

# **Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements**

*Proposed Amendments to the Low Carbon Fuel  
Standard Regulation*

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# **The Specific Purpose and Rationale of Each Adoption, Amendment, or Repeal**

California Government Code section 11346.2(b)(1) requires a description of the specific purpose for each proposed adoption, or amendment, the problem the agency intends to address with the proposed LCFS regulation, and the rationale for determining that each proposed adoption and amendment is reasonably necessary to both carry out the purposes of CARB staff's proposed LCFS regulation and to address the problems for which it is proposed.

The overarching purpose of the proposed LCFS regulation is to decarbonize transportation through increasing the supply of low-carbon alternative fuels. The problems that LCFS needs to address are described in Chapter II of the Staff Report. This appendix presents the summary of each proposed amendment and describes its purpose and rationale for its role in increasing low-carbon alternative fuel supply.

## **I. Purpose and Rationale of Each Adoption, Amendment, or Repeal**

### **A. Subarticle 7. Low Carbon Fuel Standard**

#### **1. Subarticle 7. Minor changes throughout the Low Carbon Fuel Standard Regulation.**

##### **a) Purpose**

Staff proposes minor changes, which do not have a material impact on requirements of the regulation, throughout subarticle 7 to improve consistency and clarity.

- Update the California Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (CA-GREET) model version 3.0, or "CA-GREET3.0" to "CA-GREET4.0" and update the applicable implementation date and document release dates.
- Update "OPGEE2.0" to "OPGEE3.0b" (or "OPGEE" as a generic term for the model) and update the model release date.
- Replace "Simplified CI Calculator" and "Tier 1 Simplified CI Calculator" with "Tier 1 CI Calculator"
- Replace "LCFS Verification Portal (LVP)" with "LCFS Reporting Tool & Credit Bank and Transfer System (LRT-CBTS)"
- Replace "web site" with "website."
- Remove "st" and "th" from dates (e.g., June 30<sup>th</sup>, December 31<sup>st</sup>).

##### **b) Rationale**

These changes maintain consistency and clarity in the regulation. These terminologies are used throughout the regulation and the reasoning provided here is applicable for all sections where these terms appear.

- Updating "CA-GREET3.0" to "CA-GREET4.0" and implementation dates are necessary to maintain consistency with the staff proposal to incorporate CA-GREET4.0 in the regulation and convey the official timeline about the availability of CA-GREET4.0 calculators in submitting applications and annual fuel pathway reports.

- Updating “OPGEE2.0” to “OPGEE3.0b” or “OPGEE” and implementation date are necessary to maintain consistency with the staff proposal to incorporate OPGEE3.0b in the regulation.
- Replacing “Simplified CI Calculator” and “Tier 1 Simplified CI Calculator” with “Tier 1 CI Calculator” will improve consistency throughout the regulation and removes unnecessary verbiage.
- Replacing “LCFS Verification Portal” with “LCFS Reporting Tool & Credit Bank and Transfer System” is necessary in order to more accurately reflect the mechanism needed and used to support LCFS verification implementation. The proposed term more accurately reflects the name of the used system because the required verification functions are currently, and will continue to be, an embedded tool within the existing LCFS Reporting Tool & Credit Bank and Transfer System, rather than a separate platform. Thus using “tool” rather than “platform” better reflects the structure of the interactive and secured web-based verification system.
- “Website” and “web site” are both used throughout the regulation. “Website” is more commonly used, so all instances of “web site” are replaced with “website.”
- Dates are listed throughout the regulation both using the “st” or “th” (e.g., June 30<sup>th</sup>, December 31<sup>st</sup>) and not using them. Since the “st” and “th” are unnecessary, staff proposes to remove them.

## 2. Subarticle 7. Revisions to business days, calendar days, and number of days.

### a) Purpose

To improve consistency and avoid confusion regarding the deadlines for taking the stipulated actions, staff is proposing to make the following changes:

- Replace “business days” and “calendar days” with “days” throughout the regulation,
- Change 15 days to 14 days throughout the regulation, and
- Change the following number of days listed in Table 1 below.

Table 1: Proposed Revisions to Regulatory Time Period Lengths

Current Section	Proposed section	Description	Current # of days	Proposed # of days
95489(c)(3)(B) 95489l(4)(B)	95489(c)(3) (C) and 95489l(4) (C)	Comment period for Innovative Crude and Refinery Investment Credit Program provisions	10 calendar days	14 days
Not applicable	95489(f)(4) (C)	Comment period for Renewable Hydrogen Refinery Credit Program	NA	14 days
95489(b)(3)(B)	Same as current	Applicants to respond to comments related to Annual Crude Average Carbon Intensity Value	10 days	14 days

Current Section	Proposed section	Description	Current # of days	Proposed # of days
95490(d)(2)	Same as current	Applicants to respond to comments related to carbon capture and Sequestration projects	10 calendar days	14 days
95488.7(d)(5)(A)	Same as current	Tier 2 application comment period	10 business days	14 days
95488.8(j)(2)(A)	95491.2.(a)(2)(A)	Provide additional documents for calibration postponement request	10 (ten) business days	14 days
95491.1(a)	Same as current	Regulated entities to provide requested records	20 days	14 days
95495(b)(2)	Same as current	Provide additional information to Executive Officer after the credit modification notice is issued.	20 days (twice)	14 days (twice)
95495(b)(4)	Same as current	Executive Officer to make a final determination on credit modification after the initial determination	50 days	30 days

## b) Rationale

The proposed changes are necessary to create consistency throughout the regulation document given that “day” is defined in section 95481 as a calendar day unless specified as a business day. Replacing “business days” with calendar days will clarify when items are due from applicable entities. This will also reduce administrative burden for staff as they receive regular inquiries about timelines and due dates from entities.

Additionally, changing 15 days to 14 days throughout the regulation creates timeline consistency across various LCFS provisions and with the Mandatory Greenhouse Gas Reporting Regulation. The proposed changes in the number of days for the comment period will provide consistency across various provisions, while continuing to provide adequate time for public feedback on the applications.

The other proposed changes to number of days, listed in Table 1 above, will provide a reasonable response time while maintaining consistency with the Mandatory Greenhouse Gas Reporting Regulation and without compromising program efficiency.

## **B. Section 95481. Definitions and Acronyms**

### **1. Section 95481(a). Remove Numbering in Definitions Section.**

#### **a) Purpose**

Staff proposes to remove the numbering in the Definitions section of the regulation.

#### **b) Rationale**

The numbering in the Definitions section is not necessary and creates more administrative burden for staff when definitions are added or subtracted from the regulation. Removing the numbering also aligns with the layout of the Acronyms subsection. Instead of referring to the definitions numbering, the regulation will use the term to refer to the definition.

### **2. Section 95481(a). Revise and Add Definitions for Common LCFS Terms**

#### **a) Purpose**

Staff proposes to revise the definitions for “alternative fuel”, “renewable diesel” and “renewable hydrogen” and add definitions for the following terms:

“Biomass Gasification”

“Byproduct”

“Book-and-Claim Accounting”

“California-Modified Greenhouse Gases, Regulated Emissions, and Energy use in Transportation Model (CA-GREET)”

“California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB)”

“Carbon Capture and sequestration (CCS) project”

“Composite CI”

“Co-product”

“Distiller’s Grains and Solubles”

“Emissions & Generation Resource Integrated Database (eGRID)”

“Emission Factor”

“Food Scraps”

“Fugitive Methane”

“Higher Heating Value (HHV)”

“Hydrogen Capacity Evaluator (HyCap)”

“Hydroprocessed Ester and Fatty Acid (HEFA) Fuel”

“Lower Heating Value (LHV)”

“Operating Condition”  
“Operational Data Period”  
“Organic Waste”  
“Primary Product”  
“Renewable Natural Gas (RNG)”  
“Renewable Naphtha”  
“Residue”  
“Standard Value”  
“Urban Landscaping Waste”  
“Waste”  
“Wastewater Sludge”

## **b) Rationale**

The proposed new definitions are necessary to improve transparency, comprehensibility, and consistency of how the terms they are used in the program, as they have precise meanings in the LCFS. The addition of these definitions will facilitate more precise understanding of the meanings of the terms used in the regulation, which is anticipated to reduce potential confusion and associated administrative resource demands.

The proposed changes to the definitions of “alternative fuel”, “renewable diesel” and “renewable hydrogen” are necessary to clarify the terms and maintain consistency with other proposed edits to referenced fuel types.

## **3. Section 95481(a). Updates to Documents Incorporated by Reference**

### **a) Purpose**

Staff propose to update and adopt the following documents, all of which are incorporated by reference in Section 95481(a):

- “AEZ-EF Model” - Remove an outdated web link.
- “Avoided Cost Calculator” - Update date of version release and remove outdated web link.
- “CA-GREET3.0” - Remove language that incorporates this by reference under the definition of “Blendstock” and change to “CA-GREET4.0”.
- “OPGEE” - Update version, date of version release, and web link where model can be accessed.

### **b) Rationale**

These updates are necessary so that the most current versions of the documents and models are incorporated by reference. Removing outdated web links and adding new web links makes it easier for the public to view these documents. For “CA-GREET3.0”, the removal of language



that incorporates this by reference is necessary because documents should only be incorporated by reference once in the regulatory text, and it is more appropriately referenced in section 95488.1(c).

#### **4. Section 95481(a). Definition for “Alternate Method”**

##### **a) Purpose**

Staff proposes to add a definition for “alternate method” to specify what may need to be included in the alternate method request.

##### **b) Rationale**

Entities that are required to submit an alternate method request need to understand what types of data may be required to receive CARB approval. The concept of “conservative” is introduced for those sources with inaccurate data that are required to submit an alternate method for their data to be verifiable. Section 95481(a). Definition for “Alternative Jet Fuel”

##### **c) Purpose**

Staff proposes to revise the definition for “alternative jet fuel” to delineate alternative jet fuel from the proposed definition for fossil jet fuel.

##### **d) Rationale**

The proposed revision for the “alternative jet fuel” definition harmonizes with terminology used in the fossil jet fuel and conventional jet fuel definitions. Section 95481(a). Definition for “Auto Acceleration Mechanism”

##### **e) Purpose**

Staff proposes to add a definition for “Auto Acceleration Mechanism,” defined as the mechanism implemented to advance the carbon intensity benchmark schedule by one year in the event that a trigger event occurs.

##### **f) Rationale**

The proposed addition of a definition for “Auto Acceleration Mechanism” recognizes the need to create a proper definition to refer to the specific mechanism that will be used to advance the carbon intensity benchmark schedule by one year.

#### **5. Section 95481(a). Definition for “Break ground”**

##### **a) Purpose**

Staff proposes to add a definition for “break ground”, defined as the earthmoving and site preparations necessary for construction of the digester system and supporting infrastructure that starts following approval of all necessary entitlements/permits for the project.

## **b) Rationale**

It is necessary to define “break ground” because it is used as a regulatory threshold standard for multiple LCFS provisions. The duration of crediting for transportation fuel used in compressed natural gas (CNG) vehicles produced from biomethane (bio-CNG, bio-LNG, and bio-L-CNG) is based on whether the project “breaks ground” before or after December 31, 2029 (section 95482(g)). This threshold is also used for determining the duration of crediting for avoided methane (section 95488.9(f)(3)) and for deliverability requirements for book-and-claim accounting for pipeline-injected biomethane (section 95488.8(i)(2)).

“Break ground” is defined as such to recognize that major project-related earthmoving occurs after a project receives a construction permit from the local regulatory body. Using this event as the threshold, rather than the date the pathway is certified, recognizes that the project is moving ahead while providing flexibility for the precariousness of construction timelines that are due to factors outside the project’s control.

## **6. Section 95481(a). Definition for “Conservative”**

### **a) Purpose**

Staff proposes to add a definition for “conservative” to describe whether a low or high value should be substituted according to Table 13 of the regulation.

### **b) Rationale**

Because the regulation is clarifying staff’s initial intent that all entities with missing data use missing data substitution when reporting data to CARB, a new definition will assist entities in complying with this existing requirement.

## **7. Section 95481(a). Definition for “Credit Bank”**

### **a) Purpose**

Staff proposes to add a definition for “Credit Bank,” defined as the total credits carried over from previous crediting periods that have not been retired to demonstrate compliance.

### **b) Rationale**

Many stakeholders have been casually referring to non-retired, carry-over crediting as the “credit bank.” This definition serves to clarify exactly what is meant for regulatory purposes.

## **8. Section 95481(a). Definition for “Fossil Jet Fuel” and Fossil Jet Fuel Transaction Type**

### **a) Purpose**

Staff proposes to add a definition for “Fossil Jet Fuel,” defined as Conventional Jet Fuel from fossil sources. In Conventional Jet Fuel blends that contain Alternative Jet Fuel, the portion that is not Alternative Jet Fuel is Fossil Jet Fuel.

Staff proposes to add a definition for the transaction type “Fossil Jet Fuel used for Intrastate Flight.”

**b) Rationale**

The proposed addition of a definition for “Fossil Jet Fuel” is necessary to reflect that while Conventional Jet Fuel historically was entirely Fossil Jet Fuel, Conventional Jet Fuel is primarily defined by its physical characteristics and can be a blend of Alternative Jet Fuel and Fossil Jet Fuel. With the Proposed Amendments to section 95482, it is necessary to identify Fossil Jet Fuel as a type of Conventional Jet Fuel, so that volumes of Fossil Jet Fuel can be reported.

**9. Section 95481(a). Definitions for “Full Verification” and “Less Intensive Verification”**

**a) Purpose**

Staff proposes to add definitions for “full verification” and “less intensive verification,” which staff proposes to add with new subsection 95501(h).

**b) Rationale**

Defining these terms are necessary in order to specify the meaning of the proposed concept. Section 95501(h) details the eligibility for “less intensive verification.” Compared to full verification, less intensive verification targets lower risk entities and allows for verification in subsequent reporting periods to skip site visits if they meet the eligibility requirements.

**10. Section 95481(a). Definition for “Gasification” and “Pyrolysis”**

**a) Purpose**

Staff proposes to add definitions for “gasification” and “pyrolysis” to describe technologies that can be used to produce drop-in fuels from biomass. Drop-in fuels qualify as Tier 2 fuel pathways.

**b) Rationale**

These processes need to be defined to reduce confusion or ambiguity that may arise when these technologies are used in Tier 2 fuel pathway applications. These definitions are derived from definitions used by the California Energy Commission and U.S. Environmental Protection Agency (U.S. EPA).

**11. Section 95481(a). Definition for “Missing Data”**

**a) Purpose**

Staff proposes to add a definition for “missing data” to further define what constitutes missing data.

## **b) Rationale**

Because the regulation is clarifying staff's initial intent that entities with missing data use missing data substitution when reporting data to CARB, a new definition will assist entities in complying with this existing requirement.

### **12. Section 95481(a). Definitions for “Private MHD-FCI Charging Site” and “Private MHD-HRI Station”**

#### **a) Purpose**

Staff proposes to add definitions for “private MHD-FCI charging site” and “private MHD-HRI station” which staff proposes to add with new section 95486.3.

#### **b) Rationale**

Defining these terms is necessary in order to specify the meaning of the proposed programs, as section 95486.3 contains provisions specific to private charging and refueling infrastructure.

### **13. Section 95481(a). Definitions for “Public MHD-FCI Charging Site” and “Public MHD-HRI Station”**

#### **a) Purpose**

Staff proposes to add definitions for “public MHD-FCI charging site” and “public MHD-HRI station” which staff proposes to add with new section 95486.3.

#### **b) Rationale**

Defining these terms is necessary in order to specify the meaning of the proposed programs, as section 95486.3 contains provisions specific to public charging and refueling infrastructure.

### **14. Section 95481(a). Definition for “Temporary Method”**

#### **a) Purpose**

Staff proposes to add a definition for “temporary method” to limit the time period when a temporary method can be used and to clarify that reported data must be accurate.

#### **b) Rationale**

The proposed amendment would allow for a temporary method only to be used for specified report types for a period of up to six months each calendar year. This limitation now requires entities to request an alternate method if accurate data is not available for longer than six months, allowing CARB to provide additional oversight for these types of method changes.

For fuel pathway applications, annual fuel pathway reports, and quarterly fuel transactions reports, new missing data substitution requirements were added. Temporary methods may no longer be used for these report types.

## **15. Section 95481(a) and Sections 95501(b)(9)(B), 95501(b)(10)(A), 95501(b)(11)(A). 5% Decimals Addition**

### **a) Purpose**

Staff proposes to modify “5 percent” to “5.00 percent” and modify “2 gCO<sub>2</sub>e/MJ” to “2.00 gCO<sub>2</sub>e/MJ” in the definitions of “Material Misstatement” in section 95481(a) and calculations of “Material Misstatement” in subsections 95501(b)(9)(B), 95501(b)(10)(A), and 95501(b)(11)(A).

### **b) Rationale**

Adding 2 decimals as “.00” in “5 percent” and “2 grams” in the text of these regulation sections will increase accuracy and prevent rounding errors regarding Material Misstatement definitions and calculations.

## **C. Section 95482. Fuels Subject to Regulation**

### **1. Section 95482. Eliminate Exemption for Intrastate Fossil Jet Fuel**

#### **a) Purpose**

Staff proposes to include fossil jet fuel used for intrastate flights as a fuel subject to the LCFS regulation, starting in 2028. Fossil jet used for interstate or international flights would continue to be exempted from the LCFS program, but fossil jet used in intrastate flights would generate deficits relative to the benchmark schedule described in Table 3 of the regulation.

#### **b) Rationale**

The 2022 Scoping Plan Update highlights the importance of continuing to support low-carbon liquid fuels for sectors that are more difficult to transition to ZEV technology, such as aviation. While alternative jet fuel is currently eligible to opt-in to the program to generate credits, fossil jet fuel is currently exempt from the regulation and does not generate deficits. Replacing fossil jet fuel with low-carbon alternative jet fuel is a goal of both the state and federal governments and aligns with the deep decarbonization required under AB 1279. The proposed amendment applies to intrastate flights beginning and ending in California.

Staff proposes to remove the fossil jet fuel exemption from the LCFS program in 2028. This delay provides sufficient time for potential producers of alternative jet fuel to add capacity for the anticipated increased demand of alternative jet fuel when fossil jet fuel is included in the LCFS program.

### **2. Section 95482(f). Transportation Fuels From Palm Oil or Palm Derivatives**

#### **a) Purpose**

Staff proposes to prohibit transportation fuels produced from palm oil or palm derivatives, such as palm fatty acid distillate, from generating LCFS credits. Volumes of fuels produced from palm or palm derivatives would be reported with the same CI as Ultra Low Sulfur Diesel (ULSD) found in the Lookup Table (Table 7 of the regulation).

## b) Rationale

Palm-derived fuels are considered a high-risk feedstock for deforestation.<sup>1</sup> The Regulation currently assigns a land use change CI value of 70 g/MJ to palm-derived fuel pathways, and historically palm feedstocks have not been used in the program. However, staff is proposing to explicitly remove the ability for palm-derived fuels to generate credits to remove any incentive to send these fuels to California. In the unlikely event that palm-derived fuels are brought to California, assigning the ULSD CI ensures that the fuel would receive as many deficits as fossil diesel per gallon. Guaranteed deficit generation, coupled with the increased cost of transporting palm-derived fuels to California from other countries, should continue to send a strong signal that disincentivizes use of this fuel.

### 3. Section 95482(g). Biomethane Used in Natural Gas Vehicles

#### a) Purpose

For projects that break ground after December 31, 2029, Staff proposes to phase out pathways for transportation fuel used in compressed natural gas (CNG) vehicles produced from biomethane (bio-CNG, bio-LNG, and bio-L-CNG) after December 31, 2040. After that date, any volumes of these fuels from these fuel pathways used in CNG vehicles would be reported with the same CI as ULSD found in the Lookup Table (Table 7 of the regulation).

#### b) Rationale

The 2022 Scoping Plan Update calls for a transition to non-combustion technology and shifting biomethane resources to non-transportation end uses and hydrogen production. Beginning the phase out for these pathways in 2040 provides time for biomethane producers to transition to supplying other sectors or to use biomethane as a feedstock for renewable hydrogen production. If bio-CNG, bio-LNG, and bio-L-CNG are used as combustion transportation fuel after 2040, assigning the ULSD CI ensures that the fuel would receive as many deficits as fossil diesel per gallon.

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<sup>1</sup> European Commission, *Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the status of production expansion of relevant food and feed crops worldwide*. Brussels. March 13, 2019. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0142>

European Commission, *Annexes to the Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the status of production expansion of relevant food and feed crops worldwide*. Annexes 1 to 2. Brussels. March 13, 2019.

Searle, S., *Defining Low and High Indirect Land-Use Change Biofuels in European Union Policy*. The International Council on Clean Transportation. November 2018.

<https://theicct.org/sites/default/files/High%20low%20ILUC%20Fact%20Sheet%2020181113.pdf>

## **D. Section 95483. Fuel Reporting Entities.**

### **1. Section 95483(a)(2)(A)3.a. Incremental Deficit.**

#### **a) Purpose**

Staff proposes including the incremental deficit into the fuel pathway code for California Reformulated Gasoline Blendstocks for Oxygenate Blending (CARBOB) and Ultra Low Sulfur Diesel (ULSD) allowing for only one reported transaction.

#### **b) Rationale**

From the inception of the LCFS program, staff has conducted an analysis of the three-year crude oil average being processed by fossil fuel refiners. If the processed crude slate is higher than the 2010 baseline, an incremental deficit is applied to reported CARBOB and ULSD.

As currently written, the regulation separates the reported CARBOB and ULSD and incremental deficits into two distinct items, where the reported fuel is passed to the recipient while the incremental deficit remains with the refiner (or transferor). However, in practice, the transferor passes along the incremental deficit obligation to the recipient who is consuming the fuel. Therefore, to simplify the liquid fuel reporting process and increase accuracy in reporting, staff proposes simplifying the reporting requirements for CARBOB and ULSD so that reported fuel and incremental deficits are reported in the same transaction.

### **2. Section 95481(c)(1). Updates to Base Crediting.**

#### **a) Purpose**

Staff is proposing changes to the allocation and uses of base credits representing non-metered residential electric vehicle (EV) charging. Staff is proposing the following changes:

- The Clean Fuel Reward is changed from a light-duty rebate to a targeted medium and heavy-duty rebate
- The minimum base credit contribution required to fund the Clean Fuel Reward is adjusted along with the specific utility requirements for funding the program
- The proportion of credit proceeds required to be invested in Disadvantaged, low-income, rural, and tribal communities (holdback equity credits) is expanded; and
- The list of pre-approved projects eligible for funding of holdback equity credits is enhanced.

The Clean Fuel Reward will change from a universal new light-duty EV rebate to be focused on new and used rebates for medium- and heavy-duty trucks that are exempted from Advanced Clean Fleets regulation. This rebate will jumpstart the transition for a harder to transition segment of the truck sector that is not otherwise covered by other CARB regulations. The proportion of residential base credits will change to reflect this change in rebate from 60% of total base credits to 40% with a corresponding increase in “holdback credits.” As a result of this increase in holdback credits, staff is proposing increasing the requirements for investments in equity communities for the IOUs to 75% (from 50%) to match the requirements set by the Public Utilities Commission. Staff is also proposing new pre-approved categories for

investment of holdback equity proceeds along with a reduction in the percentage of base credits proceeds that can be utilized for administrative costs.

## **b) Rationale**

Staff's proposed changes for the distribution and uses of base credits reflects CARB's priority to accelerate the deployment of zero-emissions vehicles and infrastructure, as adopted in the 2022 Scoping Plan, Advanced Clean Cars II regulation, and the Advanced Clean Fleets regulation, with a focus on equity projects.

Staff is proposing a reform to the statewide rebate program, or "Clean Fuel Reward," from a universal new light-duty electric vehicle rebate to a rebate focused on medium and heavy-duty vehicles that are not subject to the Advanced Clean Fleet Regulation as specified in section 2015(a)(1).<sup>2</sup> This change in priority aligns with need for greater support for fleets with less than \$50 Million in revenue or for fleets of fewer than 50 vehicles. Staff is proposing reducing the base credit contribution to the Clean Fuel Reward from 60% of total base credits to 40% with the intention of providing significant incentive support for electrifying these smaller fleets, which will disproportionately benefit small businesses, as well as reduce emissions in communities burdened by combustion emissions from transport. The change in overall base credit proceeds is reflected in changes to the individual contribution percentages from the different utilities. In addition, San Diego Gas & Electric is re-defined to have a comparable contribution to the statewide program to similarly sized public utilities.

For the remaining credit proceeds, or "holdback credits," staff is proposing modifications to the regulation. First, the proposal aligns the requirement that 75% of holdback credit proceeds for the investor-owned utilities must be utilized for equity projects which is an increase from 50%.<sup>3</sup> The holdback equity requirement for Publicly Owned Utilities would remain at 50%. The definition of holdback equity communities has also been changed to include federal and state recognized tribes as well as a community in which at least 75% of public school students in the project area are eligible to receive free or reduced-price meals under the National School Lunch Program. Finally, the list of pre-approved projects for uses of holdback equity spending is modified to include priorities set from the Scoping Plan as well as from community input. These changes include but are not limited to expanding the rebates eligible for drayage to also include other medium-, heavy-duty, or off-road vehicles; investments in grid-side distribution infrastructure that would enable medium- and heavy-duty ZEV deployment; re-skilling and workforce development for transportation electrification applications; and transportation projects identified in AB 617 Community Emission Reduction Plans. Staff is also proposing the removal of holdback credit proceeds for Marketing, Education, & Outreach for electric vehicles.

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<sup>2</sup> California Air Resources Board, *Final Regulation Order Advanced Clean Fleets Regulation: High Priority and Federal Fleets Requirements*. Article 3.4. October 1, 2023.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/acf22/ac/acffro21.pdf>

<sup>3</sup> California Public Utilities Commission, *Rulemaking 18-12-006 Decision Concerning Low Carbon Fuels Standard Holdback Revenue Utilization*. December 21, 2020.

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M356/K223/356223853.PDF>



### **3. Sections 95483(c)(1) and 95483(c)(2). Fuel Reporting Entities for Residential Electrical Vehicle Charging**

#### **a) Purpose**

The purpose of the proposed amendment to section 95483(c)(1) is to specify that charging at non-reserved chargers at multi-family residences (MFR) should generate LCFS credits as nonresidential charging in order to more strongly incentivize the development of and availability of charging at MFRs. Staff proposes to modify section 95483(c)(1) so that the term “residential EV charging” is specified to include charging that occurs at chargers at reserved spaces at MFRs. Non-reserved chargers at MFRs would, therefore, be considered as “non-residential EV chargers” as defined in 95483(c)(2).

#### **b) Rationale**

Modifying the definition for residential EV charging will establish a direct LCFS incentive for EV infrastructure development at multi-family residences. This change will allow EV supply equipment owners and developers to generate credits from deployment at multi-family residences, which has been identified<sup>4</sup> as a sector requiring further investment. Because the current regulatory text broadly designates all crediting for residential charging to the EDUs, or to the entities who can register individual vehicle identification numbers, rather than to EV supply equipment owners, the latter may not have as strong and direct an incentive to develop more EV supply equipment at MFRs as could be most optimal and impactful. Enabling further charging infrastructure at multi-family residences allows for development in mixed-use zoning and eliminates confusion on charger eligibility. More strongly supporting the development of chargers at multi-family residences also encourages car sharing and harmonizes current utility rate and incentive programs.<sup>5</sup> Chargers at reserved parking spaces are reserved for residences and therefore would still be considered “residential” charging.

### **4. Section 95483(c)(1)(A). Remove Definitions Numbering for “Clean Fuels Rewards”.**

#### **a) Purpose**

Staff proposes to remove the reference to the “Clean Fuels Rewards” definition number in section 95483(c)(1)(A) (e.g. strike the number 29).

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<sup>4</sup> UCLA Luskin Center for Innovation, *Overcoming Barriers to Electric Vehicle Charging in Multi-unit Dwellings: A Westside Cities Case Study*. Prepared for The Southern California Association of Governments November 2017. [https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/Overcoming\\_Barriers\\_to\\_EV\\_Charging\\_in\\_MUDs-A\\_Westside\\_Cities\\_Case\\_Study.pdf](https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/Overcoming_Barriers_to_EV_Charging_in_MUDs-A_Westside_Cities_Case_Study.pdf)

<sup>5</sup> Los Angeles Department of Water & Power, *EV Charger Rebate Program*. April 2016. [https://www.ladbs.org/docs/default-source/publications/misc-publications/ev-charger-rebate-program.pdf?sfvrsn=faf2fe53\\_8](https://www.ladbs.org/docs/default-source/publications/misc-publications/ev-charger-rebate-program.pdf?sfvrsn=faf2fe53_8)

## **b) Rationale**

Since staff is proposing to remove the definitions numbering in section 95481(a), staff proposes to remove references to definition numbers throughout the regulation. Instead of using the numbering throughout the regulation to point to the term in section 95481(a), the general definition section will be used instead.

## **5. Section 95483(c)(1)(A). Fuel Reporting Entities for Base Credits.**

### **a) Purpose**

To facilitate more coherent and cohesive organization of the LCFS regulations, staff proposes to move requirements for annual electricity credit proceeds use reports from section 95483(c)(1)(A) and consolidate them into section 95491, which comprehensively lists reporting requirements, under a new subsection 95491(e)(5) named “Uses of Electricity Credit Proceeds.”

### **b) Rationale**

The current regulation requires that electricity credit proceeds be used to further transportation electrification in California by benefitting current or future electric vehicle drivers, and that entities demonstrate how they satisfied that requirement in an annual report. The regulation requires additional annual reporting for entities who generate base credits including the breakdown of credit proceeds used to fund the California Clean Fuel Reward and holdback credit equity projects. The proposed regulation change consolidates the electricity credit proceeds spending and reporting requirements within the section of the regulation that comprehensively focuses on reporting requirements.

## **6. Section 95483(c)(1)(A)6. Restrictions on the Use of Holdback Credits**

### **a) Purpose**

To facilitate more coherent and cohesive organization of the LCFS regulations, staff proposes to move the requirements for the annual electricity credit proceeds report from section 95483(c)(1)(A)6. and consolidate them into section 95491, which comprehensively lists reporting requirements, under a new subsection in 95491(e)(5) named “Uses of Electricity Credit Proceeds.”

### **b) Rationale**

The current regulation requires that electricity credit proceeds be used to further transportation electrification in California by benefitting current or future electric vehicle drivers, and that entities demonstrate how they satisfied that requirement in an annual report. The regulation requires additional annual reporting for entities who generate base credits including the breakdown of credit proceeds used to fund the California Clean Fuel Reward and holdback credit equity projects. The proposed regulation change consolidates the electricity credit proceeds spending and reporting requirements within the section of the regulation that comprehensively focuses on reporting requirements.

## **7. Sections 95483(c)(1)(B) and 95483(c)(2)(C). Fuel Reporting Entities for Incremental Credits**

### **a) Purpose**

Staff proposes to move and consolidate the requirements for the annual electricity credit proceeds report into a separate subsection in 95491(e)(5) named “Uses of Electricity Credit Proceeds.” No substantive changes to the reporting requirements are proposed.

### **b) Rationale**

The current regulation requires that electricity credit proceeds be used to further transportation electrification in California by benefitting current or future electric vehicle drivers, and that entities demonstrate how they satisfied that requirement in an annual report. The proposed regulation change consolidates the electricity credit proceeds spending and reporting requirements within the section of the regulation that comprehensively focuses on reporting requirements.

## **8. Section 95483(c)(2). Fuel Reporting Entities for Residential Electrical Vehicle Charging.**

### **a) Purpose**

See Purpose for Section 95483(c)(1), Fuel Reporting Entities for Residential Electrical Vehicle Charging.

### **b) Rationale**

See Rationale for Section 95483(c)(1), Fuel Reporting Entities for Residential Electrical Vehicle Charging.

## **9. Sections 95483(c)(2)(C). Fuel Reporting Entities for Incremental Credits.**

### **a) Purpose**

See Purpose for Section 95483(c)(1)(B), Fuel Reporting Entities for Incremental Credits.

### **b) Rationale**

See Rationale for Section 95483(c)(1)(B), Fuel Reporting Entities for Incremental Credits.

## **10. Section 95483(c)(4). Zero Emission Forklifts Registration.**

### **a) Purpose**

Staff proposes to align electric forklift registration with the other off-road electricity applications such as electric transport refrigeration units (eTRU), electric cargo handling equipment (eCHE), and electric power for ocean-going vessel (eOGV) by making the Fuel Supply Equipment (FSE) owner the first fuel reporting entity and default credit generator.

