

California Air Resources Board

Appendix F: Supplement to Initial Statement of Reasons – Proposed Low Carbon Fuel Standard Amendments

*Proposed Amendments to the On-Road Heavy-Duty
Engine and Vehicle Omnibus and Low Carbon Fuel
Standard Regulations*

Date of Release: September 23, 2025

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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
%	Percent
2016 State SIP Strategy	2016 State Strategy for the State Implementation Plan
2022 State SIP Strategy	2022 State Strategy for the State Implementation Plan
ACF	Advanced Clean Fleets
ACT	Advanced Clean Trucks
BEV	Battery Electric Vehicle
CAPEX	Capital Expenditure
CARB or ARB or Board	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEPAM	California Emission Projection Analysis Model
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CI	Carbon Intensity
CO ₂	Carbon Dioxide
EA	Environmental Analysis
EER	Energy Economy Ratio
EGR	Exhaust Gas Recirculation
EIR	Environmental Impact Report
EJ	Environmental Justice
EMFAC	CARB's Emissions Model or Emission FACtors Inventory Model
EO	Executive Order
EV	Electric Vehicle
Final LCFS EIA	Final Environmental Impact Analysis for the 2024 Amendments to the Low Carbon Fuel Standard Regulation

Acronym/Abbreviation	Definition
FR	Federal Register
gCO ₂ e	Grams Carbon Dioxide Equivalent
GHG	Greenhouse Gas
GWh	Gigawatt Hour
HSC	Health and Safety Code
IRS	Internal Revenue Service
ISOR or Staff Report	Initial Statement of Reasons
Lb	Pound or Pounds
LCFS	Low Carbon Fuel Standard
MJ	Megajoule
MMBTU	Million British Thermal Units
MW	Megawatt
MWh	Megawatt Hour
NO _x	Oxides of Nitrogen
Omnibus	Heavy-Duty Engine and Vehicle Omnibus
OPEX	Operating Expense
PM	Particulate Matter
RNG	Renewable Natural Gas
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
tpd	Tons Per Day
U.S.	United States
U.S. EPA	United States Environmental Protection Agency
ZEV	Zero-Emission Vehicle

I. Introduction and Background

A. Low Carbon Fuel Standard Regulation Amendments

This Appendix describes CARB staff's proposed focused amendments to the Low Carbon Fuel Standard (LCFS) regulation (California Code of Regulations, title 17, sections 95480-95503).

The purpose of the LCFS regulation is to reduce the carbon intensity (CI) of transportation fuels used in California, thereby reducing greenhouse gas (GHG) emissions, and to incentivize the production of low-carbon and renewable alternatives such as low-CI electricity, renewable hydrogen, and biofuels to displace fossil fuels, thereby providing more energy security in the transportation sector.

The proposed amendments make changes to the LCFS regulation to allow book-and-claim accounting of renewable natural gas (RNG) to produce electricity for electric vehicle charging, if the electricity is generated using a linear generator. This proposal may increase the near-term availability of low-carbon intensity electricity for electric truck refueling in high demand freight corridors where trucks are operating and helps advance California's zero emission vehicle and carbon neutrality goals.

The proposed LCFS amendments encompass the following elements:

- Amendments to Definitions to add definition of linear generator; and
- Amendments to renewable natural gas (RNG) book-and-claim provisions.

II. The Problem that the Proposal is Intended to Address

In order to implement the 2022 Scoping Plan Update and achieve carbon neutrality by 2045, California needs to reduce emissions by driving down fossil fuel demand in transportation, deploying zero-emission technology wherever feasible, and increasing the supply of low-carbon alternative fuels as quickly as possible. In this chapter, staff provides a description of the purpose of this rulemaking and how the proposed amendments to the LCFS support the State's climate and air quality targets.

A. Need for the Proposed LCFS Amendments

This proposal may increase the near-term availability of low-carbon intensity electricity for electric truck refueling. Truck fleets pursuing zero emissions truck deployment have a need for near-term, low-emission electrification solutions to provide electricity while they work with utilities to electrify their sites. Grid interconnection delays are becoming longer due, in part, to increasing grid demand from artificial intelligence data centers (CEC, 2025a¹) (CEC, 2025b²) and clean hydrogen production facilities (CEC, 2025c³). CARB staff therefore proposes to allow book-and-claim accounting of RNG to produce electricity for electric vehicle charging, if the electricity is generated using a linear generator, through December 31, 2035, in alignment with:

