



December 11, 2017

Samuel Wade, Chief of Transportation Fuels Branch
Air Resources Board
1001 I Street
Sacramento, CA 95812

(Comment submitted electronically to LCFSWorkshop@arb.ca.gov)

RE: Support for Design-Based Pathway Provision

Dear Mr. Wade,

Fulcrum BioEnergy, Inc. (“Fulcrum”) appreciates the opportunity to provide comments regarding the Air Resources Board’s (“ARB”) draft regulations to revise the Low Carbon Fuel Standard (“Draft Regulations”). Fulcrum is a world leader in the production of low carbon fuels from post-separated municipal solid waste (“Separated MSW”). This Comment expresses Fulcrum’s support for the ARB proposal to include design-based pathways in the Low Carbon Fuel Standard (“LCFS”) to better achieve California’s greenhouse gas (“GHG”) reduction goals.

Fulcrum’s Next Generation Biofuel Processing Technology

Fulcrum is the parent company of Fulcrum Sierra BioFuels, LLC (“Sierra BioFuels”). Sierra BioFuels is constructing and will own and operate a commercial scale low carbon fuel production facility comprised of a Feedstock Processing Facility and a Biorefinery (together the “Sierra BioFuels Plant”). The Feedstock Processing Facility is operational and is located near the Lockwood Regional Landfill in Storey County, Nevada. The Biorefinery is located approximately 20 miles east of Reno in the Tahoe-Reno Industrial Center. The Sierra BioFuels Plant will transform Separated MSW into very low carbon diesel fuel that is anticipated to meet ARB’s stringent future standard for low emission diesel fuel.¹ The Feedstock Processing Facility will receive Separated MSW that would

¹ See Air Resources Board, Mobile Source Strategy, May 2016, (low emission diesel specifications anticipated to be less than one percent aromatics, near zero sulfur, and a CI of 30-60 gCO₂e/MJ), <https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf> (last viewed September 12, 2016) at 153-155.



otherwise be landfilled. A sophisticated feedstock processing system will shred, screen, and sort the MSW producing a MSW-derived feedstock. The resulting products from the Feedstock Processing Facility include the MSW-derived feedstock and recoverable materials with market value (e.g. ferrous and nonferrous metals and high value plastics). The Biorefinery will have the capability to convert the MSW-derived feedstock into very low carbon diesel fuel, jet fuel, and bio-crude using a three-step process comprised of steam reformation, Fischer-Tropsch (“FT”) synthesis, and hydroprocessing.

Design-based Pathways

Prior to the effective date of the re-adopted LCFS (December 31, 2015), low carbon fuel producers could apply for LCFS pathway approval prior to facility commissioning based on the design and engineering of the planned production facility. Such pathways were referred to as prospective pathways (“Prospective Pathways”).

Through proposed §95488.8(e), ARB has proposed to establish a new regulatory basis for Prospective Pathways. As stated in the commentary notes, “a category known as ‘design-based’ pathways has been added for facilities not yet in commercial production to obtain a CI that cannot be used to generate credits.”² Fulcrum is strongly supportive of this proposed regulation, and is able to relate information regarding the company’s direct experience regarding the importance of an ARB approved CI in the financing and development of new low carbon fuel facilities.

Fulcrum’s Experience with a Design-based Pathway

Fulcrum was successful in obtaining approval for a Prospective Pathway using the CA-GREET 1.8b model under the prior LCFS regulation. Specifically, Fulcrum obtained a pathway for Fischer-Tropsch (“FT”) diesel via gasification and FT synthesis of MSW (Pathway Code: FTD 001). Subsequently, Fulcrum received notice that ARB was prepared to re-certify Fulcrum’s pathway under CA-GREET 2.0 with a CI score of 14.78. Fulcrum accepted this re-certification.

ARB’s approval of Fulcrum’s Prospective Pathway approval and re-certification of the FTD 001 pathway has been valuable in facilitating the financing of the Sierra BioFuels Plant. Fulcrum’s Prospective Pathway is highly important to investors and impacts the facility’s financial projections because Fulcrum’s CI score of 14.78 will provide more

² Proposed regulations at p. 110 (explanatory notes).



than \$1.00 of LCFS credit value per gallon in the current LCFS credit market of approximately \$100 per MT.

The Importance of Very Low Carbon Fuels to California

Under California law, very low carbon fuels reduce CI by a minimum of 60% compared to a petroleum fuel baseline. This standard was originally established by AB 692, a statute that mandates the escalating use of very low carbon fuels by California state agencies and state fleets. AB 692 and other California policy measures recognize the importance of very low carbon liquid fuels that can be distributed by the robust existing petroleum network and utilized by the vast existing fleet of gasoline and diesel vehicles. In order to meet California's aggressive GHG and criteria pollutant emission reduction requirements, displacement of conventional petroleum fuels by very low carbon fuels is essential. California is currently integrating this very low carbon fuel imperative into state transportation policy in multiple respects:

- Low Carbon Fuel Standard- A total CI reduction of 18% is proposed to be achieved between 2011 and 2030.
- SB 32/ AB 197- Pursuant to these statutes, California must reduce its GHG emissions 40% below 1990 levels by 2030 necessitating dramatic GHG reductions compared to current policies. Transportation emissions are the dominant source, constituting 35% of California's total GHG emissions of 441.5 MMTCO₂e.³
- Mobile Source Strategy- ARB has proposed to establish standards for Low-Emission Diesel ("LED"), and would require that diesel fuel providers sell steadily increasing volumes of LED until it comprises 50% of total state diesel sales by 2031. Based on current California Energy Commission ("CEC") estimates, this will require 1.6 billion of LED supply.⁴ Based on LCFS data, there was a combined total of 311 million DGE of renewable diesel, biodiesel, BioCNG and BioLNG supplied in 2015, representing less than 20% of the 2030 target.⁵

³ Air Resources Board, Public Workshop on the Transportation Sector to Inform Development of the 2030 Target Scoping Plan Update, September 14, 2016, <https://www.arb.ca.gov/cc/scopingplan/meetings/091316/FINAL%20Scoping%20Plan%20Transport%20Workshop.pdf> (last viewed September 19, 2016), at slide 11 and 14.

⁴ Air Resources Board, Mobile Source Strategy, May 2016, <https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf> (last viewed September 19, 2016) at p. 151, 153-155.

⁵ Air Resources Board, LCFS Data Dashboard, Tab 2, Alternative Fuel Volumes and Credit Generation <https://www.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm> and accompanying spreadsheet (last viewed September 12, 2016).



- Proposed 2016 Strategy for the State Implementation Plan (“Proposed SIP”)- California’s Proposed SIP includes the same target as the Mobile Source Strategy of 50% diesel market penetration by LED by 2031. Notably, only some portion of the current LCFS alternative diesel fuel supply would meet the LED standard referenced in the Proposed SIP of 30-60 g CO₂e/MJ, less than one percent aromatics, and virtually no sulfur.⁶

Conclusion

Thank you for your consideration of our input. We would welcome the opportunity to provide any further information that would be value to ARB on this subject.

Sincerely,

A handwritten signature in black ink, appearing to read "Ted Kniesche", written in a cursive style.

Ted Kniesche
Vice President, Business Development
Fulcrum BioEnergy, Inc.

⁶ Air Resources Board, Proposed 2016 State Stratetgy for the State Implementation Plan, May 17, 2016, <https://www.arb.ca.gov/planning/sip/2016sip/2016statesip.pdf> (last viewed September 12, 2016) at 101-103.