



LCFS Guidance



Low Carbon Fuel Standard (LCFS) Guidance 19-05

Reporting and Recordkeeping for Natural Gas and Book-and-Claim Accounting for Biomethane

Revised: October 2019
May 2019

INTRODUCTION

The California Air Resources Board's (CARB) Low Carbon Fuel Standard regulation, which appears at sections 95480 to 95503 of title 17, California Code of Regulations, is designed to reduce greenhouse gas emissions associated with the life cycle of transportation fuels used in California. CARB staff has prepared this guidance document to describe the regulatory requirements in a user-friendly format. Unlike the regulation itself, this document does not have the force of law. It is not intended to and cannot establish new mandatory requirements beyond those that are already in the LCFS Regulation, nor can it supplant, replace or amend any of the legal requirements of the regulation. Conversely, any omission or truncation of regulatory requirements does not relieve entities of their legal obligation to fully comply with all requirements of the regulation.

BACKGROUND

This guidance document is designed to summarize and describe LCFS Regulation¹ requirements related to reporting and recordkeeping for natural gas (NG) and biomethane (also referred to as renewable natural gas or RNG), including requirements for using book-and-claim accounting for pipeline-injected biomethane used as a transportation fuel in California. Pipeline-injected fossil NG or RNG can be compressed or liquefied, then dispensed and used in vehicles as:

- Compressed natural gas (CNG or bio-CNG),
- Liquefied natural gas (LNG or bio-LNG), and
- Liquefied for transport and/or storage, re-gasified, compressed and dispensed to CNG vehicles (L-CNG or bio-L-CNG).

FUEL REPORTING ENTITIES

¹ All citations to the LCFS Regulation are found in Title 17, California Code of Regulations (CCR), sections 95480-95503. Reporting and Recordkeeping requirements are addressed in sections 95491 and 95491.1. Book-and-claim accounting for biomethane is primarily addressed in section 95488.8(i)(2).

Fuel Reporting Entities must register in the LCFS Reporting and Credit Bank & Transfer System ([LRT-CBTS](#)) to establish a reporting account. This process is simple and primarily includes providing the organization name, organization address, organization federal employer identification number (FEIN), and account administrators' information.

The LCFS designates certain “opt-in” fuels and entities, meaning they may voluntarily elect to participate in the program, while for others participation is mandatory.

- Opt-in Fuels: Providers of bio-CNG, bio-LNG, and bio-L-CNG may elect to opt into the LCFS as a fuel reporting entity pursuant to section 95482(b).
- Mandatory Participants: Providers of fossil CNG, fossil LNG or fossil L-CNG are required to report, with the following **exceptions**:
 - Dispensing stations with total fossil CNG throughput of 150,000 gasoline-gallon equivalent or less per year are exempt until January 1, 2024.
 - Fossil CNG used in school buses that are purchased prior to January 1, 2020 is exempt.

The “first fuel reporting entity” is responsible for initiating reporting for a given quantity of fuel and initially holds the status as initial credit or deficit generator for the reported fuel quantity. First fuel reporting entities for natural gas are designated, in section 95483(b), as follows:

- 1) For bio-CNG, including the biomethane portion of a blend with fossil CNG, the first fuel reporting entity is the producer or importer of the biomethane;
- 2) For bio-LNG and bio-L-CNG, including the biomethane portion of any blend with fossil LNG and L-CNG, it is the producer or importer of the biomethane;
- 3) For fossil CNG, LNG, and L-CNG it is the entity that owns the fueling equipment through which the fossil fuel is dispensed to motor vehicles for transportation use.

Per section 95483(b)(2), the first fuel reporting entity may elect not to be the fuel reporting entity for a given gaseous fuel, provided another entity has contractually agreed to be the fuel reporting entity for the purpose of LCFS reporting and credit or deficit generation. In this case, the two entities must agree by written contract that the first fuel reporting entity will not generate credits or deficits and will provide the amount of fuel dispensed, and other required information pursuant to sections 95483.2(b)(8), 95491 and 95491.1, to the contractually designated entity. The contractually designated entity must accept all LCFS responsibilities as the first fuel reporting entity and as a credit or deficit generator, as applicable.

