

August 16, 2021

Chair Liane M. Randolph
California Air Resources Board
1001 I St.
Sacramento, CA 95814

Submitted electronically via the web at
[https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=sp22-co2-removal-
ws&comm_period=1](https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=sp22-co2-removal-
ws&comm_period=1)

**Re: 2022 Scoping Plan Update –
Engineered Carbon Removal Technical Workshop**

Honorable Chair Randolph:

Biofuelwatch¹ is an international organization that works to increase public understanding and civic engagement on the land-use implications of climate policy. We have a particular focus on the environmental harms and social inequities of large-scale industrial bioenergy projects, and we work extensively on addressing the negative ecological and social outcomes of policy and actions that are justified as being beneficial to the global climate, yet carry with them risks and threats to public health and natural resources.. This brief letter is provided by our organization as comment on the recent Technical Workshop on Engineered Carbon Removal (Workshop) that was hosted by the Air Resources Board (ARB) on August 3, 2021 to ostensibly meet informational needs for the 2022 Scoping Plan.

Considering the threats and dangers embedded in the climate altering technologies that the ARB promoted in this workshop we are compelled to begin this letter with a discussion of the definitions at play. To advance this discussion we want to bring attention to the ***Carnegie Climate Governance Initiative***². Considering as well that ARB staff had made specific mention to the questions of governance we think that bringing attention to already existing efforts regarding governance of these matters can help transparently illuminate what is at hand.

In particular, whether one fully agrees (or not) with the agenda of the Carnegie Climate Governance Initiative (C2G), the entity has become a reference point for these issues. The mission of the Initiative is described on their website: “C2G seeks to catalyze the creation of effective governance for climate-altering technologies, in particular for solar radiation modification and large-scale carbon dioxide removal.”³

¹ <http://www.biofuelwatch.org.uk/>

² <https://www.c2g2.net/>

³ <https://www.c2g2.net/c2g-mission/>

To further the discussion C2G also includes a glossary on their website, and within that glossary is contained a description of geoengineering⁴ that includes carbon dioxide removal (CDR).

Geoengineering

The deliberate large-scale manipulation of the planetary environment to counteract **anthropogenic climate change** (Shepherd, 2009). Also known as **climate engineering**.

Theoretical approaches would include the use of **carbon dioxide removal** and **solar radiation modification** or other **climate-altering techniques**.

Regardless of the clear inclusion of CDR within the class of climate-altering techniques that could be considered “geoengineering” the ARB and workshop panelists refused to make any reference to the fact that the workshop was essentially a workshop in “geoengineering.”

Whether or not this is the exact word that best describes the technologies at hand, the fact that this is an open topic for discussion was obfuscated by the ARB during the entirety of the workshop that was euphemistically entitled “engineered carbon removal.” This is not a small detail. Whether it be called ‘mechanical sequestration,’ ‘artificial sequestration,’ ‘engineered carbon removal,’ or ‘carbon dioxide removal’ there is no avoiding the reality that these are ‘climate-altering techniques’ that fall under the broad umbrella of ‘geoengineering.’

To be clear, C2G is not a central of conspiracy theory hyperbole; regardless if one is ideologically aligned with C2G (or not) there is no question that this is one of the more developed entities for discussing the governance of these technologies.

For the ARB fail to describe these dynamics is a failure of the state government to be upfront and transparent with the residents of the state about what is at stake. We find it of great concern that the ARB staff responsible for this workshop is not adequately defining this rapidly evolving field, which carries with it tremendous risks and threats to public health and the environment. We insist that the ARB take full responsibility for the promotion of technologies as a response to climate change and call these mechanisms for what they are: geoengineering.

In that vein, we think it is noteworthy that the ARB is now promoting geoengineering, even if the agency is not willing to call it by name. This certainly carries with it some serious reputational risk. Transparency is an imperative.