- a. Board Resolution 24-14, which directed staff to monitor, report back to the Board as part of the next Scoping Plan Update, and propose adjustments to

address impediments to the ability of the State to achieve its air quality and climate goals, and transition to zero emission technology, including a potential “need for new provisions that accelerate the deployment of new technologies that support low-carbon electricity for electric vehicle charging in the near-term, such as linear generators;” (CARB, 2024a⁴) and

- b. Board Resolution 23-13, which directed staff “to prioritize policy discussions related to SB 1383 [Lara, Chapter 395, Statutes of 2016] and SB 1440 [Hueso, Chapter 739, Statutes of 2018] implementation and discussions on how to transition biomethane into hard-to-decarbonize sectors or as a feedstock to produce hydrogen for FCEV fuel and to produce electricity to charge BEVs to achieve the SB 1383 target.” (CARB, 2023a⁵)

This proposal is intended to increase the number of low-carbon electrification options available for electric truck charging, particularly for high demand freight corridors where electric trucks are operating prior to grid interconnection, and potentially help advance California’s zero emission vehicle and carbon neutrality goals. The proposed LCFS amendments provide another low-carbon fueling option to support electric vehicle charging sites along trade corridors and throughout the State. The utilization of indirect supply of RNG matched to fossil natural gas would ultimately be reliant on economic factors (i.e. linear generator capital costs (CAPEX) and operation costs (OPEX), RNG prices, electricity prices, LCFS credit prices, and other factors).

Electricity supplied to fuel vehicles by locally-permitted linear generators, powered by RNG, is already eligible for LCFS crediting. Currently, however, the RNG must be co-located with the generator (or physically transported to the generator) to be eligible for credits. Therefore, installation and operation of linear generators is already allowed under the LCFS Regulation. The proposed LCFS amendments provide additional flexibility to provide low-carbon fuel for linear generators, which are already expected to be deployed at charging stations near high demand freight corridors and other optimal sites. This would allow RNG volumes to be matched to linear generators near high demand freight corridors and other optimal sites rather than exclusively at stations located adjacent or nearer to RNG production facilities. The proposed LCFS amendments allow fuel pathways producing electricity transportation fuel via a linear generator to use indirect accounting for pipeline injected RNG, limited to reported fuel volumes supplied through December 31, 2035.

III. The Specific Purpose and Rationale of Each Adoption, Amendment, or Repeal

Government Code section 11346.2(b)(1) requires CARB to describe the specific purpose for each adoption and amendment. It also requires a description of the rationale for CARB’s determination that each provision of the regulation is reasonably necessary to address the problems described in Section II of this Appendix, above.

A. Section 95481. Definitions and Acronyms

1. Section 95481(a). Add Definition for “Linear Generator”

a. Purpose

Staff proposes to add a definition for “linear generator” which staff proposes to add with new subsection 95488.8(i)(2)(f) and in existing provisions within 95488.8(i)(2).

b. Rationale

The proposed definition of “linear generator” is necessary in order to specify the technology referenced by the proposed additions to section 95488.8(i)(2). The definition aligns with both the definition of linear generators provided by the South Coast Air Quality Management District Rule 1110.3 (SCAQMD, 2023⁶) and with the minimum efficiency required under IRS Instructions for Form 3468: Investment Credit. (IRS, 2024⁷)

B. Section 95488.8.

1. Section 95488.8(i)(2) Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel, to Produce Electricity for EV Charging, or to Produce Hydrogen. Related sub-sections 95488.8(i)(2)(A), 95488.8(i)(2)(C), and 95488.8(i)(2)(F).

a. Purpose

Within the LCFS regulation, staff are proposing to allow for book-and-claim accounting of RNG to produce electricity for electric vehicle charging, if the electricity is generated using a linear generator, through December 31, 2035.

b. Rationale

This proposal increases the low-carbon intensity electricity options for electric truck refueling. Currently, book-and-claim accounting of biomethane to produce electricity is only allowed when fuel cells are used to generate the electricity. The proposed LCFS amendments may provide another low-carbon fueling option to support electric vehicle charging sites along trade corridors and throughout the State, and potentially provides a near-term solution to accelerate electrifying prospective charging sites.

IV. Benefits Anticipated from the Regulatory Action

CARB anticipates that by facilitating the near-term availability of low-carbon intensity electricity for electric truck refueling, the proposed LCFS amendments may contribute to near and long-term reduced GHG emissions as businesses will potentially have more stable sources of low-carbon electricity. The amendments may specifically support the increased use of lower CI electricity for ZEVs.