FUELING SUPPLY EQUIPMENT REGISTRATION IN THE LRT

Pursuant to section 95483.2(b)(8), a fuel reporting entity for natural gas must register all fueling supply equipment (FSE) in the LRT-CBTS using the FSE registration template available on the [LRT-CBTS](#) homepage. For more information, see LCFS Guidance 19-04: Fueling Supply Equipment Registration on the [LCFS Guidance Documents and FAQs](#) webpage.

QUARTERLY FUEL TRANSACTIONS AND ANNUAL COMPLIANCE REPORTING

In order to generate credits, a fuel reporting entity must submit quarterly fuel transactions and annual compliance reports² in the LRT-CBTS and meet the reporting requirements set forth in section 95491 of the LCFS Regulation. The primary parameters reported quarterly are the quantity of natural gas dispensed, CI value (fuel pathway), and the vehicle application (e.g., light/medium duty, heavy duty).³ The quantity of fuel dispensed per FSE for each applicable Fuel Pathway Code (FPC) must be reported on a quarterly basis.⁴ In addition, the total quantity of fuel dispensed through each FSE during the reporting period summed across all FPCs must be reported using the *NG Total Throughput Reporting Template* available on the LRT-CBTS homepage.

Table 11 of the LCFS Regulation provides a summary checklist of parameters that are required to be included in quarterly fuel transactions and annual compliance reports.

FUEL PATHWAY APPLICATION OPTIONS

A certified fuel pathway carbon intensity (CI) is required for credit and deficit generation. The type of feedstock and fuel determines whether an applicant can use a Lookup Table pathway, or submit a Tier 1 or Tier 2 fuel pathway application through the Alternative Fuels Portal ([AFP](#)).

Lookup Table Pathways

The Lookup Table⁵ includes a pathway for CNG from North American average pipeline natural gas, with a CARB-developed CI value of 79.21 gCO_{2e}/MJ. To report using this CI, a pathway application is not required; eligible fuel reporting entities can simply register in the LRT-CBTS and begin reporting.

Tier 1 Pathways

Tier 1 includes fuel pathways for which CARB has identified a discrete set of site-specific inputs that can be modified to determine CI using a Board-approved Simplified CI Calculator. Tier 1 applies to fossil LNG and L-CNG, and most RNG pathways. For

² Note that even if no fuel was provided, reporting entities must submit a quarterly report with zero quantities.

³ The vehicle application determines the Energy Economy Ratio (EER) used in the credit calculation, which accounts for the difference in alternative vehicle (such as natural gas) powertrain efficiency relative to conventional gasoline and diesel vehicles they replace. See EER values for each vehicle-fuel combination in Table 5 of the LCFS Regulation.

⁴ Pursuant to section 95483.2(b), entities may not report and generate credits based on transactions that precede the quarter in which they opt in.

⁵ Table 7-1 in the LCFS Regulation. The CI values of Lookup Table pathways can be found in the online table of all certified Fuel Pathways: <https://www.arb.ca.gov/fuels/lcfs/fuelpathways/pathwaytable.htm>

specific documentation requirements, refer to the Application Checklists for Tier 1 pathways, available on the [Pathway Application Process](#) webpage.⁶

There are five Tier 1 Simplified CI Calculators (August 13, 2018) for NG and RNG:

- LNG and L-CNG from North American Natural Gas
- Biomethane from North American Landfills
- Biomethane from Anaerobic Digestion of Wastewater Sludge
- Biomethane from Anaerobic Digestion of Dairy and Swine Manure
- Biomethane from Anaerobic Digestion of Organic Waste

Tier 2 Pathways

A Tier 2 application is used for any pathway that is not included in the Lookup Table or Tier 1 classification. Applicants for fuel pathways designated as Tier 1 may be eligible to submit a Tier 2 application, provided that substantiality requirements are met as described in section 95488.9(a). Tier 2 applicants may use the full CA-GREET 3.0 model, or a relevant Simplified CI Calculator, with modifications as needed to accurately reflect the unique, site-specific CI of the pathway. Documentation requirements are typically more extensive for Tier 2 pathway applications, and the certification process includes a 10-day public comment period.⁷

The Board-adopted life cycle analysis models and calculators that can be used to determine CI are available on the [LCA Models and Documentation](#) webpage.