## **b) Rationale**

The first fuel reporting entity is the owner of the FSE for most off-road electricity applications such as eTRU, eCHE and eOGV. For these applications, the FSE is defined as “the facility or location where electricity is dispensed for fueling” (see subsection 95483.2(b)(8)(B)6.). For electric forklift fueling, subsection 95483(c)(4) of the current LCFS regulation defines the forklift fleet owner as the fuel reporting entity and default credit generator. This definition encouraged greater participation and was proposed, adopted, and implemented in parallel with the estimation methodology used for reporting. Designating the fleet owner as the reporting entity created registration and implementation burdens as it required reporting entities to provide detailed rosters of the forklift fleets. Where multiple reporting entities registered the same location, each reporting party had to provide additional demonstration of fleet population and ownership to ensure that there was no conflict or duplicate reporting. Staff’s proposal to change the default credit generator to the owner of the FSE is anticipated to eliminate these burdens and to further encourage and facilitate participation. Having one entity register each location enables reporting by direct metering, reduces the burden of reporting parties to maintain a detailed list of active forklifts at a location for regulatory purposes, and allows for more transparent registration and reporting. Additionally, changing the first fuel reporting entity aligns electric forklifts with the proposed zero-emission forklift regulation, where the regulated entity would be the forklift operator.<sup>6</sup>

## **11. Section 95483(c)(4)(C). Eligible Uses of Electricity Credit Proceeds.**

### **a) Purpose**

Staff proposes to move and consolidate the requirements for the annual electricity credit proceeds report into a separate section in 95491(e)(5) named “Uses of Electricity Credit Proceeds.”

### **b) Rationale**

The current regulation requires that electricity credit proceeds be used to further transportation electrification in California by benefitting current or future electric vehicle drivers, and that entities demonstrate how they satisfied that requirement in an annual report. The applicability of those requirements for electric forklifts in the current regulation had been ambiguous. With the proposed inclusion of forklifts along with other off-road electricity fueling applications in section 95483(c)(4) the regulation would specify that the use of credit proceeds and associated reporting requirements apply to electric forklift crediting. The regulation included multiple references to electricity credit proceeds spending and reporting requirements. The proposed regulation change consolidates the electricity credit proceeds spending and reporting requirements within the section of the regulation that comprehensively focuses on reporting requirements. No substantive changes to existing requirements were made.

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<sup>6</sup> California Air Resources Board, *Proposed Regulation Order Zero-Emission Forklift Fleet Requirements Regulation*. November 7, 2023. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/zeforklifts/appa1.pdf>

## **E. Section 95483.2 LCFS Data Management System.**

### **1. Section 95483.2(a) and Section 95489. Update Terminology for Data Management System.**

#### **a) Purpose**

Staff proposes changing the reference to the specified mechanism for application submissions for petroleum fuel crediting. The proposed change is necessary in order to reflect that LCFS Reporting Tool & Credit Bank and Transfer System (LRT-CBTS) is a more appropriate system than the currently specified Alternative Fuels Portal (AFP) to be used for submission of petroleum-based crediting applications.

#### **b) Rationale**

The proposed changed term reflects that petroleum fuel crediting applications, including applications for innovative crude projects, low-complexity/low-energy-use refinery credits, the refinery investment credit program, and the renewable hydrogen refinery credit program, do not require fuel pathway applications. Accordingly, the AFP, which is designed to support fuel pathway applications, certifications, and verifications, is not the most appropriate system for the submission of applications for petroleum-based crediting applications. Instead, the LRT-CBTS system, designed to support fuel transaction reporting, compliance demonstration, credit generation, banking, and transfers, better fits the system needs of applicants for petroleum fuel crediting projects. No substantive changes to existing requirements were made.

### **2. Section 95483.2(b)(8)(B). Specific Requirements for Electric Transport Refrigeration Units.**

#### **a) Purpose**

Staff proposes to change the Fueling Supply Equipment (FSE) for electric transport refrigeration units (eTRU) from the eTRU unit to the facility or location where electricity is dispensed for fueling. This change will strengthen the policy incentive signal by specifying the fueling facility owner as the fuel reporting entity and the credit generator.

#### **b) Rationale**

The proposed change is designed to more effectively direct incentive value towards the entities in the best position to use the value to support needed charging infrastructure deployment. Staff anticipates that the proposed change will facilitate more reporting participation for eTRUs in the LCFS, along with more associated credit generation and value returned.

Section 95483(c)(5)(A) of the LCFS regulation designates the FSE owner as the default reporting entity for eTRUs as well as two other off-road equipment applications—eCHE and eOGV. The FSE for electric cargo handling equipment (eCHE) and electric power for ocean-going vessels (OGV) is the fueling facility or location; however, for eTRU, the current regulation specifies the FSE to be the eTRU itself. This approach has resulted in registration complexity for eligible reporting entities for eTRU.

There are currently direct incentives for the purchase of eTRUs through the Clean Off-Road Equipment Voucher Incentive Project program;<sup>7</sup> however, there are no incentives for the development of zero-emission TRU infrastructure. TRU infrastructure deployment represents a significant barrier to the transition to zero-emissions equipment.<sup>8</sup> As of 2020, over 6,000 facilities statewide including refrigerated warehouses or distribution centers, grocery stores, ports, and intermodal railyards require infrastructure in order to enable zero-emissions TRU deployment.<sup>9,10</sup> The Proposed Amendments would specify the fueling facility owner, rather than the owner of the equipment being refueled (the eTRUs themselves) to be the first fuel reporting entity and default credit generator instead. This aligns the default reporting entity and credit generator for eTRUs with the entity in the best position to identify high use fueling locations and use the value of the LCFS credits generated to support improving or expanding needed infrastructure to further electrification. Infrastructure investments would be included as part of the annual credit proceeds reporting requirements specified in section 95491(e)(5).

Additionally, the proposal would also eliminate the current complexity of the eTRU FSE registration process. Currently, in order to report fueling and generate credits, eTRU owners register every eTRU unit in every location the unit operates. Changing the FSE from the individual TRU to the facility or location where the TRU fuels will simplify FSE registration requirements as well as the reporting process for eTRU.

## **F. Section 95483.3. Change of Ownership or Operational Control.**

### **1. Section 95483.3. Minor Changes**

#### **a) Purpose**

No substantive changes. See Purpose for Subarticle 7, Minor changes throughout the Low Carbon Fuel Standard Regulation.

#### **b) Rationale**

See Rationale for Subarticle 7, Minor changes throughout the Low Carbon Fuel Standard Regulation.

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<sup>7</sup> California CORE, *Clean off-road Equipment Voucher Incentive Project. Transportation Refrigeration Unit.* <https://californiacore.org/equipment-category/transport-refrigeration-units-tru/>

<sup>8</sup> California Air Resources Board, *2022 Technology Assessment: Non-Truck Transport Refrigeration Units (TRU).* October 2022. <https://ww2.arb.ca.gov/sites/default/files/2022-10/CARB%202022%20TRU%20Technology%20Assessment%2010-14-22.pdf>  
[https://ww2.arb.ca.gov/sites/default/files/2022-10/CARB 2022 TRU Technology Assessment 10-14-22.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-10/CARB%202022%20TRU%20Technology%20Assessment%2010-14-22.pdf)

<sup>9</sup> California Air Resources Board, *Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate.* July 27, 2021. <https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/appf.pdf>

<sup>10</sup> South Coast Air Quality Management District, *Proposed Rule 2306 Indirect Source Rule for New Intermodal Facilities.* June 7, 2022. <http://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/r2306-wgm-5-06072022.pdf?sfvrsn=6>

## **G. Section 95484. Annual Carbon Intensity Benchmarks.**

### **1. Section 95484. Annual Carbon Intensity Benchmarks and Auto Acceleration Mechanism.**

#### **a) Purpose**

The current LCFS targets a 20% reduction in average fuel carbon intensity by 2030 and maintains that target for all subsequent years. The production and use of fossil transportation fuels—most of which have a high carbon intensity—continues to contribute significantly to global warming. Implementing a one-time step-down of 5% and strengthening the carbon intensity reduction targets of the LCFS regulation through 2045 is one of the primary objectives of this rulemaking and is discussed extensively in Chapter II of this Staff Report. Staff proposes to strengthen and extend the annual carbon intensity benchmark schedules found in section 95484.

Staff also proposes to update section 95484 to allow the annual carbon intensity benchmark schedule to be updated in a limited capacity through an Auto Acceleration Mechanism (AAM). The AAM would only trigger when specific market conditions, that are monitored closely, exceed defined threshold values.

Staff held several pre-rulemaking workshops to ascertain the market indicators that may be indicative of the need for increasing the stringency of the LCFS benchmark schedule. Staff determined that two market conditions should be monitored for purposes of triggering the AAM: (1) when the pool of outstanding credits (the credit bank) exceeds three quarters of average annual deficits generation, and (2) when the number of credits generated each year exceeds the number of deficits generated each year. The purpose of monitoring these two market indicators is to assess whether the stringency of the standard is adequate given rapid changes that are occurring to California's vehicle fleets. If the market exceeds both indicator thresholds, then the market is supplying more credits than are needed for compliance, and there is already a credit bank which can cover over three quarters of annual compliance obligations.

California is currently pursuing ambitious policy that will accelerate decarbonization of the economy, which includes rapid deployment and uptake of ZEV technology. If ZEV adoption exceeds what is currently modeled or if additional low-cost, low-carbon fuels become available the currently proposed benchmark schedule may not be sufficiently ambitious to ensure that the program continues to provide support for long-term deployment of low-carbon technologies necessary to achieve long-term transportation decarbonization goals.

The AAM is intended to support long-term investment in transportation decarbonization by ensuring that there is a mechanism in place to enhance the stringency of the standard in the event that transportation decarbonization advances more rapidly than staff initially modeled in a rulemaking. If the AAM trigger conditions are met, the mechanism would advance the entire benchmark schedule by one compliance period, increasing the stringency of the regulation for all subsequent years relative to what it otherwise would have been.

Consistent with previous rulemakings, the 2010 baseline values for gasoline, diesel and jet fuel have been updated using the CA-GREET4.0 model.

## **b) Rationale**

Staff conducted an in-depth analysis and conducted extensive stakeholder engagement to inform possible benchmarks through 2045 (see Chapter VIII of this Staff Report for details). Staff developed modeling tools to inform benchmark changes that take into account feedstock supply, fuel prices, fuel incentives, and capacity constraints to assess the technical and economic feasibility of bringing low-carbon fuels to California. This analysis accounted for existing vehicle regulations, federal policies and incentives, and the potential effects of additional proposed changes to the LCFS and revisions to the crediting provisions, which may affect the volumes and types of fuels used to comply with the standard.

Technology innovation and deployment has led to an increased supply of low-carbon transportation fuels and technologies being used in California's market compared to what staff initially anticipated during the rulemaking process for the annual carbon intensity benchmark schedules adopted in 2018. As part of the formal rulemaking process to develop and update the annual carbon intensity benchmark schedule for the program, staff makes assumptions about the rate of deployment and available supply of low-carbon technologies for use in California. If technologies enter the market at a pace that is more rapid than what staff anticipated, credit prices in the LCFS can decline rapidly as credits outpace deficits. This uncertainty can create volatility in the credit market, which could jeopardize long-term investment decisions.

Long-term, low-carbon transportation technology investments are necessary to meet State decarbonization targets. Taking a 5% step down, then strengthening and extending the annual carbon intensity benchmarks and adopting an AAM can support LCFS implementation, deter market manipulation, and provide the certainty necessary for the long term investments required to meet the State's decarbonization goals. An AAM that is triggered when clearly defined market conditions are met will automatically increase program stringency, if necessary, to keep pace with technology innovation and deployment. The existence of an AAM is expected to decrease market volatility and increase market confidence, which will promote low-carbon technology investments.

Updates to the 2010 baseline CI values follows precedent from past rulemakings based on the latest modeling tools.

## **H. Section 95485. Demonstrating Compliance.**

### **1. Section 95485(c)(3). Cumulative Advanced Credits Change.**

#### **a) Purpose**

Staff are proposing to expand the maximum advanced crediting cap from 10 MMT to 30 MMT to reflect the growing size of the credit market.

#### **b) Rationale**

An advanced credit provision was created during the 2019 LCFS rulemaking to enhance cost containment for the program. The number of cumulative advanced credits that can be issued was set at 10 million credits. Starting 7-years after advanced credits are first issued, the



advanced credits that were issued are recovered over a 5-year period by reducing the number of base credits issued to electrical distribution utilities (EDUs).

In 2018, total LCFS deficits were under 4 million per quarter and light-duty battery-electric vehicle sales were under 100,000 vehicles per year.<sup>11,12</sup> The 10 million cumulative total for advanced credits established by staff in 2019 is a conservative estimate based on vehicle sales data, the proposed and then adopted LCFS targets, and fuel trends in California at the time of the 2019 rulemaking. Staff modeling for this current ISOR suggests that total quarterly deficits may exceed 13 million in the 2030-time horizon, and that light-duty electric vehicles may generate a cumulative 125 million base credits between 2030 and 2040.

Staff is proposing to increase the number of cumulative advanced credits that may be issued from 10 million credits to 30 million credits. 30 million advanced credits is approximately half the estimated average number of base credits that may be issued to EDUs during subsequent 5-year periods between 2030 and 2037. Given current shifts in electric vehicle adoption trends and the proposed increase in stringency for the LCFS benchmark schedule, increasing the cumulative advanced credits limit is consistent with maintaining current cost containment provisions for the program.

## **I. Section 95486. Generating and Calculating Credits and Deficits.**

### **1. Section 95486(a)(3)(B). Buffer Account.**

#### **a) Purpose**

The purpose of this amendment is to specify that the scope of the second of four listed possible sources of credits that may be placed into the buffer account applies to all fuel reporting types rather than only to liquid fuels. The specific second listed possible source of credits that may be placed into the buffer account is “an equivalent number of credits representing the difference between the reported carbon intensity (CI) and the verified operational CI from annual Fuel Pathway Reports for each fuel pathway code” if the operational CI is verified to be lower than the reported CI for the a past compliance period. This amendment is necessary to specify that a consistent approach applies here regardless of fuel type.

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<sup>11</sup> California Air Resources Board, *LCFS Quarterly Data Spreadsheet*. (Updated on July 31, 2023). [https://ww2.arb.ca.gov/sites/default/files/2023-08/quarterlysummary\\_073123\\_0.xlsx](https://ww2.arb.ca.gov/sites/default/files/2023-08/quarterlysummary_073123_0.xlsx)

<sup>12</sup> California Energy Commission, *New ZEV Sales in California, 2018*. (Accessed on October 30, 2023). <https://www.energy.ca.gov/zevstats>

## **b) Rationale**

The buffer account was introduced in the 2018 regulatory amendments to the LCFS regulation.<sup>13</sup> As discussed in the 2018 Initial Statement of Reasons supporting those amendments, the buffer account was created as a source for credits that could be used to protect the environmental integrity of the program if participating entities were unable to cover invalidated credits. The account accumulates credits that represent real emission reductions that were not claimed or may not be claimed by any entity pursuant to reporting requirements in the LCFS rule (for example, the prohibition on retroactive credit generation). The 2018 Initial Statement of Reasons proposed that the buffer account be populated by credits from four sources. One source was credits that would reflect real greenhouse gas emission reductions representing the difference between the reported CI and the verified operational CI from annual Fuel Pathway Reports for each fuel pathway code.

Beginning in 2021, LCFS fuel pathway holders have submitted verified annual Fuel Pathway Reports (AFPR) as required by section 95488.10(a) of the LCFS regulation. For cases where the AFPR operational CI is verified to be lower than the reported CI, real emission reductions were achieved according to reported and verified operational data, but the reporting entity may not claim those credits due to the prohibition on retroactive credit generation.

As currently written, the language provided to realize these hypothetical credits and place them in the buffer account is limited to liquid fuels reporting. This amendment will eliminate this limitation, consistent with the buffer account's underlying policy purpose of gathering otherwise unrealized credits that represent real emission reductions, by specifying that the buffer account may gather such credits from all fuel types where the verified CI was lower than the certified CI.

## **2. Section 95486(b)(1). Table 4 Updates.**

### **a) Purpose**

The credit calculation of subsection 95486.1(b)(1) of the regulation requires that all reported energy quantities be converted into megajoules in order to be compared to the standard. As new fuels are included into the regulation or as new technologies become available, it may be required to update the energy density table (Table 4 in the regulation) to provide clarity for the conversion factors required to generate credits/deficits for reported fuels. The energy densities for fossil jet fuel, dimethyl ether, renewable naphtha, and renewable gasoline have been added to Table 4 of the regulation.

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<sup>13</sup> California Air Resources Board, *Public Hearing to Consider Proposed Amendments to the Low Carbon Fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels Staff Report: Initial Statements of Reasons*. March 6, 2018.  
[https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.245534656.55013092.1681752194-839657116.1621967502](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.245534656.55013092.1681752194-839657116.1621967502)

## b) Rationale

Staff proposes adding the energy density of fossil jet fuel to Table 4 since intrastate fossil jet is a required fuel in subsection 95482(a)(11) and a standardized energy density value is necessary to calculate credits and deficits for the fuel. Staff also proposes adding the energy density of dimethyl ether because it is being used as an alternative fuel in California. The energy density of renewable naphtha and gasoline have been added because the renewable diesel calculator was expanded to include renewable gasoline and renewable gasoline blendstocks therefore, standardized energy densities are needed for these fuels.<sup>14</sup>

## J. Section 95486.1. Generating and Calculating Credits and Deficits Using Fuel Pathways.

### 1. Section 95486.1(a)(4) and Table 5. Calculation of Credits and Deficits Using Fixed Guideway Systems and Forklifts.

#### a) Purpose

Staff proposes to amend the Table 5 entry for electric and hydrogen forklifts to reflect an improved understanding of pre-baseline forklift fleet electrification and remove forklift crediting from the currently applicable subsection 95486.1(a)(4) exception to the default displaced energy conversion methodology in subsection 95486.1(a)(3). The proposed change reduces the Energy Economy Ratio (EER)<sup>15</sup> for forklifts with lift capacities less than 12,000 lbs. to 1.9 for electricity and 1.1 for hydrogen. This proposed amendment is necessary to ensure that forklift crediting more accurately reflect the fuels displaced by electricity and hydrogen forklift fueling.

#### b) Rationale

Staff has determined that using model year as an estimation mechanism is less reflective of the pre-baseline state of electrification than the proposed approach. Staff previously estimated the baseline using the fleet of forklifts with model years older than 2010 without consideration of the proportion of forklifts electrified nor whether a newer electric forklift would replace an existing electric forklift. The current credit calculation formula for forklifts is defined in subsection 95486.1(a)(1) as the following:

$$Credits = \left( CI_{standard}^{diesel} - \frac{CI^{electricity}}{EER} \right) \times E_{displaced}^{diesel} \times 10^{-6}$$

where:

*Credits* is the number of credits generated;

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<sup>14</sup> California Air Resources Board, *CA-GREET4.0 Technical Documentation*. [Date of adoption].

<https://ww2.arb.ca.gov/resources/documents/lcfs-land-use-change-assessment>

<sup>15</sup> EER is defined in section 95481(a): “‘Energy Economy Ratio (EER)’ means the dimensionless value that represents the efficiency of a fuel as used in a powertrain as compared to a reference fuel used in the same powertrain. EERs are often a comparison of miles per gasoline gallon equivalent (mpgge) between two fuels.”

$CI_{standard}^{diesel}$  is the diesel standard for the compliance year;

$CI_{electricity}$  is the CI for Electricity;

$EER$  is the Energy Economy Ratio;

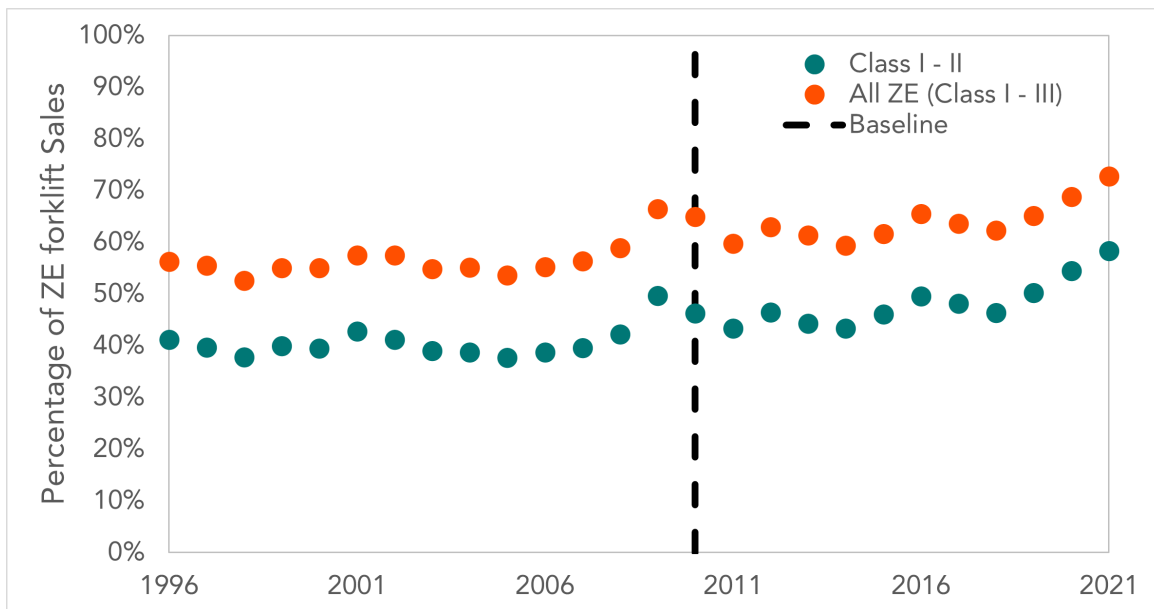
$E_{displaced}^{diesel} = Energy \times EER$  for forklifts newer than 2010 model year; and

$E_{displaced}^{diesel} = Energy$  for forklifts with 2010 or older model year.

Many new forklifts are direct replacements for existing ZE forklifts as opposed to displacing fossil. Thus, defining the baseline from the model year is not as closely representative of the pre-regulation state of forklift electrification as possible. Staff proposes to re-establish the baseline for electric forklift displacement based upon historical sales data.

Staff analyzed nationwide historical sales data from the Industrial Truck Association,<sup>16</sup> which indicates that nationwide sales of new forklifts have consistently been over 50% ZE since data has been available in the 1990s. Since 2010, ZE sales have been greater than 60% of the total population. Figure 1 below illustrates the historical nationwide sales data by forklift class, differentiating between Class I-II and all ZEV forklifts.<sup>17</sup>

Figure 1: Percentage of Zero Emission Forklift Sales<sup>18</sup>



There is not a 1:1 translation between population and energy consumption, but the overall sales data reported by the ITA provides some insight as to the scale of ZE forklift deployment

<sup>16</sup> Industrial Truck Association, *United States Factory Shipments*. 2022. <https://www.indtrk.org/wp-content/uploads/2023/01/Factory-Shipments-Table-2022-Directory.pdf>

<sup>17</sup> United States. Department of Labor Occupational Safety and Health Administration, *Powered Industrial Trucks (Forklift) eTool*. (Accessed on October 6, 2023). <https://www.osha.gov/etools/powered-industrial-trucks/types-fundamentals/types>. Forklift classes are defined by the Occupational Safety & Health Administration.

<sup>18</sup> Ibid.

in the baseline. Class I-II forklifts, which accounted for over 40% of forklift sales in the baseline, are a direct replacement for fossil fuel forklifts, while Class III forklifts consume relatively less energy and perform less energy-intensive work as compared to Class I-II or fossil fuel forklifts. Therefore, staff's reassessment of the EER reflects a baseline forklift population where 50% of forklift energy consumption was completed by a ZE forklift.

## **2. Section 95486.1(g). Calculation of Deficit Obligation for Verified CI Exceedance.**

### **a) Purpose**

Staff is proposing that fuel pathway holders will generate a deficit obligation when a verified operational CI exceeds the certified operational CI. This deficit obligation would be calculated based on four times the CI exceedance, in proportion with the quantity of fuel reported under that fuel pathway. The fuel pathway holder would be responsible for satisfying the deficit obligation pursuant to section 95485 of the regulation.

### **b) Rationale**

This proposed amendment strengthens program integrity and streamlines program implementation. Fuel pathway holders have several options for ensuring their verified operational CIs do not exceed the certified operational CI, including adding a margin of safety during the certification process, optimizing yield, and utilizing low-CI process energy. Adding a specific deficit obligation created as a result of CI exceedances encourages fuel pathway holders to add a margin of safety on their verified CI to keep from exceeding their certified operational CI. In addition, the credit-true up provision (Sections 95488.10(b) and 95486(a)(3)(B)) provides a mechanism to retroactively provide credits to fuel pathway holders when the verified operational CI is lower than the certified CI, which further encourages use of a margin of safety.

## **K. Section 95486.2. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways.**

### **1. Section 95486.2(a)(1). Hydrogen Refueling Infrastructure Pathway Eligibility.**

#### **a) Purpose**

Staff proposes that either the hydrogen station owner or their designated entity for dispensed hydrogen reporting be allowed to apply for the hydrogen refueling infrastructure (HRI) pathway.

#### **b) Rationale**

Allowing a hydrogen station owner to designate an entity to apply for the HRI pathway and be the first fuel reporting entity for HRI infrastructure credits aligns with section 95483(b)(2) of the regulation, which allows for the designation of reporting responsibilities to entities other than the typical first fuel reporting entity. As currently written in the regulation, owners of HRI stations are not able to designate an entity to submit an HRI application or handle reporting responsibilities. This proposed amendment provides more flexibility in implementing this provision.

## **2. Section 95486.2(a)(3). Application Approval Process.**

### **a) Purpose**

Staff proposes to amend the process to resubmit applications that the Executive Officer has found incomplete. Instead of having 180 days from the Executive Officer's receipt of that incomplete application to submit a revised application, an application that is still incomplete at the end of the quarter in which it was found incomplete will be denied, and the applicant can submit a new application for the site.

### **b) Rationale**

This subsection outlines the procedure used to approve and deny HRI applications. In preparing applications for formal evaluation by the Executive Officer, CARB staff work with applicants to revise incomplete applications before the end of the quarter. The proposed amendment removes the need to track the duration of time in which an HRI application is incomplete, and instead applies a quarter-by-quarter lens to the overall process. This proposed amendment will streamline the administrative requirements of reviewing and tracking HRI applications and reduce administrative processing time.

## **3. Section 95486.2(a)(4)(F). Carbon Intensity and Renewable Content Requirements.**

### **a) Purpose**

Staff proposes to amend the company-wide carbon intensity and renewable content requirements for dispensed hydrogen. Starting January 1, 2030, the carbon intensity requirement is lowered from 150 gCO<sub>2e</sub>/MJ to 90 gCO<sub>2e</sub>/MJ, and the renewable content is raised from 40% to 80%. Applicants that do not meet this requirement for dispensed hydrogen in a quarter will not generate HRI credits for that quarter.

### **b) Rationale**

The 2022 Scoping Plan Update signals that a large increase in renewable hydrogen supply will be needed to achieve carbon neutrality. Staff's proposal to increase the stringency of the carbon intensity and renewable content thresholds to align with this policy. The carbon intensity is reduced to a maximum of 90 gCO<sub>2e</sub>/MJ to align with the anticipated life cycle CI of clean hydrogen projects defined by the Inflation Reduction Act of 2022. The renewable content of hydrogen is increased to a minimum of 80% renewable hydrogen to match the ambition of the 2022 Scoping Plan Update and the California Energy Commission's "Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California."<sup>19</sup>

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<sup>19</sup> Reed, J. G., Dailey, E. E., Shaffer, B. P., Lane, B. A., Flores, R. J., Fong, A. A., & Samuelson, G. S. *Roadmap for the deployment and buildout of renewable hydrogen production plants in California*. Prepared for California Energy Commission. June 3, 2020. <https://www.energy.ca.gov/publications/2020/roadmap-deployment-and-buildout-renewable-hydrogen-production-plants-california>

#### **4. Section 95486.2(a)(7). Applications for Expanded Hydrogen Refueling Infrastructure Capacity.**

##### **a) Purpose**

Staff proposes to remove the ability for HRI applicants to apply for expanded capacity in the HRI program.

##### **b) Rationale**

This subsection outlines the procedure to apply for a capacity expansion of an operating site already generating HRI credits. To date, no expansions have been applied for in the HRI program; applicants who have wanted larger hydrogen refueling stations have opted to build completely new refueling stations and remove the old equipment rather than try to maintain the old equipment.

With the introduction of the medium- and heavy-duty HRI (MHD-HRI) program, applicants interested in expanding an existing site can apply for crediting capacity for much larger stations than what is available in the light-duty HRI (LD-HRI) program. The expansion text in subsection 95486.2(a)(7) is, therefore, not needed moving forward.

#### **5. Section 95486.2(a)(7). Transition to Light-Duty Hydrogen Refueling Infrastructure Pathways.**

##### **a) Purpose**

Staff proposes to create a new HRI program specific to light-duty vehicle refueling (LD-HRI) which would take effect after the existing HRI program sunsets at the end of 2025. This program retains many of the elements of the existing HRI program and includes modified and new elements developed to improve the efficacy of program administration, implementation, and targeting of infrastructure deployment. The purposes of these modified and new program elements are:

- A. Amendment of the location requirement. Coupled with the amendment described in subsection E. below, the CARB review of an applicant's location justification is replaced with a requirement to place LD-HRI stations in disadvantaged communities, low-income communities, or rural areas.
- B. Amendment of program application end date. The existing HRI program will stop accepting applications after December 31, 2025. Staff proposes that the LD-HRI program, which would start after that date, would accept new applications through December 31, 2030.
- C. Amendment of station nameplate refueling capacity. Staff proposes to replace the current model used to calculate refueling capacity, the Hydrogen Station Capacity Evaluation (HySCapE) model desktop version 1.0, with the most recent version of the Hydrogen Capacity (HyCap) model available.
- D. Amendment of pathway refueling capacity. Instead of a station generating infrastructure capacity credits for the full nameplate capacity of a hydrogen station as in the HRI pathway, staff proposes to limit the LD-HRI pathway's capacity to one-half the nameplate capacity of a station, up to a nameplate capacity of 1,200 kg/day.

- E. Removal of location justification. Combined with A. above, staff proposes to remove the location justification requirement and replace it with a requirement to site stations in disadvantaged communities, low-income communities, and rural areas.
- F. Amendment of available credits. Staff proposes to reduce the number of pathway credits available to light-duty hydrogen stations from 2.5% of deficits to 0.5% of deficits. This proposed amendment reflects a continuation of support for hydrogen refueling stations while shifting the majority of new support to the trucking sector. The deficit value used in the calculation is changed from the previous quarter to the most recent quarter for which data is available.
- G. Amendment of crediting period. Staff proposes to reduce the crediting period from 15 year to 10 years for new applications submitted after December 31, 2025.
- H. Amendment of time to operability. The HRI program cancels any approved application if the hydrogen refueling station is not operational within 24 months of application approval. Staff proposes to amend this in the LD-HRI program such that cancelation for nonoperational stations only occurs if the estimated potential LD-HRI credits exceed 0.5% of deficits, when the Executive Officer is no longer allowed to accept new LD-HRI applications.
- I. Addition of limit on infrastructure credits. Staff proposes that infrastructure credit generation for an LD-HRI station ceases once the estimated cumulative value of the credits generated exceeds 150% of the initial capital expenses spent to make the station operable, less any grants or external funding received for that station's construction. This proposed amendment brings treatment of LD-HRI stations into alignment with LD-FCI, MHD-HRI, and MHD-FCI applications.
- J. Amendment on accounting reporting frequency. Staff proposes that the cost and revenue accounting of LD-HRI stations provided by applicants to CARB be submitted once a year, with the annual report. Currently, cost and revenue reports are submitted on a quarterly basis.
- K. Amendment on capital expenditure reporting. Staff proposes that the cost and revenue accounting of LD-HRI stations provided by applicants to CARB include the initial capital expenses associated with constructing the station. Initial capital expenses include equipment, labor, land and materials and this data point is used to establish the upper limit on total capacity credits each station can receive.

## **b) Rationale**

The Proposed Amendments between the HRI program and the LD-HRI program reflect stakeholder feedback, staff identified opportunities for administrative improvement, and recognition of the development of zero-emission vehicles (ZEV) and their refueling infrastructure in California since 2019, including new regulations and Governor's orders.

- A. Amendment of the location justification requirement. This amendment simplifies the approval process and applies an equity lens to placement of refueling infrastructure for light-duty ZEVs. As the State transitions to ZEV technology, it is imperative that all individuals in the State have access to cleaner technologies. With this location requirement, staff proposes to focus the LD-HRI provision on low-income, disadvantaged, or rural areas of the State which face additional barriers to accessing low-carbon technology. This focused eligibility requirement not only aligns with identified priorities in the Clean Transportation Incentives Funding Plan, which provides funding



for ZEVs deployed in these regions, but also continues to support a diverse range of light duty hydrogen refueling needs in all areas of the State, including rural areas.

