

January 5, 2017

Sam Wade
Chief, Transportation Fuels Branch
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Comments of the CHBC on Changes to the LCFS Program

Dear Mr. Wade,

Below are suggested changes to the Low Carbon Fuels Program (LCFS) Program by the California Hydrogen Business Council (CHBC)¹ to increase the adoption of renewable and zero carbon fuels like hydrogen to meet California's climate and emission reduction goals.

1. The CHBC recommends adding four LCFS Pathways to the lookup table

The Lookup Table is a very important and easy to use tool to establish a credit pathway for project developers. While the scores for the lookup table may be more conservative than an individual project pathway application, they allow for initial payments at a time when projects developers experience low levels of cash and can encourage the development of LCFS-supportive projects by establishing an early payment.

The four pathways proposed to be added to the lookup table are:

1. Hydrogen production from anaerobic digestion/dairy digester projects
 - a. Liquid hydrogen production
 - b. Gaseous hydrogen production
2. Hydrogen production from wastewater treatment plants
 - a. Liquid hydrogen production
 - b. Gaseous hydrogen production
3. Hydrogen production via electrolysis of California Grid mix
 - a. Liquid hydrogen production
 - b. Gaseous hydrogen production
4. Hydrogen production via electrolysis of 100% renewable electricity from California grid with renewable attributes
 - a. Liquid hydrogen production
 - b. Gaseous hydrogen production

The CHBC sees additional opportunities to quantify the ability of project developers to generate LCFS credits from grid electricity. Those include:

1. Direct contracts with renewable electricity suppliers (with the retirement of renewable energy credits)
2. Green tariffs that utilities and CCA's offer (which already help eliminate overlap with renewable energy credit accounting in some cases)

2. The CHBC supports the establishment of add-on credits for super-system benefits

The CHBC would also support the development of a LCFS credit system that recognizes additional services provided to the grid, e.g. incentives the use of grid electricity at time of oversupply during the day via time-of-use or real-time pricing rates. Especially electrolyzers are highly dynamic systems that can take advantage of the massive increase in solar production during the day, helping to increase the share of zero-carbon hydrogen from this excess solar electricity.

3. Creation of Capacity Payments for Hydrogen Fueling Stations

The CHBC is supportive of the creation of a new "Hydrogen Infrastructure Pathway" to generate credits under the Low Carbon Fuel Standard (LCFS). We are proposing the ARB expand the LCFS credit program to accelerate hydrogen fuel availability by providing LCFS credits based on installed fuel dispensing capacity.

Research has shown that meeting California's goals for greenhouse gas and criteria pollutant emission reductions for 2030 and 2050 require acceleration and scaling up of very low-emission options in the transportation sector. Zero emission vehicles with very low-carbon fuels and an increasing rate of adoption are needed to achieve California air quality and emission reduction targets.

Specific to the LCFS, decreasing the average carbon intensity of fuels requires both supply of low-carbon fuels and demand through conditions that enable customers to switch to a low-carbon fuel. The availability and competitive pricing of very low-carbon fuels is needed for consumer adoption, and supporting fueling network coverage and cost reduction are therefore consistent with the LCFS policy intent to reduce the average carbon intensity of transportation fuels in California.

Specific to hydrogen fuel, the initial low utilization of new refueling infrastructure during early stages of the market limits the pace of development and availability of this fuel, and increases the cost relative to traditional transportation fuels, all of which inhibit customer adoption of fuel cell electric vehicles (FCEV) and switching to hydrogen fuel in furtherance of the LCFS policy intent.

Hydrogen refueling station capacity, coverage, and cost are among the factors limiting customer adoption of FCEVs, which are becoming available in larger numbers and range of models.

However, with modest scale in sustained development of hydrogen refueling infrastructure, it has been shown that the cost of hydrogen refueling stations can be reduced by 50% or more. A significant portion of cost reduction in hydrogen refueling stations serving light-duty vehicles can transfer to stations serving heavy-duty vehicles.

With successful demonstration activity enabled by effective grant support for hydrogen fuel, there is now an opportunity to pivot from demonstration toward commercialization, to accelerate and scale up hydrogen refueling infrastructure with increasing renewable content, for progress toward California's greenhouse gas and criteria pollutant emission reduction goals, to decrease cost toward fuel price parity for Californians, and to harmonize across policy support for zero emission vehicles.

This policy can enable a significant increase in the rate of station buildout, which supports the ability of automakers to deploy FCEVs into the market at higher volumes, as an important step towards commercialization.

