

**CALIFORNIA AIR RESOURCES BOARD**

**THE CALIFORNIA LOW CARBON FUEL STANDARD  
REGULATION**

***DRAFT – FOR DISCUSSION ONLY***

December 2008



**California Air Resources Board**  
**California Environmental Protection Agency**

## **Purpose of this document**

The purpose of this document is to provide a draft regulation of the California Low Carbon Fuel Standard (LCFS), which contains the staff recommendations resulting from stakeholder comments and feedback on the March 2008 LCFS Concept Outline and from ideas and concepts discussed during open-forum working groups and workshops.

This draft regulation is intended to provide stakeholders an opportunity to review and provide input to the staff proposals to date. Stakeholders are encouraged to provide comments on all sections of this draft regulation.

This draft regulation and the previous March Concept Outline can be downloaded at <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm#wg> under LCFS working group 3, Policy and Regulatory. Additional supporting documents used to develop the concepts herein can be accessed at [http://www.arb.ca.gov/fuels/lcfs/lcfs\\_meetings.htm](http://www.arb.ca.gov/fuels/lcfs/lcfs_meetings.htm).

*All values shown in this report reflect staff's latest analyses and are for discussion purposes. Final values to be ultimately proposed by staff for the LCFS are still under development. The Executive Officer will conduct a periodic review of the LCFS program in all major areas including, but not limited to: the gasoline and diesel fuel compliance schedules, technology advancements, the supply and rate of commercialization of new fuels and vehicles, lifecycle analysis, land use change, sustainability, uncertainty, policy design, compliance and regulatory process, economic impact, environmental justice, and multimedia evaluation.*

## **Instructions on Submitting Feedback**

Please provide your feedback in a separate document containing your name, date, and company letterhead (or equivalent). For each comment, include the section number and name, table number, or figure number to which the comment addresses.

**Please submit the document as an *email attachment* with the subject line “Comments for Draft LCFS Regulation” to Manisha Singh ([mansingh@arb.ca.gov](mailto:mansingh@arb.ca.gov)).**

All comments received will be posted on the LCFS comments website.

*Note: The various italicized “Commentaries” shown in this document provide staff's explanations of the sources of provisions or note potential upcoming modifications under consideration by staff. The Commentaries are not part of the proposed regulatory text.*

*Nothing in this LCFS regulation amends, repeals, or otherwise changes the California Reformulated Gasoline (CaRFG) regulations (title 13, California Code of Regulations (CCR), §§ 2260 et seq.), the California Diesel Fuel regulations (title 13, CCR, §§ 2281-2285 and title 17, CCR, §93114), or any other applicable State or federal requirements. Any person subject to the LCFS regulation will be responsible for ensuring compliance with all applicable LCFS requirements and all other applicable State and federal requirements.*

Note: The draft regulation text made available for the October 16 workshop is set forth below in normal type. Revisions are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions.

# Draft California Low Carbon Fuel Standard

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## Section 95420. Definitions and Acronyms

[Commentary: The following are preliminary definitions for the terms used in this draft regulation. ARB staff is seeking comments on all the definitions.]

(a) For the purposes of sections 95421 through 95428, the following definitions apply.

- (1) “Alternative fuels” collectively refers to natural gas (CNG, LNG, biomethane), LPG, electricity, hydrogen, an ethanol-gasoline blend containing over 10 percent ethanol by volume, a biomass-based diesel blend, B100, and E100.
  - (A) “B100” means biodiesel meeting ASTM D6751-07be1 (*Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels*).
  - (B) “E100,” also known as “Denatured Fuel Ethanol,” means nominally anhydrous ethyl alcohol meeting ASTM D4806-08 (*Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel*).
- (2) “Biomass-based diesel” means a biodiesel (mono-alkyl ester) or a renewable biodiesel that complies with ASTM D975. This includes a renewable fuel derived from co-processing biomass with a petroleum feedstock.
  - (A) “Biodiesel” means a diesel fuel substitute produced from nonpetroleum renewable resources that meet the registration requirements for fuels and fuel additives established by the Environmental Protection Agency under section 211 of the Clean Air Act. It includes biodiesel meeting the following:
    1. Registered as a motor vehicle fuel or fuel additive under 40 CFR part 79.
    2. A mono-alkyl ester.
    3. Meets ASTM D-6751-07, entitled "Standard Specification for Biodiesel Fuel Blendstock (B100) for Middle Distillate Fuels."
    4. Intended for use in engines that are designed to run on conventional diesel fuel.
    5. Derived from nonpetroleum renewable resources (as defined in paragraph (m) of this section).
  - (B) “Renewable diesel” means a motor vehicle fuel or fuel additive which is all the following:
    1. Registered as a motor vehicle fuel or fuel additive under 40 CFR

Part 79.

2. Not a mono-alkyl ester.
  3. Intended for use in engines that are designed to run on conventional diesel fuel.
  4. Derived from nonpetroleum renewable resources.
- (3) “Biomethane” means pipeline-quality gas derived from biomass as defined by the California Energy Commission (CEC), which includes any organic material not derived from fossil fuels, including agricultural crops, agricultural and forestry wastes and residues, and construction wood wastes, among others.
- (4) “Blendstock” means the blending component(s) that produce a finished fuel used in a motor vehicle. Each blendstock corresponds to a fuel pathway in the ARB CA GREET. A blendstock that is used directly in a vehicle is considered a finished fuel.  
“Carbon intensity” means the amount of greenhouse gas emissions, measured on a lifecycle basis, per unit of energy of fuel delivered. In this regulation, the units used are grams of carbon dioxide equivalent per megajoule (gCO<sub>2</sub>e/MJ).
- (5) “Conventional crude oil” means a crude oil produced by a primary, secondary, or tertiary oil recovery process.
- (6) “Co-products” means a secondary product, typically with economic value, produced as a result of the process of producing transportation fuels.
- (7) “Credits/deficits” calculated pursuant to section 95425(a)(3), is the mass of CO<sub>2</sub>e, measured in metric tons, determined from the difference between the allowed emissions, set by either the gasoline or diesel standard, and the emissions generated by the use of a fuel. A credit is generated when the emissions is less than the allowed emissions. A deficit is generated when the emissions is greater than the allowed emissions. In the LCFS, the total credit, calculated from the sum of credits generated under the gasoline and diesel groups, is used for the determination of compliance.
- (8) “Dedicated fuel vehicle” means a vehicle that uses a single external source of fuel for its operation. The fuel can be a pure fuel such as gasoline or a blended fuel such as E85 or B20. A dedicated fuel vehicle has one fueling port onboard the vehicle. Examples include BEV, E85 FFV, diesel running on B5 or B20, and grid-independent hybrids such as a Prius.
- (9) “Finished fuel” means a fuel that is used directly in a vehicle for transportation purposes without requiring additional chemical or physical processing.
- (10) “HDV” means a heavy-duty vehicle that is rated at 14,001 or more pounds

gross vehicle weight rating (GVWR).

- (11) “Home Fueling” means the dispensing of fuel by use of a fueling appliance that is located on or within a residential property with access limited to a single household.
- (12) “LDV & MDV” means a vehicle category that includes both light-duty (LDV) and medium-duty vehicles (MDV).
- (13) “LDV” means a vehicle that is rated at 8500 pounds or less GVWR.
- (14) “MDV” means a vehicle that is rated between 8501 and 14,000 pounds GVWR.
- (15) “Lifecycle Greenhouse Gas Emissions” means the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes), as determined by the Administrator, related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential. (From Section 211(o)(1) of the Clean Air Act)
- (16) “Motor vehicle” has the same meaning as defined in section 415 of the Vehicle Code.
- (17) “Multi-fuel vehicle” means a vehicle that uses two or more distinct fuels for its operation. A multi-fuel vehicle (also called a vehicle operating in blended-mode) includes a bi-fuel vehicle and can have two or more fueling ports onboard the vehicle. A fueling port can be an electrical plug or a receptacle for liquid or gaseous fuel. As an example, a plug-in hybrid hydrogen ICEV uses both electricity and hydrogen as the fuel source and can be “refueled” using two separately distinct fueling ports.
- (18) “Multimedia evaluation” has the same meaning as specified in H&S §43830.8(b) and (c).
- (19) “Non-conventional crude oil” means a crude oil ~~produced from oil sands, oil shale, or processes such as gas-to-liquid (GTL), coal-to-liquid (CTL), and processes other than those used to produce conventional crude oils.~~ produced by a process other than primary, secondary, or tertiary oil recovery including those produced from: oil sands, heavy oil, and oil shale.
- (20) “Private access fueling dispenser” means a fueling dispenser with access restricted to privately distributed electronic cards (“cardlock”) or is located in a secure area not accessible to the public.
- (21) “Public access fueling dispenser” means a fueling dispenser that is

~~accessible to the public~~ not a private access fueling dispenser.

- (22) “Pure denatured ethanol,” also known as “denatured fuel ethanol,” (E100) means nominally anhydrous ethyl alcohol meeting ASTM D4806-08 (*Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel*).
- (23) “Racing vehicle” means a competition vehicle not used on city streets.
- (24) “Regulated party” ~~means a refiner, importer, producer, or provider of a transportation fuel in California subject to this regulation~~ means a person who is subject to the LCFS pursuant to section 95424(a).
- (25) *[Commentary: The following definition comes from section 201 of Energy Independence and Security Act of 2007. ARB staff is seeking comments on the appropriateness and necessity of including this definition and how it might be used in the LCFS.]*

“Renewable Biomass” means each of the following:

(A) Planted crops and crop residue harvested from agricultural land cleared or cultivated at any time prior to the enactment of this sentence that is either actively managed or fallow, and nonforested.

(B) Planted trees and tree residue from actively managed tree plantations on non-federal land cleared at any time prior to enactment of this sentence, including land belonging to an Indian tribe or an Indian individual, that is held in trust by the United States or subject to a restriction against alienation imposed by the United States.

(C) Animal waste material and animal byproducts.

(D) Slash and pre-commercial thinnings that are from non-federal forestlands, including forestlands belonging to an Indian tribe or an Indian individual, that are held in trust by the United States or subject to a restriction against alienation imposed by the United States, but not forests or forestlands that are ecological communities with a global or State ranking of critically imperiled, imperiled, or rare pursuant to a State Natural Heritage Program, old growth forest, or late successional forest.

(E) Biomass obtained from the immediate vicinity of buildings and other areas regularly occupied by people, or of public infrastructure, at risk from wildfire.

(F) Algae.

(G) Separated yard waste or food waste, including recycled cooking and trap grease.

- (26) “Transportation fuel” means any fuel used or intended for use as a motor



vehicle fuel, other than racing fuel. In addition, “transportation fuel” includes diesel fuel used or intended for use in nonvehicular sources other than the following:

- (A) Locomotives, other than diesel electric intrastate locomotives as defined in title 17, California Code of Regulations, section 93117;  
And
- (B) Marine vessels, other than harborcraft as defined in title 17, California Code of Regulations, section 93117.

