# Demystifying Carbon Dioxide Removal February roundup

#### Dear all,

As the carbon removal industry grows, more initiatives are forming to bring together industry leaders. This month, we take a look at the new Carbon Removal Alliance and how industry counterparts are working together to shape the policy debate.

We then explore some of the new ideas proposed for CDR, which pair different technologies and approaches in an attempt to overcome the challenges in the industry, such as energy use, carbon storage and the limitations of nature-based solutions.

Lastly, we take a look at the too often overlooked perspectives of the carbon removal industry, reinforcing the need for the industry to be led by environmental justice principles instead of fossil fuel and corporate interests.

As always, please feel free to share this newsletter with anyone who may be interested. Simply <u>sign</u> <u>up here</u>, or <u>click here</u> to see an archive of previous editions. If you have any suggestions or feedback, please do get in touch - it's always great to hear from you.

Till next time, Victoria victoria.kalyvas@gsccnetwork.org

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### Stat of the month:

5%

The estimated proportion of global renewable energy generation in 2050 needed for <u>1 billion tonnes of carbon</u> <u>removal by DAC.</u> Projections suggest <u>5-10</u> <u>billion tonnes of CDR</u> is required each year by 2050 to keep global temperature rise below 2°C.



### Accelerating industry development

This month saw the launch of the <u>Carbon Removal Alliance</u>, led by Carbon180's co-founder Giana Amador. The alliance so far <u>brings together over twenty well-known CDR industry leaders</u> - including Stripe, Charm Industrial and Climeworks - to "unite the innovators", advance policy and support a diverse set of permanent carbon removal technologies. While some suggest the alliance will give the industry a <u>unified voice</u>, others point out that an exclusive <u>focus on "permanent removals" reflects</u> <u>industry tensions</u> over natural vs engineered solutions. Unlike other industry coalitions, such as the <u>Carbon Business Council</u>, the alliance does not include companies focusing on forest- and soilbased projects.

Regardless of any tensions which may exist, industry players are coming together to have their say on policy developments. This is a critical time to do so, with policy developments under discussion in the <u>EU</u> and <u>Australia</u>, and other countries questioning how they can <u>compete with the industry</u> incentives contained within the US Inflation Reduction Act. This month, the CDR industry came together to respond to the <u>guidelines released by the UN-convened Net-Zero Asset Owner Alliance</u>. These <u>prohibit carbon removal from counting toward companies' reduction targets until 2030</u> out of concern that this could "deter or detract" from other decarbonisation efforts. CDR industry leaders <u>called on the Alliance</u> to make a distinction and establish separate interim targets for carbon reduction/avoidance and removals, while reaffirming support for investment in CDR before 2030.

CDR leaders also put out an open letter calling for the creation of an industry standards initiative that would "provide a trusted, scientific stamp-of-approval for CDR protocols". The letter suggests the development of evolving guidelines across different approaches that allow "flexibility for developing new pathways". While it is hard to pick winners and losers at such an early stage, the diversity of CDR approaches may be slowing down efforts to scale the market. Bloomberg's Lara Williams suggests "costs will start coming down when the sector rallies around a method, in the same way that companies rallied around silicon for solar photovoltaic cells and lithium-ion for batteries" which builds replicable approaches and reliable supply chains.

In addition to new industry alliances, CDR got its <u>very first venture capital (VC) fund</u>. <u>Counteract</u> solely focuses on CDR technologies and has so far raised USD 42 million, with 12 companies under its portfolio. There will likely be continued interest in funds like Counteract moving forward, with carbon-related startups receiving <u>USD 4.2 billion from venture capitalists</u> last year, according to PitchBook.



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### New thinking on implementation hurdles

New CDR approaches are seeking to overcome implementation hurdles by capitalising on cobenefits or utilising existing infrastructure to improve efficiency. Direct air capture (DAC), for example, is notoriously energy-intensive, posing a <u>"very significant" barrier</u> to scaling the technology. Scaling up DAC to remove a billion tonnes of CO2 is estimated to require <u>5% of global renewable</u> <u>energy generation by 2050</u>. This prompted startup Fervo Energy <u>to pair the technology with</u> <u>geothermal energy</u>. Geothermal is a good match as it produces excess heat which is required in the DAC carbon removal process - something that other renewable technologies like solar and wind can't provide.

In the Washington Post, Shannon Osaka explores the company's plans to design and build <u>the first</u> <u>purpose-built geothermal and DAC plant</u>. This plant will be situated in the US, but similar plants aim to replicate this in Kenya, which, due to its unique geography, is particularly suited to building up DAC powered by geothermal. A first-ever <u>national workshop on CDR</u> was held in Nairobi this week to explore building the industry in the country.

