Nuclear Power and the Strength of Texas Energy

Comanche Peak Nuclear Generating Station

About Clay Montgomery

- Energy Analyst focused on natural gas, the energy transition and revival of the nuclear power industry.
- Actively manages a portfolio of investments in energy commodities, petrochemical, electric utilities and new energy infrastructure.
- Previously, a Senior Software Engineer at Texas Instruments, Nokia Research Center, Philips Semiconductors, VLSI Technology, AMX and Freelance.
- Active member of the Nuclear Energy Institute (NEI.org), the largest trade association for Nuclear Power in America.
- Resident of North Texas for over 55 years.

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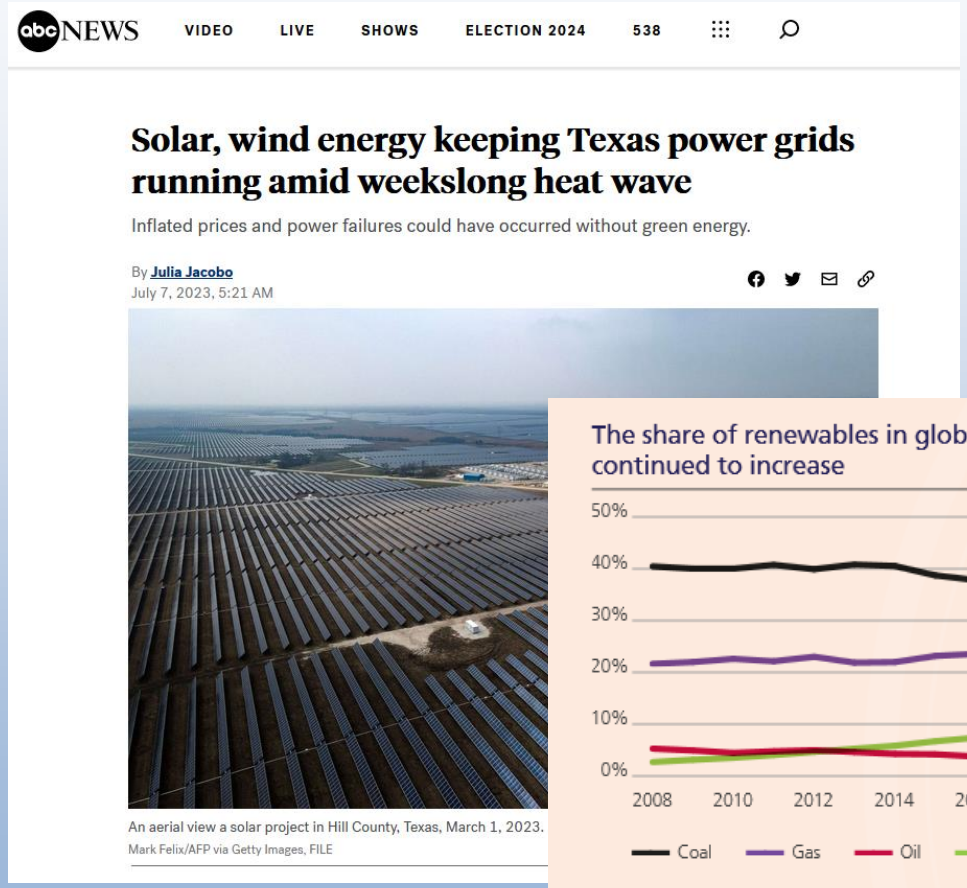
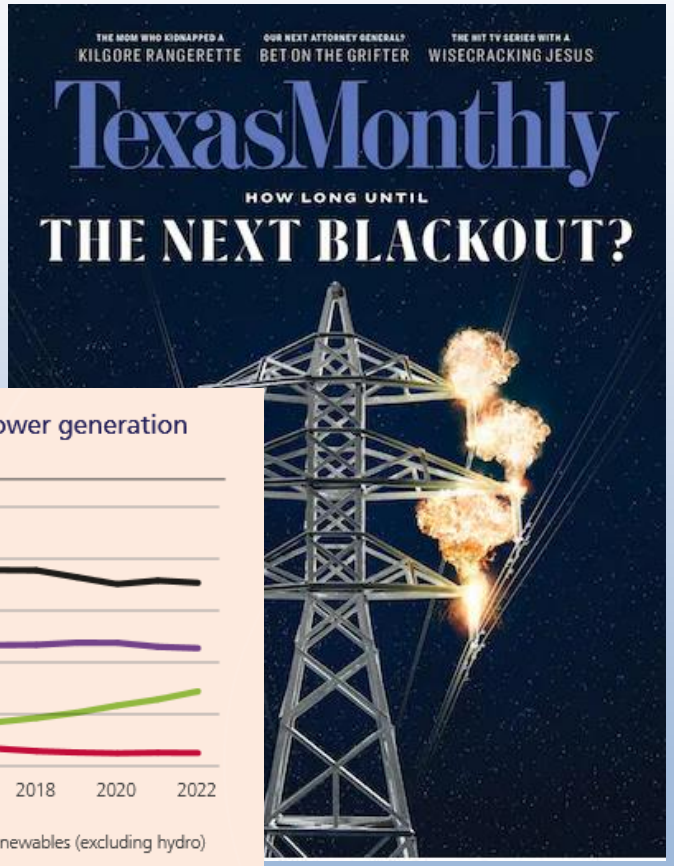
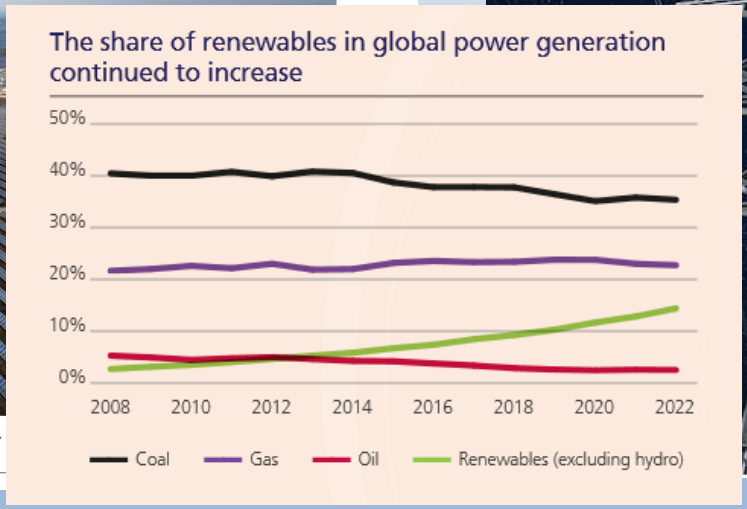
NEI NUCLEAR ENERGY INSTITUTE

