NEGEM

Quantifying and Deploying Responsible Negative Emissions in Climate Resilient Pathways

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On the 10th of November 2022, Bellona hosted an event on Global Governance of Carbon Dioxide Removal: carbon accounting of transboundary projects, moderated by **Mark Preston Aragonès**, Policy Manager at Bellona Europa. Nestled in the Blue Zone of COP27[1], where access is restricted to delegates with UNFCCC accreditation, in Sharm El-Sheikh, Egypt, the Bellona Pavilion welcomed **Nils Anders Røkke**, Executive Vice President, Sustainability, at SINTEF and **Matthias Honegger**, Senior Consultant at Perspectives Climate Group to broaden the discussion after **Dr Samantha Eleanor Tanzer**, CDR Research and Technology Manager at Bellona Europa presented on a soon-to-be-published NEGEM project draft[2] report on global governance of carbon dioxide removal (CDR). With a capacity of around 40 people, the room was full, with more participants standing by the entrance. This event at COP27, under the auspices of the Horizon 2020 project, NEGEM, looked to highlight the role of CDR in long-term climate targets and the transboundary challenges that arise from deploying them across countries.

The recording of the event is available here.

1 Opportunities and Challenges of CDR

Setting the stage, **Dr Tanzer** touched upon the role CDR plays in achieving net zero targets, saying:

> *"Getting to a net zero world is a huge challenge that relies primarily and always on massive and rapid reductions of the greenhouse gases that we emit to the atmosphere. But carbon dioxide removal systems, that physically extract and permanently store carbon dioxide out of the atmosphere, will be an integral, if limited, part: in speeding those reductions towards net-zero; at balancing residual fossil emissions and other greenhouse gases at net-zero; and then extracting historical emissions of greenhouse gases to reduce atmospheric concentrations of CO_2 in the long run."*

Given their impactful role in net-zero dates and beyond, CDR methods are diverse and varied in CO_2 extraction and storage, ranging from biological or chemical processes to mineralisation or geological storage. This diversity of methods proves to be a challenge as a "one-size-fits-all" approach towards accounting, monitoring, and verifying will not be possible. This is compounded by the complexity of long-chain CDR systems, encompassing a wide range of activities such as energy required for transport and other services, which all impact need to be included into the accounting of a removal activity.

In the second presentation, **Matthias Honegger** touched upon the ongoing discussions on Article 6.4 of the Paris Agreement where the Supervisory Board has been asked to provide guidance on removals. He highlighted the contentious mention of ocean and product reservoirs in the proposed definition for CDR in the preliminary text. The text, which differs from the established IPCC definition, contains additional requirements for removals, on areas such as monitoring, reporting and verification,

[1] COP27 is the 27th Annual 'Conference of Parties' to the United Nations Framework Convention on Climate Change (UNFCCC). It serves as the highest governing body for matters relating to climate change, relying on a consensus between all participating countries.
[2] The final report will be published at negemproject.eu

possible reversals and negative social and environmental impacts. In terms of the legal text, Honegger stated that there is an emerging agreement for considering a removal a mitigation outcome “upon capture with intent of long-term storage”. He mentioned that this is an additional complication since the EU’s carbon removal certification is likely to provide yet another definition of removals.

2 Getting accounting right

The maths behind the accounting is straightforward **Dr Tanzer** explained:

> *"Only the **net** carbon dioxide removal measures the decrease in atmospheric greenhouse gases. which is of course the point of CDR. [It's] also really important to make sure that we are only measuring these physical flows of removals and emissions. We have to make sure that we're only counting physical flows of greenhouse gases, the extraction, the storage, the emissions. [Emission] avoidance and reduction should always be accounted for separately."*

Tanzer continued to highlight three key considerations for a good CDR accounting system, as elaborated in the draft report on Global Governance of Carbon Dioxide Removal.

1. A robust definition of CDR that accounts for the physical extraction of CO_2 from the atmosphere, the amount permanently stored and all the associated emissions with the entire process.
2. Clear metrics to CDR, which also means clearly separating measures that are reductions and avoidance over removals.
3. Frameworks for monitoring and verifying removals that are science based.

However, the current form of legal text under UNFCCC that defines a mitigation outcome across borders is ambiguous. **Honegger** pointed out that there needs to be a clarity on who can claim credit for mitigation outcomes and inconsistent handling of this credit would complicate the ability to appropriately track carbon flows.

