

He says Big Sky will know “relatively soon” if the project is working “because as we collect the samples once every couple weeks or so, the trend will develop pretty soon.”

CARBON, CARBON EVERYWHERE

Just as the earth has always released carbon, it has also always stored it, without any hocus pocus. Humans are just releasing a whole lot more of the stuff by burning fossil fuels. Kearns says, “Coal is the culprit in global warming,” which is why the Sierra Club has targeted coal power in its “Beyond Coal” campaign. She calls carbon storage and capture “a distraction from the true source of the problem.”

Coal provides about half of the U.S.’s electricity and more than 30 percent of our global warming pollution, according to the Sierra Club. In Oregon specifically, Kearns says, despite our hydropower, wind and solar production, coal provides about 40 percent of our power. Though Oregon is set to stop burning coal at the Boardman plant by 2020, Portland General Electric has an ownership interest in Montana’s Colstrip coal-fired power plant, and Oregon gets a large percentage of its 40 percent coal-produced power from Montana and Wyoming. The more coal burned, the more CO₂ produced, and all that CO₂ has to go somewhere.

The Columbia River basalt layer extends from Idaho into Eastern Oregon and Washington, along the river’s path. Big Sky says the CO₂ storage potential of the Columbia River Basalt Group “makes it one of the most significant potential deep geological storage formations in the region.” Given Oregon’s dependence on CO₂ producing coal-fired electricity, it’s all rather convenient.

OSU forestry professor Mark Harmon studies CO₂ in forests. “They will probably say they have a permanent solution, and if it doesn’t leak back out then it’s true,” he says of CO₂ injection. “Nothing biological is permanent, but that’s a little bit misleading.” Biological systems, he says, like rangelands and forests, can be permanent if they are maintained.

“You have to think of what your starting point is,” Harmon says, “Nothing is really permanent, even planets and the sun.”

In the case of forests, he draws the analogy of a bucket. “We’ve got a bucket; we’ve got leaks in it. Some is leaking out, but the more we pour in the bucket the more that bucket will store.” In a forest managed for carbon storage, one would harvest less often, he says, taking less each time and raising the permanent amount of carbon in it.

No matter how you store it, too much CO₂ is a problem. CO₂ is part of the greenhouse effect, which used to keep the planet at a nice temperature for human survival, but humans — and our love for fossil fuels — have dramatically increased the amount of CO₂ in the atmosphere, and that has increased the temperature of the earth. According to the National Oceanic and Atmospheric Administration, the global CO₂ for April 2011 was 391.92 parts per million. That’s up over 36 percent from pre-Industrial Revolution levels of 280 ppm, and according to the Intergovernmental Panel on Climate Change, it’s why the earth’s temperature is rising.

Plants store carbon and rangelands are covered in plants, and Tony Svejcar researches the way rangelands store CO₂. Half or a little more of the earth’s surface is covered in rangelands, he says.

Svejcar began researching rangeland carbon storage in 1993. He says the research lasted “for 10-plus years, but we couldn’t get any interest at the Washington level.” He says when it comes to rangeland, “there are lots of examples of people who manage the resource well.” If ranchers could get carbon credits for the carbon stored in their rangelands, he says, it could be a marketing niche.

The additional benefits to well-managed rangelands are worth even more, Svejcar says: Less erosion, better habitat and more productivity. Forests yield similar benefits when managed for carbon.

Svejcar says that the cost of monitoring how much CO₂ is being stored on something as variable as rangeland is prohibitive, and a drought year can turn a carbon sink into a source. Most rangelands, he says, “over time will sequester carbon but there’s huge spatial variability, and there’s variability over time.”

Small grains of the basalt mounted in epoxy that could be used for carbon sequestration



COURTESY PACIFIC NORTHWEST NATIONAL LABORATORY

According to Harmon, another reason the quick carbon injection fix, as opposed to terrestrial solutions, is appealing is because some of the agricultural, range and forestry solutions are “a little more complicated than trap it and stick it into the ground,” and they give the false image of impermanence. “That makes it harder to sell,” he says.

