

# The Root Cause of the Texas Energy Disaster

Presented to:

**National Coal Transportation Association (NCTA)  
Spring Conference 2021**

**Napa, CA**

**April 14, 2021**



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“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:  
14<sup>th</sup> 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

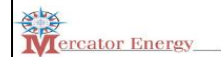
## The IPAMS/Bentek Study A Catalyst to Avoid a Train Wreck?



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



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

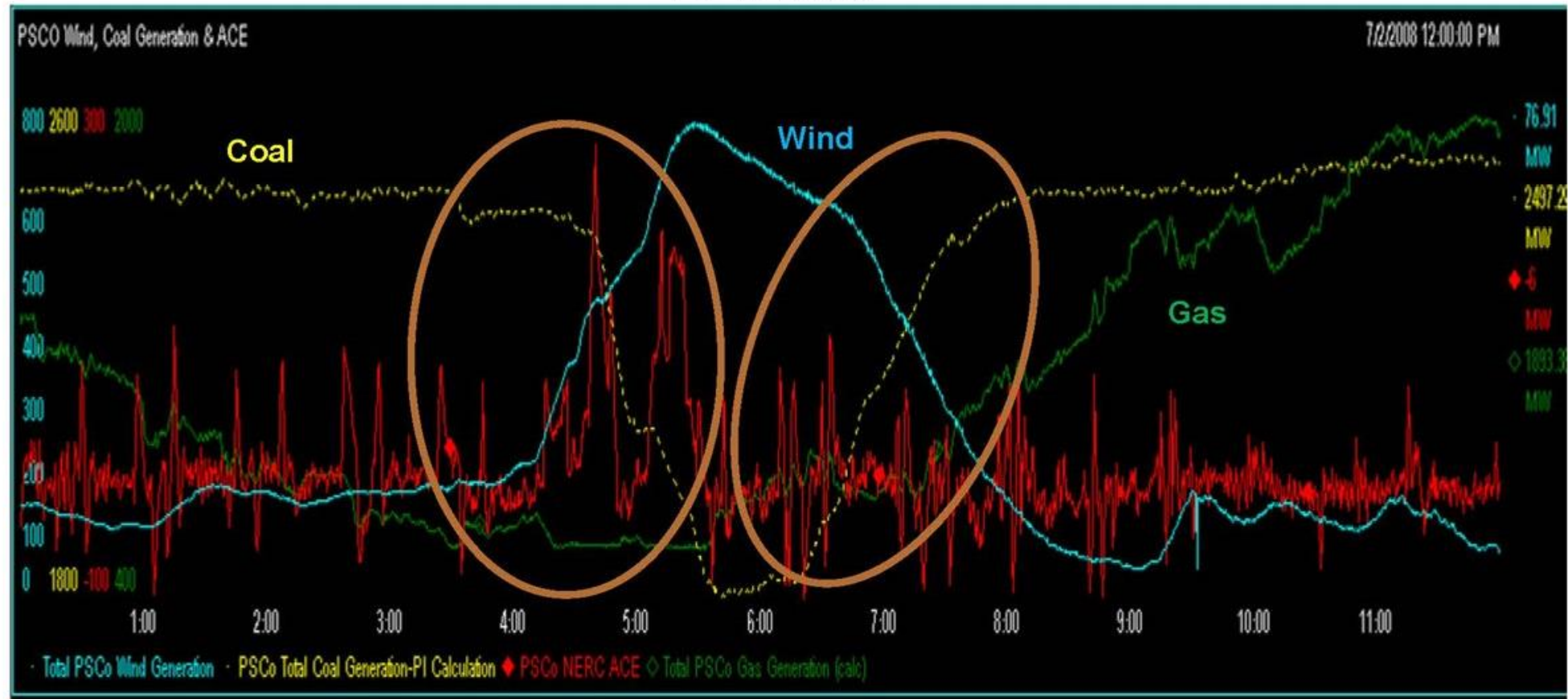


Natural gas: not just a bridge to renewables.  
It's a way to avoid a train wreck.



## 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

Monday, February 8<sup>th</sup> through Tuesday February 16<sup>th</sup>:

Wind  93%

Coal  47%

Natural Gas  450%

**“All performed as expected...”**



- 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 12<sup>th</sup>, 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.”**

