

State of California
Air Resources Board

UPDATED INFORMATIVE DIGEST

**REGULATION TO IMPLEMENT THE CALIFORNIA LOW CARBON FUEL
STANDARD**

Sections Affected

Adoption of California Code of Regulations, title 17, new sections 95480, 95480.1, 95481, 95482, 95483, 95484, 95485, 95486, 95487, 95488, 95489. and 95490.

Background:

In 2006, the Legislature passed and Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (Assembly Bill 32; Stats. 2006, chapter 488). In Assembly Bill (AB) 32, the Legislature declared that global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The Legislature further declared that global warming will have detrimental effects on some of California's largest industries, including agriculture and tourism, and will increase the strain on electricity supplies. While national and international actions are necessary to fully address the issue of global warming, the Legislature recognized that action taken by California to reduce emissions of greenhouse gases (GHG) will have far-reaching effects by encouraging other states, the federal government, and other countries to act. AB 32 creates a comprehensive, multi-year program to reduce GHG emissions in California, with the overall goal of restoring emissions to 1990 levels by the year 2020. AB 32 requires ARB to take actions that include:

- Establishing a statewide GHG emissions cap for 2020, based on 1990 emissions;
- Adopting a scoping plan by January 1, 2009, indicating how emission reductions will be achieved from significant GHG sources via regulations, market mechanisms, and other actions;
- Adopting a list of discrete, early action GHG emission reduction measures by June 30, 2007, which can be implemented and enforced no later than January 1, 2010; and
- Adopting regulations by January 1, 2010, to implement the measures identified on the list of discrete early action measures.

In 2007, Governor Schwarzenegger signed Executive Order S-01-07. This executive order directed the Air Resources Board (ARB or Board) to determine if an LCFS for transportation fuels used in California can be adopted as a discrete early action measure pursuant to AB 32.¹ If ARB so determines, Executive Order S-01-07 directs

¹ In addition to substantially reducing GHG emissions from transportation fuels, the LCFS is expected to help diversify the transportation fuels market in California, thereby cutting petroleum dependency and

ARB to consider adoption of the LCFS on the list of early action measures required to be identified by June 30, 2007, pursuant to Heath and Safety Code section 38560.5. Executive Order S-01-07 further directs the ARB to draft the LCFS so that it reduces the carbon intensity of transportation fuels used in California by at least 10 percent by the year 2020.

In 2007, the Board approved a list of nine discrete early action measures. The list includes a measure entitled “Low Carbon Fuel Standard.” The regulation is designed to implement this measure pursuant to the requirements of AB 32 and Executive Order S-01-07.

Description of the Regulatory Action:

Overview

The regulatory action will reduce GHG emissions by reducing the carbon intensity of transportation fuels used in California by an average of 10 percent by the year 2020. Carbon intensity is a measure of the direct and indirect GHG emissions associated with each of the steps in the full fuel cycle of a transportation fuel (also referred to as the “well-to-wheels” for fossil fuels, or “seed or field-to-wheels” for biofuels). Depending on the circumstances, GHG emissions from each step can include carbon dioxide (CO₂), methane, nitrous oxide (N₂O), and other GHG contributors. Moreover, the overall GHG contribution from each particular step is a function of the energy that the step requires. Thus, carbon intensity is typically expressed in terms of grams of CO₂ equivalent per mega-Joule (grams CO₂E/MJ).

The LCFS achieves a 10 percent reduction in average carbon intensity by starting specified providers of transportation fuels (referred to as “regulated parties”) at an initial level and incrementally lowering the allowable carbon intensity for transportation fuels used in California in each subsequent year. A regulated party’s overall carbon intensity for its pool of transportation fuels would then need to meet each year’s specified carbon intensity level. Regulated parties can meet these annual carbon intensity levels with any combination of fuels they produce or supply and with LCFS credits acquired in previous years or from other regulated parties.

