

From: Grant Faber <grant@carbonbasedconsulting.com>
Sent: Tuesday, 23 May, 2023 6:55
To: Supervisory-Body <Supervisory-Body@unfccc.int>
Subject: Input to SB005 annotated agenda and related annexes

Hello,

I am the founder and president of Carbon-Based Consulting LLC, which is an independent consultancy that works on techno-economic and life cycle assessment for carbon removal and management startups. Over the past few years, I have helped dozens of emerging carbon removal technologists, startups, and investors conduct cost and emissions modeling to understand the current and expected economic and environmental performance of their technologies, set targets, guide R&D, and meet requirements for funders. Much of my work centers on so-called "engineered" removals, such as direct air capture, direct ocean capture, enhanced rock weathering, mine tailing carbonation, and other innovative, highly technological approaches.

I'm writing to submit a few comments on the "Information note: Removal activities under the Article 6.4 mechanism" that will be under consideration in your upcoming meeting. Many of my comments revolve around section 3.

My first comment is that there are other potentially promising carbon removal pathways that are not featured in Table 4 or elsewhere in the note, including various ocean-based pathways (such as direct/electrochemical ocean capture, artificial downwelling, algae cultivation and use in long-lived products, and more as described by Ocean Visions), mine tailing carbonation (if not included under enhanced weathering), synthesis of solid carbon products such as graphite or carbon nanotubes using atmospheric carbon, and integrated BECCS–DACCS processes that integrate energy and CO₂ obtained from biomass with DAC. There are notable startups working and already obtaining major funding and customer agreements in each of these areas, such as Captura, Ebb Carbon, Arca, Gaia Refinery, and Homeostasis. Many more startups are pursuing unique avenues for CDR but are still in stealth mode. There are also emerging carbon removal pathways that may be somewhat hard to capture in existing categories; research and startup activity in carbon removal is occurring at an unprecedented level globally. Therefore, I would recommend (a) expanding the taxonomy of removal activities to be as broad as possible; and (b) making room for emerging categories that may not be fully defined yet but may still be relevant to addressing the climate challenge.

Furthermore, I believe the distinction between "engineered" and "land-based" is not entirely useful. Many in the carbon removal community—of which I have been a part for over four years—are now shying away from this distinction given the level of engineering and technology that is required for many "land-based" or "nature-based" solutions and how nature is incorporated into more technological approaches. For example, new mineralization approaches can involve applying microbial solutions to existing crops to accelerate CO₂ uptake in soil. Andes is one such company working on this approach. While this process fundamentally relies on weathering and an engineered microbe, it is also tied to cropland and soil. Trying to classify this as exclusively either engineered or land-based is probably not helpful, and in some ways, this applies to many of the pathways that feature both kinds of components. In place of this classification, it may be useful to simply define criteria— such as additionality, co-benefits, storage duration, etc.—and evaluate if and how each individual pathway meets them. By taking this relatively more pathway-agnostic approach, the market will ensure that the lowest-cost pathways that meet all regulatory requirements will be implemented first, enabling removal with greater resource efficiency.

Finally, based on my direct experience assessing the economics of various "engineered" CDR pathways, I would disagree with the characterization provided in Table 3 that "[e]ngineering-based removal activities are technologically and economically unproven, especially at scale, and pose unknown environmental and social risks." While many may be operating at lower technology readiness levels and feature the same degree of uncertainty that any technology at such a stage of development does, it is highly likely that at least a subset of these activities will prove both their efficacy and cost effectiveness at significant scales within the next several years.

As just one example, it is rather unlikely that the DAC Hubs program, sponsored by the Bipartisan Infrastructure Law in the U.S., will not yield even one successful DAC plant or industrial hub by the end of the decade, particularly with the amount of expert diligence going into guiding and evaluating submissions. Companies including Climeworks, Carbon Engineering, Heirloom, and CarbonCapture Inc. are working on major deployments with an eye toward cost reduction through economies of scale and various other forms of technological improvement, with many newer DAC companies following suit. I have personally worked on the techno-economic assessments for a number of these companies and believe that reasonable cost reductions—made possible by funding and support today—could enable very reasonable, sub-\$200-per-net ton-of-CO₂-removed cost results for DAC plants along with many other removal activities.

Underestimating the potential of technological CDR activities today could have a major, unnecessary, and detrimental effect on the industry and the development of these technologies that are, in my professional opinion, very likely to be able to play a major role in addressing society's residual/hard-to-abate emissions and helping reach global net negativity. While obviously not every last technology or company will be successful, enough will be to make investments and support of this type of removal today worthwhile. I strongly urge the Supervisory Body to consider this and be more supportive of the role of so-called "engineered" removals.

Please let me know if I can expand on any of the points discussed herein.

Thank you,
Grant Faber, M.S.

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