Method 2 Application for the Establishment of a New Fuel Pathway under the California Low Carbon Fuel Standard (LCFS)

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California Environmental Protection Agency

Air Resources Board

LCFS Method 2 Pathway Application

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Please feel free to contact the California Air Resources Board (ARB) staff if you have any questions concerning the application process.

LCFS Method 2 Contact E-mail: lcfs.method2@arb.ca.gov

California Air Resources Board Main Website: http://www.arb.ca.gov

Low Carbon Fuel Standard Website: http://www.arb.ca.gov/fuels/lcfs/lcfs.htm

I. LCFS APPLICATION METHOD 2 SUBMITTAL REQUIREMENTS

As specified in the LCFS regulation (Title 17, CCR, §§ 95480 through 95490) an application package must contain the following items in order for ARB staff to complete a preliminary evaluation within 30 days of submittal:

Required Documents	Submittal Details
1. A completed Method 2 application form.	The application form can be downloaded from http://www.arb.ca.gov/fuels/guidancedocs.htm (2nd bullet under "Low Carbon Fuel Standard). In addition, review the Method 2 guidance document available by clicking the 1st bullet.
2. For an application containing confidential business information (CBI) (as defined in Title 17, CCR, § 95486(f)(3)(B)1) please submit the following *two* versions of each document: • A full version containing CBI. • A full non-confidential version, suitable for posting to the LCFS public website.	***Example:*** Existing non-confidential pathway reports along with other required documentation for all Method 2 applications are available at http://www.arb.ca.gov/fuels/lcfs/2a2b/2a-2b-apps.htm. Applicants are not required to submit a non-confidential version of their application packets in order to initiate the 30-day completeness review process.
3. Recent utility invoices covering the *two* most recent representative years of operation at the facility: • Natural Gas usage • Electricity usage • Petroleum usage • Coal usage • Other process fuel usage	All original invoices must be scanned and submitted electronically for verification. In addition, details from each invoice must be itemized in a spreadsheet. Please see Title 17, CCR, § 95486(f)(3)(C)3.
4. Fuel production records covering the same two-year period as the invoices described in item #3 above.	Provide copies of sales receipts or internal production or sales records. Records should also be itemized in a spreadsheet in a manner similar to the utility invoice itemization. Please explain if the plant was shut down at any point during the two years covered by the production records. Please see Title 17, CCR, § 95486(f)(3)(C)3.

Required Documents	Submittal Details
5. Trucking/transport invoices (if non-default transportation values are claimed).	Scan and electronically submit invoices and include spreadsheet itemizing all invoices. This spreadsheet should be structured like the utility invoice spreadsheet described in item #3 above. Please see Title 17, CCR, § 95486(f)(3)(C)3.
6. A copy of the CA-GREET 1.8b spreadsheet that was used to calculate the final pathway CI. A separate table must itemize, describe, and provide spreadsheet and cell locations of all inputs used and modifications made.	Using the input values and modification information provided by the applicant, staff must be able to replicate the applicant's pathway CI results.
7. List of combustion-powered equipment.	The list should describe the equipment and specify the fuel used.
8. One or more Process Flow Diagrams (PFDs).	The PFDs must be current, accurate, and must fully describe the fuel production process.
9. Air pollution control permits.	As issued by the local jurisdiction. This would normally be a state environmental regulatory agency, but could be an air quality management district. Outside the U.S., equivalent permits are issued by the national government, or a more local regulatory entity.
10. The third-party engineering report prepared for compliance with the Federal Renewable Fuels Standard (RFS2).	The RFS2 program requires an independent third-party engineering review report. A copy of this report is also required by ARB. Please see Title 17, CCR, § 95486(f)(3)(C)9.

Required Documents	Submittal Details
11. A transmittal attestation letter from the applicant.	Applicants must submit a signed transmittal letter attesting to the veracity of the information in the application packet and declaring that the information submitted accurately represents the long-term, steady state operation of the fuel production process described in the application packet. Please see Title 17, CCR, § 95486(f)(3)(C)12. The transmittal letter shall: 1. Be the original copy. Photocopies, scanned electronic copies, facsimiles, and other non-original documents will not be accepted. 2. Be on company letterhead. 3. Be signed in blue ink by an officer of the applicant with the authority to attest to the veracity of the information in the application and to sign on behalf of the applicant. 4. Be from the applicant and not from an entity representing the applicant (such as a consultant or legal counsel).

