

From: Matthias Honegger <honegger@perspectives.cc>

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To: Supervisory-Body <Supervisory-Body@unfccc.int>

Cc: Sandra Johanna Dalfiume Boner <dalfiume@perspectives.cc>; Juliana Maria Kessler <kessler@perspectives.cc>; Laila Darouich <darouich@perspectives.cc>

Subject: Call for input 2022 - activities involving removals under the Article 6.4 Mechanism of the Paris Agreement.

dear Sir/Madam

Please find attached submission by Perspectives Climate Research regarding removals under the Article 6.4 Mechanism of the Paris Agreement.

best regards,

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Matthias Honegger

Senior Research Associate

Perspectives Climate Research gGmbH
Hugstetter Str. 7 | 79106 Freiburg | Germany

M: +49 (0) 176 644 23 919

www.perspectives.cc

Input by Perspectives Climate Research' on

Activities involving removals under the Article 6.4 Mechanism of the Paris Agreement

Perspectives' team is concerned that the draft requirements indicate **some confusion on fundamental terms and concepts** – while already outlining some issues in excessive detail. The foundational and definitional work should be prioritized as otherwise later decisions will take place on a flawed basis.

We believe the Art. 6.4 work on 'removals' should be conducted with a clear understanding that the scope is for **removals of all greenhouse gases** addressed by the UNFCCC. This is so despite a near-term practical focus on CO₂ as other GHG removal methods may become more relevant over time.

Reversals concern both *removals* as well as *emissions reductions* when they involve storage of a GHG. Reversals thus need to be addressed in both contexts!

The working group needs to deepen its **engagement with experts and stakeholders** on GHG removal in order to deepen its understanding of key design options and to base this understanding on long-term experiences in carbon markets (voluntary and compliance). This engagement should in particular involve independent organizations (including buyers of removal units) that do not directly benefit from one option or another.

The working group needs to ensure its work provides a **sufficient foundation for any future decisions** on removals under Art. 6.4 and does so without inappropriately locking in design options that may prove incompatible with its mandate upon further analysis.

The working group needs to be mindful of its **signaling role toward other processes** unfolding in parallel such as guidance and regulation by national regulators seeking to shape the role of domestic and international carbon markets within their domestic policies as well as regional regulatory frameworks such as the EU's carbon removal certification mechanism.

Key methodological issues of removals – not adequately addressed to date

The documents lack in clarity as to the various options that the Art. 6.4 working group may adopt to in dealing with some of the most central issues in regards to GHG removal, including notably:

- Recognizing that not all biomass may be appropriately viewed as having a zero emissions factor given multiple influencing factors such as upstream land-use change induced through additional demand, land-use related GHG emissions in biomass production, and transportation-related emissions: How to refine biomass emissions factors such that these factors are consistently considered including identification of potential monitoring requirements in biomass sourcing (there does not appear to be a clear best-practice approach to follow, but the working group should carefully examine the issue given that it holds the potential to completely undermine the credibility of biomass-based removals)
- Appropriate setting of project boundaries for removals
 - Upstream: a) notably whether to include biomass generation, and b) whether to consider embodied carbon (e.g. sorbent materials that require regular replacement).
- Economic leakage
- Physical reversal and non-permanence
- Liability including during transport (also in international territories) and storage

- Accounting in national GHG inventories
 - in case of transboundary projects (where does a removal occur)?
 - In which specific (sub-)sector (e.g. DACCS in industry)?

Key sources of lessons learned

- The working group needs to draw on good practices built on decades of work in carbon markets and do so consistently both for land-use related sinks and removals as well as those removals reliant on geological storage of CO₂.
 - Regarding geological storage: leverage the full ensemble of guidance from the CDM
 - For land-based removals: fully leverage expertise and experience from REDD+
- Regarding lessons learned on dealing with reversals, the working group should consider the experiences made with regards to buffer stocks including under Californias' LCFS and the VCS. Independent observers have commented on their respective challenges and opportunities – observations, which should be taken very seriously when building out the basis for Art. 6.4 work on removals.
 - For example, buffer pools are generally regarded as an appropriate approach to dealing with reversals, but experiences in case of Verra and the California LCFS buffer reserves have proved their level to be insufficient due to significant forest fire activity.
- Over time there will be national level guidance (such as e.g. Finnish guidance on removals that is currently under preparation), which may allow further enriching Art. 6.4 treatment of some of these complex issues
- The working group should also consider innovative approaches for aligning carbon markets with net-zero emissions ambitions such as the ambition coefficient proposed by Michaelowa et al. ([2022](#)).

Holding period, tonne-years, time horizon, and permanence period

It concerning that the working group is considering tonne-year accounting without proper definitions given that this accounting approach to reversals can undermine the credibility and environmental integrity of carbon markets. This approach has not been requested by subsidiary body members and is without precedent in any carbon crediting mechanism in the UN system. So, if it is to be pursued, the conditions need to be very carefully defined.

Permanence of carbon removal and preservation of carbon stocks is of utmost importance for climate change mitigation (see Ruseva et al. 2020)¹.

Unsustainable “short-termism”, i.e. the generation of a significant amount of credits during a period of only a few years after which the reservoirs are destroyed needs to be avoided at all cost.