- B. Amendment of program application end date. Staff is proposing to create a new LD-HRI program that is distinct from the existing HRI provision and will begin accepting applications for the LD-HRI provision after the end-date of the existing HRI provision. The new start and end date for the LD-HRI program creates a five-year window for applicants to submit applications for the LD-HRI pathway. This proposal aligns with the time periods in which staff will accept applications for the light-duty FCI (LD-FCI), MHD-HRI, and medium- and heavy-duty FCI (MHD-FCI) provisions.
- C. Amendment of station nameplate refueling capacity. The National Renewable Energy Laboratory (NREL) develops hydrogen station capacity refueling models as part of its hydrogen fueling infrastructure analysis research. The current Hydrogen Station Capacity Evaluation (HySCapE) model used for the HRI pathway is limited in its evaluation of station design and size. NREL has developed a new tool, the Hydrogen Capacity model (HyCap), for determining hydrogen refueling station characteristics which can accommodate a larger range and variety of station designs. Replacing the existing HySCapE model used for HRI with this new model will improve accuracy of nameplate refueling capacity. The HyCap model is similar to the HySCapE model and includes several improvements in representing station design and also accommodates stations designed for larger vehicles.
- D. Amendment of pathway refueling capacity. Reducing the capacity credit of station from full nameplate capacity to one-half nameplate capacity will potentially enable the program to incentivize twice as many light-duty hydrogen refueling stations. The LD-HRI provision has the same maximum nameplate capacity limit as the existing HRI provision, 1,200 kg/day. This proposal aligns with the proposed treatment of MHD vehicle refueling stations under the MHD-HRI provision in section 95486.3(a).
- E. Removal of location justification. Removing the location justification and replacing it with the location requirement in A. is expected to streamline staff processing time for each application. Applicants have generally selected hydrogen station sites that help support the growing number of light-duty fuel cell electric vehicles or add to the overall network of stations to reduce range anxiety, and have a built-in incentive to find commercially viable locations for the long-term.
- F. Amendment of available credits. While infrastructure pathways are an effective tool to incentivize ZEV refueling infrastructure, the quantity of infrastructure credits must be bounded to prevent adverse impacts to the larger credit market. However, there are still locations in the State in need of LD hydrogen refueling infrastructure that have not yet been met through the existing HRI incentive. In response to stakeholder feedback and to fill these gaps and provide equitable access to hydrogen infrastructure across the State, staff will continue to accept applications for LD refueling with a narrower focus. Staff is focusing most of the new capacity crediting on the MHD infrastructure space to support implementation of recent regulations in that sector and recognizes the need for further limited support in the LD sector and will continue to accept applications past 2025.
- G. Amendment of crediting period. A crediting period of 10 years aligns with the proposed crediting periods for the LD-FCI, MHD-HRI, and MHD-FCI provisions. While dependent on station costs and operation, staff anticipates that most sites will generate cumulative credit values equivalent to their initial capital expenditures before the end of the 10-year crediting periods.

- H. Amendment of time to operability. Implementation of the HRI program has shown that cancelled projects were at times delayed due to supply chain problems or similar issues that were beyond an applicant's ability to speed station construction. This amendment cancels these delayed projects only if necessary to accommodate additional stations in the program and removes administrative burden for applicants and staff. New applications for canceled stations can be submitted the quarter after application.
- I. Addition of limit on infrastructure credits. To cover the initial capital expenses associated with building a station, the LD-HRI program is designed to provide credits until 1.5 times the initial capital expense of the station is equal to estimated value of LD-HRI infrastructure credits, plus the sum of non-LCFS total funds granted or pledged before the station is operational. The 1.5 multiplier is included to represent the discounted estimated value of infrastructure credits issued during the crediting window. Establishing this value up-front removes the need for ongoing tracking of cost and revenue reporting and provides more certainty for applicants regarding total funding they may expect to receive from the program.
- J. Amendment on accounting reporting frequency. Most required accounting reporting in the LCFS program is annual, submitted with the annual report; the LD-HRI program is aligned with this submission timing.
- K. Amendment on capital expenditure reporting. In order to implement subsection J., the initial capital expense associated with hydrogen station construction is a necessary datum. A breakdown of these costs provides CARB with a better understanding of the characteristics of station construction and the challenges the refueling station infrastructure must overcome.

## **6. Section 95486.2(b)(1). Fast Charging Infrastructure Pathway Eligibility.**

### **a) Purpose**

The purpose of this proposed amendment is to update the eligibility of electric vehicle (EV) supply equipment that can be approved for inclusion in the Fast Charging Infrastructure (FCI) program. In addition to fuel supply equipment (FSE) owners being able to apply, staff proposes to allow FSE owners' delegates, as defined in section 95483(c)(2)(B), to apply on the FSE owner's behalf. Staff also proposes modifying the existing requirements related to direct current fast charger connector types at approved sites. Specifically, staff proposes that after an applicant has exceeded 0.5% of overall deficits from the prior quarter from approved FCI sites, all additional fast chargers at sites submitted for FCI approval must support the Society of Automobile Engineers Combined Charging System fast charging connection. In addition to this amendment, staff also proposes to raise the minimum nameplate power rating of eligible FSEs from 50 kilowatt (kW) to 150 kW.

### **b) Rationale**

This subsection outlines the characteristics of EV chargers eligible to be issued credits from the FCI pathway. The purpose of the FCI program is incentivize the installation of new EV refueling infrastructure that will support the growing population of electric vehicles in California. These proposed updates reflect changes to the EV population and associated refueling needs since 2019, as well as minor eligibility adjustments to streamline implementation and reflect the timing of the Proposed Amendments.

Allowing an FCI site's owner to designate an entity to apply for the FCI pathway and be the first fuel reporting entity for FCI infrastructure credits aligns with subsection 95483(c)(2)(B) of the regulation, which allows for designation of reporting responsibilities to entities other than the typical first fuel reporting entity. As currently written in the regulation, owners of FCI sites are not able to designate an entity to submit an FCI application or handle reporting responsibilities. This proposed amendment provides more flexibility in implementing this provision by removing an administrative requirement.

Staff's proposal to remove connector protocol requirements reflects the state of EVs today. Most automobile manufacturers have announced adoption of the NACS connector protocol, which is undergoing standardization as SAE J3400.<sup>20</sup> The current language in subsection 95486.2(b)(1)(B), which requires under certain conditions the presence of the Combined Charging System and Charge de Move connector types at FCI charging sites, is outdated and requires unnecessary administrative tracking to comply with and implement. Charging adapters exist and continue to be developed for different connect or types<sup>21</sup> enabling vehicles to use chargers with different connection types. The California Department of Transportation and California Energy Commission continue to engage with in regard to connection types.<sup>22</sup>

Newer EVs are able to charge at much higher rates than older ones, and new EV supply equipment supported by the FCI provision should be able to provide electricity at those higher rates. Raising the minimum power nameplate capacity of FCI eligible FSEs from 50 to 150 kW raises the bar for FCI-funded chargers to meet the needs of modern EVs and aligns with the NEVI Formula Program Guidance, which requires that maximum charge power per DC port should not be below 150 kW.

## **7. Section 95486.2(b)(2). Fast Charging Infrastructure Application Requirements.**

### **a) Purpose**

This subsection outlines the requirements to apply for a Fast Charging Infrastructure (FCI) pathway, which include restrictions on the characteristics of the FCI site where the direct current fast chargers are located, including a limit to the total nameplate power rating for all FSE at a single site claiming FCI credit under this provision to 2,500 kW. The current regulation allows applicants to apply, with justification, for a total nameplate power rating of a site up to 6,000 kW, provided that the number of fuel supply equipment (FSE) at sites greater than 2,500 kW does not exceed 10% of total FSE approved under FCI pathways. The purpose of this proposed amendment is to remove the ability to apply for an FSE site greater than 2,500 kW. Restricting the size of FCI sites should increase the number and distribution of FCI

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<sup>20</sup> United States Joint Office of Energy and Transportation, *Joint Office Supports Charging Standardization to Enhance EV Charging Experience*. September 14, 2023. <https://driveelectric.gov/news/NACS-CCS-Interview>

<sup>21</sup> California Energy Commission, *Statement on the North American Charging Standard – J3400*. September 2023. <https://efiling.energy.ca.gov/GetDocument.aspx?tn=252421&DocumentContentId=87420>

<sup>22</sup> California Department of Transportation and California Energy Commission, *California's Deployment Plan for the National Electric Vehicle Infrastructure Program: 2023 Update*. August 2023. <https://dot.ca.gov/-/media/dot-media/programs/esta/documents/nevi/2023-ca-nevi-plan-update-final-a11y.pdf>

sites, as the number of infrastructure credits available to the FCI programs remains unchanged.

**b) Rationale**

The text staff is proposing to remove is unnecessary given the scope of the Proposed Amendments. Staff proposes to include a new subsection in the regulation, 95486.3, which allows for much larger direct current fast charging sites. Removing this exception for larger sites in the existing FCI provision provides the opportunity for approval of more FCI sites within the existing credit limit. Increasing the distribution of charging sites throughout the State provides more certainty to EV drivers that refueling sites will be available to them when they travel. In addition, FSE owners with sites larger than 2,500 kW can still apply for the FCI pathway for FSEs at that site as long as the total nameplate power rating of the selected FSEs in the application is less than 2,500 kW.

**8. Subsection 95486.2(b)(3). Application Approval Process.**

**a) Purpose**

Staff proposes to amend the process to resubmit applications that the Executive Officer has found incomplete. Instead of having 180 days from the Executive Officer’s receipt of that incomplete application to submit a revised application, an application that is still incomplete at the end of the quarter in which it was found incomplete will be denied, and the applicant can submit a new application for the site when they are ready.

**b) Rationale**

This subsection outlines the procedure used to approve and deny FCI applications. In preparing applications for formal evaluation by the Executive Officer, CARB staff work with applicants to revise incomplete applications before the end of the quarter. The proposed amendment removes the necessity to track the duration of time in which an FCI application is incomplete, and instead applies a quarter-by-quarter lens to the overall process. This proposed amendment will streamline the administrative requirements of reviewing and tracking FCI applications and reduce administrative processing time.

**9. Section 95486.2(b)(7). Applications for Expanded Fast Charging Infrastructure Capacity.**

**a) Purpose**

Staff proposes to remove the ability for FCI applicants to apply for expanded capacity in the FCI program. Applicants interested in expanding an existing, operating site in the FCI program may apply for the additional capacity in the new medium- and heavy-duty FCI program, as outlined in the new subsection 95486.3(b).

**b) Rationale**

This subsection outlines the procedure to apply for a capacity expansion of an operating site already generating FCI credits. To date, there have been 9 expansions of the over 500 sites approved for in the FCI program. FCI sites that are co-located at a parking lot are typically too

small to expand significantly, and FCI sites located at a charging plaza typically already meet available site power. By removing expansions, the FCI program can incentivize more sites instead of larger sites.

## **10. Subsection 95486.2(b)(7). Transition to Light-Duty Fast Charging Infrastructure Pathways.**

### **a) Purpose**

Staff proposes to create a new FCI program specific to light-duty refueling (LD-FCI) station owners and delegates once the existing FCI program sunsets at the end of 2025. This program retains many of the elements of the original FCI program with modified and new elements to improve the efficacy of program administration, implementation, and efficacy. The purposes of the modified and new program elements are:

- A. Addition of location requirement. Staff proposes to require that LD-FCI stations be built in low-income or disadvantaged communities, or at least 10 miles away from the nearest fast charger.
- B. Amendment of program application end date. The existing FCI program will stop accepting applications after December 31, 2025. Staff proposes that the LD-FCI program, which would start after that date, would accept new applications through December 31, 2030.
- C. Amendment of total site nameplate power rating. Staff proposes to reduce the total nameplate power rating for all chargers in the FCI program of 2,500 kW to 1,000 kW for the LD-FCI program.
- D. Addition of maximum number of chargers per site. Staff proposes to limit the number of chargers at an LD-FCI site to four or fewer.
- E. Amendment of pathway refueling capacity. Instead of a site generating infrastructure capacity credits based on a power equation, as in the FCI program, staff proposes to set the LD-FCI pathway's capacity to 20% of the nameplate capacity of a station, up to 20% of 350 kW.
- F. Amendment of available credits. Staff proposes to reduce the aggregate number of pathway credits available to light-duty fast charging sites from 2.5% of deficits to 0.5% of deficits. This proposed amendment reflects a continuation of support for hydrogen refueling stations while shifting the majority of new support to the trucking sector. The deficit value used in the calculation is changed from the last quarter to the most recent quarter for which data is available.
- G. Amendment of crediting period. Staff proposes to increase the crediting period from 5 years to 10 years for new applications submitted after December 31, 2025. An LD-FCI application approved on December 31, 2030, could generate infrastructure credits through December 31, 2040.
- H. Amendment of time to operability. The FCI program cancels any approved application that does not result in an operating hydrogen refueling station within 12 months of application approval. Staff proposes to amend this in the LD-FCI program such that cancellation only occurs if the estimated potential LD-FCI credits exceed 0.5% of deficits, when the Executive Officer is no longer allowed to accept new LD-FCI applications.
- I. Amendment of limit on infrastructure credits. Staff proposes that infrastructure credit generation for an LD-FCI station ceases once the estimated cumulative value of the

credits generated exceeds 150% of the initial capital expenses spent (not including expenses spent on on-site electricity generation) to make the station operable, less any grants or external funding received for that station's construction. This proposed amendment brings treatment of LD-FCI sites into alignment with light-duty Hydrogen Refueling Infrastructure (LD-HRI), medium- and heavy-duty HRI, and MHD-FCI applications.

- J. Amendment on accounting reporting frequency. Staff proposes that the cost and revenue accounting of LD-HRI stations provided by applicants to CARB be submitted once a year, with the annual report.
- K. Amendment on capital expenditure reporting. Staff proposes that the cost and revenue accounting of LD-HRI stations provided by applicants to CARB include the initial capital expenses associated with constructing the station. Initial capital expenses include equipment, labor, land and materials and this data point is used to establish the upper limit on total capacity credits each site can receive.

## **b) Rationale**

The Proposed Amendments between the FCI program and the LD-FCI program reflect stakeholder feedback. Staff identified opportunities for administrative improvement, and recognition of the development of zero emission vehicles (ZEV) and their refueling infrastructure in California since 2019, including new regulations and Governor's orders.

- A. Addition of location requirement. This amendment simplifies the approval process and applies an equity lens to placement of refueling infrastructure for light-duty ZEVs. As the State transitions to ZEV technology, it is imperative that all individuals in the State have access to cleaner technologies. With this location requirement, staff proposes to focus on LD-FCI provision on communities or regions which face additional barriers to accessing low-carbon technology. For example, residents of low-income and disadvantaged communities often lack the ability to charge EVs at nearby locations, and locating fast-chargers in these communities can help alleviate this disparity. In addition, while the State has made significant progress in installing charging capacity, there are still regions (e.g. rural areas or towns within rural areas) that lack access to fast charging technology. Supporting fast chargers with a minimum buffer distance from other chargers can help to fill those gaps, increasing overall charging network strength, reducing range anxiety, and improving fast charging access.
- B. Amendment of program application end date. Staff proposes to create a new LD-FCI program that is distinct from the existing FCI provision and will begin accepting applications for the LD-FCI provision after the end date of the existing FCI provision. The new start and end date for the LD-FCI program creates a five-year window for applicants to submit applications for the LD-FCI pathway. This window should be sufficiently large for applicants to plan and apply for new fast charging infrastructure for light-duty vehicles and aligns with the time periods in which staff will accept applications for the LD-HRI, MHD-HRI, and MHD-FCI provisions.
- C. Amendment of total site nameplate power rating. By setting the total nameplate power rating of the chargers at a site to a smaller value, the LD-FCI program will be able to incentivize more charging sites throughout the State. This aligns with the goal of filling gaps in the existing charging network and supporting multifamily housing developments that may currently lack access to home charging. Sites with larger total nameplate

power ratings than 1,000 kW can still apply for the LD-FCI pathway, albeit only for a subset of the chargers at the site.

- D. Addition of maximum number of chargers per site. Sites in the FCI program have had as few as 1 charger or as many as 14 chargers. By setting the maximum number of LD-FCI chargers per site to 4, the LD-FCI program can incentivize a larger number of sites. Sites with more than 4 chargers can still apply for the LD-FCI pathway, albeit only for a subset of the chargers at the site. See also the rationale for subsection C above.
- E. Amendment of pathway refueling capacity. The power equation used in the FCI program was developed by stakeholders to recognize that the cost of building larger infrastructure does not necessarily scale up linearly. While this remain true, staff is proposing to revise the power equation to provide FCI credits directly in proportion to the nameplate capacity without reducing the capacity for larger chargers. This proposed amendment may incentivize larger chargers due to the smaller size of the sites allowed under the LD-FCI provision, and provides a better customer experience for EV drivers, who will be able to refuel considerably faster at the larger nameplate chargers. Coupled with an upper limit per FSE of 150% of initial capex, this proposed amendment would not result in over-crediting a site or unduly impact the credit market.
- F. Amendment of available credits. While infrastructure pathways are an effective way to incentivize ZEV refueling infrastructure, the number of infrastructure credits must be bounded to prevent adverse impacts on the larger credit market. However, there are still locations in the State needing LD fast charging infrastructure that have not yet been met through the existing FCI incentive. In response to stakeholder feedback and to fill these gaps and provide equitable access to fast charging infrastructure across the State, staff will continue to accept applications for LD refueling with a narrower focus. Staff is focusing most of the new capacity crediting on the MHD infrastructure space to support implementation of recent regulations in that sector and recognizes the need for further limited support in the LD sector and will continue to accept applications past 2025.
- G. Amendment of crediting period. A crediting period of 10 years aligns with the proposed crediting periods for the proposed LD-HRI, MHD-HRI, and MHD-FCI provisions and gives sufficient time to pay back 1.5 times the initial capital expenditures in most scenarios. While dependent on station costs and operation, staff expects that most sites will meet their crediting limit before the end of the 10-year crediting periods.
- H. Amendment of time to operability. Implementation of the FCI program has shown that cancelled projects were often delayed due to supply chain problems or similar issues that were beyond an applicants' ability to speed station construction. This amendment cancels these delayed projects only if necessary to accommodate additional stations in the program and removes administrative burden for applicants and staff. New applications for canceled stations can be submitted the quarter after application.
- I. Limit on infrastructure credits per site. To cover the initial capital expenses associated with building a site, the LD-FCI program is designed to provide credits until 1.5 times the initial capital expense of the station is equal to estimated value of LD-FCI infrastructure credits, plus the sum of non-LCFS total funds granted or pledged before the station is operational. The 1.5 multiplier is included to represent the discounted estimated value of infrastructure credits issued during the crediting window. On-site generation is excluded from this calculation because the benefits from on-site generation are recognized already in reduced utility electricity costs and renewable energy certificates. Establishing this value up-front removes the need for ongoing tracking of cost and

revenue reporting and provides more certainty for applicants regarding total funding they may expect to receive from the program.

- J. Amendment on accounting reporting frequency. Most required accounting reporting in the LCFS program is annual, submitted with the annual report; the LD-FCI program is aligned with this submission timing.
- K. Amendment on capital expenditure reporting. In order to implement paragraph I. above, the initial capital expense associated with fast charging site construction is a necessary datum. A breakdown of these costs provides CARB with a better understanding of the characteristics of station construction and the challenges the refueling station infrastructure must overcome.

## **L. Section 95486.3. Generating and Calculating Credits for Medium- and Heavy-Duty Zero Emission Vehicle Fueling Infrastructure Pathways.**

### **1. Section 95486.3. Generating and Calculating Credits for Medium- and Heavy-Duty Zero Emission Vehicle Fueling Infrastructure Pathways.**

#### **a) Purpose**

Staff proposes to add section 95486.3 to the LCFS regulation. The purpose of this provision is to establish requirements for ZEV Fueling Infrastructure Pathways for medium- and heavy-duty vehicles, similar to the existing infrastructure crediting provisions that focus on light-duty vehicles.

#### **b) Rationale**

During the 2018 rulemaking, the Board adopted section 95485.2 of the regulation, which created the Hydrogen Refueling Infrastructure (HRI) provision and the Fast Charging Infrastructure (FCI) provision. These two crediting opportunities were designed to incentivize light-duty ZEV refueling infrastructure ahead of anticipated ZEV demand. The intent of these provisions was to help remove the “chicken-and-egg” issue of vehicle demand waiting on refueling development, and refueling infrastructure waiting on vehicle demand, by incentivizing rapid buildout of public refueling infrastructure. The programs have supported buildout of dozens of hydrogen stations and thousands of fast chargers in California and plays a key role in supporting the overall transition to ZEV technology, driven in large part by the Advanced Clean Cars II regulation.

California’s ZEV goals are not limited to LDVs. The Innovative Clean Transit, Clean Truck Partnership, Advanced Clean Trucks and Advanced Clean Fleets rules, which have all been adopted since 2018, will drive a rapid transformation to ZEV technology in the MHD trucking sector in the very near future. In order to achieve fleet turnovers on this timeframe, refueling infrastructure suitable for MHD trucks must be available to maintain operations. Staff, therefore, proposes to create a version of the HRI and FCI programs in section 95486.3 that incentivizes MHD ZEV refueling infrastructure during the early years when refueling demand is low. Similar to the LD HRI and FCI provisions, the MHD-HRI and MHD-FCI provisions will provide LCFS credits for the unused refueling capacity at eligible stations and sites, which will naturally phase out as more vehicles become operational and vehicle refueling demand increases. LCFS ZEV fueling infrastructure credits for the MHD trucking sector will play a key



role in supporting California's ZEV goals, and in particular the technology transition under the ACF regulation.

Unlike the existing LD-HRI and LD-FCI provisions, which support only public infrastructure, staff is proposing to extend eligibility for the MHD HRI and FCI provisions to private infrastructure as well. Staff focused on public infrastructure for the existing infrastructure crediting provisions because the LD market largely had sufficient coverage for at-home refueling where practical but lacked a robust publicly available refueling network. The MHD sector is fundamentally different and needs significant support to meet the refueling needs of both trucks utilizing public refueling infrastructure and private fleet refueling. Stakeholders have expressed that private refueling should also receive an incentive from the MHD infrastructure crediting provisions to support the early capital costs of installing ZEV refueling infrastructure. Staff agrees that some support is needed and is proposing to allow a limited amount of credits for private refueling infrastructure, described in detail later in this chapter.

## **2. Section 95486.3(a)(1). Medium- and Heavy-Duty Hydrogen Refueling Infrastructure Pathway Eligibility.**

### **a) Purpose**

The purpose of this subsection is to define hydrogen refueling stations that are eligible to certify an MHD-HRI pathway. Staff proposes that stations eligible to apply for the MHD-HRI provision be able to accommodate medium- and heavy-duty vehicle 8,501 lbs and greater. Stations must be located within one mile of a ready or pending hydrogen Federal Highway Administration Alternative Fuel Corridor, on or adjacent to a property where medium- and heavy-duty vehicles are parked overnight or have received funding from a state or federal competitive grant program that already considers location. Staff proposes to accept applications through December 31, 2030. Consistent with the LD infrastructure crediting provisions, stations built as a mitigation measure or pursuant to any settlement are ineligible to apply for capacity crediting. Stations permitted to operate before January 1, 2022, would not be eligible to apply for MHD-HRI crediting.

### **b) Rationale**

Broadly speaking, the design and location of MHD-HRI stations should accommodate medium- and heavy-duty vehicle (MHDV) refueling needs. A MHD hydrogen refueling station must be accessible to MHDVs, defined in section 95481 as 8,501 lbs or greater, including practical design features such as available space for entering and exiting the station. MHDVs often rely on State Routes, U.S. Highways, and U.S. Interstates to transport goods, and the Federal Highway Commission has designated Alternative Fuel Corridors<sup>23</sup> in each state to prioritize alternative fuel infrastructure development. Requiring that MHD-HRI stations be within one

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<sup>23</sup> United States Department of Transportation Federal Highway Administration, *Alternative Fuel Corridors: All Designated Corridors by State*. (Accessed on October 6, 2023).  
[https://www.fhwa.dot.gov/environment/alternative\\_fuel\\_corridors/all\\_corridors/](https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/all_corridors/)

mile of an Alternative Fuel Corridor is a transparent way to support infrastructure in the locations most useful for MHD refueling needs and increases accessibility of those stations to MHDVs that use those corridors. MHD-HRI stations may also be used to charge MHD fleets overnight, and so MHD-HRI stations can also be located on or adjacent to properties where MHD vehicles already park overnight to provide that service. Overnight parking on a public street is not overnight parking on a property. To allow flexibility in siting, staff proposed that stations may also be approved further away from Alternative Fuel Corridors if already approved for a competitive grant by a government agency, similar to how the existing HRI provision functions.

Staff proposed to accept applications for the MHD-HRI program through the end of 2030 to provide a targeted incentive in the near-term while the Advanced Clean Fleets requirements are taking effect. This gives applicants sufficient time to plan and apply for the MHD-HRI pathway while also encouraging early construction of MHD hydrogen refueling stations.

Consistent with the existing HRI provision, any station that is required to be built due to a mitigation measure or California or federal regulation enforcement will not be eligible for the MHD-HRI provision. This provision is intended to accelerate buildout of this infrastructure, and stations that are required to be built anyway do not need this additional, targeted support. In addition, staff proposes to limit eligibility to stations permitted to operate on or after January 1, 2022, to focus the support on recent infrastructure buildout, and to align with the release of workshop materials in 2022 that discussed this topic.

### **3. Section 95486.3(a)(2). Medium- and Heavy-Duty Hydrogen Refueling Infrastructure Application Requirements.**

#### **a) Purpose**

The purpose of this subsection is to identify the application requirements for an MHD-HRI pathway. In addition to basic applicant information and the location of the station, the applicant must notify CARB of the expected daily permitted hours of operation, the station nameplate capacity of the station, the number of dispensing units, information about the hydrogen that will likely be dispensed from the station, and the expected operational date of the station.

Staff proposes that the MHD-HRI refueling capacity would be defined as 50% of the nameplate capacity of a shared MHD-HRI station, and 25% of the nameplate capacity of a private MHD-HRI station, up to a nameplate capacity of 6,000 kg/day. This capacity would be evaluated using the Hydrogen Capacity model (HyCAP) tool. Staff also proposes to make a distinction between applications for shared stations and applications for private stations. Private refueling stations, used by only one fleet, would only be eligible for half as many credits as shared stations, which is incorporated into the nameplate capacity formula.

#### **b) Rationale**

The identity of the owner must be known in order to award credits to them. A contact person representing the owner must be available to answer questions about the station. The station location must be known to confirm it meets location requirements. The daily permitted hours

must be known to calculate the number of infrastructure credits generated by the site. The number of dispensing units must be known to confirm the nameplate refueling capacity. Expected hydrogen fuel characteristics must be known to anticipate the number of credits generated by the station. The expected date must be known to convey to the MHDV owners when the new infrastructure is anticipated to be available for their use.

The basic applicant information is standard for LCFS applications and provides a contact for staff to follow up with as needed. Likewise, the basic station information provides staff with the context needed to assess if the station meets the location requirements in section 95486.3(a)(1)(B). In addition, information related to permitted hours of availability, nameplate capacity, and total dispensers plays a key role in staff's evaluation of the accuracy of the stated nameplate capacity. The expected renewable content percentage and carbon intensity of future dispensed fuel, as well as the expected operational date, are not binding but give a sense for future demand of hydrogen from different sources.

As described in the Purpose and Rationale for section 95486.2(a)(7) of the regulation, the National Renewable Energy Laboratory is developing a new HyCap tool to predict final characteristics of designed hydrogen refueling stations. The HyCap model is similar to the Hydrogen Station Capacity Evaluation (HySCapE) model used for the existing HRI provision and includes improvements in representing station design and accommodates stations designed for larger vehicles. Requiring use of the HyCAP model to calculate nameplate capacity will standardize the process across applicants with a complex tool designed for this task.

Staff proposes that the medium- and heavy-duty Hydrogen Refueling Infrastructure (MHD-HRI) provision credit one-half of the nameplate capacity provided by HyCap, which is capped at 6,000 kg/day. This approach is designed to provide sufficient incentive to individual MHD-HRI stations while also incentivizing a sufficient number of stations to accommodate anticipated medium- and heavy-duty hydrogen fuel demand calculated by the 2022 Scoping Plan Update.<sup>24</sup> Through the public engagement process, stakeholders have confirmed that 6,000 kg/day, derated to 50% of the nameplate capacity, provides sufficient incentive for MHD-HRI stations.<sup>25</sup> HRI stations can be larger than 6,000 kg/day, but are limited to a maximum MHD-HRI refueling capacity of 3,000 kg/day.

Staff's proposal to include both shared and private stations in the MHD-HRI program reflects the distinct nature of the primarily commercial MHD fleet in California compared to the primarily private LD fleet. Private and contracted refueling for MHD fleets is a common business model. The MHD-HRI program will promote uptake of MHD FCEVs by incentivizing opportunity refueling infrastructure and incentivizing private and contracted fueling. Staff's proposal to provide half as many credits to private MHD-HRI stations reflects the varying levels of support

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<sup>24</sup> California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*. December 2022. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

<sup>25</sup> California Hydrogen Coalition, *Workshop Comment Letter to CARB*. March 21, 2023. <https://www.arb.ca.gov/lists/com-attach/171-lcfs-wkshp-feb23-ws-W2oAMwM2BAgLblz.pdf>

needed for shared and private refueling. Private refueling infrastructure faces steep initial capital costs just like shared infrastructure, but can be sized more economically to meet known refueling demands. Shared infrastructure demand is less certain and, therefore requires more support during periods in which demand is low. Staff's proposed refueling capacity equation accounts for this difference while still providing support to the private refueling stations.

#### **4. Section 95486.3(a)(3). Application Approval Process.**

##### **a) Purpose**

The purpose of this section is to explain the application approval process. Applications are first reviewed for completeness and are rejected if not deemed complete by staff by the end of the quarter in which the application was submitted. Staff proposes that 2.5% of quarter deficits, from the most recent quarter with deficit data, be available for crediting the MHD-HRI pathway, and that no single applicant be allowed to have additional stations approved beyond 1% of deficits. During the application review period, the Executive Officer would use the formula described in subsection 95486.3(a)(3)(B) to determine if approval of the application would cause the program to exceed the 2.5% credit cap. Applications approved by Executive Officer are granted crediting periods of 10 years.

##### **b) Rationale**

Staff proposes to review MHD-HRI applications using the same general approach as the existing HRI provision, which centers on a completeness review and an evaluation of the proposed capacity. Applications that are deemed not complete by the Executive Officer will be denied and a new application for the station can be resubmitted later. Staff intends for this process to be streamlined without missing essential elements relevant to the application.

The proposed quantity of estimated potential credits available for the MHD-HRI pathway each quarter is 2.5% of the deficits for the most recent quarter for which data is available, based on stakeholder input from LCFS workshops. This aggregate crediting cap aligns with treatment of the existing HRI and FCI provisions and is sufficient to approve a significant number of MHD-HRI stations and support the burgeoning transition to ZEVs. To evaluate whether a new MHD-HRI application will cause the program to exceed the 2.5% limit, staff proposed to use the estimated potential credit calculation in subsection 95486.3(a)(3)(B). Estimated potential credits are calculated by multiplying the number of MHD-HRI credits issued in the most recent quarter for which data is available by the ratio of approved MHD-HRI capacity to operational MHD-HRI capacity. This estimates the number of MHD-HRI credits issued if all approved MHD-HRI sites are operational and serves as a conservative evaluation to protect against exceeding the cap.

A single applicant's participation in the MHD-HRI program is limited to 40% of available credits so that multiple applicants can participate in the program. As of March 2023, there are 5 applicants participating in the light-duty HRI program, which is at 50% capacity. The largest applicant in the HRI program has 32% of total capacity. Multiple companies offering refueling services ensures competitiveness in fuel prices that benefits MHDV owners.

The proposed crediting period for approved MHD-HRI stations is 10 years. A crediting period of 10 years aligns with the proposed crediting periods for the LD-FCI, MHD-HRI, and MHD-FCI provisions. While dependent on station costs and operation, staff anticipates that most sites will generate cumulative credit values equivalent to their initial capital expenditures before the end of the 10-year crediting periods.

## **5. Section 95486.3(a)(4). Requirements to Generate Hydrogen Refueling Infrastructure Credits.**

### **a) Purpose**

The purpose of this section is to determine how MHD-HRI approved stations can generate HRI credits. Stations must have characteristics that provide benefits to low-carbon transportation in California, including accessibility and operability for hydrogen-fueled medium- and heavy-duty vehicles, and low-carbon hydrogen fuel, as well as provide quarterly information necessary to calculate credit generation. CARB's intent is to incentivize the construction of as many stations as possible with the available credits and ensure that station owners receive credits to reduce the costs associated with station construction.

Staff proposes that each MHD-HRI station be either a private station, which can have its availability limited to 1 fleet, or a shared station, which must be available to at least 2 fleets or to the public for at least 12 hours each day. If the station is available to the public, it must accept all major credit and debit cards. Station performance must be reported to the Station Operational Status System if that service is available to the stations. The characteristics of the dispensed hydrogen must be at least 150 gCO<sub>2e</sub>/MH or less and 40% renewable or more before December 31, 2029, and 90 gCO<sub>2e</sub>/MJ and 80% thereafter. If a station fails to become operational within 24 months of approval, and the program's estimated potential credits has reached 2.5% of deficits, that station's approval for the MHD-HRI pathway will be cancelled. MHD-HRI pathway credit generation will cease for any station for which the estimated cumulative value of MHD-HRI credits is greater than 1.5 times the initial capital expenditure, less any initial grant revenue or funding.

