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Comments on SB 100 Draft Report

Attached please find comments from Oberon Fuels on the SB 100 Draft Report on Charting a path to a 100% Clean Energy Future.

Additional submitted attachment is included below.

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November 19, 2020

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814
Docket No.: 19-SB-100
Submitted via email to: docket@energy.ca.gov

Subject: Oberon Fuels Comments re SB 100 Joint Agency Report: Charting a Path to a 100% Clean Energy Future – Draft Results Workshop

Introduction

Oberon Fuels appreciates the opportunity to comment on the Draft Results Workshop for Senate Bill 100 Joint Agency Report: Charting a Path to a 100% Clean Energy Future. Oberon supports this key legislation and the urgency behind it. Oberon also thanks the California Energy Commission, the California Public Utilities Commission and the California Air Resources Board for their work in preparing the report.

Oberon Fuels (Oberon) is a California-based company that produces innovative, ultra-low-carbon dimethyl ether (DME), which can used directly as a diesel replacement fuel, a feedstock for renewable hydrogen and as a carbon reducer when blended with propane.

Oberon recognizes that under SB 100, California's renewable energy and zero-carbon resources would supply 100 percent of electric retail sales to end-use customers and 100 percent of electricity procured to serve state agencies by Dec. 31, 2045. Oberon supports this policy. As described below, we are committed to accelerating the global carbon-reduction effort by adding carbon-negative fuel to California's suite of solutions.

Oberon Fuels provides these remarks to demonstrate our commitment to accelerating California's carbon-reduction effort by adding innovative, first-of-its kind fuels technology to the mission. We submit these comments in the interest of informing and broadening the knowledge base of the SB 100 interagency task force staff and the public in developing policies that lead us to carbon-neutrality by 2045, with the added benefit of bringing the existing fleet of liquid-fueled vehicles to carbon neutrality well before that deadline.

Background

Dimethyl ether's (DME) clean-burning properties and versatility as a fuel can reduce greenhouse gas emissions and criteria pollutants in three different ways (see below). Thus, we believe DME has a key role to play in CARB's LCFS and other fuel and vehicle GHG and criteria emission policies. DME can be produced from a variety of waste streams and renewable feedstocks and holds the potential to support the state's additional goals of methane reduction (SB 1383) as well as fossil fuel replacement.

Finally, DME also provides an economical pathway to the end goal of zero-emission mobility and carbon neutrality.

1) DME as a Diesel Replacement. DME has long been recognized as an excellent diesel replacement fuel. DME is a clean-burning, non-toxic and can be produced from renewable feedstocks. Its high cetane value (55-60) and quiet combustion, as well as its inexpensive fueling system, make it an excellent, inexpensive diesel alternative that will meet strict emissions standards and facilitate utilizing cleaner trucks and equipment, particularly Class 7-8 trucks and off-road equipment in the hard-to-electrify sector.

Oberon Fuels is currently leading a project funded by the California Energy Commission to upgrade its pilot DME production facility to demonstration scale and to produce the first renewable DME in the US at its plant in the Imperial Valley region of California (Brawley, CA).

DME has been used for decades as an energy source in China, Japan, Korea, Egypt and Brazil, and can be produced domestically from a variety of feedstocks, including biogas from organic waste produced in cities or by agricultural operations, as well as renewable natural gas. Ideal uses in North America are in the transportation, agriculture, emergency power and construction industries. DME made from a range of renewable feedstocks can make it extremely competitive, if not more affordable, than traditional diesel.

DME is a gas under ambient conditions. However, because it can be stored as a liquid under moderate pressure (similar to propane/LPG), it eliminates the need for the high-pressure containers used for CNG or cryogenics, as in the case of LNG. DME's easy handling properties make fueling and infrastructure relatively simple and inexpensive.

CARB's LCFS staff calculated the carbon intensity of DME from dairy biogas feedstocks produced by the Oberon process to be -278 (negative 278) when made from renewable natural gas with a CI of -150. In addition, DME is approved as a renewable fuel under the U.S. Environmental Protection Agency's Renewable Fuels Standard, making it eligible for RINs credits when made from biogas with the Oberon process. The EPA estimated that biogas-based DME offers a 68% reduction in greenhouse gases. Argonne National Laboratory, at the direction of the US Department of Energy, worked with Oberon, Volvo, Ford, Haldor Topsoe, and Lulea University in 2016 to update the GREET lifecycle analysis of DME. When using renewable feedstocks, the updated GREET analyses estimated DME to offer 85-101% GHG reduction. DME has also been issued specifications by ASTM International and the International Organization for Standardization (ISO) to ensure that as DME is rolled out as a fuel the right standards and regulations are in place to ensure a stable high-quality supply chain.