A. Emission Impacts

The proposed LCFS amendments are not expected to result in changes to NO_x nor PM as compared to the baseline, as staff’s analysis estimates that linear generators are already

operational at sites that may choose to book-and-claim RNG. A more detailed discussion about emission impacts and air quality is provided in Chapter VI.

B. Health Impacts

The proposed LCFS amendments are not expected to result in health benefits nor impacts as staff's analysis estimates that linear generators are already operational at sites that may choose to book-and-claim RNG. A more detailed discussion about emission impacts and air quality is provided in Chapter VI.

V. Air Quality

If utilized, RNG would be accounted for through book-and-claim to match the fossil natural gas being used in linear generators at truck charging sites and therefore would not result in changes to NO_x and PM emissions at the linear generator site. Additionally, linear generators fueled with RNG would result in lower statewide PM and NO_x emissions per Megawatt Hour (MWh) than grid electricity currently (CEC, 2024⁸) and is expected to result in fewer PM and NO_x emissions until at least 2030. (CARB, 2025⁹)(CEC, 2025d¹⁰)^a A more detailed discussion about emission impacts and air quality is provided in Chapter VI.

VI. Environmental Analysis

A. Introduction

As previously stated, while CARB is proposing the Omnibus amendments, LCFS amendments and the proposal to make permanent CARB's Emergency Vehicle Emissions Regulations together as one rulemaking for administrative efficiency, the Omnibus amendments, LCFS amendments and the proposal to make permanent CARB's Emergency Vehicle Emissions Regulations are three separate regulatory items and projects which will result in three separate approval actions. Therefore, the Omnibus amendments, LCFS amendments and the proposal to make permanent CARB's Emergency Vehicle Emissions Regulations are three separate projects under the California Environmental Quality Act (CEQA). As such, CARB appropriately analyzed the Omnibus amendments, LCFS amendments and Emergency Vehicle Emissions Regulations as separate projects under CEQA. The CEQA determinations made for the proposed LCFS Amendments are summarized below.

CARB is the Lead Agency under the California Environmental Quality Act (CEQA) of the proposed LCFS amendments. This chapter provides the basis for CARB's CEQA determination for the proposed LCFS amendments. CARB's regulatory program—which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality has been certified

^a Staff compared emission factors from linear generators in (CEC, 2024) by estimated grid emission rates (lbs/MWh) by dividing grid NO_x and PM emissions (electric utilities + cogeneration) from CARB's CEPAM tool (CARB, 2025) by sum of generation (GWh) projected in CEC's SB 100 reference scenario (CEC, 2025d). Staff expect grid emissions to decline further as generation based on natural gas declines in line with SB 100 grid decarbonization goals.

by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of the California Environmental Quality Act (CEQA) (Cal. Code Regs., tit. 14, § 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. CARB, as a lead agency, prepares a substitute environmental document (referred to as an “Environmental Analysis” or “EA”) as part of the Staff Report to comply with CEQA under its certified regulatory program (Cal. Code Regs., tit. 17, §§ 60000 to 60008).

This EA explains why the proposed LCFS amendments are exempt from the requirements of CEQA. It also serves as a substitute document equivalent to an addendum to the Final EIA for the 2024 Amendments to the Low Carbon Fuel Standard Regulation (Final LCFS EIA) (CARB, 2024a¹¹, CARB, 2024b¹², CARB, 2024c¹³, CARB, 2024d)¹⁴ and explains CARB’s determination that no additional environmental analysis is required for the project.

B. Prior Environmental Analysis

CARB previously prepared the Final LCFS EIA under its certified regulatory program to comply with the CEQA requirements. The Final LCFS EIA provided CARB’s environmental analysis, which focused on reasonably foreseeable potentially significant adverse and beneficial impacts on the physical environment resulting from reasonably foreseeable compliance responses. CARB responded in writing to comments received on the Draft LCFS EIA and Recirculated Draft LCFS EIA in the Response to Environmental Impact Analysis Comments document that was made publicly available on November 6, 2024 (CARB, 2024e).¹⁵ At the public hearing on November 8, 2024, the Board adopted Resolution 24-14 certifying the Final LCFS EIA and adopting the findings and statement of overriding considerations. A Notice of Decision was filed with the Secretary of State on November 22, 2024 (CARB, 2024f).¹⁶ All associated documents are incorporated by reference and available at <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>.

The Final LCFS EIA provided an analysis of the potentially significant adverse and beneficial environmental impacts resulting from implementation of the LCFS Amendments and their associated reasonably foreseeable compliance responses. In addition, the Final LCFS EIA used a conservative approach and considered some environmental impacts as potentially significant because of the inherent uncertainties in the relationship between physical actions that were reasonably foreseeable under the rulemaking and environmentally sensitive resources or conditions that may be affected.

