



October 19, 2016

Jim M. Aguila, Chief of Program Planning & Management Branch
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: Recommendation to Include Prospective Pathways in Low Carbon Fuel Standard
on a Discretionary Basis

Dear Mr. Aguila and 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”). Fulcrum is recommending that ARB re-integrate Prospective Pathways into 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)



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.

Status of Prospective Pathways under the LCFS

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”).

As part of the regulatory revisions considered during the re-adoption process, ARB proposed eliminating Prospective Pathways and allowing facilities to generate tradeable LCFS credits only after the applicant had submitted a full two years of “(i)nvoices and receipts for all forms of energy consumed in the fuel production process.” Facilities with one quarter or more of energy data could receive a provisional pathway (“Provisional Pathway”) but ARB initially proposed that facilities with Provisional Pathways could generate only provisional credits that could not be sold or traded. There was significant concern expressed during the rulemaking process that these LCFS program modifications would increase the already daunting challenge of financing a next generation facility. ARB subsequently modified the LCFS proposal to allow facilities with one full calendar quarter of energy consumption data that received a Provisional Pathway to generate and trade LCFS credits subject to certain conditions.²

While ARB partially addressed industry concerns by enabling facilities with Provisional Pathways to generate and trade credits, the re-adopted LCFS did not authorize the establishment of Prospective Pathways. Instead, ARB provided for a limited window for facilities to apply for a Prospective Pathway until December 31, 2015. Facilities that were successful in this effort received a certified carbon intensity (“CI”) score. ARB further agreed to re-certify approved Prospective Pathways to the new CA-GREET 2.0 model. ARB’s approach to Prospective Pathways is best summarized by the FAQ on the re-certification process released earlier this year:

² See ie. Air Resources Board, Proposed Second 15-Day Regulation Order, §§ 95488(c)(2), 95488(c)(3), 95488(c)(4), and 95488(d)(2) and changes thereto at p. 63- 91, <https://www.arb.ca.gov/regact/2015/lcfs2015/lcfsmodregorder.pdf> (last viewed September 19, 2016).



Q: Can a facility that was given a certified pathway under the original LCFS regulation be re-certified as a legacy pathway if the facility is not expected to have one-quarter of commercial or operational data after the re-adopted LCFS goes into effect on January 1, 2016?

A: Yes. A facility may request re-certification of their certified prospective pathway and may receive a re-certified, prospective CI without the operational data that would otherwise be required for new pathway applicants. However, commercial operational data for each quarter must be submitted as soon as it is available to allow the Executive Officer to adjust the provisional CI based on these data if necessary as detailed in § 95488(d)(2). The provisional nature of the CI will be removed after a full two years of operating data is submitted.³

Fulcrum's Pathway Status

Fulcrum appreciates the opportunity that ARB provided in 2015 for planned facilities to obtain Prospective Pathways. 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). Recently, 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 has 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 than \$1.00 of LCFS credit value per gallon in the current LCFS credit market of approximately \$100 per MT.

³ Air Resources Board, LOW CARBON FUEL STANDARD (LCFS) FREQUENTLY ASKED QUESTIONS RELATED TO THE RE-ADOPTED LCFS REGULATION, Last Update: January 6, 2016, <https://www.arb.ca.gov/fuels/lcfs/fuelpathways/faq-01062016.pdf> (last viewed September 19, 2016) at p. 9.



Recommendation

Due to the importance of Prospective Pathways to the financing of production facilities, Fulcrum recommends that ARB utilize the current LCFS rulemaking to re-integrate Prospective Pathways into the LCFS. The Prospective Pathway process serves a vital purpose in facilitating the development of next generation facilities that can produce very low carbon fuels including “drop-in” fuels that integrate seamlessly with existing infrastructure and vehicles. As an example, Tesoro has announced its intent to purchase Fulcrum’s very low carbon intensity bio-crude at its Martinez Refinery.⁴ To the extent that Fulcrum supplies bio-crude to Tesoro, this material will directly displace high CI fossil crude and lower the CI of the gasoline and diesel fuel that Tesoro supplies to the marketplace. Given the production capacity of Tesoro’s refining operations, this supply agreement enables Fulcrum to rapidly increase supply of a low carbon fuel without encountering the distribution challenges that alternative fuels must typically overcome.

Regrettably, Fulcrum was unable to apply for a Prospective Pathway for bio-crude in 2015 that would be refined into finished fuel by Tesoro due to time and resource limitations. The lack of a Prospective Pathway has added additional uncertainty around the Sierra BioFuels’ marketing plans and has complicated the development and financial close of the project. It is important for Sierra BioFuels’ investors and its lender that Sierra BioFuels obtain an ARB-certified Prospective Pathway with a CI score that is specific to co-processing as soon as possible (and well before commercial operations). Other similarly situated facilities that do not yet have Prospective Pathways also face financing challenges due to the lack of an ARB approved CI score. The lack of Prospective Pathways for next generation facilities could undercut the effectiveness of California’s aggressive program to reduce GHG’s from transportation fuels and to expand the supply of very low carbon fuels. The following summaries of key aspects of California’s programs to reduce GHG emissions in the transportation sector demonstrate the importance of developing new types and sources of very low carbon fuels for California.

