Carbon dioxide storage hub seeks 80,000 acres across Western Pa., Ohio and West Virginia

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Landmen are knocking on doors again in southwestern Pennsylvania, eastern Ohio and West Virginia. This time, it's not to make deals for what's already in the ground, but for the empty spaces that could hold the region's industrial waste — the carbon dioxide that comes out of smokestacks across the tri-state region.

Omaha, Neb.-based Tenaska is developing a Tri-State CCS Hub. CCS stands for carbon capture and sequestration, but Tenaska's role will be in the second category. Its vision involves collecting carbon dioxide captured by industrial plants and injecting it into 20 to 30 wells across the three states, with three wells to be sited in Washington County. Underground, that carbon dioxide would spread out across some 80,000 acres, a storage field capable of hosting 5 million tons of CO_2 a year for 30 years.

That would be roughly the equivalent of the carbon dioxide emitted from U.S. Steel's Edgar Thomson Works and Shell's petrochemical complex.

Capturing the carbon will be left to the facilities that produce it, like steel mills, power plants, or cement kilns.

"We've got active negotiations with lots of landowners across eight counties in three states," said Bret Estep, vice president of development for Tenaska. The reception so far has been "excellent," he said. "I've been very impressed."

Last fall, Tenaska submitted a proposal to Washington County to option a few surface acres for a well and 1,377 acres under Cross Creek County Park for carbon storage. According to a document submitted to the county's planning commission, Tenaska was offering a bonus payment of $50 per acre for the option of CO2 storage which, if exercised, would then yield another bonus of $350 per acre for pore rights.

The offer also included an annual payment per acre, starting at $50 the first year and increasing by 3% each year for the next 30. The company's calculations showed Washington County would receive $3.9 million over the next three decades.

Cross Creek County Park is already peppered by shale gas wells drilled by Range Resources Corp., a point noted by the staff of the planning commission, which briefly discussed the proposal at its Oct. 4 meeting. The commissioners decided to table the proposal while its staff researches potential impact to the environment and public safety, logistical issues and bonding and benefits, according to the meeting minutes.

Other than that, the effort has been mostly under the radar. Tenaska said it has secured about a dozen sites for injection wells across the three-state footprint and thousands of acres of pore rights so far, but declined to disclose specifics or give a capital cost for the entire project.

"It's early days," Mr. Estep said, and the numbers are changing daily.

Supersoakers

The Tri-State CCS Hub is one of three projects that Tenaska has announced publicly, as it pursues half a dozen others, mostly in the South.

The farthest along of the public efforts is the Longleaf CCS initiative in Mobile, Ala., which involves four carbon storage wells. A permit application for a CO_2 injection well was submitted to the U.S. Environmental Protection Agency last year and is in the midst of technical review.

Its Pineywoods CCS project in Texas isn't far behind. That one also involves four storage wells in east Texas, with the ability to sequester 5 million tons of CO_2 annually.

The Tri-State hub that straddles the Pennsylvania, Ohio and West Virginia borders is being designed to hold the same amount of carbon dioxide, but because of the area's complicated and uneven geology, it will require four to five times as many injection wells, Mr. Estep said.

Formations that the company is targeting in Appalachia lie somewhere between 4,000 and 13,000 feet under the surface. These are dolomites and sandstones — porous rock layers than can soak up a lot of CO_2 and are capped by hard, impermeable layers that serve as a lid.

"In Alabama and Texas, that geology is simpler. If you think of a coastal plain, it's nice, flat, level. It used to be seabed," he said. "In central Appalachia, there was lots of upheaval where the mountains were made."