Compliance responses to the LCFS amendments were expected to result in:

- beneficial impacts to greenhouse gas emissions;
- less-than-significant impacts to air quality (odor-related), energy demand, mineral resources (short-term construction-related), population and housing, public services, recreation; and
- potentially significant and unavoidable adverse impacts to: aesthetics, agriculture and forestry, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral

resources (long-term operational related), noise, transportation, tribal cultural resources and utilities and service systems.

While many of the identified potentially significant adverse impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, authority to do so is beyond the purview of CARB. The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, causing inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts. Consequently, the Final LCFS EIA took the conservative approach in its post-mitigation significance conclusion and disclosures of potentially significant and unavoidable adverse impacts, for CEQA compliance purposes. The significance determinations are discussed in greater detail in the Final LCFS EIA. As discussed below, the proposed LCFS amendments would not constitute a substantial change or new information resulting in any new significant effects or a substantial increase in the severity of previously identified significant effects.

C. The Proposed Regulatory Action

As described in sections II and III above, staff are proposing to allow LCFS crediting for book-and-claim accounting of renewable natural gas (RNG) used by linear generators to produce electricity for electric vehicle charging through December 31, 2035.

1. Compliance Responses

While the proposed LCFS amendments provide some additional flexibility regarding crediting options for electricity produced from linear generators, staff do not anticipate significant utilization of indirect supply of RNG matched to fossil natural gas nor increases in deployment of linear generators as a result of this provision. Staff's analysis concludes that the additional costs of procuring RNG in place of fossil natural gas would be high, and that in the absence of similarly high credit prices, these additional RNG procurement costs would not be fully compensated by the additional LCFS credit revenue that results from indirectly supplying RNG for linear generators. Staff's analysis assumed (1) an average \$67 credit price (based on recent historical values), (2) a carbon intensity of -502gCO₂e/MJ based on a 45% efficiency and -250.8gCO₂e/MJ biogas fuel, and (3) an EER of 5^b as compared to utilizing fossil natural gas with an effective carbon intensity of 170gCO₂e/MJ. Staff also does not anticipate new RNG capture projects will be developed for the sole purpose of matching RNG attributes to linear generator electric vehicle charging sites because one company is currently deploying and operating linear generators using fossil natural gas, and the estimated additional cost of RNG compared to natural gas is expected to be higher than the additional value of LCFS credits under this amendment. Therefore, staff's analysis concludes there will be no change to current conditions as a result of the proposed LCFS amendments. Specifically, this conclusion means both that the proposed LCFS amendments are not reasonably anticipated to drive

^b Value associated with a battery electric truck as compared to a diesel truck.

notable RNG use at linear generators, and that the proposed amendments are not reasonably expected to result in the installation of any new linear generator facilities.

D. Exemption Analysis

Under CEQA, certain classes of projects are exempt from environmental review unless an exception applies. (Cal. Code Regs., tit. 14, § 15300.2.) As explained below, the common sense exemption is supported by substantial evidence and would reasonably apply to the LCFS amendments, such that no further environmental review is required.

1. Common Sense Exemption—General Rule

The Project is exempt from CEQA under the common-sense exemption, which applies where “it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment.” (Cal. Code Regs., tit. 14, § 15061, subd. (b)(3).) Here, the proposed LCFS amendments allow fuel pathways producing electricity transportation fuel via a linear generator to use indirect accounting for pipeline-injected RNG, limited to reported fuel volumes supplied through December 31, 2035. The proposed LCFS amendments provide additional flexibility to provide low-carbon fuel for linear generators, which are already expected to be deployed at charging stations near high demand freight corridors and other optimal sites. As explained further below, given anticipated credit prices and the comparatively higher cost of RNG, staff do not anticipate this amendment to incentivize significant indirect supply of RNG in any linear generators. Therefore, staff’s analysis concludes there will be no change to existing conditions as a result of the proposed LCFS amendments, and the proposed LCFS Amendments qualify for exemption under California Code of Regulations, title 14, section 15061, subdivision (b)(3).

