February 20, 2024

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

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph,

The undersigned Direct Air Capture (DAC) Coalition and leading DAC companies welcome the opportunity to comment on the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation. We affirm the urgent need for both reducing total emissions and scaling carbon removal to limit global warming to 1.5 degrees Celsius. We therefore commend the California Air Resources Board (CARB) for its leadership in recognizing the importance of DAC as an eligible technology under the LCFS, in support of California's carbon removal and net-zero goals. However, **we believe that the proposed quarterly matching book-and-claim accounting for low-CI electricity** (Section 95488.8(i)(1)(C) of the Proposed Amendments) **would present a significant barrier to DAC deployment today, due to current constraints in low-CI electricity supply and temporal attribute market systems.** Such an outcome could set back California's plan to achieve net-zero carbon emissions by 2045. In the near-term, **an annual book-and-claim accounting system would facilitate the growth of the industry, create jobs, and help ensure deployment of a vital tool to enable the state of California to meet its net-zero goals**.

Instead of prescribing a temporal matching framework that is not fit for purpose and does not reflect the current state of low-CI electricity supply or temporal attribute markets, we encourage CARB to convene a dialogue with key stakeholders to consider matching requirements appropriate for DAC as the technology and markets for temporal matching mature alongside DAC deployment. Such a dialogue would provide a venue for collecting valuable input to ensure that LCFS requirements mitigate resource shuffling and maximize long-term climate benefits. Prescribing an outcome without a robust conversation risks undercutting the growth of an industry that is likely to be vital to meet the State's 2045 net-zero goal.

Low-CI electricity requirements for successful commercialization of DAC

As leading DAC technology developers and proponents of permanent carbon removals, we are committed to advancing high-quality projects that enshrine the highest levels of transparency, accountability, safety, environmental stewardship, and societal benefits, with full lifecycle emissions accounting–including energy usage–that ensures net removal of carbon dioxide

(CO_2) from the atmosphere. We note the following key points that outline the electricity needs for DAC projects and our specific concerns with the proposed amendments:

- DAC technology requires energy to operate, including from electricity. In order to maximize net removal of CO_2 from DAC facilities, the electricity supply must have low emissions. DAC facilities must also maximize continuous running time in order to remove the maximum amount of CO_2 at the lowest levelized cost, particularly given the nascent stage of DAC technology deployment and associated early-stage technology costs. DAC technologies therefore require a continuous, reliable, and economic electricity supply.
- Section 95488.8(i)(1)(C) of the Proposed Amendments includes criteria required for low-CI electricity supplying DAC projects. Criterion 1 requires that low-CI electricity be supplied to the grid within the local balancing authority where the electricity is consumed (local supply). Criterion 3 requires low-CI electricity to be supplied from new or expanded production within three years of the start of the direct air capture project (additionality). **We strongly support these criteria for local supply and additionality as key pillars to mitigate against resource shuffling where existing low-CI electricity is redirected and backfilled with higher-CI electricity.**

Why quarterly book-and-claim proposal will hamper the growth of DAC

Section 95488.8(i)(1)(C) Criterion 4 requires quarterly book-and-claim accounting for low-CI electricity, however, for the following reasons we believe that requirement would make it significantly ***more*** difficult for DAC projects to generate credits in the LCFS, undermining the effectiveness of the program and presenting a barrier to the deployment of DAC projects around the country:

- Intermittent renewable electricity is the lowest cost and most available low-CI electricity source for DAC projects today. The technology for supplying continuous 24/7 low-CI electricity at the scale and duration needed for DAC is not yet readily available, and the market systems for tracking and trading the necessary low-CI power attributes at sub-annual time resolution do not currently exist. This combination presents DAC projects with significant cost and financial risk challenges for complying with sub-annual matching today[1]. For example, one commercial DAC project currently under development in the U.S. estimated that quarterly book-and-claim matching could require 25% more power to be over-contracted and not consumed by the DAC project, at substantial market price risk, compared with annual matching even in the most favorable locations for renewable resources.
- **At this nascent stage of both DAC technology deployment and availability of continuous 24/7 low-CI electricity, an annual book-and-claim matching period for DAC under LCFS is appropriate. This would account for the full annual seasonal cycle for intermittent renewables. Matching periods shorter than 12 months will**

[1] Verse, “Heirloom Portfolio Planning Case Study” 2024: (https://verse.inc/blog/heirloom-portfolio-planning-case-study/)

significantly impact the financeability of early DAC projects and impede deployment of this critical climate technology.

Alternative proposal for annual book-and-claim accounting

The inclusion of DAC as an eligible technology to receive credits under the LCFS is an important recognition of the potential for DAC to support California's carbon removal and net-zero goals as set forth in law under SB905 and AB1279. To accomplish the state's goals, ***an annual period for book-and-claim matching of low-CI electricity supply for DAC projects is necessary and appropriate*** given the inherent challenges present within the current technology, market systems, and economics for continuous low-CI electricity.

We request that CARB revise Section 95488.8(i)(1)(C) Criterion 4 of the Proposed Amendments to require annual book-and-claim matching for low-CI electricity for DAC projects in order to help facilitate early DAC project deployment. This would be consistent with other leading global standards. For example, Verra's methodology for electricity consumption emissions, currently under development, includes annual matching requirements[2]. Importantly, DAC projects already under development in the U.S. are being designed with the annual standard in mind. Sub-annual matching could be phased in at a later time once the necessary technologies and markets are available and accessible for DAC projects.

Climate experts, from the Intergovernmental Panel on Climate Change[3] to the National Academies of Sciences[4], have made clear the need for billion-ton scale carbon removal by mid-century alongside rapid emissions reductions. Therefore it is critical that DAC deployments advance today to support the ongoing technology development needed to reduce future DAC deployment costs and enable deployment at climate-relevant scale in the coming decades.

California, through its LCFS regulation, has the opportunity to set the bar for rigorous policy design that accelerates DAC technology deployment and unlocks economic and job opportunities in California and around the U.S.

We would welcome the opportunity for continued engagement with CARB on these important matters.

Signed:

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[2] Verra, "Tool for the Estimation of Emissions Associated with Electricity Consumption" 2024": (https://verra.org/methodologies/tool-for-the-estimation-of-emissions-associated-with-electricity-consumption/)

[3]IPCC, "Summary for Policymakers. Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change," 2022: (https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf)

[4] National Academies of Science, Engineering & Medicine, "Developing a Research Agenda for Carbon Dioxide Removal and Reliable Sequestration," 2019: (https://www.nationalacademies.org/our-work/developing-a-research-agenda-for-carbon-dioxide-removal-and-reliable-sequestration)

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