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A Vision for the responsible deployment of Carbon Dioxide Removal

Six steps and policy recommendations

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Introduction

The climate policies and targets for 2040 and 2050 as well as the regulations for the deployment of Carbon Dioxide Removal are being currently discussed and shaped in the European Union and globally.

Thus, there is a need for a clear vision of how and to what extent we can use technologies and practices for Carbon Dioxide Removal (CDR) in a sustainable and responsible way, to supplement drastic emission reductions.

Since 2020, NEGEM project has published a significant amount of multidisciplinary scientific results on the responsible use of CDR.

Based on those results, the project aims at contributing to the current climate policy debate, with the formulation of the NEGEM Vision, co-created by both project partners and other stakeholders, to provide insight for policymakers, industrial stakeholders, and the scientific community.

A summary of the NEGEM Vision is provided in the next pages.

Read the full document **here**

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1

Carbon Dioxide Removal as supplementary measure to emissions reduction

To meet the climate goals of the Paris Agreement, drastic, immediate, and sustained reductions in greenhouse gas emissions are needed.

To keep the warming at 1.5-2 °C, **carbon dioxide removal (CDR)** technologies and practices are needed but should only be relied on as a **supplementary measure to emissions reduction**.

The smaller the residual emissions are, the lower the demand for CDR will be.

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2

Both technology-based and nature-based CDR are needed

Technical solutions with **storage at geological time** scale provide **permanent CDR**, which is needed to reach climate neutrality.

Nature-based CDR methods provide **synergies** between climate change mitigation, the international targets for **nature restoration** and the broader **Sustainable Development Goals**.

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3

A portfolio approach should be adopted to deploy CDR at scale

To respond to environmental and social challenges, a portfolio of CDR methods is needed to balance the impacts.

A large portfolio of CDR methods together with global cooperation will enable cost-effective mitigation pathways.

International cooperation allows the usage of CO2 transport and geological storage facilities in an efficient manner.

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4

Science-based policy and monitoring framework

A **responsible implementation** of CDR, **balancing** between the targets for climate change mitigation and the protection of other **planetary boundaries**, is guided by **science-based evidence**, as well as clear and transparent policy and monitoring frameworks.

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Stakeholder dialogue for social licence to operate

Continuous interaction between different stakeholders, as well as a system perspective in regulation design, will enable a **social licence to operate** for CDR methods.

A growing number of regions, countries, businesses, and other stakeholders need to form CDR visions within broader visions for climate neutrality, while enabling **continuous R&D efforts** and establishing **commercialisation mechanisms** for CDR methods.

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Lay the ground for deployment at scale

The industrial deployment of CDR methods should start in the 2030s, to **prepare for a large-scale deployment with permanent storage** by 2050s. However, dependence on CDR should be kept to a minimum.

As the amount of permanent carbon removals is likely a scarce resource, counterbalancing of residual emissions should be achieved at a broader system-level, rather than at country or corporate level.

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Key policy messages

1. Separate policy targets for greenhouse gas reductions, land use sector (LULUCF), and technical CDR that leads to permanent storage, **are needed** to guarantee balanced contributions to climate change mitigation.

2. An **equitable and fair allocation** of the CDR targets between countries and regions is needed.

3. Permanent CDR is required to achieve climate neutrality. The carbon dioxide storage time and vulnerability to intended and/or unintended release of carbon are essential.

4. A cost-efficient implementation of CDR is enabled by a large **portfolio** of CDR methods, together with **international cooperation** on CDR regulation, and CO2 storage and transport systems.

5. The implementation of **nature-based solutions should be accelerated immediately**, especially when co-benefits can be linked to targets of nature restoration and Sustainable Development Goals.

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Key policy messages

6. Technical solutions such as bioenergy combined with carbon capture and storage (BECCS) and direct air capture and storage (DACCS) **start to scale up from 2030-2040**, their highest level of deployment likely taking place between 2060 and 2070s.

7. The deployment of technological solutions for CDR needs to **start from 2030's** to provide removals at scale by 2050 and later.

8. Sustainable **BECCS** applications could be deployed in a relatively short time frame by **using residual biomass feedstock** and the **capture of point source emissions of biogenic CO2** e.g. from existing and future installations such as biorefineries and pulp- and paper industry.

9. The BECCS technologies vary from combined heat and power production, to bioliquids and biogases, instead of using BECCS mostly in power plants.

10. Monitoring, verification, and dynamic risk and liability mechanisms are needed to ensure CO2 storage.

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Join us for the NEGEM final event

Visions and Pathways for Carbon Dioxide Removal in the EU

18 April 2024, Brussels

Discover the agenda and register

Link in description

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