Applicability, Regulated Parties, and Fuels

In general, the regulation places compliance obligations initially on regulated parties that are upstream entities (i.e., producers and importers that are legally responsible for the quality of transportation fuels in California), rather than downstream distributors and fueling stations. However, under specified conditions, the regulated party may be another entity further downstream that can be held responsible for the carbon intensity of the fuels or blendstocks that they dispense in California.

creating a sustainable and growing market for cleaner fuels. Governor’s White Paper, *The Role of a Low Carbon Fuel Standard in Reducing Greenhouse Gas Emissions and Protecting Our Economy*, <<http://gov.ca.gov/index.php?fact-sheet/5155/>>.

For gasoline, diesel, and other liquid blendstocks (including oxygenates and biodiesel), the regulated party will generally be the producer or importer of the fuel or blendstock. With regard to compressed and liquefied natural gas derived from petroleum sources (fossil compressed natural gas (CNG) and fossil liquefied natural gas (LNG), respectively), the regulated party for fossil CNG will generally be the utility company, energy service provider, or other entity that owns the fuel dispensing equipment; for fossil LNG, it is the entity that owns the fuel when it is transferred to the fuel dispensing equipment in California. For other gaseous fuels (biogas/biomethane, hydrogen), the regulated party will generally be the person who produces the fuel and supplies it for vehicular use. For electricity, the regulated party will be either the load service entity (LSE) supplying the electricity to the vehicle or another party that has a mechanism to provide electricity to vehicles and has assumed the LCFS compliance obligation. The regulation specifies the criteria under which a person would be deemed a regulated party for each particular fuel and how the responsibility of complying with the LCFS can be transferred.

With respect to the fuels, the LCFS applies, either on a compulsory or opt-in basis, to most types of fuels used for transportation in California, including:

- California reformulated gasoline;
- California diesel fuel;
- Compressed or liquefied natural gas;
- Electricity;
- Compressed or liquefied hydrogen;
- Any fuel blend containing hydrogen;
- Any fuel blend containing greater than 10 percent ethanol by volume;
- Any fuel blend containing biomass-based diesel;
- Neat denatured ethanol;
- Neat biomass-based diesel; and
- Any other liquid or non-liquid fuel not otherwise exempted from the regulation.

Voluntary Opt-In Provision

The regulation includes an opt-in provision for certain alternative fuels that have full fuel-cycle carbon intensities that inherently meet the compliance requirements through 2020. These fuels are electricity, hydrogen and hydrogen blends, fossil CNG derived from North American sources, biogas CNG, and biogas LNG. Regulated parties for these fuels are required to meet the LCFS requirements (e.g., reporting, credit balancing) only if they elect to generate credits based on these fuels as provided under the regulation. Generally, parties that opt into the LCFS program will be those parties that expect to generate LCFS credits under the regulation. By opting into the program, a person becomes a regulated party under the LCFS regulation and is required to meet the LCFS reporting obligations and requirements. The provisions for opting into the LCFS are set forth in the regulation.

Exemptions

The regulation exempts any alternative fuel that is not biomass-based or renewable biomass-based and for which the aggregated volume by all parties for that fuel is less than 420 million mega-Joules per year (3.6 million gasoline gallon equivalent per year). This is intended to exempt research fuels entering the market or very low volume niche fuels. Also, the regulation does not apply to regulated parties providing liquefied petroleum gas (LPG or propane).

There is also an exemption for specific applications of transportation fuels, including fuels used in aircraft, racing vehicles, interstate locomotives, ocean-going vessels, and military tactical vehicles and tactical support equipment. However, it is important to note that this exemption does not apply to *intrastate* locomotives and commercial harborcraft, for which the diesel fuel is already subject to the requirements in California Code of Regulations, title 17, section 93117 (i.e., required to use on-road California diesel). Because of this, the diesel fuel sold or offered for sale for use in intrastate locomotives and commercial harborcraft subject to California Code of Regulations, title 17, section 93117, would be treated the same as any other transportation fuel subject to the LCFS.

Transfer of Compliance Obligations and Regulated Party Status

As noted, certain persons are initially designated as regulated parties who are responsible for the LCFS compliance obligations. Except as provided in the regulation, this status as a regulated party generally remains with the initially designated party even if ownership to the fuel is transferred from one party to another. There are two major exceptions to this general rule. For California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB) and diesel fuel, the compliance obligations would generally transfer to another producer or importer that receives CARBOB or diesel fuel from the initial regulated party, with provisions for the initial regulated party to retain the compliance obligation if so desired by the affected parties.