We therefore propose for your consideration in this rulemaking the creation of a pathway for generating LCFS credits based on installed hydrogen station fuel dispensing capacity. Very simply, the number of credits generated through this "Hydrogen Infrastructure Pathway" would be equal to the potential for credit generation from the station capacity minus the credits generated through hydrogen fuel sales.

The Hydrogen Infrastructure Pathway accomplishes the following during the initial increase in FCEV sales:

- It partially offsets the initial low utilization of hydrogen refueling stations, thereby supporting refueling network development to increase the availability of this fuel and enable customer adoption
- It enables efficient development of hydrogen refueling stations at a sustained pace and scale to achieve significant cost reduction, for efficient use of public and private funds and for progress in reducing the cost of low-carbon fuels for Californians
- It enables the incentive structure already in place in the LCFS to reduce the carbon intensity of hydrogen through increasing renewable content, by generating credits for the station capacity based on the fuel pathway rather than just the fraction of capacity initially used
- It is self-balancing and sun-setting, with credit generation through the Hydrogen Infrastructure Pathway decreasing over time as hydrogen sales and station utilization increase

The Hydrogen Infrastructure Pathway as proposed addresses the following:

- A potential unintended consequence of gaps in the hydrogen refueling network coverage, especially for connector and destination stations with lower initial utilization, is partially mitigated by the structure of the Hydrogen Infrastructure Pathway generating more credits for under-utilized stations, and may be further addressed with targeted grant funding opportunities.
- Potential manipulation through false/stranded/poor quality/excessive capacity hydrogen refueling infrastructure is addressed through qualification requirements for stations to meet established and industry-recognized performance standards

This pathway would create a durable and scalable mechanism to partially offset low utilization during early commercialization of hydrogen fuel. Specific language is proposed below.

4. Explore Program Adjustments to Increase the Demand for Renewable Hydrogen.

Achieving California goals for GHG reduction will ultimately require the deployment of a fleet of millions of hydrogen powered vehicles spanning all classes and vocations. However, in the early growth of the market, the demand for renewable hydrogen will be modest. Additional demand can be generated by creating pathways and incentives to employ renewable hydrogen in applications like refining, natural gas blending and fertilizer production. Specific attention should be given to how the LCFS program can be adapted or extended to include these sources of potential demand for renewable hydrogen.

Thank you for your consideration.

Sincerely,



Emanuel Wagner

Assistant Director

California Hydrogen Business Council

§ 95488.2 Pathway Registration and Facility Registration is amended by adding at the end:

(c): Hydrogen Refueling Facility Registration. All hydrogen refueling stations applying to generate credits through the Hydrogen Infrastructure Pathway per section 95490.5 must be registered in the AFP. All of the following fields that apply are required:

- (1) Refueling station company name and full mailing address*
- (2) Company contact person's contact information*
 - a. Name*
 - b. Title or position*
 - c. Phone number*
 - d. Mobile phone number*
 - e. Email address*
 - f. Company web site URL*
- (3) Facility name (or names, if more than one facility is covered by the proposed pathways)*
- (4) Facility address (or addresses, if more than one facility is covered by the proposed pathways)*
- (5) Facility geographical coordinates (for each facility covered by the proposed pathways).
Coordinates can be reported using either the latitude and longitude or the Universal Transverse Mercator coordinate systems.*
- (6) Facility contact person's contact information*
 - a. Name*
 - b. Title or Position*
 - c. Phone number*
 - d. Mobile phone number*
 - e. Email address*
- (7) **Facility Nameplate Refueling Capacity** as defined in 95490.5 (b) (1) (A). This information is required for each facility covered by the proposed pathways.*

§ 95490.5 Provisions for Hydrogen Refueling Infrastructure.

(a) Eligibility. Fuel Reporting Entities for Hydrogen as defined in section 95483(f)(1) are eligible to receive Hydrogen Infrastructure Investment Credits for Hydrogen Refueling Facilities registered under Section 95488.2(c) serving light, medium, and/or heavy-duty vehicles that comply with applicable codes and standards as well as either the Standard Performance Requirements in the most recent Application Manual for Grant Funding Opportunity for Light Duty Vehicle Hydrogen Refueling Infrastructure under the Alternative Renewable Fuel and Vehicle Technology Program from the California Energy Commission or similar adopted by the Air Resources Board if more recent or applied to Hydrogen Refueling Facilities serving medium or heavy-duty vehicles.

(b) General Requirements.

(1) *Credit Calculation.* The number of Hydrogen Infrastructure Investment Credits generated shall be equal to the (Facility Nameplate Refueling Capacity – Quantity of Hydrogen Sold) x (Credits per unit Hydrogen according to the Fuel Pathway Carbon Intensity Value certified for that Hydrogen Refueling Facility).

