

Demystifying Carbon Dioxide Removal

March roundup

Dear all,

2025 started with a slew of catchy headlines about the scope and profitability of carbon dioxide removal (CDR), including the New York Times calling it “[the new climate gold rush](#)”. This month, we look at how the expansion of the removals market compares to these high expectations.

We also review new draft standards set by the Science Based Targets initiative (SBTi) that may further increase demand for removals. Some believe this could send a strong market signal for investment in the industry. But, at the same time, new research has reiterated the importance of reserving CDR for emissions that cannot be avoided and prioritising decarbonisation.

On nature, we look at the challenges and uncertainties of using afforestation and forest conservation to capture carbon. A new paper highlights the tension between using land for food and carbon sequestration and food security, especially in the Global South.

As always, please feel free to share this newsletter with anyone who may be interested. You can [sign up here](#), or [click here](#) to see previous editions. Don't hesitate to get in touch if you have any questions, suggestions or feedback.

Till next time,

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Stat of the month:

73%

The proportion of CDR suppliers that have never delivered a credit. 55% have never sold a credit.



Hope and hype

2025 started with some bold headlines about CDR, especially in the US. The New York Times referred to it as “[the new climate gold rush](#)” – an opportunity for venture capital – and Nora Cohen Brown, head of market development and policy at CDR company Charm Industrial, described it as “[The Great New American Industry](#)” in Forbes.

Plans for increasing capacity and forecast market growth are fueling optimistic takes. At the end of last year, New Scientist wrote that “[Direct CO2 capture from the atmosphere will scale up massively in 2025](#)” due to the planned opening of the Stratos direct air capture (DAC) facility in Texas, the biggest in the world. A report published in March projected that the market for [engineered CDR credits will surpass USD 14 billion in 2035](#), suggesting that the recent 40,000 tonne deal between Climateworks and investment bank Morgan Stanley and the anticipated completion of Project Stratos will help the sector towards the “milestone” of one million tonnes of carbon removals in 2025.

However, CDR deployment remains slow and the future impact of what can be achieved is uncertain. As with any emerging industry, anticipating challenges and keeping hype in check is key. CDR purchases have risen, increasing by 59% to [USD 3.4 million](#) between 2023 and 2024, but the delivery of CDR credits – i.e. actually completing the promised removal – remains low. According to CDR.fyi, currently [only 4.66%](#) of the 13 million tonnes of CO2 removal credits sold worldwide have been delivered.



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A recent survey from CDR.fyi revealed that [55% of CDR suppliers haven't sold a credit and 73% haven't delivered one](#). This creates supply uncertainty in the market and, according to Forbes, [could cause buyers and investors to hesitate](#). Industry experts have suggested that the industry [may face a plateau in the next 2-3 years](#) stemming from a lack of anticipated purchases.

Plus, the finite potential for carbon removal must be kept in mind. Recent research reiterated that CDR needs to be used exclusively to compensate for hard-to-abate emissions and overshoot, to “[prevent lower costs for near-term actors leading to larger long-term system-wide costs](#).” The research looked at how much CDR would be needed in future pathways that enable warming to return back to 1.5 °C after temporarily overshooting it at the lowest cost, finding that [78 of 81 scenarios require all available “sustainable” CDR](#) (referring to afforestation, reforestation and BECCS) be used to compensate for “hard-to-abate” emissions and overshoot.

Recent research by the American Physical Society has also given the physical science take on [what is needed for implementing large-scale CDR](#). They highlighted that to remove one billion tonnes of CO2 – “just 3% of what humans add every year” – the systems “would need to [process the same amount of air that all the air conditioners in the world currently process](#) in one year.” Despite the mass energy and resource use, the report’s authors acknowledged that [CDR could be necessary in future](#), recommending that research and development investments should be pursued “[selectively and prudently](#).”

Trump watch

There have been drastic governmental changes in the US following Trump's inauguration in January, with the Department of Energy (DoE) being no different. By February, the Department of Energy's Carbon Dioxide Removal Team had been hollowed out [down to one remaining worker](#), according to Heatmap News.

This raises uncertainty about the implementation of DAC programmes, including [two large-scale projects in South Texas and Louisiana and around 19 smaller hubs](#) in earlier stages of development. The two large hubs are part of a list of Biden-initiated programs [at risk of being erased under Congress's budget reconciliation bill to fund tax cuts](#), which is currently under review by Energy Secretary Chris Wright. Of the USD 550 and USD 500 million the hubs were awarded, they have [only received USD 50 million thus far](#).