Corporate Media Misinformation

- There's a lot of really poor and deceptive journalism about energy issues.



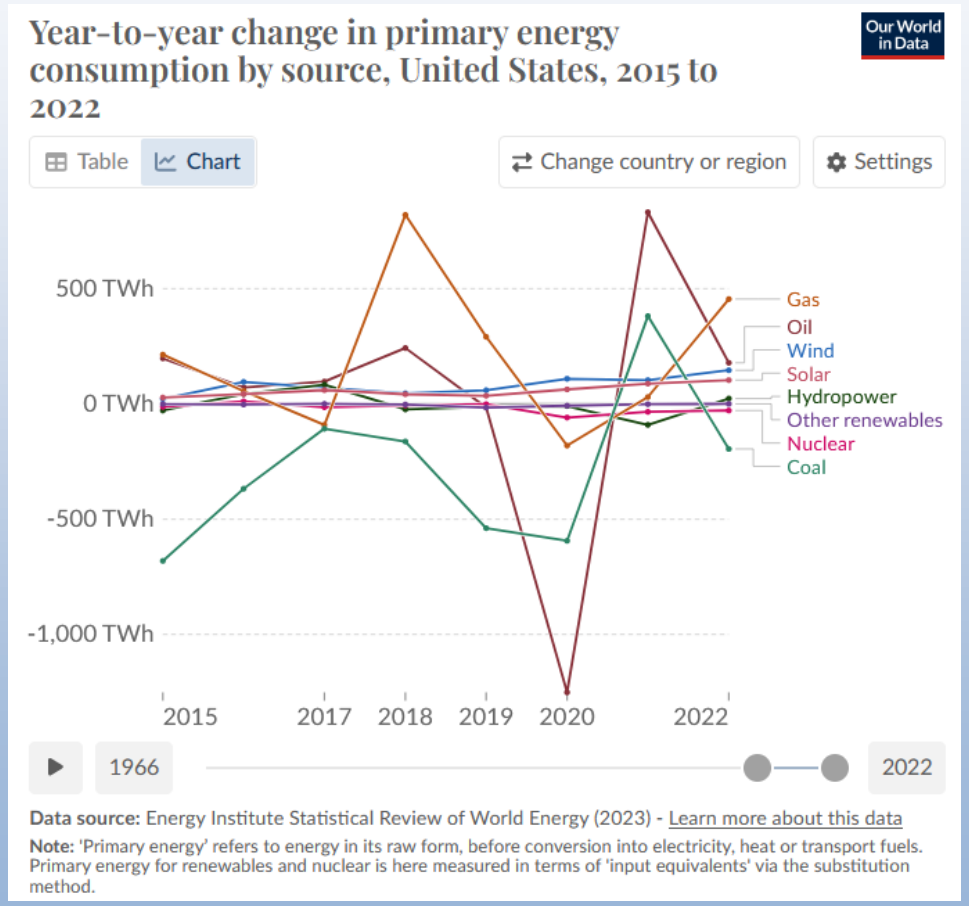


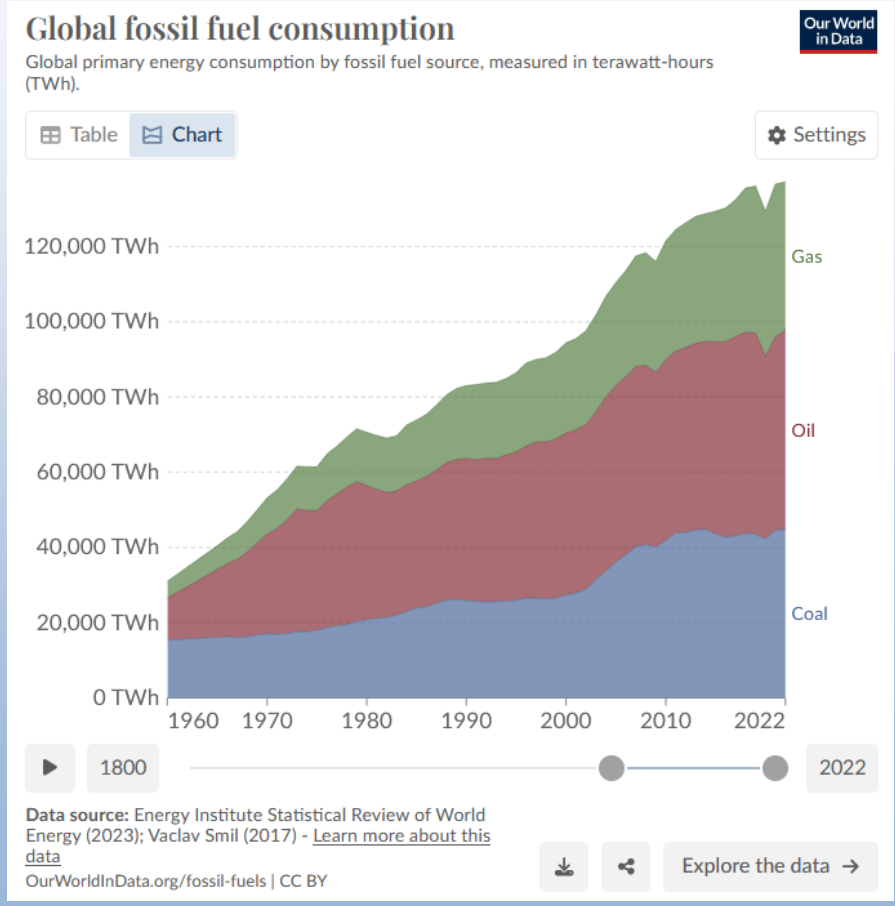


https://www.texasmonthly.com/news-politics/texas-electric-grid-failure-warm-up/
https://abcnews.go.com/US/solar-wind-green-energy-keeping-texas-power-grids-running/story?id=100796136
https://www.energyinst.org/statistical-review

Energy Sector Growth

- Oil, Gas and Coal production are still growing faster than Wind and Solar.
- Natural gas is the clear leader in most Western countries.





https://quillette.com/2022/10/18/hyping-the-energy-transition/

The Failing Energy Transition

- US has spent more than $2 Trillion on “renewable” energy over the past 3 decades.
- But, there’s still little evidence that any “energy transition” is underway.
- US and global growth in oil, natural gas and coal, still far exceed the growth of wind, solar and hydrogen, by huge margins.
- More than 3 billion people on the planet today still live in energy poverty.
- The world needs Texas’ leadership in LNG exports and Nuclear Power to continue.

- Spending on wind, solar and biomass “renewable” energy 2004 to 2019:
  - By the US: $577 Billion.
  - Rest of the world: $1.5 Trillion.

- Meanwhile, US oil, gas and coal use **increased 5X more** than wind and solar!

- Wind and solar energy are **not** displacing hydrocarbons.
- They are actually just expensive incremental additions to our existing energy mix, only useful when the weather is right.