⁴ <https://www.c2g2.net/glossary/>

Mitigation Deterrence Must Be Addressed

One of the concerns with the promotion of ‘carbon dioxide removal’ and ‘negative emissions’ is due to the amount of resources and political energy that can be focused on the development of technologies that may not achieve their stated goals, and that carry with them extensive threats to water and biodiversity resources, as well as presenting a host of public health and safety concerns. When this political energy is focused on the hypothetical future removal of carbon dioxide from the atmosphere as opposed to the direct emissions reductions that would be the foundation of any science and equity based plan to respond to climate change it raises questions of **mitigation deterrence**. Mitigation deterrence is referred to as *the risks of negative emissions or carbon removal technologies delaying or deterring climate mitigation activities*. This is an active field of academic and policy study⁵. These dynamics must be addressed by the ARB, and in fact they merit being elevated to being the primary topic of a workshop to the same detail of discussion as this recent Workshop regarding geoengineering.

Unrealistic Energy and Materials Requirements of Direct Air Capture

We also want to flag the dangerous assumptions about the potential for “direct air capture” (DAC) to be an effective tool for responding to climate change at all, much less an effective tool for responding to climate change in an equitable manner.

In short, in our study of the public and policy discourse on these matters, we believe it is incumbent upon the ARB to look hard at the real world energy and materials requirements of any DAC program of a scale to actually have an impact on the global climate. It is our assessment that the enormity of these requirements is not being taken adequately into consideration. To fail to address these requirements is to fail to address the biodiversity, land use, public health and indeed public safety considerations of these as of yet unproven technologies.

This issue of energy and material requirements of DAC cannot be understated. Even those studies that could be considered relatively positive about DAC warn of the risks of assuming that DAC could be implemented at scale, but then to find that such objectives are technically unattainable (Realmonte et al 2019)⁶. In response to that article a more sober analysis of energy and materials requirements resulted in the conclusion that DAC, even if it were conceivable to pursue at some significant scale, would be “a significant distraction with negligible contributions to mitigating climate change” (Chatterjee and Huang 2020)⁷.

It is an imperative that transparent and fact based due-diligence is done regarding DAC before embedding dependence on risky and unproven technologies into the 2022 Scoping Plan.

⁵ <http://wp.lancs.ac.uk/amdeg/>

⁶ <https://www.nature.com/articles/s41467-019-10842-5>

⁷ <https://www.nature.com/articles/s41467-020-17203-7>

IPCC Climate Science Report Exposes Disputed Effectiveness of Carbon Removal

This past week has been one of high intensity climate news coverage, with a bombardment of media amplifying the release of the most recent version of the review of physical science of climate change by the International Panel on Climate Change (IPCC). Officially this report is the Working Group I contribution to the Sixth Assessment Report on the Physical Science Basis of climate change⁸.

It is this report that has informed the multitude of news stories this past week that affirm unequivocally that climate change is fast occurring due to the increasing concentration of greenhouse gases in the atmosphere.

Once again, the scientific consensus was made clear that human economic activities, primarily the extraction and burning of fossil fuels, but also land use change such as deforestation, are mobilizing carbon stocks that had long been locked away and destabilizing the global climate system.

The stark realities presented by the report are not a surprise to us who make up the team at Biofuelwatch. In that sense, we clearly understand what is at stake.

Unfortunately, from our experience, some of the most alarming developments surrounding the release of the report are in regards to how the circumstances of global ecological and climate breakdown are being exploited by commercial interests to perpetuate activities that are at the root of the problem, not solutions.

This is manifested in the increasing urgency being expressed by industrial operators and government officials for pursuing technology for ostensibly removing carbon from the atmosphere, whether it be with futuristic 'carbon vacuums' (Direct Air Capture) or through the planting of massive monoculture plantations for pursuing bioenergy with carbon capture and sequestration (BECCS).

From within the handrails of the mission of Biofuelwatch, these interests include but are not limited to the bioenergy sector actors such as Drax in the UK as well as the rapidly expanding carbon capture narrative that links bioenergy directly with fossil fuel and Silicon Valley interests in places like California.

These urgent claims by a select group of stakeholders that the IPCC concludes that the only option remaining to humanity is to pursue technical fixes to the climate problem merit close scrutiny. A close look at the report reveals that the effectiveness of these mechanisms, many of which do not even exist, is actually a matter of scientific dispute.

