

Paul G. Falkowski said the science behind the New Jersey proposal is sound

An energy company wants to pump carbon dioxide under the ocean floor 70 miles off the New Jersey coast using a promising but controversial technology.

SCS Energy LLC of Concord, Mass., wants to build a new coal-fired power plant on a former industrial site in Linden in Union County, near Staten Island. The company plans to separate carbon dioxide from the coal and pump the liquefied gas 138 miles away to a drilling platform off Atlantic City, where it conceivably could remain buried forever beneath the Atlantic Ocean.

Supporters said the scientific process — called carbon capture and storage — could be lucrative and help reverse climate change by removing carbon dioxide from the atmosphere.

Environmentalists and some local residents say the technology is unproven and dangerous and poses an unnecessary risk to New Jersey's tourism and fishing industries.

SCS has two wells about 70 miles east of Atlantic City that would pump carbon dioxide 1.5 miles below the ocean floor, displacing seawater under multiple layers of shale and sandstone that would trap it indefinitely, said Marisa Mascaro, executive vice president for legal and regulatory affairs at SCS.

Energy companies in the 1970s closely studied the geology of the continental shelf off Atlantic City when they were looking unsuccessfully for oil. Instead, Mascaro said, they drilled through layers of rock and sediment perfect for capturing carbon dioxide.

"When you get to the bottom, the temperature and pressure keeps it in place. It's no longer buoyant," she said. "We have an impermeable shale formation that acts as a cap. And another cap on top of that with more sandstone. It's safe and permanent."

Every breath we take

Carbon dioxide is a colorless, odorless and slightly acidic greenhouse gas that contributes to global warming. Dry ice is carbon dioxide in solid form. People exhale carbon dioxide with every breath while plants absorb it through photosynthesis.

Carbon dioxide is harmless to humans in normal concentrations, but can be suffocating in unusual circumstances such as the 1986 volcanic eruption beneath Lake Nyos in the West African country of Cameroon that spewed tons of carbon dioxide into the air. The dense, low-lying cloud suffocated 1,700 people in villages 15 miles from the lake, according to the U.S. Department of Energy.

Carbon dioxide is also a greenhouse gas — meaning its increasing presence in the atmosphere contributes to global warming.

Excess carbon dioxide is partly to blame for the increasing acidification of the world's oceans, killing corals that harbor and feed fish. Power plants are the No. 1 source of manmade carbon dioxide emissions. But unlike nitrogen dioxide and other pollutants, carbon dioxide is not regulated in New Jersey. Instead, power plants here and across the country are allowed to release carbon dioxide into the air unchecked.

This could change if federal regulators lump carbon in with other forms of pollution. If that happens, carbon capture systems — long considered a possible tool to reverse climate change — could be very lucrative.

SCS is planning extra capacity in its pumping systems to capture carbon dioxide from nearby refineries in Linden.

“Global warming is such a huge problem that we need to look at many ways to solve it,” Mascaro said. “Carbon dioxide sequestration is one of many. We also highly support renewables such as wind and solar and conservation. But we think it’s a mix of all of these things that will help bring about a solution.”

Local opponents

Some residents in southern New Jersey are wary, in part because of the proposal’s novelty and the calamity that another largely experimental technology — deepwater oil drilling — created this year in the Gulf of Mexico.

“I think we should put our money and resources into things we know are safe and renewable — not something we have to worry about being stored forever,” said Angela Jones, 38, of Vineland.

Jones grew up in Cape May and graduated from Lower Cape May Regional High School. She learned about PurGen One from Citizens United for Renewable Energy, one of many environmental groups that oppose the project.

“We see what happened to the economy of the Gulf Coast during the oil spill. I wouldn’t want to see people not come to the shore because of some accident,” she said.

The Natural Resources Defense Council, a nonprofit environmental activist group, supports the concept of carbon capture as a tool for reversing climate change. The Sierra Club, the nation’s largest environmental organization, said it is not opposed to studying the technology more closely.

“In terms of making decisions about where to invest money on energy solutions, we’re in favor of putting that money into proven, cleaner sources like energy efficiency, wind and solar,” spokesman David Willett said. “These are technologies we know work now.”

