

**State of California  
AIR RESOURCES BOARD**

**Notice of Public Availability of Modified Text**

AMENDMENTS TO THE CARBON INTENSITY LOOKUP TABLES IN THE LOW  
CARBON FUEL STANDARD REGULATION

Public Executive Officer Hearing Date: February 24, 2011  
Public Availability of Modified Text Date: December 8, 2011  
Deadline for Public Comment: December 23, 2011

This Notice constitutes the continuation of a rulemaking in which the ARB is seeking to amend a specific portion of California's Low Carbon Fuel Standard (LCFS). On February 24, 2011, the Executive Officer conducted a hearing for the purpose of considering proposed amendments to the carbon intensity (CI) values contained in the Lookup Tables set forth in title 17, California Code of Regulations (CCR), section 95486, and related provisions. Those proposed amendments consisted of 28 new fuel pathways to be added to the Lookup Table and were released for public review with a 45-day public notice on January 6, 2011 ("45-Day Public Notice").

At the hearing, it was suggested that the Executive Officer consider additional changes in two of the Method 2 pathway applications and two ARB staff-developed pathway packages. The Executive Officer agreed with these suggestions, and as a result, revisions to a total of 17 individual Method 2 pathways and three individual staff-developed pathways are being proposed for a supplemental 15-day review and comment period ("15-Day Public Notice"). These substantive changes are summarized in the "Summary of Proposed Modifications" section below.

**Modified Text Being Made Available for Public Comment**

Attachment 1 to this 15-Day Public Notice contains the additional proposed regulatory text changes showing the modifications to the initially proposed regulatory text that was made available at the time of the 45-Day Public Notice. As shown in the 45-Day Public Notice, the existing regulatory language is denoted by plain text, while additions to the existing regulatory text, as initially proposed, were denoted by single underline and deletions by ~~single-strikeout~~. The additional proposed changes to the existing regulatory text that are subject to comment in this 15-day comment period are denoted in Attachment 1 by double underline and deletions by ~~double-strikeout~~. Text in Attachment 1 that has both ~~single underline and double-strikeout~~ is text that staff proposed during the 45-day Public Notice period but later proposed for retraction as part of this 15-day Public Notice period.

## **Summary of Proposed Modifications**

The following is a summary of the proposed modifications to the regulation and staff's rationale for proposing those modifications.

- (1) Revisions to nine of the corn ethanol pathways proposed by POET LLC. Two of those revisions—the wet DGS versions of sub-pathways two and four—were undertaken at POET's request. POET requested these changes so that it could better ensure that the plants operating under those pathways could reliably meet the proposed pathway carbon intensities. Seven other POET sub-pathways are being revised to correct rounding errors introduced when staff prepared the documentation for the February 24, 2011 Executive Officer Hearing. These rounding error corrections are considered to be non-substantive. Two pathway carbon intensities—the dry DGS versions of pathways 3 and 6—are not being revised. Table 1 reports all original and revised values.

The values reported in Table 1 reflect the values appearing in POET's completed Method 2A Application Form (POET LLC, February 20, 2011, *POET Method 2A Application*. Please see the "Supporting Documents and Information" Section, below). The table under item d. on page 5 of 8 of that document contains the carbon intensity values appearing in Table 1.

**Table 1: Revised Carbon Intensities: POET LLC**

		Carbon Intensity (gCO <sub>2</sub> e/MJ)			
		100% Dry DGS		100% Wet DGS	
Sub-Pathway	Sub-Pathway Description	Original Value	Revised Value	Original Value	Revised Value
1	Raw Starch Hydrolysis	92.40	92.44	83.70	83.69
2	Raw Starch Hydrolysis/Combined Heat and Power	88.50	88.49	79.80	80.01 <sup>1</sup>
3	Raw Starch Hydrolysis/Biomass & Landfill Gas Fuels	88.50	Unchanged	none	None
4	Raw Starch Hydrolysis/Corn Fractionation	91.70	91.66	80.70	80.26 <sup>1</sup>
5	Conventional Cook/Combined Heat and Power	90.50	90.52	80.50	80.47
6	Raw Starch Hydrolysis/Biogas Process Fuel	74.70	Unchanged	73.20	73.21

<sup>1</sup>These values were changed at POET's request. All other revisions are ARB-initiated rounding error corrections.