The principal rule noted above notwithstanding, the regulation generally allows the regulated party for a fuel to transfer its compliance obligations by written instrument to another party under specified conditions; the buyer or recipient of the transferred fuel, in turn, becomes the regulated party for that fuel. For a variety of reasons, the transfer of such compliance obligations, along with the potential for generating and selling credits, may be desirable for a company, and the regulation allows such transfers.

Fuel Pool Carbon Intensity Requirements

As noted, the LCFS achieves the goals of Executive Order S-01-07 by incrementally reducing the allowable carbon intensity of transportation fuel used in California. The LCFS does not limit the carbon intensity of individual batches or types of fuels, but it does require regulated parties to comply with annual, average carbon-intensity levels for the total amount of fuel they provide in California. The allowable carbon intensity of transportation fuels decreases each year, starting in 2011, until the carbon intensities of

gasoline and diesel transportation fuels in 2020 are each reduced by 10 percent relative to 2010. Gasoline and diesel follow similar carbon intensity reduction curves from 2011 through 2020 and beyond. Under the regulation, the carbon intensity for alternative fuels (e.g., biofuels, natural gas, hydrogen, electricity) will be judged against either the gasoline or diesel carbon intensity requirements, depending on whether the alternative fuel is used for light- and medium-duty vehicles or for heavy-duty vehicles, as specified in the regulation. In each year, the carbon intensity of each fuel is compared to the LCFS requirement for that year. Fuels that have carbon intensity levels below the requirement generate credits. Fuels with carbon intensity levels above the requirement create deficits. To comply with the LCFS for a given year, a regulated party must show that the total amount of credits equals or exceeds the deficits incurred. Excess credits can be retained or sold to other regulated parties.

Progress Reporting and Account Balance Reporting

The regulation provides for regulated parties to submit quarterly progress reports by specified dates. These quarterly progress reports are intended to ensure that regulated parties keep track of their ability to comply with the allowable carbon intensity at the end of the annual compliance period. The quarterly reports are required to contain a specified set of information and data, such as carbon intensities, fuel volumes sold or dispensed, and other information.

The annual account-balance reporting includes the information required for the quarterly reporting, along with additional information relating to the total credits and deficits generated during the year or carried over from the previous year; total credits acquired from another party; total credits transferred to other parties; credits generated and banked in the current year; and any deficits to be carried into the next year. All quarterly and annual reporting will be done via a Web-based, interactive form that ARB staff will establish prior to the implementation of the regulation.

Recordkeeping

Regulated parties will be required to maintain specified records in English for a minimum of three years. Upon request by the Executive Officer, regulated parties would need to provide such records within 20 days.

Evidence of Physical Pathway

To ensure that low carbon fuels and blendstocks, produced outside of California, are actually the source of finished fuels used in the State, regulated parties will be required under the regulation to demonstrate that a physical pathway evidence for transportation fuels subject to the LCFS. The regulated party's demonstration may include citations to pathway demonstrations submitted by non-regulated party fuel producers whose fuels are used by the regulated party. For each transportation fuel that a regulated party is responsible for under the LCFS, the demonstration could involve a four-part showing:

- A one-time demonstration that there exists a physical pathway by which the transportation fuel is expected to arrive in California. This includes 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 account for the fuel's movement from the generator of the fuel, through intermediate entities, to the fuel blender, producer, or importer in California;
- Written evidence, by contract or similar evidence, showing that a specific volume of a particular transportation fuel with known carbon intensity was inserted into the physical pathway as directed by the regulated party;
- Written evidence, by contract or similar evidence, showing that an equal volume of that transportation fuel was removed from the physical pathway by the regulated party for use as a transportation fuel in California; and
- An update to the initial physical pathway demonstration whenever there are modifications to the initially demonstrated pathway.

The Executive Officer will be required to post on the ARB website the names and contact information for regulated parties and other fuel producers that have obtained approval for their physical pathways, as well as the transportation fuels subject to such approved physical pathways.

