

OPINION: Carbon capture could expand Alaska power options

Tim Bradner : 6-8 minutes



Plumes rise into minus 40 degree air from UAF's Ben Atkinson Building, which houses the university's heating and power plant on January 9, 2020. (Marc Lester / ADN)

Alaska may have a potential clean energy source hiding in plain sight: It's "clean coal" — or, more correctly, cleaned-up coal with 95% of its carbon dioxide, or CO₂, removed in emissions from power plant combustion. A bonus is that 100% of other pollutants like sulfur dioxide are removed, and the majority of nitrous oxide and particulate matter are also removed in the process.

For a lot of people, coal is a dirty word. It shouldn't be. We should always be open-minded.

Coal is packed with energy. It's low-cost and abundant around the world, especially in Alaska. Around 27% of the world's coal is in the U.S., and half of that is in Alaska. The problem is that coal releases carbon dioxide when used as fuel and contributes to global warming. But if the CO₂ release can be mitigated, what's the problem?

New research by the University of Alaska Fairbanks, working with U.S. Department of Energy support, now shows that an Alaska coal-burning power plant with a carbon capture system removing CO₂ from its emissions, and with the CO₂ permanently stored underground, can approach "net-zero" in carbon release.

Because of the low price of coal, the cost of power generated, including the cost of capturing and storing CO₂ underground, appears highly competitive with energy sources like imported liquefied natural gas and even conventional natural gas combined with renewable energy from wind or solar, according to the UAF research.

Federal clean-energy tax credits paid per ton for the CO₂ stored underground are important in this calculation, and critics will argue that the tax credits may be temporary, which could undermine the long-term economics. But many wind and solar projects are helped by the federal tax credits, too, so the same argument applies.

Carbon capture is a hot research topic today. Our university and a team of partners were selected by the U.S. Department of Energy to lead a study of whether the process could work in Alaska. What's important is that CO₂ capture from a coal plant relies on proven technology. The basic process has been used for years in many industries.

One coal CO₂ capture project now in development is at the Milton R. Young coal power station in Center, North Dakota. The owner is Minnkota Power Cooperative with Japan's Mitsubishi Heavy Industries and Kiewit, a major U.S. company, as participants.

Carbon capture works well with coal because the CO₂ is more concentrated, at about 14% of the coal emissions than emissions from a natural gas-fired power plant, where the carbon dioxide is less concentrated, at 3% of emissions from a gas plant. Because of that, the technology is more challenging. There's also a lot of research and development work on capturing CO₂ directly from air, but this is not yet considered ready for wide use.

Back to Alaska. For purposes of its research, the university used a plausible — but still hypothetical — example of a large power plant and a coal mine near Skwentna in the western Matanuska-Susitna Borough. The study assumed a new 75-mile pipeline would be built to carry the captured CO₂ to the existing Beluga gas field west of Anchorage.

The Beluga field has a lot of underground reservoir space available for CO₂ storage that is estimated sufficient for more than 60 years of carbon dioxide storage from a 400-megawatt power plant at Skwentna. The example also assumes a 75-mile power transmission line to Chugach Electric Association's Beluga power station near the gas field where the new power could be connected with Chugach's existing transmission, feeding it into the Railbelt electric grid that serves Southcentral and Interior Alaska.

Skwentna was used as an example because there are known coal resources and a company that is now exploring. Also, there would be a market for the power in Southcentral Alaska communities if the coal plant and transmission line were built. The predicted shortfall of natural gas from Cook Inlet gas fields has utilities in the region searching for alternative sources of energy, and this could be one.

I admit a large power plant and coal mine at Skwentna, which is off in the boondocks, seems a stretch. But power plants and transmission lines have been built before in less-accessible areas. Chugach Electric's Beluga power plant, for example, was built in the 1960s without road access. There is still no road to the Beluga plant, which is still operating.

Skwentna's relative proximity to the Beluga gas field for CO₂ storage makes it plausible. However, other locations for a coal plant with carbon capture are possible, such as near the existing Usibelli coal mine at Healy,

south of Fairbanks. But Healy is much farther from the Beluga gas field and would require a longer CO2 pipeline of about 280 miles.

It may be possible to inject and store CO2 in underground coal seams at Healy, but research on coal-bed storage is not very far along. Still, the plus for Healy is that there is already a coal mine, two coal-fired power plants, and long-distance electric transmission lines. The university hopes to examine the possibility of carbon capture there but needs additional support.

That includes state support, too. UAF is now waiting on whether the Legislature can fund the \$2 million needed this year to match a \$9 million federal grant for more work on coal carbon capture and storage.

Meanwhile, here's some data from the university's study on coal carbon capture, in metric tons of CO2 emissions per gigawatt hour of electricity (a metric ton is 2,200 pounds compared with a U.S. ton of 2,000 pounds): Coal without carbon capture: 1,100 metric tons; natural gas, current: 550 metric tons; wind power with natural gas backup (wind or solar must have backup for reliability): 250 metric tons; Coal with carbon capture: 100 metric tons.

To me, this sounds promising. We should not ignore it.

Tim Bradner is publisher of the *Alaska Legislative Digest* and *Alaska Economic Report*.

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