The common-sense exemption is not subject to the exceptions listed in section 15300.2, which apply only to categorical exemptions. (See *Berkeley Hillside Preservation v. City of Berkeley* (2015) 60 Cal.4th 1086, 1097.) Instead, the applicable standard is whether it can be seen with certainty that there is no possibility the activity may have a significant effect on the environment. (Cal. Code Regs., tit. 14, § 15061, subd. (b)(3); *Muzzy Ranch Co. v. Solano County Airport Land Use Com.* (2007) 41 Cal.4th 372, 387–389.) Based on the record, given the lack of anticipated compliance responses associated with the proposed amendments, there is substantial evidence that the proposed LCFS Amendments do not have the potential to result in a significant environmental effect, either directly or indirectly, and that no substantial evidence supports a fair argument to the contrary. Therefore, no further environmental review is required.

E. Subsequent Environmental Review Analysis

As previously analyzed in the exemption section, there is substantial evidence that the LCFS Amendments do not have the potential to result in a significant environmental impact, as the LCFS Amendments are not expected to change the existing compliance responses under the LCFS program. To the extent the underlying, reasonably anticipated circumstances change, for comprehensiveness and transparency, CARB conducted the following analysis of potential

environmental impacts for consistency with CEQA. This section serves as a substitute document equivalent to an addendum for the proposed LCFS amendments.

1. Legal Standards

When considering modifications to a regulation for which a substitute document equivalent to an Environmental Impact Report (EIR) or negative declaration had previously been prepared, CARB looks to Public Resources Code section 21166 and CEQA Guidelines section 15162 for guidance on the requirements for subsequent or supplemental environmental review. (Cal. Code Regs., tit.17, § 60004.4.)

CEQA Guidelines section 15162 states:

- (a) When an EIR has been certified or a negative declaration adopted for a project, no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, one or more of the following:*
 - (1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.*
 - (2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or*
 - (3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:*
 - (A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;*
 - (B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;*
 - (C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or*
 - (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.*

If a subsequent or supplemental EIR or negative declaration is not required, the lead agency may document its decision and supporting evidence in an addendum (Cal. Code Regs., tit. 14, § 15164 (e)). The addendum and lead agency's findings should include a brief explanation, supported by substantial evidence, of the decision not to prepare a subsequent or

supplemental EIR or negative declaration (Cal. Code Regs., tit. 14, § 15164(e)). An addendum need not be circulated for public review but must be considered by the lead agency prior to making a decision on the project (Cal. Code Regs., tit. 14, § 15164(c), (d)).

2. Basis for Determination

CARB has determined that the proposed LCFS amendments do not involve any changes that result in any new significant adverse environmental impacts or a substantial increase in the severity of the significant adverse impacts previously disclosed in the Final LCFS EIA. The proposed modifications to the LCFS regulation do not alter the compliance responses analyzed under the Final LCFS EIA for the LCFS regulation. Further, there are no changes in circumstances or new information that would otherwise warrant any subsequent or supplemental environmental review. The Final LCFS EIA adequately addresses the implementation of the LCFS regulation as modified by the proposed LCFS amendments, and no additional environmental analysis is required. The basis for CARB's determination that none of the conditions requiring further environmental review are triggered by the proposed modifications is based on the following analysis.

- *There are no substantial changes to the regulation previously analyzed in the Environmental Impact Analysis which require major revisions to the Environmental Impact Analysis involving new significant environmental effects or a substantial increase in the severity of previously identified effects.*

The proposed LCFS amendments would allow book-and-claim accounting of RNG to produce electricity for electric vehicle charging, if the electricity is generated using a linear generator, through December 31, 2035. Linear generators are a newer technology already being deployed as a rapid near-term electrification solution where fleets are awaiting grid interconnection and potentially to reduce electricity costs during peak pricing since linear generators produce electricity for \$0.09/kWh to \$0.12/kWh.^c These amendments may provide fleets with more technology options for deploying low-CI fuels and electric vehicle charging infrastructure, particularly if economic conditions change and become more favorable than staff currently expect is reasonably foreseeable (e.g., if CAPEX and OPEX costs are lower, if RNG producers sell RNG at a lower price than staff estimate, if LCFS credit prices are higher than staff estimate, or other economic factors change). However, even if this were to occur, compliance responses associated with the proposed LCFS amendments would be similar to those associated with allowing EV charging stations to use book-and-claim accounting of RNG to produce electricity for electric vehicle charging using a fuel cell because both linear generators and fuel cells (which was already analyzed in the Final LCFS EIA) reduce NO_x and PM emissions as compared to reciprocating engines (U.S. EPA, 2025¹⁷) using RNG and would have similar construction impacts to fuel cells as they are similarly sized (Mainspring, 2025a,¹⁸ Bloom, 2024¹⁹). Therefore, the proposed LCFS amendments align with the compliance responses and reasonably foreseeable impacts already analyzed under the Final LCFS EIA.

