas to population centers in Dallas/Fort Worth and Austin** because wind developers couldn't afford it
- Most every Texas ratepayer **pays around \$3–\$5 per month** (and will do so for a decade) for CREZ, a project that never would have been built if the wind developers themselves had to foot the bill
- The final buildout of CREZ cost nearly **\$7 billion of taxpayer dollars**

CREZ Transmission Map

- Transmission Plan designed to serve approximately 18.5 GW
 - ~3,600 right-of-way miles of 345-kV
 - \$6.8 billion project cost
- Lines are open access; use not limited to wind



Renewable Subsidy Costs in Texas 2006-2029	
Subsidy/Credit	Amount
Production Tax Credit	\$16.3 billion
Investment Tax Credit	?
CREZ Transmission Lines	\$14.0 billion
Federal Stimulus Funds	\$1.6 billion
Renewable Energy Credits	\$570 million
Interconnection Costs	\$1 billion
313 Property Tax Limitations	\$2.5 billion
312 Property Tax Abatements	?
ORDC Costs Caused by Renewables	\$2.5 billion?
Total	\$36.0 billion +
Average Annual Cost	\$1.50 billion +
Current Annual Cost	\$2.47 billion +
% of ERCOT 2018 Total \$ Sales	7.8% +
% of ERCOT Renewable \$ Income	28.8% +

Other Wind Subsidies in Texas

Eligibility for the PTC			
Parent Company	2016	2007-2016	# of Turbines
NextEra Energy, Inc.*	\$778	\$5,702	9,287
Iberdrola/Avangrid Renewables (Spain)*	\$301	\$2,651	3,497
EDP-Energias de Portugal*	\$217	\$1,671	2,487
Invenergy, LLC*	\$227	\$1,290	2,181
NRG Energy, Inc.	\$178	\$1,143	1,553
E.ON (Germany)*	\$171	\$1,134	1,987
Duke Energy*	\$158	\$938	1,636
BP plc (England)	\$148	\$913	1,179
Brookfield Asset Management Inc. (Canada)	\$189	\$770	1,525
Dominion Energy, Inc.	\$107	\$727	762
EDF-Electricite de France*	\$174	\$622	1,783
Exelon Corp.	\$95	\$528	839
Pattern Energy*	\$131	\$500	870
Enel (Italy)*	\$144	\$462	1,320
AES Corporation	\$36	\$330	1,191
Subtotal	\$3,054	\$19,380	32,097
Share of PTC Market	71%	76%	59%
TOTAL	\$4,298	\$25,474	54,528

Negative Power Prices are OK for Wind

- Wind is bid at the lowest prices
- Wind operators have another advantage over generators that use coal or natural gas: a **federal production tax credit of 2.3 cents per kilowatt-hour** that applies to every kilowatt of power produced
- Even if wind operators give the power away or offer the system money to take it, they still **receive a tax credit equal to \$23 per megawatt-hour**

“I Want My PTC”



Andrew Barlow, Head of the PUC in Texas is quoted as follows,

“Legislators have shown strong support for the energy-only market that has fueled the diversification of the state’s electricity generation fleet and yielded significant benefits for customers while making Texas the national leader in installed wind generation.”

As noted by the head of the PUC in Texas, an energy only market can fuel diversification towards intermittent resources. It does this because it rewards only energy that is fed into the grid, not backup power.

The five states with the most wind capacity installed at the end of 2019 were:



- 1. Texas (28,843 MW)**
- 2. Iowa (10,201 MW)**
- 3. Oklahoma (8,172 MW)**
- 4. Kansas (6,128 MW)**
- 5. California (5,973 MW)**

- The PUC met Monday, February 15 to address the electric “pricing issue” and decided to order ERCOT to **set prices administratively at the \$9,000/MWh systemwide** offer cap during the emergency.
- \$9 / KWH for electricity = \$2,640.00 / MMBTU for natural gas
- Stated another way, any price a gas-fired generator paid below \$2,640.00 for natural gas supply was a good deal to convert a gas molecule to an electron
- Reaction: Minnesota Sen. Tina Smith calls for federal regulators to investigate possible price gauging of natural gas **as spot prices spiked as high as 100 times typical levels**

- Andrew Barlow, spokesman for the Texas Public Utility Commission, said that a “system glitch” caused the price for electricity to **remain artificially low at \$1,200 per MW**
- According to spokesman Barlow, that is why the TPUC **ordered the price be fixed immediately** (on Monday, February 15th) at \$9000 per MW



“The Black Swan Winter Event Caused the ERCOT Wholesale Market to Incur Charges for Wholesale Power of \$55 Billion Over a Seven-Day Period, an Amount Equal to What it Ordinarily Incurs over Four Years”



- The following 9 pages specifically address natural gas volume, number of deals, and resulting index for the following three critical trading points related to Texas during the ERCOT crisis:
 - **Panhandle, TX-OKLA**
 - **WAHA**
 - **NYMEX Henry Hub**
- These postings include the volume in 1,000 MMBTU and the number of deals transacted each day. You can also find a link to the S&P Global Platts Gas Daily Price Assessment Methodology
- Given the volume and number of trades reported at each of the Price Assessment Points, **it would be virtually impossible for natural gas producers to manipulate the spot market for natural gas**

Gas Price Manipulation? NO WAY!

