

Staff Summary
Method 2B Application:
FT Diesel via Gasification and FT Synthesis of MSW
Fulcrum Sierra BioFuels, LLC, Pleasanton, CA
(Pathway Code: FTD 001)

Deemed Complete Date: December 30, 2015
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Pathway Summary

Fulcrum BioEnergy, Inc. (“Fulcrum”), the parent company of Fulcrum Sierra BioFuels, LLC (“Sierra BioFuels” or the “Applicant”), has applied for a Method 2B Application for the establishment of a new fuel pathway under the California Low Carbon Fuel Standard (“LCSF”) for its process of converting municipal solid waste (“MSW”) into Fischer-Tropsch (“FT”) diesel fuel.

Sierra BioFuels is constructing a MSW-to-FT diesel fuel facility comprised of a Feedstock Processing Facility and a biorefinery (together the “Sierra BioFuels Plant”). The Feedstock Processing Facility will receive MSW that otherwise would have been landfilled. A sophisticated feedstock processing system shreds, screens, and sorts the MSW producing a MSW-derived feedstock meeting the feedstock specification required for conversion into renewable fuel at the biorefinery. Recyclable materials are recovered and sold to the commodity market. Residual materials (e.g. inerts, high moisture content waste) are sent to the landfill. The MSW feedstock is transported to the biorefinery where it is converted to FT diesel using a three-step process comprised of steam reforming gasification, FT liquids synthesis and hydroprocessing upgrading technologies. Natural gas is used for process energy and additional power is imported from the grid.

The Feedstock Processing Facility 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 applicant is requesting a carbon intensity (“CI”) of 37.47 g/MJ. The CI value for this pathway is based on a lifecycle analysis conducted using a model comparable to the CA-GREET 1.8b model.

Carbon Intensity of FT Diesel

The pathway follows the framework for biomass to FT diesel in the CA-GREET1.8b model. Efficiency inputs are modified to reflect the applicant’s process. The upstream emissions for natural gas and electricity are based on CA-GREET default values. The avoided landfill emissions follow the ARB approach used for waste material pathways. The calculated values for the pathway are shown in the table below.

**Table 1
Proposed Lookup Table Entries**

Fuel	Pathway Identifier	Pathway Description*	CI Value (gCO ₂ e/MJ)		Total
			Direct CI	Indirect LUC	
MSW to FT Diesel	FTD001	Method 2B Application: MSW to FT Diesel via Gasification and FT Synthesis	37.47	0	37.47

* Conditions Apply

Operating Conditions

Due to limited production data available for the FT process, the applicant used default inputs from CA-GREET 1.8b for FT diesel production. Staff therefore, imposes constraints on production of FT diesel from this prospective pathway which are listed below. The applicant is required to submit one (1) calendar quarter of commercial production data to obtain an updated provisional CI for this pathway prior to generating LCFS credits. In addition,

- The company shall provide evidence that the assumptions regarding process operating conditions and yields are valid as described in the application.
- The company shall provide evidence that recycled material is sold for reuse as primary materials.
- The company shall provide quarterly receipts for up to eight (8) quarters to support the quantity of FT diesel produced from the Sierra BioFuels Plant, including MSW consumed, natural gas consumed, electric power consumed, FT diesel produced, and co-products (e.g. recycled materials) produced.
- Any additional lifecycle inventory data, process information, etc. should also be made available if requested prior to certifying a provisional CI.
- Conformance with the CA-GREET 2.0 model (or version of CA-GREET applicable at the time of consideration of a provisional CI) may be required.

Staff Analysis and Recommendation

Staff has reviewed Sierra BioFuels' Method 2B application and has replicated, using the model supplied, the CI value calculated by the applicant. Sierra BioFuels provided energy inputs developed from a process simulation model for the Fulcrum FT fuel production process. Based on a preliminary assessment using the limited information provided, staff has estimated a CI that matches the

CI proposed by the applicant. Since the applicant provided limited process data consistent with a material balance, staff recommends that the Sierra BioFuels' Method 2B application be approved as prospective with a CI value for the pathway listed in the table above.

Fuels with prospective CIs are not eligible to claim credits under the LCFS. It will require the applicant to provide one (1) quarter of operational data once commercial production has commenced. Staff will then complete an updated lifecycle analysis and if warranted, make necessary adjustments to the originally certified prospective CI and approve a provisional CI for the pathway being considered in this application. To confirm compliance with updated operating conditions, the Executive Officer may reevaluate any aspect of the review at any time and revise the certification to reflect new information. At any time after certification, the Executive Officer may increase the CI values upon determination that the provisional CI underestimates the fuel lifecycle CI. (Cal. Code Regs. tit. 17, § 95486, subd. (e)(3)(K) (Original LCFS); Cal. Code Regs. tit. 17, § 95488, subd. (c)(5)(L) (from January 1, 2016).)