Provisions Governing Credits and Deficits and Reconciliation of Shortfalls

Detailed equations and calculations are specified in the regulation for a regulated party to use in calculating its total credits and deficits within each compliance period. A regulated party will meet its annual compliance requirements if its credit balance, at the end of the compliance year, is greater than or equal to zero. Conversely, a regulated party is in deficit and may be in violation if its credit balance is less than zero at the end of a compliance year.

As noted, a regulated party whose credit balance is less than zero at the end of a compliance year is in deficit and may be in violation of the LCFS, depending on the magnitude of the shortfall. Shortfalls are categorized into two main categories. First, a regulated party that ends a compliance year with a significant credit balance shortfall, determined on a percentage basis, will be in violation of the LCFS and subject to a notice of violation and penalties commensurate with the size of the violation. In addition, the regulated party under that scenario must reconcile and remedy the shortfall within a specified period of time. By contrast, a regulated party that ends a compliance year with a relatively small shortfall (e.g., shortfall is 10% or less) will be required to reconcile the shortfall within the following year, as well as meet the compliance obligations that apply in that year.

It should be noted that, under the regulation, two or more consecutive years in a shortfall will be treated the same as a substantial credit balance shortfall, irrespective of the shortfall's size.

A regulated party may generate credits on a quarterly basis and unused credits may be banked without expiration. There is no prohibition against retiring or exporting LCFS credits to other GHG reduction initiatives, but importing credits from such external programs into the LCFS program is not allowed. A non-regulated third party is prohibited from buying, selling, or trading LCFS credits unless that third party is acting on behalf of a regulated party or the credits are being exported for compliance with other GHG reduction initiatives.

Determination of Carbon Intensity Values

The carbon intensity values represent the currency upon which the LCFS is based. The carbon intensity is determined in two parts. The first part represents all of the direct emissions associated with producing, transporting, and using the fuel. This involves determining the amount of GHG emissions emitted per unit of energy for each of the steps in the fuel pathway. The second part considers other effects, including those caused by changes in land use. For some crop-based biofuels, staff has identified land use changes as a significant source of additional GHG emissions. Therefore, staff is proposing that emissions associated with land use changes be included in the carbon intensity values assigned to those fuels in the regulation. No other significant effects that result in large GHG emissions have been identified that would substantially affect the LCFS framework for reducing the carbon intensity of transportation fuels.

To assess the direct emissions, staff used a modified version of the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model. Argonne National Laboratories developed the original GREET model. The modified model, referred to as CA-GREET, was developed under contract with the California Energy Commission. Staff used the CA-GREET model as the primary method for calculating carbon intensity values for various transportation fuels.

CA-GREET is essentially a very large spreadsheet that incorporates many specific numeric values that allow for the calculation of the life cycle GHG emissions associated with producing, transporting, and using various fuels. Staff used CA-GREET to develop specific carbon intensities for a number of different pathways. For some fuels, multiple pathways were developed that represent differences in how and where the fuel is produced.

To assess the emissions from land use changes, staff used the Global Trade Analysis Project (GTAP) to estimate the GHG emissions impact. The GTAP model is discussed in the Staff Report and related Appendices. In general, the model evaluates the worldwide land use conversion associated with the production of crops for fuel production. Different types of land use have different rates of storing carbon. In general, multiplying the changes in land use times an emission factor per land conversion type results in an estimate of the GHG emissions impacts of land conversions.

The regulation has several different methods for establishing carbon intensities. Under the first method, referred to as Method 1, a Lookup Table in the regulation establishes carbon intensity values for a number of specified fuel pathways. Regulated parties may choose to use these pathways to calculate credits and deficits. Values for additional pathways can be added in a subsequent rulemaking.

Under specified conditions, regulated parties may also obtain Executive Officer approval to either modify the CA-GREET model inputs to reflect their specific processes (Method 2A) or to generate an additional pathway using CA-GREET (Method 2B). For both Method 2A and 2B, there is a scientific defensibility requirement for the regulated party to meet before the Executive Officer can approve new values. For Method 2A, there is an additional provision that requires a substantial change in the carbon intensity relative to the analogous value calculated for that pathway under Method 1.