VERIFICATION CONSIDERATIONS FOR BIOMETHANE PATHWAYS

To maintain a valid CI for use in reporting, fuel pathways with site-specific CI data (e.g., Tier 1 and 2 fuel pathways) require validation of applications beginning in 2020 and verification of annual fuel pathway reports beginning in 2021 by CARB-accredited LCFS third-party verification bodies. See sections 95500(a)(1)(A) and 95500(b)(1)(A). As a specified source feedstock, any pathway using pipeline-injected biomethane must maintain chain-of-custody evidence for review by CARB or verifier (see section 95488.8(g) for requirements). For fuel pathways that do not require third-party validation or verification, e.g., Lookup Table pathways including hydrogen from biomethane, specified source feedstocks must be included in the scope of verification of the Quarterly Fuel Transactions Reports (see 95501(b)(4)(E)) required in 2021 and thereafter.

⁶ Section 95488.6 of the LCFS Regulation provides details on applying for a Tier 1 fuel pathway.

⁷ Section 95488.7 of the LCFS Regulation provides details on applying for a Tier 2 fuel pathway.

FUEL PRODUCTION FACILITY AND **NEW!** INTERMEDIATE FACILITY REGISTRATION IN THE AFP

All production facilities and intermediate facilities from which site-specific operational data is relied upon in determining the CI score for a pathway must be registered in the Alternative Fuel Portal ([AFP](#)). The information required to register a facility is listed in section 95488.2(a) of the LCFS Regulation.



NOTE: Currently, the AFP does not support the required **registration of intermediate facilities** as distinct from fuel production facilities. Intermediate facilities must be registered by following the same process as a fuel production facility in the AFP. The pathway application should be created under the fuel production facility, and the intermediate facility ID number(s) should be referenced in the calculator and other application materials as relevant.

- For fossil LNG and L-CNG pathways, the fuel production facility is defined as the liquefaction plant.
- For biomethane pathways:
 - The fuel production facility is the location where the biomethane is upgraded, purified, or processed to meet standards for injection to a natural gas common carrier pipeline or for use in natural gas vehicles (e.g., the biogas upgrading facility).
 - The biogas source (e.g. landfill or digester) must be registered as an intermediate facility, unless it is the same location as the fuel production facility and it is the sole biogas source supplied to the fuel production facility. For example, a dairy cluster in which three digesters supply raw biogas to an upgrading facility must register all four sites.
 - Liquefaction facilities must be registered as intermediate facilities for bio-LNG and bio-L-CNG pathways.
 - Any other facility from which site-specific operational data is relied upon in determining the CI score for a pathway must be registered as an intermediate facility.
- For hydrogen pathways in which biomethane environmental attributes are matched to fossil natural gas used as feedstock to produce hydrogen via steam methane reformation:
 - The fuel production facility is the location where hydrogen is produced.
 - The biogas source (e.g. landfill or digester) must be registered as an intermediate facility.
 - For Tier 2 hydrogen pathways, any facility from which site-specific operational data is relied upon in determining the CI score for a pathway must be registered as an intermediate facility.
- For hydrogen pathways in which fossil natural gas is used as feedstock and process energy to produce hydrogen via steam methane reformation:
 - The fuel production facility is the location where hydrogen is produced.
 - For Lookup Table hydrogen pathways using fossil natural gas, no intermediate facility is required to be registered.

- For Tier 2 hydrogen pathways, any facility from which site-specific operational data is relied upon in determining the CI score for a pathway must be registered as an intermediate facility.

BOOK-AND-CLAIM ACCOUNTING FOR PIPELINE-INJECTED BIOMETHANE

Book-and-claim accounting refers to the chain-of-custody model in which decoupled environmental attributes⁸ are used to represent the ownership and transfer of transportation fuel under the LCFS, without regard to physical traceability. For reporting transactions in Q1 2019 and onwards, the LCFS recognizes the use of book-and-claim accounting for pipeline-injected biomethane that is either claimed as a transportation fuel (e.g., bio-CNG), or claimed as a feedstock to produce hydrogen for transportation purposes (including hydrogen that is used in the production of a transportation fuel).⁹

Book-and-claim accounting cannot be used to claim any fuel that is used as *process energy* in the production of a transportation fuel. Pursuant to section 95488.8(h), any renewable or low-CI process energy must be directly (physically) supplied to the fuel production facility in order to be recognized in the CI score.