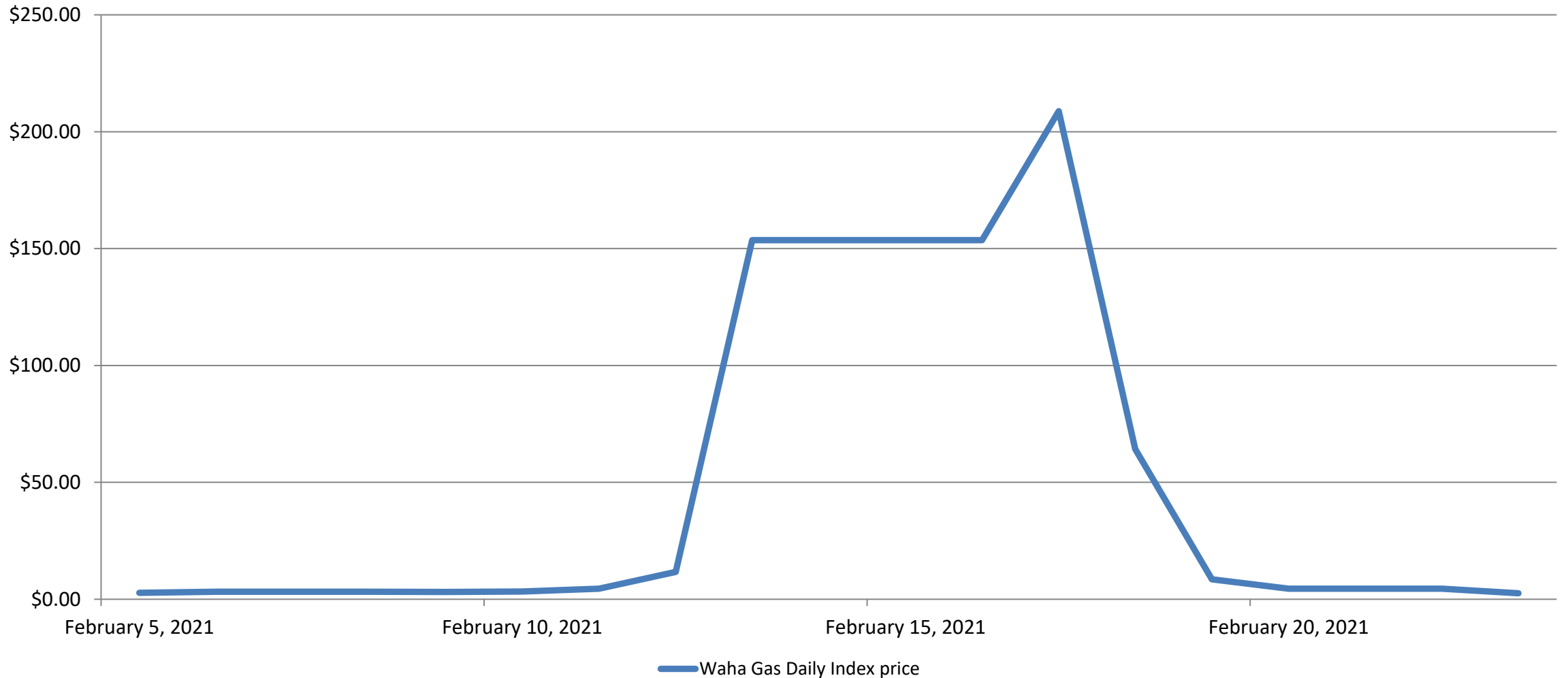
Waha S&P Global Platts Gas Daily Index

Date	Gas Daily Index Price	Volume*	Deals
February 5, 2021	\$2.76	967	148
February 6, 2021	\$3.15	1237	187
February 7, 2021	\$3.15	1237	187
February 8, 2021	\$3.15	1237	187
February 9, 2021	\$3.14	841	127
February 10, 2021	\$3.26	1520	212
February 11, 2021	\$4.54	1297	201
February 12, 2021	\$11.69	1204	183
February 13, 2021	\$153.62	770	133
February 14, 2021	\$153.62	770	133
February 15, 2021	\$153.62	770	133
February 16, 2021	\$153.62	770	133
February 17, 2021	\$208.79	452	78
February 18, 2021	\$64.22	389	76
February 19, 2021	\$8.51	365	46
February 20, 2021	\$4.46	507	83
February 21, 2021	\$4.46	507	83
February 22, 2021	\$4.46	507	83
February 23, 2021	\$2.58	838	110

*Volume in 000 MMBtu/day

Gas Price Manipulation? NO WAY!

Waha S&P Global Platts Gas Daily Index



Waha Platts Gas Daily Historical Index

Date	Gas Daily Index Price	Volume*	Deals
January 29, 2011	\$4.125	597	78
January 30, 2011	\$4.125	597	78
January 31, 2011	\$4.125	597	78
February 1, 2011	\$4.470	786	87
February 2, 2011	\$4.790	1,238	125
February 3, 2011	\$5.795	905	92
February 4, 2011	\$7.295	753	83
February 5, 2011	\$4.760	940	91
February 6, 2011	\$4.760	940	91
February 7, 2011	\$4.760	940	91
February 8, 2011	\$4.250	529	75

*Volume in 000 MMBtu/day

Gas Price Manipulation? NO WAY!