### **b) Rationale**

Categorization of MHD-HRI program into private and shared stations balances stakeholder requests that conversion of existing private refueling infrastructure be eligible, with the need for accessible hydrogen refueling stations to fleets that rely on third-party refueling stations. Fleets must have reasonable access to shared MHD-HRI stations, but these stations can be more restrictive than stations accessible for public use are, such as by requiring key cards or codes for entry and use. Stations available to the public must have a point-of-sale terminal that accepts major fuel, credit and debit cards, in alignment with the existing HRI program. Refueling for all stations must require no formal or registered training, in alignment with current refueling practices.

Staff proposes that, if available, all MHD-HRI stations must be connected to the Station Operational Status System to transmit station availability status in real time. In addition, staff proposes to require declarations and evaluations of operability through the normal

commissioning process in California, to ensure that MHDV operators can use the stations safely. Subsequent fuel supply equipment (FSE) registration is required to report information to the LCFS Reporting Tool to be issued credits.

Staff proposes to cap the maximum carbon intensity of dispensed hydrogen fuel at MHD-HRI stations to a maximum of 150 gCO<sub>2e</sub>/MJ, in alignment with the current light-duty HRI program. The carbon intensity is reduced to a maximum of 90 gCO<sub>2e</sub>/MJ to align with the anticipated life cycle CI of clean hydrogen projects defined by the Inflation Reduction Act of 2022 and staff's proposed eligibility threshold for book-and-claim of hydrogen.

The renewable content of hydrogen is initially set at a minimum of 40%, in alignment with the current light-duty HRI program. It is increased to a minimum of 80% renewable hydrogen to match the ambition of the 2022 Scoping Plan Update and the anticipated 2045 goal used in the California Energy Commission's "Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California."<sup>Error! Bookmark not defined.</sup>

The original HRI program cancels applications if operability is not demonstrated within 24 months. Implementation of the light-duty HRI program has shown that cancelled projects were often delayed due to supply chain problems or similar issues that were beyond an applicants' ability to speed station construction. In the MHD-HRI program, nonoperating stations are cancelled after 24 months only if necessary to accommodate additional stations in the program. Applications for these stations can be resubmitted the quarter after application.

To cover the initial capital expenses associated with building a station, the MHD-HRI program is designed to provide credits until 1.5 times the initial capital expense of the station is equal to estimated value of MHD-HRI infrastructure credits, plus the sum of non-LCFS total funds granted, pledged, or pursuant to settlements from public entities before the station is operational. The 1.5 multiplier is included to replace a discounting factor used in the original FCI program. Establishing this value up-front removes the need for ongoing tracking of cost and revenue reporting and provides more certainty for applicants regarding total funding they may expect to receive from the program.

## **6. Section 95486.3(a)(5). Calculation of Hydrogen Refueling Infrastructure Credits.**

### **a) Purpose**

The purpose of this subsection is to determine how credits will be calculated based on the quarterly station performance and dispensed fuel. Staff proposes that the formula structure for the MHD-HRI program is the same as the HRI program: infrastructure credits are calculated from the difference between the available MHD-HRI refueling capacity of the station and the amount of hydrogen fuel dispensed.

### **b) Rationale**

The equation in this subsection calculates MHD-HRI credits by first taking into account the nameplate refueling capacity of the station (kg/day), and then subtracting out the dispensed quantity. As described in the overview of section 95486.3, the capacity crediting provisions are

intended to support station operation in the early years when refueling demand is low, and to naturally phase out as dispensed hydrogen increases. This proposed crediting equation creates the mechanism for this to occur. As the station is intended to fuel heavy-duty vehicles, the heavy-duty Energy Economy Ration (EER) is used.

## **7. Section 95486.3(a)(6). Reporting and Recordkeeping Requirements.**

### **a) Purpose**

Staff proposes that operating MHD-HRI stations are required to submit the following information to determine MHD-HRI eligibility and to calculate generated infrastructure credits:

- Station availability, the percentage of hours the station is available for fueling during the quarter,
- Company-wide, weighted average renewable content and carbon intensity of hydrogen dispensed during the quarter,
- Total capital expenditures, including a breakdown of initial capital expenditures, which include equipment, labor, materials and fees, and
- Total grant revenue or other external funding received toward capital, operational, and maintenance expenditures, including funds pursuant to any settlement related to any California or federal regulation enforcement.

In addition to information required to evaluate progress toward the cap on credits per station, staff proposes that applicants must submit the following information which CARB uses to monitor the state of hydrogen refueling infrastructure in California:

- Total and average delivered cost for hydrogen,
- Total maintenance costs, land rental costs, and other operational expenditures, and
- Total revenue received from hydrogen sales and average retail price for hydrogen sold.

### **b) Rationale**

In addition to the information required to determine MHD-HRI eligibility and to calculate generated infrastructure credits, data about the nascent hydrogen refueling infrastructure is useful to CARB to better understand the state of the industry and to inform policy that achieves emission reduction goals while minimizing economic impact. The requested data in this section informs CARB on both groups of information.

## **8. Section 95486.3(b)(1). Medium- and Heavy-Duty Fast Charging Infrastructure Pathway Eligibility.**

### **a) Purpose**

The purpose of this subsection is to define direct current fast chargers that are eligible to certify an MHD-FCI pathway. Staff proposes that chargers eligible to apply for the MHD-FCI provision be able to accommodate medium- and heavy-duty vehicle refueling. The design and location of these chargers should accommodate MHDV needs for refueling.

Staff proposes that the MHD-FCI program will incentivize both shared and private fast charging sites. Shared MHD-FCI charging sites are sites that are available to at least 2 EV fleets under different ownership, or to the public for at least 12 hours per day. Public sites must accept all major credit and debit cards. Private MHD-FCI charging sites are sites that can be limited to EVs under single ownership. Sites must be accessible to vehicles with a gross weight vehicle rating 8,501 lbs and greater. The sites must be located in California within one mile of a Federal Highway Administration Alternative Fuel Corridor or, to allow flexibility in siting, on or adjacent to a property where medium- and heavy-duty vehicles are parked overnight, or have received capital funding from a state or federal competitive grant program that included location evaluation as a criteria.

Staff proposes that chargers must have a nameplate capacity of at least 250 kW and must not have been permitted to operate prior to 2022, nor have been built as required mitigation or as a settlement. Staff proposes to accept MHD-FCI applications through December 31, 2030.

## **b) Rationale**

Broadly speaking, the design and location of MHD-FCI sites should accommodate MHDV refueling needs, including practical design features such as available space for entering and exiting the site. MHDVs often rely on State Routes, U.S. Highways, and U.S. Interstates to transport goods, and the Federal Highway Commission has designated Alternative Fuel Corridors<sup>26</sup> in each State to prioritize alternative fuel infrastructure development. Requiring that MHD-FCI chargers be within one mile of a ready or pending electric vehicle Alternative Fuel Corridor is a transparent way to support infrastructure in the locations most useful for MHD refueling needs and increases accessibility of those chargers to MHDVs that use those corridors. MHD-FCI chargers may also be used to charge MHD fleets overnight, and so MHD-chargers can also be located on or adjacent to properties where MHD vehicles already park overnight to provide that service. Overnight parking on a public street is not overnight parking on a property. To allow flexibility in siting, staff proposed that stations may also be approved further away from Alternative Fuel Corridors if already approved for a competitive grant by a government agency, similar to how the existing FCI provision functions.

Staff propose to accept applications for the MHD-FCI program through the end of 2030 to provide a targeted incentive in the near-term while the Advanced Clean Fleets requirements are taking effect. This gives applicants sufficient time to plan and apply for the MHD-FCI pathway while also encouraging early construction of fast charging infrastructure for the trucking sector.

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<sup>26</sup> U.S. Department of Transportation Federal Highway Administration, *Alternative Fuel Corridors: All Designated Corridors by State*. (Accessed on October 6, 2023).  
[https://www.fhwa.dot.gov/environment/alternative\\_fuel\\_corridors/all\\_corridors/](https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/all_corridors/)



Staff proposes to establish a minimum power rating of 250 kW for all chargers supported by the MHD-FCI program. 250 kW is the smallest charger at MHDV charging sites funded by the California Energy Commission to date and is a reasonable lower bound for this provision.<sup>27</sup>

Consistent with the existing FCI provision, any charger that is required to be built due to a mitigation measure or California or federal regulation enforcement will not be eligible for the MHD-FCI provision. This provision is intended to accelerate buildout of this infrastructure, and stations that are required to be built anyway do not need this targeted support. In addition, staff proposes to limit eligibility to stations permitted to operate on or after January 1, 2022, to focus the support on recent infrastructure buildout, and to align with the release of workshop materials in 2022 that discussed this topic.

## **9. Section 95486.3(b)(2). Medium- and Heavy-Duty Fast Charging Infrastructure Application Requirements.**

### **a) Purpose**

The purpose of this subsection is to identify the application requirements for an MHD-FCI pathway. In addition to basic applicant information and the location of the site, the applicant must notify CARB of the expected daily permitted hours of operation, the nameplate power rating of the chargers, the number of dispensing units, and the expected operational date of the station.

Staff proposes that a single applicant cannot have more than 10 chargers generating MHD-FCI credits within a ¼ mile radius. A single applicant cannot have chargers generating MHD-FCI credits with a total nameplate capacity of more than 10 megawatts (MW) within a ¼ mile radius. The site power available to the chargers, including from the electric grid, battery energy storage, and on-site production, must be equal to or greater than the total nameplate capacity of the MHD-FCI chargers. Consistent with proposed treatment of MHD-HRI stations, chargers at MHD-FCI shared sites are incentivized at up to 20% of their daily capacity, while private chargers are incentivized at up to 10% of their daily capacity.

### **b) Rationale**

The basic applicant information is standard for LCFS applications and provides a contact for staff to follow up with as needed. Likewise, the basic site information provides staff with the context needed to assess if the site meets the location requirements in section 95486.3(b)(1)(B).

Multiple sites of a single type can be located on or adjacent to a single address, but the limits of a single site are applied to all sites in that area. This allows applicants to add chargers to an

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<sup>27</sup> California Energy Commission, *CEC Approves \$2.9 Billion Investment for Zero-Emission Transportation Infrastructure*. December 14, 2022. <https://www.energy.ca.gov/news/2022-12/cec-approves-29-billion-investment-zero-emission-transportation-infrastructure>

address over time without sacrificing the crediting window of MHD-FCI pathway eligibility for the chargers built at later dates.

The limit of 10 MHD-FCI-eligible chargers incentivizes a sufficient number of chargers at any location while encouraging many individual sites. Larger chargers will earn more credits, which is intended to incentivize larger chargers in the program, up to a total summed power rating of 10 MW.

It is important for MHDV fueling that chargers be able to provide near to their nameplate power capacity when all chargers are operating. Consequently, staff proposes that site power should be at least equal to the total nameplate power rating of the chargers.

Staff's proposal to include both shared and private stations in the MHD-FCI program reflects the distinct nature of the primarily commercial MHD fleet in California compared to the primarily private LD fleet. Private and contracted refueling for MHD fleets is a common business model. The MHD-FCI program will promote uptake of MHD BEVs by incentivizing opportunity refueling infrastructure and incentivizing private and contracted fueling. Staff's proposal to provide half as many credits to private MHD-FCI stations reflects the varying levels of support needed for shared and private refueling. Private refueling infrastructure faces steep initial capital costs just like shared infrastructure but can be sized more economically to meet known refueling demands. Shared infrastructure may not be designed for a known refueling demand and, therefore, requires more support during periods in which demand is low. Staff's proposed refueling capacity equation accounts for this difference while still providing support to the private refueling stations.

## **10. Section 95486.3(b)(3). Application Approval Process.**

### **a) Purpose**

The purpose of this subsection is to explain the application approval process. Applications are reviewed for completeness and are rejected if not deemed complete by staff by the end of the quarter in which the application was submitted.

Staff proposes that 2.5% of deficits, from the most recent quarter with deficit data, be available for crediting the MHD-FCI pathway, and that no single applicant be allowed to have additional stations approved beyond 0.5% of deficits. After each quarter, the Executive Officer would use the formula described in subsection 95486.3(b)(3)(A) to determine if approval of additional applications would cause the program to exceed the 2.5% credit cap. Applications approved by the Executive Officer are granted crediting periods of 10 years.

### **b) Rationale**

Staff proposes to review MHD-FCI applications using the same general approach as the existing FCI provision, which centers on a completeness review and an evaluation of the proposed capacity. Applications that are not complete by the end of the quarter in which they were submitted will be denied and can be resubmitted the following quarter. Staff intends for this process to be streamlined without missing essential elements relevant to the application.

The proposed quantity of estimated potential credits available for the MHD-FCI pathway each quarter is 2.5% of the deficits for the most recent quarter for which data is available, based on stakeholder input from LCFS workshops. This aggregate crediting cap aligns with treatment of the existing HRI and FCI provisions and is sufficient to approve a significant number of MHD-FCI sites and support the burgeoning transition to ZEVs. To evaluate whether a new MHD-FCI application will cause the program to exceed the 2.5% limit, staff proposes to use the estimated potential credit calculation in subsection 95486.3(b)(3)(A). Estimated potential credits are calculated by multiplying the number of MHD-FCI credits issued in the most recent quarter for which data is available by the ratio of approved MHD-FCI capacity to operational MHD-FCI capacity. This estimates the number of MHD-FCI credits issued if all approved MHD-FCI sites are operational and serves as a conservative evaluation to protect against exceeding the cap.

A single applicant's participation in the MHD-FCI program is limited to 20% of available credits so that multiple applicants can participate in the program. As of March 2023, there are 16 applicants participating in the light-duty FCI program, which is at 30% capacity. The largest applicant in the FCI has 25% of total capacity.

The proposed crediting period for approved MHD-FCI chargers is 10 years, the amortization period for fast charger equipment.<sup>28</sup> A crediting period of 10 years aligns with the proposed crediting periods for the proposed LD-HRI, LD-FCI, and MHD-HRI provisions and gives sufficient time to pay back 1.5 times the initial capital expenditures in most scenarios. While dependent on station costs and operation, staff expects that most sites will meet their crediting limit before the end of the 10-year crediting periods.

## **11. Section 95486.3(b)(4). Requirements to Generate Fast Charging Infrastructure Credits.**

### **a) Purpose**

The purpose of this section to determine how MHD-FCI approved chargers can generate FCI credits. Stations must have characteristics that provide benefits to low-carbon transportation in California, including accessibility and operability for electricity-fueled MDHVs, as well as provide quarterly information necessary to calculate credit generation. CARB's intent is to incentivize the construction of as many stations as possible with the available credits and ensure that station owners receive credits to reduce the costs associated with station construction.

Staff proposes that each MHD-FCI station be either a private station, which can have its availability limited to 1 fleet, or a shared station, which must be available to at least 2 fleets or to the public for at least 12 hours each day. If the station is available to the public, it must

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<sup>28</sup> United States Department of Energy, *Federal Workplace Charging Program Guide*. Office of Energy Efficiency & Renewable Energy. November 2020. <https://www.energy.gov/sites/default/files/2020/11/f80/federal-workplace-charging-guide.pdf>

accept major fuel, credit and debit cards. If a station fails to become operational within 24 months of approval, and the program's estimated potential credits has reached 2.5% of deficits, that station's approval for the MHD-HRI pathway will be cancelled. MHD-FCI pathway credit generation will cease for any station for which estimated cumulative value of MHD-FCI credits is greater than 1.5 times the initial capital expenditure, less any initial grant revenue or funding.

## **b) Rationale**

Categorization of MHD-FCI program into private and shared stations balances stakeholder requests that conversion of existing private refueling infrastructure be eligible, with the need for accessible fast chargers to fleets that rely on third-party charging. Fleets must have reasonable access to shared MHD-FCI stations, but these stations can be more restrictive the stations accessible for public use, such as by requiring key cards or codes for entry and use. Stations available to the public must have a point-of-sale terminal that accept major fuel, credit and debit cards, in alignment with the existing FCI program. Refueling for all stations must require no formal or registered training, in alignment with current refueling practices. FSE registration is required to report information to the LCFS Reporting Tool to be issued credits, and the FSEs must be declared acceptable for use.

The existing FCI program cancels applications if operability is not demonstrated within 12 months. Implementation of the light-duty FCI program has shown that cancelled projects were often delayed due to supply chain problems or similar issues that were beyond an applicants' ability to speed station construction. In the MHD-FCI program, nonoperating stations are cancelled after 24 months only if necessary to accommodate additional stations in the program. Applications for these stations can be resubmitted in the subsequent quarter.

To cover the initial capital expenses associated with building a station, the MHD-FCI program is designed to provide credits until the 1.5 times the initial capital expense of the station is equal to the sum of the estimated value of MHD-FCI infrastructure credits and the sum of non-LCFS total funds granted, pledged, or pursuant to settlements from public entities before the station is operational. The 1.5 multiplier is included to replace a discounting factor used in the light-duty program. Initial capital expense of a charging site can include battery energy storage systems, which can be critical for MHD charging without undue demand on the electrical grid. Establishing this value up-front removes the need for ongoing tracking of cost and revenue reporting and provides more certainty for applicants regarding total funding they may expect to receive from the program.

## **12. Section 95486.3(b)(5). Calculation of Fast Charging Infrastructure Credits.**

### **a) Purpose**

The purpose of this subsection is to determine how credits will be calculated based on the quarterly charger performance and dispensed fuel. Staff proposes that the formula structure for the MHD-FCI program is the same as the existing FCI program: infrastructure credits are calculated from the difference between the available MHD-FCI capacity of the charger and the amount of electricity dispensed.

## **b) Rationale**

The equation in this subsection calculates MHD-FCI credits by first taking into account the nameplate power rating of the site, and then subtracting out the dispensed quantity of electricity. As described in the overview of section 95486.3, the capacity crediting provisions are intended to support station operation in the early years when refueling demand is low, and to naturally phase out as dispensed electricity increases. This proposed crediting equation creates the mechanism for this to occur. As a conservative assumption, the light-duty/medium-duty Energy Economy Ration (EER) is used for the capacity crediting equation.

## **13. Section 95486.3(b)(6). Reporting and Recordkeeping Requirement.**

### **a) Purpose**

Staff proposes that operating MHD-FCI sites are required to submit the following information to determine MHD-FCI eligibility and to calculate generated infrastructure credits:

- FSE availability, the percentage of hours the FSE is charging for fueling during the quarter,
- Total capital expenditures, including a breakdown of initial capital expenditures, which include equipment, labor, materials and fees, and
- Total grant revenue or other external funding received toward capital, operational, and maintenance expenditures, including funds pursuant to any settlement related to any California or federal regulation enforcement.

In addition to information required to evaluate progress toward the cap on credits per station, staff proposes that applicants must submit the following information which CARB uses to monitor the state of hydrogen refueling infrastructure in California:

- Total and average delivered cost of electricity,
- Total maintenance cost, land rental costs, and other operational expenditures, and
- Total revenue received from electricity sales and average retail price for electricity sold.

### **b) Rationale**

In addition to the information required to determine MHD-FCI eligibility and to calculate generated infrastructure credits, data about the nascent medium- and heavy-duty charging infrastructure is useful to CARB to better understand the state of the industry and to inform policy that achieves emission reduction goals while minimizing economic impact. The requested data in this section informs CARB on both groups of information.

## **M. Section 95487. Credit Transactions**

### **1. Section 95487. Minor changes**

#### **a) Purpose**

No substantive changes. Only a punctuation correction and minor edit as described in the Purpose of Subarticle 7, Minor changes throughout the Low Carbon Fuel Standard Regulations.

#### **b) Rationale**

See Rationale for Subarticle 7, Minor changes throughout the Low Carbon Fuel Standard Regulations.

## **N. Section 95488. Entities Eligible to Apply for Fuel Pathways.**

### **1. Section 95488(c). Transition to CA-GREET4.0**

#### **a) Purpose**

Staff proposes that any existing certified pathways under CA-GREET3.0 will transition to the CA-GREET4.0 through annual verification of 2024 Annual Fuel Pathway Reports. Staff proposes to adjust CIs of existing pathways and perform credits adjustment via annual verification to reflect the changes in CA-GREET4.0, including the Tier 1 CI Calculators.

The transition of existing certified pathways from the previous models to CA-GREET4.0 through annual verification is necessary to ensure that fuel pathways used for reporting and credit generation reflect the most accurate, robust, and up-to-date modeling methodologies.

Staff proposes that applicants submitting new applications which are certified with a CI effective date of January 1, 2025, or later must use the CA-GREET4.0 or associated Tier 1 CI Calculators.

#### **b) Rationale**

The CA-GREET4.0 model and associated Tier 1 CI Calculators are proposed to be incorporated by reference into section 95488.3 of the regulation.

To specify how CARB will implement the proposed transition to CA-GREET4.0, it is necessary to specify the date when the updated/new Tier 1 CI Calculators for Tier 1 applications, and the modified versions of Tier 1 CI calculators or the CA-GREET4.0 model for Tier 2 applications are available to certify fuel pathway applications or process annual fuel pathway reports. Staff proposes pathways under new applications must be certified using CA-GREET4.0 effective January 1, 2025, or later in order to align the CI compliance schedule and avoid potential confusion about pathway certification in 2024 and subsequent annual verification in 2025. With annual verification already in place, a fuel pathway can transition to a calculator under 4.0 through 2024 Annual Fuel Pathway Report verification which occurs in 2025. Hence, the systemwide transition to all pathways using the updated modeling frameworks will be streamlined through the annual verification process. The process used for the previous modeling transition of phasing out old pathways and requiring new applications for certification

of existing pathways will not be necessary for making this transition. Allowing the transition to occur via annual verification is anticipated to reduce administrative and compliance burdens by avoiding duplicative work. Updated CIs certified through 2024 compliance year annual verification during 2025 becomes effective for reporting January 1, 2026.

## **O. Section 95488.1. Fuel Pathway Classifications.**

### **1. Section 95488.1(b). Lookup Table Classification Updates**

#### **a) Purpose**

Staff proposes to update the incorporated Lookup Table (LUT) pathways technical supporting documentation, rename “Propane” to “Fossil Propane,” and remove the LUT hydrogen pathways. In addition, staff proposes to add a LUT pathway for fossil jet fuel.

#### **b) Rationale**

These amendments to subsection 95488.1(b), which introduces the Lookup Table pathways classification, are necessary to respectively support, improve clarity, and maintain consistency with the updates and amendments to the Lookup Table itself in section 95488.5. By changing “Propane” to “Fossil Propane,” the source of propane is clearly established, which helps avoids confusion regarding the type of propane eligible for a LUT pathway carbon intensity score. The LUT hydrogen pathways are no longer necessary because staff is proposing to incorporate a Tier 1 hydrogen calculator that will be a superior replacement as described in further detail in support of amendments to sections 95488.1(c) and 95488.3. Staff released an updated technical supporting document for LUT pathways.<sup>29</sup> Therefore, the reference to the existing document has become outdated and is updated to maintain consistency.

### **2. Section 95488.1(c) and Section 95488.3. Update CA-GREET3.0 to CA-GREET4.0.**

#### **a) Purpose**

Staff developed and updated the CA-GREET model based on the most current emission factors and data available, including Argonne National Lab’s GREET model, OPGEE, U.S. EPA eGRID, and CARB’s EMISSIONS FACTOR (EMFAC) model. Staff proposes to update the CA-GREET3.0 model referenced in the current regulation to CA-GREET4.0.

Updates to incorporate CA-GREET4.0 are necessary in order to ensure that the applicable regulatory tools model fuel life cycle emissions using the most accurate, robust, and up-to-date data sources.

Likewise, updates to the Tier 1 CI Calculators are necessary to ensure that those calculators model full life cycle emissions using the most accurate, robust, and up-to-date data sources.

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<sup>29</sup> California Air Resources Board, *Lookup Table Pathways Technical Support Documentation*. February 21, 2023. [https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/ca-greet/lut\\_update\\_2023\\_2.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/ca-greet/lut_update_2023_2.pdf)

Staff proposes to incorporate updated Tier 1 CI Calculators reflecting the following changes:

1. Updated input and emission factors using the most current and robust data available to permit accurate accounting of GHG reductions,
2. Improved consistency in equations and methodologies to make Tier 1 CI Calculators broadly applicable to most fuel pathways and reduce the number of Tier 2 applications, and
3. Streamlined functionality of Tier 1 Calculators by improving the user interface and layout.

Staff proposes to update the names of the following Tier 1 Calculators:

- Tier 1 Calculator for Starch and Fiber Ethanol to Tier 1 Calculator for Corn or Sorghum Ethanol
- Tier 1 Calculator for Sugarcane-Derived Ethanol to Tier 1 Calculator for Sugarcane Ethanol
- Tier 1 Calculator for Biomethane for North American Landfills to Tier 1 Calculator for Landfill Biomethane
- Tier 1 Calculator for Biomethane from Anaerobic Digestion of Wastewater Sludge to Tier 1 Calculator for Wastewater Sludge Biomethane
- Tier 1 Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure to Tier 1 Calculator for Dairy and Swine Biomethane
- Tier 1 Calculator for Biomethane from Anaerobic Digestion of Organic Waste to Tier 1 Calculator for Organic Waste Biomethane

Staff proposes to remove the existing Tier 1 CI Calculator for liquefied natural gas (LNG) and liquefied compressed natural gas (L-CNG) from North American Natural Gas.

Staff also proposes to add a Tier 1 CI Calculator for Hydrogen. Staff proposes to include two hydrogen production methods as part of the Tier 1 CI Calculator. They are (1) steam methane reforming, and (2) electrolysis. The steam methane reforming method covers two types of feedstock: North American natural gas and biomethane (renewable natural gas, or RNG). For biomethane, the calculator would model both direct supply and book-and-claim accounting. Similar to other Tier 1 CI Calculators, staff incorporated standard and/or site-specific inputs for certain input parameters, such as steam methane reformation efficiency, electrolysis efficiency, energy usage in production, boil off loss, and electricity use at dispensing stations.

Staff proposes to split the Tier 1 CI Calculator for Biodiesel and Renewable Diesel into two calculators: one each for biodiesel and Hydroprocessed Ester and Fatty Acid (HEFA) fuels.

As part of the new calculator for HEFA fuels, staff proposes to expand the scope of fuels under Tier 1 classification to include renewable naphtha, alternative jet fuel, and renewable propane. This proposal is reflected in Proposed Amendments to subsection 95488.1(c)(3).

Finally, staff proposes to change the term “rendered tallow” to “rendered animal fat” in subsection 95488.1(c)(3).



## b) Rationale

A new version of the GREET model, GREET 2022,<sup>30</sup> is available and reflects updated emission factors from the GREET 2016 model used to develop the CA-GREET3.0 model incorporated by the current regulation. The GREET model is updated regularly with current data and more accurately represents emission factors and process conditions than previous versions. The proposed CA-GREET4.0 updates are necessary so that the applicable CA-GREET model incorporated by the regulation will be based on the most current version of the GREET model with California-specific modifications. Appendix B of this Staff Report includes the associated supporting technical documentation for GREET4.0, while the model itself is available at <https://ww2.arb.ca.gov/resources/documents/lcfs-land-use-change-assessment>.

As specified by the current regulation, the Tier 1 fuel pathway classification applies to conventional alternative fuel pathway categories which CARB staff has extensive experience evaluating, such as, for example, starch ethanol and biodiesel. To streamline the processes for application, review, certification, and verification of such pathways, the current regulation incorporates Tier 1 CI calculators developed from the more complex CA-GREET model, designed to simplify inputs and the LCA framework.

Tier 1 CI calculators have specific equations, inputs, and emission factors. As emission factors are updated over time to reflect better data, energy mix changes, production technology changes and standards of practice, the calculators likewise need to be updated. CARB staff experience working on modeling, evaluation, certification, and verification of these pathways has provided better insight into streamlining of the inputs, emission factors, and modeling approaches. In addition, the layout of Tier 1 CI Calculators can be enhanced to further facilitate data input by the applicant and review by CARB staff and third-party verification bodies.

The updated Tier 1 CI Calculators will include updated emission factors that reflect the current technology, processes, and energy mix. Specifically, updates to the Tier 1 CI Calculators incorporate input and emission factors from modeling tools, including Argonne National Laboratory GREET 2022, U.S. Environmental Protection Agency eGRID2021, and California Air Resources Board EMFAC v1.0.2.<sup>31</sup>

Updates are anticipated to streamline Tier 1 CI Calculators to reflect better understanding of the fuel production processes used by most fuel pathway applicants, thereby allowing more applicants to use the Tier 1 approach. Staff anticipates that this proposal will improve routine implementation of these pathways by facilitating application, review, certification, and verification.

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<sup>30</sup> Wang, M., Elgowainy, A., Lee, U., Baek, K. H., Bafana, A., Benavides, P. T., Burnham, A., Cai, H., Cappello, V., Chen, P., Gan, Y., Gracida-Alvarez, U. R., Hawkins, T. R., Iyer, R. K., Kelly, J. C., Kim, T., Kumar, S., Kwon, H., Lee, K., Liu, X., Lu, Z., Masum, F., Ng, C., Ou, L., Reddi, K., Siddique, N., Sun, P., Vyawahare, P., Xu, H., & Zaimes, G., *Greenhouse gases, Regulated Emissions, and Energy use in Technologies Model (2022 Excel)*. October 10, 2022. [https://greet.anl.gov/greet\\_excel\\_model.models](https://greet.anl.gov/greet_excel_model.models)

<sup>31</sup> California Air Resources Board, *CA-GREET4.0 Technical Documentation*. [Date of adoption]. <https://ww2.arb.ca.gov/resources/documents/lcfs-land-use-change-assessment>

The addition of the proposed Tier 1 CI Calculator for hydrogen would streamline application review for many projects. First, it would expedite review and validation by facilitating both standard and site-specific operational data inputs. These include standard inputs for hydrogen production, energy use, boil-off loss as well as project-specific input for hydrogen transport and biomethane emission factors used as feedstock. Second, book-and-claim accounting substantiation data for hydrogen are integrated into the calculator to expedite third-party validation and annual verification. Overall, the development of a Tier 1 CI Calculator for hydrogen can contribute to expediting application review and certification.

Currently, hydrogen pathway applications must use either a Lookup Table (LUT) pathway or a Tier 2 application. To be eligible for a LUT pathway CI, hydrogen production must meet applicable criteria for feedstock source, energy use, transportation distance and mode, and other conditions as described in the LUT pathway descriptions and technical support document for LUT pathways. Even minor changes to a LUT pathway input require elevating the pathway application to a Tier 2 approach. Moreover, LUT pathways do not offer CIs specific to ultra-low CI feedstock, such as biogas from dairy and swine manure. As a result, hydrogen fuel pathway applicants must use Tier 2 applications in order to capture the GHG reductions offered by these ultra-low CI feedstocks used in hydrogen production. Since 2020, 60% of the certified hydrogen pathways have been Tier 2 applications to capture either small differences in transport distance and mode or site-specific emission factors related to biomethane, which are obtained from annually verified RNG pathway applications. These are input which can be easily standardized and incorporated into Tier 1 modeling. Moreover, Tier 2 applications impose additional requirements for applicants, staff, and third-party verification bodies which can be avoided from the use of Tier 1 calculator for hydrogen.

The 2022 Scoping Plan Update projects that large quantities of hydrogen are needed in transportation by 2045 in order to meet the State's decarbonization goals for the sector and hydrogen reporting has also been recently growing in the LCFS. For example, the volume of hydrogen reported in the LCFS program between 2017 and 2021 increased by about seven-fold.<sup>32</sup> With the continuing and future anticipated growth in the use of hydrogen as a transportation fuel in California, staff expects a large number of hydrogen pathway applications to be submitted for consideration. Expanding the ability to use the Tier 1 CI calculator for hydrogen provides another avenue for applicants and can help reduce pathway review and processing times relative to Tier 2 applications.

Staff proposes to remove the Tier 1 CI Calculator for LNG and L-CNG from North American Natural Gas because it is unnecessary. CARB has received only one applicant for this fuel pathway since the calculator was introduced in 2019. Staff does not expect that any such requests will be made in the future because LNG and L-CNG are now likely have become deficit-generating fuels. Because reporting these fuels now likely results in the generation of deficits rather than credits, reporting entities are less likely to seek to supply these fuels in California in the future. Without a Tier 1 pathway available, any LNG and L-CNG supplied may

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<sup>32</sup> California Air Resources Board, LCFS Data *Dashboard*, Figure 2. (Accessed on October 11, 2023). <https://ww2.arb.ca.gov/sites/default/files/2022-04/fig2.xlsx>

be reported using temporary pathways specified in section 95488.9(b) or by obtaining Tier 2 pathway CI certification.