In the context of the US's chaotic and uncertain funding landscape, Jorden Dye, director of the Pembina Institute's CDR Centre, suggested that [Canada can step in](#), take the lead and hit the CDR targets the US will now fail to meet. Dye highlights that three provinces and the federal government have already launched "consultations to integrate CDR within their carbon compliance systems and establish regulations for carbon storage" in the last three months.

In the EU, [recommendations on scaling up CDR](#) were recently released by the European Scientific Advisory Board on Climate Change. Companies claim [CDR could help EU competitiveness](#) and reports from [Germany](#), [the Netherlands](#) and [France](#) outline potential strategies for ramp-up.



BECCS vs. land

Countries have to submit nationally determined contributions (NDCs), or national climate pledges, as part of the Paris Agreement, which include targets for land systems and nature-based solutions – but what do these mean in practice?

While some earlier studies estimated that climate mitigation could allow future cropland expansion to feed growing populations, a new paper in Nature Climate Change found that implementing national pledges would result in a [12.8% reduction in cropland area](#). This is mainly due to the conversion of low-density crop areas to make way for forest plantations and reforestation. The impacts are most pronounced in the Global South, where [81% of the countries expected to experience cropland loss](#) are located and many regions are already facing the brunt of food security issues.

Biomass for bioenergy with carbon capture and storage (BECCS) is included in some NDCs and is heavily relied on in climate models that limit warming to 1.5°C. At the end of March, Swedish energy company Stockholm Exergi [announced that it will build one of the largest BECCS plants in the world](#).

Growing crops for use in BECCS also requires land. For the first time, a new report has explored how [BECCS could impact planetary boundaries](#), which represent the safe limits for life on Earth. The researchers concluded that if BECCS crops are planted beyond the land currently used for agriculture, only a very small amount – [much less than is assumed in many climate scenarios](#) – could be achieved before it would [endanger the stability of the biosphere](#). Six of the nine planetary boundaries have [already been crossed](#), meaning the Earth is already outside the "safe operating space for humanity".



Forestry uncertainty

Planting forests (called afforestation) involves deciding what to plant and where. New research found that in the UK, the best planting strategy for a high-emission future is very different to that for a future [“that remains on a ‘near-historic’ path.”](#) Planting decisions need to be made with future uncertainty in mind, and making the wrong decisions could lead to net costs. The researchers highlighted that [diversifying species and planting locations](#) can help reduce risks and increase the chances that the plants remain resilient.

Despite the uncertainty, the researchers maintained that tree planting is still [a very effective way of removing carbon in the UK](#). This sentiment is shared in an article (not linked to the study) that suggests AI companies invest in nature-based solutions instead of gambling [“on complex, expensive and risky technologies”](#) in the context of the AI-driven CDR boom.

Planting more trees is good and well, but ultimately it won’t make a dent in warming unless we rapidly reduce emissions now. Recent research assessed a wide variety of possible CDR routes to return warming to 1.5°C, or even 1°C. For this to be possible via large-scale deployment of removal technologies, [“a transition towards 100% renewable energy must be the number one priority”](#) to enable technologies to be run on renewable energy.

Plus, biodiversity seems to be being left as an afterthought in afforestation efforts. A new paper found that most initiatives that restore forest cover are focused on [“achieving utilitarian functions over biodiversity gains”](#), often with plantations of one or few tree species and carbon sequestration prioritising thinking. Inappropriate reforestation projects have also resulted in [detrimental outcomes for natural areas](#). Afforestation and forest restoration have the potential to be winning strategies due to the co-benefits they can provide for ecosystem services and biodiversity. The authors highlight that there are many opportunities to bring biodiversity to the forefront of planning [if clear biodiversity goals are defined](#), alongside adequate monitoring and sustained funding.

More on minimising trade-offs:

- A study released early this year modelled the trade-offs of using different carbon removal approaches, finding that using a mix of different methods was the most cost-effective net-zero strategy. In specific regions, such as Latin America and Africa, [nature-based removals offer the most benefits](#), not only in terms of carbon removal but also for “preserving planetary well-being and human health.”
- A study looking at the US echoed this finding that when more CDR technologies were available, side effects on energy, land and material

supplies [were less pronounced](#). The authors highlighted the importance of using approaches “tailored to each state’s unique economic and industrial characteristics to ensure equitable and effective decarbonization strategies.”