^c (CEC, 2024). Staff reproduced this value based on the CAPEX, OPEX for a 250kW unit operating for 10 years, and a natural gas spot price of \$6.

Furthermore, if utilized, RNG would be accounted for through book-and-claim to match the fossil natural gas being used in linear generators at truck charging sites and therefore would not result in changes to NOx and PM emissions. Additionally, electric vehicle fueling by electricity produced with linear generators would result in lower PM and NOx emissions than grid electricity currently and is expected to result in fewer PM and NOx emissions until at least 2030.^d

As stated previously, staff do not anticipate significant utilization of indirect supply of RNG matched to fossil natural gas nor increases in deployment of linear generators because the additional costs of procuring RNG in place of fossil natural gas would be high, and that in the absence of similarly high credit prices, these additional RNG procurement costs would not be fully compensated by the additional LCFS credit revenue that results from indirectly supplying RNG for linear generators. The analysis staff conducted for the recent 2024 LCFS amendments (CARB, 2024²⁰) did not project a change in LCFS credit price significant enough to incentivize book-and-claim of RNG. Staff estimated that a credit price of at least \$123 would be needed to result in credit revenue exceeding the additional costs of RNG procurement. Given that current credit prices, and the estimated credit prices included in staff's analysis of the recent 2024 LCFS amendments are well below this value, staff do not anticipate this amendment to incentivize significant indirect supply of RNG in any linear generators. While speculative, there is a hypothetical scenario in which it is possible that in the future RNG producers could reduce the RNG price to a level that would become economically viable for linear generators to use. In an effort to illustrate this possibility, staff analyzed a hypothetical scenario where RNG prices fall from staff's estimated price of \$45 per MMBTU to \$25 per MMBTU. Under this hypothetical, a 2 megawatt (MW) project (staff's assumed average installation size, similar to an existing project staff are aware of in Southern California (Mainspring, 2025b²¹)) would generate net revenue of approximately \$158,000 per year (net revenue = - RNG purchase cost + CNG purchase cost + RNG credit) at an average \$67 credit price. A 2MW project is estimated to have CAPEX costs of \$5,000,000 given Mainspring's estimated cost of \$2,500 per kW capacity, OPEX of about \$61,000 per year, and RNG procurement costs of \$2.4 million per year. It is possible companies could use this revenue to increase their purchases of indirect supply of RNG matched to fossil natural gas or to more quickly deploy linear generators under this scenario, but it is speculative for CARB to estimate RNG volumes that would be used, and it is especially speculative to assess whether or how many linear generators would additionally be installed given the LCFS revenue generated under this scenario. If new linear generators were deployed, each additional 2MW site is expected to generate 0.31 tons per year (tpy) of NOx,^e which is well below most air districts' significance threshold of 10 tpy of NOx.^f Therefore, even if the proposed amendments resulted in deployment of linear generators, there would be no new significant environmental effects or substantial increases in significant environmental effect previously identified in the Final LCFS EIA.

^d Staff expect grid emissions to decline further as generation based on natural gas declines in line with SB 100 grid decarbonization goals. See footnote a on page 6 for details of calculation.

^e Based on emission factor from the California Energy Commission (see reference "CEC, 2024").

^f PM concentrations are below detectable natural gas emissions factor limits.

The record does not indicate the proposed LCFS amendments would cause any additional significant environmental impacts or increase the severity of any identified environmental impacts because the proposed modification is equivalent to what was already analyzed in the Final LCFS EIA. There is no substantive change to the way in which regulated entities operate, and the proposed LCFS amendments will not result in additional physical changes to the environment beyond what was already analyzed and disclosed in the Final LCFS EIA. Therefore, CARB staff does not anticipate that the proposed LCFS amendments will cause new significant environmental effects or a substantial increase in the severity of previously identified effects in the Final LCFS EIA.

- *There are no substantial changes with respect to the circumstances under which the regulation is being undertaken which require major revisions to the previous Environmental Impact Analysis involving new significant environmental effects or a substantial increase in the severity of previously identified effects.*

There are no substantial changes to the environmental settings or circumstances in which the proposed modifications to the LCFS regulation are being implemented compared to that analyzed in the Final LCFS EIA. As explained above, the proposed LCFS amendments would allow book-and-claim accounting of RNG to produce electricity for electric vehicle charging using a linear generator. Compliance responses associated with the proposed LCFS amendments would be similar to those associated with allowing EV charging stations to use book-and-claim accounting of RNG to produce electricity for electric vehicle charging using a fuel cell because both linear generators and fuel cells (which was already analyzed in the Final LCFS EIA) reduce NOx and PM emissions as compared to reciprocating engines using RNG and would have similar construction impacts to fuel cells as they are similarly sized. Therefore, the proposed LCFS amendments do not substantially alter the compliance responses of the regulated entities or result in any changes that significantly affect the physical environment.