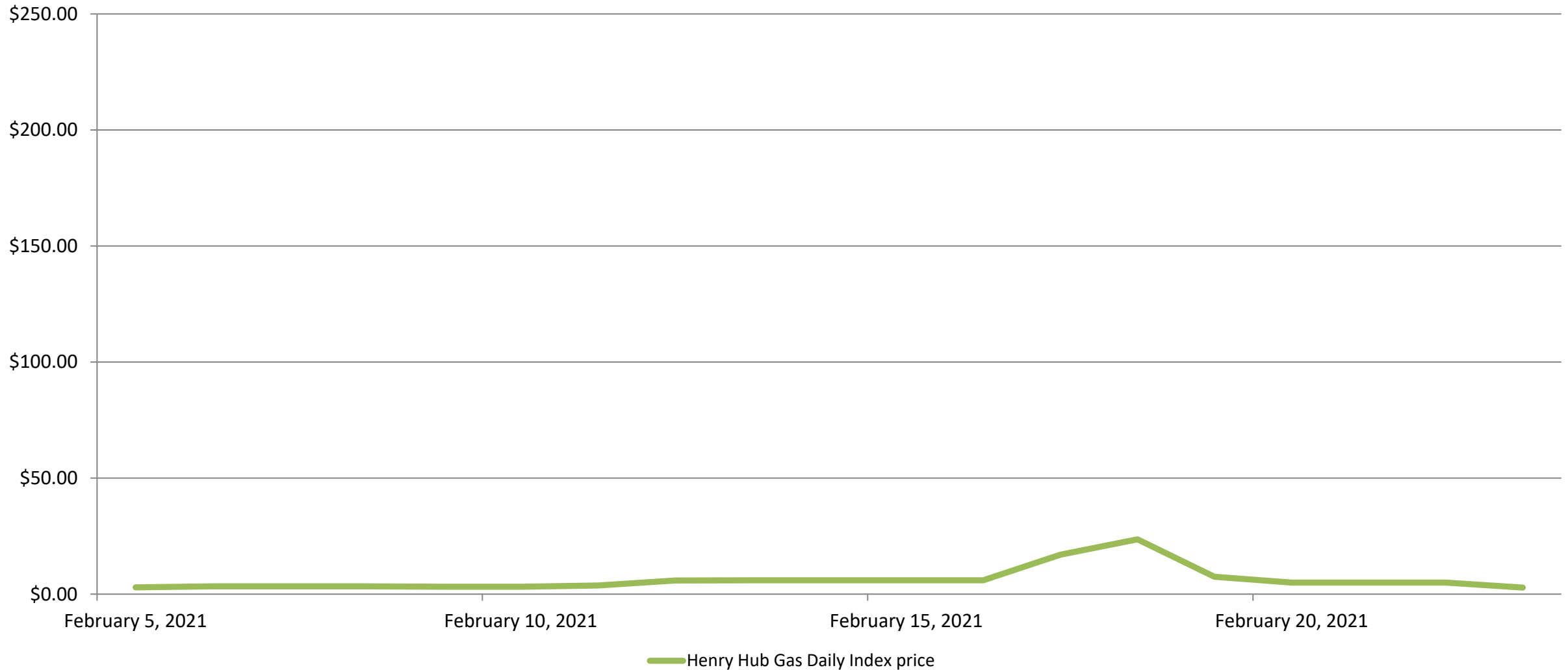
NYMEX Henry Hub S&P Global Platts Gas Daily Index

Date	Gas Daily Index Price	Volume*	Deals
February 5, 2021	\$2.92	94	16
February 6, 2021	\$3.39	185	43
February 7, 2021	\$3.39	185	43
February 8, 2021	\$3.39	185	43
February 9, 2021	\$3.18	158	29
February 10, 2021	\$3.20	155	22
February 11, 2021	\$3.68	387	60
February 12, 2021	\$5.88	731	91
February 13, 2021	\$6.00	709	92
February 14, 2021	\$6.00	709	92
February 15, 2021	\$6.00	709	92
February 16, 2021	\$6.00	709	92
February 17, 2021	\$16.96	459	64
February 18, 2021	\$23.61	464	58
February 19, 2021	\$7.50	232	26
February 20, 2021	\$4.99	282	40
February 21, 2021	\$4.99	282	40
February 22, 2021	\$4.99	282	40
February 23, 2021	\$2.84	278	40

*Volume in 000 MMBtu/day

Gas Price Manipulation? NO WAY!

NYMEX Henry Hub S&P Global Platts Gas Daily Index



- **Deaths:** 69
- **Damages:** \$18 billion (early estimate)
- 4+ days of **rolling blackouts**
- Countless **empty grocery stores**
- Countless “boil water” notices
- Supply chain efficiency shut down
- Zero crude oil exports
- Death knell for retail electric companies in Texas
- Exponential increase in gas and electric utility bills