(b) *Acronyms.* For the purposes of sections 95421 through 95428, the following acronyms apply.

- (1) “gCO<sub>2</sub>e/MJ” means grams of carbon dioxide equivalent per mega joule.
- (2) “FFV” means flex fuel vehicles.
- (3) “PHEV” means plug-in hybrid vehicles.
- (4) “FCV” means fuel cell vehicles.
- (5) “BEV” means battery electric vehicles.
- (6) “LDV” means light-duty vehicles.
- (7) “MDV” means medium-duty vehicles.
- (8) “HDV” means heavy-duty vehicles.
- (9) “EER” means energy economy ratio.
- (10) “AFCl” means average fuel carbon intensity.
- (11) “MT” means metric tons of carbon dioxide equivalent.

## Section 95421. Applicability of the Standard

(a) *Applicability of the Low Carbon Fuel Standard.* The California Low Carbon Fuel Standard (the “LCFS”) applies to all California transportation fuels, as defined in section 95420, for which a regulated party is responsible in a calendar year. The types of fuels include, ~~but are not limited to the following,~~ when used or intended for use for transportation purposes in California, include:

- (1) California reformulated gasoline (“gasoline” or “CARFG”),
- (2) California ultra low sulfur diesel fuel (“diesel fuel” or “ULSD”),
- (3) Compressed natural gas (“CNG”) or liquefied natural gas (“LNG”),
- (4) Liquefied petroleum gas (“LPG” or “propane”),
- (5) Electricity,
- (6) Compressed or liquefied hydrogen (“hydrogen”),
- (7) A fuel blend containing hydrogen (“hydrogen blend”)
- (8) A fuel blend containing greater than 10 percent ethanol by volume,
- (9) A fuel blend containing biomass-based diesel,
- (10) Pure denatured ethanol (E100),
- (11) Pure biomass-based diesel (B100), and
- (12) Any other liquid or non-liquid fuel except those in section 95421(b).

(b) *Exemption for Alternative Fuels Distributed in Low Volumes for Transportation Uses.*

- (1) The LCFS regulation does not apply to an exempted regulated party providing in a calendar year a transportation alternative fuel – other than a biofuel – that is supplied in California by all parties for transportation use at an aggregated volume of less than 420 million MJ (3.6 million gasoline gallon equivalent) per year.
- (2) A regulated party wishing to receive an exemption for a calendar year for an alternative fuel must submit to the Executive Officer (i) an LCFS Exemption Application, and (ii) all relevant data and calculations used to demonstrate qualification of exemption. Within 15 business days of receipt of the application, the Executive Officer shall notify the party of any additional information that is needed for the application to be deemed complete. Within 15 business days of receipt of a complete application, the Executive Officer shall grant the application if the applicant has demonstrated that he or she satisfies the criteria in section 95421(b)(1). Upon acting on an application, the Executive Officer shall notify the applicant in writing and the decision shall be posted on ARB’s webpage. An exemption may be renewed for subsequent calendar years.
- (3) If a regulated party submits an Exemption Application in the first quarter of the calendar year, the exemption shall apply for that year to all parties who would otherwise be regulated parties with respect to the alternative fuel covered by the exemption. During the exemption period, an

exempted party may elect to voluntarily opt-in to the LCFS for that alternative fuel by notifying the Executive Officer in writing. Upon opting into the LCFS, the exempted party shall be subject to all of the requirements for a regulated party with respect to the alternative fuel and be considered a regulated party subject to all compliance requirements.

- (4) Late submissions. If a regulated party submits an Exemption Application other than within the first quarter of the year, the exemption will begin no sooner than the date upon which the exemption is approved and remain effective until the end of the calendar year.

**Section 95422. Standards**

- (a) Starting January 1, 2010, the transportation gasoline and diesel fuel for which a regulated party is responsible in each calendar year must meet the average carbon intensity standards set forth in this section, except as provided in section 95424(b)(4).
- (b) *Standards for gasoline and fuels used as a substitute for gasoline.* For gasoline and fuels used as gasoline substitutes, as provided in section 95423, the carbon intensity standard is set in 2010 using a baseline fuel of CARFG with an ethanol blend of 10 percent by volume ethanol (E10). The baseline carbon intensity standard is 96.7 gCO<sub>2</sub>e/MJ in 2010. Table 1 shows the carbon intensity standard that must be met in each calendar year following 2010.

*Table 1. LCFS Compliance Schedule for 2010 to 2020 for Gasoline and Fuels Used as a Substitute for Gasoline.*

Year	Carbon Intensity (gCO <sub>2</sub> e/MJ)	% Reduction
2010	96.7	0.0
2011	96.5	-0.3
2012	96.2	-0.5
2013	96.0	-0.8
2014	95.5	-1.3
2015	94.5	-2.3
2016	93.1	-3.8
2017	91.4	-5.5
2018	<u>89.6</u>	-7.3
2019	<u>87.9</u>	-9.1
2020 <u>and</u> <u>subsequent years</u>	86.5	-10.5

*[Commentary: The 2010 baseline is CARFG with 10% ethanol (E10) derived from corn, where 80% of the ethanol is produced via dry milling and 20% is produced via wet milling. To compensate for the corn-ethanol-induced increase in gasoline’s carbon intensity, the LCFS requires a 10.5 percent decrease in the carbon intensity of the gasoline fuel group in 2020. This reduction is needed to achieve a net 10 percent reduction in the carbon intensity of gasoline from 2010. This schedule is still under review and may be adjusted]*

- (C) *Standards for diesel fuel and fuels used to as a substitute for diesel fuel.* For diesel and fuels used as diesel fuel substitutes, as provided in section 95423, the standard is set in 2010 using a baseline fuel of ULSD containing no biomass-based diesel. The baseline carbon intensity standard is 95.8 gCO<sub>2</sub>e/MJ in 2010. Table 2 shows the carbon intensity standard that must be met in each calendar year following 2010.

*Table 2. LCFS Compliance Schedule for 2010 to 2020 for Diesel Fuel or Fuels Used as a Substitute for Diesel Fuel.*

<b>Year</b>	<b>Carbon Intensity (gCO<sub>2</sub>e/MJ)</b>	<b>% Reduction</b>
2010	95.8	0.0
2011	95.6	-0.3
2012	95.3	-0.5
2013	95.1	-0.8
2014	94.6	-1.3
2015	93.6	-2.3
2016	92.0	-4.0
2017	90.5	-5.5
2018	<u>88.9</u>	-7.2
2019	<u>87.6</u>	-8.6
2020 <u>and subsequent years</u>	86.2	-10.0

*[Commentary: This schedule is still under review and may be adjusted]*

*[Commentary: The standards for gasoline and diesel fuel beyond 2020 will require additional reductions to reflect the need to achieve the AB32 GHG emissions reduction goals in 2050.]*

**Section 95423. Applicable Standards for Alternative Fuels**

- (a) For purposes of determining compliance under section 95424 and credits and deficits under section 95425, the requirements of this section apply to a regulated party that provides an alternative fuel as a transportation fuel.
- (b) *Carbon Intensity Requirements for an Alternative Fuel Other Than a Biomass-Based Diesel Fuel.*
  - (1) A regulated party must use the gasoline-standard carbon intensity value in section 95422(b) for its alternative fuel, other than biomass-based diesel fuel, that is used or is intended to be used in any single-fuel:
    - (A). light-duty vehicle, or
    - (B). medium-duty vehicle.
  - (2) A regulated party must use the diesel fuel-standard carbon intensity value in section 95422(c) for its alternative fuel, excluding biomass-based diesel, that is used or is intended to be used in any single-fuel application not identified in section 95423(b)(1).
- (c) *Carbon Intensity Requirements for Biomass-Based Diesel Fuel.* A regulated party must use the diesel fuel-standard carbon intensity value in section 95422(c) if its biomass-based diesel fuel is used or is intended to be used in any single-fuel:
  - (1) light-duty vehicle,
  - (2) medium-duty vehicle,
  - (3) heavy-duty vehicle,
  - (4) off-road transportation application,
  - (5) off-road equipment application,
  - (6) locomotive application, or
  - (7) non-stationary source application not otherwise specified in 1-6 above.
- (d) *Carbon Intensity Requirements for Transportation Fuels Provided for Use in Multi-Fuel Vehicles (Including Bi-fuel Vehicles).*
  - (1) For an alternative fuel provided for use in a multi-fueled vehicle (including a bi-fuel vehicle), a regulated party must use:
    - (A) the gasoline-standard carbon intensity value in section 95422(b) if one of the fuels used in the multi-fuel vehicle is gasoline.
    - (B) the diesel-standard carbon intensity value in section 95422(c) if one of the fuels used in the multi-fuel vehicle is diesel fuel.
  - (2) For an alternative fuel provided for use in a multi-fueled vehicle (including a bi-fuel vehicle) that does not use gasoline or diesel fuel, a regulated party

must use:

- (A) the gasoline-standard carbon intensity value in section 95422(b) if that alternative fuel is used or is intended to be used in:
  - a. light-duty vehicle, or
  - b. medium-duty vehicle.
  
- (B) the diesel-standard carbon intensity value in section 95422(c) if that alternative fuel is used or is intended to be used in an application not identified in section 95423(d)(2)(A).

(e)

*Table 3. Summary of Applicable Standards for Alternative Fuels.*

For Fuel Used In	Representative Examples	Applicable Standard
Dedicated or multi-fuel vehicles used in LDV & MDV applications (except LDV & MDV diesel vehicles)  OR  Dedicated or multi-fuel vehicles operating on gasoline or ethanol blends	Grid-independent hybrids (i.e. Prius); BEV; PHEV; CNG (i.e. Honda CNG); Hydrogen FCV or ICEV; Hydrogen plug-In FCV or ICEV;	Gasoline
Dedicated or multi-fuel vehicles used in HDV applications  OR  Dedicated or multi-fuel vehicles operating on diesel fuel, ethanol used for HDV applications, or biomass-based-diesel fuel blends  OR  Off-road transportation, off-road equipment, locomotive	CNG Buses, LNG trucks, Hydrogen ZBus or ICE Buses          Diesel plug-in hybrid (LDV & MDV, HDV), Conventional diesel vehicle (LDV & MDV, HDV), Vehicles using B5, B20 Vehicles using E100 (HDV)  Forklifts	Diesel fuel

(LDV & MDV = light- and medium-duty vehicle, HDV = heavy-duty vehicle, BEV = battery electric vehicle, PHEV=plug-in hybrid electric vehicle, FFV = flex fuel vehicle, FCV = fuel cell vehicle, ICEV = internal combustion engine vehicle)

## Section 95424. Compliance

### (a) *Regulated Parties.*

#### (1) *Regulated Party for Gasoline.*

##### (A) Initial Designation.

##### 1. Where Oxygenate Is Added to Downstream CARBOB.

For gasoline consisting of CARBOB and an oxygenate added downstream from the California facility at which the CARBOB was produced or imported, the regulated party is the following:

- a. With respect to the CARBOB, the regulated party is the person who produced the CARBOB in California or imported it into California; and
- b. With respect to the oxygenate, the regulated party is the person who owns the oxygenate immediately prior to its being blended into CARBOB to produce finished California gasoline.