For CARBOB, gasoline, and diesel fuel, there are specific provisions with regard to the method for determining carbon intensity values, depending on whether the crude oil used to make such fuels is derived from crude oils with high carbon intensity relative to the average carbon intensity of crude oils used in California refineries. Examples include certain crude oils produced from oil sands, oil shale, or other high carbon-intensity crude oils. With regard to CARBOB, gasoline, and diesel fuel made from crude oil extracted from any source other than these high carbon-intensity crude oils, the regulated party would be required to use the carbon intensity specified in the Lookup Table for that fuel.

By contrast, for CARBOB, gasoline, and diesel fuel made from high carbon-intensity crude oil, the regulated party would be required to use the carbon intensity value, if any, which is specified in the Lookup Table for that particular pathway. If there is no carbon intensity value specified for a particular high carbon-intensity crude oil, the regulated party could use Method 2B (with Executive Officer approval) to generate an additional pathway for this type of crude. Alternately, the regulated party could use the standard Lookup Table value, but only if the regulated party can demonstrate to the Executive Officer that its crude production and transport carbon-intensity value has been reduced to a specified level.

The uses of Method 2A and 2B are subject to public review under the regulation. In other words, the Executive Officer may not approve a carbon intensity value proposed pursuant to Method 2A or 2B unless the proposed method and associated information submitted in support of that method has been disclosed to the public and available for public review for the prescribed time period. Trade secrets, as defined under State law, that are submitted would be treated in accordance with established ARB regulations and procedures (California Code of Regulations, title 17, sections 91000-91022) and the Public Records Act (Government Code § 6250 et seq.).

Executive Officer Review and Multimedia Evaluations

The regulation requires the Executive Officer to conduct two reviews of the implementation of the LCFS, to be completed and presented to the Board by January 1, 2012 and January 1, 2015. The regulation identifies 13 areas that must be addressed in each review.

Pursuant to Health and Safety Code section 43830.8(a), the Board may not adopt a regulation that establishes a specification for a motor vehicle fuel unless a multimedia evaluation for the regulation undergoes the review process specified in the statute. However, this multimedia requirement does not apply if the regulation does not establish a motor-vehicle fuel specification. Based on its assessment as discussed in the Staff Report, staff has determined that the LCFS regulation, by itself, does not establish a motor-vehicle fuel specification and therefore does not trigger a multimedia evaluation requirement under Health and Safety Code section 43830.8(i).

While the regulation, by itself, does not establish motor-vehicle fuel specifications, we expect that as new, lower-carbon intensity fuels are developed over time, ARB may need to establish fuel specifications to allow the sale of such fuels in California. In those cases, we anticipate the need to conduct multimedia evaluations for the specific fuels. Indeed, ARB has a multimedia evaluation already underway for biodiesel and renewable diesel, for which we hope to establish new fuel specifications in a future rulemaking. Similar multimedia evaluations may be needed if ARB amends the specifications for 85% ethanol gasoline (E-85) and adopts a new biobutanol fuel specification. Therefore, the regulation contains provisions relating to multimedia evaluations which, when applicable, would be conducted pursuant to Health and Safety Code section 43830.8.

Finally, the Initial Statement of Reasons includes a quantitative evaluation of GHG emissions generated during the production of biofuels by including both direct and indirect land use impacts in the carbon intensity values. Other issues with regard to the sustainability of alternative fuels will be evaluated by the staff and addressed in the next few years. This will require coordinating with other organizations on a national and international basis.

Bifurcation of the LCFS Submittal to the Office of Administrative Law

ARB plans to adopt and submit to the Office of Administrative Law two additional LCFS provisions after the provisions are made available for supplemental comment. The first will consist of the addition of two more carbon intensity pathways in the Method 1 Lookup Table for diesel and fuels that substitute for diesel, covering biodiesel from Midwest soybeans and renewable biodiesel from Midwest soybeans. The second will be a severability provision. ARB plans to submit these additional provisions, as part of the current LCFS rulemaking, on or before February 23, 2010.