

ATTACHMENT A
PROPOSED 15-DAY MODIFICATIONS

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LOW CARBON FUEL STANDARD

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REGULATION ON COMMERCIALIZATION OF ALTERNATIVE DIESEL FUELS

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PROPOSED 15-DAY MODIFICATIONS

The originally proposed regulatory language is shown in ~~strike through~~ to indicate proposed deletions from existing regulations and underline text indicates the additions originally proposed to existing regulations. New deletions and additions to the originally proposed language that are made public with the “Notice of Public Availability of Modified Text and Availability of Additional Documents and Information” are shown in ~~double strike through~~ and double underline format, respectively. All portions that remain unchanged from the originally proposed regulation are indicated by the symbol “* * * * *” for reference.

Amend sections 95480, 95481, 95482, 95483, 95483.1, 95483.2, 95484, 95485, 95486, 95487, 95488, 95489, 95490, 95491, 95492, 95493, 95494, 95495, 95496, and 95497; and

Adopt sections 95483.3, 95486.2, 95488.1, 95488.2, 95488.3, 95488.4, 95488.5, 95488.6, 95488.7, 95488.8, 95488.9, 95488.10, 95490, 95491.1, 95498, 95499, 95500, 95501, 95502, and 95503, title 17, California Code of Regulations, to read as follows:

Subchapter 10. Climate Change

Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions

Subarticle 7. Low Carbon Fuel Standard

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§ 95480. Purpose

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§ 95481. Definitions and Acronyms.

- (a) *Definitions.* For the purposes of sections 95480 through ~~95497~~95503, the definitions in Health and Safety Code sections 39010 through 39060 shall apply, except as otherwise specified in this section or sections 95482 through ~~95497~~95503:

* * * * *

- (9) “Aviation Gasoline” means a complex mixture of volatile hydrocarbons, with or without additives, suitably blended to be used in aviation engines. Specifications can be found in ASTM Specification D910-17 (2017), Standard Specification for Aviation Gasolines, which is incorporated herein by reference.

* * * * *

~~(13)~~(10) “Biogas” means the raw gaseous mixture comprised primarily of methane and carbon dioxide and derived from sources, including but not limited to, the anaerobic decomposition of organic matter in a landfill, lagoon, or constructed reactor (digester). Biogas often contains a number of other impurities, such as hydrogen sulfide, and it cannot be directly injected into natural gas pipelines or combusted in most natural-gas-fueled vehicles. It can be used as a fuel in boilers and engines to produce electrical power. The biogas can be refined to produce near-pure methane, which is sold as biomethane.

* * * * *

~~(17)~~(14) “Biomass” means non-fossilized and biodegradable organic material originating from biogenic plants, and animals or micro-organisms, material, especially including: products, by-products, residues and waste from agricultural, or forestry, waste products, and related industries; the non-fossilized and biodegradable organic fractions of industrial and municipal wastes; and gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material. ~~which can be used as a source of fuel, or feedstock for the production of fuel, soil amendment, or fertilizer.~~

~~(18)~~(15) “Biomass-based dDiesel” means a biodiesel (~~mono-alkyl ester~~) or a renewable diesel ~~that complies with ASTM D975-14a, (2014), Specification for Diesel Fuel Oils, which is incorporated herein by reference. This includes a renewable fuel derived from co-processing biomass with a petroleum feedstock. However, biomass-based diesel should only include co-processed fuel to the extent that the co-processed renewable diesel is greater than 5 percent of the total diesel volume.~~

~~(19)~~(16) “Biomethane” is ~~primarily~~ means methane derived from biogas, or synthetic natural gas derived from renewable resources, including the organic portion of municipal solid waste, after carbon dioxide and other impurities present in the biogas are chemically or physically separated from the gaseous mixture. Biomethane has equivalent chemical, physical, and performance characteristics as methane gas which has been upgraded to meet pipeline quality natural gas standards for use in natural gas vehicles. Biomethane contains all of the environmental attributes associated with biogas and can also be referred to as renewable natural gas.

* * * * *

~~(24)~~ “CHAdeMo Connector” means a connector and communication protocol for vehicle DC charging initially developed in Japan during 2005-2009. It

was first adopted into international standards IEC 61851-23/24 and IEC 62196-3 in 2014 and then into USA standard IEEE 2030.1.1 in 2015. Further updates to the protocol are managed by the CHAdeMO Association.

(25) “SAE CCS Connector” means a connector that supports both AC J1772 and DC Charging and created by the Society of Automobile Engineers, which is a standards development organization for vehicle technology.

* * * * *

(27) “Conventional Jet Fuel” means aviation turbine fuel that complies with ASTM Specification D1655-17 (2017), Standard Specification for Aviation Turbine Fuels, which is incorporated herein by reference. Jet fuel includes Commercial and Military Jet Fuel. Commercial Jet Fuel includes products known as Jet A, Jet A-1, and Jet B. Military Jet Fuel includes products known as JP-5 and JP-8.

* * * * *

~~(34)~~(27) “Diesel Fuel Blend” means a blend, no more than 5 percent biodiesel and no more than 5 percent renewable diesel, that meets of diesel fuel and biodiesel containing no more than 5 percent (B5) biodiesel by weight and meeting ASTM D975-14a, (2014), Standard Specification for Diesel Fuel Oils, which is incorporated herein by reference.

(34) “Direct Current Fast Charging” means charging an electric vehicle at 20 kW and higher using direct current.

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(36)~~(28)~~ “E100,” also known as “Denatured Fuel Ethanol,” means nominally anhydrous ethyl alcohol meeting ASTM D4806-14 (2014), Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark Ignition Engine Fuel, which is incorporated herein by reference.

* * * * *

(38) “Electric Cargo Handling Equipment (eCHE)” means equipment used to transfer goods or perform maintenance and repair activities, including rubber-tired gantry crane, top handler, side handler, bulldozer and loader.

(39) “Electric Auxiliary Engine for Ocean-going Vessel (eOGV)” means the auxiliary engine powered by electricity operated on Ocean-going vessels, which are commercial ships that are greater than or equal to 400 feet in

length, weigh 10,000 gross tons or greater, or are propelled by a marine compression ignition engine with a displacement of at least 30 liters per cylinder.

(40) “Electric Transport Refrigeration Units (eTRUs)” means refrigeration systems powered by electricity designed to refrigerate or heat perishable products that are transported in various containers, including semi-trailers, truck vans, shipping containers, and rail cars.

* * * * *

(61) “Green Tariff ~~Shared Renewables~~” means ~~the~~ a program in which a retail seller of electricity offers its customers an opportunity to purchase a portfolio of energy sourced from low-carbon intensity energy resources, including solar photovoltaic, wind, solar thermal, electricity generated from a small hydroelectric facility of 30 megawatts or less, ocean wave, ocean thermal, and tidal current. This includes the Green Tariff Shared Renewables program established pursuant to California Senate Bill 43 ~~(2016)~~ (2013), and defined under the California Public Utilities Code sections 2831-2833.

* * * * *

(89) “Multi-family Residence” means a dwelling unit in a building that consists of at least four condominium dwelling units or at least three apartment dwelling units in which each unit shares a floor or ceiling on at least one side.

* * * * *

(112)(74) “Renewable Hydrocarbon Diesel” means a diesel fuel that is produced from non-petroleum renewable resources but is not a mono-alkyl ester and which is registered as a motor vehicle fuel or fuel additive under 40 Code of Federal Regulations part 79. This includes the renewable portion of a diesel fuel derived from co-processing biomass with a petroleum feedstock.

(113) “Renewable Hydrogen” means hydrogen derived from (1) electrolysis of water or aqueous solutions using renewable electricity; (2) catalytic cracking or steam methane reforming of biomethane; or (3) thermochemical conversion of biomass, including the organic portion of municipal solid waste (MSW). Renewable electricity, for the purpose of renewable hydrogen production by electrolysis, means electricity derived from biomass, including the organic portion of MSW, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, electricity

generated from a small hydroelectric facility of 30 megawatts or less, biogas, ocean wave, ocean thermal, and tidal current.

~~(114)~~(113) “Renewable Propane” means a renewable fuel that complies with ASTM D1835-16, (2016), Standard Specification for Liquefied Petroleum (LP) Gases, which is incorporated herein by reference liquefied petroleum gas (LPG or propane) that is produced from non-petroleum renewable resources.

* * * * *

(115) “Single-family Residence” means a building designed to house a family in a single residential unit. A single-family residence is either detached or attached including duplex or townhouse units.

* * * * *

(119) “Station Operational Status System (SOSS)” means a software database tool developed and maintained by California Fuel Cell Partnership to publicly monitor the operational status of hydrogen stations.

* * * * *

(123)~~(77)~~ “Transaction Type” means the nature of a fuel-based transaction as defined below:

* * * * *

(L) “eTRU Fueling” means providing fuel to electric transport refrigeration units.

(M) “eCHE Fueling” means providing fuel to electric cargo handling equipment.

(N) “eOGV Fueling” means providing fuel to an electric auxiliary engine for an ocean-going vessel.

~~(O)~~~~(M)~~(L) “EV Charging – Grid” means providing electricity to recharge EVs using the California Average Grid Electricity Lookup Table pathway for a given year as specified in section 95488.5;

~~(P)~~~~(N)~~ “EV Charging – Non-Grid” means providing electricity that has a carbon intensity lower than the average grid electricity and is obtained through an approved arrangement as specified in section 95488.8(h) or section 95488.8(i) to recharge EVs;

~~(Q)~~~~(O)~~ “EV Charging – Smart Charging TOU” means providing electricity that is eligible to generate credits under the ~~time-of-use smart~~ charging provisions in section 95488.5 to recharge EVs;

~~(R)~~~~(P)~~(M) “Fixed Guideway Electricity Fueling Charging” means fueling light rail, or heavy rail, cable car, street car, and trolley bus, or

exclusive right-of-way bus operations, or trolley coaches with electricity;

~~(S)(Q)(N)~~ “Forklift Electricity Fueling” means providing fuel (electricity, hydrogen, etc.) to electric forklifts;

~~(T)(R)~~ “Forklift Hydrogen Fueling” means providing fuel to hydrogen forklifts;

~~(U)(S)~~ “Fuel Cell Vehicle (FCV) Fueling” means the dispensing of hydrogen at a fueling station designed for fueling hydrogen fuel cell electric vehicles;

~~(V)(T)~~ “Fuel Cell Vehicle (FCV) Fueling – Smart Electrolysis ~~TOU~~” means the dispensing of hydrogen that is eligible to generate ~~time of use~~ credits under the smart charging or electrolysis provisions in section 95488.5;

~~(W)(U)(O)~~ “NGV Fueling” means the dispensing of natural gas at a fueling station designed for fueling natural gas vehicles;

~~(X)(V)~~ “Propane Fueling” means the dispensing of propane at a fueling station designed for fueling propane vehicles.

* * * * *

(b) *Acronyms.*

* * * * *

“CHAdEMO” means Charge de Move, a DC fast charging protocol.

* * * * *

“DC” means Direct Current.

* * * * *

“eCHE” means Electric Cargo Handling Equipment.

“eOGV” means Electric Auxiliary Engine for Ocean-going Vessel.

* * * * *

“SAE CCS” means Society of Automotive Engineers Combined Charging System, a DC fast charging protocol.

* * * * *

“SOSS” means Station Operational Status System.

* * * * *

~~“TOU” means time of use.~~

* * * * *

§ 95482. Fuels Subject to Regulation.

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(c) *Exemption for Specific Alternative Fuels.* The LCFS regulation does not apply to an alternative fuel that meets the criteria in either subsections (c)(1) or (2) below:

* * * * *

(4) Any credit-generating fossil CNG or fossil propane dispensed at a fueling station with total throughput of 50,000 gasoline-gallons equivalent or less per year. The exemption for fossil propane dispensing stations expires January 1, 2021, when the use of that fuel in heavy-duty or off-road applications becomes deficit generating. The exemption for fossil CNG dispensing stations expires January 1, 2024, when the use of that fuel in heavy-duty or off-road applications becomes deficit generating.

* * * * *

§ 95483. Fuel Reporting Entities.

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(a) For Liquid Fuels. Liquid fuels refer to fossil fuels (including CARBOB, gasoline, diesel, and conventional jet fuel), liquid alternative fuels (including ethanol as an oxygenate, biomass-based diesel, and alternative jet fuels), and blend of liquid alternative and fossil fuels.

(1) Designation of First Fuel Reporting Entities for Liquid Fuels. The first fuel reporting entity for liquid fuels is the producer or importer of the liquid fuel. For liquid fuels that are a blend of liquid alternative fuel components (including ethanol as an oxygenate, biomass-based diesel, or alternative jet fuels) and a fossil fuel component (including CARBOB, gasoline, diesel, conventional jet, or other fossil fuels), the first fuel reporting entity is the following:

(A) With respect to the alternative fuel component, the producer or importer of the alternative fuel component.

(B) With respect to the fossil fuel component, the producer or importer of the fossil fuel component.

(C) Specifics for Alternative Jet Fuel. For an alternative jet fuel or the alternative fuel portion of a blend with conventional jet fuel, the first

fuel reporting entity is the producer or importer of the alternative jet fuel, which is delivered to the a storage facility where fuel is stored before it is uploaded to an aircraft in California. Conventional jet fuel, including the conventional jet fuel portion of a blend, is not subject to the LCFS and must not be reported.

* * * * *

(3) *Transfer Period.* For all liquid fuels, the period in which credit or deficit generator status can be transferred to another entity, for a given amount of fuel, is limited to ~~two~~ three calendar quarters. This means that, for example, if an entity receives title to a fuel along with credit or deficit generator status in ~~one~~ the first calendar quarter, the status as credit or deficit generator for that amount of fuel can be transferred to another entity no later than the end of the ~~following~~ third calendar quarter. After this period is over, the credit and deficit generator status for that amount of fuel cannot be transferred.

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(b) *For Gaseous Fuels.* Gaseous fuels refer to natural gas fuels (including CNG, LNG and L-CNG), propane and hydrogen.

* * * * *

(E) *Hydrogen.* The first fuel reporting entity for hydrogen is the entity that ~~operates~~ owns the fueling supply equipment (“hydrogen station ~~operator~~ owner”) through which hydrogen fuel is dispensed to motor vehicles for transportation use. Notwithstanding the above, the first fuel reporting entity for hydrogen used in fuel cell forklifts is the forklift fleet owner.

* * * * *

(c) *For Electricity Used as a Transportation Fuel.*

(1) ~~Residential~~ *EV Charging at Single-family Residences.* For on-road transportation fuel supplied for electric vehicle (EV) charging in a single- ~~or~~ multi-family residence, there are ~~multiple possible~~ following entities are the credit generators:

(A) *Base Credits.* ~~For residential EV charging,~~ The EDU is the credit generator for base credits for EV charging at single-family residences in its service territory. The EDU must meet the requirements set forth in paragraphs 1. through 5. in section 95491(d)(3)(A).

(B) *Incremental Credits.* Any entity, including an EDU, is eligible to generate incremental credits (in addition to the base credits) for improvements in carbon intensity of electricity used for residential EV charging at single-family residences. An EDU that generates incremental credits must meet the requirements set forth in paragraphs 2. through 5. in section 95491(d)(3)(A). Multiple claims for incremental credits for metered residential EV charging associated with a single FSE ID will be resolved pursuant to the following order of preference:

1. The Load Serving Entity (LSE) supplying electricity to the EV associated with the FSE ID and metered data has first priority to claim credits;
2. The manufacturer of the EV associated with the FSE ID has second priority; and
3. Any other entity has third priority.

(2) *EV Charging at Multi-family Residences.*

- (A) For electricity supplied for EV charging at multi-family residences, the owner of the FSE is eligible to generate the credits.
- (B) Subsection (A) above notwithstanding, the owner of FSE may elect not to be the credit generator and instead designate another entity to be the credit generator if the two entities agree by written contract that:
1. The owner of FSE will not generate credits and will instead provide the electricity data to the designated entity for LCFS reporting pursuant to sections 95483.1(b)(8), 95491 and 95491.1.
 2. The designated entity accepts all LCFS responsibilities as the fuel reporting entity and credit generator.
- (C) An entity that generates credits for EV charging at multi-family residences must meet the requirements set forth in paragraphs 2., 3., and 5. in section 95491(d)(3)(A).
- (D) An EDU may generate credits for any multi-family residence not claimed by any other entity. The EDU generating credits must meet the requirements set forth in sections 95491(d)(3)(A), paragraphs 3. through 5.

~~(3)(2) *Non-Residential EV Charging.* For electricity supplied for EV charging for on-road applications through non-residential charging equipment, an entity may generate credits as long as it meets the FSE registration requirements pursuant to section 95483.2(b)(8), reporting requirements pursuant to section 95491, recordkeeping and auditing requirements pursuant to sections 95491.1, and no other entity is generating credits for the electricity dispensed through the same FSE.~~

~~(A) For electricity supplied for non-residential EV charging, the owner of the FSE is eligible to generate the credits.~~

~~(B) Subsection (A) above notwithstanding, the owner of FSE may elect not to be the credit generator and instead designate another entity to be the credit generator if the two entities agree by written contract that:~~

~~1. The owner of FSE will not generate credits and will instead provide the electricity data to the designated entity for LCFS reporting pursuant to sections 95483.1(b)(8), 95491 and 95491.1.~~

~~2. The designated entity accepts all LCFS responsibilities as the fuel reporting entity and credit generator.~~

~~(C) An entity that generates credits for non-residential EV charging must meet the requirements set forth in paragraphs 2., 3., and 5. of section 95491(d)(3)(A).~~

~~(4)(3) *Fixed Guideway Systems.* For electricity supplied as transportation fuel to a fixed guideway system, the transit agency operating the system is the fuel reporting entity and the credit generator for electricity used to propel the system. Upon submittal to, and approval by, the Executive Officer of the transit agency's written acknowledgment that it will not opt in and generate credits under this provision, the EDU becomes eligible to generate the credits for the electricity, and must meet the requirements set forth in sections 95491(d)(3)(A), paragraphs 3. through 5.~~

~~(5)(4) *Electric Forklifts and Other Mobile Freight Equipment.*~~

~~(A) For transportation fuel supplied to electric forklifts and other mobile freight and goods movement equipment, the fleet operator owner is the fuel reporting entity and the credit generator for electricity supplied to a specified fleet.~~

(B) Subsection (A) above notwithstanding, the electric forklift fleet ~~operator-owner~~ may elect not to be the credit generator and instead designate another entity to be the credit generator, if the two entities agree by written contract that:

1. The electric forklift fleet ~~operator-owner~~ will not generate credits and will instead provide the electricity data to the designated entity for LCFS reporting pursuant to sections 95483.2(b)(8), 95491 and 95491.1.
2. The designated entity accepts all LCFS responsibilities as the fuel reporting entity and credit generator.
3. The EDU can generate credits for electricity supplied to electric forklift fleet used for EV charging in its service territory during a quarter if not claimed by any other entity under paragraphs 1. and 2., above. The EDU must meet the requirements in section 95491(d)(3)(A), paragraphs 3. through 5.

~~(6)(5)~~ *Electric Transport Refrigeration Units (eTRU), Electric Cargo Handling Equipment (eCHE), Electric Auxiliary Engines for Ocean-going Vessel (eOGV).*

(A) For electricity supplied to eTRU, eCHE, or eOGV, the ~~operator-owner~~ of the eTRU, eCHE, or eOGV is the fuel reporting entity and the credit generator for electricity supplied to ~~a specified each~~ respective unit.

(B) Subsection (A) above notwithstanding, the eTRU, eCHE, or eOGV ~~operator-owner~~ may elect not to be the credit generator and instead designate another entity to be the credit generator if the two entities agree by written contract that:

1. The eTRU, eCHE, or eOGV ~~operator-owner~~ will not generate credits and will instead provide the electricity data to the designated entity for LCFS reporting pursuant to sections 95483.1(b)(8), 95491 and 95491.1.
2. The designated entity accepts all LCFS responsibilities as the fuel reporting entity and credit generator.

(7) *Other Electric Transportation Applications.* For electricity supplied to a transportation application not covered in subsection (1) through (6) above, any entity can apply to the Executive Officer to be the fuel reporting entity

and the credit generator for electricity supplied as long as it meets the requirements of section 95488.9(g) and 95491.

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§ 95483.1. Opt-In Parties-Entities.

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§ 95483.2. LCFS Data Management System.

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(b) LCFS Reporting Tool and Credit Bank & Transfer System (LRT-CBTS). The LRT-CBTS is designed to support fuel transaction reporting, compliance demonstration, credit generation, banking, and transfers.

* * * * *

(8) Registration of Fueling Supply Equipment (FSE). After establishing the LRT-CBTS account, fuel reporting entities for natural gas, electricity, propane, and hydrogen must register all fueling supply equipment in the LRT-CBTS using the FSE registration template available on the LRT-CBTS home page. The completed FSE registration template with supporting documents must be uploaded into the LRT-CBTS. Upon FSE registration, the applicant will receive a unique LCFS FSE ID that must be used for reporting fuel transactions in the LRT-CBTS pursuant to 95491. The following must be provided:

(A) General Requirements. All FSE registrations must include:

~~(A)~~ 1. Federal Employer Identification Number (FEIN) for the entity registering, name of the facility at which FSE is situated, street address, latitude, and longitude of the FSE location.

~~(B)~~ 2. Name and address of the entity that ~~operates or~~ owns the FSE, if different from the entity registering the FSE.

(B) Specific Requirements by Fuel Type.

~~(C)~~ 1. For CNG, FSE refers to a fueling station associated with a utility meter. A CNG station with multiple dispensers is considered a single FSE. Fuel reporting entities for CNG must provide the natural gas utility meter number at the FSE location, name of the utility company, and a copy of the most recent utility bill.

- ~~(D)~~ 2. For LNG and propane, FSE refers to a fueling station. An LNG or propane station with multiple dispensers is considered a single FSE. Fuel reporting entities for LNG and propane must provide a unique identifier associated with the FSE used for their own fuel accounting or financial accounting or other purposes and copy of invoice or bill of lading for the most recent fuel delivery.
- ~~(E)~~ 3. For non-residential and multi-family residential EV charging, FSE refers to each piece of equipment capable of measuring the electricity dispensed for EV charging. Fuel reporting entities for ~~non-residential~~ EV charging for on-road applications must provide the serial number assigned to the FSE by the original equipment manufacturer (OEM) and the name of OEM. If there are multiple FSEs at the same location, each unique piece of equipment must be registered separately.
- ~~(F)~~ 4. For single-family residential metered EV charging, FSE refers to a piece of equipment or on-vehicle telematics capable of measuring the electricity dispensed for EV charging. Fuel reporting entities for single-family metered residential EV charging using off-vehicle meters must provide the serial number assigned to the FSE by the OEM and the name of the equipment OEM, and the Vehicle Identification Number (VIN) for the vehicle expected to be charged at the location. Fuel reporting entities using vehicle telematics must provide the VIN. This reporting is optional when reporting metered electricity to generate base credits.
- ~~(G)~~ 5. Fuel reporting entities for ~~non-metered residential EV charging and~~ fixed guideway systems are exempt from subsection (A)1. above. The LRT-CBTS will assign FSE IDs for reporting purposes based on the information provided in the LRT-CBTS account registration form.
6. For electric forklifts, eCHE, or eOGV, FSE refers to the facility or location where electricity is dispensed for fueling. Fuel reporting entities for electric forklift, eCHE, or eOGV must provide name of the facility at which FSE is situated, street address, latitude, and longitude of the FSE location.
- ~~(H)~~ 7. For eTRU, FSE refers to each eTRU. Fuel reporting entities for eTRU fueling must provide the serial number assigned to the unit by the OEM and the name of the OEM.