##### 2. Where No Separate CARBOB.

For gasoline that does not include CARBOB that had previously been supplied from the facility at which the CARBOB was produced or imported, the regulated party with respect to the gasoline is the person who produced the gasoline in California or imported it into California.

##### (B) *Transfer of CARBOB or Gasoline and Compliance Obligation.*

Except as provided for in section 95424(a)(1)(C), on each occasion that a person transfers ownership of CARBOB or gasoline before it has been transferred from its “final distribution facility” (as defined in 13 CCR §2260(a)(11)), the recipient of ownership of the CARBOB or gasoline (i.e., the transferee) becomes the regulated party for that CARBOB or gasoline. The transferor shall provide the recipient a product transfer document that prominently states:

- (1) the volume and average carbon intensity of the transferred CARBOB or gasoline; and
- (2) the recipient is now the regulated party for the acquired CARBOB or gasoline and accordingly is responsible for meeting the requirements of the LCFS regulation with respect to the CARBOB or gasoline.



(C) Transfer of *CARBOB* or Gasoline and Retaining Compliance Obligation.

Section 95424(a)(1)(B) notwithstanding, the transferor may choose to remain the regulated party and retain the LCFS compliance obligation for the transferred CARBOB or gasoline by written contract with the recipient. The transferor shall provide the recipient with a product transfer document that identifies the volume and average carbon intensity of the transferred CARBOB or gasoline.

(D) No Post-Transfer Modifications To Transferred *CARBOB* or Gasoline By A Non-Regulated Party.

No person to whom the gasoline has been transferred may blend into, add anything to, or otherwise modify the gasoline unless that person:

1. has become the regulated party for that gasoline pursuant to section 95424(a)(1)(B). In this case, the regulated party (transferee or recipient) shall be responsible for complying with the LCFS regulation (including responsibility for credits and deficits) for the portion of the finished fuel that the regulated party blended, added, or otherwise modified; or
2. is under a contractual obligation with the regulated party to make the modification as specified in the contract. In this case, the regulated party (transferor) remains responsible for complying with the LCFS regulation for the entire finished fuel, including any portion that is blended, added, or otherwise modified by the recipient.

The provisions in this part in no way add to, delete from, or otherwise modify the prohibitions and limits on CARBOB blending set forth in 13 CCR §2266.5(f).

(2) Regulated Party for Diesel Fuel and Diesel Fuel Blends.

(A) Initial Designation.

1. Where Biomass-Based Diesel Is Added to Downstream Diesel Fuel.

For a diesel fuel blend consisting of diesel fuel and biomass-based diesel added downstream from the California facility at which the diesel fuel was produced or imported, the regulated party is the following:

- a. With respect to the diesel fuel, the regulated party is the person who produced the diesel fuel in California or

imported it into California; and

- b. With respect to the biomass-based diesel, the regulated party is the person who owns the biomass-based diesel immediately prior to its being blended into diesel fuel to produce finished California diesel fuel.

2. All Other Diesel Fuels.

For any other diesel fuel that does not fall within section 95424(a)(2)(A)1, the regulated party is the person who produced the diesel fuel in California or imported it into California.

(B) *Transfer of Diesel Fuel and Diesel Fuel Blends and Compliance Obligation.*

Except as provided for in section 95424(a)(2)(C), on each occasion that a person transfers ownership of diesel fuel before it has been transferred from its “final distribution facility” (as that term is used in 13 CCR §2284(a)(5)), the recipient of ownership of the diesel fuel or diesel fuel blend (i.e., the transferee) becomes the regulated party for that diesel fuel or diesel fuel blend. The transferor shall provide the recipient a product transfer document that prominently states:

1. the volume and average carbon intensity of the transferred diesel fuel or diesel fuel blend; and
2. the recipient is now the regulated party for the acquired diesel fuel or diesel fuel blend and accordingly is responsible for meeting the requirements of the LCFS regulation with respect to the diesel fuel or diesel fuel blend.

(C) *Transfer of Diesel Fuel or Diesel Fuel Blend and Retaining Compliance Obligation.*

Section 95424(a)(2)(B) notwithstanding, the transferor may choose to remain the regulated party and retain the LCFS compliance obligation for the transferred diesel fuel or diesel fuel blend by written contract with the recipient. The transferor shall provide the recipient with a product transfer document that identifies the volume and average carbon intensity of the transferred diesel fuel or diesel fuel blend.

(D) *No Post-Transfer Modifications To Transferred Diesel Fuel or Diesel Fuel Blend By A Non-Regulated Party.*

No person to whom diesel fuel or diesel fuel blend has been transferred may blend into, add anything to, or otherwise modify the diesel fuel or diesel fuel blend unless that person:

1. has become the regulated party for that diesel fuel or diesel fuel blend pursuant to section 95424(a)(2)(B). In this case, the regulated party (transferee or recipient) shall be responsible for complying with the LCFS regulation (including responsibility for credits and deficits) for the portion of the finished fuel that the regulated party blended, added, or otherwise modified; or
2. is under a contractual obligation with the regulated party to make the modification as specified in the contract. In this case, the regulated party (transferor) remains responsible for complying with the LCFS regulation for the entire finished fuel, including any portion that is blended, added, or otherwise modified by the recipient.

The provisions in this part in no way add to, delete from, or otherwise modify the prohibitions and limits on diesel fuel blending set forth in 13 CCR §2281 et seq..

(3) *Regulated Party For Liquid Alternative Fuels Not Blended With Gasoline Or Diesel Fuel.*

For a liquid alternative fuel that is used as a transportation fuel and is not blended with gasoline or diesel fuel, or any other petroleum-derived fuel, including but not limited to E100 and B100, the regulated party is the person who produced the liquid alternative fuel in California or imported it into California.

(4) *Regulated Party For Blends Of Liquid Alternative Fuels And Gasoline Or Diesel Fuel.*

For a transportation fuel that is a blend of liquid alternative fuel and gasoline or diesel fuel – but that does not itself constitute gasoline or diesel fuel – the regulated party is the following:

- (A) With respect to the alternative fuel component, the regulated party is the person who produced the liquid alternative fuel in California or imported it into California; and
- (B) With respect to the gasoline or diesel fuel component, the regulated party is the person who produced the gasoline or diesel fuel in California or imported it into California.

(C) Transfer Of A Blend Of Liquid Alternative Fuel And Gasoline Or Diesel Fuel And Compliance Obligation.

Except as provided for in section 95424(a)(4)(D), on each occasion that a person transfers ownership of fuel that falls within section 95424(a)(4) (“alternative liquid fuel blend”) before it has been transferred from its final distribution facility, the recipient of ownership of such an alternative liquid fuel blend (i.e., the transferee) becomes the regulated party for that alternative liquid fuel blend. The transferor shall provide the recipient a product transfer document that prominently states:

1. the volume and average carbon intensity of the transferred alternative liquid fuel blend; and
2. the recipient is now the regulated party for the acquired alternative liquid fuel blend and accordingly is responsible for meeting the requirements of the LCFS regulation with respect to the alternative liquid fuel blend.

(D) Transfer Of A Blend Of Liquid Alternative Fuel And Gasoline Or Diesel Fuel And Retaining Compliance Obligation.

Section 95424(a)(4)(C) notwithstanding, the transferor may choose to remain the regulated party and retain the LCFS compliance obligation for the transferred alternative liquid fuel blend by written contract with the recipient. The transferor shall provide the recipient with a product transfer document that identifies the volume and average carbon intensity of the transferred alternative liquid fuel blend.

(E) No Post-Transfer Modifications To Transferred Blend Of Liquid Alternative Fuel And Gasoline Or Diesel Fuel By A Non-Regulated Party.

No person to whom alternative liquid fuel blend has been transferred may blend into, add anything to, or otherwise modify the alternative liquid fuel blend unless that person:

1. has become the regulated party for that alternative liquid fuel blend pursuant to section 95424(a)(4)(C). In this case, the regulated party (transferee or recipient) shall be responsible for complying with the LCFS regulation (including responsibility for credits and deficits) for the portion of the finished fuel that the regulated party blended, added, or otherwise modified; or
2. is under a contractual obligation with the regulated party to make the modification as specified in the contract. In this case, the regulated party (transferor) remains responsible for complying with the LCFS regulation for the entire finished fuel, including any portion that is blended, added, or otherwise modified by the recipient.

The provisions in this part in no way add to, delete from, or otherwise modify any other prohibitions or limits on blending of liquid alternative fuels set forth elsewhere in State law or regulations.

(5) *Natural Gas (Including CNG, LNG, And Biomethane) and LPG.*

For natural gas and propane used as a transportation fuel, the regulated party is the person that holds title to the fuel immediately prior to delivery of the fuel to the facility at which the fuel is dispensed to motor vehicles.

(6) *Electricity.*

For electricity used as a transportation fuel, the regulated party is the person that supplies electricity to the facility at which it is used to charge vehicles.

(7) *Hydrogen Or A Hydrogen Blend.*

For hydrogen or a blended fuel containing hydrogen used as a transportation fuel, the regulated party is as follows: ~~the hydrogen producer unless the producer and station owner have a written agreement to transfer the responsibility of the regulated party to the station owner.~~

- (A) ~~For hydrogen or a hydrogen blend produced onsite, the regulated party is the hydrogen refueling station owner;~~
- (B) ~~For hydrogen or a hydrogen blend delivered to refueling stations, the regulated party is the hydrogen producer.~~

(b) *Determining Compliance.*

- (1) *Compliance Period.* Beginning in 2010 and every year thereafter, the compliance period is January 1 through December 31 of each compliance year.
- (2) *Determination of Compliance.* Compliance with the LCFS is determined annually based on the information reported in 95424(c)(1)(B).

[This section is under development]

(A) ~~Compliance credits~~ 
$$\text{CreditBalance} = \text{Credits}^{\text{Gen}} + \text{Credits}^{\text{Balance CarriedOver}} + \text{Credits}^{\text{Retired Acquired}} - \text{Credits}^{\text{Exported}}$$

where:

$\text{Credits}^{\text{Gen}}$  is the total credits or deficits generated pursuant to section 95425(a) for the current compliance period; gasoline plus diesel fuel credits as calculated in 95425(a)(3);

$\text{Credits}^{\text{CarriedOver}}$  is the regulated party's credits or deficits carried over from the previous compliance period;

$\text{Credits}^{\text{Acquired}}$  is the regulated parties' credits purchased or otherwise acquired in the current and previous compliance period;

and  $\text{Credits}^{\text{Exported}}$  is the credits exported to programs outside the LCFS.