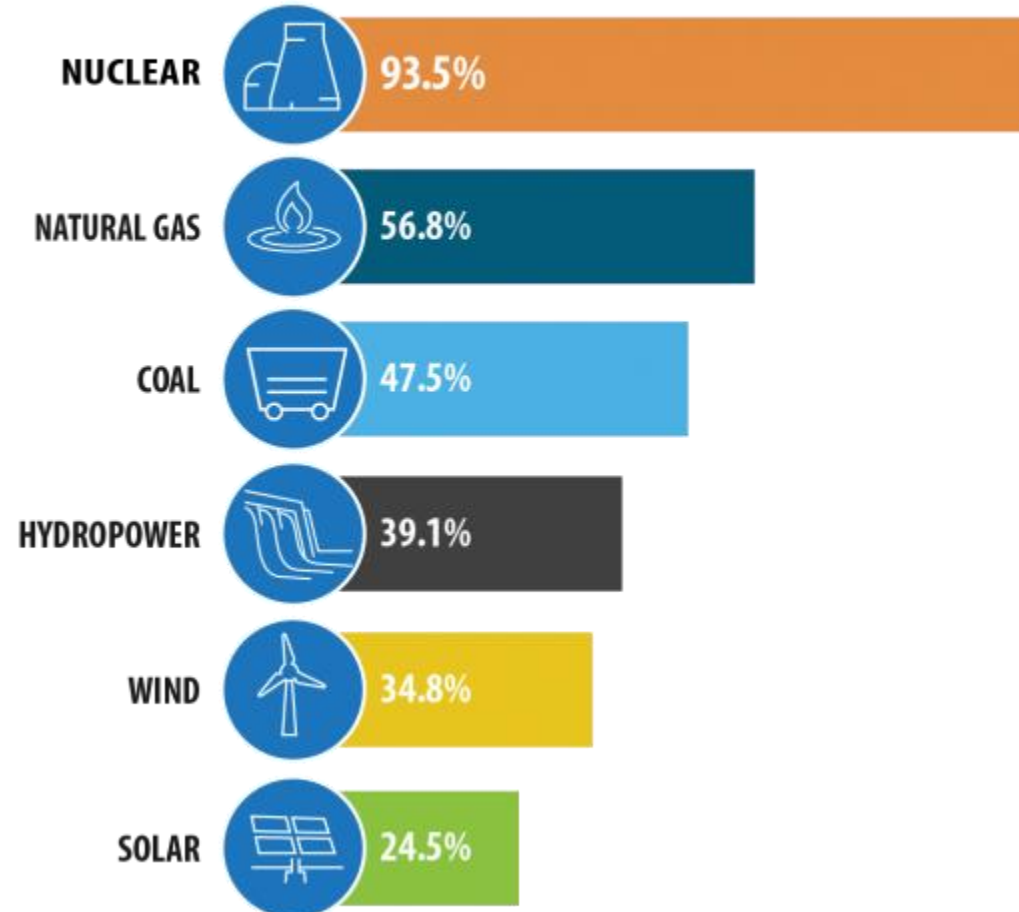


“The nature of electricity markets, instantaneous matching of supply and demand, means that intermittent technologies are not perfect substitutes for any one of dispatchable technology.

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



## 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?**



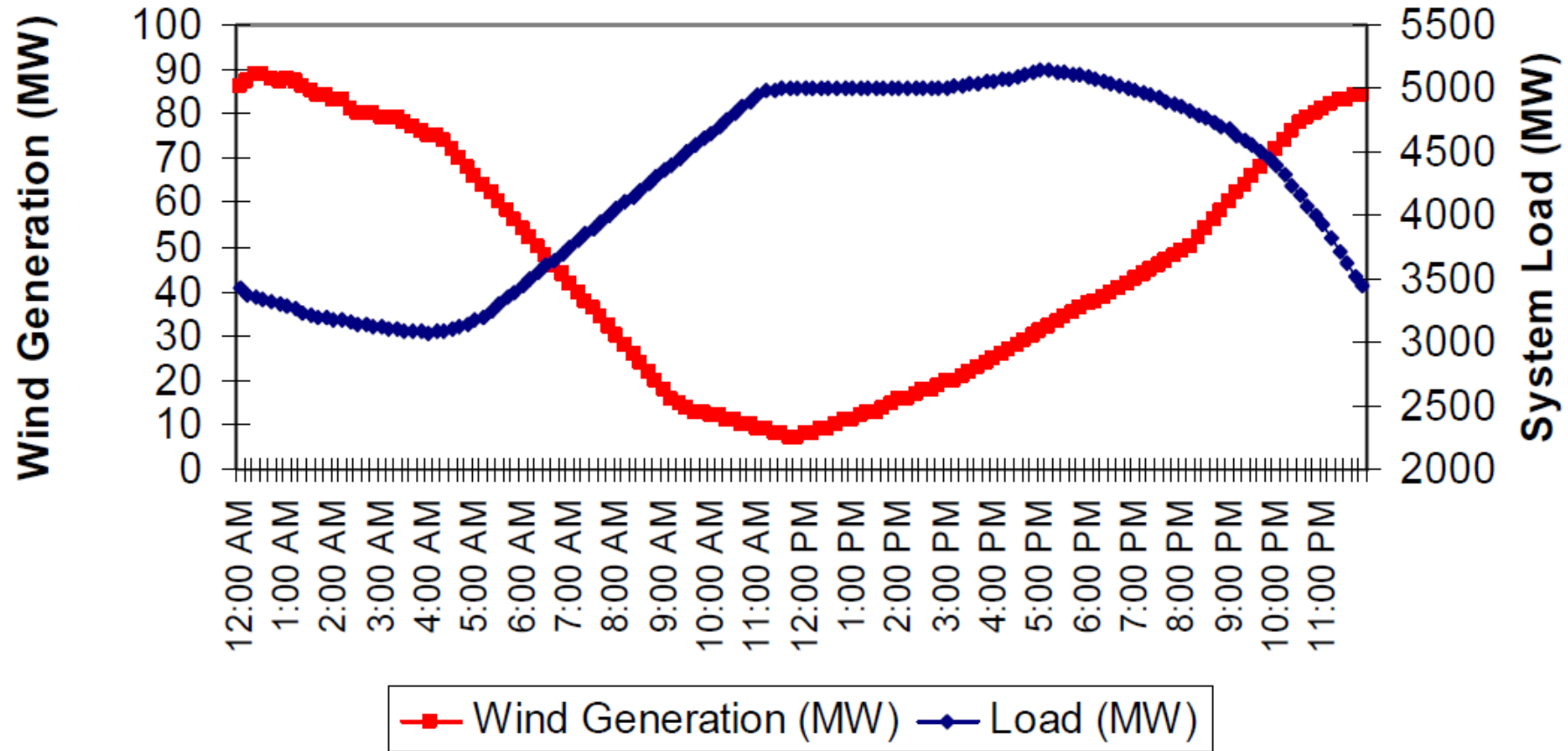
“The operation of generation facilities to produce energy at the **lowest cost to reliably serve consumers**, recognizing any operational limits of generation and transmission facilities.”