The staff proposal to separate the current Tier 1 CI Calculator for Biodiesel and Renewable Diesel into two calculators (one each for biodiesel and HEFA Fuels) will enhance flexibility, simplify the interface, and streamline the entry of site-specific data for multiple feedstocks, improving the review and verification of operational data. Although they may be made using the same feedstocks, the biodiesel and HEFA fuel production processes are completely different. The inputs and co-products are also entirely different. By separating the two different production processes into two calculators, the complexity of calculators will be reduced to make it easier to navigate for applicants and third-party verifiers.

The existing Tier 1 CI Calculator for renewable diesel covers renewable naphtha, alternative jet fuel, and renewable propane derived from rendered animal fat, used cooking oil, and vegetable oil but only renewable diesel is mentioned under the Tier 1 classification. Thus, the proposed amendment to subsection 95488.1(c)(3) to specify that renewable naphtha, alternative jet fuel, and renewable propane may be modeled under the Tier 1 classification is consistent with the functionality of both the previous and updated calculators. The proposal to use the same feedstock name “rendered animal fat” for biodiesel and renewable diesel in subsection 95488.3(b)(3) rather than two names (“animal fat” and “tallow”) used interchangeably is intended to minimize confusion by ensuring accuracy and consistency in pathway descriptions. Animal fat, as defined in section 95481, includes tallow and therefore, rendered animal fat is a better term to use.

Staff proposes to update the names of some of the Tier 1 CI calculators (listed in Rationale above) to more concisely describe the calculator topics. These shorter and clear names will reduce confusion and limit any issues that may arise from downloading calculators with long document names.

### **3. Section 95488.1(d). Tier 2 Updates.**

#### **a) Purpose**

Staff proposes to add hydrogen fuel pathways under the Tier 1 classification and remove them from the Lookup Table. Because there are no longer hydrogen pathways in the Lookup Table, staff proposes to delete subsection 95488.1(d)(3), which refers to such pathways, as inapplicable and unnecessary.

The drop-in fuels category listed in section 95488.1(d) currently refers to renewable hydrocarbon fuels. Because other drop-in fuels, such as synthetic gasoline, can also be produced from non-biomass feedstock by combining hydrogen with captured CO<sub>2</sub>, staff proposes to specify an expanded scope of potential drop-in fuels by including synthetic hydrocarbon fuels, such as synthetic gasoline and hydrogen, in the definition of drop-in fuels. Staff proposes to provide gasification and pyrolysis as examples of technologies used in producing renewable hydrocarbon fuels from biomass and add corresponding definitions in section 95481. Staff also proposes to replace the phrase “renewable diesel” with “renewable hydrocarbon fuels.” These amendments are necessary to align this section with amendments proposed for other sections of the regulation.

Currently, subsection 95488.1(d) states that carbon capture and sequestration (CCS) pathways fall under the Tier 2 classification. However, this statement regarding CCS could be read to be ambiguous as currently phrased by failing to specify that CCS must be tied to the alternative fuel production. Staff proposes to revise the phrase to specify the link between alternative fuel production and CCS.

#### **b) Rationale**

Subsection 95488.1(d)(3) mentions that hydrogen pathways not covered by the Lookup Table (LUT) are classified as Tier 2 pathways. The proposal to remove the LUT hydrogen fuel pathways makes the reference in 95488.1(d)(3) unnecessary and inapplicable.

Staff expects growth in renewable hydrocarbon fuels, such as renewable diesel, gasoline, and alternative jet fuel, produced via novel thermo-chemical conversions of biomass feedstocks in the future. Since gasification and pyrolysis are technologies used to produce renewable hydrocarbon fuels, it is necessary to define these processes to reduce confusion or ambiguity that may arise when these technologies are used. Likewise, there is a growing interest in producing synthetic fuels by combining hydrogen with captured CO<sub>2</sub>. Clearly specifying that these pathways qualify as Tier 2 pathways is necessary in order to help inform prospective alternative fuel producers of the appropriate classification of these fuel pathways when submitting an application.

Staff's proposal to replace renewable diesel with renewable hydrocarbon in subsection 95488.1(d) is necessary in order to align with the relevant broader list of hydrocarbon fuels that qualify as Tier 1 pathways specified with Proposed Amendments to subsection 95488.1(c).

Regarding the Tier 2 classification for pathways involving CCS, the proposed change is necessary in order to clarify that carbon capture and/or sequestration in Tier 2 pathways must be tied to alternative fuel production, eliminating any potential ambiguity.

### **4. Section 95488.1(d). Substantiality Requirements.**

#### **a) Purpose**

See Purpose for Section 95488.9(a), Substantiality Requirements.

#### **b) Rationale**

See Rationale for Section 95488.9(a), Substantiality Requirements.

## **P. Section 95488.2. Relationship Between Pathway Registration and Facility Registration.**

### **1. Section 95488.2. Minor Changes**

#### **a) Purpose**

No substantive changes. Only minor edits as discussed in Purpose for Subarticle 7, Minor Changes throughout the Low Carbon Fuel Standard Regulation.

## **b) Rationale**

See Rationale for Subarticle 7, Minor Changes throughout the Low Carbon Fuel Standard Regulation.

## **Q. Section 95488.3. Calculation of Fuel Pathway Carbon Intensities.**

### **1. Section 95488.3. Update CA-GREET3.0 to CA-GREET4.0.**

#### **a) Purpose**

See Purpose for Section 95488.1(c), Update CA-GREET3.0 to CA-GREET4.0.

#### **b) Rationale**

See Rationale for Section 95488.1(c), Update CA-GREET3.0 to CA-GREET4.0.

## **R. Section 95488.4. Relationship of Pathway Carbon Intensities to Units of Fuel Sold in California.**

### **1. Section 95488.4(a). CI Exceedance Conditions that Trigger Automatic Deficits.**

#### **a) Purpose**

As an element of a proposal to strengthen program integrity through more specified regulatory signals to prevent exceedances of carbon intensity scores, staff proposes to narrow the conditions that constitute regulatory violations for CI exceedances by adding a reference to a newly proposed systematized CI exceedance remedy and adding in a financial deterrent. Staff also proposes to change the term “fuel pathway applicant” to fuel pathway holder in this section.

#### **b) Rationale**

Staff is proposing to introduce a deficit obligation provision beginning with the 2025 reporting year for fuel pathway holders if the verified operational CI exceeds the certified CI. The deficit obligation, in conjunction with the new credit true-up provisions (see Section 95488.10(b) and Section 95486(a)(3)(B)), are expected to effectively deter CI exceedances and to encourage fuel pathway holders to add an appropriate conservative margin of safety to their fuel pathway CI scores in order to ensure that their verified operational CI scores will not exceed their certified CIs. By including a margin of safety in a fuel pathway, a fuel pathway holder can reduce the likelihood of exceeding their certified CI and triggering the automatic deficit generation. If the operational verified CI is lower than the certified CI (with the margin of safety), the fuel pathway holder will be eligible to receive additional credits via the true-up provisions included in Section 95488.10(b). and Section 95486(a)(3)(B).

With a deficit obligation provision in place to effectively deter CI exceedance, verified CI exceedances alone will no longer be considered regulatory violations if fuel pathway holders satisfy the automatic deficit obligation. The proposed amendment to this section is necessary in order to specify that fuel pathway holders with CI exceedances would be in violation of the LCFS regulation if they fail to comply with the proposed deficit obligation provision.

Since the determination of a CI exceedance is made after the conclusion of annual verification by which time the applicant has already become a fuel pathway holder, “fuel pathway holder” is a more accurate and appropriate designation to use than “fuel pathway applicant.”

## **S. Section 95488.5. Lookup Table Fuel Pathway Application Requirements and Certification Process.**

### **1. Section 95488.5. Lookup Table Fuel Pathway Application Requirements and Certification Process.**

#### **a) Purpose**

Staff proposes to update the Lookup Table values in Tables 7-1 for the following pathways to reflect the updated emission factors included in the CA-GREET4.0 model:

- California Reformulated Gasoline Blendstocks for Oxygenate Blending (CARBOB,
- Ultra Low Sulfur Diesel (ULSD,
- California Reformulated Gasoline,
- Fossil Jet Fuel,
- Compressed Natural Gas,
- Propane, and California Grid Electricity.

Staff also proposes to update the Calculated Smart Charging or Smart Electrolysis Carbon Intensity Values in Tables 7-2.

These amendments are necessary in order to incorporate modeling and other data updates to improve the accuracy of regulatory values.

In addition, staff proposes to delete LUT hydrogen pathways and add a LUT pathway for fossil jet fuel.

These amendments are necessary in order to reflect the development and incorporation of Tier 1 hydrogen calculators through Proposed Amendments to section 95488.3 and the addition of fossil jet fuel as a regulated fuel through Proposed Amendments to section 95482.

#### **b) Rationale**

The LCFS regulation provides LUT pathways with standard carbon intensity values that generally allow users to directly report fuel volumes without going through a fuel pathway application and certification process. The LUT pathways generally have well-defined life cycle GHG emissions with conservative inputs, such that the use of LUT pathways by fuel reporting entities poses a low risk of undercounting pathway carbon intensity. The intent of LUT pathways is to allow expeditious use of well-understood fuel pathways with minimal pathway details needed from applicants.

Staff uses standard/consistent input and emission factors across all CI calculations, including LUT pathways. Staff proposes to update emission factors using the most current data to accurately reflect the current technology, energy mix, and processes than in previous versions. The update is consistent with past practice of updating the CA-GREET model. Also see the rationale for CA-GREET4.0 supporting amendments to subsection section 95488.3.

Staff proposes to incorporate a Tier 1 CI Calculator for Hydrogen, which will be used instead of the LUT hydrogen pathways. The Tier 1 CI calculator for hydrogen is preferable to applicants since it allows the applicants to capture facility-specific improvements to lower the CI scores. Therefore, the LUT hydrogen pathways are less likely to be used and may be removed. The rationale for developing a Tier 1 CI Calculator for hydrogen is discussed in 95488.3. Tier 1 Classification below.

Staff proposes to add fossil jet fuel as regulated fuel with amendments to section 95482(a). The addition of a LUT pathway for fossil jet fuel is necessary in order to enable reporting parties to report that fuel.

## **2. Section 95488.5(b)(2). Lookup Table Pathway Application Requirements.**

### **a) Purpose**

The proposed removal of the LUT hydrogen pathways will make the Lookup Table application requirements for hydrogen pathways unnecessary. Staff proposes to delete subsections 95488.5(b)(2) and 95488.5(b)(3).

### **b) Rationale**

The removal of subsections 95488.5(b)(2) and 95488.5(b)(3) is necessary in order to be consistent with the proposal to remove the LUT pathways those requirements applied to.

## **3. Section 95488.5(e). Remove Duplicative Incorporation by Reference**

### **a) Purpose**

Staff propose to remove text that incorporates the Lookup Table Pathways Technical Support Documentation (now proposed to be titled 'Technical Support Documentation for Lookup Table Pathways') for this section.

### **b) Rationale**

This document was already incorporated by reference in section 95488.1(b). Removing this duplicative reference to the technical documentation will reduce confusion and better align with rulemaking procedures.

## **T. Section 95488.6. Tier 1 Fuel Pathway Application Requirements and Certification Process.**

### **1. Sections 95488.6 and 95488.7. Updating CA-GREET4.0.**

#### **a) Purpose**

Staff is updating the U.S. EPA's Emissions and Generation Resource Integrated Database with year 2014 data by incorporating eGRID2021 electricity mix data and corresponding electricity emission factors in the CA-GREET4.0 model and Tier 1 CI Calculators. Staff proposes to rename eGRID2014v2 to eGRID2021 with the release date of January 30, 2023.

## **b) Rationale**

The proposed change is necessary to align with comprehensive updates of regulatory models and associated improved data sources.

## **2. Section 95488.6(a)(1). Tier 1 Carbon Intensity Calculator.**

### **a) Purpose**

Staff proposes requiring Tier 1 applications to have an interval not exceeding three months between the end of the reported operational data period and the date of submission. This amendment is necessary in order to ensure that Tier 1 fuel pathway certification applicants support their application and certification with recent and representative operational data.

### **b) Rationale**

Even though the current regulation requires the most current 24 months of recent operational data to be included in Tier 1 CI calculators, it is not specific enough regarding the timeline and leaves room for interpretation. As a result, applicants submitting Tier 1 fuel pathway applications do not always include the most recent operational data, potentially leading to a certification with outdated information. As a result, the certified CI used for reporting fuel volumes and generating associated LCFS credits or deficits may not align with the actual operational CI. Following annual fuel pathway verification, this misalignment may result in increased credit invalidation or regulatory violations in the case of CI exceedances. By requiring the applicant to submit the most current operational data in calculating the CI, the amendment assures that the certified CI will more accurately reflect the CI at the time of fuel reporting in the LRT for the purpose of credit generation.

## **3. Section 95488.6(a)(1)(B). Tier 1 CI Calculator Instruction Manuals**

### **a) Purpose**

Staff proposes to include the names of each Tier 1 CI Calculator Instruction Manuals that is incorporated by reference in the regulation.

### **b) Rationale**

Individually listing each of the Tier 1 CI Calculator Instruction Manuals better conforms with regulatory requirements of documents incorporated by reference.

## **4. Sections 95488.6(b)(2) and 95488.7(d)(3). Deemed Complete Date for Tier 1 and Tier 2 Applications.**

### **a) Purpose**

Staff proposes to align and explicitly define the deemed complete date for both Tier 1 and Tier 2 applications as the quarter in which a positive or qualified positive statement is provided to CARB. As part of this proposed alignment, staff proposes to replace “Completeness Review” with “Pre-validation Review,” and “complete” and “incomplete” to “ready for validation” and “not ready for validation” for Tier 2 applications in subsection 95488.7(d)(1). Staff also proposes to



change the timeline for completing validation from within six months of submitting an application to within six months of a verification body receiving the application from CARB in the LCFS Reporting Tool and Credit Bank & Transfer System (LRT-CBTS). Staff also proposes to amend the regulation to explicitly state that fuel pathway applicants may submit a new application if validation is not completed successfully within the proposed timeline.

## **b) Rationale**

The evaluation processes specified under the current regulation for both Tier 1 and Tier 2 applications indicate a deemed complete date that serves as a basis for determining the first potential eligible fuel reporting quarter. Both types of applications include preliminary staff review, third-party validation, post validation review, and if deemed eligible, certification. Tier 2 applications generally involve more staff resources and time due to complexities with life cycle methodologies and inclusion of nonstandard inputs. Also, Tier 2 applications require additional time for public posting and reviewing applicant responses to public comments if any are received.

Currently the “deemed complete” date in the application review process is different for Tier 1 and Tier 2 applications. Tier 1 applications are deemed complete when the verification body (VB) issues a positive or qualified positive (+ or Q+) validation statement. Tier 2 applications are deemed complete upon routing from CARB staff to a VB for validation.

Aligning the deemed complete date for Tier 1 and Tier 2 applications is necessary to ensure a consistent evaluation process across pathway classifications. The alignment allows sufficient time for a thorough preliminary review of Tier 2 applications and facilitates the development of clear operating conditions and site-specific inputs which in turn expedites the validation and post-validation engineering review phases. The proposal also retains the signal of when the application is deemed complete to enable the fuel pathway holders to plan for fuel sale logistics.

Changing “Completeness Review” to “Pre-validation Review,” “complete” to “ready for validation” and “incomplete” to “not ready for validation” specifies that the review of a Tier 2 application prior to routing to the VB is a pre-validation review and does not make the application complete, which is consistent with the current Tier 1 approach.

The current timeline for completing validation is six months from the date of application submission. Staff review of Tier 1 and Tier 2 applications requires substantial time before they can be routed to the verification body for validation. The revised timeline starts from the day the verification body receives the application from CARB, which is after staff’s review of the application. Therefore, the proposed timeline provides more time (i.e., six months) for the verification body to verify data/information thoroughly and complete validation, rather than requiring staff review and third-party validation to occur within six months. The proposed clarification regarding the rejection of the application without prejudice is anticipated to help better inform applicants about the follow-up actions that applicants can take for submitting a new application.

## **U. Section 95488.7. Tier 2 Fuel Pathway Application Requirements and Certification Process.**

### **1. Section 95488.7 Updating CA-GREET4.0.**

#### **a) Purpose**

See Purpose for Section 95488.6, Updating CA-GREET4.0.

#### **b) Rationale**

See Rationale for Section 95488.6, Updating CA-GREET4.0.

### **2. Section 95488.7(a)(1). CA-GREET Model.**

#### **a) Purpose**

See purpose for subsection 95488.6(a)(1), CA-GREET Model.

#### **b) Rationale**

See rationale subsection 95488.6(a)(1), CA-GREET Model.

### **3. Section 95488.7(c). Documents for Public Review.**

#### **a) Purpose**

Tier 2 applications are required to go through a 10-day public comment period. CARB staff posts a redacted LCA report, provided by the applicant, along with other documents on the LCFS website for soliciting public comments. Staff published LCFS Guidance 20-05<sup>33</sup> in 2020 describing what types of information/data are not confidential and should not be redacted by applicants. Staff proposes to include language that directs prospective applicants to not redact any nonconfidential information in the LCA report submitted for public posting.

#### **b) Rationale**

Including a clear statement that public, nonconfidential information must not be redacted in the regulation is necessary in order to clarify notification of the regulatory requirements. This added notice is anticipated to potentially improve transparency in the public process by establishing clearer stakeholder expectations of the information that must be provided for public review.

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<sup>33</sup> California Air Resources Board, LCFS *Guidance 20-05: Redaction of Confidential Business Information under the Low Carbon Fuel Standard (LCFS)*. April 2020.

[https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance\\_20-05\\_ADA.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance_20-05_ADA.pdf)

#### **4. Section 95488.7(d)(3). Deemed Complete Date for Tier 1 and Tier 2 Applications.**

##### **a) Purpose**

See Purpose for Section 95488.6(b)(2), Deemed Complete Date for Tier 1 and Tier 2 Applications.

##### **b) Rationale**

See Rationale for Section 95488.6(b)(2), Deemed Complete Date for Tier 1 and Tier 2 Applications.

#### **V. Section 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.**

##### **1. Section 95488.8(c). Designation of Confidential Business Information.**

##### **a) Purpose**

The current regulation requires that “redactions” must be replaced with the phrase “Confidential business information has been redacted by the applicant.” Staff proposes to simplify this current requirement to specify the more limited and necessary practice of simply but clearly redacting the confidential information.

##### **b) Rationale**

The proposed revision simplifies the redaction requirement and will thus potentially eliminate marginal administrative burden for applicants. The method of redaction proposed to be specified is more in line with common redaction practice and need. This amendment does not alter the general requirement for effective and clear redaction and may save time for applicants.

##### **2. Section 95488.8(g). Specified Source Feedstocks.**

##### **a) Purpose**

Staff proposes to delete the specific descriptions of industry operations which produce specified source feedstock as nonprimary products and the descriptions of the fuel types produced from specified source feedstocks listed in subsection 95488.8(g)(1)(A)1. Staff also proposes to add forestry residues and municipal solid waste (MSW) that is diverted from landfill disposal to the list of specified source feedstocks in subsection 95488.8(g)(1)(A)3. to provide clarity regarding the eligibility and documentation requirements for these feedstocks.

The Proposed Amendments also specify that for forest-derived material to be considered a residue, applicants must demonstrate that the forest-derived material is small-diameter, non-merchantable, and was removed from the harvest site for the purpose of wildfire mitigation or forest stand improvement.

These amendments help specify eligibility and requirements for specific specified source feedstocks.

## **b) Rationale**

Deleting the specific industry descriptions will more accurately reflect that industry operations other than those specified can also produce specified source feedstocks listed in subsection 95488.8(g)(1)(A)1. Similarly, because more types of fuel can be produced from specified source feedstocks than those currently mentioned in subsection 95488.8(g)(1)(A)1., the deletion of the reference to specific fuel types produced from specified source feedstock appropriately broadens the scope of eligible fuels.

Landfills are a major source of methane emissions. Diverting organic MSW from landfill disposal to beneficial uses, such as recycling, reuse and energy recovery including fuel production, significantly reduces methane emissions. The LCFS offers incentives to alternative fuels produced from landfill-diverted organic MSW by quantifying the avoided methane emissions. To ensure that feedstocks claimed as diverted from landfill disposal are actually the types that would otherwise be disposed in landfills, robust chain of custody documentation that traces MSW to the point of origin is required. By specifying MSW as specified source feedstock, it will be subject to rigorous verification requirements benefiting landfill diversion projects while contributing to California's methane reduction goals under SB 1383.

Stakeholders have requested clarity on the eligibility and documentation requirements of forestry residues that may be used as biofuel feedstocks in the LCFS.

In the current regulation, feedstocks derived from waste, residue, by-product, and similar materials can be used to generate low CI fuels and are designated as "specified source feedstocks" in the LCFS. Subsection 95488.8(g)(1)(A) provides a nonexclusive list of feedstocks that the LCFS designates as specified source feedstocks, which require chain-of-custody documentation to facilitate transparency of supply chains, ensure that the source, type, and quantity of the feedstock is verifiable, and that the correct CI value is assigned to the fuel pathway.

Staff recognizes the potential for mischaracterization of merchantable or intentionally-produced wood material (sometimes referred to as roundwood, sawlogs, sawtimber, stemwood, or pulpwood), as well as the potential environmental impact such as deforestation or increased harvest of wood for bioenergy. Specifying which forest-derived wood residues are specified source feedstocks will ensure that applicants are required to provide documentation demonstrating that the residues consist of small-diameter slash or thinnings that have been removed from the harvest site, either to improve the health and resilience of the remaining stand, or to reduce the fuel load for wildfire mitigation to protect buildings, roads and other infrastructure in high-hazard areas. The demonstration helps mitigate the concerns regarding deforestation and other unintended environmental impacts.

## **3. Section 95488.8(g)(1)(D). Requirements for Attestation Letter.**

### **a) Purpose**

Further documentation is needed in order to facilitate transparency of supply chains for designated specified source feedstocks, which enables third-party verifiers and CARB to verify the source, type and quantity of the feedstock along the supply chain.

## **b) Rationale**

The current regulation requires that fuel pathway holders using a specified source feedstock must maintain records demonstrating chain of custody from the point of origin to the fuel production facility. Currently, specified source feedstock supply chain entities are not required to maintain attestation letters. To ensure specified source feedstock supply chain entities provide the correct source, type, and quantity of the specified source feedstock as described in the product transfer documents under subsection 95488.8(g)(1)(C), staff proposes to require that all specified source feedstock supply chain entities maintain attestation letters for CARB accredited verifier and CARB review. Signed specified source feedstock supplier attestations improve traceability requirements, especially when the point-of-origin parties are not immediately upstream of the fuel production facility.

### **4. Sections 95488.8(h)(1)(A), 95488.8(i)(1)(B)3., 95488.8(i)(2)(E). Accounting for Environmental Attributes.**

#### **a) Purpose**

Staff proposes to update the language in this provision to clarify the accounting of environmental attributes in the LCFS program. To do this, staff proposes to mirror how it is handled in CARB's Cap-and-Trade program.

#### **b) Rationale**

Under the current regulation, there was confusion about the restrictions on the use of environmental attributes in another mandatory or voluntary programs when the same environmental attributes are used in the LCFS program. The clarification uses more precise language to remove confusion and continues to make clear the environmental attributes cannot be used across programs except in very limited instances related to compliance programs.

### **5. Sections 95488(i)(1), 95490(b)(8), and 95491(d)(4)(D). Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.**

#### **a) Purpose**

Staff proposes clarifying book-and-claim accounting for matched low-CI electricity for use to produce hydrogen used as a transportation fuel as well as for direct air capture (DAC) projects with certain conditions such as new or increased capacity, local deliverability requirements, and quarterly balancing for attributes matching.

#### **b) Rationale**

The 2022 Scoping Plan Update identified that deployment of low-carbon hydrogen used as a transportation fuel as well as mechanical carbon dioxide removal, which includes direct air capture as a primary option, will be necessary to achieve California's AB 1279 targets. The Scoping Plan also noted that mechanical carbon dioxide removal, including direct air capture, will need governmental or other incentive support to overcome the near-term technology and

market barriers. The LCFS regulation introduced a provision to incentivize direct air capture with sequestration projects as well as with hydrogen production via electrolysis or with matched biomethane attributes in the 2018 amendments. A number of CARB stakeholders have expressed interest in developing direct air capture with sequestration projects as well as hydrogen produced via novel methods such as biomass gasification and methane pyrolysis. However, different from the carbon capture activities occurring at the controlled, high CO<sub>2</sub> concentration sources (e.g., fermentation vessels at an ethanol plant, or natural gas-fired turbine at a refinery), the process of capturing CO<sub>2</sub> directly from the atmosphere has higher electricity demand, which makes it financially challenging and may drive the need for additional electricity load. This is also true for non-fossil-based hydrogen production. Additionally, there are regions that may be ideal for CO<sub>2</sub> sequestration but have grid electricity with a higher GHG footprint or have geographic limitations for installing low-GHG power generation units (e.g., a solar or wind farm) onsite at the direct air capture facility. The proposal permits low-CI electricity with quarterly demonstration of trackable deliverability to be used for hydrogen production for hydrogen used as a transportation fuel as well as at a direct air capture facility, which aligns with the requirement for renewable or low-CI process energy (section 95488.8(h)(1)(C)). Hydrogen production and direct air capture facilities that use low-GHG electricity would reduce potential demand to the power grid while maximizing net GHG reductions and incentives for the projects. Also, the requirement that low-CI electricity must be sourced from the new or expanded operation beginning no earlier than January 1, 2024, minimizes resource shuffling.

## **6. Section 95488.8(i)(1)(B)3. Accounting for Environmental Attributes.**

### **a) Purpose**

See Purpose for Section 95488.8(h)(1)(A), Accounting for Environmental Attributes.

### **b) Rationale**

See Rationale for Section 95488.8(h)(1)(A), Accounting for Environmental Attributes.

## **7. Sections 95488.8(i)(2)(A-D)). Modifications to Book-and-Claim Accounting for Pipeline-Injected Biomethane.**

### **a) Purpose**

The current LCFS regulation allows for indirect accounting of biomethane when injected into the North American natural gas pipeline without requirements that the specific molecules of biomethane injected be delivered to California. Staff proposes to more closely align the deliverability requirements for pathways for biomethane used in CNG vehicles with the requirements applicable to other fuels pathways in the LCFS program by requiring a demonstration of deliverability to California for projects that break ground after December 31, 2029.

### **b) Rationale**

The proposal aims to align deliverability requirements for biomethane used as transportation fuel with those applicable to other fuels, including electricity, which must demonstrate

deliverability to California, as well as all other fuels in the program which must physically be dispensed in California. The specific proposal is based on similar deliverability requirements for biomethane currently in effect in the California Renewable Portfolio Standard and the California Public Utilities Commission biomethane procurement program implemented as directed by SB 1440 (Hueso, Chapter 739, Statutes of 2018). The deliverability requirements would apply to biomethane fuel pathways that break ground after December 31, 2029 and are claimed for use as bio-CNG, bio-LNG, or bio-L-CNG in CNG vehicles, and gives time for planned methane reduction projects without a demonstrable deliverability path to develop other offtake agreements, or to transition to producing hydrogen for use in California. Biomethane fuel pathways that break ground before Jan 1, 2030 would not be subject to the deliverability requirements, in order to support the need for the significant methane reductions called for this decade by the scientific community.<sup>34,35</sup> Specifically, staff proposes to incorporate the deliverability requirement identified by the RPS and SB 1440: that biomethane injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG for CNG vehicle use in California must be carried through common carrier pipelines that physically flow within California or toward the end use in California. Additionally, natural gas flows through a pipeline as a result of a series of compressors creating pressure differentials. The gas flows from an area of high pressure to an area of relatively low pressure. However, in some cases, the natural gas coming out of the wells has enough pressure to move through the gathering lines on its own. Generally, pipelines flow in one direction, but there are pipelines that can be bidirectional, which means that gas can come from both ends of the pipeline, depending on where the gas is removed and where the compressors create the pressure differential.<sup>36</sup> Therefore, to demonstrate the potential for molecules to flow to California, staff proposes that eligible pipelines must flow toward California at least 50% of the time on an annual basis, as defined by the current RPS eligibility guidebook. Flows are monitored by supervisory control and data acquisition systems and reported to the Energy Information Administration. The requirement to demonstrate deliverability s for projects that break ground after January 1, 2030 for bio-CNG, bio-LNG and bio-L-CNG take effect on January 1, 2041, and on January 1, 2046 for biomethane used as an input to produce hydrogen.

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<sup>34</sup> Intergovernmental Panel on Climate Change, *Summary for Policymakers, In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* 2018.

[https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM\\_version\\_report\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf)

<sup>35</sup> United States Department of State and the United States Executive Office of the President, *The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050.* November 2021. [https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf?itid=lk\\_inline\\_enhanced-template](https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf?itid=lk_inline_enhanced-template)

<sup>36</sup> Pipeline Safety Trust, *Pipeline Briefing Paper #2: Pipeline Basics & Specifics About Natural Gas Pipelines.* September 2015. <https://pstrust.org/wp-content/uploads/2015/09/2015-PST-Briefing-Paper-02-NatGasBasics.pdf>

## **8. Section 95488.8(i)(2)(E). Attestations Regarding Environmental Attributes.**

### **a) Purpose**

An entity reporting any RNG as a transportation fuel in LRT-CBTS, and a fuel pathway holder using biogas or biomethane as feedstock or process energy, must obtain and keep attestations from each upstream party. Staff clarifies that the upstream parties must also maintain the attestations.

### **b) Rationale**

Biomethane supplied using book-and-claim accounting and claimed as a feedstock in pathways for bio-CNG, bio-LNG, bio-L-CNG, and hydrogen via steam methane reformation is a specified source feedstock. The current regulation requires that reporting entities for RNG as a transportation fuel in the LRT-CBTS and fuel pathway holders using biogas or biomethane as a feedstock or for process energy must obtain and keep records from each upstream party; however, these specified source feedstock supply chain entities were not clearly required to maintain the attestation letters. To help ensure specified source feedstock supply chain entities provide the correct source, type, and quantity of the specified source feedstock consistent with the proposed amendment under subsection 95488.8(g)(1)(D), staff proposes to clarify that all specified source feedstock supply chain entities must maintain attestation letters for CARB accredited verifier and CARB review.

## **9. Section 95488.8(i)(2)(E). Accounting for Environmental Attributes.**

### **a) Purpose**

See Purpose for Section 95488.8(h)(1)(A), Accounting for Environmental Attributes.

### **b) Rationale**

See Rationale for Section 95488.8(h)(1)(A), Accounting for Environmental Attributes.

## **10. Section 95488.8(i)(3). Expand Indirect Accounting for Low-CI Hydrogen.**

### **a) Purpose**

Currently, the LCFS offers an indirect (or "book-and-claim") accounting mechanism for biomethane used as CNG, LNG, and to produce low-CI hydrogen. Staff proposes to expand such use of indirect accounting to include low-CI hydrogen injected into a dedicated hydrogen pipeline, which can be either used directly in transportation, or used in alternative fuel production in proposed subsection 95488.8(i)(3). This will result in a revision of the title of subsection 95488.8(i).

Staff proposes to align book-and-claim accounting of hydrogen with production tax credits under the Inflation Reduction Act (IRA). For this, staff proposes well-to-wheel CI thresholds of less than or equal to 55.00 gCO<sub>2</sub>e/MJ for gaseous hydrogen and less than or equal to 95.00 gCO<sub>2</sub>e/MJ for liquid hydrogen. Eligible hydrogen for use in book-and-claim accounting must be injected in a pipeline network that is physically connected to California. Only new and



expanded hydrogen production are eligible for book-and-claim accounting and must meet the following conditions:

1. Hydrogen fuel production facilities begin new or expanded production after December 31, 2023; and
2. If hydrogen is produced from steam methane reforming of fossil natural gas, biomethane attributes must be used to meet the required CI thresholds for low-CI hydrogen.

In summary, staff believes that this amendment is necessary to facilitate and spur hydrogen decarbonization.

## **b) Rationale**

The 2022 Scoping Plan Update<sup>37</sup> calls for accelerating the transition to hydrogen use in support of achieving carbon neutrality. The 2022 Scoping Plan Update scenario projects significant growth of renewable and low-CI hydrogen production spurred by demand in the transportation sector and hard-to-electrify end uses. In this context, allowing indirect accounting of low-CI hydrogen in the LCFS can be one mechanism to support California's energy decarbonization goals by helping to overcome bottlenecks in hydrogen production and supply.

Book-and-claim accounting of pipeline-injected hydrogen allows the matching of the environmental attributes of low-CI hydrogen to transportation end uses in California eligible for LCFS credit generation. At present, low-CI hydrogen production is limited, and production facilities are located at far distances from end uses, which makes physical delivery of hydrogen challenging and more GHG intensive. Staff proposes expanding the existing book-and-claim accounting provision to include low-CI hydrogen in order to incentivize and spur increased development and supply of low-CI hydrogen by providing flexibility to hydrogen production facility siting and supply logistics. Staff believes that this amendment is necessary to facilitate and spur the use of low-CI hydrogen in support of California's decarbonization efforts.