https://quillette.com/2022/10/18/hyping-the-energy-transition/

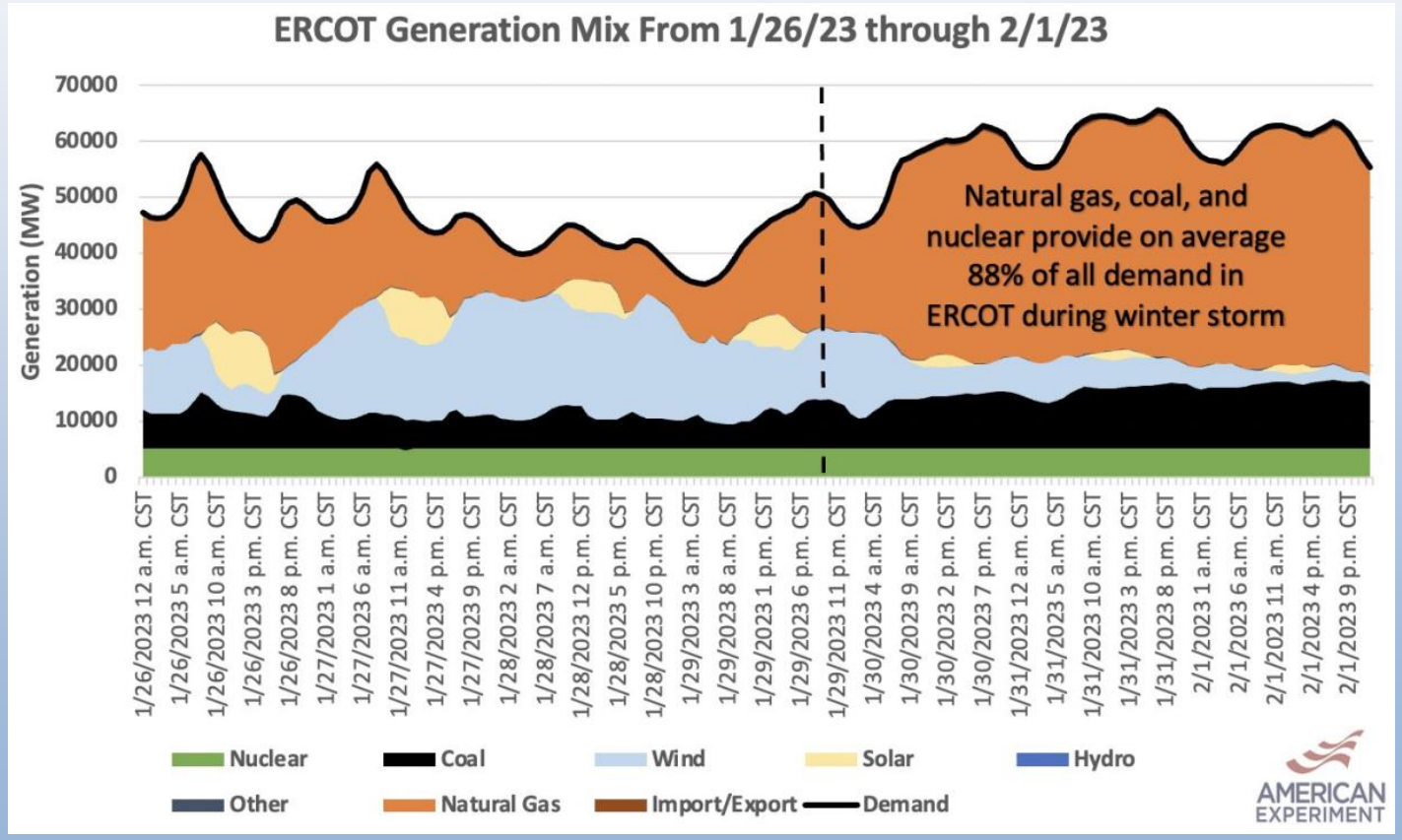
What REALLY Happened to the Texas Electric Grid

- **Federal** EPA increased costs on coal-fired electric plants to require most of them to be decommissioned and replaced with gas, wind, solar and batteries (to reduce CO2).
- **Federal** EPA required all natural gas compressors to be replaced with electric units, powered by the **same electric grid** that they supply (to reduce CO2).
- **Federal** and local tax subsidies incentivized investments into intermittent wind and solar, while insufficient gas-fired base-load was built and **No** new nuclear.
- ERCOT deregulation discouraged utilities from investing in electric grid capacity infrastructure improvements, other than wind, solar and batteries.