- (B) If ~~compliance credits~~ CreditBalance is greater than or equal to zero, the regulated party is in compliance with the LCFS.
- (C) If ~~compliance credits~~ CreditBalance is less than zero, the regulated party is not compliant with the LCFS for the compliance period.
- (D) If ~~compliance credits~~ CreditBalance is less than zero, and the deficit is greater than or equal to 10 percent of *[add revised language]*
- (E) If ~~compliance credits~~ CreditBalance is less than zero for two or more consecutive years, then the regulated party is in violation of the LCFS.

- (3) [reserved for future use]
- (4) *Deficit Reconciliation.* This provision applies for any compliance period in which the regulated party is in violation of the LCFS. When a violation has occurred for a compliance period (as determined by April 1st of the following year), the regulated party must meet the following requirements:
  - (A) If the regulated party is out of compliance, but not significantly out of compliance with the LCFS requirements, the regulated party has until December 31st of that year to fully reconcile the deficit without penalty; or
  - (B) If the regulated party is not compliant with the LCFS requirements, they have until December 31st of that year to fully reconcile the deficit. In addition, the regulated party is subject to penalties to the extent permitted under State law and must implement any additional measures imposed by the Executive Officer.
  - (C) A regulated party must clear any deficit in a given compliance period by the end of the next compliance period ("deficit-clearance period"). During the deficit-clearance period, the regulated party must meet its obligations for that period with sufficient excess credits to clear the carryover deficit.

The provisions of section 95424(b)(4)(A) and (B) notwithstanding, a regulated party that is reconciling in the current calendar year the deficit from the prior year remains responsible for meeting the LCFS requirements during the current calendar year using any of the methods specified in section 95424(b)(2).

*[Commentary: This section is still under development and ARB is seeking comments on deficit reconciliation.]*

(c) *Compliance and Progress Reporting Requirements.*

- (1) *Reporting Frequency.* A regulated party must submit to the Executive Officer a progress report and an annual compliance report, as defined in sections 95424(c)(3) and 95424(c)(4). The reporting frequencies for these reports are set forth below:
  - (A) *Quarterly Progress Reports For All Regulated Parties and Credit Generators.* Beginning 2010 and each year thereafter, a regulated party (including one that only generates credits) must submit quarterly progress reports to the Executive Officer by:
    1. May 31st – for the first calendar quarter covering January through March;

2. August 31st – for the second calendar quarter covering April through June;
  3. November 30th – for the third calendar quarter covering July through September; and
  4. February 28th (29th in a leap year) – for the fourth calendar quarter covering October through December.
- (B) *Annual Compliance Reports.* By April 30th of 2011 and each year thereafter, a regulated party must provide an annual compliance report for the prior calendar year. The report must ~~also contain all calculations specified in section 95425(a); show all credits generated, acquired and used and all deficits generated pursuant to section 94524(b)(1) and (b)(2); and contain all of the following:~~ the requirements specified in section 95424(c)(4).
- (2) *How To Report.* A regulated party may submit an annual compliance and quarterly progress report by using:
- (A) an interactive, secured internet web-based form; or
  - ~~(B) a written report by email; or~~
  - (C) ~~a written report by regular mail.~~ a standardized ARB reporting form available on the ARB website that can be submitted by email or regular mail.

The regulated party is solely responsible for ensuring that the Executive Officer receives its progress and compliance reports by the dates specified in section 95424(c)(1). The Executive Officer shall not be responsible for delays in shipping or the failure of electronically submitted reports to be transmitted to the Executive Officer. A submitted hardcopy report must be signed by at least one person authorized by the regulated party to attest to the accuracy and validity of the report and its contents. The report must contain a statement attesting to the report's accuracy and validity. The Executive Officer shall not deem an electronically submitted report to be valid unless the report is accompanied by a digital signature that meets the requirements of Title 2, California Code of Regulations, Section 22000 et seq.

~~The regulated party must keep and maintain all records used to support the progress reports, compliance reports, and any other information submitted to the Executive Officer for a minimum of 3 years and must provide such records within 48 hours of a request by the Executive Officer or as otherwise mutually agreed to by the Executive Officer and the regulated party.~~

*[Commentary: Software Compliance Tool. The Executive Officer is planning on developing and providing stakeholders with a software compliance tool that computes the carbon intensity of a finished fuel based on default values*



*or custom data, where allowed. The software compliance tool will incorporate key characteristics of the ARB CA GREET model including default fuel pathways with provisions to allow for the generation of custom fuel pathways (upon approval), and applicable calculation methods for land use change and co-products. Additional technical features currently under consideration include an interactive graphical user-interface, a secure online data submission form for compliance or credit reporting, and a downloadable static PDF form for email submission of the report, password-protected log-in, and a searchable or indexed user guide.]*

- (3) *Reporting Requirements for Quarterly Progress Reports.* A regulated party must submit a quarterly progress report that meet, at minimum, the requirements outlined below.

~~The regulated party must determine the blendstock Average Fuel Carbon Intensity pursuant to section 95425(a)(2).~~

~~The regulated party must report all Renewable Identification Numbers (RINs) retired for its facilities in California.~~

- (A) 1. Quarterly Reporting Requirements for Gasoline and Diesel Fuel. For each transfer of gasoline or diesel fuel that results in a transfer of the compliance obligation or retention of the compliance obligation by written contract, the regulated party must provide to the Executive Officer the product transfer document and report the applicable information identified in section 94524(a)(1)(B), (a)(1)(C), (a)(2)(B), (a)(2)(C), (a)(4)(C), or (a)(4)(D), whichever applies.
2. The carbon intensity value of each blendstock pursuant to section 95426.
3. The volume of each blendstock (in gal) per compliance period.
- (B) Quarterly Reporting Requirements for CNG, LNG, and LPG. For each private access, public access, or home fueling facility to which the regulated party supplies CNG, LNG or LPG as a transportation fuel:
1. a. For CNG, the regulated party must report the amount of fuel dispensed (in scf) per compliance period for all light/medium-duty vehicles (“LDV & MDV”) and heavy-duty vehicles (“HDV”);
- b. For LNG or LPG, the regulated party must report the amount of fuel dispensed (in gal) per compliance period for all LDV & MDV and HDV;
2. Except as provided for in section 95424(c)(3)(B)3, the regulated party must report the amount of fuel dispensed based on the use of separate fuel dispenser meters at each fuel dispenser;
3. In lieu of using separate meters at each fuel dispenser, the regulated party may report the amount of fuel dispensed at each facility using any other method that the regulated party demonstrates to the Executive Officer’s satisfaction as being equivalent to or better than the use of separate fuel meters at each fuel dispenser in each fueling facility;

4. The carbon intensity value of the CNG, LNG, or LPG pursuant to section 95426.
- (C) Quarterly Reporting Requirements for Electricity. For electricity used as a transportation fuel, a regulated party must also submit the following:
1. For residential charging stations, the total electricity dispensed (in kWh) to all vehicles at each residence based on direct metering, which distinguishes electricity delivered for transportation use;
  2. For each public access charging facility, the amount of electricity dispensed (in kWhr);
  3. For each fleet charging facility, the amount of fuel dispensed (in kWhr).
  4. The carbon intensity value of the electricity pursuant to section 95426.
- (D) Quarterly Reporting Requirements for Hydrogen or a Hydrogen Blend. For hydrogen or a hydrogen blend used as a transportation fuel, a regulated party must also submit the following:
1. For each private access fueling facility, the amount of fuel dispensed (in kg) by vehicle weight category: LDV & MDV and HDV.
  2. For each public access filling station, the amount of fuel dispensed (in kg) by vehicle weight category: LDV & MDV and HDV.
  3. The carbon intensity value of the hydrogen or the blendstocks used to produce the hydrogen blend pursuant to section 95426.

(4) *Reporting Requirements for Annual Compliance Reports*. A regulated party must submit an annual compliance report that meet, at minimum, the requirements outlined in section 95424(c)(3) above and additional requirements below:

(A) A regulated party must report the following:

1. The total credits or deficits generated by the regulated party in the current year, as calculated by Eqn. 2 in 95425(a)(2);
2. Any credits carried over from the previous year;
3. Any deficits carried over from the previous year;
4. The total credits acquired from another party (identify which party);
5. The total credits sold or otherwise transferred to each party and identify each party to whom those credits were transferred;
6. Any credits generated and banked in the current year, along with the balance of credits banked up to and including the current year;
7. Any deficits to be carried into the next year; and
8. ~~Any additional information specified by the Executive Officer to be included in the report.~~

- (5) Significant Figures. For purposes of complying with the LCFS requirements in sections 95420 through 95429, the regulated party must report the following quantities as specified below:
- (A) carbon intensity, expressed to the same number of significant figures as shown in the ARB Carbon Intensity Lookup Table (Method 1);
  - (B) credits, expressed to the nearest whole metric ton CO2 equivalent;
  - (C) fuel volume, expressed as follows:
    - 1. a fuel volume greater than 1 million gasoline gallon equivalent (gge) must be expressed to the nearest 10,000 gge;
    - 2. a fuel volume between 100,000 gge and 1 million gge, inclusive, must be expressed to the nearest 1,000 gge;
    - 3. a fuel volume between 10,000 gge and 99,999 gge, inclusive, must be expressed to the nearest 100 gge; and
    - 4. a fuel volume less than 9,999 gge must be expressed to the nearest 10 gge.
  - (D) any other quantity not specified in section 95424(c)(5)(A) to 95424(c)(5)(C) must be expressed to the nearest whole unit applicable for that quantity.
  - (E) Rounding intermediate calculated value.

For the purpose of this section, an intermediate calculated value is a value used in the calculation of a reported value but does not by itself meet the reporting requirement under section 95424(c).

A regulated party must use one of the following procedures for rounding intermediate calculated values for: fuel quantity dispensed, blended, or sold; calculated carbon intensity values; calculated LCFS credits, deficits, and incremental obligations; and any other calculated or measured quantity required to be used, recorded, maintained, provided, or reported for the purpose determining a reported value under the Low Carbon Fuel Standard regulation (13 CCR section 95420 et seq.):

- 1. ASTM E 29-08, “Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications;” or
- 2. Any other practice which the regulated party has demonstrated to the Executive Officer’s written satisfaction that provides equivalent or better results compared with the method specified in subsection 1.