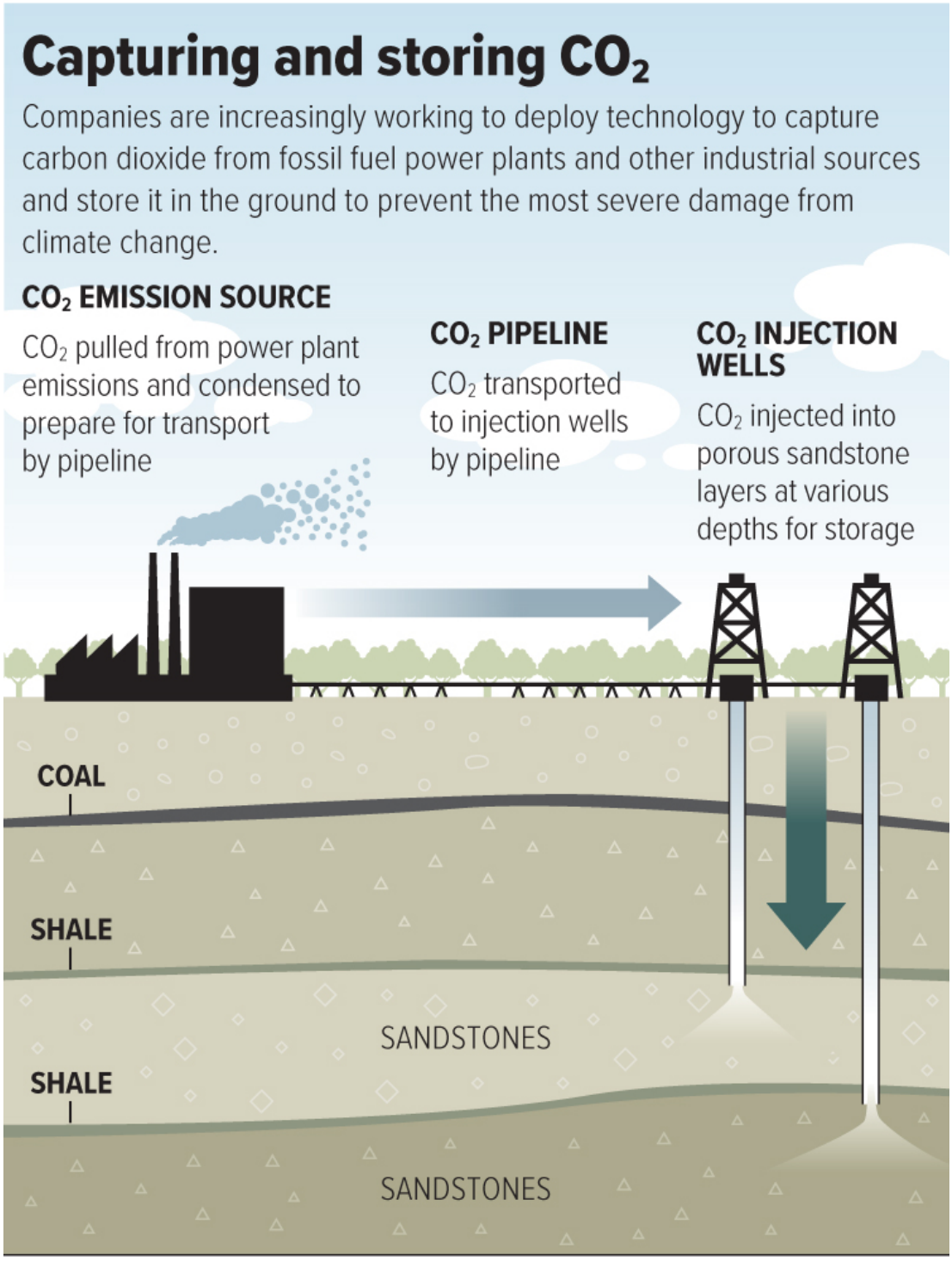
He compared it to a layer cake. In the Gulf Coast, the layers are thick and uniform. In the Ohio River Valley, they look more psychedelic, rising and falling, narrowing in one area and bunching up in another.

Mr. Estep said Tenaska was pulled into this region — geological complexities and all — by the strong demand from industrial facilities that are looking for a way to abate their emissions.

Some may be feeling pressure from shareholders to capture and store carbon, others could be anticipating a requirement to do so in the future. For example, the U.S. Environmental Protection Agency put forward a rule last year that would limit CO_2 emissions at powerplants, essentially mandating any gas or coal plants to be outfitted with carbon capture at some point in the future.