II. BIOFUEL PRODUCER REGISTRATION REQUIREMENTS

Following ARB approval of a Method 2 Application, the applicant is invited to participate in the voluntary LCFS Biofuel Producer Registration Program. The benefits of participation are summarized below. Registration is accomplished by submitting the following two items:

Required Documents	Submittal Details
1. ARB voluntary biofuel producer registration information, if any.	The registration form can be found at: http://www.arb.ca.gov/fuels/lcfs/reportingtool/biofuelregistration.htm.
2. A transmittal signed by the company's CEO, or the CEO's designee.	The letter affirms that the pathway description and CI appearing in the registration form accurately reflect the registrant's actual pathway and CI.

III. INSTRUCTIONS

The California Low Carbon Fuel Standard (LCFS) (Title 17, CCR, §§ 95480 through 95490) requires regulated parties to report the carbon intensity (CI) of all fuels sold in California to the Air Resources Board (ARB).[1] Fuel CIs may be obtained in one of two ways:

- ***Method 1***: Regulated parties may use a CI from the LCFS Lookup Table[2], as long as their fuels were produced using a production pathway that is consistent with the production pathway behind the CI they wish to use. The website links of the LCFS pathways are provided at the end of this section.

- ***Method 2:*** Regulated parties may apply for a new fuel pathway that reflects their specific fuel production processes. Completing this application form is the first step in the Method 2 application process.

Users of either Method 1 or Method 2 are encouraged to register their CIs through the LCFS Biofuel Producer Registration Program. Registration is a voluntary process that helps fuel buyers find the fuels they need for LCFS compliance, and it facilitates the compliance reporting process. Registered producers and the fuels they offer are listed on the Registration website, and are included in a drop-down list of sellers in the LCFS Reporting Tool (LRT). To register, a producer:

- Fills out a brief form requesting information about the producer and the fuel produced;
- Signs a statement affirming the accuracy of the information provided in the form, and;
- Provides evidence of the existence of a physical pathway by which the fuel can be transported from its point of production to California.

Applicants for a Method 2 pathway must complete the application form that begins on page 8 of this document. Submittal of this form initiates the formal pathway evaluation process. Prospective applicants are encouraged to discuss their proposals with ARB staff prior to submitting a completed application form. The documentation that must be submitted along with this form is specified in Title 17, CCR, § 95486(f)(3)(C)1. Submission of an incomplete application packet will result in delays, which could lead to denial. A general list of the types of supporting information that must be submitted with a Method 2 application appears in Section I of this application form.

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[1] As specified in Title 17, CCR, § 95480.1, the LCFS applies to most transportation fuels sold in California. Some fuels are deemed to have already complied with the regulation, but may "opt in" to earn credits. A few others are specifically exempted.

[2] As specified in Title 17, CCR, § 95486 (b)(1). "Table 6. Carbon Intensity Lookup Table for Gasoline and Fuels that Substitute for Gasoline"; and "Table 7. Carbon Intensity Lookup Table for Diesel and Fuels that Substitute for Diesel."

The full Method 2 application process is described in detail in a document entitled *Establishing New Fuel Pathways under the California Low Carbon Fuels Standard*. It is available on the LCFS website:

http://www.arb.ca.gov/fuels/lcfs/012010newguideline.pdf

The life cycle analysis reports included with Method 2 application packets should be similar in format, content, and scope to those already approved under the LCFS. Examples of approved life cycle analyses can be found at:

http://www.arb.ca.gov/fuels/lcfs/2a2b/2a-2b-apps.htm
http://www.arb.ca.gov/fuels/lcfs/workgroups/workgroups.htm#pathways

Applicants may designate portions of their submittals as confidential business information (CBI). All information so designated will be treated in accordance with Title 17, CCR, §§ 91000-91022 and the California Public Records Act. The decision to designate portions of a packet as CBI should take into consideration the public nature of the rulemaking process. New and modified pathways can be approved only if enough information is available publicly to justify that approval.

Section 95486 (f)(3)(E) of the LCFS Regulation requires Method 2 applications that staff has recommended for certification to be posted for public comment for **ten calendar days**. Once all comments have been addressed, applications are certified and posted to the Method 2 website.

The carbon intensity of the electricity used in a fuel production process (or of the electricity itself, if it is used as a fuel) must be determined using the U.S. Environmental Protection Agency's eGRID database (URL: http://cfpub.epa.gov/egridweb/index.cfm). The electrical energy generation mixes associated with eGRID regions are average mixes. In most cases, these must be converted to marginal mixes by allocating the nuclear and large hydroelectric generation to natural gas generation.

Applicants must identify the location of their fuel production facilities using either latitude and longitude, or universal transverse Mercator (UTM) coordinates.