Requirements for using book-and-claim accounting for biomethane include:

1. The entity claiming the environmental attributes must demonstrate the exclusive right to claim environmental attributes associated with the sale or use of the biogas or biomethane.
2. The pathway applicant and fuel reporting entity must be able to link the environmental attributes of biomethane injected (in MMBtu or Therms) with corresponding quantities of natural gas withdrawn for transportation use in California. Environmental attributes are considered attached to the physical quantity of natural gas withdrawn at a specified CNG station, LNG liquefaction plant, or hydrogen SMR facility, and must be counted in a manner consistent with physical inventories; when the fuel is claimed as dispensed and reported under the LCFS, the environmental attributes are retired.
3. The quantity of environmental attributes claimed under the LCFS may not be used or claimed in any other program or jurisdiction with the **potential** exception of the federal Renewable Fuel Standard, and California's Cap-and-Trade program. A unit of biomethane that is matched to a unit of natural gas dispensed at a California fueling station and claimed as bio-CNG or bio-LNG is eligible for

⁸ For the purposes of the LCFS Regulation, "Environmental Attribute" means GHG emission reduction recognition in any form including verified emission reductions, voluntary emission reductions, offsets, allowances, credits, avoided compliance costs, emission rights and authorizations under any law or regulation, or any emission reduction registry, trading system, or reporting or reduction program for GHG emissions that is established, certified, maintained, or recognized by any international, governmental, or non-governmental agency. (LCFS Regulation, section 95481(a)(47).)

⁹ Book-and-claim accounting for biomethane is addressed in section 95488.8(i)(2).

both RIN generation under the federal RFS and for LCFS crediting. A unit of biomethane may not be double claimed pursuant to section 95488.8(i)(2)(B). This means that a unit of biomethane injected to a common carrier pipeline may only be linked with a corresponding quantity of natural gas withdrawn from a common carrier pipeline. Examples of double claims prohibited under the LCFS Regulation include, but are not limited to:

- Double claiming occurs if a unit of biomethane is linked with a larger quantity of natural gas withdrawn.
 - The same unit of biomethane may not be claimed as used in California under the LCFS and claimed as used in another state under the federal RFS.
 - The same unit of biomethane may not be claimed as used at multiple CNG fueling stations in California.
 - The same unit of biomethane may not be claimed as feedstock for hydrogen production and claimed as dispensed bio-CNG, regardless of whether the dispensing location is inside or outside California.
4. Book-and-claim accounting for biomethane may span only three quarters as illustrated in the following table. Figure 1 shows that if a quantity of biomethane (and all associated environmental attributes, including a beneficial CI) is injected to the North American common carrier pipeline in the first calendar quarter of a given year, the quantity claimed for LCFS reporting must be matched to bio-CNG or bio-LNG dispensed, or to natural gas used as a feedstock for hydrogen, no later than the end of the third calendar quarter of that year. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting. In other words, only biomethane quantities injected in a common carrier pipeline in Q1 through Q3 are eligible to link to corresponding natural gas quantities withdrawn/dispensed in Q3 and reported in Q4.

Q1	Q2	Q3	Q4
"X" therms of RNG injected to the pipeline	"X" therms of RNG attributes can be matched with NG supplied and reported in the LCFS for Q1, Q2 or Q3		
Natural Gas (therms) dispensed in Q1	Natural Gas (therms) dispensed in Q2	Natural Gas (therms) dispensed in Q3	
	Data reported for Q1	Data reported for Q2	Data reported for Q3

←----- Three quarters allowed for book-and-claim accounting ----->

Figure 1. Three Quarter Limit for Book-and-Claim Accounting (Example)


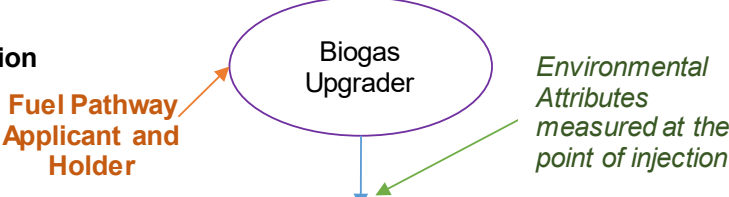
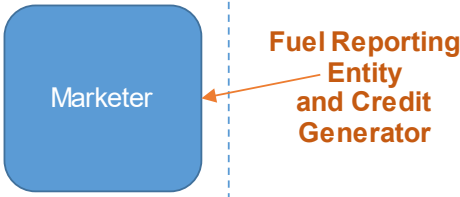