~~(1)~~ ~~8.~~ For hydrogen, FSE refers to a fueling station. A hydrogen station with multiple dispensers is considered a single FSE. Fuel reporting entities for hydrogen must provide the station ID assigned by SOSS FSE Dispenser ID as assigned by CARB or assigned under any other program or standard such as in National Renewable Energy Laboratory (NREL) National Fuel Cell Technology Evaluation Center's Hydrogen Station Infrastructure Data Template. If there are multiple FSEs at the same location, each unique piece of equipment must be registered separately.

9. For transportation applications not covered in paragraphs 1. through 8. above, FSE refers to a fuel dispenser or a transportation equipment with the capability to measure the dispensed fuel in that equipment.

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§ 95483.3. Change of Ownership or Operational Control.

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§ 95484. Average Annual Carbon Intensity Requirements Benchmarks.

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(b) *Requirements Benchmarks for Gasoline and Fuels used as a Substitute for Gasoline.*

Table 1. LCFS Compliance Schedule ~~Carbon Intensity Benchmarks~~ for 2011 to ~~2020-2030~~ for Gasoline and Fuels Used as a Substitute for Gasoline.

<i>Year</i>	<i>Average Carbon Intensity (gCO₂e/MJ)</i>	<i>Year</i>	<i>Average Carbon Intensity (gCO₂e/MJ)</i>
2010	Reporting Only		
2011*	95.61	2021	94.22-90.76
2012	95.37	2022	89.97-89.51
2013**	97.96	2023	88.72-88.27
2014	97.96	2024	87.47-87.90
2015	97.96	2025	86.22-85.78
2016***	96.50	2026	84.97-84.54
2017	95.02	2027	83.72-83.30
2018	93.55	2028	82.48-82.05
2019****	91.08-93.72-93.24	2029	81.23-80.81
2020 and subsequent years	88.62-92.47-92.00	2030 and subsequent years	79.98-79.57

* The ~~average carbon intensity requirements benchmarks~~ for years 2011 and 2012 reflect reductions from base year (2010) CI values for CaRFG (95.85) calculated using the CI for crude oil supplied to California refineries in 2006.

** The ~~average carbon intensity requirements benchmarks~~ for years 2013 to 2015 reflect reductions from revised base year (2010) CI values for CaRFG (98.95) calculated using the CI for crude oil supplied to California refineries in 2010.

*** In 2015 the LCFS was readopted and the CI modeling updated. The ~~average carbon intensity requirements benchmarks~~ for years 2016 to ~~2020~~18 reflect reductions from revised base year (2010) CI values for CaRFG (98.47).

**** The benchmarks for years 2019 to 2030 reflect reductions from revised base year (2010) CI values for CaRFG (~~99.97-99.46~~).

(c) ~~Requirements Benchmarks~~ for Diesel Fuel and Fuels used as a Substitute for Diesel Fuel.

Table 2. LCFS Compliance Schedule ~~Carbon Intensity Benchmarks~~ for 2011 to ~~2020-2030~~ for Diesel Fuel and Fuels Used as a Substitute for Diesel Fuel.

<i>Year</i>	<i>Average Carbon Intensity (gCO₂e/MJ)</i>	<i>Year</i>	<i>Average Carbon Intensity (gCO₂e/MJ)</i>
2010	Reporting Only		
2011*	94.47	<u>2021</u>	<u>92.12 91.67</u>
2012	94.24	<u>2022</u>	<u>90.86 90.41</u>
2013**	97.05	<u>2023</u>	<u>89.59 89.16</u>
2014	97.05	<u>2024</u>	<u>88.33 87.90</u>
2015	97.05	<u>2025</u>	<u>87.07 86.65</u>
2016***	99.97	<u>2026</u>	<u>85.81 85.39</u>
2017	98.44	<u>2027</u>	<u>84.55 84.14</u>
2018	96.91	<u>2028</u>	<u>83.28 82.88</u>
2019****	<u>94.36 94.64 94.18</u>	<u>2029</u>	<u>82.02 81.62</u>
2020 and subsequent years	<u>91.81 93.38 92.93</u>	<u>2030 and subsequent years</u>	<u>80.76 80.37</u>

* The ~~average carbon intensity requirements benchmarks~~ for years 2011 and 2012 reflect reductions from base year (2010) CI values for ULSD (94.71) calculated using the CI for crude oil supplied to California refineries in 2006.

** The ~~average carbon intensity requirements benchmarks~~ for years 2013 to 2015 reflect reductions from revised base year (2010) CI values for ULSD (98.03) calculated using the CI for crude oil supplied to California refineries in 2010.

*** In 2015 the LCFS was readopted and the CI modeling updated. ~~The average carbon intensity requirements benchmarks~~ for years 2016 to ~~2020~~18 reflect reductions from revised base year (2010) CI values for ULSD (102.01).

**** The benchmarks for years 2019 to 2030 reflect reductions from revised base year (2010) CI values for ULSD (~~100.95~~ 100.46).

(d) *Benchmarks for Fuels used as a Substitute for Conventional Jet Fuel.*

Table 3. LCFS Carbon Intensity Benchmarks for 2019 to 2030 for Fuels Used as a Substitute for Conventional Jet Fuel.

<i>Year</i>	<i>Average Carbon Intensity (gCO₂e/MJ)</i>
<u>2019*</u>	<u>84.23 89.38</u>

<u>Year</u>	<u>Average Carbon Intensity (gCO₂e/MJ)</u>
<u>2020</u>	<u>83.10 89.38</u>
<u>2021</u>	<u>81.98 89.38</u>
<u>2022</u>	<u>80.86 89.38</u>
<u>2023</u>	<u>79.73 89.16</u>
<u>2024</u>	<u>78.61 87.90</u>
<u>2025</u>	<u>77.49 86.65</u>
<u>2026</u>	<u>76.36 85.39</u>
<u>2027</u>	<u>75.24 84.14</u>
<u>2028</u>	<u>74.12 82.88</u>
<u>2029</u>	<u>73.00 81.62</u>
<u>2030 and subsequent years</u>	<u>71.87 80.37</u>

* The benchmarks reflect reductions from base year (2010) CI values for conventional jet fuel (~~89.84~~ 89.38).

* * * * *

§ 95485. Demonstrating Compliance.

* * * * *

§ 95486. Generating and Calculating Credits and Deficits.

(a) *Generation and Acquisition of Transferrable Credits.*

- (1) Credit and Deficit Issuance. Upon submission and acceptance of a timely quarterly reports as required by this subarticle, the total number of credits and deficits generated through the supply of fuels or blendstocks with carbon intensity values below that of the applicable standard will be issued deposited in a credit the LRT-CBTS account of the applicable regulated party or credit or deficit generator. Once banked issued, credits may be retained indefinitely, retired to meet a compliance obligation, or transferred to other regulated party or credit generators entities through the LRT-CBTS. The Executive Officer will issue the credits in the LRT-CBTS if:

- (A) The credit generator met all the reporting requirements pursuant to this subarticle;
- (B) The credit generator reconciled its Obligated Amount data with business partners by the quarterly reporting deadline, if applicable;
- (C) The activity is not prohibited pursuant to section 95486(a)(2) or any other provision of this subarticle.

* * * * *

(b) *Calculation of Credits and Deficits Generated.* The Executive Officer will calculate the number amount of credits and deficits generated in a compliance period for an LCFS fuel ~~will be calculated~~ within the LRT-CBTS using the methods specified in sections 95486.1 and section 95489. The total credits and deficits generated are used in determining the overall credit balance for a compliance period, pursuant to section 95485. All credits and deficits are denominated in units of metric tons (MT) of carbon dioxide equivalent.

- (1) All LCFS fuel quantities used for credit calculation ~~must be~~ using fuel pathways are in energy units of megajoules (MJ).

Fuel quantities denominated in other units, such as those shown in Table ~~34~~, ~~must be~~ are converted to MJ in the LRT-CBTS by multiplying by the corresponding energy density¹:

Table 34. Energy Densities and Conversion Factors for ~~of~~ LCFS Fuels and Blendstocks.

<i>Fuel (units)</i>	<i>Energy Density</i>
CARBOB (gal)	119.53 (MJ/gal)
CaRFG (gal)	115.83 (MJ/gal)
Diesel fuel (gal)	134.47 (MJ/gal)
Pure Methane (ft³)	1.02 (MJ/ft³)
Natural Gas (ft³)	1.04 (MJ/ft³)
LNG (gal)	78.83 (MJ/gal)
<u>CNG (Therms)</u>	<u>105.5 (MJ/Therm)</u>
Electricity (kWh)	3.60 (MJ/kWh)

¹ Energy density factors are based on the lower heating values of fuels in CA-GREET~~3.0 2.0~~ using BTU to MJ conversion of 1055.06 J/Btu.

Hydrogen (kg)	120.00 (MJ/kg)
Undenatured Anhydrous Ethanol	80.53 (MJ/gal)
Denatured Ethanol (gal)	81.51 (MJ/gal)
FAME Biodiesel (gal)	126.13 (MJ/gal)
Renewable Diesel (gal)	129.65 (MJ/gal)
<u>Alternative Jet Fuel (gal)</u>	<u>126.37 (MJ/gal)</u>
<u>Propane (LPG) (gal)</u>	<u>88.89 89.63 (MJ/gal)</u>

* * * * *

§ 95486.1. Generating and Calculating Credits and Deficits Using Fuel Pathways.

* * * * *

~~(3)(a)~~ General Calculation of Credits and Deficits Using Fuel Pathways. LCFS credits or deficits for each fuel or blendstock for which a fuel reporting entity is the credit or deficit generator will ~~supplied by a regulated party~~ must be calculated according to the following equations:

* * * * *

~~(B)(2)~~ $CI_{reported}^{XD} = \frac{CI_i}{EER^{XD}}$

where:

CI_i is the carbon intensity of the fuel or blendstock, measured in gCO₂e/MJ, determined by a CA-GREET pathway or a custom pathway and incorporates a land use modifier (if applicable); and

EER^{XD} is the dimensionless Energy Economy Ratio (EER) relative to gasoline ($XD = \text{“gasoline”}$), ~~or diesel fuel~~ ($XD = \text{“diesel”}$), or jet fuel ($XD = \text{“jet”}$) as listed in Table 45. For a vehicle-fuel combination not listed in Table 45, $EER^{XD} = 1$ must be used unless an applicant is granted certification of an EER-adjusted CI value pursuant to section 95488.7(a)(3).

* * * * *

Table 45. EER Values for Fuels Used in Light- and Medium-Duty, and Heavy-Duty Applications.

<i>Light/Medium-Duty Applications</i> <i>(Fuels used as gasoline replacement)</i>		<i>Heavy-Duty/Off-Road Applications</i> <i>(Fuels used as diesel replacement)</i>		<i>Aviation Applications</i> <i>(Fuels used as jet fuel replacement)</i>	
<i>Fuel/Vehicle Combination</i>	<i>EER Values Relative to Gasoline</i>	<i>Fuel/Vehicle Combination</i>	<i>EER Values Relative to Diesel</i>	<i>Fuel/Vehicle Combination</i>	<i>EER Values Relative to Conventional Jet</i>
Gasoline (incl. E6 and E10) Or E85 (and other ethanol blends)	1.0	Diesel fuel Or Biomass-based diesel blends	1.0	Alternative Jet Fuel Jet fuel or Biomass-based jet fuel blends	1
CNG/ICEV	1.0	CNG or LNG (Spark-Ignition Engines) CNG or LNG (Compression-Ignition Engines)	0.9 1.0		
Electricity/BEV, or PHEV	3.4	Electricity/BEV, or PHEV* Truck Electricity/BEV or PHEV* Bus	2.7 4.2 5.0		
On-Road Electric Motorcycle	4.4	Electricity/Fixed Guideway, Heavy Rail Electricity/Fixed Guideway, Light Rail Electricity/Trolley Bus, Cable Car, Street Car Electricity Forklifts Electric eTRU eCHE	4.6 3.3 3.1 3.8 3.4 2.7		

		<u>eOGV</u>	<u>2.6</u>
H2/FCV	2.5	H2/FCV	1.9
		H2 Fuel Cell Forklifts	2.1
<u>Propane</u>	<u>1.0</u>	<u>Propane</u>	<u>0.9</u>

*BEV = battery electric vehicle, PHEV= plug-in hybrid electric vehicle, FCV = fuel cell vehicle, ICEV = internal combustion engine vehicle.

* * * * *

(c) Calculation of Credits for EV Charging Using Fuel Pathways.

* * * * *

(2) Incremental Credits for Residential EV Charging. “Incremental Credit” refers to any credits generated in addition to the base credits generated by an EDU pursuant to subsection (1)(B) above, for the same electricity, using the calculation in subsection (2)(B), below.

(A) Quantity of Electricity.

1. Non-Metered Residential EV Charging. The Executive Officer shall use the formula in 95486.1(c)(1)(A) for calculating the quantity of electricity eligible to generate incremental credits for each residence that has an electric vehicle that is not separately metered and is shown to receive low-CI electricity, and is not claimed by another generator of incremental low-CI electricity credits using metered data.
2. Metered Residential EV Charging for Incremental Credits. Any entity generating incremental credit for metered residential EV charging must supply the quantity of low-CI electricity through timely submission of Quarterly Fuel Transaction Reports based on meter records.

(B) Calculation of Incremental Credits. Incremental credits for electricity used for EV charging, including low-CI electricity and ~~time of use~~ smart charging pathways, must be calculated according to the following equation:

$$Credits_i(MT) = (CI_{grid\ average} - CI_{reported}) \times Electricity \times C$$

where:

Credits_i(MT) is the number of incremental LCFS credits generated (a zero or positive value), in metric tons, for improvements in carbon intensity of electricity supplied as transportation fuel compared to the grid-average carbon intensity;

CI^{XD}_{grid average} is the carbon intensity of California Average Grid Electricity pathway certified by the Executive Officer for a given year;

CI^{XD}_{reported} is the adjusted carbon intensity of electricity, in gCO₂e/MJ, as calculated for a certified Tier 2 pathway or a Lookup Table pathway, including ~~time-of-use smart charging pathways~~;

Electricity is the total quantity of low-CI electricity supplied for EV charging, in MJ, determined from the energy density conversion factors in Table 4; and

C is a factor used to convert credits to units of metric tons from gCO₂e and has the value of:

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

(d) Calculation of Credits for Non-Residential EV Charging Using Fuel Pathways. The base and incremental framework does not apply to non-residential EV charging. Only one entity per FSE may claim credits for non-residential metered EV charging, pursuant to the framework described in subsections (1) and (2) below.

(1) An entity may generate credits for Non-Residential EV charging using a carbon intensity from the Lookup Table in section 95488.5, or a carbon intensity value certified through the Tier 2 pathway application process, and the credit calculation in 95486.1(a).

(2) ~~Time-of-Use Smart Charging Pathways for EV Charging.~~ An entity can generate credits, in addition to credits generated pursuant to subsection (1), above, for improvements in the CI of electricity used for EV charging due to ~~time-of-use smart charging~~ pursuant to section 95488.5, and the credit calculation in section 95486.1(c)(2)(B).

(e) Calculation of Credits for Hydrogen Using Fuel Pathways.

(1) An entity may generate credits for hydrogen used as a transportation fuel pursuant to section 95486.1(a), using a carbon intensity found in the Lookup Table in section 95488.5 or a carbon intensity value certified

through the Tier 2 pathway application process, and the credit calculation in 95486.1(a).

- (2) ~~Time of Use Smart Electrolysis Pathways for Hydrogen Production.~~ An entity can generate credits, in addition to credits generated pursuant to subsection (1), above, for improvements in the CI of electricity used for electrolysis to produce hydrogen due to ~~time of use smart electrolysis~~ pursuant to section 95488.5 and the credit calculation in section 95486.1(c)(2)(B), where:

Electricity is the total quantity of low-CI electricity supplied to the electrolyzer for hydrogen production.

* * * * *

§ 95486.2. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways.

(a) Hydrogen Refueling Infrastructure (HRI) Pathways.

- (1) HRI Pathway Eligibility. A hydrogen station owner may submit an application to certify an HRI pathway subject to the following eligibility conditions:

(A) The proposed HRI must be located in California and open to the public.

(B) The HRI pathway application must be received on or before December 31, 2025.

(C) Stations receiving funds pursuant to any enforcement settlement related to any California or Federal regulation are not eligible for HRI crediting.

- (2) HRI Application Requirements. For each hydrogen refueling station, the station owner must submit an application in the LRT-CBTS containing the following information:

(A) Name and address of the owner of the proposed station.

(B) Contact person for the owner entity.

1. Name
2. Title or position
3. Phone number
4. Mobile phone number

(J) CBI must be designated pursuant to the requirements described in section 95488.8(c).

(K) An application and supporting documents must be submitted electronically via the LRT-CBTS unless the Executive Officer has approved or requested in writing another format.

(3) Application Approval Process. The HRI application must be approved by the Executive Officer before the station owner may generate hydrogen refueling infrastructure credits. If HRI credits from all approved stations exceed 2.5 percent of deficits in the prior quarter, the Executive Officer will not approve additional HRI pathways and will not accept additional applications until HRI credits are less than 2.5 percent of deficits. HRI applications will be evaluated for approval on a first come, first served basis.

(A) After receipt of an application designated by the applicant as ready for formal evaluation, the Executive Officer will advise the applicant in writing either that:

1. The application is complete, or

2. The application is incomplete, in which case the Executive Officer will identify which requirements of section 95486.2(a)(2) have not been met.

a. The applicant may submit additional information to correct deficiencies identified by the Executive Officer.

b. If the applicant is unable to achieve a complete application within 180 days of the Executive Officer's receipt of the original application, the application will be denied on that basis, and the applicant will be informed in writing.

(B) The Executive Officer will not approve an application if the Executive Officer determines, based upon the information submitted in the application and any other available information, that the application does not meet requirements in subsections 95486.2 (a)(1) and (a)(2). If the Executive Officer does not approve the application, the applicant will be notified in writing and the basis for the disapproval shall be identified.

(C) If the Executive Officer determines that the applicant and application have met all requirements for approval pursuant to subsections 95486.2 (a)(1) and (a)(2), the Executive Officer will

approve the application and provide an approval summary on the LCFS website including the station location and assigned identifier, number of dispensing units, HRI refueling capacity, and effective date range for HRI pathway crediting. HRI crediting is limited to 15 years starting with the quarter following Executive Officer approval of the application.

- (4) Requirements to Generate Credits. To generate credits using HRI pathways the station must meet the following conditions. The station owner must maintain, and submit to CARB upon request, records demonstrating adherence to these conditions.
- (A) The station owner must update the HRI refueling capacity if different from the design HRI refueling capacity provided in the application. Any station design or operational information that deviates from the original application must be declared to the Executive Officer, and a new attestation submitted pursuant to 95486.2(a)(2)(J).
- (B) The station must be open to the public, meaning that no obstructions or obstacles exist to preclude vehicle operators from entering the station premises, no access cards or personal identification (PIN) codes are required for the station to dispense fuel, and no formal or registered station training shall be required for individuals to use the hydrogen refueling station.
- (C) The station uses a public point of sale terminal that accepts major credit and debit cards.
- (D) The station is connected to the Station Operational Status System (SOSS) and:
1. The station passed final inspection by the appropriate authority having jurisdiction and has a permit to operate.
 2. The station owner has fully commissioned the station, and has declared it fit to service retail FCV drivers. This includes the station owner's declaration that the station meets an appropriate SAE fueling protocol, as required in California.
 3. At least three OEMs have confirmed that the station meets protocol expectations, and their customers can fuel at the station.
 4. The County Department of Weights and Measures has verified dispenser performance, enabling the station to sell

hydrogen by the kilogram (pursuant to CCR Title 4, Division 9, Chapter 1).

(E) The quantity of dispensed hydrogen is reported as required in 95491(d)(4)(A).

(F) Dispensed hydrogen meets the following CI and renewable content requirements on a company-wide, weighted average basis. All the stations registered by an entity with a unique FEIN in LRT-CBTS are considered for calculating the company-wide weighted average CI and renewable content.

1. CI of 75 gCO₂e/MJ or less, and

2. Renewable content of 40 percent or greater.

(G) The station must be operational within 24 months of application approval. If the applicant fails to demonstrate the operability within 24 months of approval then the application would be canceled. The applicant can reapply for the same station eligible only for 10 years of crediting.

(5) Calculation of HRI Credits. HRI credits will be calculated using the following equation:

$$\begin{aligned} \text{Credits}_{HRI} (MT) &= (CI_{standard}^{XD} \times EER - CI_{HRI}) \times E_{H2} \\ &\times (Cap_{HRI} \times N \times UT - H2_{disp}) \times C \end{aligned}$$

where:

$CI_{standard}^{XD}$ is the average carbon intensity requirement of gasoline ($XD =$ "gasoline") for a given year as provided in sections 95484(b):

EER is the dimensionless Energy Economy Ratio for H2/FCV relative to gasoline as listed in Table 5:

CI_{HRI} is the carbon intensity used for HRI crediting. Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater;

E_{H2} is the energy density for hydrogen in MJ/kg as listed in Table 4:

Cap_{HRI} is the HRI refueling capacity for the station (kg/day):

UT is the the uptime multiplier which is the percentage of time that the station is available as reported to SOSS during the quarter;

H₂_{disp} is the quantity of hydrogen dispensed during the quarter (kg);

N is the number of days during the quarter;

C is a factor used to convert credits to units of metric tons from gCO₂e and has the value of:

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

(6) Reporting and Recordkeeping Requirements. The following must be reported to the executive officer each quarter before credits will be added to the LRT account associated with an approved HRI pathway.

(A) Station availability. This value is to be reported as the percentage of hours (from 6 am to 9 pm or the hours that the station is permitted to operate, whichever is less) during the quarter that the station is available for fueling as reported to SOSS. Any period of time that SOSS reports that a portion of the station capacity is not available will count as a pro-rated amount of station availability, proportional to the percentage of the station capacity that remains available for fueling for this period of time.

(B) Company-wide, weighted average renewable content (percent) for dispensed hydrogen.

(C) Cost and revenue data. Provide a quarterly account of the following costs and revenues up through the most recent reporting quarter per station.

1. Capital expenditures (\$)
2. Total delivered cost (\$) of hydrogen and average delivered cost (\$/kg) for hydrogen
3. Maintenance costs (\$)
4. Land rental cost (\$)
5. Grant revenue (\$)
6. Total revenue (\$) received from sale of hydrogen and average retail price (\$/kg) for hydrogen sold
7. Other operational expenditures (\$)

(7) Applications for Expanded HRI Refueling Capacity. Station owners who expand the capacity of a station and that is already generating HRI credits

under the LCFS must submit an application to the Executive Officer to generate additional credits based on the updated capacity. Applications for expanded station capacity must be received before December 31, 2025 and do not extend the effective date range for the HRI crediting specified upon initial project approval in 95486.2(a)(3)(D). The application must include the following elements.

- (A) In order to be eligible to generate HRI credits for expanded capacity, the station owner must demonstrate that station throughput in a reporting quarter is greater than or equal to 50 percent of the original approved HRI refueling capacity.
- (B) Updated station nameplate refueling capacity (12-hour) and updated HRI refueling capacity.
- (D) If the sources of hydrogen and delivery methods stated in the original HRI application will change as a result of the added capacity, the station owner must disclose the new hydrogen sources and delivery methods.
- (E) The station owner must maintain records demonstrating that any new equipment added as a result of the expansion in capacity, including storage and fueling dispensers, meet the requirements listed in 95486.2(a).

(b) DC Fast Charging Infrastructure (FCI) Pathways.

