POWERHOUSE TEXAS

Key Takeaways from the Nuclear & Hydrogen Energy Tour*

3/5/2025

Nuclear & Hydrogen Tour Speakers:

1. Representative Erin Zwiener, District 45, Chair of Texas Energy & Climate Caucus
2. Zack Abnet, Texas State Director, American Conservation Coalition
3. Lindsay Cooper Phillips, Senior Gulf Coast Regional Policy Manager, Clean Air Task Force
4. Dr. Derek Haas, Associate Professor, UT Austin
5. Daniel Womack, Global Lead for Carbon Policy, Dow
6. Dr. Emily Beagle, Research Associate and Professor, Webber Energy Group, UT Austin
7. Liz Adams, Executive Assistant, UT Austin's Hydrogen Proto Hub and Center for Electromechanics

Nuclear Energy in Texas

Advantages of Nuclear Energy

- Texas has potential to be a powerhouse in exporting nuclear energy throughout the U.S.
- Nuclear is reliable, staying online 24/7 with minimal service needs
- Nuclear reactors provide high-paying jobs that are permanent
- ERCOT has predicted that our demand for power will double in the next decade, but nuclear energy is a great solution to account for the increasing energy demand in Texas
- Nuclear energy is stable in its fuel pricing, creating a solution for economic independence and keeping our energy production in Texas, compared to volatility of natural gas or other fossil fuel sources
- Nuclear can be colocated for energy to desalinate water and produce power
- Nuclear can be colocated for energy to clean up produced water and reuse it for drinking water or agriculture
- Old, retiring coal plants can be converted into new nuclear plants
    - We can immediately take 80% of the coal plant workforce and put them on nuclear power plants and the other 20% would need some level of retraining
- Nuclear does not need long-term subsidies or commitment like other energy areas; once we build the first power plants and re-spark the industry, costs continue to decrease

***These are not official policy recommendations by PowerHouse Texas. Recommendations were mentioned by speakers throughout the tour.**

POWERHOUSE TEXAS

Current Trends of Nuclear Development

- The federal government is investing in nuclear and providing incentives for development
- $60 billion dollars of investment in the U.S. for deployment of nuclear technologies and development of new technologies
- States across the U.S. are interested in developing nuclear and advanced small modular reactors, including Georgia, Indiana, Tennessee, and several here at Texas universities, including Abilene Christian University, Texas A&M, and UT Austin
    - UT Austin and Natura Resources have partnered on the development of a small modular reactor at Abilene Christian University
- Dow Chemical is working with X-Energy to build a Pebble Bed Modular Reactor (PBMR) in Seadrift, Texas.
    - The reactor will provide clean, reliable energy to Dow's industrial operations.
    - Expected operational timeline: early 2030s.

Permitting Processes:

- Shorter permitting processes through the Nuclear Regulatory Commission are available for advanced nuclear, as the NRC has undergone a culture and mindset shift from permitting of traditional nuclear to smaller reactors
- Regulatory commissions like the NRC can now see reactors in practice through advanced computational modeling
    - For example, the computational capabilities of UT with the largest supercomputer (Frontera at the Texas Advanced Computing Center) allow for the modeling of how reactors work using fundamental physics and chemistry
        - TACC can validate codes from various reactors and model changes
- After earning a construction permit, companies then commence with undergoing the process to earn an operations license

Addressing Concerns:

- Most safety concerns regarding nuclear energy include hazardous radioactive waste from spent fuel, transportation of waste, long-term storage of spent fuel, or hurricane-proofing reactors are based primarily in public perception of nuclear energy, but much progress has been made in developing regulatory frameworks and advanced long-term waste disposal

***These are not official policy recommendations by PowerHouse Texas. Recommendations were mentioned by speakers throughout the tour.**

- First-mover problem: Workforce development programs at universities and retaining the skills and project management for construction and maintenance of nuclear power plants can overcome a lack of skilled workers and expertise after 30 years of little to no nuclear development and decrease labor and construction costs overtime
- Who is going to be first, with timeline, cost overrun, and regulatory risks? How can the state work with the companies that are already starting with it?

Policy Recommendations:*

- Cost-sharing or tax incentives can push companies to begin projects with nuclear energy
- Continue streamlining regulatory processes to shorten permitting processes for new nuclear reactors
- Focus on maximizing investment and funding into development of nuclear technologies
- Industry, government support, and university programs are necessary to continue boosting the construction of new power plants

Hydrogen Energy in Texas

Hydrogen Proto-Hub at the JJ Pickle Research Campus:

- It is the largest existing hydrogen hub in the state, particularly in the Gulf Coast region, which produces a third of all the hydrogen energy in the country
    - This constitutes the support of 40+ hydrogen production facilities, hundreds of miles of existing hydrogen pipelines, and the associated expertise, regulatory framework, and workforce
- Approximately 40% of UT's research activities are conducted at the JJ Pickle Research Campus; they have been researching hydrogen energy systems for nearly 2 decades
- The H2@Scale in Texas and Beyond project is supported by the US department of Energy's Hydrogen and Fuel Cell Technologies office
- The Hub hosted Texas' first hydrogen fueling station for over 15 years
- The Hub operated and demonstrated the first commercial fuel cell vehicle in Texas
- They hosted two fuel cell bus pilot programs with CapMetro, Austin's local transportation agency

Opportunities for Hydrogen:

- Texas can capitalize on our available low-cost abundant natural gas and low-cost abundant renewable resources to support a future hydrogen economy
- Hydrogen production at H2@Scale is interconnected through a common distribution and storage system, which envisions a future interconnected hydrogen pipeline network

***These are not official policy recommendations by PowerHouse Texas. Recommendations were mentioned by speakers throughout the tour.**

- Produced hydrogen is then supplied to end-use applications, including vehicle fueling or hydrogen fuel cell power system that can provide clean power for data centers
- Hydrogen production saves energy costs and power demand costs
    - Electrolysis systems capture excess solar energy from solar panels
    - The fuel cell power system is intended to level load servers to the electric grid by providing peak power needs
- Natural gas from landfills and renewable solar and wind resource profiles can power hydrogen production

Policy Recommendations:*

- Maintain the current framework of regulatory oversight, with targeted clarifications and improvements
- Encourage training and education programs to improve public awareness and acceptance of hydrogen
- Continue streamlining and standardizing its permitting processes
- Encourage significant expansion of infrastructure supporting the entire hydrogen value chain, including 'all-of-the-above' energy approach for electricity, low-cost natural gas, and carbon management infrastructure
- Texas should help fund/promote the upgrades to existing infrastructure for the deployment of hydrogen
    - Hydrogen blending has been recommended by UT H2 researchers for existing power plants
- Promote and fund the transportation and storage of hydrogen as a liquid
- If we want to drive hydrogen vehicles, Texas needs to define a lead agency to fund and oversee the deployment of hydrogen refueling stations

Further Resources:

Recommendations from PUCT Advanced Nuclear Reactor Working Group (November 2024)

Summary Video of the UT-CEM Hydrogen Research and Demonstration Facility

Texas Hydrogen Framework Report (March 2024)

Texas Hydrogen Production Policy Report (December 2024)

***These are not official policy recommendations by PowerHouse Texas. Recommendations were mentioned by speakers throughout the tour.**