"We're actually seeing it as an economic development tool," Mr. Estep said. A place to dispose of CO_2 emissions is a big plus in site selection, he said, and for some companies it might be a must-have.

In December, the influential EFI Foundation, founded by former Department of Energy Secretary Ernie Moniz, identified 112 facilities in the Ohio River Valley that would be the likeliest customers for a carbon capture and storage cluster. The study looked at facilities other than power plants, focusing on those that run frequently and where it's technically feasible to capture CO2. It noted the "heavy presence of petroleum and natural gas systems and iron and steel production," estimating that 8.3 million metric tons of CO2 could be captured and stored from emitters across the tri-state area. The biggest single chunk, 3.6 million metric tons, could come from oil and gas infrastructure, the study found.



By Tenaska's count, there are 131 such facilities in the cluster it's targeting.

In November, the federal government validated Tenaska's motive by granting the Tri-State CCS project a chance at up to $69 million to jumpstart development. The money will help the company drill characterization wells — which will deliver details about the host rock and whether it would be hospitable to carbon dioxide storage.

Tenaska plans to file for its first CO2 injection well permit for this project in the spring. It will likely be for a site in Hancock County, W.Va. Permits for sites in Washington County will follow at a later date, Mr. Estep said.

To date, there have been no test wells drilled for this purpose in southwestern Pennsylvania, although a few companies have toyed with the idea over the past few years.

Dan Billman, a veteran geologist who consults for many in the oil and gas industry in Appalachia, has been predicting a "war for porosity" for several years. That was the title of a talk he gave several years ago, forecasting an increasing demand on the different layers of the earth from companies that want to store commodities and waste, ranging from saltwater coming out of shale wells to hydrogen to, yes, carbon dioxide.

When selecting a potential spot, storage developers need to be mindful of the decades, and sometimes centuries, of extraction etched into the subsurface in southwestern Pennsylvania. "This area is heavily drilled in the Marcellus, or this area could be heavily drilled in the Utica in the future," Mr. Billman said, ticking off variables. "And all the different operators need to work together to ensure that storage is being done safely" and without interfering with another business, he said last week.

Mr. Billman is not involved in the storage hub efforts.

Mr. Estep said the density of coal mining, oil and gas wells and storage fields in this region is a double-edged sword. "The upside of that is that mineral and land owners tend to be very sophisticated," he said. They know what to expect from a company that wants to lay a pipe or build a well.

"The downside is how do we manage any potential conflicts. It's a complexity, for sure."

Second time's the charm?

This isn't Tenaska's first attempt at carbon capture and sequestration.

In the late 2000s, the company said it would spend $3.5 billion building a coal-to-gas plant in Illinois that would capture and sequester carbon dioxide emissions.

In Texas, under a settlement with the Environmental Defense Fund, Tenaska agreed to install carbon capture on a planned $3 billion coal plant. The resulting stream of CO_2 would be piped to nearby oil wells where it would be used to coax more fuel out of the ground in a process called enhanced recovery.

But by 2013, both projects were canceled. Tenaska found they were not financially viable.

Instead, it hit the gas pedal on gas plants.

The current carbon capture and sequestration plan is a different animal, Mr. Estep said. “It’s a much simpler approach — just transportation and storage.”

Of “other people’s emissions,” he added.

Critics of the technology who have seen its false starts over the past few decades warn that it may not be economical today either. There is no price on carbon dioxide in the U.S. — no compliance penalty for emissions so far — which might make it hard to justify a large capital investment to capture the waste and pay a company like Tenaska to dispose of it.

So far, Mr. Estep said, the enthusiasm from potential customers in Appalachia has led Tenaska to believe otherwise.

There are other forces in the state putting a focus on industrial greenhouse gas emissions. The Pennsylvania Department of Environmental Protection is pursuing up to $500 million in federal grants for industrial decarbonization. Officials said they chose to tackle the sector because it is the largest single chunk of Pennsylvania’s greenhouse gas emissions, according to the state’s latest inventory.

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