(1) FCI Pathway Eligibility. An FSE owner may submit an application to receive an FCI pathway subject to the following eligibility conditions:

- (A) The proposed FSE must be located in California and open to the public for charging 24 hours per day, 7 days per week.
- (B) Each site must have DC fast charging equipment that can support at least two of the following three fast charging connectors: CHAdeMO, SAE CCS, and/or Tesla. Each site must have at least one FSE with a CHAdeMO connector and at least one FSE with an SAE CCS connector. No more than two-thirds of all FSE at a site can support one fast charging connector only.
- (C) The FCI pathway application must be received on or before December 31, 2025.
- (D) An FSE that is permitted to operate prior to January 1, 2019 or is receiving funds pursuant to any enforcement settlement related to any California or Federal regulation is not eligible for FCI crediting.

(E) Each FSE must have a minimum nameplate power rating of 50 kW.

(F) Each FSE must be networked and capable of tracking and reporting its availability for charging.

(2) FCI Application Requirements. The applicant must submit an application in the LRT-CBTS containing the following information:

(A) Name and address of the owner of the proposed FSE.

(B) Contact person for the owner entity.

1. Name
2. Title or position
3. Phone number
4. Mobile phone number
5. Email address

(C) Name, street address, latitude, longitude and a location description for each proposed FSE site.

(D) The number and type of FSEs.

(E) The nameplate power rating (kW) for each FSE.

(F) The effective simultaneous power rating (kW) for each FSE calculated using the equation below. The total simultaneous power for all FSE at a single site approved under this provision cannot exceed 1500 kW.

$$P_{Sim}^i = P_{NP}^i \times \frac{P_{Sim}^{Tot}}{\sum_{i=1}^n P_{NP}^i}$$

where:

P_{Sim}^i is the simultaneous power rating for FSE i;

P_{NP}^i is the nameplate power rating for FSE i;

P_{Sim}^{Tot} is the maximum total power that can be delivered to all FSEs at a single site when they are operated simultaneously; and

n is the number of FSEs at a single site.

(G) Expected date that the FSE will be operational.

(H) A signed attestation letter from the applicant attesting to the veracity of the information in the application packet. The attestation letter shall be submitted as a scanned electronic 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, be from the applicant and not from an entity representing the applicant (such as a consultant or legal counsel), and include the following attestation:

I, an authorized representative of _____ (applicant entity), attest to the veracity of the information submitted as part of the DC Fast Charging Infrastructure (FCI) application, attest that the proposed FSE is not receiving funds pursuant to any enforcement settlement related to any California or Federal regulation, and declare that the information submitted accurately represents the anticipated and intended design and operation of the charging infrastructure. Further, I understand and agree to each of the statements in the attached application. I am a duly authorized officer with authority to attest to the veracity of the information in the application and to sign on behalf of the respective applicant.

I understand that the following information in the FCI application will be made available on the LCFS web site: Name of the Applicant Entity, Site Name, Site Address, Number and Type of Charging Units, Power Rating for Each Unit, and Effective Date Range for FCI Crediting

By submitting this application, _____ (applicant entity) accepts responsibility for the information herein provided to CARB. I certify under penalty of perjury under the laws of the State of California that I have personally examined, and am familiar with, the statements and information submitted in this document. I certify that the statements and information submitted to CARB are true, accurate, and complete.

(I) CBI must be designated pursuant to the requirements described in section 95488.8(c)

(J) An application and supporting documents must be submitted electronically via the LRT-CBTS unless the Executive Officer has approved or requested in writing another format.

(3) Application Approval Process. The FCI application must be approved by the Executive Officer before the applicant may generate FCI credits. If FCI credits from all approved FSEs exceed 2.5 percent of deficits in the prior quarter, the Executive Officer will not approve additional FCI pathways and will not accept additional applications until FCI credits are less than 2.5 percent of deficits. FCI applications will be evaluated for approval on a first come, first served basis.

(A) After receipt of an application designated by the applicant as ready for formal evaluation, the Executive Officer shall advise the applicant in writing either that:

1. The application is complete, or

2. The application is incomplete, in which case the Executive Officer will identify which requirements of section 95486.2(b)(2) have not been met.
- a. The applicant may submit additional information to correct deficiencies identified by the Executive Officer.
- b. If the applicant is unable to achieve a complete application within 180 days of the Executive Officer's receipt of the original application, the application will be denied on that basis, and the applicant will be informed in writing.
- (B) The Executive Officer shall not approve an application if the Executive Officer determines, based upon the information submitted in the application and any other available information, that the application does not meet requirements in subsections 95486.2(b)(1) and (b)(2). If the Executive Officer does not approve the application, the applicant will be notified in writing and the basis for the disapproval shall be identified.
- (C) If the Executive Officer determines the application has met all requirements for approval pursuant to subsections 95486.2(b)(1) and (b)(2), the Executive Officer will approve the application and provide an approval summary on the LCFS website including the site location and FSE ID, number and type of FSE, power rating for each FSE, and effective date range for FCI pathway crediting. FCI crediting is limited to 5 years starting with the quarter following Executive Officer approval of the application.
- (4) *Requirements to Generate Credits.* To generate credits using FCI pathways the following conditions must be met. The applicant must maintain, and submit to CARB upon request, records demonstrating adherence to these conditions.
- (A) The applicant must update the nameplate and effective simultaneous power ratings if different from the power ratings provided in the application. Any FSE design or operational information that deviates from the original application must be declared to the Executive Officer, and a new attestation submitted using the language in 95486.2(b)(2)(H).
- (B) The FSE must be open to the public, meaning that no obstructions or obstacles exist to preclude vehicle operators from entering the FSE premises, no access cards or personal identification (PIN)

codes are required for the FSE to dispense fuel, and no formal or registered equipment training shall be required for individuals to use the FSE.

- (C) The FSE must be capable of supporting a public point-of-sale method that accepts credit or debit card without incurring any additional fees, inconvenience or delays versus other payment or access control methods. Additional payment mechanisms may be offered, such as RFID or smart card that is linked to a credit card or payment through mobile applications. The point-of-sale and supporting network must use an open protocol to allow subscribers of other EV charging system networks to access the charging station.
- (D) The FSE passed final inspection by the appropriate authority having jurisdiction and has a permit to operate.
- (E) The FSE owner has fully commissioned the FSE, and has declared it fit to service retail EV drivers. This includes the FSE owner's declaration that the FSE meets an appropriate SAE fueling protocol, as required in California.
- (F) The County Department of Weights and Measures has verified charging unit performance, enabling the FSE to sell electricity by the kWh (pursuant to CCR Title 4, Division 9, Chapter 1).
- (G) The quantity of dispensed electricity must be reported as required in section 95491.

(5) Calculation of FCI Credits. FCI credits will be calculated using the following equation for each FSE approved under this provision:

$$\begin{aligned} Credits_{FCI} (MT) &= (CI_{standard}^{XD} \times EER - CI_{FCI}) \times C_{Elec} \\ &\times \left(P_{FCI}^i \times 6 \frac{hr}{day} \times N \times UT - Elec_{disp} \right) \times C \end{aligned}$$

where:

$CI_{standard}^{XD}$ is the average carbon intensity requirement of gasoline ($XD =$ "gasoline") for a given year as provided in section 95484(b);

EER is the dimensionless Energy Economy Ratio for Electricity/BEV or PHEV relative to gasoline as listed in Table 5;

CI_{FCI} is the California average grid electricity carbon intensity as listed in Table 7-1;

C_{Elec} is the conversion factor for electricity as listed in Table 4;

P_{FCI}^i is the simultaneous power rating (kW) for the FSE as defined in section 95486.2(b)(2) or 150 kW, whichever is less;

N is the number of days during the quarter;

UT is the uptime multiplier which is the fraction of time that the FSE is available for charging during the quarter;

$Elec_{disp}$ is the quantity of electricity dispensed during the quarter (kWh);

C is a factor used to convert credits to units of metric tons from gCO_{2e} and has the value of:

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

(6) *Reporting Requirements.* The following must be reported to the Executive Officer each quarter before credits will be added to the LRT account associated with an approved FCI pathway.

(A) FSE uptime. Fraction of time each FSE is operational during the quarter.

(B) Cost and revenue data. Provide a quarterly account of the following costs and revenues up through the most recent reporting quarter per site.

1. Capital expenditures (\$)
2. Total delivered cost (\$) of electricity, including demand charges, and average delivered cost (\$/kWh) for electricity
3. Maintenance costs (\$)
4. Land rental cost (\$)
5. Grant revenue (\$)
6. Total revenue (\$) received from sale of electricity and average retail price (\$/kWh) for electricity sold
7. Other operational expenditures (\$)

(7) *Applications for Expanded FCI Capacity.* Applicants who increase the power rating of an FSE or add an FSE to a site that is already generating FCI credits under the LCFS must submit an application to the Executive Officer to generate additional credits based on the increased power or

number of FSEs. Applications must be received before December 31, 2025 and do not extend the end date for the FCI crediting specified upon initial project approval in 95486.2(b)(3). The application must include the following elements.

- (A) Updated number and type of FSE at the site.
- (B) Updated nameplate power and effective simultaneous power for each FSE at the site.
- (C) The applicant must maintain records demonstrating that any new equipment added as a result of the expansion in capacity meet the requirements listed in 95486.2(b).

NOTE: Authority cited: Sections 38510, 38530, 38560, 38560.5, 38571, 38580, 39600, 39601, 41510, 41511, and 43018 Health and Safety Code; 42 U.S.C. section 7545, and *Western Oil and Gas Ass'n v. Orange County Air Pollution Control District*, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975). Reference: Sections 38501, 38510, 39515, 39516, 38571, 38580, 39000, 39001, 39002, 39003, 39515, 39516, 41510, 41511 and 43000, Health and Safety Code; Section 25000.5, Public Resources Code; and *Western Oil and Gas Ass'n v. Orange County Air Pollution Control District*, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975).

§ 95487. Credit Transactions.

- (a) *General.* LCFS credits shall not constitute instruments, securities, or any other form of property.

* * * * *

- (2) A regulated ~~party~~ entity may not:
 - (A) ~~u~~Use credits in the LCFS program that are generated outside the LCFS program, including credits generated in other ~~AB 32-~~ tradeable emission credit programs administered by the California Air Resources Board.
 - (B) ~~b~~Borrow or use credits from anticipated future carbon intensity reductions to demonstrate compliance pursuant to section 95485(a). (This does not preclude contracting for future delivery of LCFS credits as described in section 95487(b)(1)(B).)
 - (C) ~~g~~Generate LCFS credits from fuels exempted from the LCFS under section 95482(d) or are otherwise not eligible pursuant to one of the transportation fuels specified in section 95482(a).

* * * * *

~~(e)~~(b) *Credit Transfers between Parties.*

- (1) A regulated party ~~entity that who~~ wishes to sell or transfer credits (“the Seller”) and a regulated party ~~entity that who~~ wishes to purchase or acquire a credit (“the Buyer”) may enter into an agreement to transfer credits. Any such agreement must be fully documented in the LRT-CBTS pursuant to section 95487(b)(1)(B) and (C).

* * * * *

(B) The credit transfer request must identify the type of transaction agreement for which the transfer request is being submitted, selecting one of the following types:

1. *Type 1 Transfer.* Over-the-counter agreement for the sale or transfer of LCFS credits for which delivery will take place no more than 10 days from the date the parties enter into ~~of~~ the transaction agreement.
2. *Type 2 Transfer.* Over-the-counter agreement for the sale or transfer of LCFS credits for which delivery is to take place more than 10 days from the date the parties enter into ~~the of~~ transaction agreement or that involve multiple transfers of LCFS credits over time.
3. *Type 3 Transfer.* Agreements for the sale of LCFS credits through any contract arranged through a clearing service provider.

~~(C)(B) *Credit Seller Requirements.* When a credit transfer agreement has been reached From the date of the credit transaction agreement, within 10 business ~~5~~ days the Seller must initiate the documentation by completing and posting for the Buyer's review an online Credit Transfer Form (CTF) provided in the LRT-CBTS. The CTF shall contain the following fields:~~

- ~~1. *Date of Transaction Agreement.* The date on which the Buyer and Seller reached the transaction agreement;~~
- ~~2. Names of the Seller and Buyer Companies as registered in the LRT-CBTS;~~
- ~~3. The Federal Employer Identification Numbers (FEIN) of the Seller and Buyer Companies as registered in the LRT-CBTS;~~

- ~~4. First Name, and Last Name, and contact information of the person who performed the transaction on behalf of the Seller Company;~~
- ~~5. Contact information of the person who performed the transaction on behalf of the Seller Company;~~
- ~~65. First Name, and Last Name, and contact information of the person who is anticipated to performed the transaction on behalf of the Buyer Company;~~
- ~~7. Contact information of the person who performed the transaction on behalf of the Buyer Company;~~
- ~~86. The number of credits proposed to be transferred and any credit identification numbers assigned to the credits by the Executive Officer; and~~
- ~~97. The price or equivalent value of the consideration (in U.S. dollars) to be paid per credit proposed for transfer, excluding any fees. If the transaction agreement does not specify the price for LCFS credits, the seller may select one of the following options:~~
- ~~a. The proposed transfer is to reflect an adjustment in GI value of fuel transacted between Seller and Buyer;~~
- ~~b. The proposed transfer incorporates a credit trade along with the sale or purchase of other product, and does not specify a price or cost basis for the sale of the credits alone. In such cases, Seller should provide a brief description of the pricing method.~~
- ~~8. Additional Information for Agreements that Include Future Credit Transfers. If the transaction agreement contains terms or obligations for credit transfers that extend beyond credits to be transferred upon the buyer's confirmation within 5 days, then the seller must specify the following:~~
- ~~a. The length of the agreement, including the date by which all transfers are to be completed;~~
- ~~b. The total number of credits that the Seller is obligated to transfer under the agreement;~~

~~c. If periodic transfers are included in the agreement the number of credits and schedule, by quarter, for those transfers;~~

~~d. The specific price, or other pricing mechanism specified in the agreement for future transfers;~~

~~e. If the agreement is terminated or amended prior to its full execution as provided in paragraph a. above, the Seller must notify the CARB within 5 days, using the appropriate forms in the LRT-CBTS.~~

(C) For Type 1 Transfer. Within 10 days from the date the parties enter into the credit transaction agreement, the Seller and the Buyer must initiate and complete the transfer request using the Credit Transfer Form (CTF) provided in the LRT-CBTS. The parties must provide:

1. Date of Transaction Agreement. The date on which the Buyer and Seller enter into the credit transaction agreement;

2. Names and the Federal Employer Identification Numbers (FEIN) of the Seller and the Buyer as registered in the LRT-CBTS;

3. First name, last name, and contact information of the Seller and Buyer representative;

4. The number of credits proposed to be transferred;

5. The price or equivalent value of the consideration (in U.S. dollars) per credit proposed for transfer, excluding any fees.

(D) For Type 2 Transfer. Within 10 days from the date the parties enter into the credit transaction agreement, the Seller and the Buyer must report the following using the Credit Transfer Form (CTF) provided in the LRT-CBTS:

1. Date of Transaction Agreement. The date on which the Buyer and Seller enter into the credit transaction agreement;

2. Names and the Federal Employer Identification Numbers (FEIN) of the Seller and the Buyer as registered in the LRT-CBTS;

3. First name, last name, and contact information of the Seller and Buyer representative;

4. If the agreement requires a single delivery of credits or multiple delivery of credits
5. The date of last credit delivery or the length of the agreement including the date by which all deliveries are to be completed;
6. The total number of credits anticipated to be transferred under the agreement;
7. The price per credit (in U.S. dollars) or the terms to determine the price for future credit transfer as per the agreement.
8. If the agreement is terminated or amended prior to its full execution as provided in subsection 5. above, the parties must notify the CARB within 10 days.

(E) For Type 3 Transfer. A credit transfer request submitted for an agreement executed through a clearing service provider must provide the following information:

1. Identify the exchange through which the transaction is conducted;
2. Date of close of trading for the contract;
3. Identify the contract description code assigned by the exchange to the contract;
4. Price at close of trading for the contract;
5. The number of credits in the contract to be transferred;
6. Date of delivery of LCFS credits covered by the contract.

(F) If the transaction agreement does not specify the price for LCFS credits, the Seller must provide a brief description of the pricing method for the full transaction inclusive of all products and value exchanged. The seller must also select one of the following options:

1. The proposed transfer is to reflect an adjustment in CI value of fuel transacted between Seller and Buyer;

2. The proposed transfer incorporates a credit trade along with the sale or purchase of other product, and does not specify a price or cost basis for the sale of the credits alone.

~~(D)(C) Credit Buyer Requirements.~~

~~1. Confirmation of Agreement for Credit Incoming Transfer. Within 105 days of receiving the CTF from the Seller, the Buyer must confirm the accuracy of the information therein by signing and dating the CTF. The LRT CBTS will capture the electronic signatures from the Seller and Buyer in the CTF and archive the completed CTF. If the Buyer and Seller have not fulfilled the requirements of this subsection 95487(b) within 2010 days of reaching an agreement, the Executive Officer will deem the transaction void.~~

~~2. Reporting to the Executive Officer. The Buyer shall submit the Credit Transfer Form with all of the required information to the Executive Officer in the LRT CBTS.~~

~~(G)(E)(D) Recording a Credit Transfer. The Executive Officer will record the transfer request, and will update the account balance of the Seller and Buyer to reflect the proposed transfer. Within five business days of Upon receiving a fully-completed CTF, the Executive Officer shall, either:~~

* * * * *

~~(F) The Executive Officer may cancel or reverse a credit transfer that is pending or completed if the Executive Officer finds the transfer request is not in compliance with this subarticle. The Executive Officer shall notify the parties and identify the reasons for cancelling or reversing a credit transfer.~~

~~(2) Credit Transfer for an Agreement executed through a Clearing Service Provider. A transfer request submitted for an agreement executed through a clearing service provider must provide the following information:~~

~~(A) Identify the exchange through which the transaction is conducted;~~

~~(B) Identify the contract description code assigned by the exchange to the contract;~~

~~(C) Date of close of trading for the contract;~~

~~(D) Price at close of trading for the contract;~~

~~(E) Date of delivery of LCFS credits covered by the contract.~~

~~(2)(3)(2)~~ *Facilitation of Credit Transfer.* A Seller or Buyer may elect to use a third-party broker as defined in section 95481 to facilitate the transfer of credits. A broker cannot ~~own~~ acquire credits. A broker who will document transfers in LRT-CBTS must register in the LRT-CBTS, and the ~~b~~Buyer, ~~s~~Seller, or both must document, using the LRT-CBTS, authorization for broker to act on their behalf. A broker may, with the consent of the parties, conduct a “blind transaction” where the Buyer of the credit does not know the identity of the Seller, and/or the Seller of the credit does not know the identity of the Buyer. ~~The broker may include, but is not limited to, a credit transfer service agency or broker who assists in arranging the transfer of credits.~~

~~(3)(4)(3)~~ *Correcting Credit Transfer Errors.* A regulated ~~party~~ entity is responsible for the accuracy of information submitted to the Executive Officer. If a regulated ~~party~~ entity discovers an error in the information reported to the Executive Officer or recorded by the Executive Officer, the regulated ~~party~~ entity must inform the Executive Officer in writing within five (5) ~~business~~ days of the discovery and request a correction. Each submitted request is subject to Executive Officer review and approval. ~~If the Executive Officer determines that the regulated party was responsible for the error, the regulated party must submit a corrected Credit Transfer Form.~~ ~~If the Executive Officer determines that the error occurred during the recording of the credit by Board staff, the Executive Officer will make the correction and no additional re-submissions are required.~~

* * * * *

~~(e)(d)~~ *Prohibited Transactions.* A trade involving, related to, or associated with any of the following ~~are~~ is prohibited:

* * * * *

(7) Upon investigation pursuant to section 95495, the Executive Officer may cancel or reverse a credit transfer if a credit transfer is determined to be a prohibited transaction as per subsection (1) through (6) above. The Executive Officer shall notify the parties and identify the reasons for cancelling or reversing a credit transfer.

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§ 95488. Entities Eligible to Apply for Fuel Pathways.

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§ 95488.1. Fuel Pathway Classifications.

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(b) *Lookup Table Classification.* Pathways falling under this classification are the simplest pathways to use. The Board’s staff develops Lookup Table pathway CI values using the CA-GREET3.0 model. Input variables and assumptions are provided in the CA-GREET3.0 Lookup Table Pathways – Technical Support Documentation (~~March 6, 2018~~ June 20, 2018), which is incorporated herein by reference.

* * * * *

(2) *Lookup Table Pathways That Require a Fuel Pathway Application.* Fuel pathway applicants for renewable electricity and all hydrogen Lookup Table pathways must register in the AFP and meet the application requirements of section 95488.5(b). Fuel pathway applicants may then report fuel transactions in the LRT-CBTS for the fuel pathways listed in 95488.1(b)(2)(A) through (F).

- (A) Electricity (100 percent ~~solar or wind~~ zero-CI sources, which include: solar photovoltaic, wind, solar thermal, small hydroelectric facilities of 30 megawatts or less, ocean wave, ocean thermal, and tidal current)
- (B) Electricity associated with ~~time-of-use~~ smart charging pathways for EV charging and smart electrolysis pathway for hydrogen production through electrolysis
- (C) Hydrogen (gaseous and liquefied) from central SMR of North American fossil-based natural gas
- (D) Hydrogen (gaseous and liquefied) from central SMR of biomethane
- (E) Hydrogen (gaseous) from electrolysis using California grid-average electricity
- (F) Hydrogen (gaseous) from electrolysis using ~~solar or wind~~ generated electricity from one of the zero-CI sources listed in (A) above

(c) *Tier 1 Classification.* The Tier 1 pathway classification applies to fuel pathway categories that the Board’s staff has extensive experience evaluating. This classification includes fuel pathways for which the Executive Officer has identified a discrete set of site-specific inputs that can be modified to achieve CI changes. CI values for Tier 1 fuel pathways are determined using Board-approved Simplified CI Calculators. The Simplified CI Calculators provide a framework for applicants to enter monthly operational data inputs that are combined with emission factors and life cycle inventory data from the CA-GREET3.0 model to calculate the pathway CI. The Tier 1 classification includes, but is not limited to,

the following fuel pathways:

* * * * *

(5) Biomethane from North American landfills, anaerobic digestion of wastewater sludge, dairy and swine manure, and food, green, and other organic waste.

(d) Tier 2 Classification. The Tier 2 pathway classification shall apply to fuel pathways that the Board's staff has limited experience evaluating and certifying, including fuel pathways that are not currently in widespread commercial production. The Tier 2 classification includes all fuel pathways not included in Tier 1 or the Lookup Table pathways. The Tier 2 classification includes, but is not limited to the following fuel pathways:

(1) Cellulosic alcohols;

(2) Biomethane from sources other than ~~landfill gas~~ those listed under the Tier 1 classification in (c)(5), above;

* * * * *

(7) Pathways classified as Tier 1 that are produced using innovative production methods, ~~which cannot be accurately modeled using the Simplified CI Calculators. Such pathways must meet the substantiality requirements of 95488.9(a).~~ Innovative production methods include, but are not limited to:

(A) Use of one or more low-CI process energy sources.

(B) Use of carbon capture and sequestration. (Projects that utilize carbon capture and sequestration are subject to the provisions of section 95490).

(C) Pathways classified as Tier 1 that cannot be accurately modeled using the Simplified CI Calculators. Such pathways must meet the substantiality requirements of 95488.9(a).

* * * * *

§ 95488.2. Relationship Between Pathway Registration and Facility Registration.

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§ 95488.3. Calculation of Fuel Pathway Carbon Intensities.