- 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





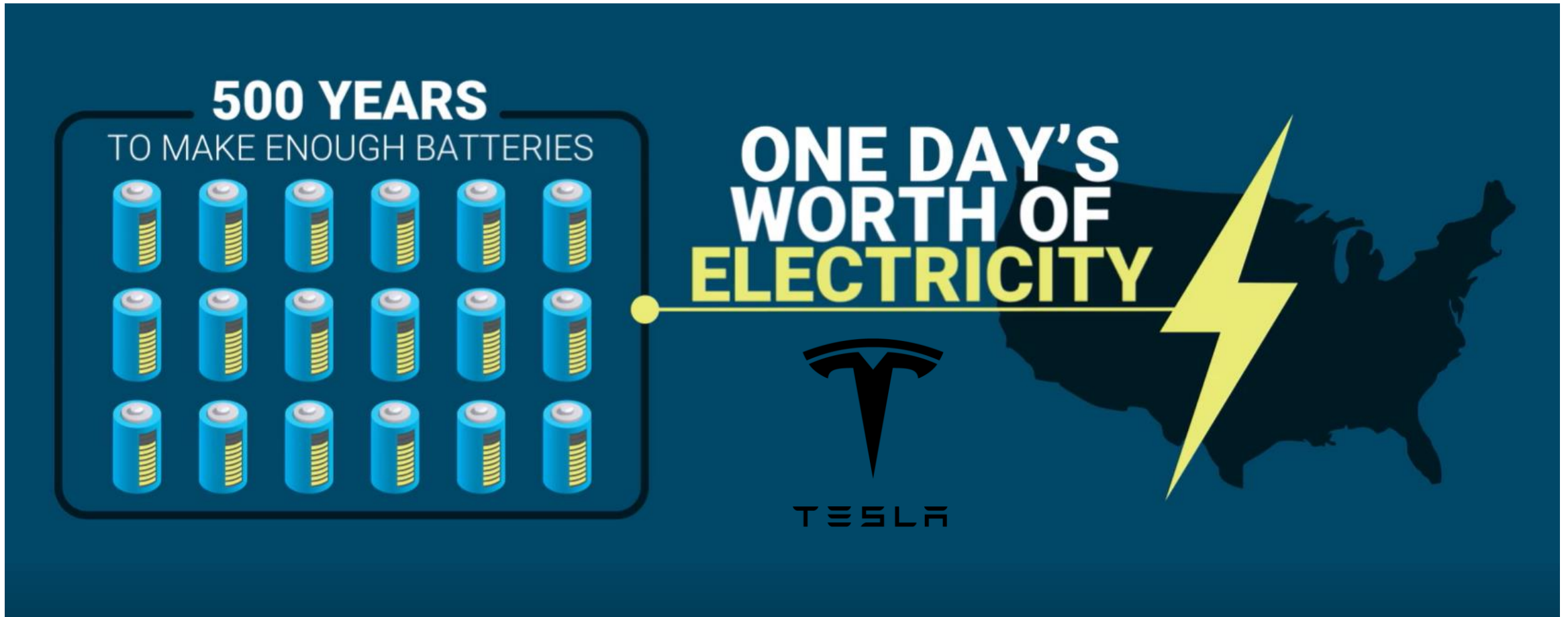
# Storage Cost Comparison: Natural Gas vs. Wind