The proposed CI thresholds are chosen because this would accommodate well-to-gate<sup>38</sup> GHG emissions of 4 kgCO<sub>2</sub>e/kg of hydrogen or lower, as required for IRA incentives, and help create a synergy between the 2 programs. This proposal will leverage the IRA incentives for low-CI hydrogen production and funding for hydrogen infrastructure projects provided by the Bipartisan Infrastructure Law.<sup>39</sup>

The proposed eligibility start date is chosen for two reasons. First, it helps LCFS incentives flow into new and expanded hydrogen projects thereby avoiding shuffling of resources. Second, the date is chosen to make it closer to the expected LCFS amendments

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<sup>37</sup> California Air Resources Board, *Scoping Plan for Achieving Carbon Neutrality*. November 16, 2022. <https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf>

<sup>38</sup> Well-to-gate GHG emissions refer to GHG emissions from extraction of feedstock and processing, feedstock transport to a hydrogen production site and hydrogen production.

<sup>39</sup> 117th Congress, *Inflation Reduction Act of 2022*. Pub.L. No. 117-169. August 16, 2022. <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>

implementation timeline. The purpose of expanding the book-and-claim accounting provision to accommodate low-CI hydrogen is to ensure that additional supply of low-CI hydrogen meets the growing demand for various end-uses and LCFS credits and their associated value are optimally used to support the carbon neutrality goals outlined in the 2022 Scoping Plan Update.

## **11. Sections 95488.8(j) and 95488.8(k). Moving Measurement Accuracy and Device Calibration and Missing Data Provisions Subsections to New Section.**

### **a) Purpose**

Staff is proposing to delete and move section 95488.8(j) and section 95488.8(k) to new section 95491.2.

### **b) Rationale**

The Proposed Amendments provide consistency across all LCFS report and application types regarding measurement accuracy, meter calibration, meter calibration postponements, and missing data requirements. This will ensure the same data quality expectations between fuel pathway applications and Annual Fuel Pathway Reports, Quarterly Fuel Transactions Reports, Crude Oil Quarterly and Annual Volumes Reports, Project Reports, and Low-Complexity/Low-Energy-Use Refinery Reports. Placement of these requirements in this original section made it erroneously appear that these requirements were specific to pathway applications and not all report and application types as intended. The Proposed Amendments also clarify that the same requirements apply to all report types (including applications) subject to third-party verification.

## **W. Section 95488.9. Special Circumstances for Fuel Pathway Applications.**

### **1. Sections 95488.9(a) and 95488.1(d). Substantiality Requirements.**

#### **a) Purpose**

Currently, the substantiality requirements apply in two scenarios to limit:

1. Applications for multiple pathways for the same feedstock-fuel combination, and
2. Tier 2 application when the fuel pathway cannot be accurately modelled using a Tier 1 calculation due to an innovative method.

Scenario 2 has rarely been exercised in evaluating applications because process changes involving low-CI process energy and CCS are already exempt from the substantiality requirement. Moreover, the proposed updates to the Tier 1 CI calculators mean most pathways could be modelled as Tier 1 pathways, further reducing the need for these criteria. Therefore, staff proposes to delete that scenario 2. For the same reason, staff proposes to delete the mention of substantiality requirements for Tier 2 applications in subsection 95488.1(d)(6)(C).

In addition, scenario 1 does not explicitly cover reapplication for the same feedstock-fuel combination pathway that has already been certified. Staff proposes to define the substantiality requirements to limit such reapplications.

## **b) Rationale**

The substantiality requirement for scenario 2 may no longer be needed for Tier 1 pathways with innovative methods because the proposed updates to Tier 1 CI calculators and inclusion of a new Tier 1 hydrogen calculator are expected to enable Tier 1 calculators to accurately model most fuel production scenarios currently under the Tier 2 classification. Those Proposed Amendments will make scenario 2, designed for pathways that could not be accurately modeled by Tier 1 redundant. For these reasons, the deletion of the substantiality requirement for Tier 1 pathways with innovative methods is necessary to align the substantiality requirements with other Proposed Amendments and simplify the regulation.

During the annual verification process, pathway holders with a verified operational CI lower than their certified CI may request adjustment to the lower CI (subsection 95488.10(a)(6)). This mitigates the need to reapply to capture marginal CI improvements. Therefore, staff proposes to establish substantiality requirements that limit reapplications of already certified pathways to avoid duplicative work and administrative burden associated with CI application processing and verification when CI reductions are marginal since marginal improvements can be captured through annual verification. The same calculator must be used when demonstrating the substantiality requirements to ensure the CI reductions are a result of improvements in the pathway process rather than changes in emission factors or other changes in calculator updates.

## **2. Section 95488.9(b). Temporary Fuel Pathways.**

### **a) Purpose**

Temporary fuel pathways allow fuel reporting entities to generate LCFS credits or deficits for reporting quantities of fuel supplied for use in California while preparing to apply for a fuel pathway or awaiting the completion of the certification process. Temporary fuel pathways have conservative CI scores. In general, the temporary CIs have been determined using the highest certified carbon intensity score for a given feedstock-fuel combination from a pool of applications certified to date, plus a conservativeness factor of 5%, and rounding up to the nearest 5 gCO<sub>2e</sub>/MJ.

Staff proposes to incorporate temporary pathways for dairy/swine manure biogas to RNG and hydrogen, hydrogen derived from non-dairy and swine manure biogas, electrolytic hydrogen from electrolysis using zero-CI electricity, renewable naphtha/gasoline, renewable jet fuel and renewable propane into in Table 7 of the regulation. The Executive Officer approved those temporary pathways initially as new temporary pathways pursuant to section 95488.9(b)(4) of the regulation.

Based on the analysis of certified pathways and the conservative CI determination method described above, staff proposes to update the temporary fuel pathway CI values in Table 7 of the regulation where applicable. The proposed updates are summarized in Table 2 below.

Table 2: List of Proposed Changes for Temporary Fuel Pathways

Fuel	Feedstock	Proposed changes
Ethanol	Corn and Sorghum	Replace renewables with solar/wind electricity as process energy
Ethanol	Any Sugar Feedstock	Update CI based on highest certified CI plus 5% margin. Replace renewables with solar/wind electricity as process energy
Ethanol	Any Cellulosic Biomass	Change feedstock name to grain fiber and bagasse. Replace renewables with solar/wind electricity as process energy
Biomass-based Diesel (HEFA fuels and Biodiesel)	Fats/Oils/Grease Residues	Update CI based on highest certified CI plus 5% margin. Replace renewables with solar/wind electricity as process energy
Biomass-based Diesel (HEFA fuels and Biodiesel)	Any feedstock derived from plant oils (excluding palm oil and palm derivatives, as a sole feedstock or blended with other feedstocks, and distiller's corn oil)	Update CI based on highest certified CI plus 5% margin. Replace renewables with solar/wind electricity as process energy
Biomass-based Diesel (HEFA fuels and Biodiesel)	Distiller's Corn Oil	Update CI based on highest certified CI plus 5% margin
Renewable Propane	Fats/Oils/Grease Residues	Update CI based on highest certified CI plus 5% margin
Renewable Propane	Any feedstock derived from plant oils (excluding palm oil and palm derivatives, as a sole feedstock or blended with other feedstocks, and distiller's corn oil)	Update CI based on highest certified CI plus 5% margin
Renewable Propane	Distiller's Corn Oil	Update CI based on highest certified CI plus 5% margin
Renewable Naphtha and Renewable Gasoline Blendstock	Fats/Oils/Grease Residues	Update CI based on highest certified CI plus 5% margin

Fuel	Feedstock	Proposed changes
Renewable Naphtha and Renewable Gasoline Blendstock	Any feedstock derived from plant oils (excluding palm oil and palm derivatives, as a sole feedstock or blended with other feedstocks, and distiller's corn oil)	Update CI based on highest certified CI plus 5% margin
Renewable Naphtha and Renewable Gasoline Blendstock	Distiller's Corn Oil	Update CI based on highest certified CI plus 5% margin
Alternative Jet Fuel	Fats/Oils/Grease Residues	Update CI based on highest certified CI plus 5% margin
Alternative Jet Fuel	Any feedstock derived from plant oils (excluding palm oil and palm derivatives, as a sole feedstock or blended with other feedstocks, and distillers' corn oil)	Update CI based on highest certified CI plus 5% margin
Alternative Jet Fuel	Distiller's Corn Oil	Update CI based on highest certified CI plus 5% margin
Biomethane CNG	Food Scraps, Urban Landscaping Waste, or Other Organic Waste	Add solar/wind electricity as process energy
Biomethane LNG	Food Scraps, Urban Landscaping Waste, or Other Organic Waste	Add solar/wind electricity as process energy
Biomethane L-CNG	Food Scraps, Urban Landscaping Waste, or Other Organic Waste	Add solar/wind electricity as process energy
Biomethane CNG	Landfill gas and Municipal Wastewater Sludge	Group landfill gas and municipal waste sludge together. Add solar/wind electricity as process energy. The temporary pathway CI is derived after excluding two outlier certified pathways.
Biomethane LNG	Landfill gas and Municipal Wastewater Sludge	Group landfill gas and municipal waste sludge together. Add solar/wind electricity as process energy. The temporary pathway CI is derived after excluding two outlier certified pathways.

Fuel	Feedstock	Proposed changes
Biomethane L-CNG	Landfill gas and Municipal Wastewater Sludge	Group landfill gas and municipal waste sludge together. Add solar/wind electricity as process energy. The temporary pathway CI is derived after excluding two outlier certified pathways.
Biomethane CNG, LNG or L-CNG	Dairy Manure	Add solar/wind electricity as process energy
Hydrogen (compressed or liquefied)	Natural Gas and Biomethane not derived from swine and dairy manure	Update CI by adding 5% margin to the existing temporary pathway CI to account for an increase in natural gas emission factor and accommodate longer transportation distances for liquid hydrogen transport. Change feedstock description to Natural Gas. Replace renewables with solar/wind electricity as process energy
Hydrogen (compressed or liquefied)	Biomethane from Dairy and Swine Manure	Replace renewables with solar/wind electricity as process energy
Hydrogen (compressed or liquefied)	Biomethane from Non-Dairy and-Swine Manure Sources	Based on prior certified hydrogen pathways with 5% margin of safety
Hydrogen (compressed or liquefied)	Electrolysis of Water using Zero-CI or Negative-CI Electricity	Considers gaseous hydrogen transport distance of less than 500 miles or liquid hydrogen transport distance of less than 2,000 miles

## b) Rationale

Temporary fuel pathways are meant to be conservative values for limited-time use. Staff reviewed CIs from pathways certified since 2019 that match the feedstock-fuel combinations of temporary pathways and propose changes to ensure that the temporary fuel pathway CIs continue to remain conservative in order to support program integrity.

The feedstock descriptions for cellulosic biomass and hydrogen are proposed to be updated to provide feedstock eligibility for temporary pathways. A separate temporary CI is created for distiller's corn oil because it has a distinctly lower CI than other vegetable oils. On the other hand, the temporary pathways for landfill gas are grouped with the temporary pathways for municipal wastewater sludge because they have a similar system boundary and fuel production system. Temporary pathways for hydrogen are expanded to include electrolytic hydrogen and non-manure biogas derived hydrogen to facilitate production of low-CI hydrogen from a diverse set of hydrogen technologies. Likewise, transport distances for hydrogen are

defined to remove the ambiguity about the eligibility for hydrogen transported long distances. Staff is replacing “renewables” used as process energy with solar/wind electricity to improve clarity of the regulation. The updated temporary pathway CIs would apply to new temporary pathway applications and temporary pathway petition extension requests submitted after the LCFS amendments go into effect. The existing certified temporary pathways at the time of the implementation date would remain in place until they expire.

### **3. Section 95488.9(c)(3). Provisional Pathways.**

#### **a) Purpose**

Staff proposes to delete section 95488.9(c)(3) to align CI adjustments for provisional and non-provisional pathways as described in support of Proposed Amendments to section 95488.10(a)(6) and (7).

#### **b) Rationale**

See the rationale for Proposed Amendments to section 95488.10(a), Aligning Provisional and Non-Provisional Pathways for CI Adjustments

### **4. Section 95488.9(f)(3). Phase Out Avoided Methane Crediting.**

#### **a) Purpose**

This subsection currently specifies that the carbon intensities for certain fuel pathways may reflect avoided methane crediting for up to three 10-year crediting periods. For projects that break ground after December 31, 2029, staff proposes that pathways for avoided methane crediting be available until 2040 for biomethane used as a transportation fuel, and until 2045 for biomethane used to produce hydrogen. Specifically, fuel pathways for biomethane with avoided methane used in CNG vehicles could be certified or recertified for 10-year crediting periods through 2040. Fuel pathways for biomethane with avoided methane used to produce hydrogen could be certified through 2045.

#### **b) Rationale**

Methane, because of its high global warming potential, is responsible for a significant fraction of current global climate change and the Intergovernmental Panel on Climate Change (IPCC) has repeatedly identified<sup>40,41</sup> the importance of quickly reducing methane emissions by 2030 to

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<sup>40</sup> Intergovernmental Panel on Climate Change, *Summary for Policymakers, In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* 2018.  
[https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM\\_version\\_report\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf)

<sup>41</sup> Intergovernmental Panel on Climate Change, *Summary for Policymakers, In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* 2022.  
[https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC\\_AR6\\_WGIII\\_SummaryForPolicymakers.pdf](https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf)

increase the likelihood of limiting warming 1.5° to 2.0° C. In 2019, amendments to the LCFS regulation came into effect designed to ensure that projects developed before the implementation of any CARB regulations to reduce methane emissions from livestock manure management operations and dairy manure management operations were guaranteed a crediting period of at least 10 years. These amendments incentivize construction of infrastructure to capture methane and produce low-carbon transportation fuels that are consistent with achieving the State's short-lived climate pollutant reduction targets and were responsive to direction from Health and Safety Code section 39730.7(e), enacted as part of SB 1383 (Lara, Chapter 395, Statutes of 2016). Since 2019, the LCFS has seen an increase in the number of these types of projects, resulting in the avoidance of methane, a powerful GHG, from being vented to the atmosphere.

The 2022 Scoping Plan Update identifies biomethane as a valuable energy source that will help California meet its climate targets by reducing methane emissions and displacing fossil fuels. Given the need to shift away from combustion engine vehicles in the transportation sector, the 2022 Scoping Plan Update projects a diminishing role for biomethane used in CNG trucks and an increasing role for biomethane use as a process fuel in difficult to decarbonize stationary sources and as an input to advanced fuel production, like hydrogen.

In recognition of the need to take quick action to reduce methane emissions and the 2022 Scoping Plan Update policy on biomethane end-uses, Staff is proposing to retain the existing provisions that provide three consecutive 10-year avoided methane crediting periods for projects that break ground prior to January 1, 2030 and to include new regulatory provisions for projects that break ground after December 31, 2029. For projects that break ground after December 31, 2029 staff proposes to phase out pathways for avoided methane crediting for biomethane used in CNG vehicles after December 31, 2040 and phase out pathways with avoided methane crediting for biomethane used for hydrogen production on December 31, 2045. This would provide a clear regulatory incentive to reduce methane prior to 2030, in line with the scientific consensus on the importance of near-term methane emission reductions. Phasing out the ability for fuel pathways to receive three consecutive 10-year avoided methane crediting periods for projects that commence after December 31, 2029 aligns with the modeling outputs supporting the 2022 Scoping Plan Update, which show a decline in biomethane use as a primary transportation fuel as biomethane is directed to other end uses and sectors. This aligns with the State's goals of phasing out combustion vehicle sales in California and an associated modeled decline of CNG use in vehicles.

## **5. Section 95488.9(g). Sustainability Requirements for Crop-Based and Forestry-Based Biofuel Feedstocks.**

### **a) Purpose**

Subsection 94588.9(g) is added to assure that crop-based and forestry-based feedstocks used in the LCFS program are harvested in a sustainable manner and do not lead to deforestation.

### **b) Rationale**

The growing demand for crop- and forest-based feedstocks for use in the LCFS program produce an increasing risk of deforestation and use of land with a high biodiversity value to



meet this demand. It is vital that the LCFS program limit deforestation and land use change as a result of feedstock production as much as possible.

## **6. Sections 95488.9(g)(1) and 95488.9(g)(1)(A). Certification Systems for Crop-Based and Forestry-Based Biofuel Feedstocks.**

### **a) Purpose**

Subsection 95488.9(g)(1) identifies Executive Officer approved certification systems as a method for limiting deforestation and land use change as a result of the LCFS program, and

Subsection 95488.9(g)(1)(A) identifies January 1, 2028, as the date by which all crop or forestry-based feedstock must be certified. If feedstocks are not certified by that date, they will be assigned the ULSD carbon intensity in the Lookup Table (Table 7 of the LCFS regulation).

### **b) Rationale**

Adding feedstock certification will enhance the existing program safeguards (e.g. ILUC and third-party verification) established to ensure the carbon-intensity of fuels is accurately quantified based on the feedstock and fuel pathway. Certification standards will also provide additional information and assurance that feedstocks used in the production of biofuels are sustainably produced. Certification systems provide independent auditing that stringent environmental measures are being observed throughout feedstock production. Certification systems measure environmental performance of feedstock production by looking at a variety of factors that affect environmental sustainability including impacts on water, soil, biodiversity, air, land use and waste. Third party site audits are conducted to assure criteria are being met. Certification systems have been in use for numerous other biomass-based energy programs, including the European Union's Renewable Energy Directive (RED II) and are also utilized by California's Cap-and-Trade Program to provide additional assurances that cultivation activities are conducted sustainably.

Assuming an effective date for these regulatory amendments on or prior to January 1, 2025, the January 1, 2028 date would give three years for all feedstocks to become certified. This is sufficient time for the Executive Officer to approve certification systems, and for feedstocks to become certified under the Executive Officer approved systems. Assigning the ULSD carbon intensity to feedstocks that are not certified by the certification date is needed to clarify how those fuel pathways will be handled and ensures that the fuel would receive as many deficits as fossil diesel per gallon. This deficit generation sends a strong signal that disincentivizes use of non-certified crop- and forestry-based feedstocks.

## **7. Sections 95488.9(g)(1)(B), 95488.9(g)(1)(C), 95488.9(g)(1)(D), 95488.9(g)(1)(E), 95488.9(g)(1)(F), 95488.9(g)(1)(G), 95488.9(g)(1)(H), 95488.9(g)(1)(I), and 95488.9(g)(1)(J). Certification System Requirements and Timelines.**

### **a) Purpose**

Subsection 95488.9(g)(1)(B) clearly identifies all the criteria that a certification system must meet in order to be considered by the Executive Officer for approval.

Subsection 95488.9(g)(1)(C) identifies the timing for certification bodies to receive Executive Officer approval prior to being eligible for using the LCFS.

Subsection 95488.9(g)(1)(D) identifies the information that a certification system must provide to the Executive Officer to be considered for approval.

Subsection 95488.9(g)(1)(E) identifies the timing for certification bodies to submit documentation to obtain Executive Officer Approval prior to being eligible for using the LCFS.

Subsection 95488.9(g)(1)(F) identifies that CARB will publish a list of Executive Office approved certification systems on a CARB website, so feedstock suppliers are aware of the certification systems that are eligible to be used to meet the criteria of subsection 95488.9(g)(1).

Subsection 95488.9(g)(1)(G) identifies that feedstock suppliers can use certification systems approved by the Executive Officer to certify feedstocks to meet the requirements of 95488.9(g)(1).

Subsection 95488.9(g)(1)(H) identifies that certification systems must renew their Executive Officer approval every three years.

Subsection 95488.9(g)(1)(I) identifies that the Executive Officer maintains authority to remove or suspend a previously approved certification system.

Subsection 95488.9(g)(1)(J) specifies the timeframe within which a feedstock supplier must switch to another Executive Officer approved certification system if the certification system currently being used to certify a feedstock is suspended or removed.

## **b) Rationale**

Subsection 95488.9(g)(1)(B): The Executive Officer needs clear criteria to evaluate certification systems that apply under this provision. The identified criteria are necessary to ensure the rigor of the LCFS program and only allow certifications systems that maintain a high level of resolution, certainty, and transparency. Criteria were developed based on International Social and Environmental Accreditation and Labeling Alliance (ISEAL), World Resource Institute (WRI), and International Organization for Standardization (ISO) standards.

Subsection 95488.9(g)(1)(C): Clear timing for Executive Officer approval is necessary so feedstock suppliers know which certification systems they are eligible to use. A certification system must be approved prior to a feedstock supplier using it for certification purposes. This assures all certification is done consistent with the requirements of section 95488.9(g)(1).

Subsection 95488.9(g)(1)(D): The information designated in this subsection will provide the Executive Officer enough information to determine if the certification system meets the criteria in section 95488.9(g)(1)(B). If the criteria are met, then the certification system is eligible for Executive Office approval and use under subsection 95488.9(g)(1).

Subsection(g)(1)(E): Clear timing for certification system documentation submittal is necessary to allow the Executive Officer sufficient time to review the documentation and make a determination if the certification system meets the requirements of section 95488.9(g)(1)(B).

Subsection 95488.9(g)(1)(F): There needs to be a clear and easy method for feedstock suppliers to determine if a certification system can be used to meet the requirements of subsection 95488.9(g)(1).

Subsection 95488.9(g)(1)(G): Explicitly states that Executive Officer approved certification systems are eligible for use by feedstock suppliers to meet the requirements of 95488.9(g)(1).

Subsection 95488.9(g)(1)(H): Renewal of certification system approval is necessary to assure that certification system continues to meet the standards required by 95488.9(g)(1)(B). Staff turnover, financial fluctuations, and other changes can occur at certification systems that necessitates the periodic reevaluation by the Executive Officer. This is similar to the requirement to renew Executive Officer approval of verifiers and verification bodies under section 95502. This does not alleviate the certification system of the obligation to maintain standards between applications, nor does it limit the ability of the Executive Officer to remove or suspend a previously approved certification system under subsection 95488.9(g)(1)(I).

Subsection 95488.9(g)(1)(I): If the Executive Officer becomes aware of information indicating that the approved certification system is no longer meeting the requirements of 95488.9(g)(1)(B). The Executive Officer must have the authority to remove the certification system from the list of eligible certification systems to maintain the credibility of feedstock certifications.

Subsection 95488.9(g)(1)(J): Feedstock suppliers must have a clear and reasonable timeframe to switch to an approved certification system if their feedstock is being certified by a certification system that has had its approval removed or suspended by the Executive Officer.

## **X. Section 95488.10. Maintaining Fuel Pathways.**

### **1. Section 95488.10(a). Operational Data in the Annual Fuel Pathway Report.**

#### **a) Purpose**

Staff proposes that Annual Fuel Pathway Reports containing less than 24 months of operational data must not exclude operational data from the initial months included in the originally certified application.

#### **b) Rationale**

A verified operational CI is expected to reflect the operational conditions of fuel production from a given reporting/compliance year. If the operational data included in the original certification are selectively omitted from an annual fuel pathway report, it may distort the verified operational CI which may not represent the true CI of the fuel reported in the corresponding reporting year. By requiring a fuel pathway holder to keep the initially reported operational data in the annual fuel pathway report, a representative CI is obtained for the purposes of CI and credit adjustments. This specification also aligns with the basis of invalidating a certified CI in subsection 95495(b)(1)(A).

## **2. Section 95488.10(a). Aligning Provisional and Non-Provisional Pathways for CI Adjustments.**

### **a) Purpose**

Staff proposes to align the CI adjustment process for provisional and non-provisional pathways. Staff proposes that the CI adjustment of a pathway occurs only if the fuel pathway holders of provisional or non-provisional pathways request that CARB adjust the CI with or without a margin of safety.

Staff proposes to exempt fuel pathway holders from the proposed 95486(g) CI exceedance deficit obligation during the transition to CA-GREET4.0 if the following condition is met.

As part of annual verification for 2025 and 2026 compliance (reporting) years, fuel pathway holders can demonstrate that the verified operational CI would not have exceeded were it not for the regulatory transition to using updated CI modeling calculators. For the purposes of this demonstration, fuel pathway holders must submit both CA-GREET3.0 and 4.0 Tier 1 calculators or equivalent populated with the operational data for the same reporting period for annual verification in the AFP.

Staff also propose to specify that pathways with 24 months of operational data will be out of compliance if the verified operational CIs are higher than certified operational CIs, and may be subject to investigation and enforcement action.

### **b) Rationale**

The alignment of CI adjustment is necessary to create consistency by aligning the CI adjustment process for provisional and non-provisional pathways.

The CI adjustment and credit adjustment processes for provisional and non-provisional pathways are described separately in sections 95488.9(c) and 95488.10(a). Because those adjustment processes occur after and are based on the results of annual verification, describing aligning the processes together in 95488.10(a) will streamline the regulation and improve regulatory consistency, concision, and clarity. Section 95488.9(c)(3) is proposed to be removed because this proposed alignment causes section 95488.9(c)(3) to become unnecessary.

Staff is proposing to update the models which will be used to report operational CIs beginning with the 2024 annual verification. The modeling updates entail updates to emission factors and input and other changes. These updates may change the operational CIs for some certified pathways for the same set of operational data when transitioning from a CA-GREET3.0 calculator to a CA-GREET4.0 calculator. Staff is also proposing to align section 95488.10 with the proposed section 95486(g).

Any increases in a CI due to the transition to CA-GREET4.0 are subject to credit adjustments even if the increases are due to calculator updates, because they reflect the most up to date modeling of real-world carbon emissions. However, in light of the introduction of the deficit obligation proposal for CI exceedances, exempting CI exceedances solely due to the modeling changes from an additional deficit obligation is consistent with the proposed comprehensive regulatory approach to ensuring environmental integrity and deterring CI exceedances. Therefore, this proposal will exempt the fuel pathway holders from additional penalties in

instances when the verified operational CIs for the 2024 and 2025 compliance years are solely due to the calculator updates.

### **3. Section 95488.10(b). and Section 95486(a)(3)(B). Credit True-Up**

#### **a) Purpose**

Currently, fuel pathways with higher verified CIs are subject to credit adjustments after completion of annual verification. Entities subject to credit adjustments are required to acquire credits (i.e., purchase credits or report credit generating fuel) needed to reconcile any negative credit balance created by the adjustments.

Fuel pathways with lower verified CIs generate credits that are assigned to the Buffer Account. Entities reporting lower verified CI pathways are not able to claim surplus credits due to the prohibition of retroactive credit claims in the regulation (95486(a)(2)).

Staff proposes to introduce a credit true-up beginning the 2025 reporting year (2025 AFPRs due in 2026) for fuel pathways with lower verified CIs which will issue additional credits to match the quantity of credits that would have been generated by the pathway based on the verified operational CI to the fuel reporting entity's accounts upon successful completion of annual verification. To align with this proposed amendment concept, staff also proposes specify in section 95486(a)(3)(B) that buffer account contributions for these quantities of retroactive credits representing verified carbon intensity reductions will may only be made for 2024 and earlier data reporting years.

#### **b) Rationale**

The credit true-up proposal is intended to support improved regulatory compliance and carbon intensity reductions by encouraging fuel pathway holders to add a margin of safety or continue to report higher certified CIs. Because the entities reporting fuel pathway holders of lower verified CIs cannot currently receive credits corresponding to the difference between the certified reporting CI and the verified operational CI, these fuel pathway holders may not be adequately incentivized to add a margin of safety to a certified CI or request a higher verified CI to ensure that the verified operational CI does not exceed their certified CI. Following associated credit adjustments, entities with non-compliant (verified operational CIs exceeding the certified CI) pathways may also face CARB enforcement action.

Issuing retroactive credits to a reporting entity's account that may otherwise have gone to the buffer account would pose minimal risk to the environmental integrity of the program. Since the buffer account was created in 2019 under section 95485(a)(3), CARB has not needed to retire credits from the account under section 95495(b)(5)(B) in order to reconcile invalidated credits or uncovered deficits to maintain program integrity. This situation arises only if the entity with invalidated credits is unable to reimburse the program. In the unlikely event that a situation like this occurs, the accumulated credits in the buffer account are available to be retired for reconciliation. There are about 350,000 credits accumulated in the buffer account through the end of 2022. The buffer account will likely continue to accumulate credits from other sources CCS projects and any credits remaining after deactivation of LRT-CBTS accounts.

Another benefit of retroactively issuing credits to reporting entities' accounts is that it allows those reporting entities to benefit from recognition of GHG reductions from lower verified CIs.

The proposal also provides a more streamlined mechanism for fuel pathway holders to eventually receive credits resulting from incremental CI improvements over time. Currently fuel pathway holders may submit of fuel pathway applications when the seek to update previously certified CIs to reflect improved CI scores. This will streamline program implementation and is expected to significantly reduce staff workload arising from reapplications driven by small changes in pathway CIs.

In order to align with the proposed implementation date of CA-GREET4.0, staff proposes that the transition from the buffer account contributions to credit true up for credits associated with fuel volumes reported for pathways eventually verified with lower CIs begin with 2025 reporting year Annual Fuel Pathway Reports submitted in 2026.

## **Y. Section 95489. Provisions for Petroleum-Based Fuels.**

### **1. Section 95489. Update Terminology for Data Management System.**

#### **a) Purpose**

See Purpose for Section 95483.2(a), Update Terminology for Data Management System.

#### **b) Rationale**

See Rationale for Section 95483.2(a), Update Terminology for Data Management System.

### **2. Section 95489(a). Deficit Calculation for CARBOB or Diesel Fuel.**

#### **a) Purpose**

Staff proposes to update the equations used to calculate both the Three-Year California Crude Average carbon intensity and the California Baseline Crude Average carbon intensity to be consistent with the updated Oil Production Greenhouse Gas Emission Estimator (OPGEE) model version, the updated Carbon Intensity Lookup Table for Crude Oil Production and Transport, and the implementation timeline of the amended regulation. The current regulation uses OPGEE model version 2.0, which was incorporated through the 2018 rulemaking. The proposed updated version is OPGEE model version 3.0b.

#### **3. Rationale**

This amendment is necessary to specify and clearly describe the equations to be used to calculate both base and incremental deficits for CARBOB and diesel fuels. In order to maintain consistency, the equations used to calculate both the three-year California Crude Average carbon intensity and the California Baseline Crude Average carbon intensity must be updated when the OPGEE model and the Carbon Intensity Lookup Table for Crude Oil Production and Transport are updated. The updated OPGEE v3.0b, which staff proposes to incorporate by reference by section 95481 into the amended regulations, was workshopped in 2021 and 2022. The updated OPGEE model has now been finalized and was posted for public reference on February 21, 2023, along with supplemental documents listing the inputs for calculating the 2010 baseline crude CI and the crude Lookup Table using the updated OPGEE v3.0b.

#### **4. Sections 95489(a), 95489(b)(1), and 95489(b)(2). Deficit and Incremental Deficit Calculation for Fossil Jet Fuel.**

##### **a) Purpose**

Staff proposes to add fossil jet fuel into deficits and incremental deficits generation to align with the proposed changes in section 95482 that propose to include fossil jet fuel used for intrastate flights as a fuel subject to the LCFS regulation.

##### **b) Rationale**

As previously mentioned in section 95482, the 2022 Scoping Plan Update includes consideration for integrating other fuels into the LCFS program and highlights the importance of continuing to support low-carbon liquid fuels for sectors that are more difficult to transition to ZEV technology, such as aviation. While alternative jet fuel is currently eligible to opt-in to the program to generate credits, fossil jet fuel is currently exempt from the regulation and does not generate deficits. Including intrastate fossil jet fuel in the LCFS beginning in 2028 will align treatment of fossil jet with other fossil fuels used in the California transportation fuel pool, and likely increase the incentive to replace high carbon fossil jet fuel with low-carbon alternatives. Replacing fossil jet fuel with low-carbon alternative jet fuel is a goal of both the state and federal governments and aligns with the deep decarbonization required under AB 1279.

#### **5. Sections 95489(b)(3)(B) and 95489(e)(4)(C). Revision to timing for the review and posting of the Annual Crude Average Carbon Intensity.**

##### **a) Purpose**

Staff proposes amendments to the process specified for posting the Annual Crude Average carbon intensity. The Proposed Amendments are necessary in order to align staff work on developing and finalizing the Annual Crude Average carbon intensity with the annual verification schedule for “marketable crude oil name” (MCON) reports.

To be consistent with other analogous public comment periods in the regulation, staff also proposes to extend the time period for public comments by changing the time period from 10 days to 14 days.

##### **b) Rationale**

Subsection 95491(e)(2) requires specified reporting entities to include an annual crude oil volumes (MCON) report as part of the Annual Compliance Report that is due annually on April 30. The current regulation requires verification of the MCON reports (section 95500(d)) every year by August 31. Because the volumes reflected in MCON reports are more certain and unlikely to change following the completion of third-party verification, it is more reasonable for staff to develop, publish, and finalize the Annual Crude Average carbon intensity calculation based on verified information following the completion of the third-party verification of the annual MCON reports, rather than developing and publishing the calculation before verification is completed.

See the rationale for Proposed Amendments to Subarticle 7, Revisions to business days, calendar days, and number of days, for description of the change from 10 days to 14 days.

