



July 7, 2023

The Honorable Dr. Steven Cliff
Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA

Re: Blue Planet Comments on Cap-and-Trade Workshop (June 2023)

Dear Dr. Cliff:

Thank you for the opportunity to comment on the June 14, 2023, Joint Cap-and-Trade Program Workshop. Cap-and-Trade underpins California's climate change goals and framework, and is critical to achieving the State's priorities. We strongly support incorporating carbon capture, removal, utilization and storage (CCRUS) into the program, in order to support implementation of the Scoping Plan and achieving carbon neutrality. We look forward to working with you and other stakeholders through this process to amend the Cap-and-Trade program in a manner that best aligns with the Scoping Plan and state priorities.

About Blue Planet

Blue Planet is a California company developing technology and products related to economically sustainable carbon capture. Our goal is to solve the carbon capture problem by converting CO₂ into high-value building materials. Our technology can be deployed at cement facilities or other difficult-to-decarbonize industries and can capture not only CO₂, but also particulate matter, NO_x, SO_x and other pollutants hazardous to surrounding communities. It can also be coupled with direct air capture facilities and deployed as a carbon dioxide removal strategy. We are currently constructing and beginning operations of a plant in Pittsburg, California on the Sacramento Delta, and our carbon-sequestered aggregate has been utilized at San Francisco International Airport, where carbon-sequestered concrete is specified.

Blue Planet's technology produces coarse and fine limestone aggregates made from sequestered CO₂ utilizing the carbon mineralization process. It allows lower-cost carbon capture, including from cement facilities, by avoiding the need to purify and enrich captured CO₂ before use, which reduces the cost and energy needs associated with carbon capture. It is also fully scalable and can be applied to any facility in any part of the state where concrete is utilized, regardless of its proximity or access to a geological sequestration site.

Carbonate mineralization offers a significant and permanent CCRUS solution

As described in our July 9, 2021, comments related to the Scoping Plan kickoff workshops,¹ and validated in peer-reviewed research,² the mineralization process permanently stores carbon in rock, which can then be used in concrete and stored in our built environment. While several technical, legal, and economic questions remain related to geologic sequestration, many of which CARB and other agencies will address through implementation of SB 905 (Caballero, Chapter 359, Statutes of 2022), carbonate mineralization offers a fully scalable, permanent carbon storage solution, ready for deployment today. We appreciate the State recognizing this opportunity, including:

- In the Final 2022 Scoping Plan Update, CARB discusses the role of carbon capture and carbonate mineralization in the context of decarbonizing cement and other sector transitions, stating “Direct air capture and carbon mineralization have high potential capacity for removing carbon...”³
- The CEC identifies carbonate mineralization, including carbon storage in aggregates, as one of the most promising strategies for decarbonizing the cement sector:⁴

Capturing carbon from industrial processes and then utilizing it in a product is considered one of the essential components for mitigating CO₂ emissions since it can achieve net negative emissions, especially for sectors that are unable to achieve zero emissions. For example, carbon capture and utilization appear to be a pathway to achieve significant decarbonization of the cement industry where 60 percent of the carbon dioxide is from process emissions... For instance, carbon capture and utilization in the cement industry has recently emerged with sustainable techniques to use carbon emissions in concrete production. Some emerging utilization techniques, such as mineral carbonation, includes adding carbon into cement to enhance the concrete’s compressive strength. With almost 4 billion tons of construction aggregate produced in North America, mineral carbonation could be the most efficient route to CO₂ utilization.

Enable CCRUS, including carbonate mineralization, as a decarbonization strategy by incorporating it into the Cap-and-Trade Program and Mandatory Reporting Regulation

We encourage CARB to formally recognize mineralization, including its promising application across a number of sectors – including refining, cement production, power generation, and others – in Cap-and-Trade and related programs. Specifically, we encourage CARB to:

- Formally incorporate carbonate mineralization into the CCS Protocol through implementation of SB 905.

¹ <https://www.arb.ca.gov/lists/com-attach/73-sp22-kickoff-ws-UTMGbFEIVGJQCQd3.pdf>

² For example, see: Xi, F., Davis, S., Ciais, P. et al. Substantial global carbon uptake by cement carbonation. *Nature Geosci* 9, 880–883 (2016). <https://doi.org/10.1038/ngeo2840>

³ CARB (2022) 2022 Scoping Plan for Achieving Carbon Neutrality, California Air Resources Board, November 16, pg. 221. <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp.pdf>

⁴ See pg. 10 at: https://esd.dof.ca.gov/Documents/bcp/2223/FY2223_ORG3360_BCP5441.pdf

- Adopting amendments in the LCFS (Low Carbon Fuel Standard) that allow new CCUS protocols to be used in that program, as they are developed and adopted through the SB 905 process.
- Incorporate the CCS Protocol into the Cap-and-Trade Program, and allow new protocols to be automatically included in Cap-and-Trade as they are finalized in the CCS Protocol.
- Account for CCRUS, including mineralization strategies, in the Mandatory Reporting Regulation.
- Develop new offset protocols for carbon removal strategies, including carbon mineralization and utilization as aggregates in concrete.

We look forward to working with CARB staff regarding any technical or accounting questions that would support these efforts.

Further incentives industrial decarbonization through Cap-and-Trade and public procurement of carbon sequestered concrete

We appreciate CARB suggesting that they will consider other mechanisms to accelerate industrial decarbonization through the upcoming process related to Cap-and-Trade amendments. We believe CARB can accelerate industrial decarbonization through allowance allocation frameworks that incentivize CCRUS and accelerated industrial decarbonization, including of the cement and concrete sectors and in-line with SB 596.

We also encourage CARB to consider opportunities to leverage public procurement of concrete to support industrial decarbonization. The state uses enough concrete every year to store all industrial sector greenhouse gas emissions – if captured CO₂ were permanently stored as rock and utilized as aggregate in concrete. (We also note that there are other, additional strategies to sequester carbon in concrete that could be additive to this approach.)

As the biggest user of concrete in California, state agencies – especially Caltrans – can provide a significant incentive for capturing industrial CO₂ emissions or for carbon removal and sequestering emissions in concrete, simply by specifying the use of sequestered carbon in concrete in state projects. This would have minimal costs on state projects, but provide a powerful incentive for supporting industrial decarbonization and carbon removal that would be additive to federal tax credits and value under the Cap-and-Trade or other programs. We encourage CARB to think holistically about Cap-and-Trade and other programs, including the SB 596 framework, and advance a wide array of supportive policies to achieve the State's climate goals and accelerate industrial sector decarbonization.

Thank you for your consideration of these comments, and we look forward to working with you as you consider amendments to the Cap-and-Trade program in the coming months.

Sincerely,

Laura Berland-Shane
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