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Zero emissions, zero problems?

Carbon removal is no substitute for decarbonisation. But for Europe to achieve 'net zero' by 2050, it needs to combine both

'Net zero' is the key climate policy buzzword of recent years. The European Union (EU) is aiming for the target by 2050, Germany and Sweden by 2045, and Finland even by 2035. Concretely, 'net zero' means that all unavoidable greenhouse gas emissions — so-called residual emissions, for example from agriculture and some industrial processes — are balanced by CO2 removal

The focus of climate policy shifted to 'net zero' after the adoption of the Paris Agreement in 2015. The signatory states agreed to achieve a 'balance between anthropogenic emissions of greenhouse gases by sources and removals of such gases through sinks' in the second half of the century. Since then, it has been clear: climate pioneers are those who, in addition to reducing emissions, also deal with CO2 removal.

This has consequences for the future climate policy of the EU and its member states. Decision-makers are now faced with the challenge of expanding the existing targets and instruments to include measures for CO2 withdrawals. One of the most politically relevant questions is how reductions and removals relate to each other. How can the latter be incentivised and regulated without undermining climate policy ambitions for conventional emission reductions?

There are more and more methods to remove carbon from the air: from classical reforestation, which binds carbon dioxide through the process of photosynthesis, to chemical processes that capture CO2 from the ambient air ('direct air capture' – DAC) and permanently store it in geological formations ('carbon capture and storage or sequestration' – CCS). Another widely discussed method first extracts bioenergy from plants, then captures and stores the CO2 underground ('bioenergy and carbon capture and storage' – BECCS).

Ecosystem-based methods like reforestation are criticised for needing lots of land and the uncertainty regarding permanent CO2storage. Forest

fires and pest infestations, for example, can cause stored CO2 to escape. Scientists note the high costs and high energy usage of geochemical methods, whose technologies have not been perfected, and the risk that with CCS, carbon could escape and enter groundwater. However, the Intergovernmental Panel on Climate Change (IPCC) considers that CCS storage more lasting than what is achieved through reforestation and other land-based methods. Further research, along with the monitoring of current projects, is still needed.

Carbon removal innovation

To date, many developments have taken place in unnoticed niches. Such as those of the Swiss company 'Climeworks'. In cooperation with companies like Microsoft, Stripe, and Audi, various DAC projects are rapidly boosting their removal capacities. Swedish and British climate policies are moving towards implementing and regulating BECCS, while in Norway major projects are working to import CO2 from the EU that will be stored using CCS. There are also numerous voluntary markets for carbon removal certificates, which mostly have to do with reforestation.

Policymakers at various levels are being pressured to include carbon removal in their climate policies.

Technologies relevant for carbon removal are also being developed in Germany, for example, at Atmosfair, an independent non-profit climate-protection organisation focused on offsetting unavoidable emissions that recently presented a plant that produces carbon-neutral paraffin for air travel. In addition to green hydrogen, which uses renewables such as wind or solar, Atmosfair's new technology uses CO2 from the ambient air to produce electricity for electrolysis. The investments that major corporations like Lufthansa are making in the new paraffin indicate how technologies like DAC are attracting more and more attention.

Methods and technologies for carbon removal are increasingly introduced on the market. The next years will show which of the new methods will be established where, and how they can be regulated. Already now, policymakers at various levels are being pressured to include carbon removal in their climate policies.

Individual approaches

Within the framework of the EU Green Deal, the European Commission is promoting carbon removal. To help the EU reach its

climate targets for 2030 and 2050, the Commission recently proposed revising the land use and forestry regulation (LULUCF) to give each member state concrete targets for removing carbon in the sector.

Thus far, technical methods like DAC have mainly been supported by an innovation fund financed by European emissions trading. The Commission also supports projects in Norway and the Netherlands that could implement CCS. Such methods are not yet embedded in current climate-policy instruments. However, the Commission has announced that in late 2021 it will publish a Communication and will create an EU-wide certification scheme for carbon dioxide removal from agriculture, forestry, and other sources to prepare for regulating carbon removal next year.

So far, EU member states have adopted very different approaches for managing unconventional measures to remove carbon from the atmosphere. In some, carbon removal has only hesitantly been introduced into climate policy. In others, governments are pursuing pro-active policies and creating new alliances — like those that Sweden, Denmark and the Netherlands are building with (non-EU) Norway.

Removing CO2 from the atmosphere is no substitute for decarbonisation.

Europe's biggest economy — Germany — has been slow to warm to the subject. In 2021, the German government passed a binding target for CO2 removal in land use, land use change, and forestry by 2040 with the amendment to the Climate Protection Act. The initial reluctance was mainly related to concerns that increased CO2 removal measures could reduce the pressure on efforts to curb emissions. In addition, the proximity of removal methods to underground storage (CCS), which is politically controversial in Germany, poses a problem. Accordingly, the technical methods have not yet been explicitly mentioned in the Climate Protection Act. However, the modelling of German reduction paths to greenhouse gas neutrality by 2045 shows that it will not be possible to get by without the use of technical CO2 removal.

A temporary way out of the charged CCS debate could be cooperation with countries that position themselves as importers and suppliers of CO2 storage capacities — but so far there are no concrete political initiatives. This means that the next German government will have to

decide whether — or rather, how — its climate policy will remove CO2 from the atmosphere.

The danger of greenwashing

Carbon removal could be used to weaken climate policy ambitions and shift emission reductions into the future — which makes many non-governmental organisations and decision-makers sceptical. They emphasise the danger of 'greenwashing' emission balances. Indeed, large oil and gas producers are hoping that removing carbon will allow them to emit fossil emissions in the future. However, if the climate targets agreed in Paris are to be achieved, that must not happen

Scientific models for Germany, the EU and globally, unmistakably show that even large-scale carbon removals — equaling 5 to 10 per cent of 1990 emissions — require drastic emission reductions as well. Removing CO2 from the atmosphere is no substitute for decarbonisation. We've got to do both. Political leaders in the EU have even committed themselves to going one step further after achieving net zero: They are aiming for a 'net negative' balance of greenhouse gas emissions.

That won't happen if emissions reductions are pitted against carbon removal.

An ambitious climate policy must make clear that it is misguided to hope that carbon removals will allow us to continue to extract fossil fuels. At the same time, future policy must proactively increase the potential to remove carbon. Innovation requires serious support. Clear objectives and incentives are needed to establish high permanence standards for carbon removals, along with regulations to ensure that CO2 removals are undertaken in addition to, and not instead of, emission reductions. Such domestic political initiatives are all the more important as more and more attention is being paid to using CO2 removals in other countries.

We need climate pioneers to draft ambitious and credible policy. The coming years will show if the EU can set such a standard.



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