## **6. Section 95489(b)(3)(C). Revisions to the OPGEE Model.**

### **a) Purpose**

Staff proposes to remove the specific “three-year cycle” timeline for updating the OPGEE model because such frequent updates are no longer necessary.

### **b) Rationale**

The OPGEE model is a robust life cycle assessment tool for estimating the oil production GHG emissions. The proposal of removing a set timeline will allow flexibility for staff to collaborate with subject experts and stakeholders on identifying and analyzing potential outstanding items necessary for the future model and Lookup Table updates on an as-needed basis. The initial three-year cycle reflected alignment with an anticipated frequency for amendments to the LCFS regulation. However, the LCFS regulation does not follow a specific frequency for amendments, and the latest OPGEE is a peer-reviewed model that is comprehensive and robust in evaluating crude CIs. Therefore, staff believes it is no longer necessary to follow a specified three-year cycle to revisit and update the OPGEE model.

## **7. Section 95489(b)(3)(C). Carbon Intensity Lookup Table for Crude Oil Production and Transport Documentation Incorporation by Reference and Update**

### **a) Purpose**

Staff proposes to update all individual crude CI values in the Carbon Intensity Lookup Table for Crude Oil Production and Transport documentation of the regulation using OPGEE v3.0b and oil field operational data from the year 2019, which is the latest year for which a complete set of representative data for many of the crudes is available. The 2010 Baseline Crude Average CI value is updated using OPGEE v3.0b and oil field operational data for the year 2010, which is the baseline year for the LCFS regulation. CI values are estimated using the methodology described in Appendix F.

### **b) Rationale**

Updates to the Carbon Intensity Lookup Table for Crude Oil Production and Transport are necessary in order to ensure that the associated elements of the LCFS regulation continue to be based upon the most up to date available information, and to fulfill the requirement of section 95489(b)(3)(C) of the current regulation to consider the following items through Proposed Amendments to the regulation:

- Revisions to the OPGEE model,
- Addition of crudes to the Carbon Intensity Lookup Table for Crude Oil Production and Transport, and
- Updates to all carbon intensity values in proposed Carbon Intensity Lookup Table for Crude Oil Production and Transport Documentation.

All carbon intensity values were calculated using the OPGEE model version v3.0b. The methodologies, which are described in more detail in Appendix F, are summarized as follows:



- For estimating the Lookup Table CI values for individual crudes, OPGEE uses, as model inputs, detailed field-level data such as production method and surface processing equipment, reservoir properties, crude oil and associated gas properties, production and injection volumes, and transport data such as modes of transport and distances from the field to the refinery. Simple defaults and smart defaults are used wherever applicable.
- The Baseline Crude Average CI is a volume-weighted average of carbon intensity values for crudes supplied to California refineries during the baseline year 2010.

## **8. Sections 95489(c)(1)(A)2. and 95489(e)(1)(D)1. Sources of CO<sub>2</sub> for Carbon Capture and Sequestration Technology implemented by Innovative Crude Projects and Refinery Investment Credit Projects.**

### **a) Purpose**

Staff proposes to update the regulation language that specifies that carbon capture and sequestration (CCS technology incorporated under either innovative crude projects (subsection 95489(c)(1)(A)2.) or refinery investment projects (subsection 95489(e)(1)(D)1.) would be eligible for LCFS credits only if the CO<sub>2</sub> is captured from existing anthropogenic CO<sub>2</sub> emission sources.

### **b) Rationale**

The goal of these provisions is to encourage existing petroleum facilities to deploy innovative technologies to reduce their operational anthropogenic GHG emissions. Anthropogenic GHG/CO<sub>2</sub> emissions in this context means emissions resulting from the fuel production activities. For projects implementing CCS technology, staff believes this update will define a set boundary for quantification and crediting of the GHG reduction, compared to the pre-CCS practice. Furthermore, the proposed clarification would prevent entities from reverting to less efficient equipment with the goal of generating more credits through CO<sub>2</sub> capture. For example, without such clarification, a project that currently implements a low GHG emission equipment could revert to a high GHG emission equipment that arbitrarily increases the captured CO<sub>2</sub> from the fuel combustion, hence resulting in a faulty representation of the GHG reduction using CCS.

It is important to also note that any modification and expansion (e.g., facility modernization, production technology and yield) of a previously approved project must be brought to CARB attention for re-evaluation, which is consistent with the overall requirements for fuel pathway and project applications.

## **9. Sections 95489(c)(1)(C), 95489(c)(1)(E). Eligible Technologies for Innovative Methods.**

### **a) Purpose**

Staff proposes to add “RNG” and “biogas” to this section to align with prior sections as they both pertain to innovative methods.

## **b) Rationale**

The current regulation language erroneously left out RNG and biogas as eligible innovative technologies, which is inconsistent with the list of eligible technologies for innovative crude projects defined in section sub95489(c)(1)(A)5.

RNG or biogas energy is eligible to generate innovative crude project credits. The proposed regulation language update will align this section with the current subsection 95489(c)(1)(A)5.

## **10. Section 95489(c)(1)(D). General Requirements for Credits for Producing and Transporting Crudes Using Innovative Methods. Registration of Opt-In Joint Applicants.**

### **a) Purpose**

Staff proposes to add registration requirements to designated third-party joint applicants choosing to opt-in as a project operator to receive credits for an approved innovative method.

### **b) Rationale**

Because a petroleum-based GHG reduction project can be managed/owned by an entity that may or may not be the crude oil producer/transporter (e.g., a project operator with contractual agreement with the crude oil producer/transporter), requiring the designated project operator to be registered as joint applicants would reflect the reality of the ownership and legal liability for many projects. The flexibility also encourages more GHG reduction projects to participate in the LCFS. This concept of a designated entity for the purpose of credit generation can also be found in other sections of the LCFS regulation, such as non-residential EV charging (subsection 95491(d)(3)(C)) and electric forklifts (subsection 95491(d)(3)(D)).

These designated third-party joint applicants would be subject to all the provisions outlined in section 95483.1, and it is important these entities undergo facility registration as required for other opt-in entities and as required for crude oil producers or transporters.

## **11. Section 95489(c)(1)(E). Updating the Innovative Method Threshold Criteria.**

### **a) Purpose**

Staff proposes to update the criteria for approving an innovative crude project from multiple criteria to single criterion to streamline the application preparation and approval process.

### **b) Rationale**

The multiple threshold criteria currently implemented were developed solely based on the estimated future projects, as there were no commenced innovative crude projects to reference. After evaluating 13 innovative crude applications and approving 10, staff has gained sufficient knowledge and confidence to use a single threshold criterion of at least 1,000 metric tons of CO<sub>2</sub> reduction per year, to reflect a representative threshold CO<sub>2</sub> reduction from crude projects using innovative methods. This amendment will expedite the application preparation and review process and will apply to all future innovative crude projects.

## **12. Section 95489(c)(1)(F). Updates to the Avoided Emission Values of Solar Steam for Calculating Credits for Producing Crude Oil with Innovative Methods.**

### **a) Purpose**

Staff proposes to update the avoided emissions values for innovative crude projects using solar steam to align with updates to the OPGEE model.

### **b) Rationale**

This is a standard update of values/factors derived from an updated GHG LCA model. The avoided emission values for solar steam are derived from the OPGEE model, which is recently updated to version 3.0b as part of the Proposed Amendments (please see the rationale for subsection 95489(b)(3)(C) for additional information). The update and alignment of modeling tools, conversion factors, and standard values improve the accuracy in the quantification of GHG reductions.

## **13. Section 95489(c)(1)(F). Updates to the Emission Factor for Calculating Credits for Producing Crude Oil with Innovative Methods using Solar or Wind-Based Electricity.**

### **a) Purpose**

Staff proposes to use the new emission factor for California grid electricity (as process energy) derived from the CA-GREET4.0 model in this equation to calculate the credits for crude oil produced or transported using solar or wind-based electricity.

Currently, for the carbon intensity evaluation of fuel pathway applications and the GHG reduction of refinery investment credit project applications, the solar and wind power is considered to displace grid electricity, which is inconsistent with the displacement method for innovative crude projects.

### **b) Rationale**

The current displacement emission factor (511 gCO<sub>2</sub>e/kWh) used in the equation was derived based on the assumption that the displaced system is a natural gas-fired combined cycle plant. However, based on the innovative crude projects using solar electricity approved by CARB since 2016, projects supplement solar electricity with grid electricity rather than installing a natural gas-fired combined cycle power plant. Therefore, adjusting the displacement factor to an electricity-based factor more accurately reflects the change in GHG emissions from these projects.

Because the innovative crude must be delivered to California refineries for processing to be eligible for crediting under this provision, the proposed update will align the displacement emission factor with the more representative and accurate California grid electricity emission factor, which is similar to the LCA approach applied to fuel pathways and other petroleum-based GHG reduction projects.

**14. Sections 95489(c)(1)(G), 95489(e)(1)(K), and 95489(f)(1)(E). Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.**

**a) Purpose**

Staff proposes to add specification to current retirement of environmental attributes provisions for the use of renewable or low-CI energy as an energy source for all project-based crediting provisions.

**b) Rationale**

The proposed text adds specification to the existing regulation regarding the retirement of environmental attributes for the use of renewable or low-CI energy. The proposed text specifies any potential misperceived differences on how the LCFS accounts for the use of these environmental attributes. The added text aligns with current practices and other similar regulatory provisions.

**15. Sections 95489(c)(3)(A), 95489(c)(5), and 95489(f)(4)(A). Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.**

**a) Purpose**

Staff proposes to remove the “Within 30 calendar days of” receipt of an application designated by the applicant as ready for formal evaluation and substitute it with “Following.”

**b) Rationale**

The current “30 calendar days” timeline was based on estimated CARB review time without a third-party validation process. Staff proposes to introduce a third-party validation step prior to the approval of project-based applications (please see the rationale for sections 95489(c)(3), 95489(e)(4), and 95489(f)(4) for additional information), which requires an update to the process timeline to ensure adequate time is dedicated to the validation of the application and the staff analysis for the project approval.

**16. Sections 95489(c)(3)(B), 95489(c)(3)(C), 95489(e)(4)(B), 95489(e)(4)(C), 95489(f)(4)(B), and 95489(f)(4)(C). Addition of Third-Party Validation and Issuance of a Qualifying Validation Statement Requirement to Initiate the Public Comments Period for Crude using Innovative Methods, Refinery Investment Projects, and Renewable Hydrogen Refinery.**

**a) Purpose**

Staff proposes to add a third-party validation provision for crude oil projects that use innovative methods, refinery investment projects, and renewable hydrogen refinery projects. The third-party validation provisions proposed would align with existing provisions for third-party validation of fuel pathways, which is required prior to pathway certification.

The purpose of introducing the 6-month validation deadline for project applications is to make it consistent with the validation deadline currently implemented for Tier 1 (subsection 95488.6(b)(1)) and Tier 2 (subsection 95488.7(d)(3)) fuel pathway applications.

## **b) Rationale**

Staff seeks to incorporate a third-party validation step to ensure that the project description and data used to establish the project's baseline and calculation methodology for crediting is supported by verifiable data. If the baseline is established using inaccurate or faulty information, the framework developed for future reporting and credit generation would be at risk. Currently, CARB staff performs technical review and in-house validation, which does not include a site visit or investigation of the facility's data and metering system due to limited resources. The scope of proposed third-party validation would be consistent with that currently required for fuel pathways, which consists of key steps such as site visit, interviewing key personnel, investigating meter accuracy and data management systems, and reviewing supporting documentation for project qualification (baseline establishment).

A third-party validation step will support continued thorough review of petroleum project crediting while also streamlining and strengthening the review of raw data and calculations, issuance of public posting materials, and approval process for credit issuance.

The proposed six-month validation deadline provides a consistent validation deadline across fuel pathway applications and petroleum-based GHG reduction project applications.

## **17. Sections 95489(c)(4), 95489(c)(4)(D)1., 95489(c)(4)(D)2., 95489(c)(4)(E)1., 95489(c)(4)(E)2., 95489(c)(4)(E)3., and 95489(c)(4)(F). Recordkeeping and Reporting for Innovative Crude Oil Applications.**

### **a) Purpose**

Staff proposes to add the option for annual reporting while maintaining the quarterly reporting option for credits generated from producing and transporting crudes using innovative methods to be consistent with the requirements for other types of project reports specified in sections 95489(e) and 95489(f).

Through this proposal, innovative projects will have the option of reporting on a quarterly or annual basis, so staff also proposes to modify the term "during the quarter" to "during the reporting period."

### **b) Rationale**

A reporting entity for a petroleum-based GHG reduction project (innovative crude, refinery investment, or renewable hydrogen refinery) is allowed to generate credits through a verified Project Report on a quarterly or an annual basis. However, among three types of petroleum-based projects, only the innovative crude projects are currently required to submit their Project Reports quarterly, even if a reporting entity chooses to generate credits on an annual basis. This adds redundant and unnecessary work for the reporting entity. In comparison, the other two project types, refinery investment and renewable hydrogen refinery, allow flexibility in the Project Report submission frequency, depending on the reporting entity's desired credit generation frequency (annual or quarterly). Adding the annual Project Report

submission option for the innovative crude projects gives more flexibility to entities to choose between quarterly or annual Project Report submission, verification, and credit generation.

Additionally, by changing reporting quarter to reporting “period” for both solar or wind electricity and total electricity consumed at the crude oil production or transport facilities, we allow flexibility for quarterly or annual reporting and credit generation.

**18. Sections 95489(c)(4), 95489(d)(2)(E), 95489(e)(5), 95489(f)(5), 95490(f). Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.**

**a) Purpose**

The current regulation requires annual submittal of all Project Reports seeking annual credit generation and all Low-Complexity/Low-Energy-Use (LC/LEU) reports. However, the deadline for submitting these annual reports is not clearly specified. Staff is proposing to clarify the submission deadline for annual Project Reports and annual LC/LEU Reports as April 30 to standardize the submission process and avoid confusion.

**b) Rationale**

Clarifying the alignment of the deadlines for submitting annual reports across all petroleum-based projects, including annual LC/LEU Reports and Project Reports seeking annual verification and credit generation, would eliminate any potential confusion for regulated entities.

**19. Sections 95489(c)(5), 95489(d)(5)(C), 95489(e)(5)(B), and 95489(f)(5)(B). Phase-out Provisions for Petroleum Projects.**

**a) Purpose**

Staff proposes to phase out crediting of petroleum projects by no later than December 31, 2040. Carbon capture and sequestration (CCS) projects would be excluded from this proposed phase-out. Currently, these petroleum projects do not have a limit on either the amount of total credit generation or the length of the crediting period.

**b) Rationale**

The LCFS currently allows crude oil extraction and refineries to earn credits for projects that reduce their GHG emissions through project-based crediting. However, in the 2022 Scoping Plan Update, the State has identified the need to phase down fossil fuel production as fossil fuel demand drops, and the need for all viable tools such as CCS and direct air capture to address the existential threat that climate change presents. As the carbon intensity benchmark schedule for the program becomes more stringent over time, low-carbon transportation fuels will generate fewer credits due to the more stringent standard. However, project-based crediting provisions calculate credits based on assumptions relating to displaced fossil fuel content. As such, credit generation is not directly dependent on increased stringency associated with the benchmark schedule. For these reasons, staff is proposing amendments to the project-based crediting provisions to align with State goals. Such that, with exception of

CCS, petroleum project crediting period would end no later than December 31, 2040. This timeline provides a near-term incentive to reduce GHG emissions through petroleum projects while signaling an end date to crediting that aligns with the broader trend of reducing fossil fuel production in tandem with demand. This timeline also aligns with the timeline for the process-improvement projects under the Refinery Investment Credit provision (subsections 95489(e)(1)(G)3 and 95489(e)(3)(H)).

## **20. Section 95489(c)(5). Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.**

### **a) Purpose**

See Purpose for 95489(c)(3)(A), Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.

### **b) Rationale**

See Rationale for 95489(c)(3)(A), Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.

## **21. Section 95489(d)(2)(E). Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.**

### **a) Purpose**

See Purpose for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.

### **b) Rationale**

See Rationale for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.

## **22. Section 95489(d)(5)(C). Phase-out Provisions for Petroleum Projects.**

### **a) Purpose**

See Purpose for Section 95489(c)(5), Phase-out Provisions for Petroleum Projects.

### **b) Rationale**

See Rationale for Section 95489(c)(5), Phase-out Provisions for Petroleum Projects.

**23. Sections 95489(e), 95489(e)(1)(A), 95489(e)(1)(B), 95489(e)(1)(D)2., 95489(e)(1)(D)3., 95489(e)(1)(D)4., 95489(e)(1)(D)5., and 95489(e)(1)(F). Refinery Investment Credit Program and General Requirements.**

**a) Purpose**

Staff proposes to amend the refinery investment credit provisions to allow for hydrogen production facilities, including those supplying hydrogen physically to a refinery but are not co-located with a refinery, to apply for crediting under the refinery investment credit provision.

**b) Rationale**

The refinery investment credit provision currently requires that projects occur within the boundaries of the refinery unless the project involves carbon capture from hydrogen production. Therefore, merchant hydrogen production facilities that are not co-located with the refinery are currently not eligible to generate refinery investment credits for use of renewable fuels, electrification of process equipment, and efficiency improvement projects. This amendment will provide consistent treatment of hydrogen production facilities that physically supply hydrogen to petroleum refineries.

The proposed amendments align with the 2022 Scoping Plan Update goals to significantly increase renewable and low-CI hydrogen production for use as transportation fuel and for hard-to-electrify end uses.

**24. Section 95489(e)(1)(D)1. Sources of CO<sub>2</sub> for Carbon Capture and Sequestration Technology implemented by Innovative Crude Projects and Refinery Investment Credit Projects.**

**a) Purpose**

See Purpose for Section 95489(c)(1)(A)2., Sources of CO<sub>2</sub> for Carbon Capture and Sequestration Technology implemented by Innovative Crude Projects and Refinery Investment Credit Projects.

**b) Rationale**

See Rationale for Section 95489(c)(1)(A)2., Sources of CO<sub>2</sub> for Carbon Capture and Sequestration Technology implemented by Innovative Crude Projects and Refinery Investment Credit Projects.

**25. Section 95489(e)(1)(D)2., 95489(e)(1)(D)3., 95489(e)(1)(D)4., 95489(e)(1)(D)5., and 95489(e)(1)(F). Refinery Investment Credit Program and General Requirements.**

**a) Purpose**

See Purpose for Section 95489(e), Refinery Investment Credit Program and General Requirements.



## **b) Rationale**

See Rationale for Section 95489(e), Refinery Investment Credit Program and General Requirements.

### **26. Sections 95489(e)(1)(G)2., 95489(e)(1)(J), and 95489(f)(1)(D). Relocated Credit Generation Threshold for Refinery Investment Projects and Introduce the Same Threshold for Renewable Hydrogen Refinery Projects.**

#### **a) Purpose**

Staff proposes to introduce the criteria for approving refinery investment projects and renewable hydrogen refinery projects to streamline the application preparation and approval process.

Staff proposes to relocate the credit generation threshold for refinery investment projects from section 95489(e)(1)(G)2. to section 95489(e)(1)(J) and add the same threshold for renewable hydrogen refinery projects.

#### **b) Rationale**

The current credit generation threshold for a specific type of refinery investment project (project improvement) was intended to apply to all refinery investment project types. The threshold was established in the LCFS regulation from the 2018 regulatory amendments, based on the minimum life cycle GHG reduction estimate compared to the pre-project refinery level GHG emissions. However, subsection 95489(e)(1)(G)2 is only applicable to one of the five eligible refinery investment project types (process improvement). The proposal provides a consistent threshold criterion across refinery investment projects.

Similarly, among all three project-based crediting provisions: innovative crude (subsection 95489(c)), refinery investment (subsection 95489(e)), and renewable hydrogen refinery (subsection 95489(f)); only renewable hydrogen refinery projects currently do not have a credit generation threshold. Given the relevancy to the petroleum refineries and a similar minimum life cycle GHG reduction estimate compared to the pre-project facility level GHG emissions, staff proposes to apply the same threshold in refinery investment (section 95489(e)) to the renewable hydrogen refinery projects. No substantive changes to existing requirements were made.

### **27. Sections 95489(e)(1)(I) and 95489(f)(1)(C). Request to Clearly Identify and Register All Entities Involved in the Project Applications.**

#### **a) Purpose**

Staff proposes to add regulatory text to require applications for the refinery investment credit and the renewable hydrogen refinery credit projects to clearly identify and register all entities involved in consuming and sharing low-CI or renewable process energy from a single source, or the supply chain of CO<sub>2</sub> for CCS (when applicable).

## **b) Rationale**

Currently, the LCFS regulation does not specifically require all entities either directly involved in a project or have operations that indirectly affect the project operation and data collection to be registered. This proposal ensures all entities relevant to a complex project are involved in the application review process, aware of their role within LCFS, and in compliance of the regulation (reporting and verification). It can also avoid potential high-risk issues such as material/energy shuffling, an incomplete application due to information withheld by joint applicant(s), or double crediting for the same GHG reduction.

This proposal aligns and streamlines the existing provisions for the review and approval of petroleum projects with the accompanying benefits of validation for opt-in entities as required for accurate accounting of renewable or low-CI process energy used at refineries and renewable hydrogen production facilities. It also aligns and streamlines the review and approval for projects that involve the delivery of carbon capture by the refinery or hydrogen production facility to a third party to store the carbon.

### **28. Section 95489(e)(1)(K). Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.**

#### **a) Purpose**

See Purpose for Section 95489(c)(1)(G), Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.

#### **b) Rationale**

See Rationale for Section 95489(c)(1)(G), Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.

### **29. Section 95489(e)(2)(A). Refinery Investment Credit Program – Calculation of Credits.**

#### **a) Purpose**

Staff proposes to update the reference to specify regulatory sections and CCS protocol used for credit calculation. With the new addition, the regulation will refer to both the CCS protocol section 95490 along with subsection 95489(e)(2) to cover the whole credit calculation process.

#### **b) Rationale**

Section 95490 as well as the CCS protocol define the quantification method for CSS projects, including the definition, general requirement, submittal procedure, reporting, and recordkeeping. The details of credit generation and the detailed calculation are also discussed under subsection 95489(e)(2). Therefore, the proposed update refers to all applicable references.

**30. Sections 95489(e)(4)(D), 95489(e)(4)(D)1., 95489(e)(4)(D)2., 95489(f)(4)(D), 95489(f)(4)(D)1., and 95489(f)(4)(D)2. Authority to Reject Applications Based on these Not Meeting Minimum Requirements.**

**a) Purpose**

Staff proposes to include provisions to specify that the Executive Officer may reject applications if the minimum requirements are not met by the applicant. These provisions include not meeting requirements established in section 95489(e) and insufficient information provided by the applicant to replicate the requested greenhouse gas emissions calculations.

**b) Rationale**

This proposal aligns with the existing requirement for innovative crude projects in current section 95489(c)(3)(C), and it is meant to provide clarity regarding the Executive Officer's authority to not approve an application, as well to serve as a reminder of the minimum application requirements needed for refinery investment credits and renewable hydrogen refinery credits to ensure application advancement.

Currently, there are no limitations for the refinery investment credit projects or renewable hydrogen refinery projects regarding when the Executive Officer can make this determination.

**31. Sections 95489(e)(5), 95489(e)(6), 95489(f)(5), 95489(f)(6), and 95490(f). Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.**

**a) Purpose**

The regulation specifies that the credits for each of refinery investment credit project, renewable hydrogen refinery credit project, and direct air capture and sequestration project can only be generated after a positive or qualified positive verification statement for the Project Report is received by CARB. The current regulatory language, however, is not specific about the requirement of regulated entities to submit a Project Report for each approved project. Staff proposes a modification to the regulatory language, specifying that the regulated entities of the approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects are required to submit a Project Report on either a quarterly or annual basis.

**b) Rationale**

In the absence of a clarified requirement for Project Reports submission, there could be instances where a regulated entity (e.g., refinery) defers submission or verification of the Project Report due to a lack of demonstration of consistent GHG reduction of a project. Staff has observed that this usually due to outstanding modifications or fluctuations to the original project that staff had initially evaluated and approved. Not mandating the submission of an annual or quarterly Project Report could create loopholes to these provisions and put program

integrity at risk. In the future, when a regulated entity resumes report submissions, it may become challenging for staff to track records and ascertain the entity's compliance or eligibility over the time.

Furthermore, a similar reporting requirement has been specified for the innovative crude project in section 95489(c)(4). Because innovative crude projects, refinery investment projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects are the four project types eligible under the project-based crediting provisions, this proposed update aims to harmonize the reporting requirements for all project report types.

### **32. Section 95489(e)(5). Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.**

#### **a) Purpose**

See Purpose for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.

#### **b) Rationale**

See Rationale for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.

### **33. Section 95489(e)(5)(B). Phase-out Provisions for Petroleum Projects.**

#### **a) Purpose**

See Purpose for Section 95489(c)(5), Phase-out Provisions for Petroleum Projects.

#### **b) Rationale**

See Rationale for Section 95489(c)(5), Phase-out Provisions for Petroleum Projects.

### **34. Section 95489(e)(6). Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.**

#### **a) Purpose**

See Purpose for Section 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

## **b) Rationale**

See Rationale for Section 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

### **35. Sections 95489(f) and 95489(f)(2)(A). Renewable Hydrogen Refinery Credit Program.**

#### **a) Purpose**

Staff proposes to allow renewable hydrogen production physically supplying hydrogen to the refinery but not co-located with a refinery to be eligible for crediting and require a hydrogen production facility not owned by the refinery to be registered as joint application. This proposal also results in a modification to the crediting eligibility for renewable hydrogen used at petroleum refineries.

#### **b) Rationale**

The Proposed Amendments would allow renewable hydrogen production at a facility not co-located with the refinery to be eligible under this provision, as long as the renewable hydrogen is physically supplied to the refinery.

Joint applicant designation as the opt-in project operator and credit generator is not allowed for refinery investment or renewable hydrogen to refineries projects. For example, the operator of a solar photovoltaic project that provides electricity to an oil field may be designated as the opt-in project operator and credit generator under the innovative crude provision but could not be designated if supplying solar electricity to a refinery under the refinery investment credit provision.

This proposal is meant to allow flexibility for renewable hydrogen refinery credit projects for the purpose of enhancing technology deployment and production volumes of low-CI hydrogen.

### **36. Section 95489(f)(1)(C). Request to Clearly Identify and Register All Entities Involved in the Project Applications.**

#### **a) Purpose**

See Purpose for Section 95489(e)(1)(I), Request to Clearly Identify and Register All Entities Involved in the Project Applications.

#### **b) Rationale**

See Rationale for Section 95489(e)(1)(I), Request to Clearly Identify and Register All Entities Involved in the Project Applications.

**37. Section 95489(f)(1)(D). Relocated Credit Generation Threshold for Refinery Investment Projects and Introduce the Same Threshold for Renewable Hydrogen Refinery Projects.**

**a) Purpose**

See Purpose for Section 95489(e)(1)(G)2., Relocated Credit Generation Threshold for Refinery Investment Projects and Introduce the Same Threshold for Renewable Hydrogen Refinery Projects.

**b) Rationale**

See Rationale for Section 95489(e)(1)(G)2., Relocated Credit Generation Threshold for Refinery Investment Projects and Introduce the Same Threshold for Renewable Hydrogen Refinery Projects.

**38. Section 95489(f)(1)(E). Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.**

**a) Purpose**

See Purpose for Section 95489(c)(1)(G), Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.

**b) Rationale**

See Rationale for Section 95489(c)(1)(G), Retirement of Renewable Energy Certificates and Environmental Attributes for Renewable or Low-CI Energy Sources.

**39. Section 95489(f)(2)(A). Renewable Hydrogen Refinery Credit Program.**

**a) Purpose**

See Purpose for Section 95489(f), Renewable Hydrogen Refinery Credit Program.

**b) Rationale**

See Rationale for Section 95489(f), Renewable Hydrogen Refinery Credit Program.

**40. Section 95489(f)(4)(A). Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.**

**a) Purpose**

See Purpose for 95489(c)(3)(A), Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.

## **b) Rationale**

See Purpose for 95489(c)(3)(A), Approval Process for Innovative Crude Oil and Renewable Hydrogen Refinery Credit Applications.

### **41. Sections 95489(f)(4)(B) and 95489(f)(4)(C). Addition of Third Party Validation and Issuance of a Qualifying Validation Statement Requirement to Initiate the Public Comments Period for Crude using Innovative Methods, Refinery Investment Projects, and Renewable Hydrogen Refinery.**

#### **a) Purpose**

See Purpose for Section 95489(c)(3)(B), Addition of Third Party Validation and Issuance of a Qualifying Validation Statement Requirement to Initiate the Public Comments Period for Crude using Innovative Methods, Refinery Investment Projects, and Renewable Hydrogen Refinery.

#### **b) Rationale**

See Rationale for Sections 95489(c)(3)(B), Addition of Third Party Validation and Issuance of a Qualifying Validation Statement Requirement to Initiate the Public Comments Period for Crude using Innovative Methods, Refinery Investment Projects, and Renewable Hydrogen Refinery.

### **42. Section 95489(f)(4)(D), 95489(f)(4)(D)1., and 95489(f)(4)(D)2. Authority to Reject Applications Based on these Not Meeting Minimum Requirements.**

#### **a) Purpose**

See Purpose for Section 95489(e)(4)(D), Authority to Reject Applications Based on these Not Meeting Minimum Requirements.

#### **b) Rationale**

See Rationale for Section 95489(e)(4)(D), Authority to Reject Applications Based on these Not Meeting Minimum Requirements.

### **43. Section 95489(f)(5). Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.**

#### **a) Purpose**

See Purpose for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types

#### **b) Rationale**

See Rationale for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types

**44. Section 95489(f)(5). Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.**

**a) Purpose**

See Purpose for Section 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

**b) Rationale**

See Rationale for Section 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

**45. Section 95489(f)(5)(B). Phase-out Provisions for Petroleum Projects.**

**a) Purpose**

See Purpose for Section 95489(c)(5), Phase-out Provisions for Petroleum Projects.

**b) Rationale**

See Rationale for Section 95489(c)(5), Phase-out Provisions for Petroleum Projects.

**46. Section 95489(f)(6). Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.**

**a) Purpose**

See Purpose for Section 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

**b) Rationale**

See Rationale for Section 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.



## **Z. Section 95490. Provisions for Fuels Produced Using Carbon Capture and Sequestration.**

### **1. Section 95490. Provisions for Fuels Produced Using Carbon Capture and Sequestration.**

#### **a) Purpose**

Staff proposes regulatory amendments in this section for the purposes of 1) improving specificity of existing regulatory requirements, 2) aligning with other LCFS provisions, and 3) narrowing geographic eligibility for direct air capture with sequestration projects.

#### **b) Rationale**

Amendments to these provisions are necessary to add specificity to various subsections, which is explored in more detail in the rationale for subsection 95490(a)(2).

### **2. Section 95490(a)(2). Eligibility.**

#### **a) Purpose**

Staff proposes to delete “project” in the phrase “project applications” to accommodate both project and fuel pathway applications.

Staff proposes to clarify that hydrogen as an intermediate input to alternative or petroleum fuel production is eligible for reducing the GHG emissions associated with fuel production if hydrogen production is equipped with carbon capture and sequestration (CCS).

Staff proposes to amend the regulation to narrow eligibility for crediting of direct air capture (DAC) and sequestration projects to those located in the United States (including its territories). This limitation does not apply to direct air capture-to-fuel production submitted as Tier 2 alternative fuel pathways, as the final transportation fuels from these pathways must be supplied to California to be eligible for LCFS credits.

Staff also proposes to clarify that DAC projects that convert captured CO<sub>2</sub> to fuel are not required to comply with the CCS protocol.

#### **b) Rationale**

GHG reductions from CCS projects can be claimed via project-based applications under petroleum provisions or Tier 2 fuel pathway applications. The deletion of “project” from the phrase “project applications” removes the ambiguity about whether Tier 2 fuel applications with CCS are also eligible for GHG reductions from CCS projects.

There is a growing interest in capturing CO<sub>2</sub> from hydrogen production using steam methane reforming. The low-CI hydrogen thus produced can be used as an intermediate input in petroleum refineries or hydrotreatment of HEFA to lower the GHG emissions associated with fuel production. However, this scenario is not explicitly listed in the current regulation. By clearly establishing that hydrogen as an intermediate input can contribute to GHG reductions via CCS, the LCFS program provides additional clarity on the scope of eligible CCS projects.

Direct air capture (DAC) is an emerging technology that has potential to reduce large amounts of carbon dioxide already in the atmosphere and could help achieve California's and the nation's long-term climate goals. It will continue to need support to be built to scale and to be deployed more broadly.

To support the ongoing technology development needed to reduce future direct air capture deployment costs in the United States, and to align with geographic eligibility for federal programs on direct air capture, staff proposes to limit eligibility for crediting of direct air capture with sequestration projects to those located in the United States. This concept directly supports national efforts to deploy direct air capture projects and helps achieve national and California emission reduction goals.