- *There is no new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous Environmental Impact Analysis was certified as complete, that changes the conclusions of the Environmental Impact Analysis with regard to impacts, mitigation measures, or alternatives.*

There is no new information of substantial importance that has become available to CARB staff since the Final LCFS EIA was certified in November 2024, that would alter any of the conclusions of the Final LCFS EIA relating to significant environmental impacts. Additionally, there are no feasible mitigation measures or alternatives that were previously found to be infeasible, nor any new mitigation measures or alternatives considerably different from those previously considered in the Final LCFS EIA. As discussed above, the proposed LCFS amendments do not substantially alter the compliance responses analyzed under the Final LCFS EIA, so the mitigation measures proposed in the Final LCFS EIA would similarly apply here. Therefore, the conclusions found in the Final LCFS EIA about the compliance responses for the LCFS regulation or potential environmental impacts to any resource areas have not changed.

In summary, no supplemental or subsequent environmental analysis is required for these proposed modifications to the LCFS regulation because, as described above, the proposed LCFS amendments do not result in any new environmental impacts or in a substantial increase in severity to the impacts previously disclosed in the Final LCFS EIA. Further, there are no changes in circumstances or new information that would otherwise warrant any additional environmental review.

VII. Environmental Justice

Many elements of the LCFS support key environmental justice-related recommendations, including the reduction of fossil fuel use, promotion of cleaner fuels, expansion of incentives for zero-emission vehicles, and the incentivization of charging and fueling infrastructure in disadvantaged communities. LCFS complements other State policies as part of a suite of policies in California's portfolio of strategies to support reducing petroleum dependence by 94% by 2045 and reducing combustion emissions to improve air quality.

VIII. Economic Impacts Assessment

Based on staff estimates, RNG costs approximately \$45 per MMBTU as compared to fossil natural gas estimated to cost \$17.40 per MMBtu (CARB, 2023b²²). LCFS credit values are not expected to compensate for this price differential (recent historical average credit prices were \$67⁹, which staff used for this analysis) assuming linear generators are 45 percent efficient (CEC, 2024). Credit prices above \$123 would be required for businesses to generate positive net revenue from using RNG, which is above staff's projected future credit values in the Proposed Scenario of the 2025 LCFS Amendments (CARB, 2024h).

Accordingly, staff does not anticipate cost nor cost saving impacts from the amendments. Staff also does not anticipate new RNG capture projects will be developed for the sole purpose of matching RNG attributes to linear generator electric vehicle charging sites since one company is currently deploying and operating linear generators using fossil natural gas without LCFS credit support, and the estimated cost of RNG is expected to be higher than the additional value of LCFS credits potentially available under these amendments.

While staff do not anticipate cost nor cost savings given the current and projected economics of the market, the proposed book-and-claim amendments to the LCFS program could provide flexibility for using RNG to produce electricity for electric vehicle charging particularly if economic conditions change and become more favorable than staff currently expect is reasonably foreseeable (e.g., if CAPEX and OPEX costs are lower, if RNG producers sell RNG at a lower price than staff estimate, if LCFS credit prices are higher than staff estimate, or other economic factors change). It is speculative for CARB to estimate RNG volumes that would be used and whether or how many linear generators would additionally be installed given the LCFS revenue generated under this scenario.

⁹ LCFS credit prices averaged \$67 between January 2023 and June 2025.

F. The expansion of businesses currently doing business within the State of California.

It would be speculative to assume that this amendment will result in a net increase or decrease in LCFS crediting, given the current cost differential between fossil natural gas and RNG. It is also speculative to assume an expansion of business or for CARB to estimate RNG volumes that would be used and whether or how many linear generators would additionally be installed given the LCFS revenue generated under this scenario. Businesses are already deploying linear generators fueled with fossil natural gas, and these amendments would provide flexibility to use low-carbon RNG if credit prices unpredictably rise above \$123.