In addition to energy use, other start-ups are looking at solutions for carbon storage. While countries are starting to conduct <u>comprehensive assessments of available carbon storage</u>, there is a limit on the amount of CO2 we can shove under the ground. As an alternative approach, CDR companies Heirloom Carbon Technologies and CarbonCure teamed up to trial the permanent storage of CO2 in <u>concrete for the first time</u>. The test only stored 37 kilograms of CO2, which CarbonCure's chief executive acknowledges is a "drop in the bucket", but it proves technological viability. Political backing is also starting, with New Jersey signing a new law this month which provides tax credits for concrete producers delivering "<u>quantifiable reductions in embodied carbon</u>". However, even though CO2 is stored in the concrete, currently this is less than the carbon emitted in the process of producing that concrete. Heirloom's chief executive commented that <u>achieving net negative</u> emissions will be a "multi-decade effort".

Nature-based solutions are also exploring ways to increase efficiency. Startup Living Carbon has planted <u>genetically modified trees in US forests for the first time</u> to speed up the capture of carbon from the atmosphere. Trials conducted in a greenhouse suggest the fast-growing trees <u>accumulate 53% more biomass and up to 27% more CO2 than regular trees</u>. However, some are sceptical that these results can be replicated in forests. Also looking to speed up plant growth is startup Funga, which <u>claims to be the first CDR company which uses fungi to capture carbon</u>. There are millions of diverse species of bacteria and fungi living in soil, and introducing the right combination of fungi species can <u>accelerate plant growth by up to 64%</u>, the company claims. Lastly, researchers are suggesting using <u>desalinated water produced with renewable energy to grow new forests on arid land</u>, claiming this could capture an unbelievable 730 billion tonnes of CO2 between 2030 and 2100. The estimated cost is high - <u>over USD 500 in 2030</u>, <u>dropping to USD 100 in 2100</u> - and will likely

have a 20-year lag between investment and carbon uptake, but the approach could be considered as a future alternate mitigation option in arid regions.



### **Centring environmental justice**

CDR is still a niche topic, and the media generally features perspectives from budding startups, academic researchers and policy experts. Often less attention is paid to environmental justice perspectives. For his article in Atmos, Nathan Thanki spoke with "<u>philosophers, activists, scientists, academics and policy activists around the world to find out whether carbon removal is feasible or wise.</u>" The article outlines the worries of activists, such as the Indigenous Environmental Network's Panganga Pungowiyi, that CDR will perpetuate the "long, painful history" of exploitation, and that we should be "advocating technologies that benefit people, not corporations". Others, such as associate philosophy professor Olúfémi O. Táíwò, still advocate for carbon removal on the basis of an overall reduction in emissions, but want to see governments like the US <u>help developing nations fund their own carbon removal as a form of climate reparations</u>.

With the industry moving fast, it will be important to keep a close eye on CDR implementation, ensuring it is shaped by environmental justice principles, not just commercial interests. Elon Musk's XPRIZE and Carbon180 recently came out with a new report that <u>aims to put environmental justice</u> <u>at the centre of the carbon removal conversation</u> and offers practical recommendations for startups and project developers. The report acknowledges that literacy in environmental justice principles and a commitment from the industry is crucial to "<u>avoid replicating past injustices and ensure that the benefits from their projects are felt broadly and equitably.</u>"

Greta Thunberg also shared her thoughts on CDR, referring to its promotion as a way for the <u>fossil</u> <u>fuel industry to deflect attention and delay action</u>. In an op-ed adapted from her new book, she asks "why make the world picture a potential solution so vividly that we include it in every possible future scenario and then fail to invest in it?" While it makes some practical sense for oil and gas companies to be involved in carbon removal due to existing infrastructure and industry know-how, it is a little strange for companies like Shell, which <u>doubled its profits from fossil fuel extraction in 2022 to USD 40 billion</u>, to now be <u>touting carbon removal as the solution</u>. Bill Gates also didn't make a great impression after justifying his use of private jets due to his investment in carbon removal. For perspective, the Climeworks project he is funding in Iceland removes up to 4,000 tonnes of CO2 annually - just half of his personal yearly transport emissions.



## **News in brief**

#### Leading The Charge On Climate: Carbon Removal's Role In Achieving Net Zero (Forbes)

"The world is making progress in reducing carbon emissions, largely due to Russia's invasion of Ukraine and the rise in funding from measures like the Inflation Reduction Act. But, to achieve net zero emissions, equal focus must also be given to carbon removal efforts. However, the question remains whether stigma and complacency will hinder progress."