Nils Anders Røkke, participating alongside Honegger in a panel discussion, touched on the need to think about new accounting methodologies to trace CO_2 along the whole value chain and the work SINTEF does using blockchain to achieve this. He points out the need for such a robust system of accounting to avoid false claims.

3 Gaps in Global Governance

At a global level, appropriate accounting for emissions or their reductions aligns physical sciences with climate responsibility. An effective framework for accounting for this climate responsibility requires clarity in four key areas: the goals defined, the metrics and methodologies used for accounting, the jurisdiction and finally the liability for said emissions.

Using the example of a Bio-CCS[3] value chain, **Dr Tanzer** expanded upon the complexity of accounting for net CDR in a system based on territorial accounting. Under the reporting guidelines of the IPCC, accounting becomes more complicated. Even if the net CDR might be appropriately accounted for, the liability and jurisdiction among the countries involved in the value chain are handled differently. There is added ambiguity when dealing with emissions from international transport, which are counted but not attributed. The complication stems from having to decide which emissions and removals happen

[3] Sometimes also referred to as BECCS (Bioenergy with Carbon Capture and Storage). Bellona uses the broader term 'Bio-CCS', which also includes non-energy uses of biomass.

in whose jurisdiction, leading to the larger question that hangs over CDR accounting: Whose removal is it?

Who claims credit for a removal is still a difficult question to answer, especially with a value chain that crosses borders. Moreover, the gap within the accounting of CDR at this scale is quite evident:

> *"There is an inherent dichotomy between the territorial accounting framework that's used for national and international emissions reporting and life cycle system accounting needed for CDR"*, said **Dr Tanzer**.

The attribution of emissions and removals, according to life-cycle accounting frameworks dictate that they be attributed to the CDR system, while territorial accounting frameworks attribute emissions within the borders to the nation itself. These parallel methodologies point to the root problem in not being able to definitively attribute removals to a particular stakeholder.

Expanding on the ambiguity regarding liability, **Honegger** added:

> *"The challenge I think, in practical terms, that we have before us is how to consider and acknowledge and legally and economically deal with the fact that the storing country adopts a liability by storing CO_2 from another country. And as a host country I would imagine Norway [cited as an example] would need to enter into an agreement with the company that is actually affecting that storage in order, perhaps through insurance or some other agreement, to account for that and actually make sure that the storing entity has all the incentives it needs, and all the liability taken care of. And of course, then looking at this transaction as a service agreement in a sense that it also needs to consider for that fact and compensate essentially for the liability that is being adopted."*

4 Closing core gaps and moving forward

Dr Tanzer concluded her presentation providing multiple recommendations. To build a foundation to tackle transboundary accounting issues, several fundamental steps should be taken:

1. An international agreement on a robust definition of CDR.
2. Methodologies to monitor and verify heterogenous CDR systems.
3. Science-based frameworks to account for non-biological removals and non-geological permanent storage.
4. Explicit treatment of delayed extraction, storage permanence and reversal risk.
5. Liability for international transport emissions.
6. Explicit CDR targets that sit on top of emission reduction targets.

Upon this foundation, more nuanced questions can be answered by putting the following in place:

1. Framework for attributing ownership of whole chain CDR emissions and removals.
2. Guardrail regulations to ensure resources are used sustainably.
3. Avoiding over-exploitation and unjust distribution of CDR use.

4. Deciding how to take responsibility for historical emissions.

A separation of frameworks for accounting for CDR from territorial emissions as established under the IPCC framework forms a valid means of counting the actual physical flow of carbon.

Honegger further pointed to bilateral agreements under Article 6.2 of the Paris Agreement that help develop high-quality pilot activities for CDR. He explained that these pilot projects, which can be publicly scrutinised by civil society organisations, can help identify issues and set early examples for robust and consistent accounting frameworks.

Røkke on what steps need to be taken moving forward reiterated the need to focus on the four definitional principles of removals. In addition, he mentioned the worrying developments of lobbyists in the EU pushing for measures that are not removals to be attributed as such, highlighting once again the issue of false claims:

> *"I think it's really important to keep to these four principles of physical removal, that we have good and consistent rules on accounting and that we do not enter into the kind of pathways which actually adds emissions to the atmosphere."*

Comments were raised from the audience, questioning the validity of attributing a mitigation outcome upon the capture of CO_2 with intent of storage, rather than at the point of permanent storage. The general takeaway from the session was the need to establish clearer guidance on how to define and account for CDR, both nationally and internationally, as well as clarifying the accounting rules for permanent biogenic CO_2 storage and for direct extraction of CO_2 from the atmosphere.