Bloomenergy®

August 8, 2022

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Bloom Energy Corporation's Comments on the July 7, 2022 Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard

Dear CARB Staff,

Bloom Energy (Bloom) appreciates the opportunity to comment on Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard ("workshop") held on July 7, 2022. Bloom is overall supportive of staff's direction in contemplating higher carbon intensity (CI) targets, implementing policies that would accelerate investment in alternative fuels, and continued efforts to send the appropriate long-term market and stable signals to the transportation sector. Bloom respectfully offers the following comments as a partner in ensuring a cleaner transportation sector in California.

Bloom is a provider of an all-electric solid oxide fuel cell technology that produces always-on, reliable, resilient, and cost-effective electricity both behind-the-meter and in-front-of-the-meter. We have deployed almost 300 MW of clean, firm power to Californians to date, and are proud to be a California company, with manufacturing facilities in the Bay Area, that is exporting leading-edge energy technology worldwide, including fuel cells and hydrogen electrolyzers.

The Carbon Intensity reduction target should be increased to at least 30% to align with Executive Order N-79-20

During the workshop, staff shared possibly increasing the current 20% CI reduction target to 25% or 30%. Bloom is supportive of **at least** a 30% CI reduction target, because it aligns with Executive Order N-79-20, which set goals of 100% of new passenger vehicles to be zero-emission by 2035 and 100% of new medium- and heavy-duty vehicles to be zero-emission by 2045. Staff presented the successes of the Low Carbon Fuel Standard (LCFS) program to date in sending market signals to invest in alternative fuels and increasing diversification of transportation fuels in California. The LCFS program's successes indicate that the program is a critical driver of market and price signals. A more aggressive 30% CI reduction target aligns with EO N-79-20 goals by paving the way for increased low and zero carbon fuel diversity. In the long-term, the market signals sent today will be key in attracting more development and investment of low and zero carbon fuels.

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A book-and-claim pathway for biogas would unlock the full potential of California's biogas market.

To further enhance the LCFS program, Bloom recommends that a biogas to electric vehicle (EV) pathway be established, similar to the book-and-claim processes in places for compressed natural gas (CNG). Establishing a book-and-claim pathway for biogas would significantly increase the prospect of biogas as an alternative fuel, as well as improve the economics of the biogas market. For instance, rather than limiting dairy biogas participation to those with a direct pipeline connection to the San Joaquin Valley, all LCFS participants would be able to participate in California's growing dairy biogas market. As seen in Dairy Cares latest California Dairy Digester Development update, 182 dairy farms are currently planned to be included in the "hub and spoke" pipeline model.[1] However, an additional 35 dairy digester projects under development are not part of the hub and spoke clusters. CARB should consider allowing biogas book-and-claim in the LCFS program in order to unlock the full potential of California's biogas market. Bloom estimates that biogas from California's dairy farms has the potential to generate 300MW+ of power, equivalent to powering approximately 600,000 EVs, each traveling 15,000 miles per year.[2] When considering the nationwide market, the potential is even greater.

In addition to dairy, there are 541 operational landfill gas energy projects in the US and 474 candidate projects. The operation projects are capable of 1,471 MW or 314 mmscf of gas per day, and the candidate projects are capable of 980 MW or 545 mmscf of gas per day.[3] There are immense opportunities to better incorporate biogas into the LCFS program, and this is a prime opportunity to do so.

The capacity credit framework should be expanded to include medium- and heavy-duty vehicles to increase the adoption of hydrogen MHDs.

Bloom is supportive of staff's proposal to expand capacity crediting to support the development of hydrogen refueling stations for medium- and heavy-duty vehicles (MHD). Similar to the existing capacity credit framework for light-duty zero emission vehicle (ZEV) infrastructure, enacting a capacity credit for MHD hydrogen refueling infrastructure would increase adoption of hydrogen MHDs. The capacity credit would be a significant financial incentive towards increasing hydrogen refueling infrastructure. For an example of the impact a financial incentive can have, staff can look to the increase in size and number of hydrogen stations for light-duty vehicles once the capacity credit was

[1] Feb. 7, 2022. California Dairy Digester Developments. https://www.dairycares.com/_files/ugd/e8c369_b8e47af9d6e04bd4a417bb66f5825260.pdf
[2] July 18, 2022. Bloom Energy. https://www.bloomenergy.com/news/bloom-energys-dairy-farm-installation-receives-national-recognitions-for-biogas-innovation-and-sustainability-achievements/
[3] March 16, 2022. Environmental Protection Agency. Landfill Methane Outreach Program. https://www.epa.gov/lmop/project-and-landfill-data-state

added to the program.

The LCFS program should place serious considerations to including alternative low carbon or carbon-neutral fuels.

To further develop the market of alternative fuels, Bloom is also supportive of the inclusion of fuels such as ammonia and methanol as well as other novel technologies. Considering the plethora of manufacturing and industrial sectors in California, the LCFS team must consider all opportunities to take advantage of existing chemical and/or exothermic processes for the development of more transportation fuels. For commercial harbor craft, avenues for energy dense ammonia and methanol to participate in LCFS should be considered. Staff should consider developments in the Department of Energy's REFUEL program for more information on how carbon-neutral liquid fuels, such as ammonia, can serve a role.[4]

The LCFS program is bold and innovative and will need to continue as such in order to meet our clean air goals. Now that most of the "low hanging fruit" has been picked, Bloom encourages staff to consider a CI adjustment along with these changes recommended to ensure the LCFS program continues to send appropriate market signals. Bloom appreciates the opportunity to provide staff with these comments and is looking forward to next steps in the informal LCFS process and formal rulemaking process.

Best Regards,

Christina Tan
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[4] For more information, see https://arpa-e.energy.gov/technologies/programs/refuel

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