Aug 16, 2018

California Air Resources Board
1001 "I" Street, Sacramento, CA 95812
ATTN: Sam Wade

RE: Air Liquide Comments regarding the Proposed Low Carbon Fuel Standard Program

Dear Mr. Wade and CARB Staff:

On behalf of Air Liquide, thank you for the opportunity to submit our comments regarding the proposed changes to the Low Carbon Fuel Standard Program. We are strong supporters of the ***Hydrogen Refueling Infrastructure*** (HRI) Pathway as proposed by the California Air Resources Board (CARB).

In order to make the program as effective as possible and in order to insure that the goals of the State of California with respect to implementation of zero emission vehicles and supporting infrastructure are met, we have the following recommendations:

Hydrogen Station Capacity Evaluation Tool

We agree that an accurate, robust model is needed so that CARB can evaluate station grant proposals and determine station capacity, and that the proposed HyC model can meet these needs.

Recognizing the urgency to provide feedback to CEC and CARB regarding the tool's performance, we have installed and used the tool to model performance of our Anaheim station and provide the following feedback regarding its effectiveness:

1. We believe the tool is sufficiently robust, providing a systematic, predictable and transparent method that scores proposed equipment relative to an ideal case. **As such, HyC should be suitable to meet the anticipated needs of CARB and industry**.

2. During our testing of the tool from 7/24/2018 to 8/14/2018, we identified several areas of improvement related to parameter inputs, operational limits, and inconsistencies. These findings were detailed in a previous communication with CEC and **we believe that all of our concerns have been addressed in the most recent version of the tool**.

3. While we have not had sufficient time to perform a comprehensive evaluation of the tool with all of our designs, we are confident that the tool is ready for implementation. **We encourage CARB to establish a regular review process by which updates to the model can be evaluated and considered for future implementation.**

Renewable Power Usage in Production, Distribution, and Dispensing:

Electrical power is an important input in all aspects of hydrogen production, compression, liquefaction, distribution, and dispensing. Electricity is the primary input when hydrogen is produced by electrolysis from water, but electrical power is also a significant source of energy for compression, liquefaction, pumping, and refrigeration of hydrogen produced by any method. Therefore, it is important that the LCFS regulations recognize renewable electricity as such whenever it is used in a hydrogen pathway. For example, in proposed Sections 95481, 95486, and 95488, the credits available for improvements in the CI of electricity used for the production of hydrogen by electrolysis should also be available for improvements in the CI of electricity used for compression, liquefaction, distribution or dispensing. Further, the *Time-of-Use* pathway definition (rather than *Smart Electrolysis* definition) should be restored to include electrical power used in all hydrogen production pathways. Lastly, we need to insure that Book-and-Claim Accounting can be used for all aspects of hydrogen production. We therefore propose the following revisions to the sections below:

Section 95481(a)(124) "Renewable Hydrogen" means hydrogen derived from (1) electrolysis of water or aqueous solutions using renewable electricity; (2) catalytic cracking or steam methane reforming of biomethane; or (3) thermochemical conversion of biomass, including the organic portion of municipal solid waste (MSW). Renewable electricity, for the purpose of renewable hydrogen production by electrolysis ***or for hydrogen compression, liquefaction, distribution or dispensing,*** means electricity derived from sources that qualify as eligible renewable energy resources as defined in California Public Utilities Code sections 399.11-399.36.

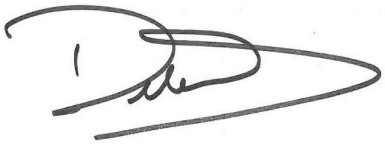
Section 954861(f)(2): ***Time-of-Use Pathways*** for Hydrogen Production. An entity can generate credits, in addition to credits generated pursuant to subsection (1), above, for improvements in the CI of electricity used for electrolysis***, or for hydrogen compression, liquefaction, distribution or dispensing,*** to produce hydrogen due to time of use ***time of use*** pursuant to section 95488.5 and the credit calculation in section 95486.1(c)(2)(B).

Section 95488.8(i)(1): *Book-and-Claim Accounting for Renewable or Low-CI Electricity Supplied as a Transportation Fuel or Used to Produce Hydrogen.* Reporting entities may use indirect accounting mechanisms for renewable electricity to reduce the CI of low-CI electricity supplied as a transportation fuel or for hydrogen production through electrolysis***, and for hydrogen compression, liquefaction, distribution or dispensing***, for transportation purposes (including hydrogen that is used in the production of a transportation fuel), provided the conditions set forth below are met:

Similar changes would follow in Section 95488.1, Section 95488.5, Section 95488.10(a)(4) and Section 95491. Without these changes, a hydrogen producer has very limited incentive to improve renewable content within a given pathway and the targeted CI reductions will likely become irrelevant.

Again, thank you for the opportunity to provide input to this critically important program. If you have any questions or comments, please contact me at any time.

Sincerely,



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