

**Summary of CA-GREET Model Pathway for Biodiesel Produced
in the Midwest from UCO**

The Midwestern used cooking oil biodiesel (UCO BD) pathway described in this analysis yields a higher carbon intensity (CI) than the approved "Detailed California-Modified GREET Pathway for Biodiesel Produced in California from Used Cooking Oil."¹ The CI differences between these pathways are shown in Tables 2 and 4, below. Except for the final distribution and use of the fuel, all of the production steps for the Midwestern product occur in the Midwest. The carbon intensity difference between the Midwestern and California fuels is due to: (1) differences in the feedstocks used to generate electricity in the two regions, and (2) the distances the finished biodiesel must be transported for final use.

The differences between the electrical generation fuel mixes used in the current and approved UCO pathway analyses are shown in Table 1.

Table 1: Electrical Generation Fuel Mix Differences Between the California and Midwestern UCO Pathways

	Natural Gas	Coal	Biomass	Other (Solar Wind, Hydroelectric, etc.)
Midwest	33.5%	51.6%	5.8%	9.1%
California	78.7%	0%	0%	21.3%

The differences in the BD transport distances are as follows:

- Approved California pathway: 50 miles to bulk terminals and 90 miles to distribution points, all by heavy-duty diesel truck;
- New Midwestern pathway: 1,400 miles by rail to California and 90 miles to distribution points by heavy-duty diesel truck.

Tables 2 through 4 summarize the CI differences between the new Midwestern pathway and the already approved UCO pathways

¹ California Environmental Protection Agency, Air Resources Board. September 23, 2009. Detailed California-Modified GREET Pathway for Biodiesel Produced in California from Used Cooking Oil. Stationary Source Division, Version: 2.0. http://www.arb.ca.gov/fuels/lcfs/092309lcfs_ucobd.pdf

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Table 2: Carbon Intensity Comparison—BD produced in the Midwest (New Pathway) versus BD produced in CA (Existing Approved Pathway) (Cooking Required)

	New Midwest Pathway Emissions (gCO₂e/MJ)	Existing CA Pathway Emissions (gCO₂e/MJ)
Rendering of UCO	5.71	4.73
UCO Transport (after rendering)	0.31	0.31
Biodiesel Production	6.07	5.56
Biodiesel Transport	1.87	0.76
Total (Well To Tank)	13.96	11.36
Total (Tank To Wheel)	4.48	4.48
Total (Well To Wheel)	18.44	15.84

For the scenario where no cooking is required, the only difference in carbon intensities results from UCO rendering emissions (Table 3).

Table 3. Comparison of Rendering Carbon Intensities (Cooking versus Non-cooking)

	New Midwest Pathway Emissions (gCO₂e/MJ)	Existing CA Pathway Emissions (gCO₂e/MJ)
UCO Rendering (Cooking)	5.71	4.73
UCO Rendering (No cooking)	0.80	0.65

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Table 4. Comparison of Carbon Intensities of BD produced in the Midwest versus BD produced in CA (No Cooking Required)

	New Midwest Pathway Emissions (gCO₂e/MJ)	Existing CA Pathway Emissions (gCO₂e/MJ)
Rendering of UCO	0.80	0.65
Total (Well To Tank)	9.05	7.28
Total (Tank To Wheel)	4.48	4.48
Total (Well To Wheel)	13.53	11.76

Staff recommends that the executive officer approve this fuel pathway.