DEMONSTRATING SUPPLY OF BIOMETHANE

The figure on page 9 shows an example of a supply chain and recordkeeping requirements for each stage to track the pipeline-injected biomethane reported as

bio-CNG fuel for vehicles in California. In this example, the fuel pathway applicant (who becomes the pathway holder upon pathway certification) is the biogas upgrader, and the fuel reporting entity is a marketer that purchases the biomethane with its environmental attributes from the biogas upgrader, and sells the attributes to CNG dispensing stations in California. This is merely an example provided to illustrate the roles and responsibilities of each entity in one specific supply chain configuration. These roles are not assigned by CARB; for example, a single entity may work across the supply chain and accept the responsibilities as both applicant/holder and reporting entity.

- Chain of custody of the environmental attributes must be clearly documented, but demonstrating the physical transfer of gas through the supply chain is not required; for example, a station owner may acquire environmental attributes directly from a biogas producer or upgrader. For hydrogen pathways with biomethane claimed as a feedstock input to hydrogen production, this means that the hydrogen station owner (or other end user of the hydrogen, such as a renewable diesel producer) may demonstrate attribute ownership, irrespective of the location where natural gas is physically withdrawn to produce the hydrogen.
- The link between the environmental attributes of biomethane injected (in MMBtu or Therms) and natural gas withdrawn for transportation purposes in California is demonstrated by providing records, including invoices and contracts, between all applicable parties along the supply chain. The records must show the quantities of biomethane produced and injected at the source, the price per unit at which the attributes were sold/purchased, and demonstrate that the entity has exclusive right to claim the attributes.
- When the quantity of fuel with a CI that reflects the emissions associated with biogas or biomethane is reported in the LRT-CBTS by a fuel reporting entity, the environmental attributes are deemed retired and can no longer be sold, transferred, or claimed by any entity or for any other purpose. This requirement may be clearly demonstrated when the fuel reporting entity is the final owner of the attributes.
- The pathway holder and the fuel reporting entity must submit the attestation to CARB as set forth in section 95488.8(i)(2)(C)2., as well as obtain and keep environmental attribute attestations from each upstream party, collectively demonstrating that (a) the entity claiming the environmental attributes has the exclusive right to claim environmental attributes associated with the sale or use of the biogas or biomethane, and (b) the environmental attributes have not been used or claimed in any other program or jurisdictions, with the exceptions provided in the LCFS Regulation.
- The pathway holder and fuel reporting entity must track the date of biomethane injection to ensure compliance with the three quarter limit as discussed above. The pathway holder must include the monthly quantity injected in the Annual Fuel Pathway Report, and injection records are subject to verifier and CARB review.

EXAMPLE SUPPLY CHAIN FOR PIPELINE-INJECTED RNG TO CNG STATIONS IN CA

Stages	Entities	Reporting & Recordkeeping Requirements
Raw biogas Production		<p>Production records for the quantity of raw biogas produced</p> <p>Contract & invoices for sale of raw biogas from the biogas producer to the biogas upgrader and any other users (if applicable); quarterly affidavits (if available)</p>
RNG Production & Pipeline Injection		<p>Operational data required in CI application and annual fuel pathway report, including: metered raw gas inflow, monthly utility invoices evidencing metered pipeline injection</p> <p>Contracts between the biogas producer, upgrader, and any downstream parties for the sale of RNG attributes; monthly invoices and quarterly affidavits (if available)</p> <p>Attestations Regarding Environmental Attributes</p>
Transfer by Marketer		<p>Contracts & invoices from the marketer for the amount of RNG purchased from the biogas upgrader & sold to dispensing stations (if applicable); quarterly affidavits (if available)</p> <p>Attestations Regarding Environmental Attributes</p> <p>Accounting system for attribute inventory, including injection records to support 3-quarter transfer limit</p>
RNG Dispensed in CA		<p>Contracts & invoices from the CNG station owners for the quantity of RNG purchased from the marketer (if applicable); quarterly affidavits (if available)</p> <p>Monthly invoices from local utility that owns & operates the utility meter at the CNG station showing the total amount of gas withdrawn and dispensed</p> <p>Supplemental report to identify the quantities of fuel dispensed to LDV/MDV and HDV, for the purpose of using correct EER (if applicable)</p>

UNIT CONVERSION FOR REPORTING RENEWABLE NATURAL GAS OR RENEWABLE HYDROGEN IN THE LRT-CBTS

In order to correctly match the environmental attributes, typically transacted in MMBtu, along the supply chain and the units reported in the LRT (gallons of LNG, therms of CNG, or kilograms of hydrogen), the following conversion factors must be used.