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(b) CA-GREET3.0. The CA-GREET3.0 model (~~March 6, 2018~~ June 20, 2018) contains emission factors for calculating greenhouse gas emissions from site-specific inputs to fuel pathways and standard values for parts of the life cycle not included in applicant-specific data submission. The model is open source and publicly available at <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm> and is incorporated herein by reference. CA-GREET3.0 includes contributions from the Oil Production Greenhouse Gas Estimator (OPGEE2.0) model (for emissions from crude extraction) and Global Trade Analysis Project (GTAP-BIO) together with the Agro-Ecological Zone Emissions Factor (AEZ-EF) model for land use change (LUC).

Tier 1 Simplified CI Calculators, which incorporate emission factors and life cycle inventory data from the CA-GREET3.0 model, are used to calculate carbon intensities for Tier 1 pathways. The ~~five-eight~~ Simplified CI Calculators listed below (~~March 6, 2017~~) are publicly available at <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm> and are incorporated herein by reference:

- (1) Tier 1 Simplified CI Calculator for Starch and Corn-Fiber Ethanol (June 20, 2018)
- (2) Tier 1 Simplified CI Calculator for Sugarcane-derived Ethanol (June 20, 2018)
- (3) Tier 1 Simplified CI Calculator for Biodiesel and Renewable Diesel (June 20, 2018)
- (4) Tier 1 Simplified CI Calculator for LNG and L-CNG from North American Natural Gas (June 20, 2018)
- (5) Tier 1 Simplified CI Calculator for Biomethane from North American Landfills (June 20, 2018)
- (6) Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Wastewater Sludge (June 20, 2018)
- (7) Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure (June 20, 2018)
- (8) Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Food, Green, and Other Organic Waste (June 20, 2018)

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§ 95488.4. Relationship of Pathway Carbon Intensities to Units of Fuel Sold in California.

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§ 95488.5. Lookup Table Fuel Pathway Application Requirements and Certification Process.

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(b) *Lookup Table Pathway Application Requirements.* Entities seeking approval to report fuel transactions using the fuel pathways listed in 95488.1(b)(2)(A) through (F) (~~solar or wind~~ electricity generated from one of the zero-CI sources listed in 95488.1(b)(2)(A), ~~time-of-use~~ smart charging or smart electrolysis, and all hydrogen Lookup Table pathways) must submit the fuel pathway applicant attestation letter pursuant to the requirements of 95488.8(a) and meet the following requirements:

(1) The following information must be submitted with applications for the Lookup Table pathways for electricity or hydrogen utilizing electricity generated from ~~solar or wind~~ zero-CI sources ~~supplied to EVs and time-of-use~~ smart charging or smart electrolysis ~~electricity supplied to EVs or hydrogen electrolyzers~~:

(A) For directly supplied ~~renewable~~ zero-CI electricity, an applicant must indicate the locations of ~~renewable~~ electricity generation equipment, meters, meter ID numbers, and identify any other users of the electricity.

(B) For zero-CI electricity supplied using book-and-claim accounting, contracts and invoices are required to demonstrate that the ~~solar or wind generated~~ electricity meets the requirements of section 95488.8(i)(1).

(C) For ~~time-of-use~~ smart charging or smart electrolysis electricity, records demonstrating the quantity of electricity dispensed during each hour ~~time-of-use window~~ for the latest quarter.

* * * * *

(d) *Updates to Electricity Pathways.*

* * * * *

(2) *Update to ~~Time-of-Use~~ Smart Charging Electricity Pathways.* In order to reflect the seasonal variation of electricity generating resources in California and to maintain accounting consistency with the CI of the California Average Grid Electricity pathway, the Executive Officer will use the methodology described in the supporting document specified in section 95488.5(e) and the public comment process described in 95488.5(d)(2) to update the ~~time-of-use~~ smart charging pathway CIs in Table 7-2.

* * * * *

(e) The following supporting document, which is incorporated herein by reference, describes the methodology and data sources used to determine the carbon intensity values for the fuel pathways, shown below in Table 7-1, and the hourly windows for ~~time-of-use smart charging or smart electrolysis~~ electricity pathways, shown below in Table 7-2:

Industrial Strategies Division, California Air Resources Board. ~~March 6, 2018~~ June 20, 2018. CA-GREET3.0 Lookup Table Pathways Technical Support Documentation.

Table 7-1. Lookup Table for Gasoline and Diesel and Fuels that Substitute for Gasoline and Diesel²

<u>Fuel</u>	<u>Fuel Pathway Code</u>	<u>Fuel Pathway Description</u>	<u>Carbon Intensity Values (gCO₂e/MJ)</u>
<u>CARBOB</u>	<u>CBOB</u>	<u>CARBOB - based on the average crude oil supplied to California refineries and average California refinery efficiencies</u>	<u>101.43 100.84</u>
<u>Diesel</u>	<u>ULSD</u>	<u>ULSD - based on the average crude oil supplied to California refineries and average California refinery efficiencies</u>	<u>100.95 100.46</u>
<u>Compressed Natural Gas</u>	<u>CNGF</u>	<u>Compressed Natural Gas from Pipeline Average North American Fossil Natural Gas</u>	<u>79.03 79.21</u>
<u>Propane</u>	<u>PRPF</u>	<u>Fossil LPG from crude oil refining and natural gas processing used as a transport fuel</u>	<u>83.38 83.65</u>
<u>Electricity</u>	<u>ELCG</u>	<u>California average grid electricity supplied to electric vehicles in California</u>	<u>93.42 95.54 (and subject to annual updates)</u>
	<u>ELCR</u>	<u>Electricity that is generated from 100 percent solar or wind zero-CI sources supplied to electric vehicles in California</u>	<u>0.00</u>
	<u>ELCT</u>	<u>Electricity supplied under the time-of-use smart charging provision with a CI based on curtailment probability</u>	<u>(See Table 7-2)</u>

² For comparison on an equivalent basis (gCO₂e per MJ of conventional fuel displaced), the CIs listed in Tables 7-1 and 7-2 must be divided by the EER in Table 5 for the appropriate fuel-vehicle combination. The EER-adjustment is made when fuel quantities are reported in the LRT-CBTS to calculate the correct number of credits or deficits, using the equations in 95486.1(a).

<u>Fuel</u>	<u>Fuel Pathway Code</u>	<u>Fuel Pathway Description</u>	<u>Carbon Intensity Values (gCO₂e/MJ)</u>
Hydrogen	<u>HYF</u>	<u>Compressed H2 produced in California from central SMR of North American fossil-based NG</u>	<u>121.43 117.72</u>
	<u>HYFL</u>	<u>Liquefied H2 produced in California from central SMR of North American fossil-based NG</u>	<u>173.42 150.97</u>
	<u>HYB</u>	<u>Compressed H2 produced in California from central SMR of biomethane (renewable feedstock) from North American landfills</u>	<u>103.36 99.76</u>
	<u>HYBL</u>	<u>Liquefied H2 produced in California from central SMR of biomethane (renewable feedstock) from North American landfills</u>	<u>155.34 129.35</u>
	<u>HYEG</u>	<u>Compressed H2 produced in California from electrolysis using California average grid electricity</u>	<u>164.02 163.85</u>
	<u>HYER</u>	<u>Compressed H2 produced in California from electrolysis using solar or wind generated zero-CI zero-CI electricity</u>	<u>10.48 10.47</u>

(f) ~~Time of Use Smart Charging or Smart Electrolysis Lookup Table Pathways~~. The Executive Officer calculates a ~~TOU~~ smart charging carbon intensity Lookup Table each quarter for California grid electricity that may be used for reporting electric vehicle charging and hydrogen produced via electrolysis.

Table 7-2 below specifies the carbon intensity values for the ~~time of use smart charging~~ electricity pathways. Updates to this table will be provided quarterly on the LCFS web site.

Table 7-2. Calculated ~~Time of Use~~ Smart Charging Carbon Intensities*

<u>Smart Charging TOU Window</u>	<u>CI (gCO₂e/MJ)</u>			
	<u>Q1</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
<u>12:01 AM – 1:00 AM</u>	<u>95.69 97.86</u>	<u>103.32 105.67</u>	<u>101.96 104.28</u>	<u>96.61 98.80</u>
<u>1:01 AM – 2:00 AM</u>	<u>95.04 97.16</u>	<u>104.94 107.33</u>	<u>102.09 104.41</u>	<u>96.85 99.02</u>
<u>2:01 AM – 3:00 AM</u>	<u>94.76 96.96</u>	<u>102.23 104.55</u>	<u>100.94 103.23</u>	<u>96.40 98.58</u>
<u>3:01 AM – 4:00 AM</u>	<u>93.85 95.98</u>	<u>102.03 104.35</u>	<u>100.42 102.70</u>	<u>96.27 98.46</u>
<u>4:01 AM – 5:00 AM</u>	<u>93.84 95.97</u>	<u>102.19 104.50</u>	<u>99.88 102.14</u>	<u>96.41 98.60</u>
<u>5:01 AM – 6:00 AM</u>	<u>97.13 99.34</u>	<u>99.84 102.10</u>	<u>99.71 101.97</u>	<u>94.99 97.15</u>
<u>6:01 AM – 7:00 AM</u>	<u>97.33 99.54</u>	<u>89.51 91.54</u>	<u>98.02 100.25</u>	<u>93.79 95.91</u>

<u>7:01 AM – 8:00 AM</u>	<u>86.07 88.03</u>	<u>64.23 65.69</u>	<u>401.38 103.68</u>	<u>87.44 89.39</u>
<u>8:01 AM – 9:00 AM</u>	<u>57.07 58.36</u>	<u>37.43 38.28</u>	<u>78.83 80.62</u>	<u>86.05 88.00</u>
<u>9:01 AM – 10:00 AM</u>	<u>45.16 46.19</u>	<u>28.08 29.63</u>	<u>59.11 60.45</u>	<u>72.83 74.48</u>
<u>10:01 AM – 11:00 AM</u>	<u>47.82 48.91</u>	<u>47.79 18.19</u>	<u>51.06 52.22</u>	<u>72.97 74.63</u>
<u>11:01 AM – 12:00 PM</u>	<u>50.44 51.55</u>	<u>43.43 13.73</u>	<u>30.20 30.89</u>	<u>70.29 71.89</u>
<u>12:01 PM – 1:00 PM</u>	<u>51.86 53.04</u>	<u>44.27 14.59</u>	<u>34.66 35.44</u>	<u>68.29 69.84</u>
<u>1:01 PM – 2:00 PM</u>	<u>58.3 59.63</u>	<u>21.6 22.09</u>	<u>41.52 42.46</u>	<u>69.29 70.87</u>
<u>2:01 PM – 3:00 PM</u>	<u>60.19 61.56</u>	<u>27.63 28.25</u>	<u>54.34 55.58</u>	<u>73.24 74.90</u>
<u>3:01 PM – 4:00 PM</u>	<u>57.02 58.32</u>	<u>47.02 49.00</u>	<u>66.7 68.22</u>	<u>70.53 72.13</u>
<u>4:01 PM – 5:00 PM</u>	<u>67.18 68.70</u>	<u>57.44 58.74</u>	<u>85.88 87.83</u>	<u>80.72 82.55</u>
<u>5:01 PM – 6:00 PM</u>	<u>89.19 91.21</u>	<u>85.82 87.76</u>	<u>90.28 92.32</u>	<u>91.63 93.71</u>
<u>6:01 PM – 7:00 PM</u>	<u>96.73 98.92</u>	<u>93.86 95.99</u>	<u>94.07 96.21</u>	<u>94.04 96.18</u>
<u>7:01 PM – 8:00 PM</u>	<u>98.33 100.56</u>	<u>101.16 103.46</u>	<u>97.62 99.83</u>	<u>95.16 97.32</u>
<u>8:01 PM – 9:00 PM</u>	<u>98.45 100.68</u>	<u>101.77 104.08</u>	<u>98.22 100.45</u>	<u>95.41 97.58</u>
<u>9:01 PM – 10:00 PM</u>	<u>98.66 100.89</u>	<u>100.57 102.85</u>	<u>98.68 100.92</u>	<u>95.55 97.72</u>
<u>10:01 PM – 11:00 PM</u>	<u>98.16 100.39</u>	<u>103.22 105.56</u>	<u>99.75 102.01</u>	<u>95.74 97.91</u>
<u>11:01 PM – 12:00 AM</u>	<u>93.31 95.43</u>	<u>103.53 105.88</u>	<u>102.05 104.37</u>	<u>96.18 98.36</u>

*Based on curtailment data for year 2017 and subject to updates.

* * * * *

§ 95488.6. Tier 1 Fuel Pathway Application Requirements and Certification Process.

(a) Documentation Required for Tier 1 Pathways. A fuel pathway applicant may apply for a Tier 1 pathway using the provisions set forth in this section. After satisfying all requirements for pathway and facility registration in 95488.2, the applicant must submit the following information to the Executive Officer for consideration of a Tier 1 pathway CI.

(1) Simplified CI Calculator. A fuel-specific Simplified CI Calculator populated with all applicable site-specific operational data inputs is required. The period covered shall be the most recent 24 month period of operation. Fields that require site-specific inputs are marked in the Simplified CI Calculator. Site-specific inputs include, but are not limited to, the monthly quantity of all feedstocks consumed in the fuel production facility, the electricity generation mix of the subregion(s) where feedstock and fuel production occur, the types and monthly quantities of all energy used in the production of the fuel, and the monthly quantities of fuel produced.

(A) The Simplified CI Calculators include appropriate LUC or other indirect carbon intensity modifiers from Table 6 when applicable.

(B) Applicants must follow the instructions for completing site-specific inputs in the Simplified CI Calculators found in the Tier 1 Simplified

CI Calculator Instruction Manual (March 6, 2018-June 20, 2018), incorporated herein by reference.

Industrial Strategies Division, California Air Resources Board. March 6, 2018-June 20, 2018. Tier 1 Simplified CI Calculator Instruction Manual.

- (C) All applicants using grid electricity must choose electrical generation energy mixes from among the subregions in CA-GREET3.0 and the Simplified CI Calculators, if applicable. The options include the 26 subregions defined in the U.S. EPA's Emissions and Generation Resource Integrated Database with year 2014 data (eGRID2014v2, released on February 27, 2017)-2014 data year edition, and a national grid mix for Brazil and Canada.

* * * * *

(b) Certification Process for Tier 1 Pathway Applications.

- (1) Validation. The applicant must seek the services of an Executive Officer accredited verification body to complete a pathway validation as specified in section 95500. A positive or qualified positive validation statement must be received by the Executive Officer from the verification body in order for CARB's completeness review, evaluation, and certification of the pathway application to proceed. In cases where a single applicant or a joint applicant does not complete validation, the application will be denied without prejudice. In cases where an applicant cannot complete validation within six months of submitting an application or receives an adverse validation statement, the application will be denied without prejudice.

- (2) Preliminary Completeness Review. Upon receipt of a positive or qualified positive validation statement, the Executive Officer will conduct a preliminary completeness review of the Tier selection to ensure the pathway meets the requirements for Tier 1, and evaluate if the inputs to the Simplified CI Calculator are complete.

- (A) Application Complete. If the Executive Officer deems complete the applicant's Simplified CI Calculator and supplemental information, the fuel pathway applicant shall be notified as such. The applicant shall then seek the services of an Executive Officer accredited verification body to complete a pathway validation as specified in Section 95500.

- (B) Application Incomplete. If the Executive Officer deems the Simplified CI Calculator and supplemental information incomplete, the Executive Officer will reject the pathway application without

prejudice and inform the fuel pathway applicant of the rationale for rejection. Applicants whose applications are rejected may submit a new application that addresses deficiencies highlighted during the earlier review.

~~(2) Validation. See section 95501 for a full description of the Validation process. A positive or qualified positive validation statement must be received by the Executive Officer from the verification body in order for CARB's evaluation and certification of the pathway application to proceed. In cases where a single applicant or a joint applicant does not complete validation, the application will be denied without prejudice. In cases where an applicant cannot complete validation within six months of submitting an application, the application will be denied without prejudice.~~

(3) Certification. The Executive Officer may certify or reject a pathway application.

(A) ~~Following Validation,~~ The Executive Officer will evaluate the application to determine whether it has met all requirements necessary for certification. At any point during the evaluation process, the Executive Officer may request in writing additional information or clarification from the applicant.

(B) If the Executive Officer determines the application has met all requirements necessary for certification ~~pursuant to subsection (3)(A) above,~~ the Executive Officer will complete a pathway summary of the inputs, the facility average fuel production yield, CI results, and ~~identify~~ any limitations or conditions not specifically named in this subarticle. Upon certification of a Tier 1 application, the pathway will be available for reporting for the quarter in which it was deemed complete.

(C) Upon certification, the fuel pathway applicant(s) becomes the fuel pathway holder(s) for the certified fuel pathway and is subject to the requirements of 95488.10, and any limitations or conditions identified by the Executive pursuant to (3)(B) above, in order for that pathway to remain eligible for reporting and credit generation purposes.

* * * * *

§ 95488.7. Tier 2 Fuel Pathway Application Requirements and Certification Process.

(a) Documentation Required for Tier 2 Pathways. A fuel pathway applicant may apply for a Tier 2 pathway using the provisions set forth in this section. After

satisfying all requirements for pathway and facility registration in 95488.2, the applicant must submit the following information to the Executive Officer for consideration of a Tier 2 pathway CI:

* * * * *

(2) *Life Cycle Analysis Report.* A life cycle analysis report that describes the full fuel life cycle, and describes in detail the calculation of the fuel pathway CI. This report shall contain sufficient detail to allow the Board's staff to replicate the CI calculated by the applicant. All inputs to, and outputs from, the fuel production process that contribute to the life cycle CI must be described in the life cycle analysis report. These inputs and outputs must then be fully accounted for in the calculation of the fuel pathway CI. The life cycle analysis report shall include the following information:

(A) A detailed description of the full fuel production process. The description shall include:

* * * * *

7. A quantitative discussion of the thermal and electrical energy consumption that occurs throughout all phases of the fuel life cycle over which the applicant exercises control. All fuels used (natural gas, biogas, coal, biomass, etc.) must be identified and use rates quantified. The regional electrical energy generation fuel mix used in the CA-GREET3.0 analysis must be identified. Internally generated power such as cogeneration and combined heat and power must also be described. All fuel pathway applicants using grid electricity must choose electrical generation energy mixes from among the subregions in CA-GREET3.0, if applicable. The options include the 26 subregions defined in ~~eGRID2014v2~~ ~~the U.S. EPA's Emissions and Generation Resource Integrated Database (eGRID) 2014 data year edition~~, and a national grid mix for Brazil and Canada. Applicants whose fuel production facilities or feedstock source regions are located in an area for which there is no corresponding subregion included in CA-GREET3.0 must enter user-defined energy resources and submit the source of the data utilized to the Executive Officer for approval.

* * * * *

(3) *Tier 2 Pathways for EER-Adjusted Carbon Intensity.* Applicants supplying fuel for a transportation application that is not included in Table 5 may

apply for an EER-adjusted carbon intensity for reporting and credit generation purposes.

(A) *Documentation Requirements.* To request an EER-adjusted carbon intensity, the applicant must provide the following in addition to subsections (1) and (2) above:

1. A letter of intent to request an EER-adjusted CI and why the EER values provided in Table 5 do not apply.
2. Supplemental information including a detailed description of the methodology used, all assumptions made, and all data and references used for calculation of the proposed EER-adjusted CI value. The methodology used must compare the useful output from the alternative fuel technology to that of comparable conventional fuel technology.
3. If the applicant plans to use a Lookup Table pathway to request an EER-adjusted CI then subsections (1) and (2) above does not apply.

* * * * *

(d) *Certification Process for Tier 2 Pathway Applications.*

* * * * *

(3) *Validation.* ~~See section 95501 for a full description of the validation process and outcomes.~~ A positive or qualified positive validation statement must be received by the Executive Officer from the verification body in order for CARB's evaluation and certification of the pathway application to proceed. In cases where a single applicant or a joint applicant does not complete validation, the application will be denied without prejudice. In cases where an applicant cannot complete validation within six months of submitting an application, or receives an adverse validation statement, the application will be denied without prejudice.

* * * * *

(6) *Certification.* The Executive Officer may certify or reject a pathway application. Upon certification of a Tier 2 application, the pathway will be available for reporting for the quarter in which it was deemed complete. Upon certification, the fuel pathway applicant(s) becomes the fuel pathway holder(s) for the certified fuel pathway and is subject to the requirements of 95488.10 in order for that pathway to remain eligible for reporting and credit generation purposes.

§ 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

* * * * *

(h) Renewable or Low-CI Process Energy. Unless expressly provided elsewhere in this subarticle, indirect accounting mechanisms for renewable or low-CI process energy, such as the use of renewable energy certificates, cannot be used to reduce CI. In order to qualify as a low-CI process energy source, energy from that source must be directly consumed in the production process as described in (1) and (2) below:

(1) Renewable electricity must be supplied from generation equipment under the control of the pathway applicant. Such renewable electricity must be able to demonstrate:

(A) Any renewable electricity certificates or other environmental attributes associated with the energy are not produced, or are retired and not claimed under any other program with the exception of the federal RFS, and the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800).

* * * * *

(3) Solar steam or heat generation must be physically supplied directly to the production facility, and any environmental attributes associated with the energy are not produced, or are retired and not claimed under any other program with the exception of the federal RFS, and the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800).

(i) Indirect Accounting for Renewable Electricity and Biomethane.

(1) Book-and-Claim Accounting for Renewable or Low-CI Electricity Supplied as a Transportation Fuel or Used to Produce Hydrogen. Reporting entities may use indirect accounting mechanisms for renewable electricity to reduce the CI of electricity supplied as a transportation fuel or for hydrogen production through electrolysis, provided the conditions set forth below are met:

(A) Reporting entities may report electricity dispensed to electric vehicles or as an input to hydrogen production (including for purposes of the Renewable Hydrogen Refinery Credit) as renewable electricity without regard to physical traceability if it

meets all requirements of this ~~subdivision~~-subarticle. The renewable electricity must be supplied to the grid within a California Balancing Authority (or local balancing authority for hydrogen produced outside of California). Such book-and-claim accounting for renewable electricity may span only ~~two~~-~~three~~ quarters. If a renewable electricity quantity (and all associated environmental attributes, including a beneficial CI) is supplied to the grid in ~~one~~ the first calendar quarter, the quantity claimed for LCFS reporting must be matched to grid electricity dispensed to electric vehicles or for hydrogen production no later than the end of the ~~following~~ third calendar quarter. After that period is over, any unmatched renewable electricity quantities expire for the purpose of LCFS reporting.

(B) Low-CI electricity can be indirectly supplied through a green tariff program (including the Green Tariff Shared Renewables program described in California Public Utilities Code Section 2831-2833) or other contractual low carbon electricity supply relationship that meets the following requirements:

1. Electricity is generated using equipment owned by, or under contract to the pathway applicant for all environmental attributes of the ~~project~~-claimed electricity. In order to substantiate renewable electricity claims, the applicant must make contracts available to the Executive Officer, upon request, to demonstrate that the electricity meets the requirements of this subarticle. Generation invoices are required to substantiate the quantity of renewable electricity produced from the renewable assets. Monthly invoices must be unredacted copies of originals showing electricity sourced (in kWh) and contracted price;
2. All electricity procured by any LSE for the purpose of claiming a lower CI must be in addition to that required for compliance with the California Renewables Portfolio Standard or, for hydrogen produced outside of California, in addition to local renewable portfolio ~~requirements~~;
3. Renewable electricity certificates or other environmental attributes associated with the ~~energy~~-electricity, if any, are retired and not claimed under any other program with the exception of the federal RFS, and the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800).

