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Can Carbon Capture Save the World?



Can't shut the spigot off fast enough

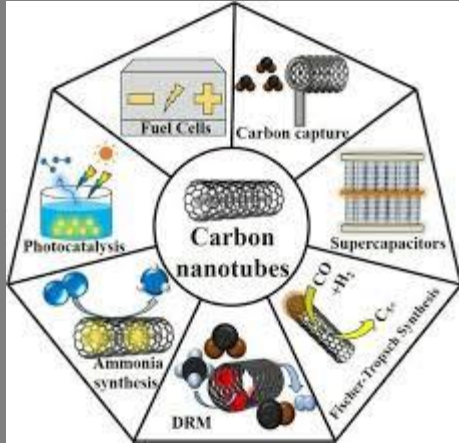


Let me preface this post by saying I lump all carbon capture and sequestration technologies into one bucket that I refer to as carbon capture.

This may not sit well with purists, but I do so because none of these approaches are designed to “eliminate” emissions, just manage them.

- I’m a major proponent of all things carbon capture for one simple reason:
The world simply cannot stop emitting carbon fast enough.
- As I’ve illustrated in a previous post, ending the use of fossil fuels could easily take a century. Heck, the world is struggling just to end the use of coal.
- Electrify transportation will also take many decades. States planning to end the sale of combustion engines by 2035 will all find themselves adjusting that date.
- Given this, the next best strategy is to figure out how to mitigate fossil fuel emissions and suck existing carbon out of the air.
- Following this course will buy the world time to make the necessary transitions systematically, without the pressure of potentially passing a point of no return.

An alphabet soup of capture



There are a multitude of approaches to capturing carbon including aqueous amine-based capture, membrane gas separation, chemical looping, marine removal, and some that use cryogenics, biomass, and nanotechnology.

Given the best outcome is likely to be achieved from a combination of methods, all should be fully vetted for economic viability.

Carbon Capture

- Carbon capture technology is basically big air filters that capture carbon dioxide before it hits the atmosphere. A typical use would be on a fossil fuel plant smoke stack.

Direct Air Capture (DAC)

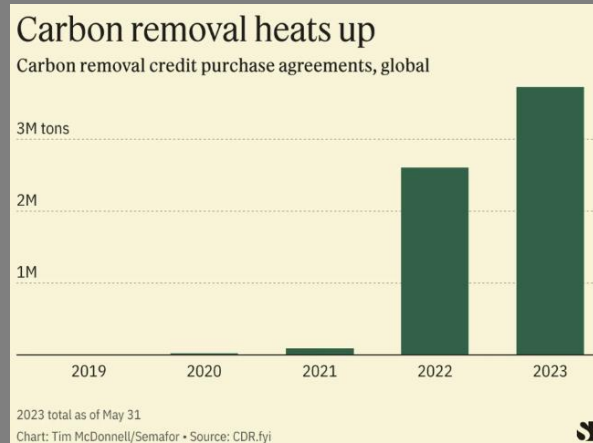
- DAC is focused on carbon that's already emitted into the air. DAC is designed to extract CO₂ from ambient air independent of the source.

Enhanced Rock Weathering (ERW)

- I'm enamored by this approach. It involves adding specific types of crushed rocks to the soil to absorb carbon, and in some cases, improve crop yield.

Carbon Capture Utilization and Storage (CCUS) & Carbon Capture and Sequestration (CCS)

- CCUS is a derivative of CCS. Both technologies remove carbon at the source. The difference is CCUS repurposes the carbon for industrial use versus storing or sequestering it.



All the company stories listed were published this year.

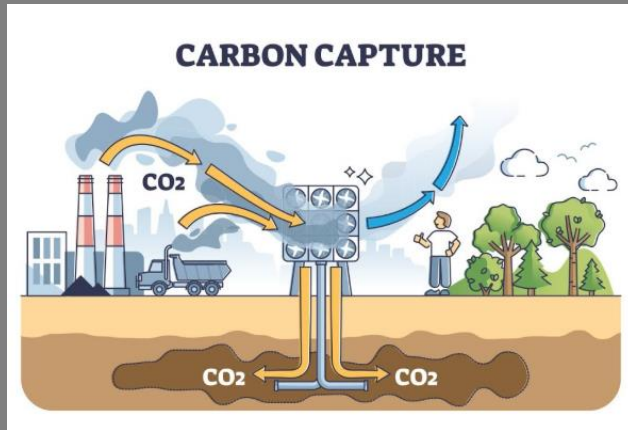
This is an indication that the focus on carbon removal is growing.

That's welcome news.

Recent corporate news



- **TikTok:** Partnered with Swiss direct air capture company Climeworks to remove 5,100 tons of CO₂ from the atmosphere through 2030.
- **United Airlines:** The venture arm of United recently invested an undisclosed amount in carbon dioxide removal startup Heirloom with an option to buy 500,000 tons of carbon removal. Heirloom uses calcium hydroxide and water to capture and convert CO₂ into limestone.
- **Microsoft:** Inked a 25-year deal with Chestnut Carbon for removal credits from restoring 60,000 acres of land and planting 35 million trees.
- **Occidental Petroleum:** On a recent earnings call CEO Vicki Hollub discussed the opportunity to leverage captured carbon to unlock billions of barrels of oil. I know, that's counterproductive, but it illustrates a demand-side incentive. Occidental received a \$500 million Department of Energy award (status unknown) to build a DAC hub in Texas.
- **Google:** Announced deals with Varaha and Charm Industrial to buy 200,000 tons of carbon removal credits from biochar by 2030.



I'm encouraged with the activity I'm seeing in what I consider critical technologies to achieve net-zero.

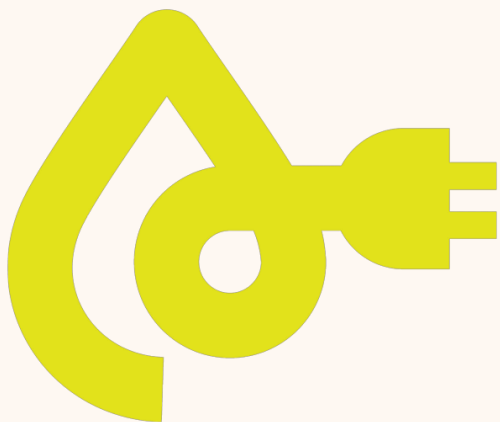
It has taken too long to recognize the importance of carbon capture.

The good news is that momentum is building. Hopefully that momentum will accelerate.

Recent technology news



- **Stanford University:** Chemists at Stanford believe that they have developed a low-cost way to permanently remove CO₂ from the air by using heat to transform common minerals.
- **Europe:** In a single day three final investment decisions (FIDs) were approved to fund CCUS projects in the UK and Europe.
- **Gigablu:** Sustainable aviation investor SkiesFifty entered into a four-year agreement with Gigablu to remove 200,000 tons of carbon. The deal represents the largest marine carbon removal agreement to date.
- **InPlanet:** Inplanet - an enhanced rock weathering (ERW) company - recently closed a deal to provide verified credits to Dutch financial services company Adyen. Although ERW only accounts for 2% of carbon removal credits, 65% of all ERW volume was contracted in 2024.



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Unbiased and Unfiltered

- An honest assessment of the climate change effort.
- I cover what's working – but more important - the issues/roadblocks that the industry would prefer to ignore.
- A must-read for anyone with a desire to understand what's really going on with renewable energy and climate change.



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