Legend:

blue text denotes verifiable metered or measured values
orange text denotes LCFS Regulation conversion factors
grey text denotes calculated results
bold text denotes reported values; not bold text is an intermediate calculation result

- 1) To convert RNG attributes in MMBtu to gallons of Bio-LNG, convert MMBtu from the higher heating value (HHV) basis to lower heating value (LHV) by multiplying by **930/1030 (CA-GREET3.0)**, divide the quantity by **78.83 MJ/gal (LCFS Regulation Table 4)** and multiply by **1055.06 MJ/MMBtu (section 95486(b))**:

Example:

RNG Attributes Procured in Q1	Quantity Eligible to Report as Bio-LNG in Q1	Total LNG Dispensed in Q1	Report Remainder under an Applicable Fossil LNG Pathway
70,000 MMBtu _{HHV} = 63,204 MMBtu _{LHV}	845,920 gal Bio-LNG = 63,204 MMBtu _{LHV}	1,000,000 gallons = 74,716 MMBtu _{LHV}	154,080 gal LNG = 11,512 MMBtu _{LHV}

- 2) To convert RNG attributes in MMBtu to therms of Bio-CNG, multiply by **10 therms/MMBtu (LCFS Regulation Table 4)**. Note that the LRT automatically converts therms from the HHV basis to MJ on the LHV basis, so no heating value adjustment is needed for reporting Bio-CNG and CNG.

Example:

RNG Attributes Procured in Q1	Quantity Eligible to Report as Bio-CNG in Q1	Total CNG Dispensed in Q1	Report Remainder under Lookup Table Fossil CNG Pathway
1,500 MMBtu _{HHV}	15,000 Therms = 1,500 MMBtu _{HHV}	20,000 Therms = 2,000 MMBtu _{HHV}	5,000 Therms = 500 MMBtu _{HHV}

- 3) Environmental attributes of RNG (in MMBtu) may be matched to natural gas withdrawn for use as a feedstock in hydrogen production using the conversions shown below.¹⁰ Hydrogen is reported in the LRT in kilograms (kg).

Under the Lookup Table Pathways for hydrogen,¹¹ a total of 1.371 MMBtu of NG is required to produce 1 MMBtu of hydrogen. One MMBtu of NG is considered to be used as feedstock, and the remaining 0.371 MMBtu of NG is used as process energy to generate steam. Attributes can only be matched to the feedstock portion of NG consumed. Thus, one MMBtu of biomethane is required per MMBtu of hydrogen in order to be reported as 100% renewable hydrogen. Applicants who use this pathway to report hydrogen use in transportation must provide evidence that equivalent quantities of pipeline-injected biomethane environmental attributes were procured and retired (1 to 1 on an energy basis, or 0.126 MMBtu (HHV) RNG per kg H₂).

To convert RNG attributes in MMBtu to kg of renewable hydrogen, divide by 0.126 MMBtu/kg. Report the remainder of hydrogen under an applicable fossil-derived hydrogen pathway.

Example:

RNG Attributes Procured in Q1	Quantity Eligible to Report as Renewable Hydrogen in Q1	Total H ₂ Dispensed in Q1	Report Remainder under Fossil H ₂ Pathway
1,500 MMBtu _{HHV}	11,905 kg H ₂ = 1,500 MMBtu _{HHV}	15,000 kg = 1,890 MMBtu _{HHV}	3,095 kg = 390 MMBtu _{HHV}

CONTACT

If you have questions regarding the above information, please visit the LCFS Contacts page at: <https://www.arb.ca.gov/fuels/lcfs/contact.htm>.

¹⁰ LCFS Regulation section 95488.8(i)(2) recognizes book-and-claim accounting for biomethane matched to the portion of NG that is used as feedstock in the production of hydrogen via steam methane reformation.

¹¹ See “CA-GREET3.0 Lookup Table Pathways Technical Support Document,” incorporated by reference in the Regulation, available at: <https://ww3.arb.ca.gov/fuels/lcfs/ca-greet/lut-doc.pdf> for further details.