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

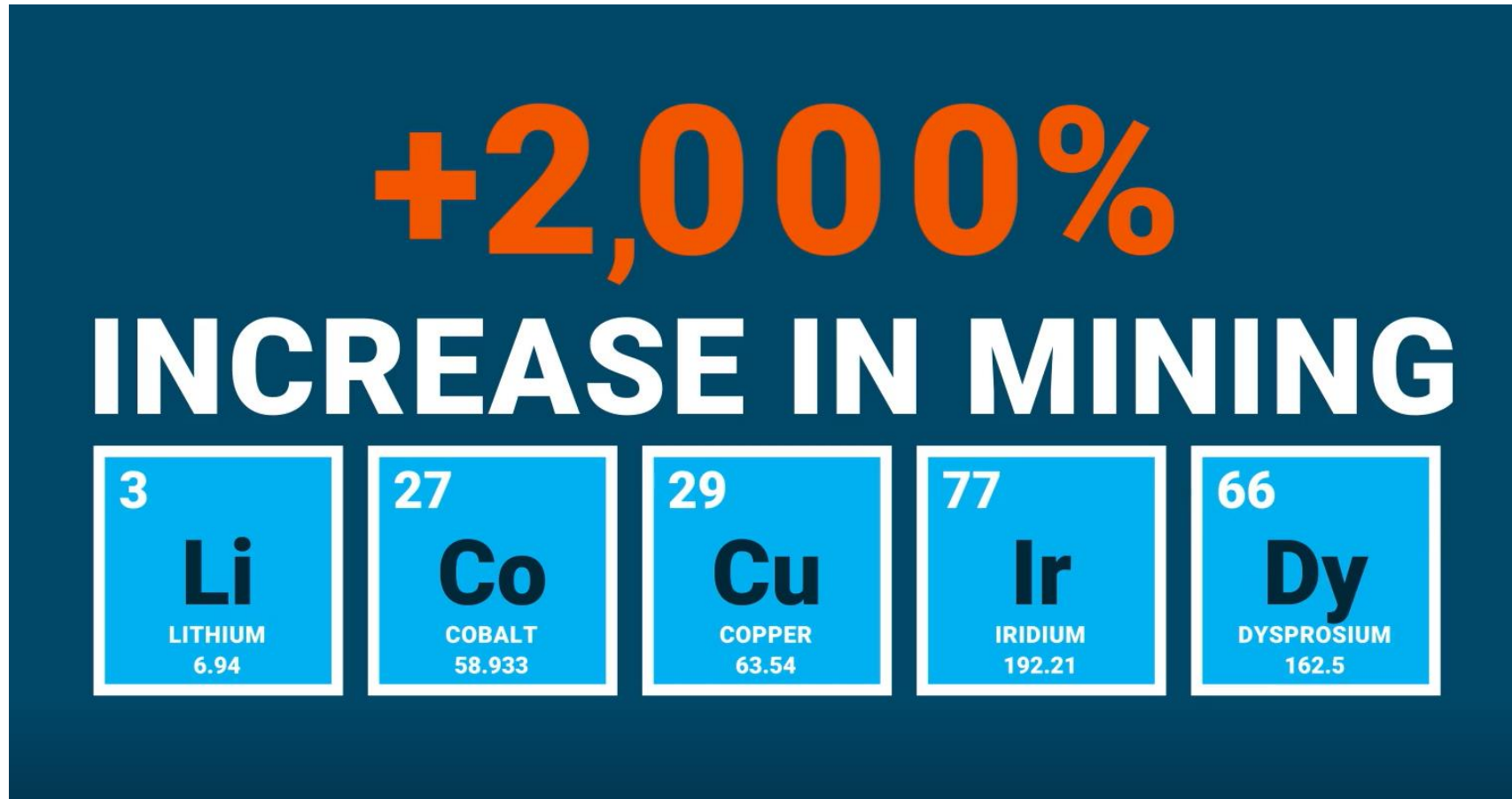
## World's Largest Utility Scale Battery in Operation

- 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.