- ERCOT ignored lessons from the winter storm of 2011 and ignored the circular dependency problems of gas compressors powered by the **same grid** they supply.
- Immigration (both legal and illegal) has greatly increased electric demand.
- Corporate media advocates connecting the ERCOT grid to neighboring states to improve its reliability, but that would surrender full control to **Federal** (FERC) regulators!

https://www.masterresource.org/baker-institute-rice-university/texas-wind-baker-study-2022/
https://www.ferc.gov/media/february-2021-cold-weather-outages-texas-and-south-central-united-states-ferc-nerc-and

Texas Electric Mix

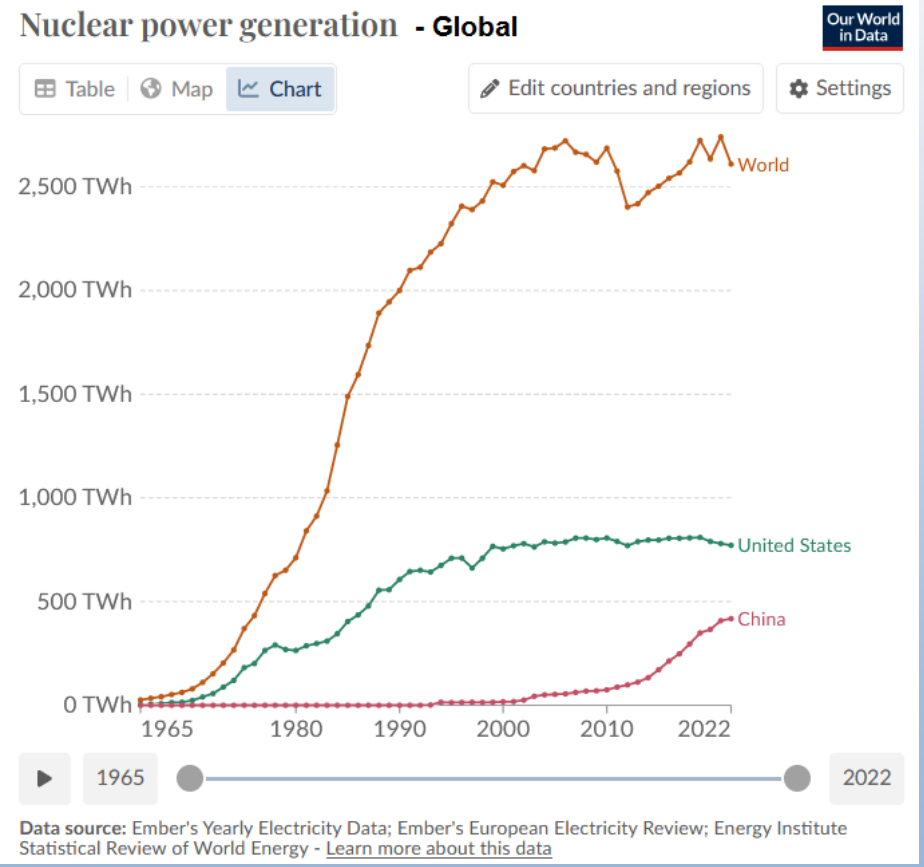
- Wind and Solar work when the weather is right.
- Other times, natural gas and coal must ramp up quickly to prevent disaster.
- Nuclear Power is always on and needs no batteries.