#### Colorado ponders storing carbon in defunct oil and gas wells (Associated Press)

"From Colorado's high desert to the wooded hills of Pennsylvania, millions of oil and gas wells sit deserted, plunging thousands of feet into the earth. Many haven't been plugged, some leak greenhouse gases. In Colorado, lawmakers are considering a solution that would give these wells a new, redemptive purpose: deep receptacles to trap carbon for millennia."

#### Denmark awards first CO2 storage licences in the North Sea (Reuters)

"Denmark has awarded its first licences to capture and store carbon in the North Sea to Wintershall Dea, INEOS Energy and TotalEnergies, the country's climate and energy ministry said on Monday."

#### Mother Nature Has the Best Climate-Fixing Technology (Washington Post)

"The quest for climate solutions reached a critical turning point when scientists recently concluded that curbing the crisis will require more than just cutting emissions: We must vacuum out the carbon already pumped into the skies."

#### Can 'untested' carbon removal technology BECCS deliver? (Deutsche Welle)

"Slashing emissions and transitioning to green energy is no longer enough to meet the world's climate goals. The UN's Intergovernmental Panel on Climate Change (IPCC) said last year that even if we manage to halve emissions by 2030 — already a major challenge — we would still need to rely on carbon dioxide removal technologies, or CDR, to remove CO2 from our air and oceans."

#### Why does Drax the tree destroyer get eco cash? (The Times)

"The City likes Drax, the world's biggest publicly listed burner of biomass — or wood, as it used to be called. The firm is to announce its annual results this week, and the investment bank JP Morgan has enthusiastically declared the shares "a top pick". Which is fine and dandy for all concerned, except the only reason Drax is handsomely profitable is the colossal subsidies it receives."

#### Congress' 'biggest fight' over climate? It's the farm bill (E&E News)

"Forget electric vehicles, wind turbines or pipelines. Congress' most consequential climate battles this year are more likely to revolve around dirt and cows. The five-year farm bill is scheduled to expire by Oct. 1, making it one of the few must-pass legislative items under this divided Congress." "Are three trees worth one rock? Permanent storage is always best, but given realistic assumptions on discounting of future damages, as well as long-term climate adaptation - carbon storage lasting centuries could be made comparable to permanent storage. However, carbon re-released before peak warming needs to be replaced and cannot be equalized to permanent CDR."

#### <u>Ancient Farming Practice Draws Cash From Carbon Credits</u> (The Wall Street Journal) "Forget whiz-bang technologies that are supposed to solve climate change. An ancient agricultural practice that removes carbon from the atmosphere is getting fresh attention and game-changing cash from big companies."

#### We can't find people to work': The newest threat to Biden's climate policies (Politico)

"President Joe Biden has been traveling the country to tout the job creation boom his billions of dollars in clean energy spending will bring. But the cutting-edge companies he's promoting face a struggle: hiring enough people to fill those jobs."



### **Useful resources this month**

<u>Synthesis</u>: The IPCC's final report for the sixth assessment cycle (AR6), which provides a synthesis of the three prior reports, will be published on 20 March.

<u>Protocol</u>: Planetary Technologies has published a measurement, reporting and verification (MRV) protocol for ocean-based carbon removals.

Perspective: McKinsey has put together a buyer's perspective for carbon removals.

<u>Summit</u>: The Ocean Visions Summit will take place 4-6 April, looking at innovative solutions for the ocean-climate nexus.

<u>Conference</u>: Registration is available for the Carbon Unbound summit taking place 11-12 May in New York.

Interview: Carbon180's executive director Erin Burns discusses CDR trends and policy.

<u>Assessment</u>: The FAO published its first Global Assessment of Soil Carbon in Grasslands, finding that application of management practices that enhance soil carbon sequestration over 20 years could sequester 30 tonnes of CO2 per square kilometre.

<u>Report</u>: A new UN report assesses the opportunities and challenges of nature-based solutions and carbon dioxide removal in Latin America and the Caribbean.

List: Carbon Herald lists the top ten carbon removal marketplaces for 2023.

<u>Study</u>: A MIT team claims to have discovered a more efficient way to remove CO2 from ocean water that does not require the use of expensive membranes.

<u>**Project</u>**: Amazon is funding the world's first commercial-scale seaweed farm located between offshore wind turbines.</u>

<u>Podcast</u>: Now a few episodes in, "Plan Sea" focuses on ocean-based climate geoengineering options that seek to reduce incoming solar radiation (SRM) or remove carbon dioxide from the atmosphere (CDR).

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Each month the demystifying carbon dioxide removal newsletter digs into the world of CDR to bring you the latest stories on everything from carbon credits and net-zero plans to nature-based solutions (NbS) and new technologies. Feel free to forward this email to your colleagues!

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