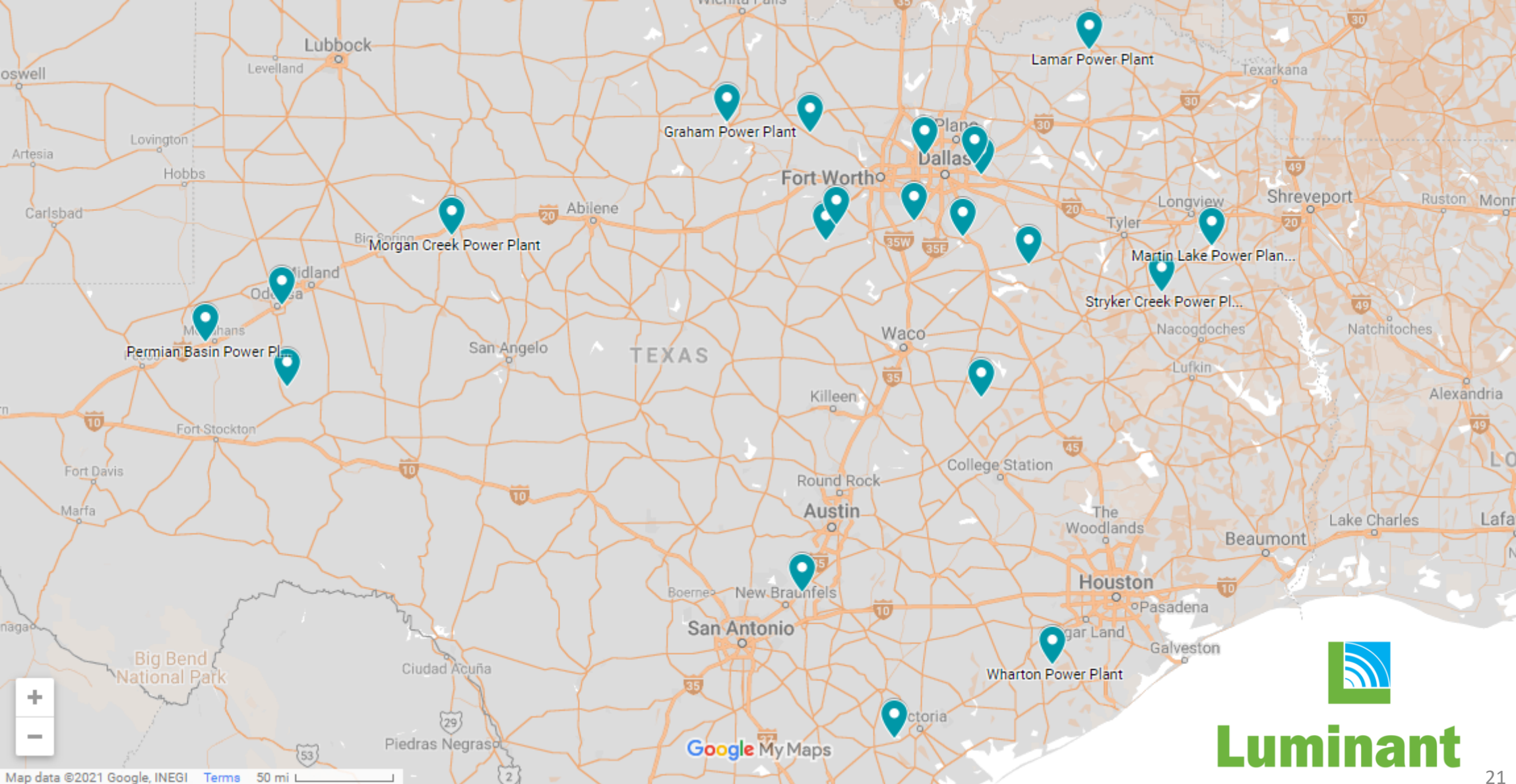
# Limited Natural Resources Drive “Green” Energy