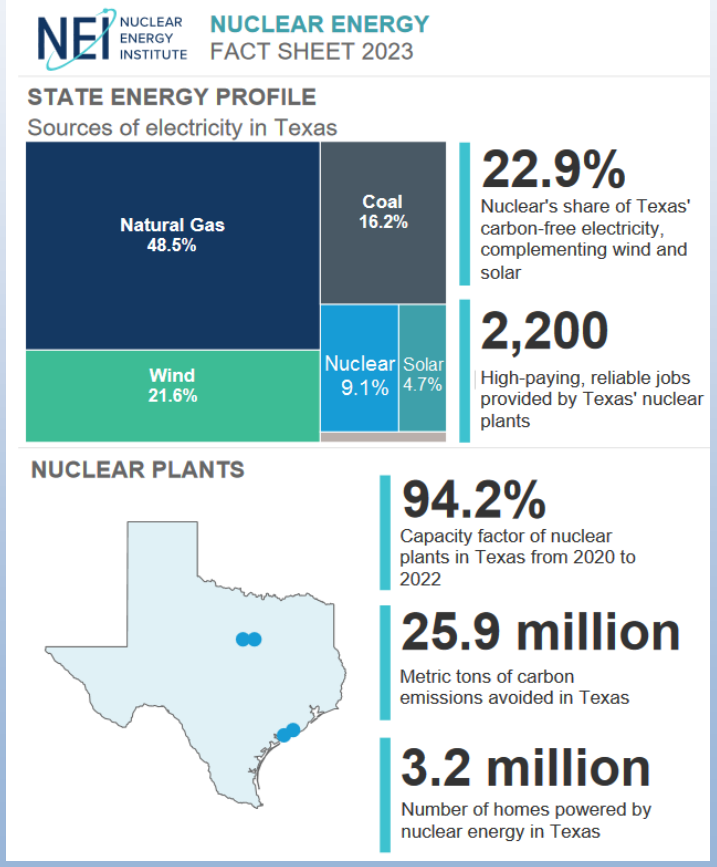


https://www.americanexperiment.org/reports/

Nuclear Energy in Texas

- Nuclear power has resumed growth globally, but growth is mostly in Asia.
- Nuclear power is still very important for Texas and primed for rapid growth.





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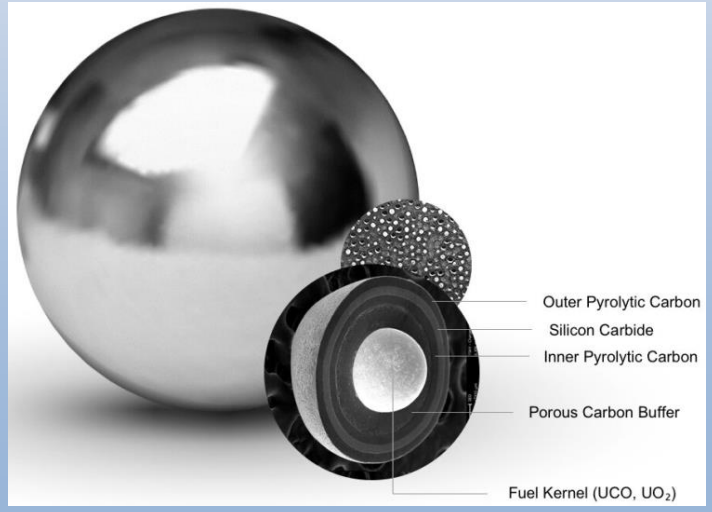
Small Modular Reactors

- Manufactured in factories and delivered on trucks.
- Several innovative designs use new Accident Tolerant Fuels.
- Recent NEI survey of 19 utility companies shows huge demand for new nuclear reactors by US and US allies.
- More than 300 new SMRs will be deployed in the US over the next 25 years.
- More than 90 GigaWatts of new nuclear generation by the 2050s.
- 90% of existing US nuclear plants are expected to extend operation to 80 years.
- Several utilities are evaluating sites that currently host retiring coal-fired plants.

Lightbridge Fuel Assembly



TRISO-X Fuel Sphere

Planned SMR Builds

- Nucor is investing $15 million in NuScale Power to build SMRs near steel mills.
  - NuScale was recently spun-out of Fluor Corp, of Irving, Texas.

- Microsoft plans to build TerraPower SMRs to power their cloud data centers.
- The TVA plans to build GE-Hitachi SMRs in Oak Ridge, Tennessee.
- Saskatchewan Power also plans to build a GE-Hitachi SMR in mid-2030s.
- Kairos will build a Hermes SMR test reactor, in Oak Ridge, Tennessee.
- BWX Technology is building the Pele SMR for the US military.
- Many countries want SMRs: Poland, Romania, Britain, Canada, Philippines, etc.