(2) Revisions to the proposed staff-developed corn oil pathway. Comments received during the 45-day comment period revealed calculation errors in the corn oil biodiesel pathway CI. Correcting those errors reduced the original value of 5.9 gCO<sub>2</sub>e/MJ to 4.00 gCO<sub>2</sub>e/MJ. Please see pages 3, 8 (Table 1), and 20 (Table 10) of the *California-Modified GREET Pathway for the Production of Biodiesel from Corn Oil at Dry Mill Ethanol Plants, Version 2.0* (which appears on the list of Supporting Documents and Information, below). The following two errors were corrected in the ARB's corn oil biodiesel pathway. Please refer to the same corn oil biodiesel pathway document to see how those corrections were implemented. The pages on which the relevant discussion can be found are noted in parentheses below:

- (a) The energy savings resulting from corn oil extraction in ethanol plants did not produce "upstream" emissions reductions. Upstream emissions are generated by supplying the ethanol plant with natural gas and electricity for process power (see Table 4, page 13 and Table 5, page 15).
- (b) The corn oil biodiesel carbon intensity includes a credit for the production of glycerin—a co-product associated with biodiesel production generally. The glycerin credit was not applied consistently in the calculation of the original pathway carbon intensity (see Table 2, page 11; Table 3, page 12; Table 6, page 17; Table 7, page 17; Table 8, page 18; and pages 23-24).

(3) Revisions to the pathways developed by Archer Daniels Midland (ADM) Corporation for its corn ethanol plant in Columbus, Nebraska. When ADM first submitted its Method 2A application, its Columbus plant had been operating for only a few months. As ADM's engineers worked to optimize the plant, they discovered that condensate return flows had to be augmented with more fresh water than initially anticipated. This created the need for additional thermal energy for steam generation. That need was met by increasing the plant's consumption of coal. Offsetting the carbon intensity increases associated with additional coal use, however, was the achievement of greater plant operational efficiency than originally anticipated. The net effect of these mutually offsetting changes was that ADM's carbon intensities changed very little. Table 2 shows how energy consumption and carbon intensities have changed at the Columbus plant.

**Table 2: Original and Revised Pathway Energy Consumption and Carbon Intensity: ADM's Columbus, Nebraska plant<sup>a</sup>**

Pathway	Original Pathways				Revised Pathways			
	Natural Gas (%)	Coal (%)	Bio-mass (%)	CI gCO <sub>2</sub> e /MJ	Natural Gas (%)	Coal (%)	Bio-mass (%)	CI gCO <sub>2</sub> e/ MJ
<b>Baseline Plant Energy</b>								
0% Biomass	36.81	63.19	0.00	91.00	29.00	71.00	0.00	90.99
5% Biomass	36.81	57.51	5.68	89.09	29.00	65.15	5.85	89.08
10% Biomass	36.81	51.83	11.36	87.17	29.00	59.29	11.71	87.16
15% Biomass	36.81	46.15	17.04	85.25	29.00	53.44	17.56	85.24
<b>Optimized Plant Energy</b>								
0% Biomass	31.65	68.35	0.00	90.11	29.48	70.52	0.00	89.80
5% Biomass	31.65	62.30	6.05	88.16	29.48	64.35	6.17	87.86
10% Biomass	31.65	56.24	12.11	86.22	29.48	58.19	12.33	85.91
15% Biomass	31.65	50.18	18.17	84.27	29.48	52.02	18.50	83.96

<sup>a</sup>The carbon intensities shown in this table can be found in Archer Daniels Midland Company, May 18, 2011, *Method 2A and 2B Application Form–Draft* (See the Supporting Documents and Information list, below). These carbon intensities can be found at the bottom of page 5. They are also discussed in Archer Daniels Midland Company, May 18, 2011. *Method 2B Pathway California Low Carbon Fuel Standard* (also in the Supporting Documents and Information list). See pages 23 through 32.

- (4) Revisions to the staff-developed used-cooking-oil-to-biodiesel pathways. Subsequent staff review of the two ARB-developed used cooking oil pathway revealed two errors. Both errors affect both used cooking oil pathways:
- (a) Emissions associated with the transport of the finished biodiesel from the plant to a bulk terminal (a 50-mile trip) were omitted.
  - (b) The glycerin co-product allocation factor of 0.951 was inappropriately applied to the transport of finished biodiesel.

Correcting these errors increased the final carbon intensity of both Midwest used cooking oil pathways, as shown on Table 3 below.

**Table 3: Existing and Revised Carbon Intensities: Staff-developed Used Cooking Oil Biodiesel Pathways**

Pathway	Previous CI	New CI
No Cooking	13.53	13.83
Cooking Required	18.44	18.72

In accordance with Government Code section 11347.1, staff has added to the rulemaking record revised versions of the following pathway supporting documents released for public comment in the 45-Day Public Notice, as noted previously.

The supporting documents in the following list are available on ARB's Formal Rulemaking Activity web page: <http://www.arb.ca.gov/regact/2011/lcfs11/lcfs11.htm>

*POET LLC:*

Air Resources Board, June 30, 2011. POET LLC Corn Ethanol Method 2A Application [Staff Summary].

POET LLC, February 20, 2011: Method 2A Application: Life Cycle Analysis Report.

POET LLC, February 20, 2011, POET Method 2A Application.