While carbon capture interests are eager to publicize how the latest IPCC report is explicit in identifying the field of carbon removal as one that merits scientific assessment, they are not being transparent about the uncertainties, risks and

⁸ <https://www.ipcc.ch/report/ar6/wg1/#SPM>

threats that the report communicates about ‘carbon dioxide removal,’ or CDR for short.

In fact, there is a section of the report itself that specifically addresses the question of the “Removal Effectiveness of CDR.”⁹

Among the scientific facts that CDR proponents are not being forthright in describing to an increasingly concerned public is that there is an intimate relationship between the atmosphere, the ocean, and the land sector, and that if indeed it were ever possible to remove carbon from the atmosphere that the effectiveness of that carbon removal for reducing atmospheric concentrations of greenhouse gases would be impacted by outgassing from the ocean.

This complex relationship is as yet poorly understood, and is highly dependent on time and emissions background factors, but there is **high confidence** from the IPCC that such outgassing into the atmosphere from the ocean and, most likely, the land sector would occur in the event of successful carbon removal from the atmosphere, if such technologies were ever to come to fruition.

Along the lines of exploring these ‘asymmetries’ in the global carbon cycle is the IPCC conclusion that “an emission of CO₂ into the atmosphere is more effective at raising atmospheric CO₂ than an equivalent CO₂ removal is at lowering it.”

That is to say that the science shows that emissions do more climate damage than carbon removals can repair.

It is important to recognize that these climate science fundamentals are addressing possible carbon cycle responses to carbon removal in models that assume a best case scenario for the technologies, with no spills, accidents, mishaps or any other of a multitude of unexpected factors might occur.

None of this science is being transparently addressed by the ARB in the context of ‘engineered carbon removal.’

The IPCC report itself in the section on CDR does actually include details on the possible negative impacts of these mechanisms — information that proponents of such geoengineering techniques are reluctant to publicize.

For instance, for BECCS specifically the IPCC report includes these informational items:

—“wood based BECCS may not be carbon negative in the first decades, initially emitting more CO₂ than sequestering”

⁹ p. 104 (5.6.2.1.3) Removal Effectiveness of CDR
https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_05.pdf

—“BECCS has several trade-offs to deal with, including possible threats to water supply and soil nutrient deficiencies”

—“Deployment of BECCS at the scales envisioned by many 1.5 - 2.0 mitigation scenarios could threaten biodiversity”

—“Additional risks and side effects are related to geologic carbon storage”

—“Highest co-benefits are obtained with methods that seek to restore natural ecosystems and improve soil carbon sequestration while highest trade off possibilities occurs for re/afforestation with monocultures and BECCS”

Another very interesting item that is buried in the report that has not received much media coverage is the Frequently Asked Question (p. 120 FAQ 5.3) of “Could climate change be reversed by removing carbon dioxide from the atmosphere?¹⁰”

The ambiguous answer of the IPCC to this question is perhaps best characterized as a caveat loaded “maybe?”

Among the caveats however are these statements from the IPCC:

—“It should be noted that CO₂ removal technologies are not yet ready or are unable to achieve the scale of removal that would be required to compensate for current levels of emissions, and most have undesired side effects.”

—“a decline in atmospheric CO₂ as a result of net negative emissions would not lead to immediate reversal of all climate change trends”

—“temporary overshoot would result in additional climate changes compared to a scenario that reaches the goal without overshoot”

—“approaches capable of large-scale removal of CO₂ are still in the state of research and development or unproven at the scales of deployment necessary to achieve a net reduction in atmospheric CO₂ levels. CO₂ removal approaches, particularly those deployed on land, can have undesired side effects on water, food production and biodiversity.”

All of these dynamics merit serious transparent and evidence based discussion by the ARB to inform a 2022 Scoping Plan that will serve communities and the environment, as opposed to making the situation worse.

¹⁰ p. 120 FAQ 5.3 Could climate change be reversed by removing carbon dioxide from the atmosphere?

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_05.pdf

Conclusion

Our organization remains attentive to these discussions at the ARB, and will remain engaged with the development of the 2022 Scoping Plan. Thank you for your attention to these comments and we anticipate greater discussion in the future of the concerns we have described in this letter.

Sincerely,

A handwritten signature in black ink that reads "Gary Graham Hughes". The signature is written in a cursive style with a large initial "G" and "H".

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