

**Staff Summary
Method 2B Application
Universal Biofuels Private, Ltd
Tallow (BIOD039) and Used Cooking Oil (BIOD040) to Biodiesel Pathways**

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Pathway Summary

Universal Biofuels Private, Ltd (henceforth Universal) produces mixed-feedstock fatty acid methyl ester (FAME) biodiesel (BD) at its facility in Andhra Pradesh, India. The facility is permitted to produce 45 million gallons of BD annually. Universal produces BD from Indian sourced tallow (high-energy rendered) and used cooking oil (UCO, cooking required) from China, Thailand and Saudi Arabia. As explained later in this summary, Universal is permitted to import UCO from anywhere in the world due to using conservatively high shipping distances, electricity resource generation mix, and cooking required for UCO in their CI calculations.

Universal has supplied two years of operating data to support their BD pathway CIs, which includes grid electricity invoices, diesel invoices (for backup electricity generation), and rice husk invoices for thermal fuel combusted in a biomass boiler. Universal provided support that the rice husks should be considered a food-processing by-product with zero CI agriculture emissions, and due to the abundance of rice husks they should also have a zero CI regarding product displacement (replaced by another product) due to their use as a thermal energy fuel. Universal accounted for the CI of transporting the rice husks to their facility and for nitrous oxide and methane associated combustion emissions.

Universal's tallow to BD pathway utilizes the tallow rendering parameters (except as discussed in the next section) and the resulting lifecycle emissions from a Method 2B (effectively a Method 1) pathway authored by the National Biodiesel Board (NBB) for rendered and mixed animal fats to BD. The pathway code for the NBB reference pathway is BIOD008. Universal used specific parameters for the electricity resource mix utilized when rendering tallow and transportation of the rendered tallow to Universal's facility.

Universal's used cooking oil to BD pathway utilizes some of the feedstock portion parameters of the lifecycle analysis (LCA) from the existing Low Carbon Fuel Standard (LCFS) UCO to BD (cooking required) pathway code BIOD002. Universal assumed conservatively high CI inputs for UCO transport and the electricity resource mix, which are discussed in the next section.

Universal has estimated their BD CI conservatively high to allow staff to accept the application without further verification, which is discussed in the next section of this summary.

Carbon Intensity of the Fuel Produced

Universal's LCAs result in pathway CIs (see table below) that are greater than the respective Method 1 reference pathways. Due to their CIs being higher than the respective Method 1 reference pathways, Universal had to apply under Method 2B. Because Universal's application was submitted under the Method 2B process, it is not subject to the substantiality requirements with which Method 2A applications must comply (a minimum improvement of five gCO_{2e}/MJ, and a minimum production volume of ten million gallons per year).

Universal may apply for new pathways to update their lifecycle parameters in the future. Universal has expressed interest in pursuing updates for some parameters that they agreed to assume conservatively high CI inputs. Making these conservative assumptions allowed staff to approve their application without further verification.

Universal estimated their CI conservatively high in the following ways:

1. Universal refines glycerol at their BD facility in a separate process, but with the same invoices for rice husks that are used for thermal energy, grid electricity invoices (separate internal meter for glycerol refining), and diesel invoices for electricity generation when the electric grid is not operational. Staff could not verify the process energy inputs split between the BD and glycerol refining in time to approve this pathway. Staff recommended that Universal allocate all of the inputs to BD production. Universal agreed with the more conservatively high CI allocation recommended by staff, and may reapply with more information that is verifiable by staff.
2. Universal currently sources most of their UCO feedstock from China, Thailand and Saudi Arabia. Due to the likelihood of these sources to change in the future, staff recommended that Universal assume very conservative UCO transportation distances and the UCO cooking electricity resource mix for feedstock sourcing and rendering. The parameters and values accepted by Universal are shown below.
 - UCO truck transport to port: 110 miles
 - UCO ocean tanker transport: 11,500 miles
 - Electricity generation resource mix for cooking UCO: 5% residual oil; 15% natural gas; 80% coal

Universal may reapply to use data that are more representative of their actual UCO feedstock parameters when these parameters are verifiable by staff.