In addition, if the CO<sub>2</sub> captured by a DAC project is used in making a fuel, it is no longer a CCS project. Therefore, it is not required to comply with the CCS protocol. The proposed clarifications help establish the distinction between the DAC projects with fuel production and alternative fuel producers deploying CCS projects by pointing out the differences in the process and requirements between the two cases.

### **3. Sections 95490(b)(2), 95490(b)(6), and 95490(e). Adding Reference to Regulatory Sections and Tier 2 Pathway Clarification.**

#### **a) Purpose**

Staff proposes to include more references in section 95490 to other sections of the LCFS regulations relevant to carbon capture and sequestration (CCS) in order to more clearly specify applicable quantification and reporting requirements.

Staff also proposes to clarify that CCS credits associated with alternative fuel production facilities must be claimed using a Tier 2 pathway application process and that CCS benefits are realized through a reduction in carbon intensity for a Tier 2 fuel pathway involving CCS.

#### **b) Rationale**

By adding references to the regulatory sections pertinent to each item under the quantification and reporting requirements, staff seek to facilitate improved notice of, understanding, and compliance with pertinent regulatory requirements.

If the CO<sub>2</sub> captured by a DAC project is used in making a fuel, it is no longer a CCS project. Therefore, it is not required to comply with the CCS protocol. The proposed clarifications help establish the distinction between the DAC projects with fuel production and alternative fuel producers deploying CCS projects by pointing out the differences in the process and requirements between the two cases.

### **4. Section 95490(b)(4). Removal of Gas Producer for CCS Credits Generated under the Innovative Crude Provisions.**

#### **a) Purpose**

Staff proposes to remove "and gas" from the entities that can claim CCS credits under the innovative crude provisions.

## **b) Rationale**

The term “crude oil and gas producers” was included in the 2018 regulatory amendments as a means of representing sequestrations in oil fields that may also produce associated gas as a co-product of oil production. However, the inclusion of the word “gas” here may be misinterpreted to mean that dry natural gas fields would also be eligible for sequestration under the protocol, which was not the intent, and does not match with the requirements in section 95489(c) and the CCS protocol.

Dry natural gas fields have different reservoir properties than oil fields and were not included in the development of the CCS protocol as an eligible reservoir type. This amendment is necessary to clarify that dry natural gas fields are not an eligible sequestration reservoir type.

## **5. Section 95490(b)(8). Parameters to Calculate GHG Emissions for Electricity Used by the Capture Facility.**

### **a) Purpose**

Staff proposes to specify how the electricity GHG emissions at the capture facility must be calculated for a DAC project under various scenarios. Staff proposes to clarify the accounting treatment for low-CI electricity used in direct air capture projects.

### **b) Rationale**

The 2022 Scoping Plan Update identified that deployment of mechanical carbon dioxide removal, which includes direct air capture as a primary option, will be necessary to achieve California’s carbon neutrality goal. The Scoping Plan also noted that mechanical carbon dioxide removal, including direct air capture, will need governmental or other incentive support to overcome the near-term technology and market barriers. The LCFS regulation introduced a provision to incentivize direct air capture with sequestration projects in the 2018 amendments. A number of CARB stakeholders have expressed interest in developing direct air capture with sequestration projects. However, different from the carbon capture activities occurring at the controlled, high CO<sub>2</sub> concentration sources (e.g., fermentation vessels at an ethanol plant, or natural gas-fired turbine at a refinery), the process of capturing CO<sub>2</sub> directly from the atmosphere has higher electricity demand, which makes it financially challenging and may drive the need for additional electricity load. Additionally, there are regions that may be ideal for CO<sub>2</sub> sequestration but have grid electricity with a higher GHG footprint or have geographic limitations for installing low-CI power generation units (e.g., a solar or wind) onsite at the direct air capture facility. The proposal clarifies that low-CI electricity with demonstration of trackable deliverability to be used at a direct air capture facility, which aligns with the requirement for indirect accounting of low-CI electricity for direct air capture projects specified in section 95488.8(i)(1)(C). Direct air capture facilities that use low-CI electricity would reduce potential demand to the power grid while maximizing net GHG reductions and incentives for the projects. Also, the requirement that low-CI electricity must be sourced from the new or expanded operation beginning on January 1, 2024, minimizes resource shuffling. Section 95490(b)(8). Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.

### **c) Purpose**

See Purpose for Section 95488.8(i)(1), Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.

### **d) Rationale**

See Rationale for Section 95488.8(i)(1), Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.

## **6. Section 95490(c)(1). Entities that Qualify as Joint Applicants.**

### **a) Purpose**

Staff proposes to include additional entities, such as CO<sub>2</sub> transporters, along the supply chain of a CCS project that qualify and should register as joint applicants, drawing from detailed information, including how the captured CO<sub>2</sub> passes through the supply chain among various entities, provided by potential CCS project operators/applicants since the last amendments to the regulation.

### **b) Rationale**

For CCS project LCFS crediting under the current regulation, both the capture entity and the sequestering entity must apply as joint applicants. CO<sub>2</sub> may be captured by one entity and transferred to another entity for sequestration. Because captured CO<sub>2</sub> can be transported to the sequestration site by an independent CO<sub>2</sub> transporter, it is crucial for CCS projects to track the CO<sub>2</sub> throughout the supply chain by requiring all entities involved in the projects to be joint applicants. Each joint applicant is subject to the applicable regulatory requirements for the portion of the project they control (subsection 95488(b)).

## **7. Section 95490(c)(2)(A). Demonstration of Capture and Use of CO<sub>2</sub> from Existing Projects for Maintaining Eligibility.**

### **a) Purpose**

Staff proposes to specify that if a CCS project sequesters CO<sub>2</sub> that is already being captured and used productively in industry (e.g., carbonated beverage, dry ice, cement), the project must demonstrate that a net reduction in GHG emissions is achieved, otherwise, the project will not be eligible for LCFS credit generation. This amendment is necessary to improve the clarity of existing requirements for effectively achieving net GHG reductions with these projects.

### **b) Rationale**

The net reduction in CO<sub>2</sub> emissions to the atmosphere, which CCS project operators are required by subsection 95490(e) of the current regulation to report to CARB annually, depends on the marginal new source of CO<sub>2</sub> that replaces the prior industrial use. If the marginal source of CO<sub>2</sub> is newly installed capture from anthropogenic sources, then the CCS project would

result in net CO<sub>2</sub> emission reductions to the atmosphere and would accordingly be eligible for LCFS crediting. Conversely, if the marginal source of CO<sub>2</sub> is increased production from a natural CO<sub>2</sub> dome, then net CO<sub>2</sub> reduction from the CCS project would be zero and the project would not be eligible for LCFS crediting.

## **8. Section 95490(e). Adding Reference to Regulatory Sections and Tier 2 Pathway Clarification.**

### **a) Purpose**

See Purpose for Section 95490(b)(2), Adding Reference to Regulatory Sections and Tier 2 Pathway Clarification.

### **b) Rationale**

See Rationale for Section 95490(b)(2), Adding Reference to Regulatory Sections and Tier 2 Pathway Clarification.

## **9. Section 95490(f). Credit review and issuance for carbon capture and sequestration project. Adding specifications for carbon capture and sequestration projects credited under either project-based provision or as part of a Tier 2 fuel pathway.**

### **a) Purpose**

The current regulation allows carbon capture and sequestration (CCS) technology to be incorporated in either a project-based crediting mechanism (i.e., an innovative crude project, refinery investment project, and direct air capture and sequestration project) or a fuel production operation (Tier 2 pathway). However, the process of LCFS credit review and issuance was not clearly specified in the current section 95490(f). Staff proposes to add the specifications for both projects and pathways incorporating CCS to reduce the net operational GHG emissions.

### **b) Rationale**

Staff from both LCFS and CCS Protocol teams have received many clarification inquiries from stakeholders interested in CCS under LCFS since the current regulation was implemented in 2019. Most of the inquiries are on the specifics of how a CCS project can get credited under LCFS, as section 95489(f) currently only calls out how direct air capture with sequestration projects can receive credits, which does not cover other CCS project types and is not the original intention. The proposal clarifies that Tier 2 fuel pathways with CCS can reflect the net GHG reductions resulting from CCS in the certified Tier 2 fuel pathway CI and receive LCFS credits that reflect the CCS benefits, which is distinctively different from a project-based crediting mechanism (innovative crude project, refinery investment project, direct air capture and sequestration project). The added specification distinguishes project-based crediting from pathway-based crediting for CCS projects and clarifies the original intent for promoting CCS projects in various mechanisms under LCFS.

**10. Section 95490(f). Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.**

**a) Purpose**

See Purpose for 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

**b) Rationale**

See Rationale for 95489(e)(5), Credit review and issuance for approved refinery investment credit projects, renewable hydrogen refinery credit projects, and direct air capture and sequestration projects. Adding reporting requirement quarterly or annually through a Project Report.

**11. Section 95490(f). Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.**

**a) Purpose**

See Purpose for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.

**b) Rationale**

See Rationale for Section 95489(c)(4), Deadline for submitting annual Project Reports and annual Low-Complexity/Low-Energy-Use Reports. Specifying and aligning annual report submission deadlines across various report types.

**AA. Section 95491. Fuel Transactions and Compliance Reporting.**

**1. Section 95491(d)(1). Addition of Fossil Jet Fuel to List of Fuels Requiring Quarterly Fuel Transactions Reports and Annual Compliance Reports.**

**a) Purpose**

Staff proposes to add Fossil Jet Fuel used for Intrastate Flight to the applicable transaction types for Liquid Fuels. Along with CARBOB and ULSD, fossil jet fuel is proposed to be exempt from reporting Production Company ID and Facility ID.

**b) Rationale**

As a newly proposed obligated fuel, fossil jet fuel used for intrastate flight must be listed as a new transaction type in order to specify that it must be reported consistent with reporting

requirements applicable to similar fuels. Fossil jet fuel is exempt from Production Company ID and Facility ID reporting, in alignment with other fossil fuels such as CARBOB and ULSD.

## **2. Section 95491(d)(3)(E). Specific Reporting Requirements for Quarterly Fuel Transaction Reports for Electric Forklifts.**

### **a) Purpose**

The current electric forklift estimation methodology, unlike other electricity fueling applications, allows entities to report electricity consumed by forklifts as a function of battery capacity, usage, and charging patterns rather than directly reporting measured fueling data. To simplify electric forklift reporting, improve accuracy, and align electric forklift reporting with all other electricity transactions in the LCFS, staff proposes to delete subsection 95491(d)(3)(E)2.

### **b) Rationale**

The proposed change deletes the current estimation method for reporting electricity consumed by electric forklifts. The current estimation method allows entities to report electricity consumed by forklifts as a function of battery capacity, usage, and charging patterns. As these amendments propose to require third-party verification of electricity transactions, the continued use of this methodology would unreasonably burden reporting entities and verifiers. Deleting the estimation methodology, and instead requiring metered data, aligns electric forklift reporting with all other electricity transactions in the LCFS.

## **3. Section 95491(e)(5). Uses of Electricity Credit Proceeds.**

### **a) Purpose**

To facilitate more coherent and cohesive organization of the LCFS regulations, staff proposes to move and consolidate the requirements for annual electricity credit proceeds reports into section 95491, which comprehensively lists reporting requirements, under this new a separate subsection of 95491(e)(5) named “Uses of Electricity Credit Proceeds.”

### **b) Rationale**

The general annual reporting requirements for electricity credit proceeds cross-referenced by several subsections in 95483 (i.e., subsections 95483(c)(1)(A), 95483(c)(1)(A)6, 95483(c)(1)(B), 95483(c)(2)(C), and 95483(c)(4)) were previously listed as a subsection of 95491(d), which is “Specific Reporting Requirements for Quarterly Fuels Transactions Reports.” To more coherently signal, as a matter of regulatory sequencing and organization, that the annual report for electricity credit proceeds is an annual report, references to the annual credit proceeds report are moved to 95491(e), which specifies “Reporting Requirements for Annual Compliance Reports.” The new subsection also incorporates the additional reporting requirements for nonmetered base credits. No substantive changes to existing requirements were made.

#### **4. Section 95491(d)(4)(D). Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.**

##### **a) Purpose**

See Purpose for Section 95488(i)(1), Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.

##### **b) Rationale**

See Rationale for Section 95488(i)(1), Modifications to book-and-claim accounting of low-CI electricity to produce hydrogen used as a transportation fuel and for process electricity in direct air capture projects.

#### **5. Section 95491. Table 12. Annual Compliance Calendar Updates.**

##### **a) Purpose**

Staff proposes to provide a complete list of items and report types subject to annual compliance to be consistent with the specific dates and deadlines specified across the regulation.

##### **b) Rationale**

The current Annual Compliance Calendar (Table 12 of regulation) only includes a portion of items/reports subject to annual compliance (e.g., Annual Fuel Pathway Reports, Quarterly Transactions Reports, MCON Reports), but left out the rest of report types that are also subject to annual compliance (e.g., Project Reports electing annual verification, Annual Low-Complexity/Low-Energy-Use Refinery Reports). The Proposed Amendments provide complete information of all items and report types subject to annual compliance by adding the missing report types and their specific deadlines.

#### **BB. Section 95491.1. Recordkeeping and Auditing.**

##### **1. Section 95491.1(a). Record Retention for Adding Deliverability Requirements to Book-and-Claim Accounting for Pipeline-Injected Biomethane.**

##### **a) Purpose**

The proposed amendment is necessary to update the reference to the “Attestations Regarding Environmental Attributes” subsection, which staff proposes to move from subsection 95488.8(i)(2)(C) to subsection 95488.8(i)(2)(E) as a result of the proposed addition in subsection 95488.8(i)(2) of deliverability requirements for book-and-claim accounting for pipeline-injected biomethane.

##### **b) Rationale**

This amendment maintains the accuracy of internal regulatory references in this subsection.



## **CC. Section 95491.2. Measurement Accuracy and Missing Data Provisions.**

### **1. Section 95491.2. Measurement Accuracy and Missing Data Provisions.**

#### **a) Purpose**

Staff proposes to move the requirements for measurement accuracy, meter calibration, meter calibration postponements, and missing data requirements from subsections 95488.8(j) and 95488.8(k) to new section 95491.2 and clarify that these requirements apply to all LCFS report and application types as originally intended.

#### **b) Rationale**

The Proposed Amendments are necessary in order to clarify that a consistent approach is applicable across all LCFS report and application types regarding measurement accuracy, meter calibration, meter calibration postponements, and missing data requirements. This will ensure the same data quality expectations between fuel pathway applications and Annual Fuel Pathway Reports, Quarterly Fuel Transactions Reports, Crude Oil Quarterly and Annual Volumes Reports, Project Reports, and Low-Complexity/Low-Energy-Use Refinery Reports. Placement of these requirements in section 95488.8(j) made it erroneously appear that these requirements were specific to pathway applications and not all report and application types.

### **2. Section 95491.2(a)(1). Calibration Requirements.**

#### **a) Purpose**

Staff proposes to move current subsection 95488.8(j)(1) to new subsection 95491.2(a)(1) to assure consistency across all report and application types regarding meter calibration and accuracy requirements. This section also includes necessary additions to the existing language to explicitly identify how measurement devices must be calibrated and the expected accuracy of the measurement devices.

#### **b) Rationale**

The Proposed Amendments provide consistency across all LCFS report and application types regarding measurement accuracy and calibration requirements. This will ensure the same data quality expectations between fuel pathway applications and Annual Fuel Pathway Reports, Quarterly Fuel Transactions Reports, Crude Oil Quarterly and Annual Volumes Reports, Project Reports, and Low-Complexity/Low-Energy-Use Refinery Reports. Accuracy and calibration requirements are needed for verifiers to ensure that measurement devices that log or record data are functioning according to (measurement device) manufacturer specifications. Data recorded and logged in these internal facility measurement devices are used to determine reporting data and demonstrate ongoing compliance with the LCFS regulation. In order to accurately verify site-specific inputs, verifiers must be able to ascertain that measurement devices that generated the data are appropriately calibrated and functioning as intended for all report types covered under the LCFS program. The additional requirements for calibration and accuracy in subsections 95491.2(a)(1)(A) and (B), respectively, are necessary to identify how the meters and measurement devices must be calibrated, and the accuracy required for the meters and measurement devices.

### **3. Section 95491.2(a)(2). Requests to Postpone Calibration.**

#### **a) Purpose**

Staff proposes to move current subsection 95488.8(j)(2) to new subsection 95491.2(a)(2) to assure consistency across all report and application types regarding requests to postpone meter calibration requirements.

#### **b) Rationale**

The Proposed Amendments provide consistency across all LCFS report and application types regarding requests to postpone calibration requirements. In order to provide flexibility to continuously operating fuel production facilities that cannot meet the calibration requirements of previous subsection 95488.8(j)(1) or new subsection 95491.2(a)(1), the facilities may submit written requests for postponement of calibration until the next scheduled maintenance outage. Allowing for requests to postpone calibration across all report and application types subject to third-party verification provides continuously operating facilities the flexibility to better align calibration checks with planned unit shutdowns and minimizes down time required for calibration.

### **4. Section 95491.2(b). Missing Data.**

#### **a) Purpose**

Staff proposes to move current subsection 95488.8(k) to new subsection 95491.2(b) to assure consistency across all report and application types regarding missing data requirements. Section 95491(2)(b)(1)(B) was modified to clarify the time period missing data requirements apply to.

#### **b) Rationale**

The Proposed Amendments provide consistency across all LCFS report and application types regarding missing data requirements. Missing data requirements are needed if required data is missing from a report or application due to broken metering, measuring, or recording devices, failure to comply with the calibration requirements, or a measurement device that fails a calibration or field accuracy assessment. In these cases, the process included in this section is needed for a verifier to determine whether the data is accurate or acceptable for all report types covered under the LCFS regulation. Subsection 95491(2)(b)(1)(B) was modified to clarify that missing data provisions apply back to the last time the meter or measuring device was known to be accurate. Missing data provisions must be used to replace all data of unknown accuracy, and it may not be possible to identify when the meter or measurement device no longer met the accuracy requirement of subsection 95491.2(a)(1)(B).

### **5. Section 95491.2(b)(1). Meter Record, Accuracy, or Calibration Requirements Not Met under Missing Data Provisions.**

#### **a) Purpose**

Staff proposes to move current subsection 95488.8(k)(1) to new subsection 95491.2(b)(1) and modify the new section to clarify that the reported data is specific to the device and not with

respect to the total carbon intensity of the fuel pathway. This clarification is required to ensure data reporters and verifiers know which reported data must be accurate. Amendments are also made to ensure missing data substitution is applied to all reported data types, and not just as part of an alternate method.

#### **b) Rationale**

This amendment reflects CARB's intent that all measurement devices used to report LCFS data are accurate, or an alternate method with supporting evidence of accuracy is requested. The regulatory text "reported data" was intended to refer to the data from the device irrespective of the impact on the total CI.

### **6. Section 95491.2(b)(2)(A). Missing Data Provisions.**

#### **a) Purpose**

Staff proposes to move current subsection 95488.8(k)(2) to new subsection 95491.2(b)(2)(A) and modify the new section to clarify that specified report types may use a temporary method for up to six months or request an alternate method. A new deadline is established that now requires the alternate method request to be submitted to CARB no later than 10 days after report submittal.

#### **b) Rationale**

Requiring a deadline by which alternate method requests must be submitted to CARB ensures there is adequate time for staff to review and approve requests, given staffing levels and the number of requests submitted to CARB shortly before the verification deadline. Providing 10 days after report submittal allows the applicant to ensure they can complete the reporting process and still have up to 10 days to provide the necessary documentation to CARB as part of the alternate method request.

### **7. Section 95491.2(b)(2)(B). Missing Data Provisions.**

#### **a) Purpose**

Staff proposes to move current subsection 95488.8(k)(2) to new subsection 95491.2(b)(2)(B) and modify it to require explicit missing data substitution based on data capture rate instead of requiring submittal of an alternate method request. Subsection 95491.2(b)(2)(A) specifies that an alternate method must be submitted no later than 10 days after report submittal for instances where it is not possible to use the missing data procedures specified in Table 13 of the regulation. This subsection applies to Quarterly Fuel Transactions Reports, Fuel Pathway Applications, and Annual Fuel Pathway Reports.

#### **b) Rationale**

Entities with missing data that could also not demonstrate that the reported data was accurate were previously required to spend time compiling an alternate method and requesting staff to review and approve various detailed and complicated methods. This required large amounts of staff review time and was difficult to provide consistent treatment of missing data when each entity submitted different methods and procedures to address inaccurate data. Entities still

have an option to submit an alternate method if the missing data procedures in Table 13 are not applicable, or for nonfuel pathway reports. These provisions are necessary for creating incentives for entities to achieve high data capture rates. The timing of submittal of an alternate method within 10 calendar days of report submittal provides the entity with a deadline by which CARB staff have sufficient time to review the request in advance of the verification deadline.

## **8. Section 95491.2(b)(2)(C). Missing Data Provisions.**

### **a) Purpose**

Staff proposes to move subsection 95488.8(k)(2) to new subsection 95491.2(b)(2)(C) and modify the new section to require credit generating entities to submit an alternative method within the specified timeframe to be eligible for credit generation. And deficit generating entities need to submit within the timeframe, or a conservative alternative method will be assigned by the Executive Officer.

### **b) Rationale**

Entities required to submit a request for approval of an alternate method must provide adequate time for CARB staff to review and approve requests. Credit generation is not allowed when data is not accurate and an alternate method has not been approved, which provides incentive for entities to ensure high quality data is collected. Applying a conservative alternative method for deficit generating entities will have a similar effect.

## **9. Section 95491.2(b)(3). Force Majeure.**

### **a) Purpose**

Staff proposes to specify that applicants are required to notify CARB regarding the force majeure event within 90 days of the beginning of the shutdown or disruption. Staff proposes to add a qualifying sentence to indicate that CARB has authority to request additional documents that helps establish a connection between the shutdown or disruption with a force majeure event. Staff proposes to clarify that operational data from a force majeure period must not be excluded in the applicable quarterly or annual reports for verification.

### **b) Rationale**

Specifying the deadline for reporting a force majeure event establishes a clear timeline for reporting and facilitates prompt action by the applicant. By adding a qualifying sentence, the Executive Officer will be able to request additional supporting documents to evaluate force majeure claims when necessary.

In the past, reporting parties may have excluded operational data from a time period they determined was due to a force majeure event. The regulation requires all data to be reported, but to avoid confusion, staff proposes to specify that all operational data for the time period of a submitted report must be included. The verified operational CI or GHG emissions from a project obtained from quarterly or annual verification should include the CI of fuel produced or GHG emissions occurred during a force majeure event to accurately represent the CI or GHG reductions.

## **DD. Section 95495. Authority to Suspend, Revoke, Modify, or Invalidate.**

### **1. Section 95495(b)(1). Authority to Suspend, Revoke, Modify, or Invalidate.**

#### **a) Purpose**

Staff proposes to specify invalidation of any credits generated in violation of subsection 95491.2(b)(2)(C). This is necessary as it eliminates confusion and encourages reporting entities to effectively report data in a timely manner.

#### **b) Rationale**

The Proposed Amendments specify a deadline for regulated entities to submit their alternate method requests while encouraging them to do so as early as possible. Noncompliance with the timeframes identified in this section will invalidate any credits or result in a conservative method assigned to calculate deficits, associated with the time period for which there is missing data. By specifying invalidation of any credits generated in violation of subsection 95491.2(b)(2)(C), it will ensure reporting entities to submit the alternate method requests in a timely manner and, overall, spread out the influx of alternate method requests from all entities to CARB.

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

### **1. Section 95500(b)(2)(B). Joint Applicant Deferral Eligibility.**

#### **a) Purpose**

Staff proposes to specify that joint applicants are not eligible to defer verification and are required to verify annually.

#### **b) Rationale**

Staff proposes to add language to explicitly indicate that fuel pathway holders classified as joint applicants are not eligible to defer verification of annual fuel pathway reports (AFPR). This supports the integrity of the LCFS program in multiple ways. First, one joint applicant could be linked to multiple primary applications, thus impacting the final CI scores of multiple applications that have been linked to the joint applicant. Deferring verification for the joint applicant would complicate and delay any final credit accounting for primary applications, including credit adjustments, until verification of the joint applicant is completed. Second, the eligibility for deferred verification is assessed at the production facility level, but joint applicants do not necessarily include a fuel production facility (e.g., they could be feedstock suppliers, rather than fuel producers). Third, the calculation of LCFS credits, to compare against the deferral eligibility threshold of 6,000 credits, is very challenging and may not be possible for all joint applicants, which may cause confusion with stakeholders and delay compliance. The proposed amendment will simplify and improve the implementation of the LCFS regulation.

Entities reporting hydrogen using book-and-claim accounting will not be eligible to defer verification just as entities reporting biomethane using book-and-claim accounting are not eligible to defer verification due to the elevated risk that is associated with book-and-claim accounting.

To be consistent with the rest of the regulation, annual verification statements must be submitted to CARB on or before August 31. However, the existing text incorrectly ignores acceptable submissions before the deadline. In addition, once an AFPR verification is conducted, all prior unverified AFPRs for the same production facility must be verified as well, even in the case that the two-year deferral limit has not been reached. The Proposed Amendments make corrections, clarify the implementation, and improve consistency of the whole regulation.

## **2. Section 95500(c)(1). Applicability of Verification of Quarterly Fuel Transaction Reports for Electricity and Hydrogen.**

### **a) Purpose**

Staff proposes to add third-party verification requirements for specific electricity and hydrogen-based Quarterly Fuel Transactions Reports (QFTR). Specifically, the transaction types newly subject to verification requirements for QFTR are:

1. EV Charging;
2. eTRU, eCHE, and eOGV Fueling;
3. Forklift Hydrogen and Electricity Fueling;
4. Fixed Guideway Electricity Fueling; and
5. Fuel Cell Vehicle (FCV) Fueling transaction types, not limited to hydrogen from book-and-claim biomethane.

### **b) Rationale**

Electricity and hydrogen transactions are not currently subject to third-party verification. Since the original verification requirements were incorporated, electricity has grown as a credit generator and accounted for a substantial fraction of total LCFS credits (approximately 25% of total annual credits in 2022). Additionally, the 2022 Scoping Plan Update points to an expected increase in electricity usage in transportation and an increase in hydrogen supply to achieve the State's emission reduction goals over the coming decades. Several recent vehicle regulations have established requirements that have already set the expected increase in motion. With this shift, CARB staff no longer believes that the data assurance needs for electricity and hydrogen sources can be met within the staffing capacity of CARB. The LCFS program must ensure that the electricity and hydrogen associated transaction types are held to the same standard of data quality through third-party verification as the rest of the LCFS program.

Currently, section 95500(c)(2)(B) allows for reporting entities subject to third-party verification of the QFTR that are small credit generators and meet certain requirements to defer annual verification up to two years. By deferring annual verification, a reporting entity may be able to have multiple data years verified at once, saving on verification costs. To qualify for deferred verification, the entity must earn less than 6,000 credits or deficits in the same calendar year among other requirements. Likewise, entities that are newly subject to third-party verification

requirements because of the Proposed Amendments regarding electricity and hydrogen transactions will also be eligible to defer third-party verification if they meet the requirements outlined in subsection 95500(c)(2)(B). In addition, upon receiving a positive verification statement under full verification requirements, fuel reporting entities only reporting electricity transactions subject to third-party verification may choose to obtain less intensive verification services for the following two annual verifications of their QFTRs.

As specified transaction types of electricity and hydrogen are proposed to be subject to verification, the QFTR verification exemption subsection 95500(c)(2)(C) is revised to continue to specify that that verification exemption applies only to designated liquid fuel transactions.

### **3. Section 95500(c)(1). Applicability of Verification of Quarterly Fuel Transaction Reports for Fossil Jet Fuel.**

#### **a) Purpose**

Staff also proposes to add Fossil Jet Fuel used for Intrastate Flight to the applicable transaction types requiring obtaining services of a verification body. Fossil Jet Fuel used for Intrastate Flight would have the same verification requirements as other liquid fuel transaction types.

#### **b) Rationale**

As a proposed obligated fuel, fossil jet fuel used for intrastate flight requires a new transaction type. This new transaction type would require verification services in alignment with other liquid fuels.

### **4. Section 95500(c)(2)(B). Deferred Verification.**

#### **a) Purpose**

Staff proposes to simplify and streamline the implementation for deferred verification of QFTR, eliminate ambiguity of the regulation language, and incorporate new fuel pathways.

#### **b) Rationale**

The proposed amendment simplifies the deferral eligibility analysis, allowing regulated parties to more easily determine eligibility for deferred verification.

The existing language within subsection 95500(c)(2)(B) uses terms that are more related to regulated entities subject to verification of AFPRs rather than QFTRs, although the purpose of the subsection is specific to deferred verification of QFTRs. Specifically, verification of QFTRs applies to entities reporting quarterly fuel transactions. The proposal removes the complicated deferral eligibility requirement that only applies to fuel pathway holders which are also fuel reporting entities meanwhile. Instead, staff proposes to simplify the deferral eligibility requirement and apply it to all fuel reporting entities. The proposal also removes the Lookup Table Pathways constraint which QFTR fuel reporting entities often mix up with Tier 1 or Tier 2 pathways when they conduct self-assessment of deferral eligibility.

Entities reporting hydrogen using book-and-claim accounting will not be eligible to defer verification just as entities reporting biomethane using book-and-claim accounting are not

eligible to defer verification due to the elevated risk that is associated with book-and-claim accounting.

To be consistent with the rest of the regulation, annual verification statements must be submitted to CARB on or before August 31. However, the existing text incorrectly ignores acceptable submissions before the deadline. In addition, once a QFTR verification is conducted, all prior unverified QFTRs for the same reporting entity must be verified as well, even in the case that the two-year deferral limit has not been reached. The proposed changes make corrections, clarify the implementation, and improve consistency of the whole regulation.

## **FF. Section 95501. Requirements for Validation and Verification Services.**

### **1. Section 95501(b)(13). Review of Missing Data Substitution.**

#### **a) Purpose**

Staff proposes to modify subsection 95501(b)(13) to remove the option of a temporary method for fuel pathway applications and annual fuel pathway reports. Instead, those report types must either use the missing data substitution requirements in Table 13 of the regulation or submit an alternate method request to CARB. Temporary methods may now only be used for a period not to exceed six months in a calendar year.

#### **b) Rationale**

Missing data substitution requirements were added to Table 13; therefore, a temporary method is no longer applicable for fuel pathway applications and annual fuel pathway reports. The use of a temporary method is now limited to a six-month period in a calendar year to ensure CARB can provide oversight via an alternate method when missing data exceeds a six-month period.

During the first two years of verifications, temporary methods were frequently used as part of pathway validation and verifications. Those same data calculation methods and data substitution methods will now rely on Table 13 for missing data substitution, or an alternate method if the substitution method is not applicable. Six months is an appropriate time period that will allow the entity to identify data is missing, use a temporary method or data substitution method to compile required data, and have sufficient time to request an alternate method from CARB, if necessary.

### **2. Section 95501(h). Allowance Option for Less Intensive Verifications.**

#### **a) Purpose**

Staff proposes to add the flexibility to conduct less intensive verification of QFTRs for two years following the completion of a successful full verification that received a positive verification statement for electricity used as a transportation fuel. This addition allows the verification body to skip site visits if the verification body visited the site in the last two years and issued a positive verification statement.

#### **b) Rationale**

For the report types identified, there is little change of operation from reporting period to reporting period thus reducing the benefit of annual site visits. If a verification body conducts a



site visit as part of verification services and issues a positive verification statement in year one, there is no or little risk to the integrity of the LCFS program to allow for less intensive verification services without a site visit in the annual verifications for the following two years. This should reduce the cost of verification services which is often passed on to program participants. There are several situations outlined in this section that require a site visit even after a successful full verification. These situations involve changes that would significantly affect verification. Also, if there have been large changes in the data, the verification body must justify why a full verification is not required. Additionally, in all cases a verification body is required to conduct a full verification if they deem it is necessary to reach reasonable assurance.

## **GG. Section 95502. Accreditation Requirements for Verification Bodies, Lead Verifiers, and Verifiers.**

### **1. Section 95502(c)(3)(E). Minor Change**

#### **a) Purpose**

No substantive changes. Staff propose to remove the word “the”, which was mistakenly included in the regulation.

#### **b) Rationale**

The removal of the word “the” clarifies the sentence and does not alter the existing provision.

## **HH. Section 95503. Conflict of Interest Requirements for Verification Bodies and Verifiers.**

### **1. Section 95503(b). Removal of Phase-In Exception Language that Expired August 31, 2023.**

#### **a) Purpose**

Staff proposes to remove contents of the regulation that are no longer applicable because the phase-in period outlined in the regulation has passed.

#### **b) Rationale**

Currently, section 95503(b) includes language that allows for certain services with high conflict of interest to be considered medium conflict of interest during the first few years the LCFS third-party verification requirements phase in. The phase-in period is specified to be prior to August 31, 2023, in the existing regulation. However, that option expires August 31, 2023, before the amended regulation takes effect, and, therefore, that language is proposed to be removed.

