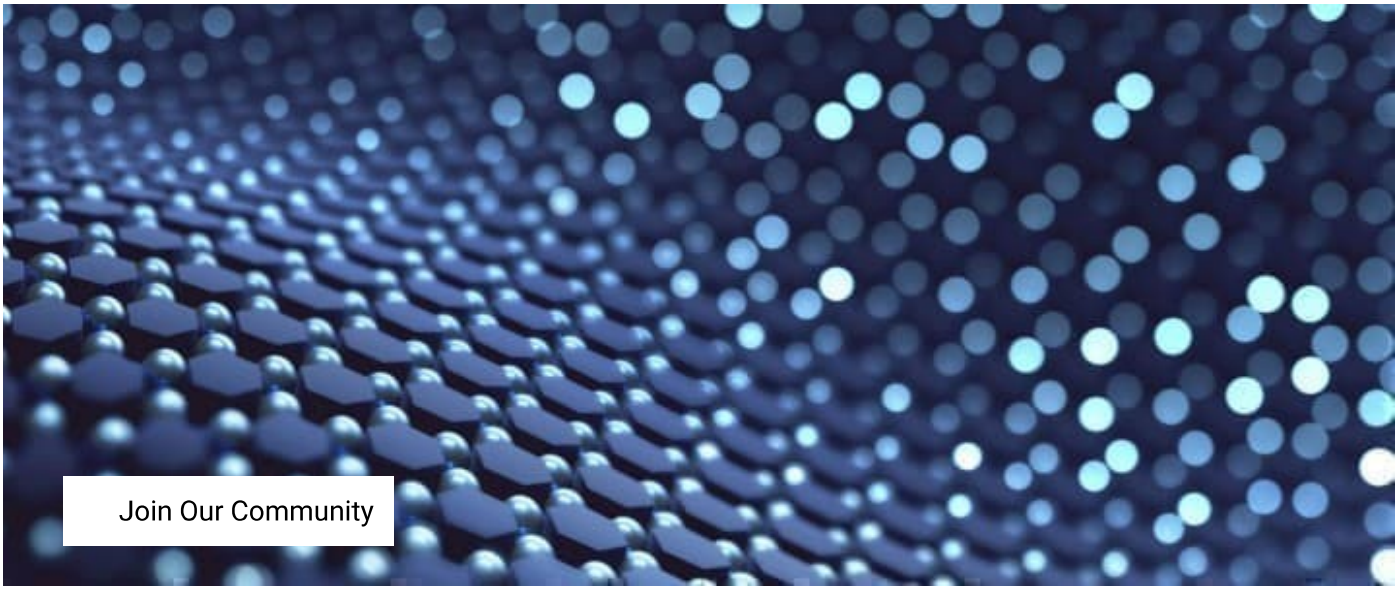
Texan Researchers Want To Store Hydrogen In Underground Salt Deposits

By Brian Westenhaus - Apr 08, 2023, 2:00 PM CDT

- **Large underground salt formations have the potential to aid in the energy transition in myriad ways.**
- **Texan Researchers propose the storage of hydrogen in underground salt caverns.**
- **Salt domes are proven containers for hydrogen used by oil refineries and the petrochemical industry.**



A new study led by researchers at The University of Texas at Austin's Bureau of Economic Geology suggests that salt could have a big role to play in the energy transition to lower carbon energy sources. The study described how large underground salt deposits could serve as hydrogen holding tanks, conduct heat to geothermal plants, and influence CO2 storage. It also highlights how industries with existing salt expertise, such as solution mining, salt mining, and oil and gas exploration, could help.

Large underground salt formations have the potential to aid in the energy transition in myriad ways. Salt deposits can host caverns for hydrogen storage (left) and can help channel heat for geothermal power (right). The geology near salt formations (center left) is often well-suited for permanent carbon storage, which keeps emissions out of the atmosphere by diverting them underground. Image Credit: University of Texas at Austin's Jackson School of Geosciences. Click the press release link for a larger image and more information.

Lead author Oliver Duffy, a research scientist at the bureau said, "We see potential in applying knowledge and data gained from many decades of research, hydrocarbon exploration, and mining in salt basins to energy transition technologies. Ultimately, a deeper understanding of how salt behaves will help us optimize design, reduce risk, and improve the efficiency of a range of energy transition technologies."

The team's study has been published in the journal *Tektonika*.

Shell's Prelude LNG: Challenges and Setbacks at the World's L...

Salt has an influential role in shaping Earth's subsurface layers. It is easily squeezed by geologic forces into complex and massive deposits, with some subsurface salt structures taller than Mount Everest. These structures and their surrounding geology offer a number of opportunities for energy development and emissions management, said study co-author Lorena Moscardelli, the director of the bureau's State of Texas Advanced Resource Recovery (STARR) program.

Duffy said, "The co-location of surface infrastructure, renewable energy potential, favorable subsurface conditions and proximity to markets is key to plan for subsurface hydrogen storage. STARR is currently engaged with emerging energy opportunities in West Texas that involve hydrogen and carbon capture, utilization and storage potential for the region."

Related: Is The UK Doing Enough To Achieve Its Ambitious Climate Pledges?

Salt domes are proven containers for hydrogen used by oil refineries and the petrochemical industry. According to the paper, these salt formations could also be put to use as holding pens for hydrogen bound for energy production. What's more, the porous rock surrounding them could be used as a permanent storage spot for CO2 emissions. The study describes the potential benefits of co-locating hydrogen production from natural gas called "blue hydrogen" and CO2 storage. While the hydrogen is sent to salt caverns, the CO2 emissions generated by production could be kept from the atmosphere by diverting them to the surrounding rock for permanent storage.

With its numerous salt domes surrounded by porous sedimentary rock, the Texas Gulf Coast is particularly well suited for this type of combined production and storage, according to the researchers.

The study also touches on how salt can aid in the adoption of next-generation geothermal technology. Although the industry is still in its early stages, the researchers show how it can make use of salt's ability to easily conduct heat from warmer underlying rocks to produce geothermal power.

Bureau Director Scott Tinker said that because salt has a role to play in developing new energy resources, it's important that multiple avenues are thoroughly explored. He said that researchers at the bureau are playing a critical role in doing just that.

Tinker said, "Bureau researchers have been studying subsurface salt formations for many decades. For their role in hydrocarbon exploration, as part of the Strategic Petroleum Reserve, for storage of natural gas, and now for their potential to store hydrogen. That's the remarkable thing about great research. It just keeps evolving, improving and finding new applications."

Additional co-authors include current and former bureau researchers Michael Hudec, Frank Peel, Gillian Apps, Alex Bump, Tim Dooley, Naiara Fernandez, Shuvajit Bhattacharya, Ken Wisian and Mark Shuster.

The Bureau of Economic Geology is a research unit of the UT Jackson School of Geosciences.

This is really interesting work. The possibilities are quite large in scale, which is a major attractant. So far there is an inventory of empty salt domes to exploit.

But the development of more huge deposits emptied out for storage is sure to light up the environmentalist crowd. An Everest sized salt excavation dumped onto the surface environment will not go unnoticed.

This is a really good idea, but lets hope the research goes into the consequences ahead of time so there won't be a long full stop when the technology is needed.

By Brian Westenhaus via New Energy and Fuel

Back to homepage