

4. Credit for Producing Crudes using Innovative Methods.

A crude oil producer or refinery purchasing the crude may receive credit for crude oil which has been produced using innovative methods and sold to California refineries.

a. General Requirements.

- i. For the purpose of this section, an innovative method means crude production using:
 - A. Solar or waste biomass-based steam generation.
 - B. Carbon capture and sequestration (CCS).
 - C. Onsite solar, wind, or waste biomass-based electricity generation.
- ii. The innovative crude oil production method must be implemented during or after the year 2010 and must be approved for use pursuant to this section before the crude oil producer or purchasing refinery can receive credit under the LCFS regulation. This regulatory approval must be initiated by the crude oil producer through a written application to the Executive Officer. Credit generation for CCS projects will only be allowed after ARB has in place an approved quantification methodology for monitoring, reporting, verification, and permanence requirements associated with geological sequestration.
- iii. Credits for producing crude oil with innovative methods must be calculated as specified below and are subject to a maximum allowable credit limit:

For crude oil produced using solar steam generation:

$$Credits_{Innov}(MT) = 27550 \times \frac{V_{steam} \times f_{solar}}{V_{crudeproduced}} \times V_{Innov} \times C$$

For crude oil produced using solar or wind based electricity:

$$Credits_{Innov}(MT) = 485 \times \frac{E_{electricity} \times f_{renew}}{V_{crudeproduced}} \times V_{Innov} \times C$$

For crude oil produced using all other innovative methods:

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$$Credits_{Innov}(MT) = \Delta CI_{Innov} \times E_{Innov} \times V_{Innov} \times C$$

For a given crude, the maximum credit allowable is:

$$Credits_{max,innov} = (CI_{CARBOB} - CI_{Standard}^{Gasoline}) \times E_{innov} \times V_{innov} \times C$$

where,

$Credits_{max,innov}(MT)$ means the maximum allowable amount of LCFS credits that can be generated (a positive value), in metric tons, by the volume of a crude oil sold to California refineries and produced using innovative production method(s);

CI_{CARBOB} means the carbon intensity, in gCO₂E/MJ, for CARBOB as listed in Table 6;

$CI_{Standard}^{Gasoline}$ is the average carbon intensity requirement for gasoline for a given year as provided in section 95482(b);

$Credits_{Innov}(MT)$ means the amount of LCFS credits generated (a positive value), in metric tons, by the volume of a crude oil sold to California refineries and produced using the innovative production method;

V_{steam} means the overall volume, in barrels cold water equivalent, of steam injected;

f_{solar} means the fraction of injected steam that is produced using solar steam generation;

$V_{crudeproduced}$ means the volume, in barrels, of crude oil produced using the innovative method;

V_{Innov} means the volume, in barrels, of crude oil produced using the innovative method and sold to California refineries. If the innovative crude is sold to California refineries as part of a blend, then V_{Innov} is the volume of blend sold to California refineries multiplied times the volume fraction of innovative crude within the blend.

$$C = 1.0 \times 10^{-6} \frac{MT}{gCO_2e}$$

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$E_{electricity}$ means the overall electricity consumption to produce the crude, in kW-hr;

f_{renew} means the fraction of consumed electricity that is produced using solar or wind power;

ΔCI_{Innov} means the reduction in carbon intensity (a positive value), in gCO_2E/MJ_{crude} , associated with crude oil production with the innovative method as compared to crude oil production by a baseline process without the method (hereafter referred to as the comparison baseline method); and

E_{Innov} is the energy density (lower heating value), in MJ/barrel, for the crude oil-produced with the innovative method.

- b. Application and Data Submittal. Unless otherwise noted, all applications for an innovative crude oil production method shall comply with the requirements below:
 - i. An applicant that submits any information or documentation in support of a proposed innovative crude oil production method must include a written statement clearly showing that the applicant understands and agrees to the following:
 - A. The applicant must specifically identify all information submitted pursuant to this provision that is a trade secret; "trade secret" has the same meaning as defined in Government Code section 6254.7;
 - B. All information in the application not identified as trade secrets is subject to public disclosure pursuant to title 17, CCR, sections 91000-91022 and the California Public Records Act (Government Code sec. 6250 et seq.); and
 - C. If the application is approved, the crude oil producer must register under the LCFS as an opt-in regulated party before receiving LCFS credit. If the crude oil producer does not intend to register as an opt-in regulated party, they must state so in writing, in which case the

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California refinery(s) that purchase the innovative crude may then claim the credit.