IV. COMPANY INFORMATION

Application Submission Date: 11-17-15	
Company Name: LytOil, Inc DBA LytEn	
Mailing Address: 933 Suite B, Kifer Road	
City: Sunnyvale	
State / Province: CA	Postal/Zip Code: 94086-5208
Country (if outside of the U.S.): USA	
Contact Person: Dan Cook	
Title: CEO	
Phone: 408-940-9298	Fax:
Mobile Phone: 415-519-0563	Email Address: dan.cook@lyten.com
Company Website URL: None	
U.S. EPA Company ID:	
Facility (Plant) Geographical Coordinates: Latitude: 37.374177 Longitude: -122.007618 or Universal Transverse Mercator (UTM) Coordinates: UTM Zone: Easting (E): Northing (N):	

V. FACILITY INFORMATION

Facility No	Facility Name	Facility Address	City	Zip Code	State or Province	Country
1	LytEn	933 Kifer Road, Suite B	Sunnyvale	94086-5208	CA	USA
2						
3						

V. FACILITY INFORMATION (Cont'd)

Facility No	Contact Person Name	Title	Phone/Fax	Mobile Phone	Email	US/EPA Facility ID	Nameplate Capacity (MGY)
1							
2							
3							

Note: If you have more than three facilities, please attach extra sheets.

VI. CONSULTANT INFORMATION

Consultant's Name: Stefan Unnasch	
Position/Title: Managing Director	
Consultant Company Address: 884 Portola Road, Suite A11	
City: Portola Valley	
State / Province: CA	Postal/Zip Code: 94028
Phone: 650-461-9048	Fax:
Mobile Phone: 650-380-9504	Email Address: unnasch@lifecycleassociates.com
Consultant's Company Website URL: www.lifecycleassociates.com	

VII. PATHWAY INFORMATION

a. Enter pathway application type. Applicants are encouraged to discuss their pathway application types with ARB staff before completing this section. Please check one box only.	
☐ Method 2A: Pathway	☒ Method 2B: New Pathway
b. Please provide a brief description of the proposed pathways, emphasizing the important innovations and/or distinctive characteristics associated with the proposed pathway or sub-pathway. All proposed Method 2A or 2B pathways must be listed in part VIII.	
LytEn, LLC is building hydrogen production systems that convert methane and light hydrocarbons to compressed hydrogen and via a proprietary cracking technology. The carbon intensity (CI) under the California Low Carbon Fuel Standard (LCFS) for LytEn's on-site hydrogen system is 15.29 g and -46.91 g CO2e/MJ for 33.3% and 100% renewable biogas respectively. The CI is 29.84 and -32.36 g CO2e/MJ for the feedstock mix delivered by tube trailer.	

VIII. METHOD 2 PATHWAY INFORMATION

1. For Method 2A applications, enter all reference pathway information. The "reference pathway" is the existing fuel pathway to which the proposed new sub-pathway is most closely related. The carbon intensity (CI) of the proposed pathway described in this application must be lowered by at least 5 gCO_2e/MJ than the carbon intensity of the reference pathway. Show all pathway information exactly as it appears in the LCFS Lookup Table. If you have more than five reference or proposed pathways, please attach extra sheets.

Reference Pathway(s):

Fuel Type	Pathway ID	Brief Pathway Description	Carbon Intensity (CI) Values (gCO_2e/MJ)		
			Direct Emissions	Land Use or Other Indirect Effect	Total CI Values
Hydrogen	HYGN005	Compressed H2 from on-site reforming with renewable feedstocks	76.1	0	76.1
Hydrogen	HYGN003	Compressed H2 from central reforming of NG	98.8	0	98.8

VIII. METHOD 2 PATHWAY INFORMATION (Cont'd)

2. Enter the proposed fuel pathway information in the following table. The carbon intensity (CI) of the proposed pathway described in this Method 2A or 2B application must be lowered by at least 5 gCO_2e/MJ than the carbon intensity of the reference pathway identified in item 1 above.

Proposed Pathway(s):

Fuel Type	Brief Pathway Description	Carbon Intensity (CI) Values (gCO_2e/MJ)		
		Direct Emissions	Land Use or Other Indirect Effect	Total CI Values
Hydrogen	LytEn, 33.3% Renewable Biogas, On Site Hydrogen	15.29	0	15.29
Hydrogen	LytEn, 100% Renewable Biogas, On Site Hydrogen	-46.91	0	-46.91
Hydrogen	LytEn, 33.3% Renewable Biogas, Tube Trailer	29.84	0	29.84
Hydrogen	LytEn, 100% Renewable Biogas, Tube Trailer	-32.36	0	-32.36

3. Compositional differences (if any) between the fuel produced by the new proposed pathway or sub-pathway and the reference pathway identified in item 1 above.

