

August 27, 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 of August 12, 2024**

Dear Chair Randolph,

The undersigned Direct Air Capture (DAC) Coalition and leading DAC companies thank you for the opportunity to comment on the additional proposed amendments to the Low Carbon Fuel Standard (LCFS) Regulation.

The LCFS is a vital program to lower California's carbon emissions, achieve air quality benefits, and accelerate technology deployment needed for California to achieve its carbon neutrality targets. As the world's first carbon compliance regulation to include DAC, LCFS helped launch the DAC industry and exemplifies California's global leadership in addressing climate change while highlighting the essential role of carbon dioxide removal for achieving net zero.

We commend the California Air Resources Board (CARB) for its dedication and diligent work to design, implement, and refine the LCFS to be an effective emissions reductions and innovation driver. We are specifically grateful for CARB's commitment to engaging with interested stakeholders in this process and for considering our feedback about LCFS regulations that will have profound implications for the DAC industry.

The latest proposed amendments to the LCFS Regulation Section 95488.8(i)(1)(C) issued on Monday, August 12th move in the right direction in allowing a longer temporal period in book-and-claim accounting for low-carbon intensity (CI) electricity for DAC (three quarters) as compared to the previous proposed amendments of January 2, 2024 (quarterly). **However, book-and-claim accounting spanning three quarters cannot accommodate DAC's continuous 24-7/365 operations given the seasonal fluctuations in wind and solar power production, and is therefore not fit for purpose nor achievable for DAC at this stage of the industry's development. Instead, annual book-and-claim accounting for DAC is necessary, appropriate, and consistent with the leading global standards today. Moreover, there is a lack of analytical evidence that emissions accounting accuracy or resource shuffling prevention would be enhanced by three-quarter accounting compared with annual.**

The need for annual book-and-claim matching for DAC is driven by underlying physical and technological constraints, as well as market realities. DAC is more nascent in technological

development and deployment than other technologies relevant to LCFS. For example, the first commercial DAC plus storage facility commenced operation in 2021, while advancements in hydrogen electrolysis are building on over 100 years of commercial operational experience.

DAC technologies need to operate constantly with limited ability to ramp up and down load because they often contain equipment components and chemical and physical processes that cannot be rapidly fluctuated or turned on and off. Currently, the vast majority of low-CI electricity generation capacity being added to the US grid is intermittent renewable electricity sources like solar and wind. Book-and-claim accounting to match intermittent renewable supply with a constant DAC load over an annual period within the same grid is a challenge that requires detailed modeling and risk management to account for annual variability in renewable output. Limiting the accounting period to three quarters significantly exacerbates the challenge, since the electricity production from these intermittent renewable resources is seasonal and a quarter of the annual cycle would be missed.

**Any temporal matching period spanning less than a full year would present a severe barrier for DAC deployment given the current state of technology's needs for continuous, additional and local low-emissions electricity supply, and the lack of market and technological systems to support more granular temporal matching.** For example, one commercial DAC project currently under development in the United States estimated that three quarter book-and-claim matching could require the the procurement an additional 10-15% low-CI power under a three quarter book-and-claim accounting period compared with an annual period, increase electricity price risk and the risk of power matching shortfalls, and could make economics infeasible.

Recognizing these constraints, leading global standards bodies and registries provide for annual book-and-claim for DAC, with an eye to re-evaluate in the future as DAC and electricity sector technologies, markets, and policies evolve. These standards include Verra, Puro.earth, and Isometric<sup>1</sup>. Our DAC facilities under development will sell credits to voluntary market customers using the carbon registries' methodologies with annual matching. **Importantly, we cannot generate credits with different matching periods from the same facility, since we cannot effectively operate under two different sets of energy procurement and operating patterns at the same facility. The LCFS market can help accelerate DAC facilities and add to demand to justify new facilities, but only if generating LCFS credits is compatible with the global DAC standards and market.**

Over time as DAC matures with technology advancements, economies of scale, market and supply chain development, and as firm dispatchable low-carbon electricity becomes more available, increasingly granular book-and-claim accounting may become more achievable and could be considered under LCFS. We would like to highlight our suggestion for CARB to convene a dialogue with key stakeholders to consider how electricity book-and-claim accounting for DAC should evolve alongside DAC industry maturation. Such a dialogue

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<sup>1</sup> Isometric standard currently allows annual book-and-claim for projects under 10 MW

would provide a venue for collecting valuable input to ensure that LCFS requirements mitigate resource shuffling and maximize long-term climate benefits.

We reaffirm our support for the LCFS and gratitude for CARB's important work, and we look forward to further engagement to help ensure the LCFS is a practically workable market that can help drive DAC technology deployment.

Signed:

Direct Air Capture Coalition  
CarbonCapture Inc.  
Heirloom Carbon Technologies  
Climeworks Corporation  
1PointFive