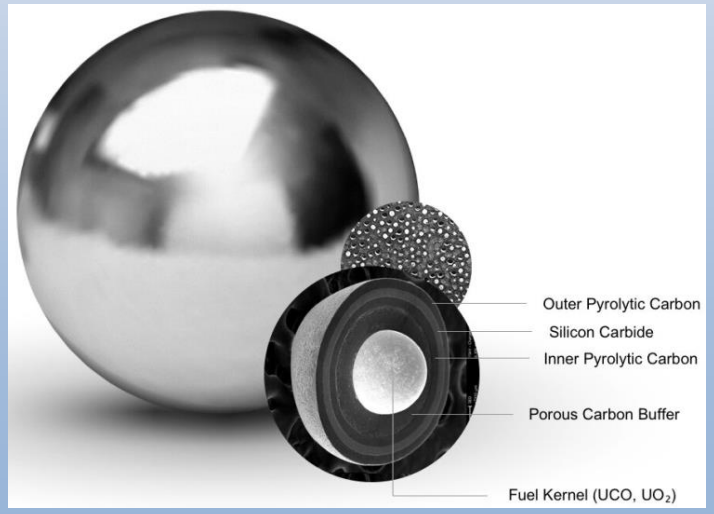
Conception of NuScale Plant

Conception of Westinghouse Plant

Dow and X-Energy SMR Project in Seadrift, Texas

- Will be the first new nuclear plant built in Texas since 1990.
- Four Xe-100 high-temperature, helium gas-cooled reactors that use TRISO-X fuel.
- Could be later expanded to eight SMR reactors on the same site.
- Awarded $1.2 billion by DOE under the ARDP for federal cost-sharing.
- Dow's chemical plant will use nuclear heat to produce plastics from natural gas.
- Lower CO2 emissions will qualify for tax credits from the Inflation Reduction Act.
- Requires HALEU fuel, which is only available from Russia in commercial quantities.
- May be in operation by 2030.

Conception of Seadrift Plant



TRISO-X Fuel Sphere

ACU Nuclear Energy Experimental Testing (NEXT) Lab

- Abilene Christian University (ACU) is building a Molten Salt Research Reactor (MSRR).
- Will advance molten salt fuel technology, originally invented in 1955, at Oak Ridge.
- MSRs could substantially reduce the costs of nuclear reactors and fuels.
- MSRs could recycle spent fuel and even **eliminate plutonium waste**.
- Will also study medical isotope production.
- Will educate future engineers with nuclear degree programs.
- NEXT Research Alliance also includes Georgia Institute of Tech, Texas A&M and UT.
- Natura Resources is sponsoring $30.5 million in research.
- Prime contractor is Teledyne Brown Engineering.
- May be in operation by 2026.

Conception of ACU NEXT Lab

https://acu.edu/research/next-lab/
https://www.world-nuclear-news.org/Articles/Application-submitted-for-US-molten-salt-research

Federal Energy Incompetence

- The White House has slowed oil and gas development.
- White House is quietly anti-nuclear, stymying development (except for export).

Administration Priorities The Record

MAY 10, 2023

FACT SHEET: Biden-Harris Administration Outlines Priorities for Building America's Energy Infrastructure Faster, Safer, and Cleaner

BRIEFING ROOM › STATEMENTS AND RELEASES

President Biden's Investing in America agenda is making a once-in-a-generation investment in America's infrastructure and our clean energy future that is creating good-paying union jobs, growing our economy, building energy security, combating climate change, advancing environmental justice, and helping lower costs for families. To continue to drive these efforts, the Biden-Harris Administration today announced a set of priorities it urges Congress to pass as part of bipartisan permitting reform legislation.

The Washington Post
Democracy Dies in Darkness

ECONOMIC POLICY

Biden seeks expanded domestic production and more-robust supply chains

National security adviser outlines effort to bolster an economic system vulnerable to market forces

By David J. Lynch

April 27, 2023 at 4:21 p.m. EDT

National security adviser Jake Sullivan in February 2022. (Demetrius Freeman/The Washington Post)

https://www.whitehouse.gov/briefing-room/statements-releases/2023/05/10/fact-sheet-biden-harris-administration-outlines-priorities-for-building-americas-energy-infrastructure-faster-safer-and-cleaner/

https://www.washingtonpost.com/business/2023/04/27/jake-sullivan-china/

US Nuclear Industry is Stagnant

- Many other countries have already begun a 180 degree U-Turn on Nuclear power.
- Federal policies from the 1980's destroyed the domestic US nuclear fuel supply industry.
- The US is critically dependent on importing our nuclear fuel from Russia.
- Regulatory burden now stymies the nuclear power industry and prevents innovation.
- Average US nuclear plants employ about 86 people just to do NRC-mandated paperwork (17% of plant employees).

