



Removing Carbon by the Gigaton

By Mark Fogarty

Energy Futures Initiative has a plan to remove carbon from the atmosphere by the gigaton by 2050. And direct air capture can play a big part.

EFI's proposal, CO-2 Secure, envisions a federal corporation, the National Carbon Removal Authority, with broad powers to fund CO2 removal by a number of different methods.

According to Washington-based nonprofit EPI, "The initiative is proposed for initiation in 2035, as a follow-on to current proposed legislation—including the Federal Carbon Dioxide Removal Leadership Act and the purchasing pilot program in the Carbon Removal and Emissions Storage Technologies (CREST) Act—that would establish a precursor pilot program in the U.S. Department of Energy."

The program builds upon current programs and legislation to achieve gigaton-scale carbon removal by midcentury, EFI says. It would also achieve net zero greenhouse gas emissions by midcentury.

The proposal notes the gigaton scale "poses new challenges in managing hundreds, if not thousands, of long-term carbon removal agreements of varying size, location and technology."

Managing a program of that size, "while providing a stable oversight environment for decades will, in turn, require new institutional arrangements" such as the National Carbon Removal Authority.

"The magnitude of the global CDR challenge is huge," the group notes in its proposal. "The 6 gigaton/year target would be equivalent to about 13 percent of current global CO2 emissions." In addition, "reaching 20 gigaton/year toward the end of the century is equivalent to current annual consumption of all oil and gas products," which is a trillion-dollar industry.

Though a challenge, it is a challenge that could be met, the group feels.

"CDR of this magnitude is achievable with technologies that are already being explored. Between nine and 28 gigaton/year—or even more with faster technological maturation—could feasibly be deployed at a cost below \$100 per ton."

The United States will need to take on a large chunk of this effort.

"A Princeton University study, for instance, found that up to 2 gigaton/year of technological and hybrid CDR could be necessary by 2050 to reach the Biden administration's long-term goals of net zero GHG emissions."

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Credit: *Energy Futures Initiative*

And, the group points out, CDR in and of itself does not eliminate the need for rapid emissions reductions.

"CDR deployment in the United States serves the dual purpose of contributing to global emissions goals and spearheading the CDR innovation push," it says. The U.S., the group points out, accounts for 25 percent of human-caused emissions of CO₂.

In a hopeful sign, "the increasing recognition of the need for CDR, combined with the enactment of R&D funding and other financial incentives, has spawned an explosion of activity and innovation in CDR technologies with a primary focus on direct air capture."

DAC companies already in the game include Climeworks, Global Thermostat, CarbonCapture and Carbon Engineering. These firms "have entered bilateral deals to implement the first round of commercial-scale CDR projects."

And big private firms like Panera and Microsoft "have announced voluntary corporate goals to achieve net-negative GHG emissions, requiring the need for

CDR projects as part of their decarbonization portfolios.

"Alphabet, Microsoft and Salesforce, as part of The First Movers Coalition have pledged \$500 million to invest in carbon removal by 2030.

"The Frontier Fund, formed by Alphabet, Stripe and Shopify, has established a target to raise \$925 million by 2030 to invest in CDR purchases and technological demonstration and development projects."

Other participants include the Musk Foundation, which is offering \$100 million in prizes for advanced CDR concepts, and the Carbon Business Council, which has more than sixty startup members.