2) DME for Propane Blending. The second way that DME can be used to put cleaner vehicles on the road and decarbonize transportation is to blend it with propane for use in propane-powered vehicles. Up to 20% DME can be blended with propane with no changes required to the vehicles or fueling infrastructure. As mentioned, under ambient conditions, DME is a gas that can be stored as a liquid under moderate pressure, making it ideal for blending with propane.

As calculated by the California Air Resources Board, the current carbon intensity (CI) score of propane is 83 gCO_2e/MJ. CARB has calculated that, when DME is made from dairy biogas (which itself has a CI of -150), DME has a CI value of -278. With only a 5% blend (based on energy content) of DME, propane's baseline CI value decreases from 83 to 65, and at a 20% blend the CI value decreases to just 11, enabling propane to approach carbon neutrality in an economic manner using the same vehicles and fueling infrastructure. Particularly during the current economically challenging time, the ability to continue to achieve carbon reductions cost-effectively with existing assets is extraordinarily powerful.

The combination of DME's handling properties, its ability to be produced from diverse, abundant, renewable resources, and its significant greenhouse gas-reducing qualities make it an excellent choice for blending with propane in the transportation sector and beyond.

3) DME as a Hydrogen Carrier. The third way in which DME can decarbonize transportation is as a hydrogen carrier. DME is an excellent carrier molecule for transporting hydrogen to power a new generation of light- and heavy-duty fuel-cell electric vehicles and to provide increased supplies of renewable hydrogen:

- DME is particularly dense in hydrogen, with six hydrogen atoms on each DME molecule.
- DME can be made from a wide variety of renewable feedstocks, creating a new pathway for renewable hydrogen production.
- DME liquefies at low pressure (~73 psi), making it much easier and less expensive to transport than hydrogen, which can need to be compressed at up to 10,000 psi of pressure. Extracting hydrogen from DME is a relatively simple, inexpensive process compared to natural gas to hydrogen conversion.

Discussion

Oberon recognizes that California's policy focus is on electrification. Governor Newsom's Sept. 23, 2020, executive order directs California to require that by 2035, all new cars and passenger trucks sold in the state be zero-emission vehicles.[1]

Meanwhile, the Legislature's SB 100 establishes a policy requiring renewable energy and zero-carbon resources supply 100% of electric retail sales to end-use customers by 2045.[2] Oberon agrees that electrification is critical to reducing carbon emissions and reversing the catastrophic impacts California already has suffered from global warming.

At the same time, between now and 2035 (and 2045), tens of millions of vehicles on the road – and thousands of emergency power generators and rural homesites – will require liquid fuels. According to the U.S. Department of Transportation, passenger vehicles are lasting longer on the road today, edging up to 11.8 years in 2019.[3] The economic headwinds encountered in 2020 promise to extend vehicle lives even further as consumers postpone new vehicle purchases in the face of an uncertain economy.

[1] Executive Order N-79-020.
[2] https://www.energy.ca.gov/sb100.
[3] https://www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states.

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To bridge the gap between the liquid present and the electric future, policymakers cannot lose sight of innovations that deliver immediate health and environmental benefits to the state and its residents. Oberon's fuel provides several planks in that bridge.

Conclusion

Oberon Fuels respectfully requests the SB 100 interagency task force seriously consider and fold into its reporting the fact that renewable fuels like ours provide immediate, near- and, long-term carbon reductions in not just transportation, but also other liquid fuel uses such as emergency power generation and rural home use. As such, when evaluated as a companion to electrification as contemplated in policies such as SB 100, our fuel technologies can be integral to the overall, shared mission to reduce global warming and climate change.

We welcome additional discussion with the team working on these important issues, and we thank you for your consideration. We look forward to continuing to work with the state of California to move our state towards carbon neutrality.

All the Best,

Rebecca Boudreaux

Rebecca Boudreaux, Ph.D.
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