



Orca, the world's largest direct air capture and storage plant that permanently removes CO₂ from the air, in Iceland. Credit: Climeworks

Essay: A Vacuum Cleaner for Atmospheric Carbon

By Mark Fogarty

My nephew Brendan is an environmental engineer, and I often bounce fanciful ideas off him as to how we can solve the existential crisis of climate change.

“What we need,” I said during one of these bull sessions, “is a giant Leonardo Da Vinci vacuum cleaner to suck all the carbon down out of the sky.”

I don't know if Leonardo actually sketched out a sky vacuum prototype in one of his notebooks, but it turns out such a thing actually exists.

Although it is an industry in its

infancy, direct air capture (DAC) plants Hoover carbon down and remove it from the atmosphere. From there, it can be reinjected into the ground (which, after all, is where it originated, which we then burn, releasing carbon into the atmosphere), or turned into cleaner fuel that can be transported away from the site, or transformed through chemical processes.

I'd like to visit one of these pioneering air-mining plants one day (less than two dozen have been launched planet-wide to date), but through the magic of YouTube I got a preview of how one in Iceland, called [Orca](#), works. (See link.)

It's impressive. For now, the process is still way too expensive to be truly viable, but all hands are working to bring the price down to a benchmark of \$100 per ton of carbon removed from the air. With eventual goals measured in gigatons rather than tons, the ramp-up time for DAC needs to be measured in years, rather than decades. Let's hope a few modern-day Leonardos are on the job!

As a journalist, I have covered tribal finance for several decades now, so it is only natural for me to wonder about DAC's suitability for Indian Country.

I can see a couple of natural fits. One is land and energy. A DAC plant requires both. Many tribes have large land bases, and some have big energy operations, such as wind farms or other electricity-generating ventures. That's a good match for the big picture in DAC, one that can lead to construction and permanent jobs for tribal members.

Another is the natural inclination of many tribes to act as stewards of the environment, as shown in efforts like the preservation of salmon habitat in the Pacific Northwest.

DAC plants aren't cheap, so a tribe needs access to capital to be a player. Money can come from financially successful tribes, partnering with private firms, and even perhaps from sources that don't quite exist yet. For instance, it is worth looking into whether Native CDFIs (community development financial institutions) can expand their business finance portfolios

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Orca DAC plant in Iceland. Credit: Climeworks

to include the carbon industry. Native CDFIs tend to be quite small, so they would need to scale up, perhaps through extensive coalitions or cooperatives, to take on the task.

As it happens, there is a model of a DAC plant under way in Indian Country.

As previously reported in *Tribal Carbon Solutions*, in British Columbia, the Upper Nicola Band is involved in a billion-dollar effort to airmine carbon and turn it into fuel.

It is providing the land for and is a partner in a \$1.3 billion DAC facility to be built on one of its reserves.

The First Nation is a 10 percent partner in a venture that is also being backed by the provincial government in the amount of \$2 million for an engineering and design study.

Upper Nicola Band Chief Harvey McLeod has noted the First Nation has the land and enough power (electricity) to make it work.

The project will use partner Carbon Engineering's Direct Air Capture and AIR TO FUELS™ technologies to capture carbon from the air and turn it into fuel.

According to the venture partners, who also include Huron Clean Energy and Oxy Low Carbon Ventures, the plant will combine air-captured carbon with hydrogen to create fuel that has 90 percent fewer emissions than traditional hydrocarbons.

The plant will be built on 100 acres of Upper Nicola Band land near Merritt, BC, and the First Nation will be in a land and business participation venture with Huron Clean Energy. Construction was expected to start this year and operations to begin in 2026.

All eyes are on this tribal venture into a big DAC commitment.

Meanwhile, I'm still coming up with climate solutions. But while it turns out Leonardo's giant vacuum cleaner actually exists, I don't think all of the fanciful ideas I discussed with my nephew Brendan will come to life.

Still, with all of the activity from NASA that we've seen in the past year, doesn't it make sense to borrow some of their rockets, blast them off into space, and offload a gigaton or two of carbon?