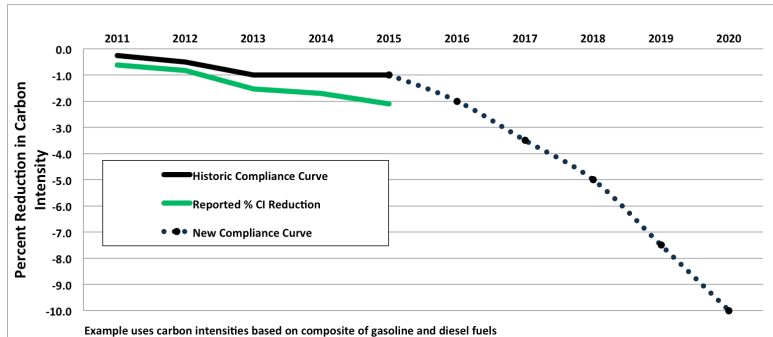
⁴ Kristen Hays, Reuters Commodities, Tesoro working with partners to run crude in U.S. made from biomass, January 20, 2016, <http://www.reuters.com/article/us-tesoro-biocruide-idUSKCN0UY0GQ> (last viewed September 20, 2016).



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- An additional 8% CI reduction must be achieved between 2016 and 2020, in addition to the 2% CI reduction achieved between 2011 and 2015.⁵

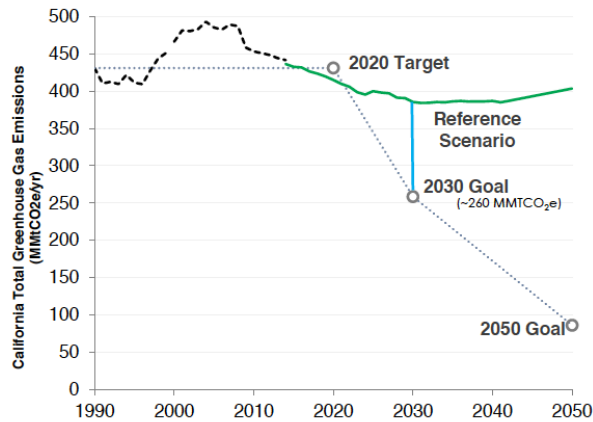


⁵ Air Resources Board, LCFS Data Dashboard, Tab 1, 2011-2015 Performance of the Low Carbon Fuel Standard, <https://www.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm> (last viewed September 12, 2016).



- 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.⁶

Draft Reference Scenario



- 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.⁷ 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.⁸

⁶ 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.

⁷ 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.

⁸ 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.⁹

Proposed Regulatory Structure

We have included specific proposed language to establish Prospective Pathways in the LCFS as an Annex to this letter. The language is styled on the proposed Provisional Pathway regulation found at 14 CCR §95488(d)(2).

Fulcrum recognizes the legitimacy of concerns that ARB has expressed regarding the dedication of staff time to the development of Prospective Pathways. In particular, there is concern that some proposed projects are not sufficiently mature in the development cycle to warrant the resources that ARB must deploy to review and analyze a proposed pathway. Developers may lack components necessary for project completion or the planned production facility may be too remote to supply the California market. To address this concern, we are proposing that the Executive Officer have broad discretion to determine whether a particular project warrants review for a Prospective Pathway.

Conclusion

Thank you for your consideration of our input. We would welcome the opportunity to discuss any aspect of this issue or our proposal further at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Ted Kniesche", is positioned above the typed name.

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

⁹ Air Resources Board, Proposed 2016 State Strategy 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.



Annex- Proposed Draft Regulation

14 CCR §95488(d)(3)

(3) *Prospective Pathways.* As set forth in sections 95488(c)(3) and (c)(4)(I)2, LCFS fuel pathways are generally developed for fuels that have been in full commercial production for at least two years. In order to encourage the development of innovative fuel technologies, however, applicants of fully engineered and designed Tier 2 facilities may petition the Executive Officer to submit New Pathway Request Forms, as set forth in section 95488(c)(1).

For any such petitions, the Executive Officer shall have broad discretion to determine whether the facility is sufficiently likely to achieve commissioning to warrant the staff time necessary to evaluate the fuel pathway application. The Executive Officer may consider all relevant criteria in making this determination including whether the facility has been sufficiently designed and engineered to warrant confidence in energy consumption and other key performance metrics, to what extent the facility is likely to supply fuel to the California market, and the degree of precision that the applicant is able to supply regarding the facility's anticipated performance.

In the event that the Executive Officer grants the petition, the applicant may submit New Pathway Request Forms, as set forth in section 95488(c)(1). If that form is subsequently approved by the Executive Officer, as set forth in section 95488(c)(2), the Executive Officer may grant prospective certification of the fuel pathway application. The approval shall clearly indicate that the pathway is prospective in nature and shall describe the applicable operating conditions that underlie the pathway. The prospective pathway approval cannot be used to generate credits. Prior to generating any credits, the applicant will be required to complete the provisional pathway process established by section 95488(d)(2), or otherwise obtain certification of the pathway by the Executive Officer as set forth in section 95488.