

The Columbus Dispatch

BUSINESS

Could captured carbon dioxide be stored underground in Ohio to fight climate change?

Patrick Cooley The Columbus Dispatch

Published 10:07 a.m. ET March 7, 2022 | Updated 12:18 p.m. ET March 14, 2022

A coalition of businesses, government agencies and nonprofits is eyeing a section of southeastern Ohio for the storage of carbon dioxide captured from factories and power plants.

The technology used to collect CO₂ from carbon emitters is decades old, but it is experiencing something of a renaissance as governments and businesses look for ways to combat climate change.

The partnership, the Midwest Regional Carbon Initiative, involves several organizations including the Columbus-based research nonprofit Battelle and the Norwegian energy company Equinor, which has oil and gas operations in Pennsylvania. The group wants to make a region encompassing southeastern Ohio, as well as parts of Pennsylvania and West Virginia, a hub for CO₂ storage.

Burying carbon dioxide underground: Is it safe? Is it feasible?

The group spent years on research and development, which included burying millions of tons of carbon dioxide in Michigan. While the group is still years away from burying carbon dioxide in Ohio, the initiative believes the path is clear for commercial development.

Coal in Ohio: Power plant communities look toward a future beyond coal

"The projects will undergo a systematic exploration and appraisal process, using existing and new data from seismic surveys, drilling, and field testing," Battelle spokesperson T.R.

Massey said in an email. That process will take two to four years, he said.

Tax incentives encouraging the use of carbon capture are on rise, and government agencies see carbon capture and storage as a way to achieve President Joe Biden's goal of cutting the nation's carbon emissions in half by 2030.

"These facilities around the world emit volumes of CO₂ into the atmosphere, and until the last couple of years, there's been no incentive for them to do otherwise," said John Tombari, a division manager for Battelle carbon services.

Representatives of Battelle and Equinor say the geography in southeastern Ohio is ideal for carbon storage. And separating CO₂ from other useful compounds and injecting it into the ground has economic benefits, said Chris Golden, a U.S. country manager for Equinor.

"We see this as a way to create new economic opportunities for industry and communities in this region," he said.

Why bury CO₂ in Ohio?

Captured carbon dioxide is liquified and the resulting compound has a number of applications, but storage is often the easiest option.

"CO₂ captured from an industrial source is in a supercritical state," said John Thompson, technology and markets director for the Clean Air Task Force, an environmental nonprofit. "That makes it more efficient to store it underground."

But it must be stored underneath a barrier that can keep it from escaping.

This is why a region at the intersection of Ohio, West Virginia, and Pennsylvania is appealing. It has an impermeable sedimentary basin to keep carbon dioxide in the ground.

Battelle helped inject millions of tons of CO₂ into the ground in Michigan, giving the organization the experience to help bury carbon dioxide in Appalachia, Tombari said.

"If you do the right job, you know it's safe and it's secure," he said.

Capturing CO₂ also can power the clean energy economy, said representatives of Equinor. In some cases, hydrogen is separated from captured carbon dioxide emissions and can be used as an emissions-free fuel.

“It goes beyond storage,” said Karen Matusic, a senior director of external affairs for low carbon solutions for Equinor.

Burying CO2: Environmentalists say it's the wrong approach to combat climate change

Not everyone is on board. While there isn't vocal opposition to burying CO2 in the ground, some environmentalists worry the money used on an expensive technology could fund renewable energy projects.

“It's demonstrated to actually work, it's just really complicated, really expensive, and in many ways not what we have to pursue to achieve the outcomes we are looking for,” Jeremy Fisher, strategic advisor to the environmental law program for the Sierra Club, said of carbon capture.

Biology: Coal plant 'help' with climate change nothing short of a miracle

Ethanol plants and natural gas producers have used carbon capture for decades, but catching and sequestering carbon from power plants and steel mills is costlier and more complex. Companies that announced carbon capture projects to great fanfare in recent years ultimately abandoned the technology.

NRG Energy and JX Sippin Oil, for example, spent \$1 billion to capture carbon from the Petra Nova coal-fired power plant in Texas in 2017. Carbon dioxide can squeeze more oil from aging oil wells, and the additional profits from a nearby oil field were supposed to pay for the venture. But the project began unprofitable when oil prices fell to less than \$50 a barrel later that year. The companies abandoned carbon capture in 2020.

“The bigger a project tends to get, the more likely it is to fail,” said Ryan Hanna, an assistant research scientist at UC San Diego who co-authored a study on the success and failure of carbon capture.

Critics of carbon capture don't think it will ever be a feasible way to prevent the worst effects of climate change. A recent Ohio River Valley Institute report concluded that coal-fired power plants that use carbon capture will never be competitive with solar and wind farms due to the expense.

“The vast majority of applications need to be massively subsidized by federal tax credits or

states attempting to take the liability,” Fisher said.

Money spent on carbon capture could be used to build non-carbon power sources such as solar farms, he said.

But to carbon capture supporters, those subsidized tax credits nurture the development of a key tool in keeping plant warming gasses out of the atmosphere.

Replacing coal and natural gas will take decades, and some carbon-emitting businesses, such as steel and cement makers, can’t be easily replaced.

“The failures with CCS (carbon capture and storage) are really policy failures,” Thompson said.

Tax credits for carbon capture are currently worth \$35 to \$50 per ton of CO2 captured, he noted. That’s up from \$20 a ton in the early 2010s.

The credits would rise to \$85 per ton if the Build Back Better plan ever passes Congress, giving carbon capture enough of a boost to proliferate throughout heavily polluting industries, Thompson said.

Critics note the tax credits only last for 12 years.

“Twelve years from now you will have the exact same issues (cost and complexity) come back again,” Fisher said.

But Thompson countered that 12 years would let carbon capture fall into widespread use and lawmakers could find new incentives when the credits expire.

Does carbon capture work?

The technology’s effectiveness is a matter of debate. Proponents note that carbon capture is decades old and captures 90% of the carbon dioxide from ethanol and natural gas facilities.

“It’s been working since the 1960s,” Thompson said.

Hanna said that the most successful carbon capture systems exist on a small scale in the agriculture, natural gas and ethanol industries.

Scaling up the technology for steel mills or power plants presents a challenge.

A recent study from the watchdog group Global Witness found that a carbon capture system on a Canadian coal-fired power plant owned by oil giant Shell caught only 48% of the facility's carbon dioxide, less than the 90% Shell boasted when it installed the system.

Shell said the group's conclusions were wrong, but the study prompted questions on whether carbon capture is a useful weapon in the fight against a warming climate.

Despite concerns about its efficacy and price tag, carbon capture is still the most cost-effective way to decarbonize industries making steel and cement, Hanna said. Other options, like converting to hydrogen power, are too expensive, he said.

Proponents of carbon capture say it will become cheaper and more efficient as more researchers study its application and more carbon emitters use it.

Hanna noted that carbon capture is a mature technology. But savings could materialize as the supply chain for captured carbon becomes more efficient.

"The kinks are going to get worked out," said Jena Lococo, program manager for carbon capture at the nonprofit policy group ClearPath.

Even though it was not financially viable in 2017, the Petra Nova facility shows the technology works and is a crucial tool in countering climate change, she said.

pcooley@dispatch.com

@PatrickACooley