- Each US nuclear plant spends, annually:
  - $14 million on various government fees.
  - $4.2 million to meet government paperwork requirements.
  - $4.4 million on government-mandated security staff.

https://www.nationalreview.com/2023/01/new-red-tape-makes-new-nuclear-reactors-impossible/

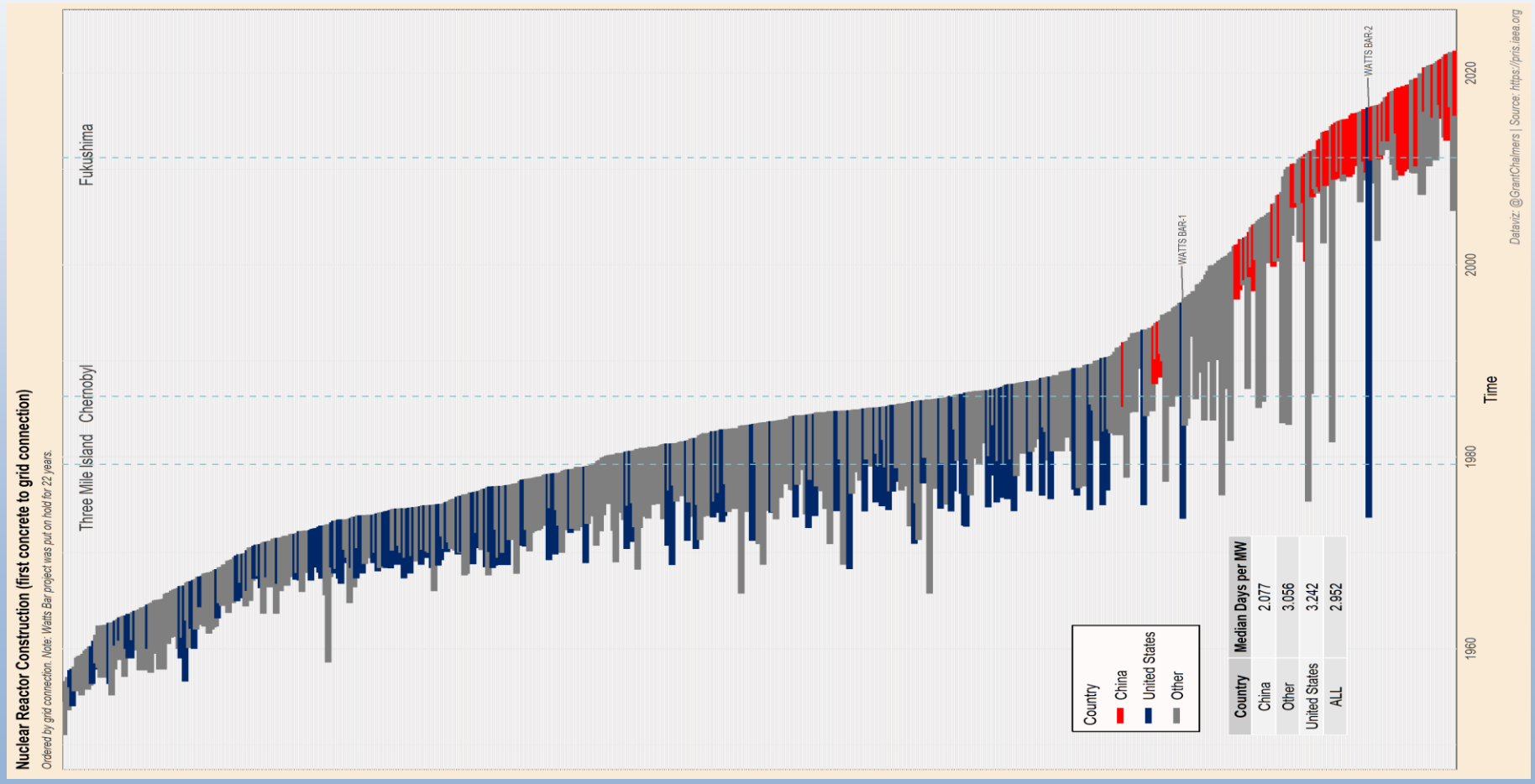
Federal NRC is Overwhelmed with a Huge Licensing Backlog

- The NRC is already overloaded by the existing reactor fleet applying for license renewals (to 80 years) plus 24 will apply for increased power output by 2030.
- $7 billion in capital investments over the next 10 years is already planned, which also require NRC approvals.
- The NRC has **never** licensed an SMR for operation before. They lack the staff, expertise, experience and leadership to do so.
- The NRC's original licensing scheme (Part 50), was initially 50 pages long.
- The NRC's new licensing scheme, for SMRs (Part 53), took 3 years to develop and it's 1100 pages long.
- Anti-nuclear groups have succeeded in making it nearly impossible for the NRC to license any new reactor designs.
- The new licensing scheme is designed to stall new nuclear projects, indefinitely.

https://thebreakthrough.org/issues/energy/members-of-american-nuclear-society-takes-the-regulatory-body-to-task-at-annual-meeting

Russia and China Stole the US Nuclear Power Industry

- While politicians cater to ignorant environmental activism, the US is losing yet another industry.
- Texas can be the solution!



New Nuclear Working Group

- Governor Greg Abbott wants Texas to become a “national leader on advanced nuclear energy.”

