From: Ryan Holmes <ryan.holmes@un-do.com>
Sent: Thursday, 25 May, 2023 14:50
To: Supervisory-Body <Supervisory-Body@unfccc.int>
Cc: Simon Manley <simon@un-do.com>; Beatrice Mocci <beatrice@un-do.com>
Subject: Input to SB005 2022 Annotated Agenda and Related Annexes

Dear Supervisory Body,

Thank you for the opportunity to provide input on the Information Note entitled "Removal activities under the Article 6.4 mechanism" (A6.4-SB005-AA-A09 version 0.40). This response is on behalf of UNDO, a UK-based company specialising in Enhanced Rock Weathering (ERW) with the goal of removing 1 billion tonnes of CO_2 from the atmosphere by 2030.

The latest IPCC report has outlined that carbon dioxide removals will be unavoidable to offer the best chance of limiting warming to the 1.5 or even 2°C pathway (IPCC AR6 Synthesis Report p 50) which Article 6 under the Paris Agreement was set up, in part, to achieve. Developing the Article 6.4 mechanism in a manner that will support the regulatory framework for the effective implementation of removal projects will be crucial. However, the information note outlines a series of concerns in relation to engineering-based activities and, more specifically, enhanced rock weathering. Across the areas of monitoring, reporting & verification (MRV), durability, scalability and co-benefits, it can be demonstrated that ERW project developers are able to address these concerns.

MRV

The note outlines that "*Enhanced rock weathering has no known method of monitoring, while there is considerable uncertainty about their environmental and social impacts.*"

There is a growing base of peer-reviewed research papers which outline the scope for mesocosm studies that replicate project-specific climate and soil conditions to quantify the sequestration of carbon. Soil mesocosms incorporate the complexity of field conditions with the added ability to take a wider range of measurements on a higher frequency. This approach is well documented to measure an enhanced weathering signal in a closed system (e.g., Ten Berge et al., 2012; Renforth et al., 2015, Dietzen et al., 2018; Kelland et al., 2020, Pogge von Strandmann et al., 2021; Amann et al., 2020, Amann and Hartmann, 2022; Vienne et al., 2022, Amann et al., 2022). Furthermore, whilst the science around how to best approach the monitoring of the carbon dioxide removal potential of ERW is developing, further large-scale field projects are being conducted and the scientific community in the field is moving toward a consensus on a suitable scientific approach.

Additionally, there are a series of positive social impacts related to ERW, particularly around job creation and food security. Furthermore, as the projects will be based on operations that are similar to those that already exist around quarrying, haulage and spreading the potential social issues will be well known and will be able to be addressed accordingly. Likewise, in-depth, modelling and analyses on the environmental impact of ERW are being conducted to fully understand the effect on ecosystems impacted by the process and to suitably abate any environmental concerns. Examples of how such concerns could be abated include conducting in-depth chemical analyses of all potential rock supplies to ensure that the level of potentially toxic elements does exceed an upper limit, such as those outlined in the EU guidelines for inorganic soil improvers and soil guideline values.

Durability

Durability will be a key component of carbon dioxide removal if the related projects are to have a lasting effect on the climate. The storage mechanism of ERW acts to ensure that the carbon dioxide removed from the atmosphere will be permanently locked away for geological timescales. Durability will therefore be a key differentiating factor when drawing comparisons against other land-based activities for which the removed carbon can be rereleased back into the atmosphere.

Scalability

Table 3 in the note highlights, as a con, that "*Engineering-based removal activities are technologically and economically unproven".* In the case of ERW, such barriers are low. ERW projects rely on the use of existing products and equipment that are already widely available. As a result, there are limited concerns relating to the supply of the requisite technology and infrastructure to initiate the project. Additionally, given that the components of the operations relating to ERW are well understood individually, driving efficiency improvements across the process as a whole when combining these components will ensure economic viability.
Furthermore, global analyses of available rock (Including the United Kingdom, countries in Sub-Saharan Africa, Australia, Canada and within the Pacific North West of the USA) have demonstrated that vast quantities of suitable rock would be available, along with large areas of suitable farmland located close to the related quarries, in countries around the world. As a result, the combination of existing infrastructure, available rock and land, and suitable climatic conditions mean that ERW will have a pivotal role to play in supporting countries to achieve their nationally determined contributions.

Co-benefits

The note outlines that engineered removal activities *"do not contribute to sustainable development, are not suitable for implementation in the developing countries and do not contribute to reducing the global mitigation costs, and therefore do not serve any of the objectives of the Article 6.4 mechanism".* In the case of ERW, this is not the case. Enhanced weathering of silicate rock has the scope to aid in securing food safety, through agronomic benefits, resulting from rock-derived nutrients as outlined in Appendix I of the notes related to co-benefits of the ERW project. Here it is noted that ERW "*can contribute to SDGs 2 (Zero hunger), 15 (Life on land, by reducing demand for arable land), 14 (Life underwater, by mitigating ocean acidification) and 6 (Clean water and sanitation)."* Supporting food security will be particularly significant in the global south where a large portion of the economy is based on agriculture, and where the countries will be most impacted by the damaging effects of climate change. Typically, fertilisers are too expensive for farmers or, when available, can degrade the soil, and negatively impact other ecosystems. Implementing enhanced rock weathering (ERW) projects provides an alternative organic - and cheaper - means of fertilising the soil which could lift millions of people out of poverty by providing jobs and by providing a more reliable supply of food. ERW may therefore be deemed to inherently enable sustainable development both economically and environmentally. Given the carbon dioxide removal potential of ERW, along with the related agronomic co-benefits, such projects can thereby support one of the key objectives of Article 6 *"To promote the mitigation of greenhouse gas emissions while fostering sustainable development."*

We would be pleased to discuss these issues further with the Supervisory Body, and we greatly appreciate the ongoing work of the Supervisory Body to achieve a safe, just and equitable climate future, as well as the opportunity to submit this input for your consideration.

Kind Regards,
UNDO

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