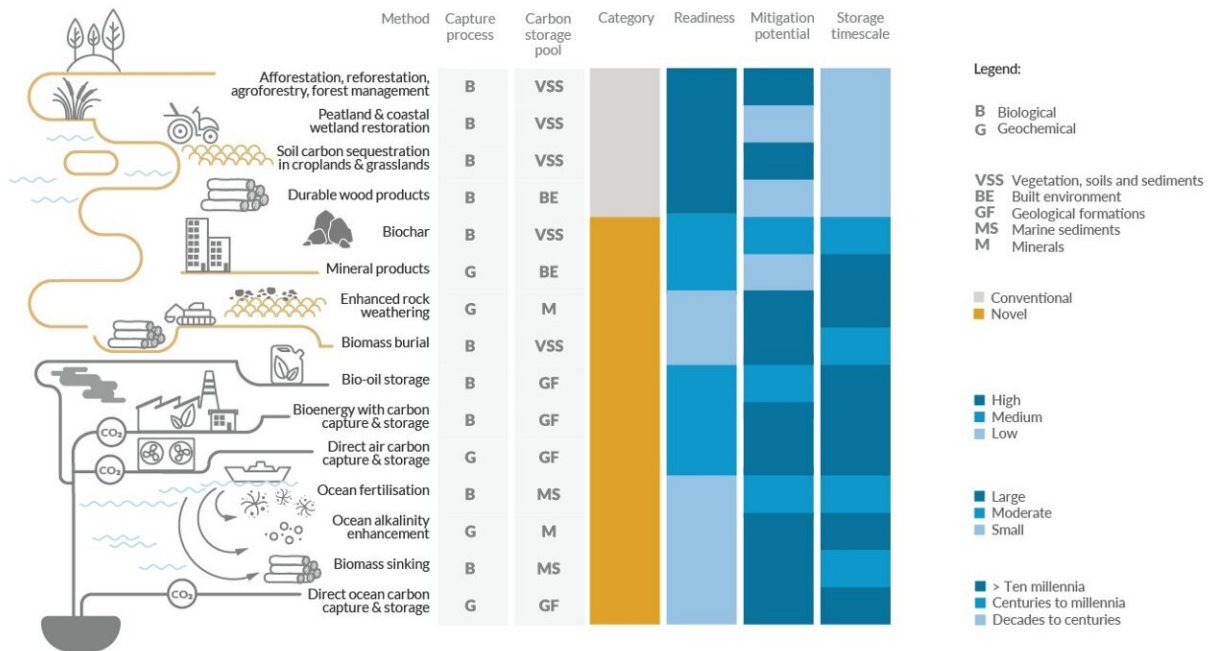


# Report: 7–9 billion tons of CO<sub>2</sub> must be extracted from the atmosphere every year to reach Paris Agreement limit

June 5 2024, by Ulrich von Lampe



Credit: The State of Carbon Dioxide Removal — Edition 2:  
<https://www.stateofcdr.org/>

Seven to 9 billion tons of CO<sub>2</sub> per year must be sustainably removed from the atmosphere by mid-century if the world is to comply with the 1.5°C Paris Agreement limit. This is highlighted in the second "State of Carbon Dioxide Removal" (CDR) [report](#), a scientific assessment delivered by more than 50 international experts.

It was led by Oxford University's Smith School of Enterprise and the Environment, with the Berlin-based climate research institute MCC (Mercator Research Institute on Global Commons and Climate Change) among the lead institutions.

"Although reducing emissions is the primary way to achieve net-zero, CDR has a critical role to play," says Jan Minx, head of the MCC working group Applied Sustainability Science.

"However, when scaling up carbon removal technologies, humanity must avoid jeopardizing other goals like future food security, biodiversity, a clean water supply and safe habitats for indigenous peoples. So we have incorporated sustainability criteria into our analysis, which forms the basis of our final figure for a Paris-consistent range of CDR."

Currently, just 2 billion tons per year are being removed by CDR, mostly through conventional methods like tree planting. Novel CDR methods—like biochar, enhanced rock weathering, direct air carbon capture and storage (DACCS), and bioenergy with [carbon capture](#) and storage (BECCS)—account for only 1.3 million tons per year, which is less than 0.1% of the total. Methods that are effectively permanent account for only 0.6 million tons per year, less than 0.05% of the total.

CDR has seen a rapid growth in research, public awareness and start-up companies, but there are now signs of a slowdown in development across

multiple indicators. "Deploying a diverse CDR portfolio is a more robust strategy than focusing on just one or two methods," says Oliver Geden of the German Institute for International and Security Affairs (SWP).

"Research, invention and investment in [start-ups](#) show diversification across CDR methods, but current deployment and government proposals for future implementation are more concentrated on conventional CDR, mainly through forestry."

Steve Smith of the Smith School of Enterprise and the Environment, University of Oxford, says, "Given that the world's decarbonization is not on track to meet the Paris temperature goal, there is a need to increase investment in CDR as well as in zero-emission solutions across the board."

Of the overall investment in climate-tech start-ups, only 1.1% are for CDR. The report notes that companies involved in this issue have high ambitions which, taken together, would drive CDR to levels consistent with the Paris Agreement. However, these ambitions have little credibility at present, and depend on a much stronger set of policies than currently exists.

"Governments have a decisive role to play now in creating the conditions for CDR to scale sustainably," Smith says.

The report urges governments to implement policies that will increase demand for carbon removal. These should include embedding CDR policies within countries' Nationally Determined Contributions ([climate action](#) plans under the United Nations Framework Convention on Climate Change) and developing better monitoring, reporting and verification systems.

At present, much of the demand for CDR is coming from companies'

voluntary commitments to buy carbon removal credits. Matthew J. Gidden, Senior Scholar at the International Institute for Applied Systems Analysis (IIASA) says, "It is clear that delaying crucial emissions reductions only exacerbates the need for mitigation in the future. But the longer the delay, the more limited the role that sustainable CDR can play."

**More information:** The State of Carbon Dioxide Removal — Edition 2: [www.stateofcdr.org/](http://www.stateofcdr.org/)

Provided by Mercator Research Institute on Global Commons and Climate Change (MCC) gGmbH

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