- He directed the Public Utility Commission (PUC) to create a new working group to study and recommend how to **accelerate the permitting and building of new reactors in Texas.**

- Their plan will outline how:

  “to engage Texas supply chain manufacturers to foster home-grown development of this technology”

  “Texas will become the national leader in using advanced nuclear technology”.

https://gov.texas.gov/uploads/files/press/Jackson,_Kathleen_08.16.23.pdf

https://gov.texas.gov/news/post/governor-abbott-touts-nuclear-energy-development-at-ut-fireside-chat

Texas Nuclear Caucus

- 7 Texas legislators recently established a new political coalition, focused on fostering the full-value chain of the nuclear industry.

- Inaugural members include, Rep. Ryan Guillen, Rep. Cody Harris, Rep. Cody Vasut, Rep. Steve Toth, Rep. Reggie Smith, Rep. David Spiller, Rep. Stan Gerdes.

- Their prioritization of nuclear bills:

  HB 3836 - Grants PUC and TCEQ authority to petition for power to **permit new nuclear.**
  HB 4003 - Charges PUC to identify regulatory changes and potential incentives for new nuclear.
  HB 4004 - Guarantees nuclear credits if the state moves to a Performance Credit Mechanism.
  HB 4047 - Charges the TCEQ to support more uranium production in Texas.
  HB 4284 - Establishes an incentive program for Small Modular Reactors (SMRs) for cogeneration.

- "We aim to establish Texas as a global leader in the nuclear industry".

https://www.pr.com/press-release/884307

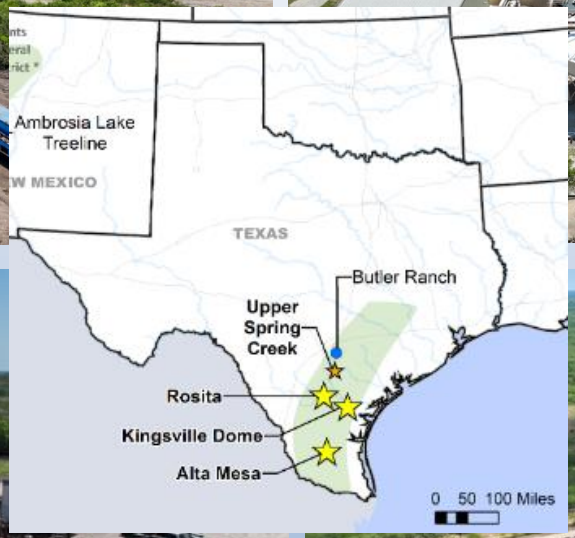
Nuclear Fuels in Texas

Pantex Weapons Plant
near Amarillo

Rosatom Enriched Fuel
Delivery in Houston
October 31, 2023

Manchester
Terminal in Houston

Uranium Production in Texas



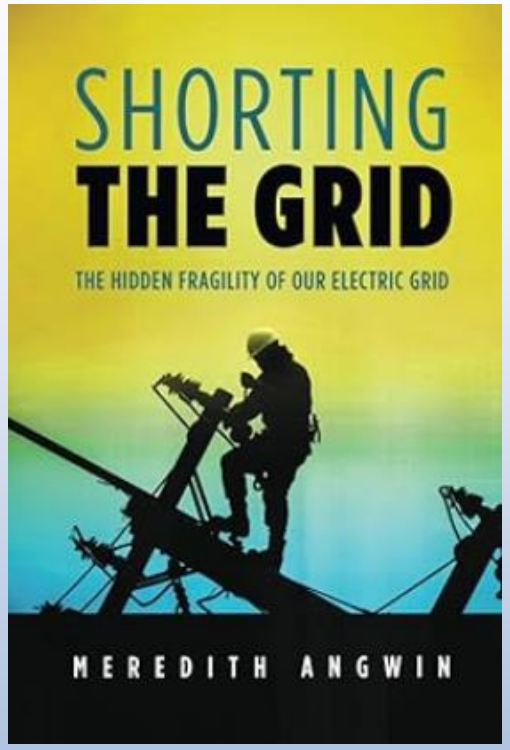
Uranium Energy Corp ISR

EnCore Energy ISR Processing

Conclusions

- **Federal** policies and lack of leadership are the major causes of grid reliability problems in Texas.
- Texans must oppose connecting the ERCOT grid to neighboring states because that would surrender control of our electric grid to **Federal** (FERC) regulators!
- Texas is a global leader in Oil and Gas and we should continue that legacy with Nuclear Power.
- The federal NRC is unable to lead and is stymieing Nuclear Power and America's energy future.
- Russia and China already dominate the global nuclear power industry due to lack of US leadership.
- Many revolutionary new nuclear reactor technologies are sitting on the shelf, unused.
- Many countries all over the world want US New Nuclear technology, but leadership is required.
- Texas must lead with its own nuclear regulatory agency, whether Texas secedes, or not!

To Learn More



https://robertbryce.com/episode/jimmy-glotfelty-commissioner-texas-public-utility-commission/

https://assets.realclear.com/files/2022/10/2074_realclear-energyinflationbydesign-josephtoomey.pdf

https://sanantonioreport.org/its-time-for-texas-to-go-big-on-nuclear-energy/

https://www.americanexperiment.org/magazine/article/enjoy-the-blackouts-jack

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