(2) *Book-and-Claim Accounting for Pipeline- Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen.* Indirect accounting may be used for RNG used as a transportation fuel or to produce hydrogen, provided the conditions set forth below are met:

(A) RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production, without regards to physical traceability. Entities may report natural gas as RNG within only a ~~two~~-three quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in ~~one~~ the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the following third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

* * * * *

(C) *Attestations Regarding Environmental Attributes.*

1. *Upstream Attestations.* An entity reporting any RNG as a transportation fuel in LRT-CBTS, and a fuel pathway holder using biogas or biomethane as process energy, must obtain and keep attestations from each upstream party collectively demonstrating that (a) the entity claiming the environmental attributes has the exclusive right to claim environmental attributes associated with the sale or use of the biogas or biomethane, and (b) the environmental attributes have not been used or claimed in any other program or jurisdictions with the exception of the federal RFS, and the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800). The attestations must be made available to the Executive Officer or a verifier upon request. The inability to promptly produce the attestations constitutes ground for credit invalidation pursuant to section 95495.

2. *Attestation to CARB.* An officer of any entity reporting biomethane in LRT-CBTS under the provisions of section 95488.8(i)(2), and an officer of any fuel pathway holder claiming use of biogas or biomethane as process energy under the provisions of section 95488.8(h)(2), must annually submit the following attestation to the Executive Officer:

I certify that to the extent that the gas used in the fuel pathway or supplied as transportation fuel is characterized as biomethane, _____ (entity name) owns the exclusive rights to the corresponding environmental attributes.

_____ (entity name) has not sold, transferred, or retired those environmental attributes in any program or jurisdiction other than the federal RFS.

Based on diligent inquiry and review of contracts and attestations from our business partners, I certify under penalty of perjury under the laws of the State of California that no other party has or will sell, transfer, or retire the environmental attributes corresponding to the biomethane for which _____ (entity name) claims credit in the LCFS program.

* * * * *

§ 95488.9. Special Circumstances for Fuel Pathway Applications.

(a) Substantiality Requirements.

(1) The substantiality requirement applies in the two scenarios listed below. The substantiality requirement does not apply when re-applying with a new operational data period or when replacing a certified CI after verification using the process described in 95488.10(a)(6).

(A) ~~Multiple applications pathways~~ *Multiple applications pathways for the same feedstock-fuel combination.* When a fuel pathway applicant applies for two or more pathways based on different inputs for the same feedstock-fuel combination processed within an operational data period at a single fuel production facility, the Executive Officer will consider separate pathways only when the CI of one or more of the proposed pathways meet the substantiality requirement relative to the CI of the reference pathway. The “reference” pathway is the composite CI that results when the fuel is modeled using a single pathway that represents the average production of all quantities of the feedstock-fuel combination produced in the operational data period.

(B) *Tier 1 Pathways using Innovative Methods.* The Executive Officer will consider a Tier 2 application for a pathway that would otherwise be classified as Tier 1 if the Simplified CI Calculator for that fuel type cannot be used to accurately model the pathway due to process innovations and the proposed pathway meets the substantiality requirement relative to the CI of the reference pathway. The “reference” pathway is the CI of the proposed pathway as calculated by the applicable Simplified CI Calculator. The substantiality requirement does not apply to pathways that qualify for Tier 2 due to the use of low-CI process energy sources, or use of carbon capture, as described in 95488.1(d)(7).

* * * * *

(b) Temporary Fuel Pathways.

* * * * *

(4) New Temporary Fuel Pathways. An entity can apply for the use of a Temporary fuel pathway CI value if it appears in Table 8 in this subarticle or if the Executive Officer approves a new Temporary pathway and publishes it on the LCFS web site. Any new Temporary pathway proposed by the Executive Officer will be posted for 45 days for public comment prior to certification. The posted information will include the rationale for assigning the CI to that particular Temporary pathway. If these comments require significant revision of the originally published pathway, a revised pathway will be posted for public comment. Upon certification of a new Temporary pathway created by the Executive Officer, the pathway will be available for reporting ~~in~~ for the quarter in which it is certified.

Table 8. Temporary Pathways for Fuels with Indeterminate CIs

<u>Fuel</u>	<u>Feedstock</u>	<u>Process Energy</u>	<u>CI (gCO₂e/MJ)</u>
<u>Ethanol</u>	<u>Corn</u>	<u>Grid electricity, natural gas, and/or renewables</u>	<u>90</u>
	<u>Sorghum</u>	<u>Grid electricity, natural gas, and/or renewables</u>	<u>95</u>
	<u>Any Sugar Feedstock</u>	<u>Bagasse and straw only; no grid electricity</u>	<u>60</u>
	<u>Any Cellulosic Biomass</u>	<u>Grid electricity, natural gas, and/or renewables</u>	<u>40</u>
<u>Biomass-based Diesel</u>	<u>Fats/Oils/Grease Residues</u>	<u>Grid electricity, natural gas, and/or renewables</u>	<u>45</u>
	<u>Any feedstock derived from plant oils, excluding palm oil</u>	<u>Grid electricity, natural gas, and/or renewables</u>	<u>65</u>
	<u>Any other feedstock</u>	<u>Grid electricity, natural gas, and/or renewables</u>	<u>Baseline (2010) CI value for ULSD</u>
<u>Fossil LNG</u>	<u>Petroleum Natural Gas</u>	<u>N/A</u>	<u>95</u>
<u>Fossil L-CNG</u>	<u>Petroleum Natural Gas</u>	<u>N/A</u>	<u>100</u>

<u>Fuel</u>	<u>Feedstock</u>	<u>Process Energy</u>	<u>CI (gCO₂e/MJ)</u>
<u>Biomethane CNG</u>	<u>Landfill or digester gas</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>70</u>
<u>Biomethane LNG</u>	<u>Landfill or digester gas</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>85</u>
<u>Biomethane L-CNG</u>	<u>Landfill or digester gas</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>90</u>
<u>Biomethane CNG</u>	<u>Municipal Wastewater sludge, Food Waste, Green Waste, or Other Organic Waste</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>40-50</u>
<u>Biomethane LNG</u>	<u>Municipal Wastewater sludge, Food Waste, Green Waste, or Other Organic Waste</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>55-65</u>
<u>Biomethane L-CNG</u>	<u>Municipal Wastewater sludge, Food Waste, Green Waste, or Other Organic Waste</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>60-70</u>
<u>Biomethane CNG, LNG or L-CNG</u>	<u>Dairy Manure or Food/Green Waste</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>0-150</u>
<u>Biomethane LNG</u>	<u>Dairy or Food/Green Waste</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>0</u>
<u>Biomethane L-CNG</u>	<u>Dairy or Food/Green Waste</u>	<u>Grid electricity, natural gas, and/or parasitic load</u>	<u>0</u>
<u>Hydrogen</u>	<u>Centralized SMR of fossil LNG</u>	<u>Grid electricity, natural gas and/or renewables</u>	<u>185</u>
<u>Any gasoline substitute feedstock-fuel combination not identified above</u>	<u>Any</u>	<u>Any</u>	<u>Baseline (2010) CI value for CaRFG</u>
<u>Any diesel substitute feedstock-fuel combination not identified above</u>	<u>Any</u>	<u>Any</u>	<u>Baseline (2010) CI value for ULSD</u>

* * * * *

(c) Provisional Pathways. As set forth in sections 95488.6(a) and 95488.7(a), LCFS fuel pathways are generally developed based on 24 months of operational data. The Executive Officer may consider Provisional pathway applications from facilities that have been in operation for less than 24 months, provided they have

been in operation for at least three months. Based on timely reports, the fuel reporting entity may generate credits or deficits using a provisionally-certified CI.

* * * * *

(3) *Adjusting CI and Credit Balance.* At any time during the 24 months following provisional certification, the Executive Officer may revise as appropriate the provisionally-certified CI. Until the Executive Officer has removed the provisional status pursuant to subsection (4) below, the Executive Officer may adjust the number of credits or reverse any credit in the fuel reporting entity's account using the provisional pathway without a hearing, notwithstanding the requirements of section 95495. At the end of the provisional period, the certified CI will be determined on the basis of 24 months of operational data.

(A) If the verified operational CI is higher than the provisionally-certified CI, the Executive Officer will replace the certified CI with the verified operational CI in the LRT-CBTS and will make any necessary credit adjustment in the fuel reporting entity's account using the provisional fuel pathway for reporting. Any credits generated using a provisionally-certified CI, across the entire period from original validation to completion of the periodic verification, are subject to adjustment.

(B) If the verified operational CI is lower than the provisionally-certified CI, the Executive Officer will certify the pathway with the lower CI, adding a conservative margin of safety per section 95488.4(a) if the applicant so desires. The fuel reporting entity ~~applicant~~ will not be eligible for any retroactive credit generation for any quarter for which the reporting deadline has passed, but the revised CI will be valid for future reporting periods.

* * * * *

(f) *Carbon Intensities that Reflect Avoided Methane Emissions from Dairy and Swine Manure or Organic Waste Diverted from Landfill Disposal.*

(1) A fuel pathway that utilizes biomethane from dairy cattle or swine manure digestion may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane, provided that:

(A) A biogas control system, or digester, is used to capture biomethane from manure management on dairy cattle and swine farms that would otherwise be vented to the atmosphere as a result of livestock operations from those farms.

- (B) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the capture and destruction of biomethane.
- (2) A fuel pathway that utilizes an organic material may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary diversion from decomposition in a landfill and the associated fugitive methane emissions, provided that:
- (A) The organic material that is used as a feedstock would otherwise have been disposed of by landfilling, and the diversion is additional to any legal requirement for the diversion of organics from landfill disposal.
- (B) Any degradable carbon that is not converted to fuel is subsequently treated in an aerobic system or otherwise is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
- (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.
- (3) Carbon intensities that reflect avoided methane emissions from dairy and swine manure projects are subject to the following requirements for credit generation:
- (A) *Crediting Periods.* Avoided methane crediting for dairy and swine manure pathways as described in (f)(1) above, and for landfill-diversion pathways as described in (f)(2) above, is limited to three consecutive 10 years crediting periods, counting from the quarter following Executive Officer approval of the application. The pathway holder must formally request each subsequent crediting period for the project through the LRT-CBTS.
- (B) Notwithstanding (A) above, in the event that any law, regulation, or legally binding mandate requiring either greenhouse gas emission reductions from manure methane emissions from livestock and dairy projects or diversion of organic material from landfill disposal, comes into effect in California during a project's crediting period, then the project is only eligible to continue to receive LCFS credits for those greenhouse gas emission reductions for the remainder of the project's current crediting period. The project may not request any subsequent crediting periods.

(C) Notwithstanding (A) above, projects that have generated CARB Compliance Offset Credits under the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800) may apply to receive credits under the LCFS. However, the LCFS crediting period for such projects is aligned with the crediting period for Compliance Offset Credits, and does not reset when the project is certified under the LCFS.

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§ 95488.10. Maintaining Fuel Pathways.

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(c) Verification Requirement and Deadline. Each fuel pathway holder, who is not exempt from obtaining verification in section 95500, must ensure that a positive or qualified positive verification statement covering the annual Fuel Pathway Report is received by the Executive Officer from the verification body pursuant to the schedule in ~~95504~~ 95500 in order to maintain a valid fuel pathway code for use in reporting fuel transactions. An adverse fuel pathway verification statement would result in investigation by the Executive Officer. It is the responsibility of the fuel pathway holder to ensure this deadline is met.

* * * * *

§ 95489. Provisions for Petroleum-Based Fuels.

* * * * *

(a)(b) Deficit Calculation for CARBOB or Diesel Fuel. A regulated party fuel reporting entity for CARBOB or diesel fuel must calculate separately the base deficit and incremental deficit for each fuel or blendstock derived from petroleum feedstock as specified in this provision.

Base Deficit Calculation

$$Deficits_{Base}^{XD} (MT) = (CI_{Standard}^{XD} - CI_{BaselineAve}^{XD}) \times E^{XD} \times C$$

Incremental Deficit Calculation to Mitigate Increases in the Carbon-Intensity of Crude Oil

If $CI_{20XXCrudeAve} > CI_{BaselineCrudeAve} + 0.10$ then:

$$Deficits_{Incremental20XX}^{XD} = (CI_{BaselineCrudeAve} - CI_{20XXCrudeAve}) \times E^{XD} \times C$$

If $CI_{20XXCrudeAve} \leq CI_{BaselineCrudeAve} + 0.10$ then:

$$Deficits_{Incremental20XX}^{XD} = 0$$

where:

$Deficits_{Base}^{XD}$ (MT) and $Deficits_{Incremental20XX}^{XD}$ mean the amount of LCFS deficits incurred (a negative value), in metric tons, by the volume of CARBOB ($XD = \text{"CARBOB"}$) and diesel fuel ($XD = \text{"diesel"}$) that is derived from petroleum feedstock and is either produced in or imported into California during a specific calendar year;

$CI_{Standard}^{XD}$ has the same meaning as specified in section 95486(b)(3)(A) 95486.1(a);

$CI_{BaselineAve}^{XD}$ is the average carbon-intensity value of CARBOB or diesel, in gCO₂e/MJ, that is derived from petroleum feedstock and is either produced in or imported into California during the baseline calendar year, 2010. For purposes of this provision, $CI_{BaselineAve}^{XD}$ for CARBOB ($XD = \text{"CARBOB"}$) and diesel fuel ($XD = \text{"diesel"}$) are the Baseline Average carbon intensity values for CARBOB and diesel (ULSD) set forth in Table 67-1. The Baseline Average carbon intensity values for CARBOB and diesel (ULSD) are calculated using data for crude oil supplied to California refineries during the baseline calendar year, 2010.

$CI_{BaselineCrudeAve}$ is the California Baseline Crude Average carbon intensity value, in gCO₂e/MJ, attributed to the production and transport of the crude oil supplied as petroleum feedstock to California refineries during the baseline calendar year, 2010. For comparison to $CI_{2015CrudeAve}$ $CI_{2018CrudeAve}$, the baseline is:

$$CI_{BaselineCrudeAve} = \frac{[11.39 \times V_{2013} + 11.39 \times V_{2014} + 11.98 \times V_{2015}]}{[V_{2013} + V_{2014} + V_{2015}]}$$

$$CI_{BaselineCrudeAve} = \frac{[11.98 \times V_{2016} + 11.98 \times V_{2017} + 12.17 \times V_{2018}]}{[V_{2016} + V_{2017} + V_{2018}]}$$

$$CI_{BaselineCrudeAve} = \frac{[11.98 \times V_{2016} + 11.98 \times V_{2017} + 11.78 \times V_{2018}]}{[V_{2016} + V_{2017} + V_{2018}]}$$

For comparison to $CI_{2016CrudeAve}$ $CI_{2019CrudeAve}$, the baseline is:

$$CI_{BaselineCrudeAve} = \frac{[11.39 \times V_{2014} + 11.98 \times V_{2015} + 11.98 \times V_{2016}]}{[V_{2014} + V_{2015} + V_{2016}]}$$

$$\cancel{CI_{BaselineCrudeAve}} = \frac{[11.98 \times V_{2017} + 12.17 \times V_{2018} + 12.17 \times V_{2019}]}{[V_{2017} + V_{2018} + V_{2019}]}$$

$$CI_{BaselineCrudeAve} = \frac{[11.98 \times V_{2017} + 11.78 \times V_{2018} + 11.78 \times V_{2019}]}{[V_{2017} + V_{2018} + V_{2019}]}$$

For comparison to $\cancel{CI_{2017CrudeAve}}$ $CI_{2020CrudeAve}$ and subsequent years, the baseline is

$$\begin{aligned} \cancel{CI_{BaselineCrudeAve}} &= 11.98 \\ \cancel{CI_{BaselineCrudeAve}} &= 12.17 \\ \underline{CI_{BaselineCrudeAve}} &= 11.78 \end{aligned}$$

$CI_{20XXCrudeAve}$ is the Three-year California Crude Average carbon intensity value, in gCO₂e/MJ, attributed to the production and transport of the crude oil supplied as petroleum feedstock to California refineries during the most recent three calendar years. For example, the Three-year California Crude Average carbon intensity value for ~~2015~~2018 is:

$$\begin{aligned} \cancel{CI_{2015CrudeAve}} &= \frac{[CI_{2013} \times V_{2013} + CI_{2014} \times V_{2014} + CI_{2015} \times V_{2015}]}{[V_{2013} + V_{2014} + V_{2015}]} \\ CI_{2018CrudeAve} &= \frac{[CI_{2016} \times V_{2016} + CI_{2017} \times V_{2017} + CI_{2018} \times V_{2018}]}{[V_{2016} + V_{2017} + V_{2018}]} \end{aligned}$$

V_{20XX} is the total volume of crude supplied to California refineries during the specified year 20XX.

CI_{20XX} is the Annual Crude Average carbon intensity value, calculated annually as described in section 95489(c)(b). The Annual Crude Average carbon intensity value for ~~2013~~2016 and 2017 ~~are~~ is specified in Table 98.

E^{XD} is the amount of fuel energy, in MJ, from CARBOB (XD = "CARBOB") or diesel (XD = "diesel"), determined from the energy density conversion factors in Table 43, either produced in California or imported into California during a specific calendar year and sold, supplied, or offered for sale in California.

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

~~(b)(e)~~ *Addition of Incremental Deficits that Result from Increases in the Carbon Intensity of Crude Oil to a Regulated Party's Fuel Reporting Entity's Compliance Obligation.*

- (1) Incremental deficits for CARBOB or diesel fuel that result from increases in the carbon intensity of crude oil will be calculated and added to each affected ~~regulated party's fuel reporting entity's~~ compliance obligation for the compliance period in which the $Deficits_{Incremental20XX}^{XD}$ become effective, which will be the year following the year in which the $CI_{20XXCrudeAve}$ was established.
- (2) Incremental deficits for CARBOB or diesel fuel for each ~~regulated party-fuel reporting entity~~ will be based upon the amount of CARBOB and diesel fuel supplied by the ~~regulated party-fuel reporting entity~~ in each compliance period for which the $Deficits_{Incremental20XX}^{XD}$ are effective.
- (3) *Process for Calculating the Annual Crude Average Carbon Intensity Value.*
 - (A) An Annual Crude Average carbon intensity value will be calculated for each calendar year using a volume-weighted average of crude carbon intensity values. The volume for each imported crude will be the total volume of that crude reported by all ~~regulated parties-fuel reporting entities~~ in the Annual Compliance Reports for the calendar year. Volume contributions for California State fields will be based on oil production data from the California Department of Conservation and volume contributions for California Federal Offshore fields will be based on oil production data from the Bureau of Safety and Environmental Enforcement. Field production volumes for California-produced crude will be reduced, if necessary, to account for crude exports. Crude carbon intensity values are those listed in Table 98. For crude names not listed, the default carbon intensity value from Table 98 will be used until the crude name and carbon intensity value is added to Table 98 as described in section 95489(b)(3).
 - (B) Within 15 days of receiving the Annual Compliance reports, the Executive Officer shall post the Annual Crude Average carbon intensity calculation at the LCFS web site (<http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>) for public comment. Written comments shall be accepted for 15 days following the date on which the analysis was posted. Only comments related to potential factual or methodological errors in the posted Annual Crude Average carbon intensity value may be considered. The Executive Officer shall evaluate the comments received and, if the Executive Officer deems it necessary, may request in writing additional information or clarification from the commenters. Commenters shall be provided 10 days to respond to these requests. The Executive Officer shall post the final Annual Crude Average carbon intensity value at the LCFS web site within 15 days

of receiving positive or qualified positive MCON verification reports per section 95500 completion of the comment period, if no comments are received. If comments are received, the Executive Officer shall post the final Annual Crude Average carbon intensity value within 30 days of completion of the comment period or within 25 days of the latest request by the Executive Officer for additional information or clarification from a commenter, whichever is later. An adverse verification statement would result in Executive Officer investigation and may result in delay of finalizing and posting the Annual Crude Average carbon intensity value.

- (C) Revisions to the OPGEE model, addition of crudes to Table 98, and updates to all carbon intensity values listed in Table 98 will be considered on a three-year cycle through proposed amendments of the Low Carbon Fuel Standard regulation.

Table 9. Carbon Intensity Lookup Table for Crude Oil Production and Transport.

<u>Country of Origin</u>	<u>Crude Identifier</u>	<u>Carbon Intensity (gCO₂e/MJ)</u>
<u>Baseline Crude Average*</u>	<u>California Baseline Crude Average applicable to crudes supplied during 2018 and subsequent years</u>	<u>42.1711.78</u>
	<u>California Baseline Crude Average applicable to crudes supplied in 2016 and 2017</u>	<u>11.98</u>
<u>Annual Crude Average</u>	<u>Volume-weighted California average CI for crudes supplied during 2016</u>	<u>12.14</u>
<u>Annual Crude Average</u>	<u>Volume-weighted California average CI for crudes supplied during 2017</u>	<u>11.93</u>
<u>Algeria</u>	<u>Saharan</u>	<u>14.77</u>
<u>Angola</u>	<u>Cabinda</u>	<u>8.99</u>
	<u>Clov</u>	<u>7.31</u>
	<u>Dalia</u>	<u>8.90</u>
	<u>Gimboa</u>	<u>8.86</u>
	<u>Girassol</u>	<u>9.95</u>
	<u>Greater Plutonio</u>	<u>8.72</u>
	<u>Hungo</u>	<u>8.23</u>
	<u>Kissanje</u>	<u>8.66</u>
	<u>Mondo</u>	<u>8.98</u>
	<u>Nemba</u>	<u>9.08</u>
	<u>Pazflor</u>	<u>8.02</u>
	<u>Sangos</u>	<u>7.06</u>

<u>Argentina</u>	<u>Canadon Seco</u>	<u>10.16</u>
	<u>Escalante</u>	<u>10.15</u>
	<u>Hydra</u>	<u>7.77</u>
	<u>Medanito</u>	<u>10.78</u>
<u>Australia</u>	<u>Enfield</u>	<u>6.84</u>
	<u>Pyrenees</u>	<u>8.24</u>
	<u>Stybarrow</u>	<u>7.84</u>
	<u>Van Gogh</u>	<u>8.46</u>
	<u>Vincent</u>	<u>6.83</u>
<u>Azerbaijan</u>	<u>Azeri</u>	<u>6.40</u>
<u>Belize</u>	<u>Belize Light</u>	<u>9.70</u>
<u>Brazil</u>	<u>Albacora Leste</u>	<u>5.99</u>
	<u>Bijupira-Salema</u>	<u>7.18</u>
	<u>Frade</u>	<u>5.63</u>
	<u>Iracema</u>	<u>5.54</u>
	<u>Jubarte</u>	<u>6.28</u>
	<u>Lula</u>	<u>6.24</u>
	<u>Marlim</u>	<u>6.76</u>
	<u>Marlim Sul</u>	<u>7.78</u>
	<u>Ostra</u>	<u>5.65</u>
	<u>Papa Terra</u>	<u>4.29</u>
	<u>Peregrino</u>	<u>4.16</u>
	<u>Polvo</u>	<u>4.31</u>
	<u>Roncador</u>	<u>6.77</u>
	<u>Roncador Heavy</u>	<u>6.45</u>
	<u>Sapinhua</u>	<u>6.00</u>
	<u>Tubarao Azul</u>	<u>5.45</u>
	<u>Tubarao Martelo</u>	<u>5.37</u>
<u>Cameroon</u>	<u>Lokele</u>	<u>19.27</u>
<u>Canada</u>	<u>Access Western Blend</u>	<u>14.21 15.15</u>
	<u>Albian Heavy Synthetic (all grades)</u>	<u>22.95 23.68</u>
	<u>BC Light</u>	<u>8.11</u>
	<u>Bonnie Glen</u>	<u>8.11</u>
	<u>Borealis Heavy Blend</u>	<u>14.11 15.41</u>
	<u>Boundary Lake</u>	<u>8.11</u>
	<u>Bow River</u>	<u>9.42</u>
	<u>Cardium</u>	<u>8.11</u>