- 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

# 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**

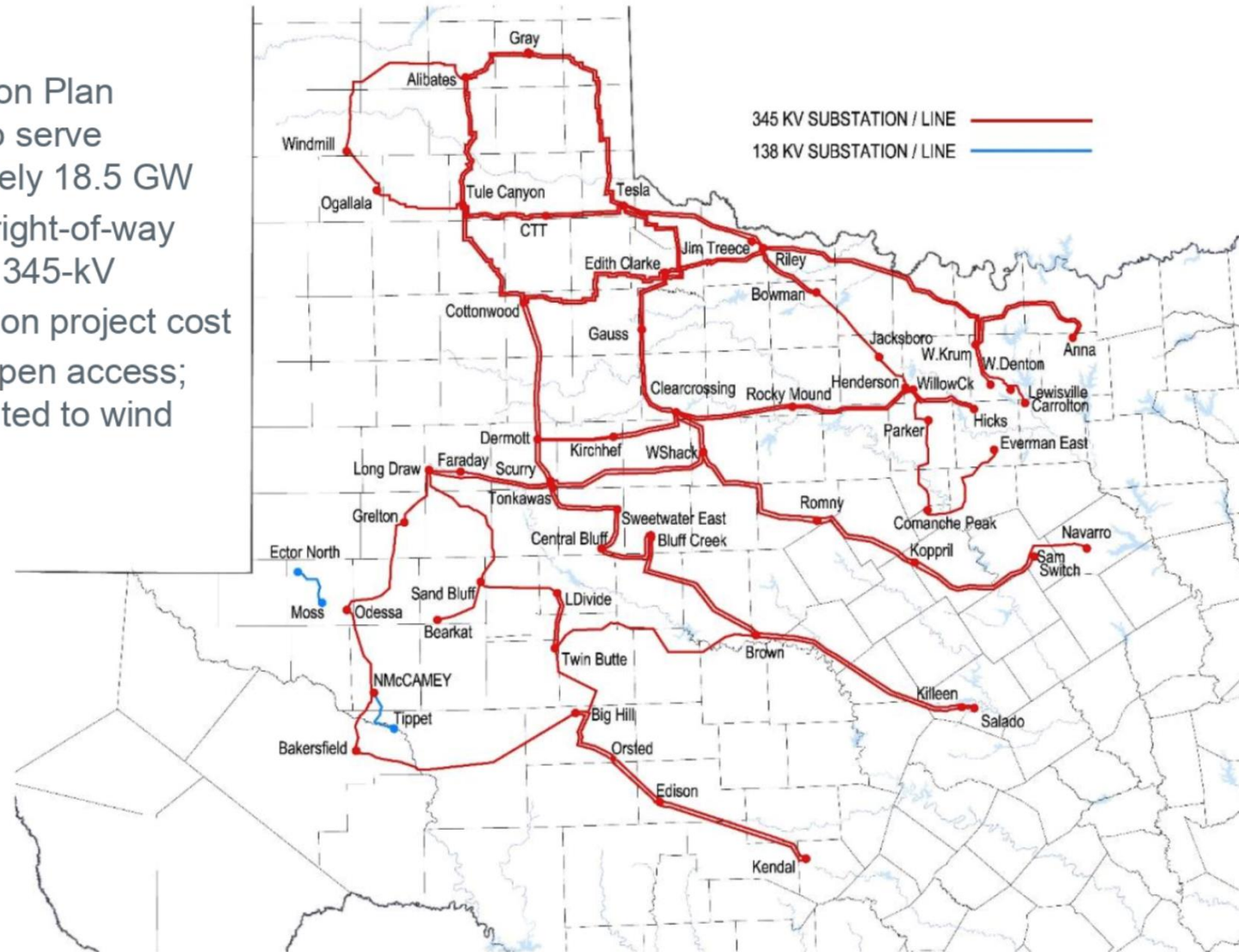


**Imagine the conversation...?**

- 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	<i>\$2.5 billion?</i>
<b>Total</b>	<b>\$36.0 billion +</b>
<b>Average Annual Cost</b>	<b>\$1.50 billion +</b>
<b>Current Annual Cost</b>	<b>\$2.47 billion +</b>
<b>% of ERCOT 2018 Total \$ Sales</b>	<b>7.8% +</b>
<b>% of ERCOT Renewable \$ Income</b>	<b>28.8% +</b>

# 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
<b>Subtotal</b>	<b>\$3,054</b>	<b>\$19,380</b>	<b>32,097</b>
Share of PTC Market	71%	76%	59%
<b>TOTAL</b>	<b>\$4,298</b>	<b>\$25,474</b>	<b>54,528</b>

## 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 15<sup>th</sup>) 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”