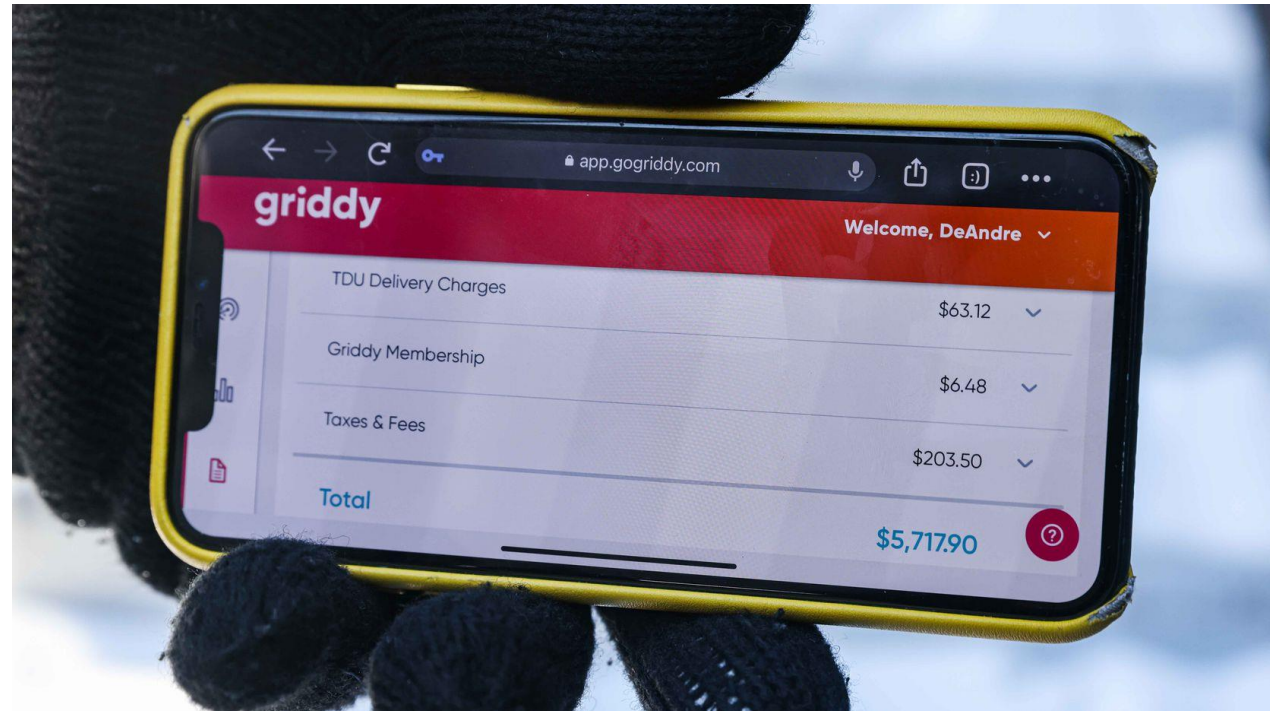
Form 8K

February 19, 2021

“Due to the historic nature of this winter storm, the Company experienced **unforeseeable and unprecedented market pricing for gas costs**, most notably in our Colorado, Kansas, and Texas jurisdictions, which resulted in aggregated natural gas purchases during this period of approximately **\$2.5 to \$3.5 billion for these jurisdictions**. These purchases are generally payable at the end of March 2021.”

- To indicate the scale of this liquidity event, in 2019 SOCAL Gas Company, the largest gas company in the US, with 5.5 million customers, earned **\$2.8 billion for residential revenue for the entire year**

DeAndre Upshaw of Dallas said the electric bill for his 900-square-foot, two-story townhouse was also \$5,000.



- The Texas power supplier Griddy, which sells unusual plans with prices tied to the spot price of power on the Texas grid, warned its customers over the weekend that their bills would rise significantly during the storm and that they should switch providers.

NEWS > WEATHER

Texas Gov. Abbott announces moratorium on power disconnects for nonpayment

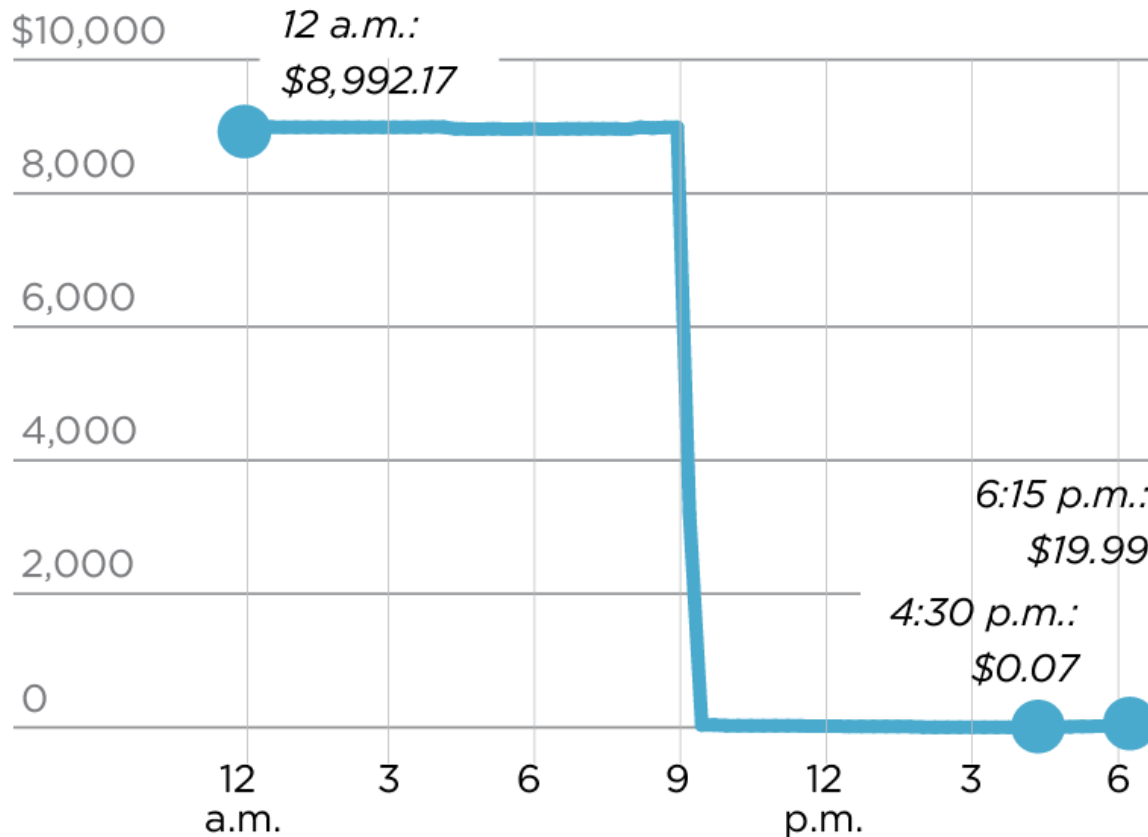
The state's energy grid, operated by the Electric Reliability Council of Texas, is operating at full capacity again, Abbott said, but 30,000 Texans are still without power due to local issues.



