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Prometheus Comments to CEC Docket No 22-TRAN-01

Additional submitted attachment is included below.

PROMETHEUS

July 20, 2022

Via Electronic Submission

Commissioner Patty Monahan
California Energy Commission
715 P Street
Sacramento, CA 95814

Subject: Docket # 22-TRAN-01

Dear Commissioner Monahan:

Prometheus Fuels, Inc. (Prometheus) writes in response to the July 14 Pre-Solicitation Workshop – Zero- and Near-Zero-Carbon Fuel Production and Supply Funding Concepts (the Workshop). We recognize the important work that the California Energy Commission (CEC) is doing to advance the energy transition. We offer the following comments and appreciate the opportunity to do so.

I. Prometheus makes Green Hydrogen and Zero Net Carbon Electrofuels.

Prometheus is a California-based company that uses direct-air-capture (DAC) technology and renewable energy (e.g., solar, wind) to manufacture zero net carbon and zero carbon CARB hydrogen and drop-in, sustainable aviation fuel, gasoline, and diesel fuel. Our fuels also are known as electrofuels. The only inputs to this fuel-production process are air and renewable electricity and the only outputs are fuel and oxygen. More information about our company is available at www.prometheusfuels.com.

Prometheus makes its zero net carbon hydrogen and other fuels using a novel, proprietary process that operates on the principle of reverse combustion. It does this in modular, containerized systems called Titan Fuel Forges. Each Titan Fuel Forge has a capacity to produce 100,000 gallons of liquid fuel and 100,000 kilograms of hydrogen per year.

First, Prometheus captures carbon dioxide (CO₂) and water (H₂O) from the air. Second, Prometheus uses only renewable electricity such as solar and wind power to turn the CO₂ and H₂O into long-chain alcohols and hydrogen via electrocatalysis. During this second step, oxygen is released, acting as a kind of mechanical forest, adding 1.3 million kilograms of oxygen to the air, or roughly the same amount of oxygen emitted by 127 acres of forest.¹ Third, Prometheus separates the alcohols from the remaining H₂O. Finally, a catalyst turns the alcohols into

¹ The forest equivalent refers to old-growth oak forest and is based on an approximate value determined by Timothy J. Fahey, professor of ecology in the department of natural resources at Cornell University. See C. Claiborne Ray, *Tree Power*, THE NEW YORK TIMES (Dec. 3, 2012), <https://www.nytimes.com/2012/12/04/science/how-many-pounds-of-carbon-dioxide-does-our-forest-absorb.html>.

hydrocarbons and recovers water. This step can be customized to produce gasoline, diesel, or jet fuel. Hydrogen is a co-product of this process. The proprietary catalysts used by Prometheus are licensed from U.S. National Laboratories, representing decades of successful national renewable energy research.

Unlike other companies that employ direct air capture of CO₂, Prometheus relies on no fossil-fuel energy to make its products, and does not contribute to or sustain business-as-usual fossil fuel use. Prometheus's electrofuel production also has no impact on the food supply as it does not compete with land use for agriculture and does not use food stocks like corn or vegetable oils. Prometheus's manufacturing process is designed to yield no waste, and to not add any new carbon emissions into the atmosphere.²

A 2021 techno-economic analysis and lifecycle assessment of the Prometheus process done by Ramboll, a well-respected engineering firm in the fuels space, shows that our energy efficiency is high – with a carbon intensity score close to zero – and conservatively estimates that our cost to capture carbon is \$36 per ton.³ The Ramboll report also confirmed the maturity of Prometheus's technology and its ability to deliver carbon-neutral fuel at a price that competes with legacy fossil fuels.⁴ In addition, our fuel requires no modifications to existing engines, has no blend limits, and burns cleaner than fossil fuels. Our fuel requires no new vehicle purchases. Thus, our fuel will be available to every community that utilizes transportation.

II. Comments specific to the Workshop.

At the Workshop, the CEC suggested that it should “[a]dd an optional on-site renewable hydrogen production component to a light-duty/multi-duty hydrogen refueling infrastructure solicitation currently in development.”⁵ We agree. The modularity in the Prometheus technology creates the opportunity for new efficiencies not previously available in the production of green hydrogen. What used to require offsite production – largely reliant on fossil energy connected to the grid – does not with Prometheus. Rather, the Prometheus Titan Fuel Forge is designed to “plug-in” directly to the renewable energy resource (e.g. solar field) and produce green hydrogen at that location. No fossil. No highly capitalized, single-use factory. No added transportation between production and consumption.

Not only can the onsite Prometheus process eliminate inefficiencies in other hydrogen production technologies produced offsite, the Titan Fuel Forge also is designed to “power on” and “shut down” with the availability/unavailability of the energy source. Whereas other processes rely on fossil energy, in part, because they do not have the flexibility to accommodate

² Compare with Letter from Environmental Justice Community to Administrator Michael Regan: Implementation of the Renewable Fuel Standard e-RINs for wood biomass, landfill gas, and factory farm gas, (May 25, 2021) (identifying that “[i]mpacted frontline communities already bear the disproportionate brunt of harm from the processing and burning of woody biomass, factory farm gas, and landfill gas.”), <http://foe.org/wp-content/uploads/2021/05/No-e-RINs-for-Biomass-Landfill-Gas-or-Factory-Farm-Gas-Letter-final-2.pdf>.

³ <https://prometheusfuels.com/news/3rd-party-techno-economic-analysis>.

⁴ <https://prometheusfuels.com/news/3rd-party-techno-economic-analysis>.

⁵ Workshop slide 20.

the intermittence associated with renewable energy, Prometheus's Titan Fuel Forge is designed to do the opposite. When the sun shines, the process can start. When the sun goes down, the process can stop.

In addition to the discussion around onsite hydrogen production, the Workshop also discussed the importance of CEC's renewable hydrogen programs being open to any type of feedstock and methods of production, and not necessarily limited to older models of electrolysis.⁶ Again, we agree. The CEC should allow any technology that can reduce reliance on fossil fuels and help the State achieve its climate goals to participate in CEC programs.

* * * *

Prometheus is well-positioned to help California decarbonize transportation by replacing the existing fossil-based transportation fuels with Prometheus zero net carbon electrofuels. This includes fossil-based and bio-based natural gas that provides the feedstock for conventional production of hydrogen. Prometheus reiterates its appreciation to CEC for its hard work in this area. We would welcome additional discussion with the team working on these important issues. Thank you for your consideration.

Sincerely,

Rob McGinnis, PhD
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Prometheus Fuels, Inc.
prometheusfuels.com

⁶ Verbal comment by CEC staff during Workshop.