Table 4. Summary Checklist of Quarterly and Annual Reporting Requirements for LCFS Transportation Fuels. (R = Required, O = Optional)

Parameters to Report	Gasoline & Diesel fuel	CNG, LNG, LPG	Electricity	Hydrogen Or Hydrogen Blends	Blended and Pure Fuels (i.e. E85, B20, B100, E100)
Company or organization name	R	R	R	R	R
Reporting period	R	R	R	R	R
Type of fuel	R	R	R	R	R
Blended fuel (yes/no)	R	R	R	R	R
If yes, number of blendstocks	R	R	n/a	R	R
Type(s) of blendstock	R	R	n/a	R	R
RIN numbers	R	n/a	n/a	n/a	R
<del>Batch Number</del>	<del>R</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>	<del>R</del>
Blendstock type	R	R	n/a	R	R
Blendstock feedstock	O	O	n/a	O	O
Feedstock origin	O	O	n/a	O	O
Production process	O	O	O	O	O
** The CI from GREET or Lookup Table (UAFCl <sub>i</sub> )	R	R	R	R	R
Amount of each blendstock (MJ)	R	R	n/a	R	R
* The CI of the fuel (AFCl <sub>compliance</sub> )	R	R	R	R	R
Amount of each fuel used as gasoline replacement (MJ)	R	R	R	R	R
Amount of each fuel used as diesel fuel replacement (MJ)	R	R	R	R	R
* Credits/deficits generated per quarter (MT)	R	R	R	R	R
<u>For Annual Reporting (in addition to the items above)</u>					
* <u>Credits/deficits generated per year (MT)</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>
* <u>Carried-over credits used from the previous year (MT), if any</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>
* <u>Deficits carried from the previous year (MT), if any</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>
* <u>Credits acquired from another party (MT), if any</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>
* <u>Credits sold to another party (MT), if any</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>
* <u>Credits exported to another program (MT), if any</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>	<u>R</u>

\* Value will be calculated or stored in the Compliance Tool.

\*\* Value will be calculated by GREET or provided by lookup table.

(d) *Recordkeeping and Auditing.*

(1) A regulated party must keep all of the following records for at least 3 years and must provide such records within 48 hours of a request by the Executive Officer or as otherwise mutually agreed to by the Executive Officer and the regulated party:

- (A) product transfer documents,
- (B) copies of all data and reports submitted to the Executive Officer,
- (C) records related to each fuel transaction, and
- (D) records used for compliance or credit calculations.

(2) *Evidence Of Physical Pathway.*

For each transportation fuel (including any fuel or blendstock used for blending with other transportation fuels) sold, offered for sale, or supplied in California, the regulated party must demonstrate to the Executive Officer's satisfaction, through appropriate documentation such as a purchase contract, the physical pathway by which the regulated party expects the fuel would reach California.

(A) For purposes of this provision, "physical pathway" means any applicable combination of truck delivery routes, rail tanker lines, gas/liquid pipelines, electricity transmission lines, and any other fuel distribution routes that, taken together, accurately and completely account for the fuel's movement from the entity that originally generated or produced the fuel, to any intermediate entities, and ending at the final fuel blender, producer, or importer in California.

(B) If there is more than one physical pathway by which the fuel reaches or can reach California, the regulated party must identify and demonstrate the physical pathways that, in combination, account for at least 95 percent of the fuel that reaches California.

(3) *Data Verification.* 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.

(4) *Access To Facility And Data.* Pursuant to Health and Safety Code section 41510, if necessary under the circumstances, after obtaining a warrant, the Executive Officer has the right of entry to any premises owned, operated, used, leased, or rented by an owner or operator of a facility in order to inspect and copy records relevant to the determination of compliance.

(e) *Violations and Penalties.*

- (1) Any failure to meet the requirements of the LCFS regulation shall constitute a violation, which includes but is not limited to: (A) the failure by a regulated party to meet a requirement specified in section 95424(b) during a compliance period; (B) failure to clear a deficit in one compliance period by the end of the next compliance period; (C) the generation or transfer of invalid LCFS credits; and (D) failure to comply with any of the reporting or recordkeeping requirements in section 95424(c) and (d).
- (2) Pursuant to Health and Safety Code section 38580 (part of the California Global Warming Solutions Act of 2006), the fuels regulation penalties set forth in Health and Safety Code section 43027 shall apply, along with any other penalties permitted under State law.
- (3) Pursuant to State law, any person who violates any prohibition or requirement of the LCFS is subject to civil penalties for each violation, every day during which each such violation occurs, and the amount of economic benefit or savings resulting from the violation.



**Section 95425. LCFS Credits and Deficits**

(a) *Determining Compliance Through Calculation of Credits and Deficits*

- (1) This section describes the method for determining compliance with the LCFS by calculating credits and deficits generated, and ensuring that the amount of credits earned or acquired equal or exceed the deficits incurred. All credits and deficits are denominated in units of metric tons (“MT”) of carbon dioxide equivalent.
- (2) All LCFS fuel quantities used for credit calculation must be in energy units of megajoules (*MJ*).

Fuel quantities denominated in other units, such as those shown in Table 6, must be converted to *MJ* by multiplying by the corresponding energy density<sup>1</sup>:

Table 6. Energy Densities of LCFS Fuels and Blendstocks.

Fuel (units)	Energy Density
CARBOB (gal)	119.53 (MJ/gal)
CaRFG (E10) (gal)	115.63 (MJ/gal)
Diesel fuel (gal)	134.47 (MJ/gal)
CNG (scf)	0.98 (MJ/scf)
LNG (gal)	78.83 (MJ/gal)
LPG (gal)	89.62 (MJ/gal)
Electricity (KWh)	3.60 (MJ/KWh)
Hydrogen (kg)	120.00 (MJ/kg)
Pure denatured Ethanol (gal)	80.53 (MJ/gal)
Pure Biomass-based diesel (gal)	126.13 (MJ/gal)

- (3) LCFS credits/deficits are calculated according to the following equations:

$$Credits^{XD} (MT) = (UAFCI_{standard} - AFCI_{compliance}^{XD}) \times E_{displaced}^{XD} \times C \tag{1}$$

The superscript *XD* denotes whether the credits are generated under the gasoline standard *XD*=”gasoline,” or the diesel fuel standard *XD*=”diesel.”

Section 95423 shows the applicable reference standard for each fuel.

For a provider of a blended fuel such as E10, E85, B5, B20, or two or more fuels:

<sup>1</sup> Energy density factors are based on the lower heating values of fuels in GREET using BTU to MJ conversion of 1055 J/Btu.

$$AFCI_{compliance}^{XD} = \frac{\sum_i^n E_i^{XD} \times UAFCI_i}{E_i^{XD} \times EER_i^{XD}} \quad \text{and} \quad (1.1)$$

$$E_{displaced}^{XD} = \sum_i^n E_i^{XD} \times EER_i^{XD} \quad (1.2)$$

For a provider of an unblended fuel such as electricity, hydrogen, or CNG/LNG, Eqns. 1.1 and 1.2 become:

$$AFCI_{compliance}^{XD} = \frac{UAFCI_1}{EER_1^{XD}} \quad \text{and} \quad (1.3)$$

$$E_{displaced}^{XD} = E_1^{XD} \times EER_1^{XD} \quad (1.4)$$

The total credits generated (or deficit incurred) is

$$\boxed{Credits^{GEN} (MT) = Credits^{gasoline} + Credits^{diesel}} \quad (2)$$

LCFS credits are denominated in units of metric tons (“MT”).

A positive value of  $Credits^{GEN}$  represents credits generated.

A negative value of  $Credits^{GEN}$  represents a deficit.

$Credits^{XD} (MT)$  is the amount of LCFS credits generated or deficits incurred for a regulated party, in MT, for providing a fuel used as a gasoline substitute (XD=“gasoline”) or a diesel fuel substitute (XD=“diesel”);

$UAFCI_{standard}$  is the applicable average fuel carbon intensity of either the gasoline or diesel fuel standard for a given year. The standard for each year is shown in Tables 1 and 2 for gasoline and gasoline substitutes, diesel fuel, and diesel fuel substitutes in section 95422, respectively;

$AFCI_{compliance}^{XD}$  is the average fuel carbon intensity value reported for compliance or credit determination, in gCO<sub>2</sub>e/MJ;

$UAFCI_i$  is, for a provider of multiple fuels, the average fuel carbon intensity of each fuel; for a provider of a blended fuel, it is the average fuel carbon intensity of each blendstock.  $UAFCI_i$  is determined by an ARB CA GREET fuel pathway or a custom pathway, measured in gCO<sub>2</sub>e/MJ;

$E_i$  is the energy of each blendstock or fuel, in MJ, determined from the energy density conversion factors in Table 6 in section 95425(a)(2);

$i$  is the blendstock or fuel index ;

$n$  is the total number of blendstocks in a fuel (for a provider of a blended fuel) or is the total number of fuels supplied (for provider of multiple fuels);

$E_{displaced}^{XD}$  is the total amount of gasoline or diesel fuel energy displaced, in MJ per reporting period, by the use of an alternative fuel;

$EER_i^{XD}$  is the dimensionless Energy Economy Ratio (EER), which compares the energy economy of an alternative fuel vehicle to a conventional gasoline or diesel vehicle. This term is also known as a Fuel Displacement Factor in this regulation to account for the amount of gasoline or diesel fuel that is displaced by the use of an alternative fuel. The subscript identifies the specific EER for a given fuel. For instance,  $EER_{electricity}^{gasoline}$  means an EER of fuel electricity measured relative to gasoline. EER values that must be used for this regulation are listed in Table 7. *[Commentary: The term  $1/EER$  is called the Vehicle Efficiency Adjustment factor ( $K$ ), used in the previous March version of the draft regulation.]*

$C$  is a factor used to convert credits to units of metric tons from  $gCO_2e$  and has the value of

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

$Credits^{GEN}$  is the total credits generated or deficits incurred for a regulated party, in metric tons, determined from the credits or deficits generated under either or both of the gasoline and diesel fuel standards.

Table 7. EER Values for Fuels Used in Light- and Medium-Duty, and Heavy-Duty Applications.

Light/Medium-Duty Applications (Fuels used as gasoline replacement)			Heavy-Duty/Off-Road Applications (Fuels used as diesel replacement)		
Fuel/Vehicle Combination	EER Values Relative to Gasoline	Notes	Fuel/Vehicle Combination	EER Values Relative to Diesel Fuel	Notes
Gasoline (incl. E6 and E10), or E85 (and other ethanol blends)	1.0	For E85 see example A2 in Appendix A.	Diesel fuel or Biomass-based diesel blends (incl. B5, B20, & other blends)	1.0	2
CNG / ICEV	1.0	See example A1, Appendix A	CNG or LNG / ICEV	1.0	3
LPG / ICEV	1.0	4	LPG / ICEV	1.0	3
Electricity / BEV	<del>4.4</del> 4.0	5	Electricity / BEV, PHEV, or off-road	2.7	3
Electricity / PHEV	<del>3.6</del> 2.4	5			
H2 / FCV or ICEV	<del>2.2</del> 3.0	6	H2 / FCV or ICEV	1.9	5

(BEV = battery electric vehicle, PHEV=plug-in hybrid electric vehicle, FFV = flex fuel vehicle, FCV = fuel cell vehicle, ICEV = internal combustion engine vehicle)

<sup>2</sup> Since all diesel and biomass-based diesel used for transportation applications are compared to the diesel standard, the EERs are assigned a value of 1.0.