- ii. All applications must contain the following summary material:
 - A. A complete description of the innovative method and how emissions are reduced;
 - B. An engineering drawing(s) or process flow diagram(s) that illustrates the innovative method and clearly identifies the system boundaries, relevant process equipment, mass flows, and energy flows necessary to calculate the innovative production method credits;
 - C. A preliminary estimate of the potential innovative production method credit, including descriptions and copies of production and operational data or other technical documentation utilized in support of the calculation.

- iii. All applications except for solar-generated steam, wind-based electricity, or solar-based electricity shall include a detailed description of the innovative method and its comparison baseline method. The description of innovative and comparison baseline methods can be limited to those portions of the crude production process affected by the innovative method. The description of the innovative method and its comparison baseline method must include (if applicable):
 - A. Schematic flow charts that identify the system boundaries used for the purposes of performing the life cycle analyses on the proposed innovative crude oil production method and the comparison baseline method. Each piece of equipment or stream appearing on the process flow diagrams shall be clearly identified and shall include data on its energy and materials balance. The system boundary shall be clearly shown in the schematic.
 - B. A description of all material and energy inputs entering the system boundaries, including their

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points of origination, modes of transportation, transportation distances, means of storage, and all processing to which material inputs are subject.

- C. A description of all material and energy products, co-products, byproducts, and waste products leaving the system boundaries, including their respective destinations, transportation modes, and transportation distances.
 - D. A description of all facilities within the system boundaries involved in the production of the crude oil and other byproducts, co-products, and waste products.
 - E. A description of all combustion and electrical powered equipment within the system boundaries, including their respective capacities, sizes, or rated power, fuel utilization type, fuel shares, energy efficiency (LHV basis), and proposed use.
 - F. A description of all thermal and electrical energy production that occurs within the system boundaries, including the respective capacities, sizes, or rated power, fuel utilization type, fuel shares, energy efficiency (LHV basis), and proposed use.
 - G. A description of all sources of flared, vented and fugitive emissions within the system boundaries including the compositions of the flared, vented and fugitive emission streams leaving the system boundaries.
- iv. All applications except solar-generated steam, wind-based electricity, or solar-based electricity shall include life cycle assessments performed on the proposed innovative crude oil production method and its comparison baseline method using the ARB OPGEE model or an alternative model or LCA methodology approved by the Executive Officer. Electronic copies of the models and calculations shall be provided. For biomass-based steam generation,

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the comparison baseline method shall include steam generation with a carbon intensity of 27,550 gCO_{2e}/bbl steam. For biomass-based electricity, the comparison baseline method shall include electricity generation with a carbon intensity of 485 gCO_{2e}/kW-hr. The descriptions of the life cycle assessment results must provide:

- A. Detailed information on the energy consumed and greenhouse gas emissions generated for the innovative method and the comparison baseline method;
 - B. Documentation of all non-default model input values used in the emissions calculation process. If values for any significant production parameters are unknown, the application shall so state and model default values shall be used for these parameters in the analysis;
 - C. Detailed description of all supporting calculations that were performed outside of the model; and
 - D. Documentation of all modifications other than those covered by item (II) above, made to the model. This discussion shall include sufficient specific detail to enable the Executive Officer to replicate all such modifications and, in combination with the inputs and supporting calculations identified in items II and III above, replicate the carbon intensity results reported in the application.
- v. All applications shall include a list of references covering all information sources used in the preparation of the life cycle analysis and/or calculation of innovative production method credit. All reference citations in the application shall include in-text parentheticals stating the author's last name and date of publication. All in-text parenthetical citations shall correspond to complete publication information provided in the list of references, and complete publication information shall at a minimum, identify the author(s), author's affiliation, title of the referenced

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document, publisher, publication date, and pages cited. For internet citations, the reference shall include the universal resource locator (URL) address of the citation, as well as the date the website was last visited.