Texas Gov. Greg Abbott speaks about the winter storm during a press conference at the State Operations Center, Thursday Feb. 18, 2021, in Austin, Texas. (Jay Janner/Austin American-Statesman via AP) (Jay Janner)

Electricity market prices in Texas

Prices fell on Friday from the week's peak of \$9,000 per megawatt hour to under \$1.



SOURCE: ERCOT

Staff Graphic

“If you’re a young person looking at the future of this planet and looking at what is being done right now, and not done, I believe we have reached the stage where **it is time for civil disobedience** to prevent the construction of new coal plants that do not have carbon capture and sequestration.

– Former Vice President, Al Gore



Alexandria Ocasio-Cortez [@AOC](#)



Alexandria Ocasio-Cortez ✓
[@AOC](#)



The infrastructure failures in Texas are quite literally what happens when you *don't* pursue a Green New Deal.

10:00 PM · Feb 16, 2021 · Twitter for iPhone

54.7K Retweets **6,720** Quote Tweets **432.9K** Likes



February 17, 2021



AOC's Former Chief of Staff Admitted Green New Deal Not About Climate Change

“The interesting thing about the Green New Deal, is it wasn't originally a climate thing at all... Do you guys think of it as a climate thing? Because we really think of it as a how-do-you-change-the-entire-economy-thing.”

Fox News, Washington Post Magazine, July 7, 2019

— NEWS —

Bill Gates: Eliminate All Greenhouse Gas In 30 Years Or Else World Will Be 5X Worse Than Pandemic

By Daily Wire News • Feb 21, 2021 DailyWire.com •   



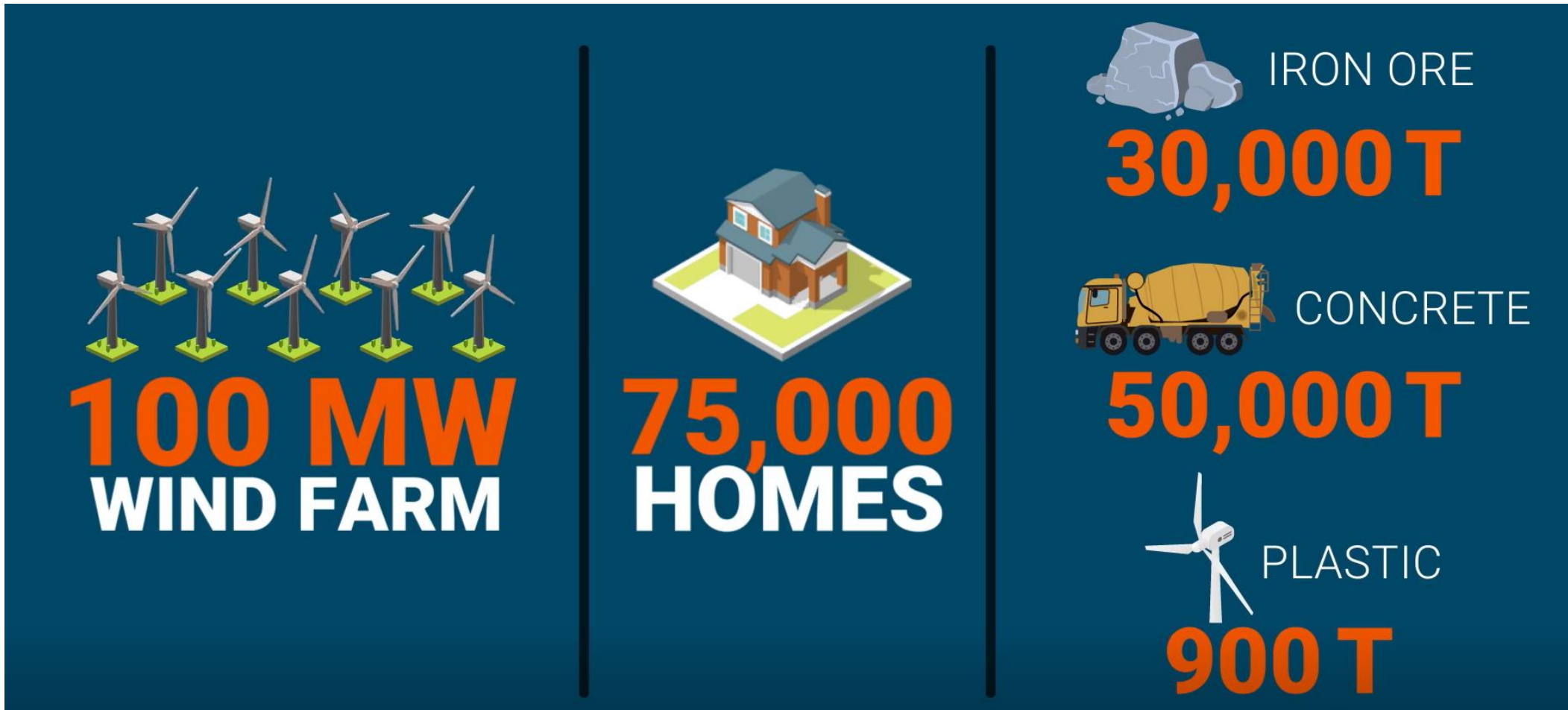
NICHOLAS KAMM/AFP via Getty Images

*“In fact, we’re going to have to almost **triple the size of the electric grid** and build all that transmission. And so, it’s not like there’s going to be a shortage of jobs overall, it’s just balancing to make sure that each community gets into the plan.”*