VIII. METHOD 2 PATHWAY INFORMATION (Cont'd)

Additional Proposed Pathway(s):

Fuel Type	Brief Pathway Description	Carbon Intensity (CI) Values (gCO_2e/MJ)		
		Direct Emissions	Land Use or Other Indirect Effect	Total CI Values

IX. PATHWAY SUPPLEMENTAL QUESTIONS

Annual volume of fuel produced using the proposed new pathway that would enter the California market (MGY):
0.07

If the facility is not currently operating at full production capacity, when is full operational capacity expected?
2018

Does the applicant expect this volume to be achieved by a single or by multiple facilities?

☐ A Single Facility	☒ Multiple Facilities

If the applicant expects this volume to be achieved by multiple facilities, would all facilities be owned by a single firm?

☐ A Single Firm	☒ Multiple Firms

Lower Heating Value (LHV) of the fuel to be produced from the new pathway (MJ/gal):
120MJ/kg

The range of production volumes over which the proposed pathway carbon intensity value is valid. The values reported below must be supported in the documentation accompanying this application.

Production Volume Range	***Fuel Volume (MGY)***
Lower Bound	0.07
Upper Bound	3.6
Average Volume	2.0

Please provide any information that may be helpful in determining the land use change impacts (if any) of the proposed pathway. Although it is ARB's responsibility to perform all land use change impact analyses, the applicant may provide any information that may be useful to the ARB in completing that analysis.

No land use change is associated with the LytEn process.

X. APPLICANT SUBMITTAL CHECKLIST

Listed below are the documents and files that may be submitted in support of a Method 2 application. Check the box to the left of each document or file type included in your submittal. After each submittal category is a check box labeled "includes confidential business information (Title 17, CCR, § 95486(f)(3)(B)1). Check that box if the submittal category contains any information the applicant considered to be a trade secret. In the actual submittal, the specific information falling into the confidential business information category must be clearly marked. Additional information regarding the submission of trade secrets can be found in the Instructions above.	
☒	Pathway life cycle analysis report (required). ☒ *Includes confidential business information*
☒	CA-GREET model results (please submit the CA-GREET spreadsheet) (required). ☒ *Includes confidential business information*
☒	All operating permits issued by the local air pollution control authority (required).
☒	One or more process flow diagrams covering the complete production process, including all inputs (feedstocks, process energy, etc.) and outputs (finished fuel, co-products, wastes, etc.) (required). ☒ *Includes confidential business information*
☒	A comprehensive list of all stationary combustion-powered equipment associated with the production facility. List entries should name the equipment, briefly describe its function, identify the fuel or fuels used, and quantify fuel use on a per-gallon-of-finished-fuel-produced basis (required). ☐ *Includes confidential business information*
☐	Equipment technical specifications. ☐ *Includes confidential business information*
☒	Production process schematics, technical drawings flow diagrams, maps, or other graphical representations (other than/in addition to the required process flow diagram). ☒ *Includes confidential business information*
☐	Engineering reports. ☐ *Includes confidential business information*
☐	Technical papers or journal articles ☐ *Includes confidential business information*

X. APPLICANT SUBMITTAL CHECKLIST (Cont'd)

☐	Emissions monitoring data or emissions modeling results. ☐ *Includes confidential business information*
☐	Spreadsheets, data files, and similar files documenting the calculations behind the fuel life cycle analysis. ☐ *Includes confidential business information*
☐	All operating permits issued by the local air pollution control authority (required).
☐	Other: In the space below, describe any additional submittals. Rationales for documents submitted or omitted may also be provided. ☐ *Includes confidential business information*

XI. APPLICANT DISCLOSURE

By my signature below, I confirm that, to the best of my knowledge, the fuel pathway CI for which I am applying accurately reflects the actual pathway CI for that fuel, and that I will only label fuel volumes with this CI when the actual CI is equal to or less than the approved LCFS pathway CI.

Instructions: *Please complete the "Name," "Title," and "Date" fields below. Then print, sign, and scan only this page. The completed application form and separate signed "Applicant Disclosure" page can then be submitted electronically to ARB.*

Name: Dan Cook	Title: CEO, LytEn
Signature:	Date: 12-14-2015

X. APPLICANT SUBMITTAL CHECKLIST (Cont'd)

☐	Emissions monitoring data or emissions modeling results. ☐ *Includes confidential business information*
☐	Spreadsheets, data files, and similar files documenting the calculations behind the fuel life cycle analysis. ☐ *Includes confidential business information*
☐	All operating permits issued by the local air pollution control authority (required).
☐	Other: In the space below, describe any additional submittals. Rationales for documents submitted or omitted may also be provided. ☐ *Includes confidential business information*

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