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Response to Guidance on the mechanism established by Article 6, paragraph 4, of the Paris Agreement, specifically the A6.4-SB004-AA-A04 Information note: Removal activities under the Article 6.4 mechanism

This submission outlines the response of the Gulf Coast Carbon Center (GCCC) at The University of Texas at Austin regarding the Information note on Removal activities under the Article 6.4 mechanism.

We are a research group that has been developing CO_2 storage technology for two decades. We are concerned that the A6.4-SB004-AA-A04 Information note, especially section 3.2 on eligibility, is not informed by scientific evidence, but rather by opinion. Specifically, we are concerned that valid removal methods might be excluded from the mechanism based on statements made in Section 3.2, paragraph 39 a*: "Some stakeholders suggest that engineering-based methods should not be made eligible under the mechanism, citing the following reasons:"* and in Section 3.2 paragraph 39 b: *"Some stakeholders suggest that only the well-established land-based activities should be made eligible under the mechanism"*. Most of the arguments that follow these statements (if not all) are not backed up with peer-reviewed scientific literature, but by an opinion piece. Whereas anyone has the right to an opinion, opinions should not be treated as truth if there is no supportive evidence base. Thus, seeing an information paper that cites opinions that are not science-based is concerning.

The above statements that recommend the exclusion of engineered removals are directly opposed to the IPCC Special Report on Global Warming of 1.5°C which states that all removal technologies have pros and cons and multiple removal technologies are needed: *"Most CDR options face multiple feasibility constraints, which differ between options, limiting the potential for any single option to sustainably achieve the large-scale deployment required in the 1.5°C-consistent pathways described in Chapter 2 (high confidence). Those 1.5°C pathways typically rely on bioenergy with carbon capture and storage (BECCS), afforestation and reforestation (AR), or both, to neutralize emissions that are expensive to avoid, or to draw down CO_2 emissions in excess of the carbon budget {Chapter 2}*".

- Regarding Section 3.2, paragraph 39 a ii – *"Most engineering-based removals depend upon CCS as the storage technology which poses significant risks and uncertainties and serves the primary purpose of prolonging the continued use of fossil fuels (P-12:c, R-43a)."*

  This statement is also misinformed. Our GCCC group at the University of Texas at Austin has been researching and developing geological CO_2 storage technology for over 20 years. We were the first group to inject CO_2 into a saline aquifer in the USA which formed the basis for the United States Regional Carbon Sequestration Partnership Program, Since then, the United States has used its academic institutions and national laboratories to methodically characterise national CO_2 storage resources and has upscaled CO_2 capture and storage to injections of nearly 2 million tonnes per annum (Mtpa). As of 2020, the USA had stored and monitored over 20 million tonnes of CO_2 in geological formations. There are currently at least 10 CCS facilities operating the USA, with some 30 projects at various stages of planning (Beck, 2020). In the world, some 20 projects are capturing around 40 Mtpa and upscaling is happening at rapid pace.

Whereas the projects we cite are not engineered removals, but primary reductions, geological storage is common to both. Companies in the USA are moving quickly to upscale DACCS and BECCS. Either way, whether a project is doing removals or primary reductions from industry, the accounting for storage is straightforward as referenced in the 2006 IPCC GHG Guidelines. As CO_2 is injected into the geological pore space, it is easily measured with conventional and established metering technology. Monitoring, verification and accounting protocols (also set forth in the IPCC GHG Guidelines, 2006) ensure that the CO_2 remains stored. Over our 20+ years researching, developing and implementing CO_2 storage, we see that storage extremely effective and robust with no losses or environmental impacts from storage to date. This is why we are perplexed when storage is labelled as "significantly risky" and "uncertain". This can only be the opinion of uninformed stakeholders.

Also, as a point of clarification, CCS, whether it is used on an industrial facility for primary emissions reduction or as a removal technology, does not serve "*the primary purpose of prolonging the continued use of fossil fuels (P-12:c, R-43a)".* In fact, according the 2005 IPCC Special Report on Carbon Dioxide Capture and Storage, the primary purpose of CCS is "*as an option in the portfolio of mitigation actions for stabilization of atmospheric greenhouse gas concentrations*". CCS is used on all types of fossil and non-fossil fuel industries (e.g. cement, iron and steel) (IPCC, 2005). Any speculation as to other motivations for using this technology have no place in an unbiased policy arena.