<sup>3</sup> EER values from Table 3-11, p. 3-25, "Full Fuel Cycle Assessment: TTW Emissions and Energy Consumption" June 2007, TIAX report for the California Energy Commission. Heavy-duty values are derived from comparison to a comparable conventional diesel vehicle. Value for CNG was 0.94, and LNG was 0.95. All values are established as 1.0.

<sup>4</sup> EER values from Table 3-10, p. 3-24, "Full Fuel Cycle Assessment: TTW Emissions and Energy Consumption" June 2007, TIAX report for the California Energy Commission. Light-duty values are derived from comparison to a comparable conventional gasoline vehicle. Value for LPG was 1.03 in the TIAX report and is established as 1.0.

<sup>5</sup> EER is based on a comparison of the energy economies of a PHEV operated in electric mode versus the same vehicle operated in gasoline mode. See example A3 in Appendix A for details.

<sup>6</sup> Electricity EER values are based on U.S. EPA Fuel Economy data and ARB estimated fuel economies for BEVs and PHEVs. For hydrogen, only the EPA-rated Honda Clarity is used. See example A3 in Appendix A for details.

(b) *Credit Generation Frequency.* Beginning 2010 and every year afterwards, a regulated party may generate credits quarterly.

- (1) For a regulated party, the total LCFS credits/deficits calculated according to Equation 2 in section 95425(a)(3) are used for determining compliance with this regulation.
- (2) A regulated party must submit a compliance report meeting the reporting requirements in section 95424(c).

(c) *Credit acquisition, banking, borrowing, and trading.*

- (1) If credits are traded within the LCFS market, the credits can be banked without expiration.

(A) 20 percent credit rollover cap.

[Commentary.] In order to ensure that previous year credits are not used preferentially for compliance purposes in a manner that would effectively circumvent the compliance obligation of a given year, a cap on the use of credits generated from the previous year is applied when demonstrating compliance with the LCFS for the current year. The cap means that no more than 20 percent of a current year obligation can be satisfied using credits generated from the previous year. Thus each obligated party will be required to use current-year credits to meet at least 80 percent of its obligations, with a maximum of 20 percent being derived from previous-year credits. Any previous-year credits that an obligated party may have that are in excess of the 20 percent cap can be traded to other obligated parties that need them. In this manner there is no ability for an obligated party to solely use accumulated credits for compliance with the LCFS. Staff is seeking comments on this proposal and at what year should the cap take effect.

- (2) A regulated party under the LCFS may acquire or transfer LCFS credits. An external 3<sup>rd</sup> party entity that is not a regulated party or acting on behalf of a regulated party, may not purchase, sell, or trade LCFS credits.
- (3) LCFS credit may be exported for compliance with other greenhouse gas reduction initiatives including, but not limited to programs established pursuant to AB 32, subject to the authorities and requirements of those programs. Credits generated from outside the LCFS program including, but not limited to, those from other AB 32 programs, cannot be used in the LCFS.
- (4) Borrowing or the use of credits from anticipated future carbon intensity reductions is not allowed.
- (5) Offsets from transportation fuels not regulated by the LCFS, such as emissions reduction from aviation or non-regulated marine fuels, are not allowed.

## Section 95426. Determination of Carbon Intensity Values

### (a) *Overview and General Requirements.*

- (1) This section presents the methods (Method 1, Method 2A and Method 2B) for determining a regulated party's compliance with the carbon intensity requirements. ~~In addition to meeting the requirements specified in this section, the regulated party must use the detailed procedures as shown in Appendices A and B, which are appended to this regulation. These procedures provide additional details on the derivation and use of the calculated carbon intensity values pursuant to the LCFS regulation.~~
- (2) Pursuant to this section, a regulated party selects a method commensurate with the party's ability to document its full fuel-cycle analysis. Higher levels of scientifically defensible documentation are rewarded with more options to choose from and lower carbon intensity values; conversely, lower levels of documentation yield fewer options and higher calculated carbon intensity values.
- (3) The selected method is subject to approval by the Executive Officer, and the method must be consistent with that method's documentation and other requirements.
- (4) Using the appropriate method, the regulated party calculates the party's blendstock carbon-intensity value, as provided for in this section. This value is calculated for each blendstock's fuel pathway in a source-to-wheel, full fuel-cycle analysis conducted pursuant to an established standard approach (Method 1), a pre-approved modification to the standard approach (Method 2A), or a pre-approved new pathway generated by the California-modified GREET (Method 2B).

### (b) *Selection of Method.*

A regulated party must choose one of the following methods (Method 1, Method 2A or Method 2B) for determining its fuel's carbon intensity value. Failure of a regulated party to declare, upon request by the Executive Officer, which of the ~~two~~ three methods the regulated party used to determine the fuel's carbon intensity will result in the Executive Officer using Method 1 (ARB Lookup Table) to calculate the fuel's carbon intensity value, as specified below.

#### (1) *Method 1 – ARB Lookup Table.*

- (A) This method uses the California-modified GREET model (version 1.8b as of [insert date]), which is incorporated herein by reference. This model is available for downloading on ARB's internet site.
- (B) *Lookup Table Fuel Pathways and Land Use Modifiers.*

A regulated party using Method 1 must run the online interface tool to generate results from the GREET and GTAP models. Initial carbon intensity values are derived from the California-modified GREET model (version 1.8b as of [insert date] and GTAP ver. XX as of [insert date] are incorporated herein by reference.

The carbon intensity lookup tables are incorporated herein by reference and will be available on ARB's internet site.

*[Commentary: GREET v. 1.8b currently does not incorporate GTAP. The final version of the interface tool will incorporate both GREET and GTAP.]*

(C) *Conventional Fuels.*

1. For conventional fuels (gasoline and diesel fuel) derived from conventional crude oil, the regulated party must use the average fuel-pathway carbon-intensity value for that fuel derived from the California-modified GREET ("conventional crude CI").
2. For conventional fuels derived from non-conventional crude oil, the regulated party must calculate its fuel's carbon intensity ("non-conventional crude CI") by one of the methods provided in section 95426(b). Production of any conventional fuel from non-conventional crude creates a rebuttable presumption that the fuel's non-conventional crude CI value is more than 10% greater than the conventional crude CI value. The presumed non-conventional crude CI value shall be the greater of the regulated party's calculated value and the Executive Officer's calculated value for the non-conventional crude CI. This presumption is rebuttable only as follows:
  - a. *Non-Conventional Crude CI Within 10% Of Conventional Crude CI.*

A regulated party providing conventional fuel derived from non-conventional crude may use the conventional crude CI value, as provided in section (b)(1)(C)1 above, only if both the regulated party's claimed non-conventional crude CI value and the Executive Officer's calculated non-conventional crude CI value are within 10 percent of the conventional crude CI value;

- b. *Non-Conventional Crude CI More Than 10% Lower Than Conventional Crude CI.*

If either the Executive Officer's or the regulated party's calculated non-conventional crude CI values is more than 10% lower than the conventional crude CI value, the

presumed carbon intensity value shall be equal to whichever calculated value is closer to the conventional crude CI value. The regulated party may use its own calculated non-conventional crude CI value only if the party has demonstrated, to the Executive Officer's written satisfaction, the validity of the party's claimed non-conventional crude CI value. No such claimed non-conventional crude CI value may be approved by the Executive Officer without adequate documentation from the regulated party to support such a claim. Upon the Executive Officer's review and approval of the documentation, the regulated party must use the custom carbon-intensity value approved by the Executive Officer for that fuel.

c. *Non-Conventional Crude CI More Than 10% Greater Than Conventional Crude CI.*

If either the Executive Officer's or the regulated party's calculated non-conventional crude CI values is more than 10% greater than the conventional crude CI value, the presumed carbon intensity value shall be equal to whichever calculated value is farther from the conventional crude CI value. The regulated party may use its own calculated non-conventional crude CI value only if the party has demonstrated, to the Executive Officer's written satisfaction, the validity of the party's claimed non-conventional crude CI value. No such claimed non-conventional crude CI value may be approved by the Executive Officer without adequate documentation from the regulated party to support such a claim. Upon the Executive Officer's review and approval of the documentation, the regulated party must use the custom carbon-intensity value approved by the Executive Officer for that fuel.

(D) *Alternative Fuels (CNG, LNG, LPG, Hydrogen, a Hydrogen Blend, Electricity, a Biomass-based Diesel Blend, an Ethanol Blend, E100, and B100)*

For any fuel other than the conventional fuels, the regulated party must use the values shown in CI Lookup Tables for that fuel, unless the regulated party chooses to use either Method 2A or 2B as provided for in subsection (b)(2) and (b)(3).

Except as provided for in subsection (b)(2) and (b)(3), the regulated party must use the default method (Method 1) as shown in the Lookup Tables. A sample lookup table (for corn ethanol) is provided in Appendix B and incorporated herein by reference.



(2) Method 2A – Customized Lookup Table Values (Modified ARB Method).

Under this method, the proponent-regulated party proposes for the Executive Officer's written approval the modification of Method 1 with one or more inputs as provided for in this provision. The Executive Officer's approval is subject to the requirements as specified in section 95426(c) and the following requirements:

- (A) Input variables that are identified as invariant input parameters in GREET may not be modified by a proponent-regulated party;
- (B) The modified GREET inputs must accurately reflect the conditions specific to the proponent-regulated party's production and marketing process; and
- (C) The proponent may not add a new input (e.g., refinery efficiency) that is not already incorporated in the California-modified GREET (v. 1.8b).
- (D) The proponent-regulated party must use the GTAP model as specified in section 95426(b)(1)(B) to incorporate the GTAP land use modifiers into the results obtained from the California-modified GREET (v.1.8b).

(3) Method 2B – New Pathway Generated by California-Modified GREET (v.1.8b).

