

Carbon removals: a hot topic that requires a cool head

There is a lot of hype around possibilities of sucking carbon out of the atmosphere and the topic is also on the EU policy-making agenda. Plenty of ways to do this exists already, but all of them come with challenges. Understanding and defining what “carbon dioxide removals” are, is a first step towards avoiding policy loopholes. As part of the [“Negem Horizon 2020” project](#), Carbon Market Watch and Bellona recently organised a workshop on defining real and credible CDR - main takeaways from that workshop can be found [here](#).

Carbon dioxide removal (CDR) refers to removing greenhouse gases from the atmosphere and storing them permanently on land, underground or in the oceans. This could be based on natural processes such as forests and land that act as “carbon sinks” (so-called CDR ‘practices’) or a variety of technology solutions.

CDR is quickly becoming the next climate hype in the EU. While they will be necessary over the course of this century (the IPCC 1.5°C Special Report makes that abundantly clear), there is a risk of CDR becoming overhyped. A great deal of scepticism and caution is necessary. This is especially the case the coming year as revisions of key European climate policies start, to increase their climate ambition in line with the European Green Deal and the Climate Law.

CDR can play a role in the EU climate framework - but only if it is done right.

How to ‘get it right’

Many different CDR technologies and nature-based solutions exist and could be implemented at a large scale. However, all of them have problems, risks or limitations.

Most importantly: the permanence of sequestered carbon is difficult to guarantee. Droughts and forest fires (climate change-induced or not) can kill off planted forests, and underground storage sites could leak.

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In addition, CDR technologies and practices all have their specific limitations: high costs, demand for land, energy use, limited storage potential or potential climate harm elsewhere in the value chain.

To complicate matters more, certain industry lobbyists like fossil fuel companies are claiming the label 'CDR' while they are not removing carbon dioxide at all. This is the case, for example, for carbon capture and storage technologies, where carbon is not captured from the atmosphere, but directly from the polluting source. [Some even claim that plastics dumped on landfills are a permanent store of carbon](#) (as if plastics would never break down and are not fossil-based!).

Counting on removals that fail to materialise or are easily reversible could undermine the EU's climate efforts and its international credibility, and/or provide a dangerous distraction from prioritising and investing in emission reductions.

To ensure that only real and credible CDRs are promoted in the EU, a strict set of principles is needed to check whether technologies or practices are really removing carbon. During our recent workshop, Carbon Market Watch and Bellona presented a set of four principles (based on an academic paper by [Tanzer and Ramírez](#)) that were agreed to by speakers and participants. The critical principles we proposed are:

Carbon Dioxide Removal

The four principles that define it

- 1 Carbon dioxide is **physically removed from the atmosphere**.
- 2 The removed carbon dioxide is **stored** out of the atmosphere **in a manner intended to be permanent**.
- 3 **Upstream and downstream GHG**, associated with the removal and storage process, are comprehensively estimated and **included in the emission balance**.
- 4 The total quantity of atmospheric **carbon dioxide removed and permanently stored is greater than** the total quantity of **carbon dioxide emitted** to the atmosphere.

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Before CDRs can be included in the EU's climate framework, a lot more work is necessary to test various CDR technologies and practices against these principles. The monitoring, reporting and verification must be watertight, and the permanence of the stored carbon must be guaranteed as far as possible. And if permanence cannot be guaranteed it has to be clear who is liable for any 'stored' carbon that is again released into the atmosphere (for example because of a forest fire or leak).

So how do we move forward with CDR the coming years?

CDRs will be necessary over the coming decades and this century, but in the short-term, the focus must be on reducing CO2 pollution.

As has been stated by the European Commission: phasing out as much GHG emissions is the key driver towards reaching climate neutrality by 2050. The best sinks for carbon are coal, gas and oil that are left in the ground. Moreover, CDRs cannot be scaled up infinitely as storage capacity and land are limited. Therefore, carbon removals alone cannot stop the climate crisis.

Keep them separate while working on both

Emission reductions and carbon removals must be kept in separate frameworks. The 2050 climate neutrality target means summing removals and reductions up - but we shouldn't conflate the two in the 2030 targets and first focus on reducing emissions.

In the meantime, however, the EU does need to start testing which CDR practices and technologies actually work and can deliver real and credible emission removals. It is also crucial to assess associated risks and social and environmental impacts - to make sure we're not promoting or relying on false solutions.

Strategies on allocating limited resources such as finance, land, storage capacity and energy need to be developed - while ensuring planetary boundaries such as biodiversity and availability of land are not disrespected.

Another allocation issue is 'who gets to use the CDRs in a climate-neutral world'? As the global CDR capacity is limited, we need a societal agreement on which emissions will be the last to be emitted, and will need to be 'compensated' with CDRs to ensure society as a whole is climate

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neutral. This distributive aspect of CDR will be complex and controversial, as many economic sectors will claim to be the 'last and unabateble emissions', but not all can be.

To make sure CDR technologies are being tested in the real world, and the necessary capacity can be built to scale them up, the EU should focus on financing technology development and real-world pilot projects - the Innovation Fund of the EU emissions trading scheme could be a suitable tool for this. However, no CDR 'credits' should flow back to the carbon market. It is encouraging that senior European Commission officials [have publicly agreed with this](#).

Many important caveats and valid questions remain on the risks and impacts of large-scale CDR – and while there is currently a lot of attention in the policy field, we should not get carried away. Caution should be the keyword when moving forward with CDR, to make sure climate policies are based on real science, and not wishful thinking.