	<u>Christina Dilbit Blend</u>	<u>41.77 12.71</u>
	<u>Christina Synbit</u>	<u>49.26 18.66</u>
	<u>Cold Lake</u>	<u>48.22 17.87</u>
	<u>Conventional Heavy</u>	<u>9.42</u>
	<u>CNRL Light Sweet Synthetic</u>	<u>22.58 25.27</u>
	<u>Federated</u>	<u>8.11</u>
	<u>Fosterton</u>	<u>9.42</u>
	<u>Gibson Light Sweet</u>	<u>8.11</u>
	<u>Halkirk</u>	<u>8.11</u>
	<u>Hardisty Light</u>	<u>8.11</u>
	<u>Hardisty Synthetic</u>	<u>33.23 36.39</u>
	<u>Husky Synthetic</u>	<u>30.89 32.66</u>
	<u>Joarcam</u>	<u>8.11</u>
	<u>Kearl Lake</u>	<u>12.89</u>
	<u>Kerrobert Sweet</u>	<u>8.11</u>
	<u>Koch Alberta</u>	<u>8.11</u>
	<u>Light Sour Blend</u>	<u>8.11</u>
	<u>Light Sweet</u>	<u>8.11</u>
	<u>Lloyd Blend</u>	<u>9.42</u>
	<u>Lloyd Kerrobert</u>	<u>9.42</u>
	<u>Lloydminster</u>	<u>9.42</u>
	<u>Long Lake Heavy</u>	<u>27.18 30.54</u>
	<u>Long Lake Light Synthetic</u>	<u>35.57 40.12</u>
	<u>Mackay Heavy Blend</u>	<u>48.69 20.43</u>
	<u>Medium Gibson Sour</u>	<u>8.11</u>
	<u>Medium Sour Blend</u>	<u>8.11</u>
	<u>Midale</u>	<u>8.11</u>
	<u>Mixed Sour Blend</u>	<u>8.11</u>
	<u>Mixed Sweet</u>	<u>8.11</u>
	<u>Moose Jaw Tops</u>	<u>8.11</u>
	<u>Peace</u>	<u>8.11</u>
	<u>Peace Pipe Sour</u>	<u>8.11</u>
	<u>Peace River Heavy</u>	<u>49.76 19.21</u>
	<u>Peace River Sour</u>	<u>8.11</u>
	<u>Pembina</u>	<u>8.11</u>
	<u>Pembina Light Sour</u>	<u>8.11</u>
	<u>Premium Albian Synthetic</u>	<u>28.20 29.49</u>

	<u>Premium Conventional Heavy</u>	<u>9.42</u>
	<u>Premium Synthetic</u>	25.39 <u>27.38</u>
	<u>Rainbow</u>	<u>8.11</u>
	<u>Rangeland Sweet</u>	<u>8.11</u>
	<u>Redwater</u>	<u>8.11</u>
	<u>Seal Heavy</u>	<u>9.42</u>
	<u>Shell Synthetic (all grades)</u>	27.68 <u>29.49</u>
	<u>Smiley-Coleville</u>	<u>9.42</u>
	<u>Sour High Edmonton</u>	<u>8.11</u>
	<u>Sour Light Edmonton</u>	<u>8.11</u>
	<u>Statoil Cheecham Dilbit</u>	15.15 <u>16.41</u>
	<u>Statoil Cheecham Synbit</u>	20.30 <u>21.08</u>
	<u>Suncor Synthetic (all grades)</u>	24.53 <u>27.09</u>
	<u>Surmont Heavy Blend</u>	20.14 <u>22.48</u>
	<u>Synbit Blend</u>	21.10 <u>22.64</u>
	<u>Syncrude Synthetic (all grades)</u>	28.68 <u>31.62</u>
	<u>Synthetic Sweet Blend</u>	26.60 <u>29.36</u>
	<u>Tundra Sweet</u>	<u>8.11</u>
	<u>Wabasca</u>	<u>6.88</u>
	<u>Western Canadian Blend</u>	<u>9.42</u>
	<u>Western Canadian Select</u>	18.44 <u>19.04</u>
<u>Chad</u>	<u>Doba</u>	<u>11.42</u>
<u>Colombia</u>	<u>Acordionero</u>	<u>6.96</u>
	<u>Cano Limon</u>	<u>9.29</u>
	<u>Castilla</u>	<u>10.55</u>
	<u>Cusiana</u>	<u>9.99</u>
	<u>Magdalena</u>	<u>22.28</u>
	<u>Rubiales</u>	<u>9.79</u>
	<u>South Blend</u>	<u>9.25</u>
	<u>Vasconia</u>	<u>9.62</u>
<u>Congo</u>	<u>Azurite</u>	<u>10.25</u>
	<u>Djeno</u>	<u>10.73</u>
<u>Ecuador</u>	<u>Napo</u>	<u>8.31</u>
	<u>Oriente</u>	<u>10.07</u>
<u>Equatorial Guinea</u>	<u>Ceiba</u>	<u>7.82</u>
	<u>Zafiro</u>	<u>20.56</u>
<u>Ghana</u>	<u>Ten Blend</u>	<u>8.08</u>

<u>Iran</u>	<u>Dorood</u>	<u>12.65</u>
	<u>Forozan</u>	<u>21.97</u>
	<u>Iran Heavy</u>	<u>13.25</u>
	<u>Iran Light</u>	<u>14.35</u>
	<u>Lavan</u>	<u>11.11</u>
	<u>Nowruz-Soroosh</u>	<u>10.53</u>
	<u>Sirri</u>	<u>10.15</u>
<u>Iraq</u>	<u>Basra Light</u>	<u>13.45</u>
	<u>Basra Heavy</u>	<u>10.69</u>
<u>Kuwait</u>	<u>Kuwait</u>	<u>10.56</u>
<u>Libya</u>	<u>Amna</u>	<u>15.82</u>
<u>Malaysia</u>	<u>Tapis</u>	<u>12.73</u>
<u>Mauritania</u>	<u>Chinquetti</u>	<u>13.74</u>
<u>Mexico</u>	<u>Isthmus</u>	<u>11.31</u>
	<u>Isthmus Topped</u>	<u>14.31</u>
	<u>Maya</u>	<u>7.85</u>
<u>Neutral Zone</u>	<u>Eocene</u>	<u>7.85</u>
	<u>Khafji</u>	<u>7.84</u>
	<u>Ratawi</u>	<u>9.42</u>
<u>Nigeria</u>	<u>Agbami</u>	<u>12.04</u>
	<u>Amenam</u>	<u>10.65</u>
	<u>Antan</u>	<u>21.98</u>
	<u>Bonga</u>	<u>5.06</u>
	<u>Bonny</u>	<u>9.91</u>
	<u>Brass</u>	<u>14.27</u>
	<u>EA</u>	<u>6.66</u>
	<u>Erha</u>	<u>10.91</u>
	<u>Escravos</u>	<u>12.00</u>
	<u>Forcados</u>	<u>8.97</u>
	<u>Okono</u>	<u>8.67</u>
	<u>OKWB</u>	<u>22.76</u>
	<u>Pennington</u>	<u>11.18</u>
	<u>Qua Iboe</u>	<u>11.45</u>
	<u>Yoho</u>	<u>11.45</u>
<u>Oman</u>	<u>Oman</u>	<u>13.48 13.32</u>
<u>Peru</u>	<u>Loreto</u>	<u>9.86</u>
	<u>Mayna</u>	<u>11.07</u>

	<u>Pirana</u>	<u>8.43</u>
<u>Russia</u>	<u>ESPO</u>	<u>11.55</u>
	<u>M100</u>	<u>17.35</u>
	<u>Sokol</u>	<u>6.94</u>
	<u>Vityaz</u>	<u>9.60</u>
<u>Saudi Arabia</u>	<u>Arab Extra Light</u>	<u>9.41</u>
	<u>Arab Light</u>	<u>9.23</u>
	<u>Arab Medium</u>	<u>8.72</u>
	<u>Arab Heavy</u>	<u>7.92</u>
<u>Thailand</u>	<u>Bualuang</u>	<u>4.07</u>
<u>Trinidad</u>	<u>Calypso</u>	<u>7.41</u>
	<u>Galeota</u>	<u>11.41</u>
<u>UAE</u>	<u>Murban</u>	<u>10.01</u>
	<u>Upper Zakum</u>	<u>7.96</u>
<u>Venezuela</u>	<u>Bachaquero</u>	<u>29.28</u> <u>28.75</u>
	<u>Boscan</u>	<u>13.91</u>
	<u>Hamaca</u>	<u>40.70</u> <u>23.04</u>
	<u>Hamaca DCO</u>	<u>10.02</u>
	<u>Laguna</u>	<u>29.28</u> <u>28.75</u>
	<u>Mesa 30</u>	<u>12.49</u>
	<u>Petrozuata (all synthetic grades)</u>	<u>23.09</u>
	<u>Santa Barbara</u>	<u>17.32</u>
	<u>Zuata (all synthetic grades)</u>	<u>23.04</u>
<u>US Alaska</u>	<u>Alaska North Slope</u>	<u>15.91</u>
<u>US Colorado</u>	<u>Niobrara</u>	<u>6.81</u>
<u>US Gulf of Mexico</u>	<u>Mars</u>	<u>6.62</u>
<u>US Louisiana</u>	<u>GCA</u>	<u>8.72</u>
<u>US New Mexico</u>	<u>Four Corners</u>	<u>11.11</u>
	<u>New Mexico Intermediate</u>	<u>11.11</u>
	<u>New Mexico Sour</u>	<u>11.11</u>
	<u>New Mexican Sweet</u>	<u>11.11</u>
<u>US North Dakota</u>	<u>Bakken</u>	<u>9.73</u>
	<u>North Dakota Sweet</u>	<u>9.73</u>
	<u>Williston Basin Sweet</u>	<u>9.73</u>
<u>US Oklahoma</u>	<u>Oklahoma Sour</u>	<u>11.93</u>
	<u>Oklahoma Sweet</u>	<u>11.93</u>
<u>US Texas</u>	<u>Eagle Ford Shale</u>	<u>11.93</u>

	<u>East Texas</u>	<u>11.93</u>
	<u>North Texas Sweet</u>	<u>11.93</u>
	<u>South Texas Sweet</u>	<u>11.93</u>
	<u>West Texas Intermediate</u>	<u>11.93</u>
	<u>West Texas Sour</u>	<u>11.93</u>
<u>US Utah</u>	<u>Covenant</u>	<u>4.43</u>
	<u>Grand Cane</u>	<u>6.92</u>
	<u>Utah Black Wax</u>	<u>5.85</u>
	<u>Utah Sweet</u>	<u>6.92</u>
<u>US Wyoming</u>	<u>Wyoming Sweet</u>	<u>10.98</u>
<u>US California Fields</u>	<u>Aliso Canyon</u>	<u>4.94</u>
	<u>Ant Hill</u>	<u>20.81</u>
	<u>Antelope Hills</u>	<u>2.84</u>
	<u>Antelope Hills, North</u>	<u>26.31</u> <u>24.75</u>
	<u>Arroyo Grande</u>	<u>33.60</u> <u>31.11</u>
	<u>Asphalto</u>	<u>8.01</u>
	<u>Bandini</u>	<u>3.09</u>
	<u>Bardsdale</u>	<u>3.47</u>
	<u>Barham Ranch</u>	<u>4.15</u>
	<u>Beer Nose</u>	<u>3.98</u>
	<u>Belgian Anticline</u>	<u>5.01</u>
	<u>Bellevue</u>	<u>5.95</u>
	<u>Bellevue, West</u>	<u>6.60</u>
	<u>Belmont, Offshore</u>	<u>5.12</u>
	<u>Belridge, North</u>	<u>4.88</u> <u>4.11</u>
	<u>Belridge, South</u>	<u>18.72</u> <u>17.09</u>
	<u>Beverly Hills</u>	<u>5.41</u>
	<u>Big Mountain</u>	<u>4.65</u>
	<u>Blackwells Corner</u>	<u>3.07</u>
	<u>Brea-Olinda</u>	<u>3.59</u>
	<u>Buena Vista</u>	<u>8.13</u> <u>7.44</u>
	<u>Burrel</u>	<u>29.43</u>
	<u>Cabrillo</u>	<u>4.14</u>
	<u>Canal</u>	<u>4.40</u>
	<u>Canfield Ranch</u>	<u>4.53</u>
	<u>Carneros Creek</u>	<u>4.06</u>
	<u>Cascade</u>	<u>3.00</u>

<u>Casmalia</u>	<u>10.26</u>
<u>Castaic Hills</u>	<u>2.68</u>
<u>Cat Canyon</u>	8.76 <u>7.83</u>
<u>Cheviot Hills</u>	<u>3.49</u>
<u>Chico-Martinez</u>	50.59 <u>48.13</u>
<u>Cienaga Canyon</u>	<u>5.78</u>
<u>Coalinga</u>	27.72 <u>25.81</u>
<u>Coles Levee, N</u>	<u>4.09</u>
<u>Coles Levee, S</u>	<u>5.87</u>
<u>Comanche Point</u>	<u>5.03</u>
<u>Coyote, East</u>	<u>5.96</u>
<u>Cuyama, South</u>	<u>14.70</u>
<u>Cymric</u>	48.63 <u>15.69</u>
<u>Deer Creek</u>	<u>11.51</u>
<u>Del Valle</u>	<u>5.78</u>
<u>Devils Den</u>	<u>7.51</u>
<u>Dominguez</u>	<u>3.57</u>
<u>Edison</u>	45.91 <u>14.53</u>
<u>El Segundo</u>	<u>4.38</u>
<u>Elk Hills</u>	<u>8.02</u>
<u>Elwood, S., Offshore</u>	<u>3.52</u>
<u>Fruitvale</u>	<u>3.75</u>
<u>Greeley</u>	<u>7.91</u>
<u>Hasley Canyon</u>	<u>2.25</u>
<u>Helm</u>	<u>3.99</u>
<u>Holser</u>	<u>3.80</u>
<u>Honor Rancho</u>	<u>3.43</u>
<u>Huntington Beach</u>	<u>6.62</u>
<u>Hyperion</u>	<u>1.90</u>
<u>Inglewood</u>	<u>10.06</u>
<u>Jacalitos</u>	<u>2.72</u>
<u>Jasmin</u>	47.75 <u>16.59</u>
<u>Kern Bluff</u>	<u>12.54</u>
<u>Kern Front</u>	39.17 <u>35.68</u>
<u>Kern River</u>	46.58 <u>15.09</u>
<u>Kettleman Middle Dome</u>	<u>3.93</u>
<u>Kettleman North Dome</u>	<u>3.42</u>

	<u>Landslide</u>	<u>12.53</u>
	<u>Las Cienegas</u>	<u>4.96</u>
	<u>Livermore</u>	<u>2.66</u>
	<u>Lompoc</u>	<u>28.45</u>
	<u>Long Beach</u>	<u>5.48</u>
	<u>Long Beach Airport</u>	<u>4.92</u>
	<u>Los Angeles Downtown</u>	<u>5.89</u>
	<u>Los Angeles, East</u>	<u>14.71</u>
	<u>Lost Hills</u>	<u>14.29</u> <u>12.99</u>
	<u>Lost Hills, Northwest</u>	<u>5.36</u>
	<u>Lynch Canyon</u>	<u>24.90</u> <u>23.10</u>
	<u>Mahala</u>	<u>4.99</u>
	<u>McCool Ranch</u>	<u>9.59</u>
	<u>McDonald Anticline</u>	<u>4.33</u>
	<u>McKittrick</u>	<u>27.00</u> <u>25.31</u>
	<u>Midway-Sunset</u>	<u>31.72</u> <u>29.33</u>
	<u>Montalvo, West</u>	<u>2.65</u>
	<u>Montebello</u>	<u>17.03</u>
	<u>Monument Junction</u>	<u>4.95</u>
	<u>Mount Poso</u>	<u>5.50</u> <u>3.71</u>
	<u>Mountain View</u>	<u>3.97</u>
	<u>Newhall-Potrero</u>	<u>3.66</u>
	<u>Newport, West</u>	<u>6.66</u> <u>5.21</u>
	<u>Oak Canyon</u>	<u>4.04</u>
	<u>Oak Park</u>	<u>3.01</u>
	<u>Oakridge</u>	<u>3.46</u>
	<u>Oat Mountain</u>	<u>3.17</u>
	<u>Ojai</u>	<u>4.94</u>
	<u>Olive</u>	<u>1.82</u>
	<u>Orcutt</u>	<u>13.91</u> <u>11.76</u>
	<u>Oxnard</u>	<u>5.65</u> <u>5.39</u>
	<u>Paloma</u>	<u>4.88</u>
	<u>Placerita</u>	<u>36.87</u> <u>32.78</u>
	<u>Playa Del Rey</u>	<u>6.87</u>
	<u>Pleito</u>	<u>2.09</u>
	<u>Poso Creek</u>	<u>25.62</u> <u>21.96</u>
	<u>Pyramid Hills</u>	<u>3.36</u>

	<u>Railroad Gap</u>	<u>7.08</u>
	<u>Raisin City</u>	<u>9.13</u>
	<u>Ramona</u>	<u>4.47</u>
	<u>Richfield</u>	<u>4.75</u>
	<u>Rincon</u>	<u>4.88</u>
	<u>Rio Bravo</u>	<u>6.98</u>
	<u>Rio Viejo</u>	<u>2.74</u>
	<u>Riverdale</u>	<u>3.80</u>
	<u>Rose</u>	<u>2.91</u>
	<u>Rosecrans</u>	<u>5.76</u>
	<u>Rosecrans, South</u>	<u>3.54</u>
	<u>Rosedale</u>	<u>2.35</u>
	<u>Rosedale Ranch</u>	<u>8.32</u>
	<u>Round Mountain</u>	<u>28.07</u> <u>24.04</u>
	<u>Russell Ranch</u>	<u>8.58</u>
	<u>Salt Lake</u>	<u>3.18</u>
	<u>Salt Lake, South</u>	<u>6.34</u>
	<u>San Ardo</u>	<u>29.14</u> <u>26.42</u>
	<u>San Miguelito</u>	<u>5.25</u>
	<u>San Vicente</u>	<u>3.22</u>
	<u>Sansinena</u>	<u>3.21</u>
	<u>Santa Clara Avenue</u>	<u>3.53</u>
	<u>Santa Fe Springs</u>	<u>12.53</u>
	<u>Santa Maria Valley</u>	<u>4.80</u>
	<u>Santa Susana</u>	<u>5.29</u>
	<u>Sargent</u>	<u>4.00</u>
	<u>Saticoy</u>	<u>3.68</u>
	<u>Sawtelle</u>	<u>2.56</u>
	<u>Seal Beach</u>	<u>5.19</u>
	<u>Semitropic</u>	<u>4.30</u>
	<u>Sespe</u>	<u>3.98</u>
	<u>Shafter, North</u>	<u>3.32</u>
	<u>Shiells Canyon</u>	<u>5.07</u>
	<u>South Mountain</u>	<u>3.58</u>
	<u>Stockdale</u>	<u>2.18</u>
	<u>Tapia</u>	<u>6.93</u> <u>6.92</u>
	<u>Tapo Canyon, South</u>	<u>3.08</u>

	<u>Tejon</u>	<u>13.77</u>
	<u>Tejon Hills</u>	<u>9.39</u>
	<u>Tejon, North</u>	<u>5.63</u>
	<u>Temescal</u>	<u>3.40</u>
	<u>Ten Section</u>	<u>7.50</u>
	<u>Timber Canyon</u>	<u>4.74</u>
	<u>Torrance</u>	<u>3.99</u>
	<u>Torrey Canyon</u>	<u>3.52</u>
	<u>Union Avenue</u>	<u>5.58</u>
	<u>Vallecitos</u>	<u>4.53</u>
	<u>Ventura</u>	<u>4.54</u>
	<u>Wayside Canyon</u>	<u>2.36</u>
	<u>West Mountain</u>	<u>3.53</u>
	<u>Wheeler Ridge</u>	<u>2.80</u>
	<u>White Wolf</u>	<u>1.92</u>
	<u>Whittier</u>	<u>3.71</u>
	<u>Wilmington</u>	<u>8.31</u>
	<u>Yowlumne</u>	<u>13.90</u>
	<u>Zaca</u>	<u>9.53</u>
<u>US Federal OCS</u>	<u>Beta</u>	<u>1.59</u>
	<u>Carpinteria</u>	<u>3.28</u>
	<u>Dos Cuadras</u>	<u>4.57</u>
	<u>Hondo</u>	<u>5.93</u>
	<u>Hueneme</u>	<u>4.67</u>
	<u>Pescado</u>	<u>7.07</u>
	<u>Point Arguello</u>	<u>14.07</u>
	<u>Point Pedernales</u>	<u>8.26</u>
	<u>Sacate</u>	<u>4.77</u>
	<u>Santa Clara</u>	<u>2.46</u>
	<u>Sockey</u>	<u>13.09</u>
<u>Default</u>		<u>42.17 11.78</u>

* Based on production and transport of the crude oil supplied to the indicated California refinery(ies) during the baseline calendar year, 2010.

(c)(d) Credits for Producing and Transporting Crudes using Innovative Methods. A crude oil producer or refinery receiving the crude may generate credits. Credits may be generated for crude oil that has been produced or transported using innovative methods and delivered to California refineries for processing.

(1) *General Requirements.*

(A) For the purpose of this section, an innovative method means crude production or transport using one or more of the following technologies:

1. Solar steam generation (generated steam of ~~55-45~~ percent quality or greater). Steam must be used onsite at the crude oil production facilities.
2. Carbon capture and ~~storage~~ sequestration (CCS). Carbon capture must take place onsite at the crude oil production facilities.
3. Solar or wind electricity generation. To qualify for the credit, electricity must be produced and consumed onsite or be provided directly to the crude oil production or transport facilities from a third-party generator and not through a utility owned transmission or distribution network. Energy storage may be used to increase the quantity of electricity supplied to crude oil production or transport facilities from intermittent solar and wind electricity generation sources.
4. Solar heat generation including, but not limited to, boiler water preheating and solar steam generation with a steam quality of less than 45 percent. Heat must be used onsite at the crude oil production facilities.
5. Geothermal, ocean wave, ocean thermal, or tidal current energy generation. Energy must be used onsite at the crude oil production facilities.
6. Renewable natural gas (RNG) or biogas energy. RNG or biogas must be physically supplied directly to the crude oil production facilities.

* * * * *

(F) Credits for producing crude oil with innovative methods must be calculated as specified below:

~~For crude oil produced using solar steam generation (generated steam of 75 percent quality or greater):~~

$$\begin{aligned} \text{Credits}_{\text{Innov}}(MT) &= 26765 \times \frac{V_{\text{steam}} \times f_{\text{solar}}}{V_{\text{crudeproduced}}} \times V_{\text{Innov}} \times C \\ \text{Credits}_{\text{Innov}}(MT) &= \text{Avoided emissions} \times \frac{V_{\text{steam}} \times f_{\text{solar}}}{V_{\text{crudeproduced}}} \times V_{\text{Innov}} \times C \end{aligned}$$

Where avoided emissions, as calculated using the OPGEE model assuming displacement of steam produced using a natural gas fired once through steam generator, are correlated with the steam quality as tabulated below:

<u>Steam quality</u>	<u>Avoided emissions (gCO₂e/bbl solar steam)</u>
<u>95% and above</u>	<u>31,260 34,875</u>
<u>85% to <95%</u>	<u>29,429 30,443</u>
<u>75% to <85%</u>	<u>27,597 28,188</u>
<u>65% to <75%</u>	<u>25,766 25,932</u>
<u>55% to <65%</u>	<u>23,934 23,677</u>
<u>45% to <55%</u>	<u>21,421</u>

* * * * *

(G) ~~Solar and wind electricity and solar steam or heat generation~~ Renewable or low-CI energy sources listed in (A) that are used to generate LCFS credit for innovative crude may not also claim renewable energy certificates or other environmental attributes recognized or credited by any other jurisdiction or regulatory program, other than the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800).

