

**Staff Summary
Method 2B Application
Neste Singapore Pte Ltd.
Mixed Used Cooking Oil to Renewable Diesel Pathway
(RNWD027)**

Deemed Complete Date: November 17, 2015
Posted for Comment Date: November 20, 2015
Certified Date: December 1, 2015

Pathway Summary

Neste Singapore Pte Ltd. produces non-ester renewable diesel (RD) from multiple feedstocks at its plant in Singapore. The plant produces approximately 250 million gallons of RD annually. Neste's non-ester product is marketed under the NEXBTL trademark.

Neste has applied for a Low Carbon Fuel Standard (LCFS) pathway covering the RD produced from mixed used cooking oil (UCO) at its Singapore plant. Mixed used cooking oil consists of yellow grease and used cooking oil. The mixed UCO is procured from collectors operating in different global regions: (e.g. United States, Canada, Southeast Asia, Mid-America, South America, Australia, Africa, Asia, and Europe). Because the UCO is purchased from different regions, Neste elected to use the worst case scenario, Global Energy Mix and farthest shipping distance, in calculating its carbon intensity score. The feedstock is transported 250 miles by truck to the ports and then shipped 11,500 nautical miles to the Neste plant. Once the mixed UCO has been converted to renewable diesel, the finished fuel is transported an estimated 7,677 nautical miles by ocean tanker to Los Angeles.

Neste's process generates a propane-rich off-gas as a co-product. The propane-rich off-gas is produced during the hydrotreatment process. The yield is not feedstock specific. The high pressure portion of this off-gas (both high- and low-pressure gas is generated) is conveyed via a dedicated pipeline to a hydrogen plant located on Jurong Island. There it displaces natural gas that would otherwise have been consumed as both a process fuel and a feedstock at the steam-methane reformer. The hydrogen supplied by the Jurong Island plant is piped back to the Neste plant where it is used for hydrotreatment. The low-pressure propane-rich off-gas is sent to a natural gas steam boiler that provides process heat to the RD plant.

Carbon Intensity of the Fuel Produced

The LCFS lookup table currently contains no pathway covering RD produced in Singapore from mixed UCO. Therefore, the Neste pathway falls under the Method 2B provisions of the LCFS. Because Neste'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 gCO₂e/MJ, and a minimum production volume of ten million gallons per year).

As shown in the following table, the applicant has calculated its pathway CI to be 30.72 gCO₂e/MJ. This CI includes a 3.09 gCO₂e/MJ credit for the natural gas displaced by the propane-rich off-gas from the RD plant. This proposed carbon intensity value includes transportation of the feedstock to the refinery, renewable diesel production, finished fuel transportation to California, and vehicle tailpipe emissions.

Operating Conditions

Proposed Lookup Table Entry

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity in gCO ₂ e/MJ		
			Direct Emissions	Land Use or other Indirect Effects	Total
Renewable Diesel	RNWD027	2B Application*: Global Mixed UCO where “cooking” is required to Renewable Diesel; Fuel Produced in Singapore	30.72	0	30.72

*Specific Conditions Apply

Operations at the plant will be subject to the following condition designed to ensure that the CI of the of the mixed UCO RD produced at the Singapore plant will remain at or below the value appearing in the following table for all volumes of mixed UCO-based RD sold in California:

- 1) Except for periods of abnormal operations, such as planned maintenance or unpredictable, unavoidable, and uncontrollable *force majeure* events, the total thermal and electrical energy use values specified in the Neste application 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. An example of such a reallocation would be associating California-bound gallons with the consumption of biogas and non-California-bound gallons with the consumption of natural gas.

Staff Analysis and Recommendation

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

- Staff has replicated, using the CA-GREET spreadsheet, the carbon intensity values calculated by the applicant; and
- Staff has concluded that the plant's and the feedstock supplier's actual energy consumption is not likely to exceed the energy consumption levels specified in Neste's Method 2B application.

On the basis of these findings, staff recommends that Neste's application for a Method 2B pathway be approved.