

Carbon Dioxide Removal: Definitions Required

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CARBON NEGATIVE - COUNTING THE CARBON

The role of carbon negative is to reduce the stock of CO₂ in the atmosphere.

+ Emissions, *the process increases the stock of CO₂ in the atmosphere (gas power plant)*

/ Mitigation, *substantially reduced or zero CO₂ process. The atmosphere is unchanged (CCS)*

- Negative, *the process results in lower concentration of CO₂ in the atmosphere (Bio+CCS)*

- Getting the basic definition correct is a very first step.
- This is not complicated so I am surprised the confusion is here the original invitation
- If the brussels bubble can not count / distinguish the difference then we have a big problem

A DEFINITION OF CARBON NEGATIVE

A prerequisite for a debate on policy of Carbon Negative requires a **Definition of Carbon Negative**

CDR is “carbon dioxide removal of greenhouse gas emissions from the atmosphere and sequestration of it in perpetuity” Carbon Dioxide Removal and Reliable Sequestration (2015)

A standard Framework and a Cradle to Grave Life Cycle Assessment are an absolute requirement for assessing Carbon Negative

- E.g. Steel Slag can mineralise CO₂ – is it now carbon negative?
 - But steel slag can only absorb a tiny % of the CO₂ released in the production of steel ~ so very carbon positive?
- When are negative emissions negative emissions? (Tanzer and Ramírez 2019)
<https://pubs.rsc.org/en/content/articlelanding/2019/ee/c8ee03338b#!divAbstract>

DIVERSE TECHNOLOGIES DIVERSE POLICY IMPLICATIONS

Carbon Negative is very diverse from technological to nature based solutions

You need to understand the processes and the technologies to begin to think of rational incentive schemes

- The potential unintended consequences are large !
 - Example:
 - CDR in the ETS – A demand pull for bio consumption via Bio-CCS to provide Carbon Negative. When the value of Carbon Negative is higher than that of the Bio energy value we have a perverse incentive – Burn and waste #Cash for Ash
 - Afforesting areas such as wetlands and bogs (unused land) can reduce carbon stock releasing much more CO₂ than taken out of the atmosphere = + increased emissions



CARBON NEGATIVE IS A LIMITED RESOURCE

Carbon negative is a limited resource - any policy framework needs to reflect this

- The more we know of the constraints the smaller the realistic potential will become – land, biomass, access to geological storage, LCA, etc.
- In the LTS & IPCC etc. – Carbon Negative has a role in both bringing us below the curve (rewinding climate change) and in compensating for very difficult areas to tackle emissions (e.g. parts of the food sector)
- => Carbon Negative can not “offset” large emissions intensive sectors such as oil and gas production
- This would consume a Carbon Negative Resource with little climate benefit



A DEFINITION OF CARBON NEGATIVE

There is a lot more zero than net in net-zero decarbonisation goals

- Deeply Decarbonising today – such as CCS on industry reduces our future reliance on Carbon Negative
 - This strategy puts in place the CO₂ transport and storage system can be a part of a carbon negative system as needed / desired.

Carbon negative can aid us in climate

- But its critical we get the basic accounting and definitions correct
- As a general rule carbon negative policies and mitigation policies should be kept distinct.

Carbon negative techniques are **NOT** a Get Out Of Jail Free



Carbon negative techniques **CAN** make Mitigation More Effective