- Bill Gates

The Real Cost of “Green” Energy

- A 100 MW Wind Farm has the capacity to power 75,000 Homes but it requires over 30,000 tons of iron ore, 50,000 tons of concrete, and 900 tons of plastic to construct



Source: “What’s Wrong with Wind and Solar?”, PragerU, Mark Mills, September 14, 2020

- What impact did the Texas Railroad Commission (TRC) emergency order (**prioritizing “human needs” customers over deliveries of natural gas to electric generation facilities**) issued on Friday, February 12th have on natural gas supplies for natural gas fired generators?
- Were Firm natural gas pipeline transportation contracts and firm natural gas supply contracts to electric generators interrupted?

- What impact did the Texas Public Utility Commission (TPUC) order on Monday, February 15th **fixing the wholesale price for electricity at \$9,000 per MW have on natural gas prices?**
- What was the “system glitch” described by Texas Public Utility Commission (TPUC) Spokesman Andrew Barlow that **kept the market price at \$1,200 per MW when it should have been \$9,000 per MW?** According to Barlow, the commission’s action, in effect, allowed the price to rise above that artificially low level of \$1,200.

- Is ERCOT's Reserve Margin (the lowest Reserve Margin of any grid operator in the US) a **sign of a dysfunctional market that lacks proper market incentives** for nonrenewable generation facilities?
- Does the lack of **predictable market demand** for fossil fuel generators (due to ever increasing market penetration by mandated and subsidized renewable energy generators) keep new gas fired plants from being constructed in ERCOT's territory?

- Until the reserve margin for ERCOT can reach an acceptable level (such level to be determined and approved by the PUC), ERCOT should put in place fixed supply **contracts with fossil fuel /nuclear power generators** that call for a baseload volume of power delivery (minimum emergency needs during peak events) that includes **penalties for non-performance** during peak periods of stress on the grid
- Some incentive needs to be created to differentiate natural gas supply (ie – weatherized natural gas “WNG”)

“Over 1,300 institutions have now divested more than \$14.5 trillion from fossil fuels. Many of these divestments may be related to the climate crisis as well as newfound interest by investors in environmental, social, and governance factors.”

- The ERCOT Market Disaster resulted from **politicians and regulators pandering to the wind industry** for the last 20 years
- 2011 should have been a warning; it was a canary-in-a-coal-mine-event
- All the while, those bureaucrats created a “systemic market of entitlement” that **requires no duty to perform**
- Given the market conditions, natural gas generators ramped up deliveries into the ERCOT system (a system that doesn’t reward reliability) by 480% **during the most critical time of the emergency**

- The best indicator of this unfortunate truth is that no one individual or entity feels the need to apologize, because “**no one is responsible**”. That is clearly an abuse of trust
- This disaster was the result of a system and environment that **could only be created by politicians and bureaucrats...** not by free markets. No one should have to worry about freezing to death in the winter. That should be, at a minimum, the energy-security-expectation for all Texans in such an energy-rich state.
- At the very least, those to blame should **consider how their choices have impacted low-income households** who pay a disproportionate amount of their monthly income towards utility bills
- The market is “smarter than a group of bureaucrats.”

Why are we jumping through all these climate change hoops when we can't force China to comply?

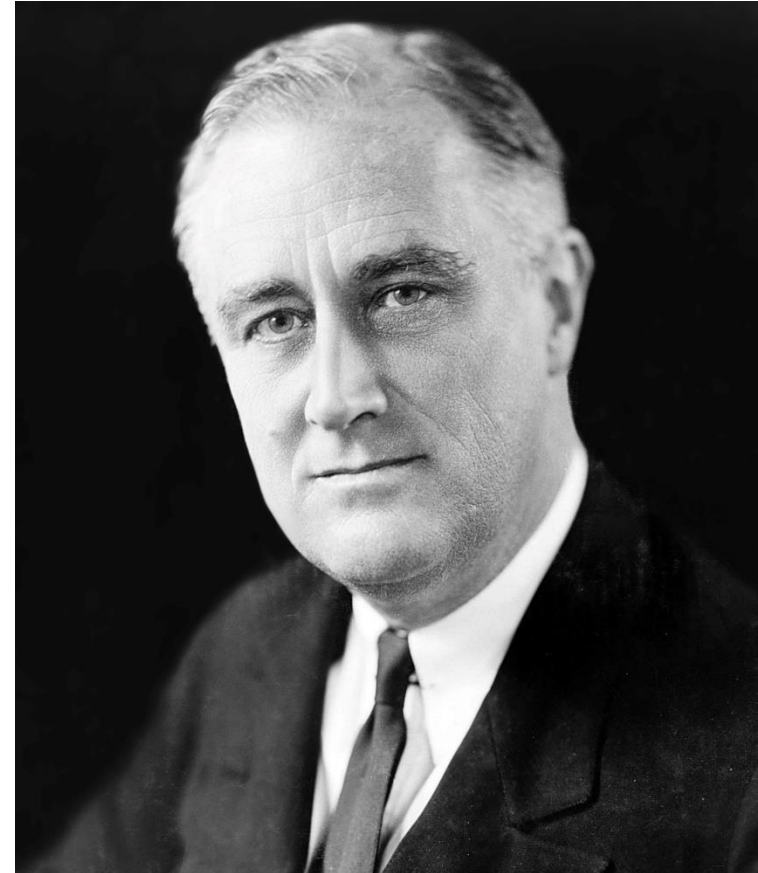


- 2020 saw 37.8 GW of coal-fired generation retired globally
- China commissioned 38.4 GW of new coal plants in 2020
- China's new coal plants represented 76% of the global total
- China has 88.1 GW of coal-fired generation under construction (almost half the global total) and a further 158.7 GW in the pipeline