3. Universal sources rendered tallow from India. The tallow renderers that supply tallow to Universal use woody biomass for thermal processing. Staff could not verify the use, the source, and the CI of the woody biomass in time for Universal to receive staff approval for the pathway. Universal agreed to use the default, Method 1, high-energy rendering and inputs for the feedstock portion of their tallow to BD pathway. Universal also conservatively allocated 100% of the thermal energy source for rendering tallow to natural gas, despite the default allowing for some (zero CI) tallow use as a thermal energy source. Universal may reapply with verifiable information regarding the use and source(s) of woody biomass used as a thermal fuel source at the rendering facilities. Staff must be supplied with sufficient information to verify the CI of woody biomass used by the tallow rendering facilities.

The following table summarizes the CIs determined by Universal.

Proposed Lookup Table Entries

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity in gCO ₂ e/MJ		
			Direct Emissions	Land Use or other Indirect Effects	Total
Biodiesel	BIOD039	2B Application*: Indian sourced high energy rendered tallow; Biodiesel Produced in Andhra Pradesh, India; biomass (rice husks); grid and backup diesel generator electricity	57.84 55.42	0	57.84 55.42
Biodiesel	BIOD040	2B Application*: Used Cooking Oil sourced world-wide where “cooking” is required; Biodiesel Produced in Andhra Pradesh, India; biomass (rice husks); grid and backup diesel generator electricity	24.45 24.21	0	24.45 24.21

*Specific Conditions Apply

Operating Conditions (*Specific Conditions Apply)

Operations at the Universal facility are subject to the following conditions designed to ensure that the CI of the BD produced will remain at or below the values appearing in the above table for all volumes of BD sold in California:

- 1) Except for periods of abnormal operations, such as planned maintenance or unpredictable, unavoidable, and uncontrollable *force majeure* events, the resulting fuel CI, which is based primarily on thermal and electrical energy use, and transportation parameters, shall not be exceeded.
- 2) All gallons produced under all certified LCFS Method 2 pathways shall inherit the same CI increment from the consumption of process energy at the plant. The applicants may not allocate process energy CIs so as to reduce the total life cycle CI of some subset of the gallons produced (e.g., those being shipped to California) and increase the CI of the remaining gallons.
- 3) Universal shall not sell BD under the LCFS that exceeds the amount produced by rendered tallow or UCO feedstocks received by the Universal facility with the assigned pathway CIs in the table above.
- 4) The commingled feedstock accounting method¹ will be used to determine the CIs for biodiesel produced using different feedstocks at this facility. Producers and regulated parties should use this approach to calculate the volumes based on weighted average of biodiesel associated with each feedstock present in the finished fuel storage tank at any given time. Producers should be able to provide records that unequivocally associate specific quantities of feedstock with specific volumes of fuel produced. As volumes are added to and withdrawn from the tank, the volume of each feedstock-related CI will be adjusted to account for those additions and withdrawals. Commingled feedstock CI accounts for various feedstocks must be directly determined over an accounting period of no more than a calendar quarter. That is, all volumes of fuel produced must be associated with a specific feedstock within a calendar quarter. Gallons will be associated with feedstocks based on the accepted yields for each fuel.

Staff Analysis and Recommendation

Staff has reviewed Universal's Method 2B application, and finds the following:

- Staff has replicated, using the CA-GREET 1.8b spreadsheet, the CI values calculated by the applicant.
- Staff has concluded that the actual energy consumption and specified material inputs at Universal's facility are not likely to exceed the energy or material input consumption levels specified in the Method 2B application.

¹ California Air Resources Board, 2012. Mixed-Feedstock Bio- and Renewable Diesel Guidance Low Carbon Fuel Standard, December 3, 2012: <http://www.arb.ca.gov/fuels/lcfs/2a2b/internal/mixed-feedstock-bdrd-120112.pdf>

Based on these findings, staff recommends that Universal's application for pathways described above be approved.