(A) Facility Nameplate Refueling Capacity in kilograms hydrogen per 24-hour day shall be the 24-hour fueling capacity as registered under Section 95488.2(c) and defined in applicable codes and standards or either the Standard Performance Requirements in the most recent Application Manual for Grant Funding Opportunity for Light Duty Vehicle Hydrogen Refueling Infrastructure under the Alternative Renewable Fuel and Vehicle

Technology Program from the California Energy Commission or similar adopted by the Air Resources Board if more recent or applied to Hydrogen Refueling Facilities serving medium or heavy-duty vehicles.

(B) The Fuel Pathway Carbon Intensity Value for use in the Hydrogen Infrastructure Pathway for each Hydrogen Refueling Facility registered under section 95488.2(c) shall be the same as the Fuel Pathway Carbon Intensity Value Certified for the/by the applicant for that Hydrogen Refueling Facility under sections 95488.1 (Fuel Pathway Classification), 95488.2 (Pathway Registration and Facility Registration), 95488.3 (Calculation of Fuel Pathway Carbon Intensities), 95488.4 (Lookup Table Fuel Pathway Application Requirements and Certification Process), 95488.5 (Tier 1 Fuel Pathway Application Requirements and Certification Process), 95488.6 (Tier 2 Fuel Pathway Application Requirements and Certification Process), 95488.7 (Fuel Pathway Application Requirements Applying to All Classifications), 95488.8 (Special Circumstances for Fuel Pathway Applications), and Maintained under section 95488.9.

(2) *Duration.* A party may generate credits through the Hydrogen Infrastructure Pathway for each registered Hydrogen Refueling Facility for 15 years from the date of application approval. The Hydrogen Infrastructure Pathway provision will remain in effect for at least 10 years; any change to policy shall not be retroactive.

(A) If a party increases the Facility Nameplate Refueling Capacity for a registered Hydrogen Refueling Facility during the period it is generating credits through the Hydrogen Infrastructure Pathway, the party may update the registered Facility Nameplate Refueling Capacity under 95488.2(c) and, upon approval, the credit calculation under 95490.5(b)(1) will use the new Facility Nameplate Refueling Capacity.

(B) A party may generate credits through the Hydrogen Infrastructure Pathway for the incremental Facility Nameplate Refueling Capacity under 95490.5 (b)(2)(A) for 15 years from the date of registration approval under 95488.2(c).

(c) Applications. An application must contain the following materials:

(1) The facility nameplate capacity as defined in Section 95490.5(b)(1)(A).

(2) The fuel pathway carbon intensity value as defined in Section 95490.5(b)(1)(B).

(3) A signed transmittal letter from the applicant attesting to the veracity of the information in the application packet. The transmittal letter shall be the original copy, be on company letterhead, be signed by an officer of the applicant with authority to attest to the veracity of the information in the application and to sign on behalf of the applicant.

(4) All documents (including spreadsheets and other items not in a standard document format) that are claimed to contain confidential business information (CBI) must prominently display the phrase "Contains Confidential Business Information" above the main document title and in a running header. Additionally, a separate, redacted version of such documents must also be submitted. The redacted versions must be approved by the applicant for posting to a public LCFS web site. Specific redactions must be replaced with the phrase "Confidential business information has been deleted by the applicant." This phrase must be displayed clearly wherever CBI has been redacted. If the applicant claims that information it submits is confidential, it must also provide contact information required in California Code of Regulations, title 17, section 91011.

(5) An applicant that submits any information or documentation in support of a proposed hydrogen infrastructure project must include a written statement clearly showing that the applicant understands and agrees that all information in the application not identified as confidential business information is subject to public disclosure pursuant to California Code of

Regulations, title 17, sections 91000 through 91022 and the California Public Records Act (Government Code, §§. 6250 et seq.), and that information claimed by the applicant to be confidential might later be disclosed under section 91022 if the state board determines the information is subject to disclosure.

(6) An application, supporting documents, and all other relevant data or calculation or other documentation, except for the transmittal letter described in section 95490(a)(3)(D), shall be submitted electronically, such as via e-mail or an online-based interface, unless the Executive Officer has approved or requested another format.

(d) Application Approval Process. An application must be approved by the Executive Officer before the hydrogen infrastructure project can generate credits under the LCFS regulation.

(1) After receipt of an application designated by the applicant as ready for formal evaluation, the Executive Officer shall advise the applicant in writing either that:

1. The application is complete, or
2. The application is incomplete, in which case the Executive Officer will identify which requirements have not been met. The applicant may submit additional information to correct deficiencies identified by the Executive Officer.