“The test of our progress is not whether we add to the abundance of those who have much. It is **whether we provide enough to those who have little.**”

- Franklin D. Roosevelt





Nothing says “renewable” like a **helicopter** (powered by fossil fuels) spraying **de-icing agent** (created from fossil fuels) on a frozen wind turbine.

John Harpole

President

Mercator Energy

26 W. Dry Creek Circle, Suite 410

Littleton, CO 80120

harp@mercatorenergy.com

(303) 825-1100 (work)

(303) 478-3233 (mobile)



Appendix



Waha S&P Global Platts Gas Daily Index

Waha (daily and monthly market)

- Deliveries into interstate and intrastate pipelines at the outlet of the Waha header system in the Permian Basin in West Texas. Pipelines and locations include El Paso Natural Gas, Transwestern Pipeline, Natural Gas Pipeline Co. of America, Northern Natural Gas, Delhi Pipeline, Oasis Pipeline, Atmos Zone 1, OneOk West Tex, and Enterprise Texas Pipeline. Does not include Atmos Zone 3 or Tolar Hub.

NYMEX Henry Hub S&P Global Platts Gas Daily Index

Henry Hub (daily and monthly market)

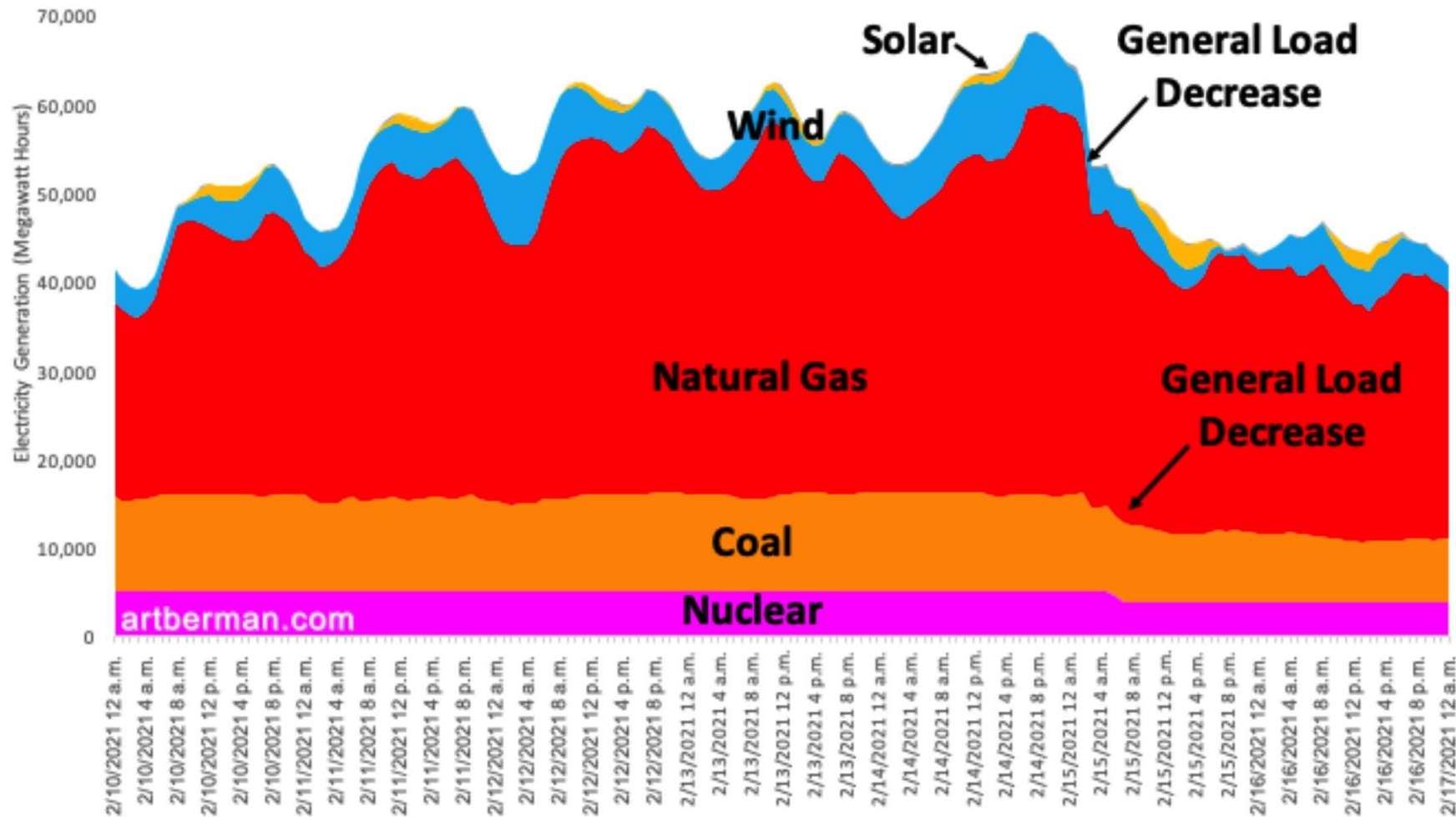
- Deliveries into interstate and intrastate pipelines from the outlet of Henry Hub on Sabine Pipe Line in Vermilion Parish, LA. Pipelines include Gulf South Pipeline, Southern Natural Gas, Natural Gas Pipeline Co. of America, Texas Gas Transmission, Sabine Pipe Line, Columbia Gulf Transmission, Transcontinental Gas Pipe Line, Trunkline Gas, Jefferson Island Pipeline and Acadian Gas