POET LLC, CA-GREET Pathway 2 Models [One CA-GREET Spreadsheet for dry DGS and one for wet DGS]. These are CA-GREET spreadsheets: changed information cannot be underlined and stuck out.

POET LLC, CA-GREET Pathway 4 Models [One CA-GREET Spreadsheet for dry DGS and one for wet DGS]. These are CA-GREET spreadsheets: changed information cannot be underlined and stuck out.

*Archer Daniels Midland Company:*

Air Resources Board, June 17, 2011. ARB Staff Summary: Archer Daniels Midland (ADM) Columbus, Nebraska Corn Ethanol Dry Mill LCFS Pathway 2B Application.

Archer Daniels Midland Company, May 18, 2011. Method 2B Pathway California Low Carbon Fuel Standard.

Archer Daniels Midland Company, May 18, 2011. Method 2A and 2B Application Form-Draft.

Archer Daniels Midland Company, May 18, 2011. ADM CA GREET Model.

*ARB Used Cooking Oil Pathway:*

Air Resources Board, July 5, 2011, Summary of the CA-GREET Model Pathway for Biodiesel Produced in the Midwest from Used Cooking Oil. This document has been rewritten. It contains no underlines or strike-outs.

Air Resources Board, June 30, 2011. Detailed California-Modified GREET Pathway for Biodiesel Produced in the Midwest from Used Cooking Oil and Used in California, Version 2.0.

The CA-GREET model run completed in support of the ARB staff's Used Cooking Oil Pathways. This is a CA-GREET spreadsheet: changed information cannot be underlined and struck out.

*ARB Corn Oil Pathway:*

Air Resources Board, November 3, 2011, California-Modified GREET Pathway for the Production of Biodiesel from Corn Oil at Dry Mill Ethanol Plants. Version 2.0. This document has been rewritten. It contains no underlines or strike-outs.

Air Resources Board, July 5, 2011. Staff Summary: Production of Biodiesel from Corn Oil Extraction at Corn Ethanol Plants. This document has been rewritten. It contains no underlines or strike-outs.

The CA-GREET model run completed in support of the ARB staff's corn oil biodiesel pathway. This is a new CA-GREET spreadsheet. No CA-GREET spreadsheet was prepared for the original corn oil biodiesel pathway.

By this 15-Day Public Notice, the modified regulatory text and additional documents and information are being made available for public comment prior to the final action by the Board's Executive Officer. All the documents referenced above are available for public inspection at the ARB's Internet website at the following address:

<http://www.arb.ca.gov/regact/2011/lcfs11/lcfs11.htm>, or from the Public Information Office, Air Resources Board, 1001 I Street, Visitors and Environmental Services Center, First Floor, Sacramento, California, 95814. Printed copies may also be obtained from Mr. Reza Lorestany at (916) 324-5402; please give your name, company name, if any, and mailing address.

**Comments and Subsequent Action**

Pursuant to Resolution 09-31 and section 95486(f)(5), title 17, CCR, the Board directed the Executive Officer to conduct and complete rulemakings to add new or customized fuel pathways and carbon intensity values, or revise any existing fuel pathway or carbon intensity value (except as specified in Resolution 09-31), in accordance with the rulemaking provisions of the Administrative Procedure Act (Government Code section 11340 et seq.). As set forth in section 11346.8 of the Government Code, the Board directed the Executive Officer to adopt the proposed regulatory changes after making the modified regulatory language available to the public for a supplemental written comment period of at least 15 days.

Written comments will only be accepted on the modifications identified with double underline, ~~double strikeout~~ or both ~~single underline and double strikeout~~ in this notice and may be submitted by postal mail or electronic mail submittal as follows:

Postal mail: Clerk of the Board, Air Resources Board  
1001 I Street, Sacramento, California 95814

Electronic submittal: <http://www.arb.ca.gov/lispub/comm/bclist.php>

Please note that under the California Public Records Act (Gov. Code § 6250 et seq.), your written and oral comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request.

In order to be considered by the Executive Officer, comments must be directed to ARB in one of the two forms described above and received by ARB by 5:00 p.m., on the deadline date for public comment listed at the beginning of this notice. Only comments relating to the above-described modifications to the text of the regulations shall be considered by the Executive Officer.

If you need this document in an alternate format or another language, please contact the Clerk of the Board at (916) 322-5594 or by facsimile at (916) 322-3928 no later than five (5) business days from the release date of this notice. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Si necesita este documento en un formato alternativo u otro idioma, por favor llame a la oficina del Secretario del Consejo de Recursos Atmosféricos al (916) 322-5594 o envíe un fax al (916) 322-3928 no menos de cinco (5) días laborales a partir de la fecha del lanzamiento de este aviso. Para el Servicio Telefónico de California para Personas con Problemas Auditivos, ó de teléfonos TDD pueden marcar al 711.

## Attachments

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see ARB's website at [www.arb.ca.gov](http://www.arb.ca.gov).*