Tonne-year accounting should be based on a conversion rate that draws on an equivalence period of 100 years. A sufficiently long time period for equivalence is crucial to ensure environmental integrity of those approaches that do not have inherent permanence (inert materials). Several proposals have been made to define a period after which a reversal of a removal would be “unproblematic” because compared to an emissions reduction they would no longer be considered to have a negative effect on climate. This is what we consider the key question to ensuring environmental integrity.

The calculations of the “equivalence period” of an emission reduction and a removal with reversal is theoretically tied to a) the residence time of a CO₂ emissions pulse in the atmosphere and to b) the

¹ Ruseva, Tatyana; Hedrick, James; Marland, Gregg; Tovar, Henning; Sabou, Carina; Besombes, Elia (2020) : Rethinking standards of permanence for terrestrial and coastal carbon: implications for governance and sustainability. Current Opinion in Environmental Sustainability, 45, 69 - 77.

availability of “backstop technologies” that generate an unlimited amount of mitigation at a specified price-point.

Moura Costa and Wilson (2000) found an equivalence period of 55 years based on a) but did not look at b) the availability of a backstop. Herzog et al. (2003) find that if climate damages require a fixed cumulative emissions limit (a carbon budget) and there is no backstop, then a storage option with even very slow leakage has limited value relative to a perfectly permanent storage option. The reasoning of Herzog et al. (2003) thus leads to proposals of equivalence periods of 1000 years or more (Carbon Plan 2021). As a compromise (using periods used in ‘Global Warming Potentials’, we support proposals for a minimum of 100 years.

Carefully identify the appropriate level of detail in recommendations

The working group should aim to lay a robust foundation, but avoid locking-in specific approaches to methodology development before fully understanding their implications.

Overly specific recommendations should be avoided unless they can be operationalized – within a comprehensive framework that clearly represents the best possible resolution based on full engagement with all lessons learned – without adding confusion.

Example, where overly specific recommendation is not well embedded in an unambiguous context raising more questions than answers:

§18 – Simplified monitoring and reporting is shall [sic] be allowed when the purpose of monitoring is to ensure continued existence of the carbon stocks and not to seek verification of additional carbon stocks.

Lack of clarity regarding long term monitoring of reversals (beyond the project crediting period)

The above paragraph raises the much more fundamental question whether, how long, and at what level of detail storage sites of various types have to be monitored for leakage (and what the consequences of any identified leakage should be). While the CDM provisions on CCS foresee the allocation of the responsibility to the state after a fixed time period, these issues should also be clarified here.

Given recent innovations toward the inherently durable (chemically inert) storage of CO₂ in basaltic rock formations (Wu et al., 2021)², the working group should also consider whether there can be a differentiation of (long-term) monitoring requirements as a function of levels of inherent permanence (varying chemical properties of storage sites) and how the continuation of such monitoring is enforced after project participants no longer receive credits. The guidance under the CDM regarding CCS includes some answers, which the working group should consider adopting (with modification if appropriate).

Section 2. *Prevention of seepage/reversal and its possible negative impact* is very detailed and appears to be mirroring parts of the guidance developed under the CDM in regards to CCS. The working group should make it clear, where it follows and adopts regulation or guidance previously developed and where it deviates from such frameworks. Where it deviates it should clearly present its reasoning in order to demonstrate a robust basis for future decisions that best build on previous provisions and expectations.

² Wu, H., Jayne, R. S., Bodnar, R. J., & Pollyea, R. M. (2021). Simulation of CO₂ mineral trapping and permeability alteration in fractured basalt: Implications for geologic carbon sequestration in mafic reservoirs. *International Journal of Greenhouse Gas Control*, 109, 103383.

Voluntary carbon market initiatives focussed on removals as sources of lessons learned for Art. 6.4?

The working group should proactively engage with and collect emerging 'lessons learned' regarding crediting of removals – including from emerging buyers such as [Microsoft](#), [Stripe Climate](#), [Frontier Climate](#) and the [Milkywire climate fund](#).

The [CCS+ initiative](#) is also – besides developing an ensemble of VCS baseline and credit methodologies – developing guidance and foundational documents that offer foundational insights into the design and operation of projects involving geological storage of CO₂ – both for emissions reductions and removals.

The working group should carefully consider other independent assessments by relevant civil society organizations in order to develop a robust profile of the advantages and disadvantages of particular approaches to crediting of removals.

Avoidance of other negative environmental and social impacts through safeguards

Over the past decade, many advances have been made in regards to the use of safeguards to minimize negative impacts and/or enhance the positive benefits of land-based projects. Standards such as the Climate, Community & Biodiversity (CCB)s are widely accepted and have international legitimacy. Along the same line, significant efforts were put into adopting the Cancun Safeguards for REDD+, as well as promoting their understanding and implementation in countries. Also, Jurisdictional REDD+ methodologies recently created (e.g., Art TREES) require activities to be implemented in conformance with the Cancun Safeguards. We advise to build on the approaches developed in the VCM and REDD+ national programs for how to address these risks. The working group should consider whether

- i) certain existing methodologies, e.g. CCBs, could be suggested as an accepted approach/methodology to deal with environmental and social risk, and
- ii) whether it may recommend a list of risks/safeguards (following the REDD+ Cancun safeguards approach) that all removal methodologies would need to address and
- iii) explore how the requirement for addressing social and environmental risk in removal projects could interoperate with Safeguard Information Systems that countries are developing for REDD+.

These approaches require more study – it is advisable for the SB to continue working on the matter of social impacts and safeguards throughout 2023.