- The Weather Channel
- <https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php>
- *The Texas Freeze: Why the Power Grid Failed*, The Wall Street Journal, Katherine Blunt and Russell Gold, February 19, 2021
- *Assigning Blame for the Blackouts in Texas*, Climate Etc., Planning Engineer, February 18, 2021
- *Ercot.com/about*
- *Is ERCOT a government agency?*, Austin American-Statesman, Nate Chute, February 19, 2021
- [https://en.wikipedia.org/wiki/Regional_transmission_organization_\(North_America\)](https://en.wikipedia.org/wiki/Regional_transmission_organization_(North_America))
- <https://www.eia.gov/todayinenergy/detail.php?id=42915>
- Perfect Storm – Sustained Arctic Weather Exposes Weaknesses in Texas’s Power Industry; Housley Carr; RBN Energy, LLC; February 18, 2021
- Fox News, Rove Reacts to Texas Power Grid
- *The Night They Drove the Price of Electricity Down*, SLATE, Daniel Gross, September 18, 2015
- *Ed Hirs Has Been Predicting This Mess for Years*, Texas Monthly, Mimi Swartz, February 19, 2021
- *Colorado PUC In the matter of the application of Public Service Company of Colorado for approval of its 2007*
 - *Colorado Resource Plan, Direct Testimony and exhibits of James F. Hill - The effective load carrying capability (“ELCC”)*
- *Government Support for Intermittent Renewable Generation Technologies*, Arthur Campbell, April 6, 2009, MIT Department of Economics
- “A Report to Congress and the States Pursuant to the Sections 1234 and 1832 of the Energy Policy Act of 2005”, United States Department of Energy, February 2007
- *Brett Oakleaf, Invenergy LLC*
- “What’s Wrong with Wind and Solar?”, PragerU, Mark Mills, September 14, 2020
- *Batteries Necessary To Support Solar Power Don’t Exist, Making Green Energy Expensive*, BEO Report, Andrew Follett, September 13, 2016
- *Ed Hirs Has Been Predicting This Mess for Years*, Texas Monthly, Mimi Swartz, February 19, 2021

- Ryan Zorn LinkedIn post, US EIA
- ERCOT Reliability: Systematic Unpreparedness, A Twentieth Century Solution for a Twenty-First Century Problem, Larry Kellerman and Robert McCullough
- Assigning Blame for the Blackouts in Texas, February 18, 2021, By Planning Engineer
- Atmos Energy
- *Austin American Statesman*
- *S&P Global Platts Gas Daily publications*
- Poweroutage.us

- *High risk, low reward drives shift from power generation*, Houston Chronicle, Marcy de Luna, March 14, 2021
- *Power Outages Main Cause of Oil, Gas Shut-Ins*, Energy & Science, Naureen S. Malik, Joe Carroll, David Wethe, Mark Chediak, February 25, 2021
- *Texas leaders failed to heed warning that left the state's power grid vulnerable to winter extremes, experts say*, Texas Tribune, Erin Douglas, Kate McGee, Jolie McCullough, February 17, 2021
- *Understanding Texas Wind Power: A Policy Guide – Texas Coalition for Affordable Power*
- *Wind Energy, Noise Pollution*. National Review, Robert Bryce, February 2, 2012
- *Top 11 Problems Plaguing Solar and Wind Power*, Daily Caller, Andrew Follett, December 25, 2015
- *Texas Is Drowning in Wind Energy*, Popular Mechanics, David Grossman, August 8, 2016
- *Texas Legislature Update: Chapter 313 and Texas Wind Production*, Environmental Defense Fund Energy Exchange Blog, Marita Mirzatuny, May 16, 2013
- *New Study Reaches a Startling Conclusion About the Cost of Solar and Wind Energy*, Think Progress, Joe Romm, November 20, 2017
- *California Girds for Energy Woes*, Wall Street Journal, Rebecca Smith, February 26, 2013
- *Searing Heat Is Hurting Texas Wind Power*, Bloomberg, Brian K. Sullivan and Ryan Collins, July 5, 2017
- *Germany's Green Energy Meltdown*, Wall Street Journal, Editorial Board, November 17, 2017
- *ERCOT Reliability: Systemic Unpreparedness, A Twentieth Century Solution for a Twenty-First Century Problem*, Larry Kellerman and Robert McCullough
- *Local Tax Abatements and the Texas Wind Industry: How Chapters 312 & 313 Are Scarring Rural Texas*, Texas Public Policy Foundation, Stanley Greer, 2019
- *The Texas Wind Power Story: Part I*, Texas Public Policy Foundation, Lisa Linowes, 2018
- *The Cost of the Production Tax Credit and Renewable Energy Subsidies in Texas*, Texas Public Policy Foundation, Bill Peacock and Josiah Neeley, 2012
- *The True Cost of Wind Energy*, Texas Public Policy Fund, Bill Peacock, 2008

All Texas energy sources decreased early Monday February 15 Supply was not the problem but a general load decrease from plant closures



artberman.com

Nuclear