(2) After accepting an application as complete, the Executive Officer will post the application at <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>. Public comments will be accepted for 10 calendar days following the date on which the application was posted. Only comments related to potential factual or methodological errors may be considered. The Executive Officer will forward to the applicant all comments identifying potential factual or methodological errors. Within 30 business days, the applicant shall either submit revisions to its application to the Executive Officer, or submit a detailed written response to the Executive Officer explaining why no revisions are necessary.

(3) If the Executive Officer finds that an application meets the requirements set forth in section 95490.5 the Executive Officer will take final action to approve the hydrogen infrastructure project. The Executive Officer may prescribe conditions of approval that contain special limitations, recordkeeping and reporting requirements, and operational conditions that the Executive Officer determines should apply to the project. If the Executive Officer finds that an application does not meet the requirements of section 95490.5, the application will not be approved, and the applicant will be notified in writing, and the basis for the disapproval shall be identified.

(e) Reporting Actual Quantity of Hydrogen Sold. Each hydrogen refueling infrastructure project must submit to the Executive Officer the annual actual quantity of hydrogen sold every year.

(f) Recordkeeping. Each applicant that receives approval as a hydrogen infrastructure project must maintain records for the project. For such a project, the applicant must maintain records for at least five years. At a minimum, the following records must be kept:

- (1) The quarterly volume of hydrogen fuel actually sold.
- (2) The carbon intensity of the hydrogen fuel actually sold.
- (3) Any additional records that the Executive Officer requires to be kept in pursuant to section 95490.5, and records that demonstrate compliance with all special limitations and operating conditions specified pursuant to section 95490.5.

ⁱ The views expressed in these comments are those of the CHBC, and do not necessarily reflect the views of all of the individual CHBC member companies. Members of the CHBC include Advanced Emission Control Solutions, Air Liquide Advanced Technologies U.S. LLC., Airthium, Alameda-Contra Costa Transit District (AC Transit), American Honda Motor Company, Anaerobe Systems, Arriba Energy, Ballard Power Systems, Inc., Bay Area Air Quality Management District, Beijing SinoHytec, Black & Veatch, BMW of North America LLC, Boutin Jones, Cambridge LCF Group, Center for Transportation and the Environment (CTE), CNG Cylinders International, Community Environmental Services, CP Industries, Dash2energy, Eco Energy International, LLC, Eldorado National – California, Energy Independence Now (EIN), EPC - Engineering, Procurement & Construction, Ergostech Renewal Energy Solution, EWII Fuel Cells LLC, First Element Fuel Inc, FuelCell Energy, Inc., GenCell, General Motors, Geoffrey Budd G&SB Consulting Ltd, Giner ELX, Gladstein, Neandross & Associates, Greenlight Innovation, GTA, H2B2, H2Safe, LLC, H2SG Energy Pte Ltd, H2Tech Systems, Hitachi Zosen Inova ETOGAS GmbH, HODPros, Horizon Fuel Cells Americas, Inc., Hydrogenics, Hydrogenious Technologies, Hydrogen Law, HydrogenXT, HyET - Hydrogen Efficiency Technologies, Hyundai Motor Company, ITM Power Inc, Ivys Inc., Johnson Matthey Fuel Cells, Kontak, LLC, KORE Infrastructure, LLC, Life Cycle Associates, Linde North America Inc, Longitude 122 West, Inc., Loop Energy, Luxfer/GTM Technologies, LLC, McPhy Energy, Montreux Energy, MPL Consulting, Inc., National Renewable Energy Laboratory (NREL), Natural Gas Fueling Solutions – NGFS, Natural Hydrogen Energy Ltd., Nel Hydrogen, New Flyer of America Inc, Next Hydrogen, Noyes Law Corporation, Nuvera Fuel Cells, Pacific Gas and Electric Company - PG&E, PDC Machines, Planet Hydrogen Inc, Plug Power, Port of Long Beach, PowerHouse Energy, Powertech Labs, Inc., Primidea Building Solutions, Proton OnSite, RG Associates, Rio Hondo College, Rix Industries, Sacramento Municipal Utility District (SMUD), SAFCell Inc, Schatz Energy Research Center (SERC), Sheldon Research and Consulting, Solar Wind Storage LLC, South Coast Air Quality Management District, Southern California Gas Company, Sumitomo Corporation of Americas, Sunline Transit Agency, T2M Global, Tatsuno North America Inc., The Leighty Foundation, TLM Petro Labor Force, Toyota Motor Sales, United Hydrogen Group Inc, US Hybrid, Verde LLC, Volute, Inc., WireTough Cylinders, LLC, Zero Carbon Energy Solutions.