# Gas Price Manipulation? NO WAY!

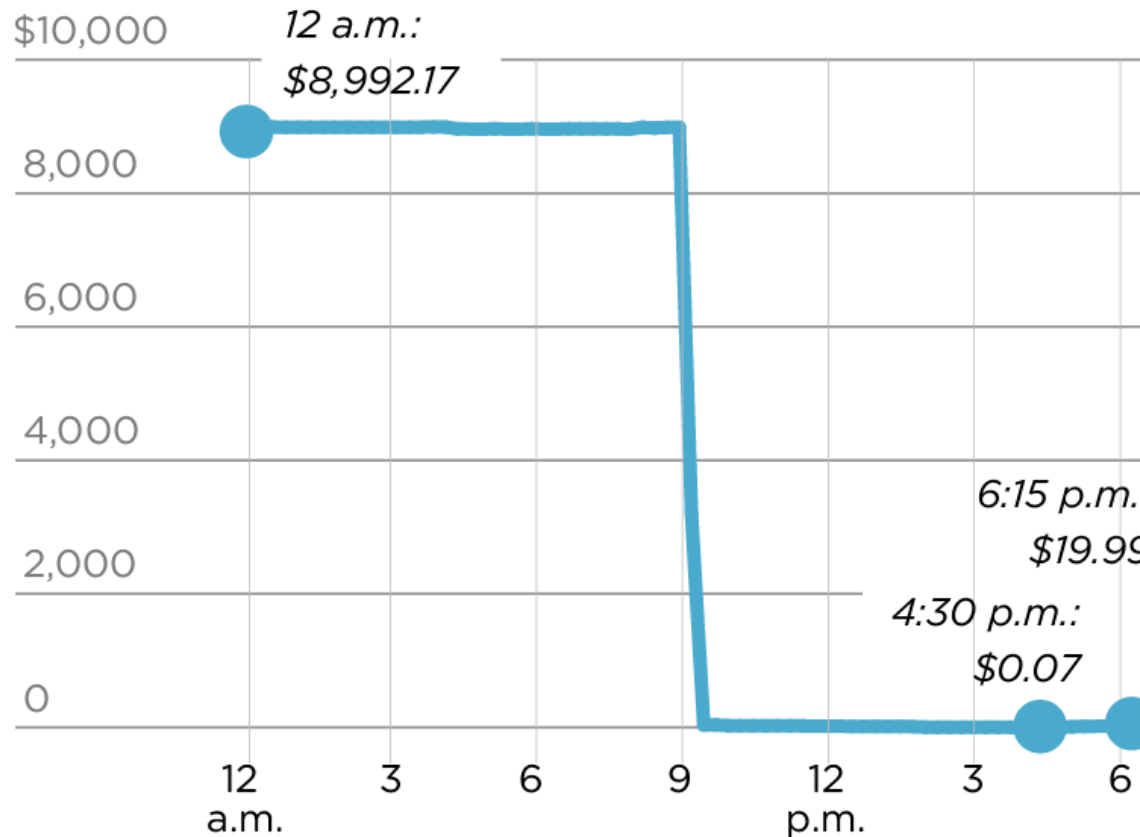
## Waha S&P Global Platts Gas Daily Index

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
<b>February 13, 2021</b>	<b>\$153.62</b>	<b>770</b>	<b>133</b>
<b>February 14, 2021</b>	<b>\$153.62</b>	<b>770</b>	<b>133</b>
<b>February 15, 2021</b>	<b>\$153.62</b>	<b>770</b>	<b>133</b>
<b>February 16, 2021</b>	<b>\$153.62</b>	<b>770</b>	<b>133</b>
<b>February 17, 2021</b>	<b>\$208.79</b>	<b>452</b>	<b>78</b>
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

## 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*

- 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 12<sup>th</sup> 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 15<sup>th</sup> **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 was a result of **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?



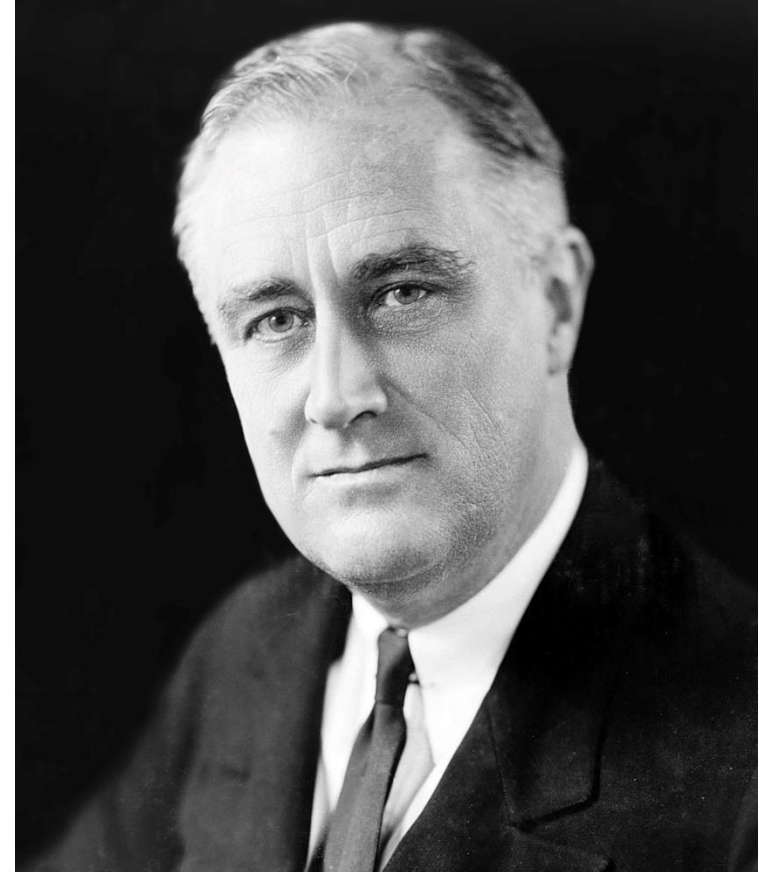
- 2020 saw 37.8 GW of coal-fired generation retired globally
- China commissioned 38.4 GW of new coal plants in 2020
- China's new coal plants represented 76% of the global total
- China has 88.1 GW of coal-fired generation under construction (almost half the global total) and a further 158.7 GW in the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

