



To: California Air Resources Board

Date: May 7, 2024

RE: LCFS Workshop April 10, 2024

Terraform Industries appreciates the opportunity to comment on the California Air Resources Board (CARB)'s Low Carbon Fuel Standard (LCFS) workshop on April 10, 2024. Terraform Industries uses alkaline electrolyzers, direct air capture, and chemical reactors to produce low-carbon methane. This renewable power-to-gas technology produces a carbon-neutral drop-in successor to conventional fossil fuel drilling. Below are Terraform's comments on low carbon intensity hydrogen and alternative fuels.

Renewable/Low Carbon Intensity Hydrogen & Hydrogen as a Feedstock

Terraform agrees with both the 2022 Scoping Plan Update and CARB's LCFS ISOR which highlight the need for low-carbon hydrogen. Terraform is also in concurrence with the ISOR's proposal that indirect accounting, the expanding of book-and-claim provisions, should be allowed for low-carbon hydrogen to increase the flexibility of hydrogen end uses.

Terraform particularly agrees that low-CI hydrogen should be used as a feedstock in addition to a primary fuel. A compelling use case of low-CI hydrogen is in the production of other low-carbon transportation fuels, such as renewable diesel and e-natural gas. Studies have shown that up to 12% of hydrogen's energy content can be lost when compressing to required pressures for storage and transport.¹ Hydrocarbons are a durable and transportable energy carrier; producing methane, for example, from low-CI hydrogen retains the majority of hydrogen's combustion energy. The ubiquitous production, storage, transportation, and end uses for methane decrease the friction of transitioning away from fossil fuels. In addition, a recent IEA report revealed that novel hydrogen applications in heavy industry and transport accounted for less than 0.1% of the global demand.² Therefore, the use of alternative fuels as a renewable hydrogen carrier has the potential to accelerate hydrogen demand and create a more stable hydrogen economy.

Innovative Alternative Fuels

In alignment with Jordan Ramalingam's presentation on the LCFS support for California's climate, air quality, and zero-emission vehicle goals, Terraform agrees that LCFS should incentivize *both* ZEV and alternative fuel adoption. While Terraform supports the advancement of ZEVs and direct electrification in the fight against poor air

¹ <https://doi.org/10.3389/fenrg.2020.570112>

² <https://www.iea.org/reports/tracking-clean-energy-progress-2023>

quality and climate change, LCFS should not play a zero-sum game and pick and choose technology “winners.” To meet the LCFS goals of adding competition to fossil fuels while not increasing retail fuel costs, we need to increase the incentives for innovative fuel development. Innovative alternative fuels, such as Terraform’s e-natural gas, are drop-in replacements for their petroleum counterparts. Therefore, alternative fuels leverage trillions of dollars worth of existing industrial infrastructure—without additional capital investments nor land use concerns—to quickly decrease costs, giving clean fuels the fighting chance to economically compete with fossil fuels.

Terraform Industries appreciates the opportunity to provide comments. Further questions and correspondence can be directed towards Tiana Wong at tiana.wong@terraformindustries.com.