Under this method, the proponent-regulated party proposes for the Executive Officer's written approval the generation of a new pathway using the California-modified GREET as provided for in this provision. The Executive Officer's approval is subject to the requirements as specified in section 95426(c) and the following requirements:

- (A) For purposes of this provision, "new pathway" means the proposed full fuel-cycle (well-to-wheel) pathway is not already in the ARB Lookup Table specified in section 95426(b)(1), as determined by the Executive Officer;
- (B) The proponent must demonstrate to the Executive Officer's satisfaction that the California-modified GREET (v.1.8b) can be modified successfully to generate the proposed new pathway. If the Executive Officer determines that the GREET model cannot successfully generate the proposed new pathway, the proponent-regulated party must use either Method 1 or Method 2A to determine its fuel's carbon intensity;
- (C) The proponent must identify all variant and invariant modified parameters for use in the California-modified GREET (v. 1.8b) for generating the new pathway;
- (D) The GREET inputs used to generate the new pathway must accurately reflect the conditions specific to the proponent-regulated party's production and marketing process; and

- (E) The proponent-regulated party must use the GTAP model as specified in section 95426(b)(1)(B) to incorporate the GTAP land use modifiers into the results obtained from the California-modified GREET (v.1.8b).
- (c) *Scientific Defensibility, Burden of Proof, the “10-10” Substantiality Requirement, and Data Submittal Procedures for Approval of Method 2A or 2B.*

For a proposed Method 2A or 2B to be approved by the Executive Officer, the proponent-regulated party must demonstrate that the method is both scientifically defensible and, for Method 2A, meets the substantiality requirement, as specified below:

(1) *Scientific Defensibility and Burden of Proof.*

This requirement applies to both Method 2A and 2B. A regulated party that proposes to use Method 2A or 2B bears the sole burden of demonstrating to the Executive Officer’s written satisfaction, with clear-and-convincing evidence, that the proposed method is scientifically defensible.

- (A) For purposes of this regulation, “scientifically defensible” means the method has been demonstrated to the Executive Officer as being at least as valid and robust as Method 1 for calculating the fuel’s carbon intensity.
- (B) Proof that a proposed method is scientifically defensible may rely on, but is not limited to, publication of the proposed Method 2A or 2B in a major, well-established and peer-reviewed scientific journal (e.g., Science, Nature, Journal of the Air and Waste Management Association, Proceedings of the National Academies of Science).
- (C) The Executive Officer shall provide a minimum 30-day public review process for any Method 2A or 2B proposed for the Executive Officer’s approval before such approval may be granted.

(2) *“10-10” Substantiality Requirement*

This requirement applies only to Method 2A. The regulated party must obtain approval from the Executive Officer for the proposed Method 2A before the party can use Method 2A to demonstrate compliance with the LCFS regulation. In seeking the Executive Officer’s written approval, the regulated party must demonstrate, with clear-and-convincing evidence, that the proposed method meets both of the following substantiality requirements, as specified below:

- (A) Method 2A yields an overall blendstock carbon intensity that is lower than the value calculated using Method 1 by more than 10%; and
- (B) The regulated party can and will produce more than 10 million gasoline gallon equivalents per year (1,156 MJ) of the regulated fuel.

This requirement applies to a transportation fuel only if the total amount of the fuel sold in California from all providers of that fuel exceeds 10 million gasoline gallon equivalents per year.

(3) *Data Submittal Process.* This requirement applies to both Method 2A and 2B. A regulated party proposing Method 2A or 2B for a fuel's carbon intensity value may use the Software Compliance Tool (as published on ARB's internet site), or any other tool determined by the Executive Officer as equivalent, to generate a custom or alternative fuel pathway for use in the California-modified GREET model (v. 1.8b).

- (A) The proponent party must provide all supporting documentation to enable the Executive Officer to verify how the carbon intensity value was derived.
- (B) The proponent must submit all relevant data and calculations to the Executive Officer by electronic submission, such as via email or an online web-based interface, when available.
- (C) The proponent must not convert spreadsheets containing formulas into other file formats. All custom or alternative carbon intensity values must be reviewed and approved by the Executive Officer prior to submission of such values by the regulated or exempt party for compliance, credit generation, or reporting purposes.

(4) *Unrestricted Public Use of Submitted Data, Pathways, Models, and Carbon Intensity Values.* This requirement applies to both Method 2A and 2B. Except as provided for in section 95426(c)(4)(C) below, a regulated party that submits any data to the Executive Officer in support of a proposed Method 2A or 2B must also submit a written declaration clearly stating that the party understands and agrees to the following:

- (A) all information submitted pursuant to this section will be disclosed and become publicly available information (i.e., public domain); and
- (B) all carbon intensity values, associated parameters, and other related information obtained or derived from all such submittals will be incorporated by the Executive Officer into the Lookup and Customized Tables for use on a free, unlimited license, and otherwise unrestricted basis by any regulated party, as provided for in this regulation.

*[Commentary: Information subject to this provision includes, but is not limited to, information on pathways, customized input values, models, and any other carbon intensity-related data, including the carbon-intensity values themselves ]*

(C) Patents. [Under Development]

[General concepts being considered:]

- [By default, the EO publishes all information submitted in support of Method 2A or 2B that is nonpatentable
  - Invention was previously known or used by others in the US before invented by patent applicant;
  - Invention was patented or described in writing in US or foreign country before invented by patent applicant;
  - Invention was patented or described in writing in US or foreign country or in public use or on sale in US more than 1 year prior to application for patent in the U.S.]
  
- [Regulated party can request short delay (30/45 days) in EO's publication of submitted information if publication would adversely affect patentability of party's LCFS technology/process
  - This provision applies only if the regulated party has not yet filed an application for a patent with the United States Patent and Trademark Office or the patent office of a foreign country
  - EO can continue to evaluate proposed Method 2A/2B while publication is suspended
  - But any delay tolls the 30-day public review period of Method 2A or 2B documentation
  - No EO approval of proposed Method 2A or 2B allowed without the 30-day public review
  - Regulated party would need to document its intent to file within 30/45 days a patent application after request for delay
  - The only information subject to suspension of EO publication would be the process or equipment involved in the Method 2A/2B pathway; all other information would be disclosable. The information must be material and central to the patent application on which the requested delay is based
  - EO can publish the submitted information once the regulated party files the patent application or the information at issue has been published by another in a printed publication.
  - 30-day public review begins only after EO publication of all submitted information, including patent-related information]

## Section 95427. Requirements for Multimedia Evaluation

### (a) *Pre-Sale Approval Requirement.*

Except as provided for in section 94527(e), a regulated party may not sell, supply, distribute, import, offer for sale, or offer for use in California a regulated fuel unless one of the following conditions has first been met:

- (1) a multimedia evaluation for the regulated fuel has been conducted pursuant to the requirements specified in this regulation, and that evaluation has been approved by the Air Resources Board; or
- (2) a multimedia evaluation for the regulated fuel has been conducted, and that evaluation was approved by the Executive Officer prior to the date the Office of Administrative Law (OAL) approves the LCFS regulation.

### (b) *Requirements.*

- (1) The Executive Officer, or his or her designee, shall not approve a multimedia evaluation subject to this section unless the evaluation has undergone the process for review and approval specified in Health and Safety section 43830.8, including but not limited to, receiving peer review and approval by the California Environmental Policy Council pursuant to Health and Safety section 43830.8(d)-(g). For purposes of Health and Safety section 43830.8(a), each Executive Officer approval of a regulated fuel for compliance with the LCFS regulation under section 94527(a)(1) shall constitute compliance with the requirement in Health and Safety section 43830.8(a) for conducting a multimedia evaluation prior to adoption of a “regulation that establishes a specification for motor vehicle fuel.”
- (2) All multimedia evaluations subject to this section shall be evaluated in accordance with the Cal/EPA guidance document entitled, *Guidance Document and Recommendations on the Types of Scientific Information Submitted by Applicants for California Fuels Environmental Multimedia Evaluations* (June 2008), which can be downloaded at <http://www.arb.ca.gov/fuels/multimedia/080608guidance.pdf>.

### (c) *Exemptions.*

- (1) *Negative Declaration For ARB-Adopted New Or Amended Fuel Specifications.*

The requirements of this section do not apply to a regulated fuel if:

- (A) the regulated fuel is subject to a proposed ARB regulation establishing a new or amending an existing fuel specification, which ARB adopts after the date OAL approves the LCFS regulation; and

- (B) the California Environmental Policy Council, following an initial evaluation of the proposed regulation, conclusively determines that the regulation will not have any significant adverse impact on public health or the environment.

(2) *CaRFG, Diesel Fuel, E100, E85, CNG, LNG, LPG, and Hydrogen.*

The requirements of this section do not apply to a regulated fuel if:

- (A) the fuel is subject to an ARB-adopted fuel specification; and
- (B) The Executive Officer does not amend that fuel specification after OAL approves the LCFS regulation.

Fuels currently subject to this provision include CaRFG, diesel fuel, E100, E85, CNG, LNG, LPG, and hydrogen. This provision applies only to the extent that the Executive Officer does not amend the fuel specification for any of the above fuels. When OAL approves an ARB amendment to a fuel specification identified above, this provision shall no longer apply for that fuel.

(3) *Biomass-Based Diesel and Electricity.*

The requirements of this section do not apply to a regulated fuel that:

- (A) is subject to the Division of Measurement Standards' Engine Fuels Standards (4 CCR §4140 et seq.); but
- (B) is not subject to an ARB-adopted fuel specification.

Fuels currently subject to this provision include biomass-based diesel, and electricity. This provision applies only to the extent that the Executive Officer does not adopt a fuel specification for any of the above fuels. When OAL approves an ARB-adopted fuel specification for a fuel identified above, this provision shall no longer apply for that fuel.

**Section 95428. Cap and Trade**

- (a) *[Commentary: This section is reserved for how the LCFS can be designed as a Cap and Trade system]*

**Section 95429. Periodic Public Review**

- (a) The Executive Officer will conduct a periodic review of the implementation of the LCFS program. The Executive Officer shall determine the scope, frequency, and content of the periodic review.



## APPENDIX A. Calculations of Energy Economy Ratios (EER)

### Example A1: Calculation of CNG EER

#### Fuel Economy (miles per gallon gasoline equivalent)

Vehicle			Gasoline	Gasoline	Gasoline	CNG	CNG	Gasoline
Model Year	Make	Model	City	HWY	Combined	City	HWY	Combined
2008	Honda	Civic	25	36	29.0	24	36	28.2

Source of mpg values: US EPA Fuel Economy Guide 2008

#### CNG Adjustment Factor Calculation

Fuel	mpg (gasoline equiv.)	EER
Gasoline	29.0	1
CNG	28.2	0.97

The EER value is established as 1.0 due to uncertainties in the data.