- vi. All applications shall include a signed transmittal letter from the applicant attesting to the veracity of the information in the application packet and declaring that the information submitted accurately represents the actual and/or intended long-term, steady-state operation of the innovative crude oil production method described in the application packet. The transmittal letter shall be the original copy, be on company letterhead, be signed by an officer of the applicant with authority to attest to the veracity of the information in the application and to sign on behalf of the applicant, and be from the applicant and not from an entity representing the applicant (such as a consultant or legal counsel).
 - vii. All documents (including spreadsheets and other items not in a standard document format) that contain confidential business information (CBI) must prominently display the phrase "Contains Confidential Business Information" above the main document title and in a running header. Additionally, a separate, redacted version of such documents must also be submitted. The redacted versions must be approved by the applicant for posting to a public LCFS web site. Within redacted documents, specific redactions must be replaced with the phrase "Confidential business information has been deleted." This phrase must be displayed clearly and prominently wherever CBI has been redacted.
 - viii. All applications, supporting documents, and all other relevant data or calculation or other documentation, except for the transmittal letter described in paragraph (vi) above, shall be submitted electronically such as via e-mail or an online-based interface unless the Executive Officer has approved or requested in writing another submission format.
- c. Application Approval Process. The application must be approved pursuant to this section before the crude oil

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producer or purchasing refinery may obtain credit under the LCFS regulation for the innovative crude.

- i. Within 30 calendar days of receipt of an application designated by the applicant as ready for formal evaluation, the Executive Officer shall advise the applicant in writing either that:
 - A. The application is complete, or
 - B. The application is incomplete and the Executive Officer will identify which requirements of section 95486(b)(2)(A)(4)a-b. above have not been met.
 1. The applicant will be permitted to submit additional information to meet the requirements to section 95486(b)(2)(A)(4)a-b.
 2. If the applicant is unable to achieve a complete application within 180 days of the Executive Officer's receipt of the application, the application will be denied on that basis, and the applicant will be informed in writing.
- ii. Once the Executive Officer has deemed an application to be complete, it will be posted for public comment at <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>. Comments will be accepted for 10 calendar days following the date on which the application was posted. Only comments related to potential factual or methodological errors may be considered. The Executive Officer will forward to the applicant all comments identifying potential factual or methodological errors. Within 30 days, the applicant shall either make revisions to its application and submit those revisions to the Executive Officer, or submit a detailed written response to the Executive Officer explaining why no revisions are necessary.
- iii. An application submitted pursuant to this section shall not be approved if the Executive Officer determines:

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- A. Based upon the application information submitted pursuant to this section, the proposed crude production method is not innovative, as that term is defined in this section.
 - B. Based upon the application information submitted pursuant to this section, the LCA methodology and/or proposed comparison baseline is not appropriate.
 - C. Based upon the application information submitted pursuant to this section, the applicant's greenhouse gas emissions calculations cannot be replicated using the ARB OPGEE model or alternative model or LCA methodology approved by the Executive Officer.
- iv. If the Executive Officer finds that an application meets the requirements set forth in subsection 95486(b)(2)(A)4, the Executive Officer will take final action to approve the associated innovative crude oil production method, describing all limitations, recordkeeping requirements and operational conditions to which the innovative crude oil production method will be subject, by amending this section 95486 in accordance with Government Code section 11340, et seq. If the Executive Officer finds that an application does not meet the requirements of subsection 95486(b)(2)(A)4, the application will not be approved, and the applicant will be notified in writing and the basis for the disapproval shall be identified.
- v. Recordkeeping. Each crude oil producer that has crude approved as innovative must maintain records identifying each facility at which it produces crude oil for sale in California under the approved innovative crude oil production method. For each such facility, the crude oil producer must compile records for at least three years showing:
- A. The annual volume of crude oil produced using the approved innovative crude oil production method and the crude name(s) under which it is marketed. If the crude oil approved as

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innovative is marketed as part of a crude blend, the crude oil producer must also maintain for at least three years annual records identifying the name of the blend and the volume fraction that the innovative crude contributes to the blend.

- B. Compliance with all limitations, recordkeeping requirements and operational conditions identified by the Executive Officer in paragraph iv, above.

These records shall be submitted to the Executive Officer within 20 days of a written request received from the Executive Officer or his/her designee, provided the request is made before the expiration of the period during which the records are required to be retained.

- d. Credits for producing crude oil using innovative methods. Within 30 days of receiving quarterly reports from California refineries detailing crude names and volumes supplied to the refineries during the previous calendar quarter and any records requested of the crude oil producer under item c.v. above, the Executive Officer will determine the amount of credits to be issued to the producer or purchasing refinery.