

## EUROPE NEEDS A DEFINITION OF CARBON DIOXIDE REMOVAL – ZEP REPORT

The European Union has set a target to reach net-zero greenhouse gas (GHG) emissions by 2050. The legally binding European Climate Law takes into account the role of carbon dioxide removals: “while greenhouse gas emissions should be avoided at source as a priority, removals of greenhouse gases will be needed to compensate for remaining greenhouse gas from sectors where decarbonisation is the most challenging.”

### What is Carbon Dioxide Removal?

Carbon Dioxide Removal involves taking CO<sub>2</sub> out of the atmosphere, where it contributes to climate change, and putting it in a location where it will not affect the climate for an extended period of time. The aim is to reduce the concentration of CO<sub>2</sub> in the atmosphere. This can be achieved through natural and technological means.



### This report:

- Provides clear, concise definitions of commonly used terms around Carbon Dioxide Removal.
- Gives an overview of existing technologies and their potential for emissions reduction.
- Identifies some examples of European industrial plants that have the potential to remove carbon from the atmosphere.
- Advocates for European CO<sub>2</sub> transport and storage infrastructure – a real enabler for large-scale carbon dioxide removals.



Achieving net-zero emissions requires a net balance between emissions and removals from the atmosphere. There are four principles that must be met for any practice or technology to be commonly considered as achieving Carbon Dioxide Removal. (This report looks at principles 1 and 2, and a second report will address principles 3 and 4)



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

## Terminology around Carbon Dioxide Removal

The terms **Greenhouse Gas Removal (GGR)** and **Negative Emission Technology (NET)** have been used to describe the same or similar processes and are somewhat interchangeable terms.

- **Greenhouse Gas Removal** refers to the removal of all GHGs. However, the effect of CO<sub>2</sub> and other GHGs on the climate are not entirely 'like-for-like' and the nature of their accumulation in the atmosphere is also quite different. In addition, efforts to remove other GHGs are less clear. To avoid confusion and possible loopholes, it is best to address the removal of CO<sub>2</sub> on its own.
- **Negative Emissions** refers to the concept of removals – the opposite of emissions. The term does not refer specifically to any GHG.



- **Negative Emission Technologies** refers to specific technologies or processes which can be used to achieve Carbon Dioxide Removal.
- The Paris Agreement target sets out to 'achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century'. **Net-zero** represents this balance between emissions and removals. (Reducing emissions remains the absolute priority for the mitigation of climate change.)

## Policy recommendations

Developing cross-border European CO<sub>2</sub> transport and storage infrastructure is key to reach the EU's target of net-zero GHG emissions by 2050. It will enable clean, competitive energy and industrial sectors, early large-scale clean hydrogen, and will deliver significant volumes of carbon emission reductions and removals.

A clear signal from policymakers is necessary to support and incentivise the deployment of CO<sub>2</sub> infrastructure. Large public investments will be needed in the initial stages, and favourable policy framework should be put in place on a European level to support industries, energy companies, and member state governments.

- Revision of the Trans-European Network for Energy (TEN-E) regulation should be based on the European Green Deal and encompass the principle of climate neutrality by 2050. It should:
  - Enable CO<sub>2</sub> transportation by several modalities – ship, barge, truck, rail.
  - Include CO<sub>2</sub> storage – an essential component of a full-chain CCS project.
- Retrofitting of existing gas pipelines should be promoted and facilitated.
  - National decarbonisation pathways outlined in the National Energy and Climate Plans (NECPs) should include deployment of CO<sub>2</sub> transport and storage infrastructure and align and coordinate with the European Hydrogen Strategy. Clean hydrogen produced from natural gas with CCS is a viable option for industrial decarbonisation that will require CO<sub>2</sub> infrastructure.

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