Locally, Clean Ocean Action and the American Littoral Society liken the project to ocean-dumping.

The pipeline would skirt Monmouth and Ocean counties before making a dogleg out to the drilling platform off Atlantic County. The pipe could corrode or rupture, releasing a plume of suffocating carbon dioxide near shore, environmentalists said.

“The PurGen proposal is one big experiment with the ocean’s ecology,” American Littoral Society spokesman Tim Dillingham said. “Our priority is protecting the very valuable uses the ocean provides today, not seeing it developed as a waste-disposal pit. That’s all this really is.”

“To draw the conclusion that this is a benign industry is as yet unproven.”

The concept of carbon capture is new to the United States, but Norway’s Statoil Co. has had a successful project in the Sleipner oil field in the North Sea since 1996. More recently it has developed similar carbon-capture projects in Algeria and the Barents Sea, spokesman Ola Morten Aanestad said.

“These three projects have been running a long time. We have been monitoring this and sharing our results with the research communities across the world to be transparent,” he said.

In Norway, the biggest controversy over carbon capture has not been about safety but about the expense, he said.

A 2007 study by the Massachusetts Institute of Technology found that plants such as PurGen One that capture carbon dioxide before combustion will have 27 percent higher costs than coal-fired plants that do not capture the gas.

But as countries such as the United States consider joining Norway in taxing carbon emissions, this process holds vast economic potential, he said.

“The big debate in Norway has been how to get costs down to make it more economical,” he said. “A lot of companies are engaging with it. We think our experience has some relevance here. We definitely can get costs down so the use of hydrocarbons will be more sustainable.”

The \$5 billion PurGen project is very similar to Norway’s Sleipner Field drilling well, but would store 10 times as much carbon dioxide, or 10 million tons per year. This would be stored far deeper in rock formations considered more suitable than those found in the North Sea, SCS’s Mascaro said.

“Because of where we’re located, it’s very safe. There is virtually no risk at all of vapor escaping,” she said.

Cost of doing nothing

Rutgers University geologist Paul G. Falkowski said the science behind the New Jersey proposal is sound.

“The reservoir offshore is stable. It’s a place that almost certainly will hold the carbon dioxide for many thousands of years,” he said. “The chemistry of removing carbon dioxide is doable. It will add a little cost to the electric rates.”

Falkowski, who works at the university’s Institute of Marine & Coastal Sciences, said it is shortsighted to dismiss carbon capture because of its novelty or proximity to any particular state. Carbon capture holds much promise as a tool for addressing climate change, which poses far more long-term risks to human life at far greater cost. And the problem is getting more dire with every passing year, he said.

“Between the time that Hannibal crossed the Alps to when Washington crossed the Delaware was a span of 2,000 years,” he said.

During that time, the atmosphere consistently contained 280 parts per million of carbon dioxide, he said. But in just 230 years, thanks in part to global industrialization, carbon dioxide has increased by 38 percent.

“We’re one million times more efficient at putting carbon into the atmosphere as nature is at taking it out,” he said.

Falkowski said this pollution has led to more frequent heat waves, stronger cataclysmic storms, melting ice caps and rising sea levels — all of which have financial costs and put people’s lives at risk.

“Do the cost-benefit analysis. Extreme weather events. Global drought. Famines. Many, many areas of the economy will be incredibly impacted,” he said. “I don’t think these are taken into account.”

A study in June by the Government Accounting Office concluded that the United States would have to take advantage of carbon capture if it hoped to address climate change. The Department of Energy spent \$600 million last year developing this technology and making power plants more efficient in a bid to curb plant emissions.

The missing piece in all this is the incentive. Until carbon dioxide is treated like any other pollution, companies will have no financial reason to reduce their emissions.

“No electric power company right now wants to remove carbon dioxide at a cost to their customers or their shareholders if everyone else is going to have a business-as-usual scenario,” Falkowski said.

In Linden, SCS Energy needs permission from the U.S. Department of the Interior to drill in federal waters. It also needs multiple state Department of Environmental Protection permits to build the coal plant and run the carbon dioxide pipeline. The first of those — an air quality permit — was rejected earlier this year. But Mascaro said the firm is confident it can secure the needed approvals and begin construction in 2012.