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# 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

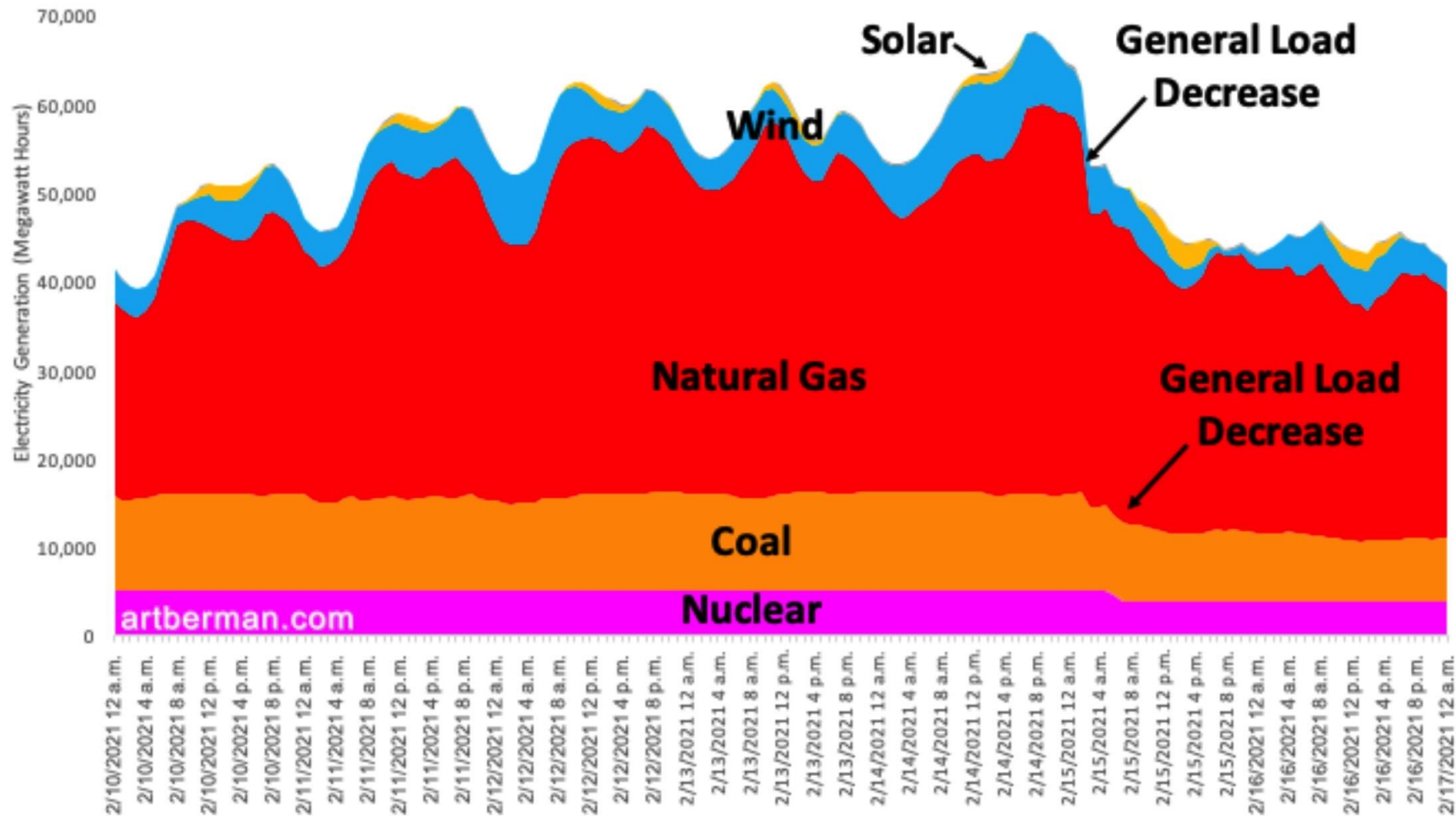
- The Weather Channel
- <https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php>
- *The Texas Freeze: Why the Power Grid Failed*, The Wall Street Journal, Katherine Blunt and Russell Gold, February 19, 2021
- *Assigning Blame for the Blackouts in Texas*, Climate Etc., Planning Engineer, 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

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- 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
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- *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
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- *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