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Ms. Rajinder Sahota
California Air Resources Board
1001 I St.
Sacramento, CA 95814

Blue Planet Comments on 2022 Draft Scoping Plan Update of May 2022

Dear Ms. Sahota:

Blue Planet Systems Corporation (Blue Planet) appreciates the opportunity to provide comments and support for CARB's Draft Scoping Plan Update.

Blue Planet is a California company developing technology and products related to economically sustainable carbon capture and conversion. Our goal is to provide a carbon capture solution for industrial and the "difficult to decarbonize" sectors, such as cement, steel, and carbon dioxide removal strategies like bioenergy with carbon capture or direct air capture. Our process converts CO2 into high-value aggregate that is used in the production of concrete. We are building a commercial demonstration plant in Pittsburg, California where we will be capturing CO2 from Calpine's Los Medanos natural gas combined cycle power generating facility by the end of 2022.

We concur with CARB's recognition that carbon capture will be a necessary tool to drastically reduce GHG emissions and achieve carbon neutrality by 2045. However, the state's focus continues to be on the geological sequestration of CO2. A limited focus on geological sequestration makes carbon capture utilization and storage (CCUS) appear to be a more costly and difficult proposition than it needs to be.

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

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. Concrete is the most widely used building material on earth, and every year, California (and the world) uses enough rocks in concrete that we could store all emissions from major industrial sources in our buildings and roads. Compared to geological sequestration, which only entails cost and requires ongoing public subsidy, carbon capture and conversion -- in particular carbon storage in concrete -- provides a value-added market that can make carbon capture cost effective without additional public subsidy.

[1] https://www.arb.ca.gov/lists/com-attach/73-sp22-kickoff-ws-UTMGbFElVGJQCQd3.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

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California Needs to Appropriately Account for Carbon Dioxide Stored in Concrete to Unleash this Powerful Climate Solution

Currently, CARB's CCS protocol excludes the use of mineralization as a qualified technology for permanent sequestration. CARB should recognize that mineralization of CO2 and its subsequent conversion to concrete provides a permanent and verifiable sequestration technology. CARB should include CO2 mineralization and sequestration in rock as an eligible CO2 storage solution in its CCUS protocol under the Low Carbon Fuel Standard (LCFS), and extend those protocols to the Cap-and-Trade Program.

We strongly support the reference in the Scoping Plan to "Establish markets for low-carbon products and recycled materials using Buy Clean" but recognize that California's Buy Clean program does not currently include concrete. We hope the final Scoping Plan will supporting expanding the Buy Clean program to cover concrete, which could be done via legislation or Executive action, as the Biden Administration has recently done,[3] and specifically incorporate carbon sequestration in concrete into the Buy Clean accounting framework and any potential incentives for use of innovative technologies or net-negative emission building materials.

Altogether – with the federal 45Q tax credit, value from the Cap-and-Trade program once a CCUS protocol with mineralization is established, and incentives for low- or negative-carbon concrete under Buy Clean – California can establish a sustainable framework to support rapid and sustainable deployment of CCUS, without additional subsidy.

These regulatory and market signals will create additional incentives for investors to capitalize additional carbon capture and mineralization facilities in the state, thereby accelerating greenhouse gas (GHG) emission reduction while also decarbonizing the built environment.

Carbon Capture and Mineralization to Decarbonize the Cement Sector

Last year, SB 596 (Becker) was signed into law, calling for a 40 percent reduction in GHG intensity in cement emissions from 2019 levels by 2035, and then net zero emissions by 2045. Capture and mineralization of CO2 to produce aggregate for use in concrete offers a natural nexus with efforts to decarbonize cement plants, and will be an important tool for advancing the ambitious goals of SB 596. We encourage CARB to incorporate carbon capture and mineralization of CO2 from cement plants into CARB's strategy developed pursuant to the law.

Mineralization and other CCUS Strategies Reduce Criteria Air Pollutants, Too

As noted in the Draft Scoping Plan, an October 2020 Stanford report discussed how the potential post-combustion capture for CO2 could also reduce emissions of criteria air pollutant emissions from certain facilities. Exploring these potential outcomes will be important to ensure deployment of CCS does not exacerbate air pollution impacts in communities and maximizes air pollution benefits.

Blue Planet's mineralization technology captures and stores other pollutants, as well. Based on years of data gathered from our in-field demonstration at the Moss Landing Power plant, the mineralization process captured

[3] https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/15/fact-sheet-biden-harris-administration-advances-cleaner-industrial-sector-to-reduce-emissions-and-reinvigorate-american-manufacturing/

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and reduced 40% - 100% of toxic air contaminants including, mercury, silver, arsenic, cadmium, chrome, copper, nickel, lead, selenium, vanadium, and zinc. It also captures over 50% of NOx and nearly 100% of SOx, which are incorporated as a solid solution in carbonate minerals of limestone at safe concentrations, similarly as they occur in natural limestone where these levels are commonly higher. These pollutants are thus captured and permanently stored in our produced limestone aggregate for permanent storage in concrete – just like CO2.

Accordingly, the faster and more deeply we deploy appropriate CCUS technologies like Blue Planet's mineralization process, the faster we can achieve air pollution benefits in the communities in and around industrial operations. We encourage CARB to deeply evaluate the science on this topic. Blue Planet would be eager to support such an evaluation and participate in related conversations.

We are grateful for your attention and consideration of our comments. We look forward to engaging in the ongoing Scoping Plan process and with CARB and other agencies in various forums around CCUS. Please do not hesitate to reach out if you have any questions about Blue Planet, our technology, or the recommendations and comments offered in this letter.

Sincerely,

Brent R. Constantz, Ph.D.
Chief Executive Officer
Blue Planet Systems Corporation