(2) *Application and Data Submittal.* Unless otherwise noted, an application for an innovative method shall comply with the requirements below:

* * * * *

(C) An application, except for solar-generated steam (~~55-45~~ percent steam quality or greater), 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 each of the following, to the extent each is applicable to the innovative method:

* * * * *

- (D) An application, except for solar-generated steam (~~55-45~~ percent steam quality or greater), wind-based electricity, or solar-based electricity shall include descriptions of the life cycle assessments (LCAs) performed on the proposed innovative method and its comparison baseline method using the CARB OPGEE model or an alternative model or LCA methodology approved by the Executive Officer. Electronic copies of the models and calculations shall be provided with the application. The descriptions of the life cycle assessment results must include each of the following:

* * * * *

- (4) Recordkeeping and Reporting. Each applicant that receives approval for an innovative method must maintain records identifying each facility at which it produces crude oil for sale in California under the approved innovative method. For each such facility, the applicant must report quarterly (through a Project Report) and maintain records for at least five-ten years showing:
- (A) The ~~quarterly~~-volume (barrels) of crude oil produced using the approved innovative method and the crude name(s) under which it is marketed.
- (B) If the crude oil produced with an approved innovative method is marketed as part of a crude blend that is not wholly refined in California, the crude oil producer must also maintain, for at least five years, quarterly records identifying the name of the blend and the volume fraction that the crude produced with the innovative method contributes to the blend.
- (C) For crude oil imported into California, ~~d~~Documentation showing that the innovative crude was supplied to ~~a~~one or more California refinery(ies) and the volume (barrels) of innovative crude supplied to each California refinery. For crude oil produced in California, documentation showing the innovative crude was supplied to one or more California refinery, the total volume (barrels) of innovative crude supplied to California refineries, and the total volume (barrels) of innovative crude exported from California.
- (D) For solar or wind electricity projects, the following additional recordkeeping and reporting will be required:
1. Metered data on solar or wind electricity consumed for crude oil production at the oil field during the quarter (kWh);

- 2. Metered data on total electricity consumed for crude oil production at the oil field during the quarter (kWh); and
- 3. An attestation letter stating that all solar or wind electricity was supplied directly for crude oil production at the oil field and that the solar or wind electricity reported for generating LCFS credit did not produce renewable energy certificates or other ~~renewable~~ environmental attributes recognized or credited by any other jurisdiction or regulatory program, other than the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800).

(E) For solar steam projects, the following additional recordkeeping and reporting will be required:

* * * * *

- 4. An attestation letter stating that all solar steam was supplied directly for crude oil production at the oil field and that the solar steam reported for generating LCFS credit did not produce renewable energy certificates or other ~~renewable~~ environmental attributes recognized or credited by any other jurisdiction or regulatory program, other than the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800).

* * * * *

(e)(f) Refinery Investment Credit Pilot Program. A refinery may receive credit for reducing greenhouse gas emissions from its facility. Any such credits ~~shall~~ must be based on fuel volumes sold, supplied, or offered for sale in California as set forth below.

(1) *General Requirements.*

- (A) The application for a refinery investment credit must be submitted during or after the year 2016 and must be approved pursuant to this section before the refinery can receive credit. A project is eligible if the project completion date is on January 1, 2016 or later.~~authority-to-construct permit was approved after January 1, 2016.~~
- (B) The refinery investment credit project must occur within the boundaries of the refinery, unless it involves carbon capture from

hydrogen production. Sequestration sites for CCS do not need to be on-site at the refinery.

~~(C)~~ ~~The refinery investment credit project must achieve a carbon intensity reduction equivalent to at least 1 percent of pre-project on-site refinery-wide greenhouse gas emissions (baseline) in metric tons per year from the comparison baseline of at least 0.1 gCO₂e/MJ.~~

~~(D)~~(C) The applicant must demonstrate that any net increases in criteria air pollutant or toxic air contaminant emissions from the refinery investment credit project are mitigated in accordance with all local, state, and national environmental and health and safety regulations.

~~(E)~~ Projects whose primary objectives are refinery equipment shutdowns, reductions in refinery or equipment throughput and refinery maintenance shall not be eligible for section 95489(f).

~~(E)~~(D) The following project types are eligible for the refinery investment project credits:

1. CO₂ capture at refineries, or at hydrogen production facilities that supply hydrogen to refineries, and subsequent geologic sequestration;
2. Use of renewable or low-CI electricity supplied behind the meter that meets the requirements of 95488.8(h)(1);
3. Use of lower-CI process energy such as biomethane, renewable propane, and renewable coke, to displace fossil fuel;
4. Electrification at refineries that involves substitution of high carbon fossil energy input with grid electricity.
5. ~~Process improvement projects that result in carbon intensity reductions per megajoule of total CARBOB and diesel produced. Greenhouse gas emissions reductions due to shutdown, simple maintenance and crude oil switching are not eligible. Process improvement projects that deliver a reduction in baseline refinery-wide greenhouse gas emissions as outlined in 95489(e)(1)(G)2. Greenhouse gas emissions reductions due to curtailment, simple maintenance; and crude oil switching that results in greenhouse gas reductions in the project system boundary~~

without improvements in the processing units or equipment involved are not eligible. For the purposes of this section, curtailment is defined as an intentional operational and/or physical change exclusively for the reduction or cessation of total gasoline and gasoline blendstocks and diesel production at the refinery. Curtailment does not include the coincidental rate reduction or shutdown of associated emitting equipment as part of a process improvement project or projects aimed primarily at optimizing refinery efficiency.

~~(F)~~ Credits created pursuant to section 95489(f) may not be sold or transferred to any other party.

~~(G)~~ Credits generated pursuant to section 95489(f) are subject to limitations set forth in section 95485(d).

~~(F)~~(E) Credits must be pro-rated for years where the units within the project system boundary were non-operational. This pro-rating will consider the calendar days of operation relative to non-operation.

~~(G)~~(F) Credits must be pro-rated if the hydrogen production facility that captures CO₂ does not supply all of its hydrogen to the applicant refinery.

~~(H)~~(G) Credits generated pursuant to section 95489(e)(1)(D)5.~~(E)(5)~~ may not be:

1. Be used to meet more than 510 percent of any entity's annual compliance obligation. The Executive Officer will exclude incremental deficits incurred pursuant to section 95489(b) when assessing this 510 percent limitation.

2. Generate fewer credits annually than the lesser of:
a. 10,000 credits, or
b. One percent of the facility's annual pre-project emissions.

~~(I)~~ 3. Credits may not be generated pursuant to section 95489(e)(1)(E)(5) after January 1, 2025. Crediting Period. Crediting is limited to 15 years from the quarter in which the Executive Officer approves the project's application.

~~(J)~~(H) Projects that utilize carbon capture and sequestration are subject to the provisions of section 95490.

* * * * *

(2) Calculation of Credits.

(A) For carbon capture and sequestration projects, determine the credit in accordance with the CCS protocol.

(B) For other refinery investment credit projects, determine the credit as follows:

1. Establish a project system boundary. The project system boundary should include direct impacts and at least first order indirect impacts;
2. Determine the credit for the refinery investment credit project by calculating pre-project life cycle greenhouse gas emissions and project life cycle greenhouse gas emissions within the project system boundary;

$$Credit_{RIP} = (GHG_{pre-project} - GHG_{post-project}) \times \frac{Volume^{XD}}{Volume^{Total}}$$

where:

$Credit_{RIP}$ is the annual credit for the refinery investment credit project in metric tons per year;

$GHG_{pre-project}$ is the annual life cycle greenhouse gas emissions from the use of fuels, electricity, steam/heat and hydrogen in the project system boundary prior to project implementation in metric tons per year corrected for downtime;

$GHG_{post-project}$ is the annual life cycle greenhouse gas emissions from the use of fuels, electricity, steam/heat and hydrogen in the project system boundary due to project implementation in metric tons per year corrected for downtime;

$Volume^{XD}$ is the volume of ~~CARBOB~~-gasoline, gasoline blendstocks, and diesel in gallons per quarter or per year produced at the refinery and sold, supplied, or offered for sale in California by the refinery involved in the Refinery Investment Credit Program; and

Volume^{Total} is the total volume of CARBOB gasoline, gasoline blendstocks, and diesel in gallons produced at the refinery per quarter or per year.

(3) *Application Contents and Submittal.* Unless otherwise noted, an application for refinery investment credits shall ~~shall~~ must comply with the following requirements:

(A) An application must contain the following summary material:

1. A complete description of the refinery investment credit project and how emissions are reduced;
2. An engineering drawing(s) or process flow diagram(s) that illustrates the project and clearly identifies the system boundaries, relevant process equipment, mass flows, and energy flows necessary to calculate the refinery investment credits, including any directly affected or indirectly affected processing units (at least first order indirect impacts) and a whole refinery diagram if requested; and
3. A preliminary estimate of the refinery investment credit, calculated as required in section 95489(e)(f)(2), including descriptions and copies of any available production and operational data including energy use and ~~or~~ other technical documentation utilized in support of the calculation. ~~The production and operational data should cover at least a period of one year after the project becomes operational.~~ The application must contain process-specific data showing that the reductions are part of the transportation fuel pathway.
4. Supporting documents demonstrating that second or higher order indirect impacts are not significant beyond the identified project system boundary.

* * * * *

(H) Applications for process improvement projects must be submitted on or before December 31, 2025.

(4) *Application Approval Process.* An application must be approved by the Executive Officer before the refinery investment credit project can generate credits under the LCFS regulation.

(A) ~~Within 30 calendar days of~~After receipt of an application designated by the applicant as ready for formal evaluation, the Executive Officer shall will advise the applicant in writing either that:

1. The project system boundary is appropriate and the application is complete, or
2. The application is incomplete, in which case the Executive Officer will identify which requirements of section 95489(e)(f) have not been met. The applicant may submit additional information to correct deficiencies identified by the Executive Officer. If the applicant is unable to achieve a complete application within 180 calendar days of the Executive Officer's receipt of the original application, the application will be denied on that basis, and the applicant will be informed in writing.

* * * * *

(5) Credit Review and Issuance. ~~Each refinery that has an approved refinery investment credit solicit Executive Officer review and re-approval of the credit every three years. Credits for refinery investment projects may be generated quarterly or annually, at the discretion of the credit generating party.~~

* * * * *

(A) Upon the completion of reporting period in which a positive or qualified positive verification statement for the applicable Project Reports per section 95500(e) is received, the Executive Officer will determine the number of credits to be issued to the applicants. An adverse verification statement would result in no credit issuance and Executive Officer investigation.

(B) ~~When the Executive Officer determines that carbon intensity reduction from the refinery investment project has decreased from the original reduction, the refinery investment credit shall be adjusted to reflect the new credit henceforth. If a revised carbon intensity greenhouse gas reduction drops is below 1 percent 0.1 gCO₂e/MJ compared to the refinery's on-site greenhouse gas emissions baseline without the refinery investment credit project, the refinery investment credit shall will be canceled henceforth.~~

* * * * *

(f)(g) Renewable Hydrogen Refinery Credit Pilot Program. A refinery may receive credit for greenhouse gas emission reductions from the production of CARBOB

or diesel fuel that is partially or wholly derived from renewable hydrogen. Any such credits ~~shall~~ must be based on fuel volumes sold, supplied, or offered for sale in California as set forth below.

(1) *General Requirements.*

~~(A)~~ ~~The application for a renewable hydrogen refinery credit must be submitted during or after the year 2016 and must be approved pursuant to this section before the refinery can receive credit.~~

~~(A)~~(B) In order to receive a renewable hydrogen refinery credit, a refiner must produce CARBOB or diesel fuel that is partially or wholly derived from renewable hydrogen. ~~The renewable hydrogen must annually replace a minimum of one percent of all fossil hydrogen in the production of CARBOB or diesel fuel.~~

~~(B)~~(C) The applicant must demonstrate that any net increases in criteria air pollutant or toxic air contaminant emissions from the renewable hydrogen refinery credit project are mitigated in accordance with all local, state, and national environmental and health and safety regulations.

* * * * *

(2) *Calculation of Credits.*

* * * * *

(A) For CARBOB or diesel fuel that is partially or wholly derived from renewable hydrogen produced from RNG that displaces fossil natural gas in a steam methane reforming unit, the calculation of credits generated quarterly or annually must be as follows:

$$Credits_{RIC}^H = (CI_{NG} - CI_{RNG}) \times E_{RNG} \times C \times \frac{Volume^{XD}}{Volume^{Total}}$$

where:

$Credits_{RIC}^H$ is the amount of LCFS credits generated (a zero or positive value), in metric tons, by renewable hydrogen;

CI_{NG} is the carbon intensity of North American pipeline natural gas at refinery gate calculated using the CA-GREET3.0 model;

CI_{RNG} is the carbon intensity of the RNG, in gCO₂e/MJ, at refinery gate and must be determined using the CA-GREET 3.0 model

unless the Executive Officer has approved the use of a method that is at least equivalent to the calculation methodology used by CA-GREET3.0 model. The process for obtaining CI_{RNG} will be identical to Tier 2 fuel pathway applications, but the life cycle steps evaluated will stop at delivery of the RNG to the refinery gate;

E_{RNG} is the amount of RNG, in MJ, delivered to a refinery per quarter or per year;

$Volume^{XD}$ is the volume of ~~CARBOB~~ gasoline, gasoline blendstocks, and diesel in gallons per quarter or per year produced at the refinery and sold, supplied, or offered for sale in California by the refinery;

$Volume^{Total}$ is the total volume of ~~CARBOB~~ gasoline, gasoline blendstocks, and diesel in gallons produced at the refinery per quarter or per year; and

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

- (B) For CARBOB or diesel fuel that is partially or wholly derived from renewable hydrogen produced from other production processes, such as electrolysis using renewable electricity or syngas from biomass gasification, the calculation of credits generated quarterly or annually must be as follows:

$$Credits_{RIC}^H = (CI_{Fossil}^H - CI_{Renewable}^H) \times D_{Renewable}^H \times M_{Renewable}^H \times C \times \frac{Volume^{XD}}{Volume^{Total}}$$

where:

$Credits_{RIC}^H$ is the amount of LCFS credits generated (a zero or positive value), in metric tons, by renewable hydrogen;

CI_{Fossil}^H is the carbon intensity of fossil hydrogen in gCO₂e/MJ delivered or produced at the refinery, as determined using the CA-GREET3.0 model or similar models approved by the Executive Officer. The process for obtaining CI_{Fossil}^H must comply with the requirements in sections 95488 to 95488.10;

$CI_{Renewable}^H$ is the carbon intensity of renewable hydrogen in gCO₂e/MJ delivered or produced at the refinery, as determined

using the CA-GREET3.0 model. The process for obtaining $CI_{Renewable}^H$ must comply with the requirements in sections 95488 to 95488.10;

$M_{Renewable}^H$ is the amount of renewable hydrogen in kg per quarter or per year;

$D_{Renewable}^H$ is the energy density of hydrogen in MJ/kg from Table 4;

$Volume^{XD}$ is the volume of ~~CARBOB~~ gasoline, gasoline blendstocks, and diesel in gallons per quarter or per year sold, supplied, or offered for sale in California by the refinery involved in the *Renewable Hydrogen Refinery Credit Program*;

$Volume^{Total}$ is the total volume of ~~CARBOB~~ gasoline, gasoline blendstocks, and diesel in gallons produced at the refinery per quarter or per year; and

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

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§ 95490. [Reserved.] Provisions for Fuels Produced Using Carbon Capture and Sequestration.

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(h) CO_2 Leakage and Credit Invalidation.

- (1) Credits for verified GHG emission reductions can be invalidated if the sequestered CO_2 associated with them is released or otherwise leaked to the atmosphere.
- (2) The number of invalidated credits is equal to the quantity of CO_2 released or leaked from the sequestration zone ($CO_{2,leakage}$), which must be determined in accordance with the CCS Protocol.
- (3) Prior to 50 years post-injection:
 - (A) The Executive Officer may retire credits from the buffer account, up to and including the project's total contribution, to count toward the number of invalidated credits.
 - (4)(B) The project operator must retire credits for any balance after retiring credits pursuant to 95490(h)(3)(A).

(5)(C) The Executive Officer may retire credits from the buffer account equivalent to remaining outstanding balance after retiring credits pursuant to 95490(h)(4)(3)(A) and (B).

(4) After 50 years post-injection:

(A) The project operator is no longer responsible to make up any credits found to be invalid due to leakage.

(B) The Executive Officer may retire credits from the buffer account to cover any credits found to be invalid due to leakage.

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§ 95491. Fuel Transactions and Compliance Reporting and Recordkeeping.

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(d) Specific Reporting Requirements for Quarterly Fuel Transactions Reports. In addition to all requirements specified in section 95491(c), for each of its transportation fuels, a fuel reporting entity must submit a quarterly fuel transactions report that contains the information specified below and summarized in Table 11:

(1) Specific Quarterly Reporting Parameters for Liquid Fuels including Gasoline, Diesel, Diesel Fuel Blends, Alternative Fuels, and Alternative Jet Fuel.

* * * * *

(C) Fuel Pathway Allocation for Produced Fuel. If a fuel production facility is processing multiple feedstocks, the fuel reporting entity must use either of the following methods to allocate the quantity of produced fuel to each certified FPC.

1. The quantity of fuel reported for a fuel pathway code must be determined using the following method:

a. $Q_{Fuel\ i}^n = Y_{average\ yield} \times Q_{Feedstock\ i}^n$

where,

$Q_{Fuel\ i}^n$ is the quantity of produced fuel with a fuel pathway i at a production facility during reporting period n ;

$Y_{average\ yield}$ is the facility's average production yield for all feedstocks as determined during pathway certification; and

$Q_{Feedstock\ i}^n$ is the quantity of feedstock processed for a fuel pathway i at a production facility during reporting period n .

- b. If the actual quantity of fuel produced during a reporting period is greater than the quantity calculated using (a) a. above, the excess fuel must be allocated to a fuel pathway with the highest CI among all pathways certified for the fuel production facility.

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~~(3)(D)~~ Specific Quarterly Reporting Parameters for Electricity used as a Transportation Fuel.

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(A) For Non-Metered Residential EV charging. ~~The EDU must meet the following requirements:~~

1. ~~On or before January 31st of each year,~~ Within the first 45 days after the end of the quarter, the EDU must provide the Executive Officer Daily Average EV Electricity Use data for the calculation of credits for non-metered charging from the prior ~~year~~ quarter. The Executive Officer shall use the method set forth in subsection 95486.1(c)(1), to calculate any credits generated for the ~~year~~ quarter and place them into the EDU's LRT-CBTS account ~~at least 30 days prior to the annual reporting deadline;~~ and
2. The LSE must ~~use~~ all credit proceeds to benefit current or future EV drivers or customers;
3. The LSE must ~~educate~~ the public and customers on the benefits of EV transportation (including environmental benefits and costs of EV charging, or total cost of ownership, as compared to gasoline);

4. The LSE must provide rate options that encourage off-peak charging and minimize adverse impacts to the electrical grid;
5. The LSE must include, in the Annual Compliance Report, the following supplemental information: an itemized summary of efforts to meet requirements 1. through 3. above and costs associated with meeting the requirements. For investor-owned utilities, this requirement may be satisfied by supplying a copy of the annual implementation report required under Order 4 of Public Utilities Commission of California (PUC) Decision 14-12-083, or any successor PUC Decisions.
6. For claiming incremental credit for non-metered residential charging the LSE must be able to provide, upon request of the Executive Officer: the VIN for each electric vehicle claimed and evidence of EV vehicle registration and low-carbon electricity supply at the same location.

(B) For Metered Residential EV charging. The quantity of electricity (in kWh) used for residential EV charging must be reported per FSE with a certified FPC and with transaction type “EV Charging – Grid,” “EV Charging – Non-Grid,” or “EV Charging – Smart Charging TOU,” as appropriate. Only an EDU may use the transaction type “EV Charging – Grid” for generating base credits for residential EV charging.

* * * * *

2. For electricity reported with transaction type “EV Charging – Smart Charging ~~TOU~~”, the following requirements must be met:
 - a. The quantity of electricity used for each ~~time-of-use~~ hourly window, as per Table 7-2 in section 95488.5(f), must be reported.
 - b. The reporting entity must be able to provide documentation showing the quantity of electricity used during a reporting period broken down by ~~time-of-use~~ hourly windows upon request by the Executive Officer. The pathway holder must keep records demonstrating the quantity of electricity dispensed through each FSE for each hour of each day; and
 - c. Only a single entity can generate incremental credits for ~~time-of-use~~ smart charging for the same FSE. If

two or more entities report for the same FSE to generate incremental credits, no incremental credits will be issued for that FSE.

(C) For Non-Residential EV Charging. The quantity of electricity (in kWh) metered for used in EV charging must be reported per FSE with a certified FPC and with transaction type “EV Charging – Grid,” “EV Charging – Non-Grid,” or “EV Charging – Smart Charging FOU,” as appropriate.

* * * * *

(D)6. For Fixed Guideway Systems. For each fixed guideway system, the amount quantity of electricity used for transit propulsion (in kWh) must be reported per FSE with a certified FPC and with transaction type “Fixed Guideway Electricity Fueling”. FSE ID is assigned by system during the registration as specified in section 95843.2(b)(8).

(E)7. For Electric Forklifts. The quantity of electricity used (in kWh) must be reported per FSE with a certified FPC and with transaction type “EV Forklifts Fueling.” The quantity of electricity used in electric forklifts may be determined as follows:

~~For the electric forklifts located in each Electrical Distribution Utility service area, the annual electricity used (in kWh), as measured at charging in the case of an electric forklift fleet operator claiming credits, or estimated by Air Resources Board staff each year in the case of an Electrical Distribution Utility claiming credits. An Electrical Distribution Utility’s report of electricity used by electric forklifts is exempted from the quarterly reporting deadlines set forth in section 95491(a)(1)(A).~~

1. Quantity of electricity used during a reporting period, as measured per FSE and with transaction type “Forklift Electricity Fueling”, in the case of an electric forklift fleet operator owner or its designee generating credits; or

2. When electric forklift credits are claimed by an EDU, CARB staff will calculate the quantity of electricity supplied to electric forklifts in the EDUs service territory each year for the generation of credits. This reporting parameter is exempt from the quarterly reporting deadlines set forth in section 95491(b).

(F) For Electric Transport Refrigeration Unit. The quantity of electricity (in kWh) dispensed to each unit must be reported per FSE with a certified FPC and with transaction type “eTRU Fueling.”

(G) Electric Cargo Handling Equipment. The quantity of electricity (in kWh) dispensed to each equipment must be reported per FSE with a certified FPC and with transaction type “eCHE Fueling.”

(H) Electric Auxiliary Engine for Ocean-going Vessel. The quantity of electricity (in kWh) dispensed to each engine must be reported per FSE with a certified FPC and with transaction type “eOGV Fueling.”

(I) Other Electric Transportation Applications. The quantity of electricity (in kWh) dispensed to equipment must be reported per FSE with a certified FPC and with transaction type made available by Executive Officer pursuant to section 95488.9(g).

(4)(E) Specific Quarterly Reporting Parameters for Hydrogen or a Hydrogen Blend Used as a Transportation Fuel.

