Shale sites studied for emission storage

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ALBANY -- New York's gas-rich underground rock formations have sparked a contentious fight over drilling safety, but they're also being studied as potential tombs for the greenhouse gas emissions that fuel global warming.

The New York State Energy Research and Development Authority is overseeing a $1.5 million research project, also supported by the U.S. Energy Department, into the Marcellus Shale as well as other shale formations in New York, Vermont and Kentucky.

Researchers hope to learn whether wells drilled a mile or more underground into the Marcellus, which contains lucrative deposits of natural gas, could be used to contain power plant emissions of carbon dioxide, a greenhouse gas released by burning of fossil fuels.

The two-year project is linked "to the current boom in development from eastern gas shales, namely hydraulic fracturing and horizontal drilling," according to research plans filed in April with the U.S. Energy Department.

Also called hydrofracking, the drilling technique -- which relies on a high-pressure blend of water, chemicals and sand to crack apart gas-bearing underground rocks -- is in widespread use in states such as Pennsylvania, Texas and Colorado.

But it has not started in New York, where companies over the past two years bought up drilling rights on thousands of acres in the gas-laden Marcellus Shale, which stretches from the western Catskills through the Southern Tier.

The state Department of Environmental Conservation is still crafting a set of rules for hydrofracking, although the state Senate recently passed a bill to delay rules until mid-May. That moratorium has not yet been taken up in the Assembly.

Opponents have linked hydrofracking to groundwater contamination in other states. The gas industry insists the process is safe.

NYSERDA is providing $250,000 toward the research, which also will determine whether CO2 injections could help push out more gas to drillers as hydrofracked wells begin to play out, boosting profits and making CO2 injection less expensive.

"If we are moving more product out of the ground that is being sold, that can make CO2 injection more economical," said Mark Torpey, NYSERDA director of research and development. "We will also be asking whether CO2 can be used as a fracking method."

Removing CO2 from power plant emissions, which account for about 40 percent of the nation's carbon emissions, and storing the gas underground -- a concept called carbon capture and sequestration -- is part of the Obama administration's plan to fight climate change.

Capture and sequestration would allow continued widespread burning of coal, which supplies half the nation's electricity but releases much more CO2 than natural gas does. New York gets about 20 percent of its electricity from coal.

Last week, the Energy Department funded 15 underground storage research projects, including the one in New York, at a total of $21.3 million.

For this project, plans call for a test CO2 injection well at a Kentucky shale field, and a second well at an as-yet-unidentified location, said Michael Godec, vice president of Advanced Resources International, an Arlington, Va.-based energy consulting company that is spearheading the two-year project.

"The biggest benefit, if this works, is that shales happen to coexist in areas where many coal-fired power plants already are," Godec said. This would reduce the need for expensive piping networks to carry CO2 to underground storage.

Godec said it was too early to tell if the second CO2 injection well will be built in New York. He said contentious nature of hydrofracking in the state might slow down needed permits for such a well beyond the project's timetable.

At Cornell University, researchers will study special chemical markers introduced into gas wells to track water flow pushed by the pressure from CO2 injection through underground cracks. Researchers from the University at Buffalo will examine the Marcellus and other New York shales for promising underground sites.

NYSERDA has spent two years looking for such sites in the Southern Tier counties of Broome, Chenango, Cayuga, Steuben, Yates, Schuyler and Tompkins, plus Erie, Chautauqua and Cattaraugus counties in the western edge of the state.

Torpey also could not say whether a CO2 injection well will be tested in New York. Further research on shale formations will be supplied by the Vermont Geological Survey, Kentucky Geological Survey, and HTC Purenergy.

If CO2 can be used to harvest more natural gas from shale while at the same time being locked away underground to reduce climate change, the beneficiaries would be "those currently developing and producing natural gas from shales today; power generators that would like to find

cost-effective CO2 storage options nearer to their facilities in the east; and states, landowners and other parties that could economically benefit from further economic production and utilization of the eastern gas shale resource," according to the research plan.

The research includes a "number of industrial partners, including several oil and gas operators that are currently drilling in eastern shale wells ... some commitments of data for wells in each of the target formations have already been made," the plans stated.

Godec declined to identify the companies, saying he did not yet have signed agreements.

Today, the cost of carbon storage appears prohibitively expensive at up to $300 per ton, according to the U.S. Department of Energy. That would greatly increase the cost of electricity generated by coal, likely making it more expensive than alternative energies like wind and solar.

The government's goal is to reduce storage costs to less than $10 per ton by 2015.

DOE estimates underground saline formations, which are different from shale, could store up to 500 billion tons. That's equivalent to about 300 years of the U.S. total CO2 emissions.

The storage method does have risks. One danger could be the sudden and unintended release of CO2 gases into the atmosphere if an underground storage area were to crack or rupture.

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