**Example A2: Calculation of E85 FFV EER**

**Fuel Economy in miles per gallon**

Model Year	Vehicle			Gasoline	Gasoline	Gasoline	E85	E85	Gasoline
	Make	Model	Engine	City	HWY	Combined	City	HWY	Combined
2008	Chrysler	Sebring Convertible		18	26	20.9	13	19	15.2
2008	Mercedez	C300		18	25	20.6	13	19	15.2
2008	Chrysler	Sebring Convertible		19	27	21.9	13	20	15.4
2008	Dodge	Avenger		19	27	21.9	13	20	15.4
2008	Chevrolet	Impala	3.5/6	18	29	21.7	14	21	16.5
2008	Chevrolet	Impala	3.9/6	18	28	21.4	13	20	15.4
2008	Ford	Crown Victoria		15	23	17.8	11	16	12.8
2008	Lincoln	Town Car		15	23	17.8	11	16	12.8
2008	Mercury	Marquis		15	23	17.8	11	16	12.8
2008	Chevrolet	Silverdado PU (average)		14.5	19.5	16.4	11	14.5	12.3
2008	Dodge	Dakota Pickup (average)		14	19	15.9	9	12	10.1
2008	Dodge	Ram 1500 PU (average)		13	17.5	14.7	9	12	10.1
2008	Ford	F150 PU (average)		13	17.5	14.7	9.5	12.5	10.7
2008	GMC	Sierra (average)		14.5	19.5	16.4	11	14.5	12.3
2008	Mitsubishi	Raider Pickup (average)		14	19	15.9	9	12	10.1
2008	Nissan	Titan (average)		12	17	13.8	9	12.5	10.3
2008	Chevrolet	Van 1500		12	16	13.5	9	12	10.1
2008	GMC	Savana 1500		12	16	13.5	9	12	10.1
2008	Chevrolet	Express 1500		12	16	13.5	9	12	10.1
2008	GMC	Savana 1500		12	16	13.5	9	12	10.1
2008	Chevrolet	Uplander		16	23	18.5	12	17	13.8
2008	Chrysler	Town and Country		17	24	19.6	11	17	13.1
2008	Dodge	Caravan		17	24	19.6	11	17	13.1
2008	Chevrolet	Avalanche 1500		14	19.5	16.0	11	14.5	12.3
2008	Chevrolet	Suburban		14	19.5	16.0	11	14.5	12.3
2008	Chevrolet	Tahoe 1500		14	19.5	16.0	11	14.5	12.3
2008	Chrysler	Aspen		13.5	18	15.2	9	12	10.1
2008	Dodge	Durango		13.5	18	15.2	9	12	10.1
2008	GMC	Yukon 1500		14	19.5	16.0	11	14.5	12.3
2008	Jeep	Commander		13.5	18.5	15.4	9	12.5	10.3

2008	Jeep	Grand Cherokee		14	19	15.9	9	12.5	10.3
2008	Nissan	Armada		12	17.5	14.0	9	13	10.4
			<b>avg.</b>	<b>14.7</b>	<b>20.8</b>	<b>16.9</b>	<b>14.9</b>	<b>14.9</b>	<b>12.1</b>

Source of mpg values: US EPA Fuel Economy Guide 2008

<b>E85 Adjustment Factor Calculation</b>					
<b>Fuel</b>	<b>mpg</b>	<b>LHV (Btu/gal)</b>	<b>Btu/mi</b>	<b>Adjustment Factor</b>	<b>EER</b>
Gasoline	16.9	111289	6581	1	
Ethanol		76330			
E85	12.1	81573.85	6715	1.02	<b>0.98</b>

Note: LHVs are from GREET Fuel Specs

$$LHV\_E85 = 0.85 * LHV\_Ethanol + 0.15 * LHV\_Gasoline$$

**The EER value is established as 1.0 due to uncertainties in the data.**

**Example A3: Calculation of Hydrogen FCV, BEV, and PHEV EERs**

**BEVs**

BEV	City mpg	HWY mpg	Combined mpg
2003 Toyota RAV4 EV	125	100	112
Average			112

Gasoline Vehicle	City mpg	HWY mpg	Unadj. City mpg	Unadj. HWY mpg	Unadj. Combined mpg	EER
2003 RAV4 2WD 4-Speed	24	29	26.7	37.2	30.6	
2003 RAV4 2WD- 5-Speed	25	31	27.8	39.7	32.1	
Average					31.3	3.57 = 112/31.3

BEV	City mpg	HWY mpg	Combined mpg
2006 AC Propulsion eBox			107
Average			107

Gasoline Vehicle	City mpg	HWY mpg	Combined mpg	EER
2006 Scion xB 4-Speed	26	31	28.0	
2006 Scion xB 5-Speed	26	30	27.7	
			27.8	3.84 = 1.07/27.8

Note: "Unadjusted" values are based on laboratory testing results. For the Scion, the range is estimated through real world driving.

PHEVs	Combined mpg
Chevy Volt (electric mode)	138

Gasoline Vehicle	New City mpg	New HWY mpg	Old City mpg	Old HWY mpg	Unadj. Old City mpg	Unadj. Old HWY mpg	Unadj. Combined mpg	EER
Chevy Malibu 4 cyl. 2.4L S6	22	32	25.0	35.0	27.8	44.9	33.5	
Chevy Malibu 4 cyl. 3.5L 4spd	22	30	25.0	33.0	27.8	42.3	32.9	
Chevy Malibu 6 cyl. 3.6L 4spd	18	29	20.0	32.0	22.2	41.0	28.0	
Chevy Malibu 6 cyl. 3.6L S6	17	26	19.0	28.0	21.1	35.9	25.9	
	19.75	29.25					30.1	4.59

=138/30.1

Note: The 40 mile for range the Volt is calculated over the FTP so the corresponding mpgs for the Malibu is unadjusted.

**Average combined mpg BEV and PHEV (electric mode): 118.8**

**Average EER for BEV and PHEV relative to a conventional gasoline vehicle: 4.0**  
 =average(3.57+3.84+4.59)

Note: The average combined mpg is calculated as the average for the BEVs and PHEVs in the electricity mode, because they are expected to use the same technology and there is no reason to expect significant differences in mpg between BEVs and PHEVs in the electric mode.

### PHEVs (Relative to PHEVs in gasoline mode)

If the EER for PHEVs in the electric mode is computed relative to the PHEVs in the gasoline mode, then the EER for PHEVs in the electric mode has to be divided by the EER for the PHEVs in the gasoline mode.

	<b>New Combined mpg</b>
Chevy Volt (gasoline mode)	39.1

	<b>New Combined mpg</b>	<b>EER</b>
Chevy Malibu 2.4L	23.1	<b>1.7</b>

	<b>EER (electric mode relative to gasoline)</b>	<b>EER (gasoline mode relative to gasoline)</b>	<b>EER (electric mode relative to gasoline mode)</b>
PHEVs (electric mode)	4.0	1.7	<b>2.4</b>

**Data used to calculate BEV and PHEV mpg values:**

<b>AC Propulsion eBox mpg calculation</b>					
<b>Range (miles)</b>	<b>Charge (kWhr)</b>	<b>Charger Efficiency</b>	<b>mile/kWhr</b>	<b>mile/MJ</b>	<b>mpgge</b>
135	35	0.86	3.32	0.92	106.5
<b>PHEV (electricity mode) mpgge calculation</b>					
<b>Range (miles)</b>	<b>Charge (kWhr)</b>	<b>Charger Efficiency</b>	<b>mile/kWhr</b>	<b>mile/MJ</b>	<b>mpgge</b>
40	8	0.86	4.3	1.19	138

Note: Range and Battery Capacity based on estimates for 40 mile range PHEVs. Charger efficiency of 0.86 is estimated by Tesla motors for the Li ion battery.

**PHEV (gasoline mode) mpg calculation :**

Assume PHEVs in the gasoline mode will get the same fuel economy as a LDV hybrid. Use the Toyota Prius, Honda Civic Hybrid, and the Nissan Altima Hybrid to estimate the fuel economy.

<b>Vehicle</b>	<b>City mpg</b>	<b>HWY mpg</b>	<b>Combined mpg</b>
Toyota Prius	48	45	46.6
Honda Civic Hybrid	40	45	42.1
Nissan Altima Hybrid	35	33	34.1
Toyota Camry	33	34	33.4
<b>Average</b>			<b>39.1</b>

**Light-Duty Fuel Cell Vehicles:**

Vehicle	City mile/kg	HWY mile/kg	City mpgge	HWY mpgge	Combined mpg
Honda 2008 FCX Clarity	77	67	79.0	68.0	73.6

Gasoline Vehicle	City mpg	HWY mpg	Combined mpg	EER
Honda Accord 2.4L	21.5	30.5	24.8	<b>3.0</b>

**Heavy-Duty Fuel Cell Buses**

relative to diesel fuel multiplier

hydrogen ICE bus	4.96 mgdge	$4.96/4.03 = 1.2$
hydrogen FC bus (average)	7.65 mpdge	$7.65/4.03 = 1.9$
diesel bus	4.03 mpg	

an NREL report shows the values for Fuel Cell Buses and HICE buses below  
 Fuel Cell buses have 6.97 to 8.33 mile per diesel gallon equivalent (average of 7.65)  
 Hydrogen ICE bus around 4.96 mpdge  
 Diesel bus 4.03 mpg  
<http://www.nrel.gov/hydrogen/pdfs/42665.pdf>  
 So an EER from these numbers would be 1.9 for FCB's, 1.2 for HHICE's



## APPENDIX B. Sample Carbon Intensity Look-up Table

**Table B1. Carbon intensity lookup table using Method 1 for corn ethanol.  
Default carbon intensity value (labeled XX) to be provided by the Executive Officer.**

Fuel	Feedstock	Feedstock Origin	Processing Characteristics
Ethanol (XX <sub>O1</sub> )	Corn (XX <sub>O2</sub> )	US Midwest (XX <sub>O3A</sub> )	Dry Mill, Natural Gas Fueling (XX <sub>O4A</sub> )
			Dry Mill, Natural Gas and Biomass Fueling (XX <sub>O4B</sub> )
			Dry Mill, Natural Gas and Coal Fueling (XX <sub>O4C</sub> )
			Dry Mill, Custom Selected Fueling (XX <sub>O4D</sub> )
			Wet Mill, Natural Gas Fueling (XX <sub>O4E</sub> )
			Wet Mill, Natural Gas and Biomass Fueling (XX <sub>O4F</sub> )
			Wet Mill, Natural Gas and Coal Fueling (XX <sub>O4G</sub> )
			Wet Mill, Custom Selected Fueling (XX <sub>O4H</sub> )
		US Other Regions (XX <sub>O3B</sub> )	Dry Mill, Natural Gas Fueling (XX <sub>O4I</sub> )
			Dry Mill, Natural Gas and Biomass Fueling (XX <sub>O4J</sub> )
			Dry Mill, Natural Gas and Coal Fueling (XX <sub>O4K</sub> )
			Dry Mill, Custom Selected Fueling (XX <sub>O4L</sub> )
			Wet Mill, Natural Gas Fueling (XX <sub>O4M</sub> )
			Wet Mill, Natural Gas and Biomass Fueling (XX <sub>O4N</sub> )
			Wet Mill, Natural Gas and Coal Fueling (XX <sub>O4O</sub> )
			Wet Mill, Custom Selected Fueling (XX <sub>O4P</sub> )

\* (XX) represents carbon intensity value calculated using ARB CA GREET.

For example, if Company Y is a regulated party that sells corn ethanol fuel in compliance with the LCFS regulation. Company Y has documentation that shows the corn ethanol is produced in the U.S. Midwest region using a wet mill, natural gas & biomass-fueled process. From the table above, Company Y will use the carbon intensity value denoted by “XX<sub>O4F</sub>.”