Because there was no interest in funding the rangeland research Svejcar was working on, he says that he “moved on to other pressing questions.” Now he says with the increased focus on carbon sequestration, “They want us to set up these programs, and we don’t have the research behind it.”

Harmon says, “The problem is it doesn’t take a lot of research to figure out some problems, like with these carbon debts, but there’s no money to look at this.”

A NEW ENERGY FUTURE?

Big Sky bills itself as “a new energy future for Montana, Wyoming, Idaho, South Dakota, the Pacific Northwest and the nation.” The partnership says it encompasses universities, national laboratories, private companies, state agencies and tribes. Several OSU professors are part of the project, though none associated with Big Sky responded to requests for interviews.

That new energy future comes with some dangers. According to the State Environmental Policy Act (SEPA) checklist that Batelle Memorial Institute’s Pacific Northwest National Laboratory filed in Washington as part of the permit process, “the presences of large volumes of compressed CO₂ would present a significant health and environmental issue because of the asphyxiation hazard.”

But the SEPA checklist says since the mill site is a mile from any residences and “no natural or injection related activities appear feasible to cause a CO₂ leakage event” there is little danger to humans at the pilot site.

What happens after the pilot project is another story if the tests are deemed successful, and the effort to store carbon in basalt expands.

Cameron and Jane Kerr allege the Weyburn-Midale CO₂ Monitoring and Storage Project in Saskatchewan, Canada, is leaking CO₂ hundreds of times above safe levels and killing rabbits, goats and other small animals.

Barry Robinson, a lawyer with Ecojustice in Canada, has been advising the Kerrs on their case. The farm is near an aging oil field operated by Cenovus (which also has a hand in oil extraction from the controversial Canadian tar sands). The oil field is part of the Weyburn carbon sequestration project.

“It’s billed as a CO₂ storage and recovery project,” Robinson says. He says three years after Cenovus began injecting CO₂ to store the carbon and force oil to the surface, the Kerrs “started seeing some unusual things going on,” on their farm — the bubbling ponds and dead animals.

Soil gas testing contracted by the Kerrs showed “very high CO₂ levels in the soil on a number of locations,” Robinson says. A study by the Petroleum Technology Research Centre, which manages the CO₂ project, said “no results have been found that would support the recently reported conclusion” that CO₂ from the project “has migrated through the geological storage system to the surface.”

Robinson says, “From our point of view, there’s something very unusual going on in the Kerrs’ land.” And it started, he says, after CO₂ injection began. The consultant hired by the Kerrs wrote in his study that the “source of the high concentrations of CO₂ in the soils of the Kerr property is clearly the anthropogenic CO₂ injected into the Weyburn reservoir.”

Robinson says well bores in the oil field — there are 25 wells within a mile of the Kerrs’ farm — that were improperly sealed could account for the leakage.

After the Kerrs released the findings to a media outcry in the U.S. and Canada, it was decided that more testing would be done. Robinson says Cenovus began its testing last week. Carbon capture and storage can be done, the attorney says, “But it has to be done right.”

Big Sky had been working on a deal with SaskPower in Saskatchewan to import CO₂ from Canada and store it in Montana, but the \$270 million deal fell through in late 2010. More than a million tons of the gas would have been sent through 50 miles of pipelines to the U.S. for storage.

Carbon capture and storage is “certainly is not going solve our climate woes,” says Cesia Kearns.

There’s another kind of leakage that is an issue, forestry professor Harmon says. “Without a system to limit the emissions, you get a lot of leakage problems,” he says. He points out that if one nation restricts fossil fuel emissions and others don’t, manufacturing simply moves to the country without an emissions cap. There needs to be an overall system that pushes down emissions, he says, but “it doesn’t seem like that’s going to happen.”

Even when it comes to CO₂, Harmon says, “Humans love the techno fix. If we can keep doing what we’re doing and just fix it through technology, then we do. If I can get pill instead of changing my diet then just give me a pill and I’ll just keep eating all those burgers and fries.”

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