- Regarding Section 3.2, paragraph 39 a v: *"The geological storage of CO_2 will be performed on very few jurisdictional territories, at least in the foreseeable future…"* and Section 3.2, paragraph 39 a xi: "*Most engineering-based removal activities do not contribute to sustainable development, are not suitable to be implemented in the developing countries and cannot contribute to reducing the global cost of mitigation. These activity types therefore do not fulfil any of the objectives of the Article 6.4 mechanism…"*

  The GCCC has been operating within the international CCS ecosystem for two decades and within the UNFCCC for at least a decade, inputting science-based information on CCS into the COPs since before 2011 COP17, when a set of modalities and procedures were established and accepted for the safe storage of CO_2 under the Clean Development Mechanism of the Kyoto Protocol. We are currently working with eight developing countries to help them assess and/or develop CCS to achieve their long-term strategies, at their request. This evidence directly refutes the statement that geological storage will not occur in developing countries. Any country with the appropriate geology can undertake geological storage. High-level global source-sink matching assessments (Wei et al., 2021 and Ringrose and Meckel, 2019) indicate that storage is feasible in saline aquifers all around the world, both onshore and offshore.

- Furthermore, and adding a response to Section 3.2, paragraph 39 a i: *Engineering-based removals are speculative, cannot be deployed at scale, and pose significant risks to human rights and the environment (P-12:b);*

  To consider community and societal impacts near project sites, we are currently implementing workforce job creation, diversity, equity and inclusion principles and the Justice 40 initiative which ensures economic benefit for communities near projects. We are seeing many communities embrace the economic opportunities that come with these projects, once they become aware of the scientific evidence on the safety and effectiveness of geologic CO_2 storage. So, the blanket statement that engineering-based removals such as DACCS pose significant risks to human rights and the environment is not based on the scientific literature which says more correctly, that "Finding the optimal CDR roadmaps will require regional assessments and cooperation among countries to design sustainable supply chains for NETs, DACCS and BECCS (Erans et al., 2022). Like any technology, there are positives and negatives, and for all technologies, countries will need to seek the most sustainable approach to their deployment.

- Regarding Section 3.2, Parag 39 (a) (iii) - *It is estimated that direct air capture facilities are currently capturing 0.01 MtCO_2 per year (P-15:a), while the conventional land-based activities are removing 2,000 MtCO_2 per year (R-50:c);*

  Whereas it may be true that capture rates for DACCS are currently relatively low, IPCC AR6 states that DACCS has the potential to remove 5–40 GtCO_2/yr –of CO_2. The document says, *"Despite limited current deployment, estimated mitigation potentials for DACCS, enhanced weathering (EW) and ocean-based CDR methods (including ocean alkalinity enhancement and ocean fertilisation) are moderate to large. As a median value [5–95th percentile range]. (medium confidence)".* Significant efforts to upscale DACCS and BECCS have recently been launched by global governments and commercial entities, and the technologies are in rapid development. For example, Mission Innovation has launched a global push for carbon dioxide removal (CDR) pilot-scale tests and demonstration projects. So far, six countries have committed to fund at least one 1,000+ metric tons of CO_2/year CDR project by 2025 and to contribute to a collective goal of $100 million for CDR pilots and demonstrations by 2025.

- Regarding Section 3.2, Parag 39 (a) (iv). *In practice, CCS projects have repeatedly failed to meet optimistic and ambitious CO_2 capture targets set by proponents (P-12:f, R-43a), even though these were to capture carbon from point sources of emissions where CO_2 concentration is about 100 to 200 times higher than CO_2 concentration in the free atmosphere; and* Section 3.2, Parag 39 (a) (viii) "*The value of future removals expected from technologies that are uncertain in terms of their scale and roll-out is difficult to assess (R-12a)"; and* Section 3.2, Parag 39 (a) (ix)" *The feasibility of most engineering-based CO_2 removal technology is highly uncertain (R-53:a)"*

  The IPCC AR6 WGIII report states "despite limited current deployment, estimated mitigation potentials for DACCS…are moderate to large (medium confidence). The potential for DACCS (5–40 GtCO_2 yr –1) is limited mainly by requirements for low-carbon energy and by cost (100–300 (full range: 84–386) USD tCO_2–1). DACCS is currently at a medium technology readiness level as many mitigation technologies have been in the past. "Uncertainty" has never been a reason for limiting a promising mitigation technology under the UNFCCC framework.

These are only a few points to illustrate the need for a revision to the note that ensures only a fact-based assessment. We sincerely hope that the UNFCCC holds its high standards for science-based factual information in policy-making above all else. We expect that the next revisions of the information note will assess technologies more systematically and equally.

References

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