(A)4. For each private and public access fueling facility, the amount-quantity (in kg) of fuel dispensed (in kg) per FSE with a certified FPC and with transaction type “FC~~E~~V Fueling” by vehicle weight category: LDV & MDV and HDV.

* * * * *

(D) For hydrogen reported with a pathway that claims carbon intensity reductions for shifts in time of electricity use for electrolytic hydrogen production, the quantity of electricity (in kWh) used to produce hydrogen for each ~~time of use~~ hourly window must be reported with transaction type “FCV Fueling – Smart Electrolysis” ~~FCEV Fueling – TOU.~~

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(e)(4) ~~General and Specific Reporting Requirements for Annual Compliance Reports.~~ A fuel reporting party entity and project operators must submit an annual compliance report that meets, at minimum, the general and specific requirements for aggregates the quarterly fuel transactions reports and provides the additional information requirements-set forth below:

(1)(A) A reporting party must report the following: LRT-CBTS generates an annual summary, for each fuel reporting entity and project operator, that includes the following:

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(G) Total credits acquired from or pledged for sale into the CCM, if applicable;

(H) Total credits purchased as carryback credits; and

(I) Any credits on administrative hold.

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§ 95491.1. Recordkeeping and Auditing.

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(c) Monitoring Plan for Entities Required to Validate or Verify. Each entity responsible for obtaining a validation or verification statement under this subarticle must complete and retain for review by a verifier, or the Executive Officer, a written Monitoring Plan. Entities also reporting pursuant to MRR may use a single monitoring plan for both programs, so long as all of the following elements are included and clearly identified:

(1) The monitoring plan must contain the following general items and associated references to more detailed information:

* * * * *

(G) Descriptions of measurement devices used to report LCFS data and how acceptable accuracy is demonstrated, e.g., installation, maintenance, and calibration method and frequency for internal meters or how the criteria in MRR section 95103(k)(7) are met to demonstrate meters are financial transaction meters such that the accuracy is acceptable. This provision does not apply to data reported in the LRT-CBTS for generating credits for EV charging.

* * * * *

(d) Verification of Pathway, CI, Report Outcomes. All data and calculations submitted by a regulated party for demonstrating compliance or claiming credit are subject to verification by the Executive Officer or a third party approved by the Executive Officer. Each entity responsible for obtaining a validation or verification statement under this subarticle must obtain third-party verification services from a verification body that meets the requirements specified in section 95502. A positive or qualified positive verification statement for the previous calendar year must be submitted to the Executive Officer by the verification or certification body by August 31st in order to maintain a valid fuel

pathway code for use in reporting fuel transactions for credit generation. An adverse transactions verification statement would result in Executive Officer investigation and possible enforcement action.

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§ 95492. Enforcement Protocols.

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§ 95493. Jurisdiction.

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§ 95494. Violations.

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§ 95495. Authority to Suspend, Revoke, ~~or Modify~~, or Invalidate.

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§ 95496. ~~Regulation Review~~. [Reserved].

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§ 95497. Severability.

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§ 95498. [Reserved].

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§ 95499. [Reserved].

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§ 95500. Requirements for Validation of Fuel Pathway Applications; and Verification of Annual Fuel Pathway Reports, Quarterly Fuel Transactions Reports, Crude Oil Quarterly and Annual Volumes Reports, Project Reports, and Low-Complexity/Low-Energy-Use Refinery Reports.

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(b) Verification of Annual Fuel Pathway Report (CIs).

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(2) Verification Schedule. Entities required to contract for verification of Fuel Pathway Reports (CI) must ensure a fuel pathway verification statement for each Fuel Pathway Report is submitted to the Executive Officer according to the following schedule.

(A) Annual Verification. Verification statements are due to the Executive Officer by August 31st of the year the annual Fuel Pathway Report is submitted, beginning in 2021 for 2020 data, unless eligible for less frequent to defer verification, as specified in section 95500(b)(2)(B).

(B) ~~Loss-Frequent-Deferred~~ Verification. Fuel pathway holders producing alternative liquid fuels may defer verification of their annual Fuel Pathway Reports and Quarterly Fuel Transactions Reports for each production facility up to two years if the quantity of fuel produced at the production facility and reported by any entity does not result in more than 6,000 or more credits generated in LRT-CBTS during the prior calendar year.

The verification body must submit fuel pathway verification statements and transactions verification statements to the Executive Officer for all prior unverified reports on August 31st of the year verification is required for the production facility.

(C) Verification services may not begin until the entity required to contract for verification services attests that the data submitted to the Executive Officer is true, complete, and accurate by certifying under penalty of perjury under the laws of the State of California.

“Quarterly review” for purposes of this subarticle means a review process conducted by the verification team after quarterly data is submitted and before annual data is submitted and verified. Quarterly review does not supersede the requirements for the verification team to consider all quarterly data submitted during annual verification. Quarterly review is optional for annual Fuel Pathway Reports, Quarterly Fuel Transactions Reports, and Crude Oil Quarterly and Annual Volumes Reports. Quarterly review must conform to the requirements for verification services in section 95501. A verification statement and verification report are not submitted after quarterly review.

Quarterly review of operational CI data may only be included as part of annual verification services if the fuel pathway holder submits quarterly data to the Executive Officer. Quarterly review

may only be conducted after the fuel pathway holder submits the report and attests that the statements and information submitted are true, accurate, and complete.

(c) Verification of Quarterly Fuel Transactions Reports.

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(2) Verification Schedule. Entities responsible for verification of Quarterly Fuel Transactions Reports must ensure a transactions data verification statement is submitted to the Executive Officer according to the following schedule.

(A) Annual Verification. The entity required to contract for verification of Quarterly Fuel Transactions Reports must ensure a transactions verification statement is submitted annually by August 31st, beginning in 2021 for 2020 data, to the Executive Officer for the prior calendar year of data unless specified otherwise in sections 95500(c)(2)(B) or 95500(c)(2)(C).

Quarterly review of a Quarterly Fuel Transactions Report may only be included as part of annual verification services after the entity submits the report and attests that the statements and information submitted are true, accurate, and complete.

(B) Deferred Verification. Fuel pathway holders producing alternative liquid fuels may defer annual verification of their Quarterly Fuel Transactions Reports for each production facility up to two years if the quantity of fuel produced at the production facility and reported by any entity does not result in 6,000 or more credits generated in LRT-CBTS during the prior calendar year.

The verification body must submit transactions verification statements to the Executive Officer for all prior unverified reports on August 31st of the year verification is required for the production facility.

~~Loss Frequent Verification. Alternative liquid fuel pathway holders qualifying for loss frequent verification of Fuel Pathway Reports, as specified in section 95500(b)(2)(B), also qualify for loss frequent verifications of their Quarterly Fuel Transactions Reports.~~

(C) Entities reporting fuel transactions as Export, Gain of Inventory, Loss of Inventory, and Not Used for Transportation, which result in no more than 6,000 credits and no more than 6,000 deficits in a calendar year are exempt from verification of the Quarterly Fuel Transactions Reports for that calendar year if all the following

conditions are met:

1. The entity did not report any liquid fuel using the transaction types: Production in California, Production for Import, or Import; and
2. The entity did not report any transactions specified in sections 95500(c)(1)(B) or 95500(c)(1)(C).

(d) Verification of Crude Oil Quarterly and Annual Volumes Reports.

- (1) Applicability. Entities submitting crude oil volume data must obtain the services of a verification body accredited by the Executive Officer for purposes of conducting verification services, including required site visit(s), for Crude Oil Quarterly and Annual Volumes Reports submitted under this subarticle.
- (2) Verification Schedule. Entities required to contract for verification of Crude Oil Quarterly and Annual Volumes Reports must ensure a crude oil volume verification statement for the prior calendar year of data is submitted to the Executive Officer annually by August 31st, beginning in 2021 for 2020 data.

Quarterly review of a Crude Oil Quarterly Volumes Report may only be conducted as part of annual verification services after the entity submits the quarterly report and attests that the statements and information submitted are true, accurate, and complete.

(e) Verification of Project Reports.

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- (2) Verification Schedule. ~~Entities required to contract for verification of Project Reports must ensure a project data verification statement is submitted to the Executive Officer for credits requested in 2020 and thereafter. Entities may elect annual verification or quarterly verification. Entities may defer verification when the quantity of credits requested does not exceed 25,000 in a calendar year. Entities submitting Project Reports may elect to conduct quarterly or annual verification. Entities must determine before the initial verification of a Project Report whether to conduct quarterly or annual verification. If an entity elects to conduct quarterly verification, it may only switch to annual verification at the beginning of a calendar year.~~

Entities electing quarterly verification must ensure each quarterly project data verification statement is submitted to the Executive Officer within five months of the Quarterly Project Report deadline beginning with 2020 data.

Entities electing annual verification must ensure annual project data verification statements are submitted to the Executive Officer by August 31, 2021 for submittal of 2020 data, and annually thereafter.

(f) *Verification of Low-Complexity/Low-Energy-Use Refinery Reports.*

(1) *Applicability.* Entities submitting Low-Complexity/Low-Energy-Use refinery data must obtain the services of a verification body accredited by the Executive Officer for purposes of conducting verification services, including required site visit(s), for Low-Complexity/Low-Energy-Use Refinery Reports submitted under this subarticle.

(2) *Verification Schedule.* The verification body must submit an annual verification statement to the Executive Officer for the prior calendar year by August 31st, beginning in 2021 for 2020 data.

(g) *Verification Body and Individual Verifier Rotation Requirements.* An entity that is required to contract for validation or verification must not use the same verification body or individual verifier(s) to perform validation and verification services under this subarticle for a period of more than six consecutive years, beginning January 1st, 2020.

The six-year period begins on the execution date of the entity's first contract for any validation or verification under this subarticle and ends on the date the final verification statement is submitted. The six-year limit does not reset upon a change in the entity required to contract for validation or verification services ownership or operational control.

If the entity is required or elects to contract with another verification body or verifier(s), the entity may re-engage the previous verification body or verifier(s) after three years, except in the case of a set-aside of a validation or verification statement as specified in section 95501. An entity required to contract for validation or verification services must, in time for the next verification, replace a verification body that has a suspended or revoked Executive Order pursuant to MRR section 95132(d), and included by reference in section 95502(a).

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§ 95501. Requirements for Validation and Verification Services.

Validation and verification services ~~are valid only when~~ must be performed by verification bodies accredited by the Executive Officer; in addition, such services must

meet the following requirements (the general term “verification services” includes validation services for fuel pathway applications unless otherwise provided):

(a) *Notice of Verification Services.* The verification body must submit a notice of validation or verification services to the Executive Officer.

* * * * *

(3) General information on the entity required to contract for verifications, including:

* * * * *

(D) A brief description of expected verification services to be performed, including expected completion date, and whether quarterly review is planned in the context of an annual verification requirement.

(4) If any of the information under sections 95501(a)(1) or 95501(a)(2) changes after the notice is submitted to the Executive Officer, the verification body must notify the Executive Officer as soon as the change is made and submit an updated notice of verification services.

The verification body must also submit an updated conflict of interest self-evaluation form with an updated notice of verification services as soon as the change is made. The conflict of interest must be reevaluated pursuant to section 95503(f) and the Executive Officer must approve any changes in writing.

(b) Verification services must include, but are not limited to, the following:

(1) *Validation or Verification Plan.* The verification team must develop a validation or verification plan based on the following:

* * * * *

(B) Timing of verification services. Such information must include:

1. Dates of proposed meetings and interviews with the entity required to contract for verification services personnel;
2. Dates of proposed site visits;
3. Types of proposed document and data reviews and, if applicable, how quarterly review is planned in the context of an annual verification requirement;

4. Expected date for completing validation or verification services.

(2) Planning Meetings with the Entity Required to contract for Verification Services. The verification team must discuss with the entity contracting for verification services the scope of the verification services and request any information and documents needed for the verification services. The verification team must create a draft sampling plan and verification plan prior to the site visit. The verification team must also review the documents provided, and plan and conduct a review of original documents and supporting data for the verification services specified in section 95501.

(3) Site Visits. At least one lead LCFS verifier accredited by the Executive Officer on the verification team must, in addition to one visit to validate an application, annually visit each facility; and, if different from the fuel production facility, the central records location for which the records supporting an application or report subject to verification are submitted. Site visits, included voluntarily as part of a quarterly review, may not substitute for the required site visit for annual verification services, which must occur after all LCFS data for the prior calendar year has been submitted to the Executive Officer and attested to.

* * * * *

(4) Sampling Plan. As part of validating fuel pathway applications and verifying LCFS reports the verification team must develop a sampling plan that meets the following requirements:

* * * * *

(D) After completing the analysis required by sections 95501(b)(4)(A) through (C) above, the verification team must include in the sampling plan a list which includes the following:

1. Data sources that will be targeted for document reviews, data checks as specified in 95501(b)(5), and an explanation of why they were chosen;
2. Methods used to conduct data checks for each data type;
3. A summary of the information analyzed in the data checks and document reviews conducted for each data type.

The sampling plan list must be updated and finalized prior to the

completion of verification services. The final sampling plan must describe in detail how the identified risks were addressed during the verification. When quarterly reviews are conducted as part of annual verification services, the final sampling plan must describe in detail how the risks and issues identified for the annual data set were addressed during each quarterly review and final annual verification.

* * * * *

- (8) Log of Issues. The verification team must keep a log that documents any issues identified in the course of verification services that may affect determinations of material misstatement and nonconformance, whether identified by the verifier, the entity required to contract for verification services, or the Executive Officer, regarding the original or subsequent application or report versions. The issues log must identify the regulatory section related to the nonconformance or potential nonconformance, if applicable, and indicate if the issues were corrected by the entity required to contract for verification services prior to completing the verification services. Any other concerns that the verification team has with the preparation of the application or report must be documented in the issues log and communicated to the entity required to contract for verification services during the course of the verification services. The log of issues must indicate whether each issue has a potential bearing on material misstatement, nonconformance, or both and whether an adverse verification statement may result if not addressed. If quarterly review is conducted before an annual verification, any issues identified must be formalized pursuant to this subsection in the log of issues during the quarterly review. The log of issues for the annual verification must include the cumulative record of issues from all quarterly reviews, as well as the annual verification.
- (9) Material Misstatement Assessments for Fuel Pathways and Quarterly Fuel Transactions. Assessments of material misstatement are conducted separately on each calculated operational CI value and each quarterly fuel transaction quantity per FPC (expressed in units from the applicable sections of this subarticle). Material misstatement assessments are not conducted for quarterly review.
- (A) Operational CI. In assessing whether a fuel pathway application or fuel pathway report contains a material misstatement, as defined in section 95481(a), the verification team must populate a controlled version of the Simplified CI Calculator for Tier 1 pathways, or CARB-approved CA-GREET3.0 for Tier 2 pathways, and determine whether any reported operational CI value contains a material misstatement using the following equations for relative error

threshold and absolute error threshold. The following calculations of relative error threshold, absolute error threshold, and percent error must be included in the final verification report pursuant to section 95501(c)(3)(A)8.

Each fuel pathway CI is subject to data checks in section 95501(b)(5) and must be assessed separately for material misstatement. One or more material misstatements results in a finding of material misstatement for the fuel pathway application or for the fuel pathway report.

$$\text{Percent error (CI)} = \frac{\sum | \text{Difference in CI} |}{| \text{Reported Operational CI} |} \times 100\%$$

~~Relative error threshold (CI)~~
Relative error threshold (CI)

$$\equiv | \text{Difference in CI} | \geq 0.05 \times | \text{Reported Operational CI Value} |$$

Absolute error threshold (CI)

$$\equiv | \text{Difference in CI} | \geq 2 \text{ gCO}_2\text{e/MJ}$$

where:

“Difference in CI” means the absolute value result of the reported operational CI minus the verifier’s calculation of CI. The verifier’s calculation of CI is based on site-specific data inputs modified to include discrepancies, omissions, and misreporting found during the course of verification services;

“Discrepancies” means any differences between the reported site-specific CI inputs and the verifier’s calculated site-specific CI inputs subject to data checks in section 95501(b)(5);

“Omissions” means any site-specific CI inputs or associated source data the verifier concludes must be part of the fuel pathway application or fuel pathway report, but were not included;

“Misreporting” means duplicate, incomplete or other CI input data the verifier concludes should, or should not, be part of the fuel pathway application or fuel pathway report; and

“| Reported Operational CI Value |” means the absolute value of the operational CI submitted in the fuel pathway application or fuel

pathway report.

* * * * *

(11) Material Misstatement Assessment for Low-Complexity/Low-Energy-Use Refinery Reports.

(A) Verifications and assessments of material misstatement are conducted separately for volumes of CARBOB produced from crude oil and for volumes of diesel produced from crude oil for the calendar year. In assessing whether a Low-Complexity/Low-Energy-Use Refinery Report contains a material misstatement, as defined in section 95481(a), the verification team must determine whether the Low-Complexity/Low-Energy-Use refinery data specified in this subarticle contains a material misstatement using the following equation.

Any discrepancies, omissions, or misreporting found by the verification team must include the positive or negative impact on the total CARBOB or diesel volume produced from crude oil when entered in the material misstatement equation. The reported refinery data contain a material misstatement if the 5 percent error threshold is exceeded. The following calculation of percent error must be included in the final verification report pursuant to section 95501(c)(3)(A)8.

Percent error (low complexity low energy use refinery data)

$$= \frac{\sum [\text{Discrepancies, Omissions, Misreporting}]}{\text{CARBOB or Diesel Volume Produced from Crude Oil}} \times 100\%$$

where:

“Discrepancies” means any differences between the sum of the quarterly volumes of CARBOB or diesel produced from crude oil reported in the Low-Complexity/Low-Energy-Use Refinery Report and the verifier’s calculation based on data checks in section 95501(b)(5);

“Omissions” means any volume of CARBOB or diesel produced from crude oil or associated source data the verifier concludes must be part of the Low-Complexity/Low-Energy-Use Refinery Report, but was not included;

“Misreporting” means duplicate, incomplete or other refinery data the verifier concludes should, or should not, be part of the Low-Complexity/Low-Energy-Use Refinery Report;

“CARBOB or Diesel Volume Produced from Crude Oil” means the sum of the quarterly volumes of CARBOB or diesel produced from crude oil in a calendar year reported in the Low-Complexity/Low-Energy-Use Refinery Report for which the verifier is conducting a material misstatement assessment.

~~“CARBOB Produced from Crude Oil” and “Diesel Produced from Crude Oil”~~ “CARBOB Volume Produced from Crude Oil” and “Diesel Volume Produced from Crude Oil” are separately subject to data checks in section 95501(b)(5) and must be assessed separately for material misstatement. One or more material misstatements results in a finding of material misstatement for the Low-Complexity/Low-Energy-Use Refinery Report.

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(13) Review of Missing Data Substitution. If a source selected for a data check was affected by a loss of data used for the reported data in the application or report, pursuant to this subarticle:

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§ 95502. Accreditation Requirements for Verification Bodies, Lead Verifiers, and Verifiers.

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§ 95503. Conflict of Interest Requirements for Verification Bodies and Verifiers

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(b) Disclosure of Services with High Potential for Conflict of Interest. If any of the following occurred during the lookback period, the activity or activities must be disclosed to the Executive Officer with a description of actions the verification body has taken to avoid, neutralize, or mitigate any ongoing potential for conflict of interest.

The potential for a conflict of interest must be deemed high if any of the following occurred during the lookback period. If the Executive Officer determines the verification body or any member of the verification team meets the criteria specified in section 95503(b), the Executive Officer shall find a high potential conflict of interest with the following exceptions:

Prior to January 1, 2023~~2~~, the Executive Officer shall deem the following services to be medium potential for conflict of interest and allow verification services to proceed when the verification body or its related entities or a member of the verification team has provided the services listed in sections 95503(b)(2)(A), (B), (E), (G), (H), (I), or (N) within the five year lookback period, provided that the potential conflict of interest is mitigated by meeting the minimum mitigation plan requirements in section 95503(d)(1). On and after January 1, 2023~~2~~, if any of the situations or services listed in section 95503(b) occurred during the five year lookback period by a verification body and its related entities or a verification team member, verification services may not proceed and rotation is required.

(1) Organizational High Potential Conflict of Interest Conditions. The verification body and responsible entity share any management staff or board of directors membership, or any of the senior management staff of the responsible entity have been employed by the verification body, or vice versa; or

(2) Organizational and Individual High Potential Conflict of Interest Conditions. Any employee of the verification body, or any employee of a related entity, or a subcontractor who is a member of the verification team has provided to the responsible entity any of the following services:

* * * * *

(G) Any service related to development of information systems, ~~including providing accounting software~~ or consulting on the development of environmental management systems is considered high conflict of interest except for systems that will not be part of the validation or verification process and except for accounting software systems;

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(N) ~~Bookkeeping or other services related to accounting records or financial statements~~ Bookkeeping and other non-attest services related to accounting records or financial statements, excluding services and results of those services that will not be part of the validation or verification process;

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REGULATION ON COMMERCIALIZATION OF ALTERNATIVE DIESEL FUELS

Amend section 2293.6 in title 13, chapter 5, article 3, subarticle 2, California Code of Regulations, to read as follows:

Chapter 5. Standards for Motor Vehicle Fuels

Article 3. Specifications for Alternative Motor Vehicle Fuels

Subarticle 2. Commercialization of Alternative Diesel Fuels

§2293.6. In-use Requirements for Specific ADFs subject to Stage 3A.

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- (a) Biodiesel Provisions for Blends of B20 and Below

* * * * *

- (4) Sunset of Biodiesel In-use Requirements

~~NOx Control requirements under 2293.6(a)(2) for biodiesel blends up to B20 will no longer be in effect when the following occur for on-road vehicles:~~

- (A) For on-road applications, NOx control requirements under 2293.6(a)(2) for biodiesel blends up to B20 will no longer be in effect ~~when~~ when the vehicle miles travelled (VMT) by NTDE heavy-duty on-road vehicles diesel NTDEs in California reaches 90 percent of total VMT by the California heavy-duty on-road diesel vehicle fleet. The portion of VMT by on-road diesel vehicles in California represented by NTDEs shall will be determined using the most current CARB mobile source emission inventory and related tools based on EmFAC.
- (B) ~~When the hours of operation of off road NTDEs in California reaches 90 percent of total hours of operation by the California heavy duty off road diesel engine fleet. The portion of hours of operation of off road diesel engines in California represented by NTDEs will be determined using the most current CARB mobile source emission inventory and related tools.~~
When the conditions in 2293.6(a)(4)(A) occur, the Executive Officer will issue an Executive Order certifying that the provisions of section 2293.6(a)(2) are no longer in effect for biodiesel used in

on-road applications. The Executive Order will be posted on the ARB website.

~~(CB) The Executive Officer issues an Executive Order certifying that the conditions in section 2293.6(a)(4)(A) and (B) have been met and that as a consequence, the provisions of section 2293.6(a)(2) are no longer in effect. The Executive Order will be posted on the CARB website and CARB will initiate a rulemaking process to remove the requirement from the regulation.~~

(C) For off-road applications, NOx Control requirements under 2293.6(a)(2) for biodiesel blends up to B20 will no longer be in effect when the hours of operation by heavy-duty off-road diesel NTDEs in California reaches 90 percent of the total hours of operation by the California heavy-duty off-road diesel engine fleet. The portion of total hours of operation by off-road diesel engines in California represented by NTDEs will be determined using the most current CARB mobile source emission inventory and related tools.

(D) When the conditions in 2293.6(a)(4)(C) occur, the Executive Officer will issue an Executive Order certifying that the provisions of section 2293.6(a)(2) are no longer in effect for biodiesel used in off-road applications. The Executive Order will be posted on the CARB website.

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