Utah ‘blessed’ with potential sites to store climate-wrecking carbon dioxide

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Utah is “significantly blessed” with sites where carbon dioxide could be injected deep into the earth to prevent warming the planet, according to the state official charged with mapping the state’s carbon-sequestration potential.

The U.S. Department of Energy has given the Utah Geological Survey a $892,683 grant to “to conduct necessary scientific work to assess the carbon storage potential of numerous underground geological formations within the state of Utah,” according to a news release from DOE.

“Almost every corner of the state has some kind of potential,” said Michael Vanden Berg, energy and minerals program manager at UGS. “Some more than others.”

Carbon capture and sequestration has attracted attention as a tool in the box of climate solutions, but it’s controversial. Some have argued that it is pushed by fossil fuel companies to extend burning when the planet should be moving to cleaner energy sources. Others say carbon dioxide emissions will persist for years and any attempt to store them is fruitful. Carbon dioxide accounts for more than three-quarters of global greenhouse-gas emissions.

For its part, the Department of Energy is spending millions on sequestration research grants, and it has a tax credit program called “45Q” that compensates companies that capture and store CO2. There is also a market for carbon “credits” internationally and in some states, wherein companies that capture carbon can sell the credits to companies that want to release more carbon.

The Utah study is focused on identifying places where carbon dioxide could be kept without escaping. Vanden Berg said that requires a deep, porous layer of rock that can absorb the CO2 with a thick, non-porous layer on top to keep it from escaping. The pressure at such depths is so large that the CO2 is a liquid rather than a gas.

Mancos over Navajo

Navajo sandstone, which is prevalent across a wide swath of Utah, has “little spheres of quartz sandgrains” that leave lots of gaps in between them that can absorb carbon dioxide, said Vanden Berg. And Mancos shale, which is found above Navajo sandstone, is an excellent seal, he said. In some places, the shale is 5,000 feet thick. “Your CO2 is not going to be able to make its way through that rock.”

He identified the northern end of the San Rafael Swell as an area with that combination of Mancos above Navajo. But the Swell is also prized by wilderness advocates who will closely monitor any sequestration plans on sensitive lands.

“While carbon sequestration is one way of mitigating the impacts of climate change, it is highly location-dependent and requires additional energy, water, and infrastructure. However, we knowthat protecting large, undisturbed landscapes contributes immediate climate benefits without any new development,” said Hanna

Larsen, staff attorney for the Southern Utah Wilderness Alliance. “That’s why the Southern Utah Wilderness Alliance (SUWA) advocates for the protection of nearly 9 million acres of wilderness-quality lands in Utah.”

Carbonates like limestone are another material that can absorb carbon dioxide, and the Paradox Basin in southeastern Utah, where the limestone is capped by impermeable salt formations, also has potential, Vanden Berg said. The basin includes Bears Ears National Monument and other areas that could also draw opposition from conservationists.

Most of the work will be done using existing data, including reviewing core samples from the Utah Core Research Center, UGS’s depository of material pulled from drill sites around the state. There could be some limited field work in areas where there isn’t much deep-drilling history, such as the West Desert, he said.

‘Not a new technology’

“Carbon capture and sequestration is ready for commercial deployment,” said University of Texas professor Tip Meckel in an interview. Meckel, a senior research scientist at UT’s **Bureau of Economic Geology**, has worked on capture projects in the United States, Japan and Norway. “It is not a new technology. We have been moving CO2 and injecting it into the subsurface for 50 years.”

Utah by itself generates about 60 million tons of carbon dioxide annually, and, theoretically, the state has the capacity to store all that and more. But theory is a long way from practice. For instance, there is no practical way to capture and store the carbon dioxide produced by gasoline and diesel cars and trucks, which produce more than a third of that CO2.

The grant is aimed at identifying potential sites for sequestering without much regard to how the CO2 might be collected and delivered to the sites. “We’re mostly focused on the storage component of the carbon capture and storage. We’re not so much on the capture side,” Vanden Berg said.

Most carbon capture under discussion involves collecting it at a major source, like a power plant or a cement factory. It’s expensive. The tax credits reduce, but do not completely offset those costs.

It’s also water intensive, which is a particular concern in the West. A study last year from the University of Utah’s Energy and Geoscience Institute (EGI) said carbon capture on coal-fired power plants nearly doubles the water needed to operate the plants.

Bonanza a possibility?

Three of Utah’s four large coal-fired power plants now have scheduled closing dates in the next decade, meaning they are unlikely to add carbon capture over that short term.

But the fourth plant, the Bonanza Power Plant near Vernal, doesn’t have a set closing date. Under a separate DOE grant for $8 million, the Energy and Geoscience Institute will be studying carbon capture opportunities in the Uinta Basin specifically.

“This project will support EGI’s innovative research team in advancing carbon capture and storage opportunities in the Uinta Basin for local industry, including the Bonanza coal-fired power plant operated by Deseret Power,” said an update on EGI’s website.

Utah could also be a possible site for “direct-air capture” of carbon dioxide. As the name implies, direct-air capture involves pulling in huge amounts of air and removing the small percentage of carbon dioxide present. The governors of Colorado and Wyoming recently announced a partnership to explore opportunities for deploying direct-air capture. “Colorado and Wyoming each have pieces of the puzzle necessary to develop a carbon removal market and industry,” said Wyoming Gov. Mark Gordon.

Since they don’t have to be connected to a carbon-dioxide source, direct-air capture facilities can be located in places where the geology is most suitable for injection. But they require a large amount of electricity, which has to come from a carbon-free source like wind or solar to keep from generating more carbon than it removes.

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