Standard setters

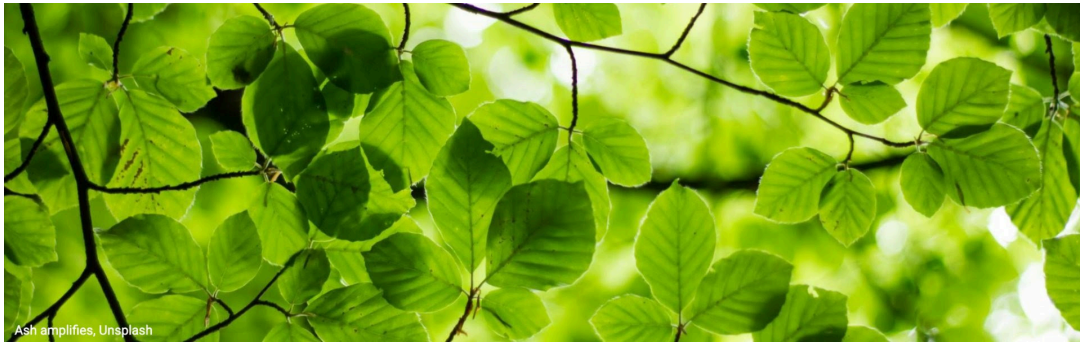
In late March, the Science Based Targets Initiative (SBTi) released the [first draft of its new Corporate Net-Zero Standard](#), which aims to give business leaders clarity on [developing decarbonisation plans aligned with climate science](#). The draft outlines carbon removals as a [way to mitigate “hard to abate” - or residual - emissions](#) and proposes three options for interim targets on how carbon removals can be used to address residual emissions. This is a change from the existing Standard adopted in 2021, which only permitted the use of carbon credits, including CDR, to neutralise residual emissions for net zero [once a company has reached its net-zero target](#).

Net zero standards, such as the ones set by SBTi, could have a substantial impact on the CDR market. Survey results from CDR.fyi indicate that [“Sixty-five percent of respondents pointed to clearer net-zero standards... as the primary motivator for buying durable carbon credits.”](#) Caroline Ott, director of carbon markets at Climeworks, told the Wall Street Journal she [“absolutely think\[s\] this is a driver”](#) for prospective customers.

However, some believe the change, which only relates to “scope 1” or companies' direct emissions, [will not be enough to generate demand for a durable CDR industry](#). (Heatmap News points out that [less than 1% of Apple’s emissions are scope 1](#), for example).

Plus, the standard assumes that companies will eventually have to start removing carbon when they hit net zero, which should be before 2050, but companies can decide whether or not they want to invest in carbon removal in the interim. Companies may have interpreted it as [“they shouldn’t or don’t have to buy carbon removal credits until 2049,”](#) Lukas May, the chief commercial officer and head of policy at Isometric, a carbon removal registry, told Heatmap News, which could threaten investment needed by the industry now [for it to scale up before 2050](#).

Recently companies have retreated from environmental, social and governance (ESG) strategies – more so since Trump began his presidency – causing [uncertainty around the impact of SBTi and other ESG standards](#). At the end of last year, [only 43 of the top 200 companies in the world had SBTi targets](#).



Our pick of the news

[Is carbon capture a solution to the climate crisis?](#) (CBS News)

"You have to think about who's proposing this technology," Jacobson [Professor of environmental engineering at Stanford University] said. "Who stands to benefit from carbon capture and direct air capture? It's the fossil-fuel companies."

[Why carbon markets aren't enough to scale carbon removal](#) (Latitude Media)

Moving beyond carbon credits could help CDR, for example by finding a market for the additional benefits of CDR approaches beyond sucking up carbon so they become a "stand-alone, scalable and cost-effective practice".

[AI's energy problem: Why carbon removal can't wait](#) (World Economic Forum)

CDR companies caution that a shortfall of clean energy compared to demand from AI companies "means unavoidable emissions, which makes carbon removal not just a corporate responsibility, but a fundamental requirement for AI's continued growth."

[Saudi Aramco launches first direct air capture test unit](#) (Reuters)

Saudi oil giant Aramco has unveiled a test DAC plant, which the company says is a first step in scaling up viable DAC systems in "Saudi Arabia and beyond".

[Net-Zero Asset Owner Alliance to 'advance work' on financing CO2 removal](#) (Responsible Investor)

Along with the new SBTi standards, The UN-convened Net-Zero Asset Owner Alliance (NZAOA) is also anticipated to release [guidance on best practices for investors to finance CDR and compensate for residual emissions](#) soon.

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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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