IX. Evaluation of Regulatory Alternatives

Government Code section 11346.2, subdivision (b)(4) requires CARB to consider and evaluate reasonable alternatives to the proposed regulatory action and provide reasons for rejecting those alternatives. CARB considered a no action alternative, but the no action alternative would not achieve the stated objective of increasing the near-term availability of low-emission electrification solutions to provide electricity for charging station operators while they work with utilities to electrify their sites. CARB also considered an alternative of sunseting the LCFS crediting use of indirect accounting for RNG electric vehicle charging powered by linear generators in 2030 instead of the proposed date of 2035. But that earlier sunset alternative would not achieve the stated objective of increasing the near-term availability of low-emission electrification solutions to provide electricity for charging station operators while they work with utilities to electrify their sites as effectively. A 2030 sunset might be too short term to allow time for linear generator EV charging projects to evaluate whether economic conditions may support seeking CARB fuel pathway certification to participate in the LCFS, and potentially apply for and receive LCFS pathway certification. As discussed in Section VIII above, staff does not anticipate cost impacts or other burdens from the proposed amendments. Accordingly, no alternative was found to be less burdensome and equally effective in achieving the purposes of the amendments. Staff do not expect small businesses to be impacted, and accordingly CARB has not identified any reasonable alternatives that would lessen an adverse impact on small business.

X. Justification for Adoption of Regulations Different from Federal Regulations Contained in the Code of Federal Regulations

There is no federal regulation comparable to the LCFS regulation. The existing LCFS and proposed amendments are authorized by California law. As explained in Sections IV and VIII above, staff does not anticipate cost impacts from the proposed LCFS amendments. Accordingly, the amendments are justified by the anticipated potential benefits to human health, public safety, public welfare, and the environment.

XI. Documents Relied Upon

- ¹ (CEC, 2025a) [Presentation – PG&E Data Center Pipeline](#), California Energy Commission, February 25, 2025.
- ² (CEC, 2025b) [Presentation – Incorporating Clean, Firm Resources into PG&E’s Integrated Resource Planning](#), California Energy Commission, July 29, 2025.
- ³ (CEC, 2025c) [Presentation - Hydrogen Potential – Electric Generation and Transportation \(2025 IEPR\)](#), California Energy Commission, July 28, 2025.
- ⁴ (CARB, 2024a) [Resolution 24-14](#), California Air Resources Board, 2024.
- ⁵ (CARB, 2023a) [Resolution 23-13](#), California Air Resources Board, 2023.
- ⁶ (SCAQMD, 2023) [Rule 1110.3: Emissions from Linear Generators](#), South Coast Air Quality Management District, November 3, 2023.
- ⁷ (IRS, 2024) [Instructions for Form 3468](#), Internal Revenue Service, 2024.
- ⁸ (CEC, 2024) [High-efficiency and Ultra-low Emissions Linear Generator Demonstration Project In Southern California](#), California Energy Commission, May, 2024.
- ⁹ (CARB, 2025) [California Emissions Projection Analysis Model \(CEPAM\) 2019 Ozone SIP v.1.04](#), California Air Resources Board, 2025.
- ¹⁰ (CEC, 2025d) SB 100 Reference Scenario workbook, California Energy Commission, email received July 21, 2025.
- ¹¹ (CARB, 2024b) [Staff Report: Initial Statement of Reasons](#). California Air Resources Board, 2024.
- ¹² (CARB, 2024c) [Final Statement of Reasons](#). California Air Resources Board, 2024.
- ¹³ (CARB, 2024d) [FSOR LCFS Addendum](#). California Air Resources Board, 2024.
- ¹⁴ (CARB, 2024e) [Appendix D: Final Environmental Impact Analysis for the Proposed Low Carbon Fuel Standard Regulation](#). California Air Resources Board, 2024.
- ¹⁵ (CARB, 2024f) [Response to Comments on the Draft and Recirculated Environmental Impact Analyses](#). California Air Resources Board, 2024.
- ¹⁶ (CARB, 2024g) [Notice of Determination](#). California Air Resources Board, 2024.
- ¹⁷ (EPA, 2025) [Large NRSI Engine Certification Data \(Model years: 2011-Present\)](#). U.S. Environmental Protection Agency, June 2025.
- ¹⁸ (Mainspring, 2025a) [The Mainspring Linear Generator](#), Mainspring 2025.
- ¹⁹ (Bloom, 2024) [The Bloom Energy Server 6.5](#), Bloom Energy, 2025.
- ²⁰ (CARB, 2024h) [Modeling Output Sheet from 15-day Package](#): Proposed Scenario (8/12/24), California Air Resources Board, 2024.
- ²¹ (Mainspring, 2025b) [Clean, onsite EV charging infrastructure & prime power generation for a global leader in logistics real estate](#). Mainspring Energy, Accessed August 8, 2025.
- ²² (CARB, 2023b) [CATS Model v0.2 Technical Documentation](#). California Air Resources Board, 2023.