From:	Keiser, Jens
To:	ARB Clerk of the Board
Cc:	Wade, Samuel@ARB
Subject:	Hitachi Zosen Inova Comments on Proposed LCFS Regulation
Date:	Wednesday, August 29, 2018 1:23:51 PM
Attachments:	HZI LCFS comment letter 8-28-2018.pdf

Dear CARB Team,

Hitachi Zosen Inova (HZI) appreciates the opportunity to provide feedback for the California Air Resources Board's (CARB) Modified Text for the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation, released on August 13, 2018.

Please find attached our comments.

Best Regards,

Hitachi Zosen Inova ETOGAS GmbH
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Waste is our Energy. Engineering is our Business. Sustainable Solutions are our Mission.

Hitachi Zosen INOVA

August 28, 2018

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California Air Resources Board
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RE: Hitachi Zosen Inova, Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation

Hitachi Zosen Inova (HZI) appreciates the opportunity to provide feedback for the California Air Resources Board's (CARB) Modified Text for the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation, released on August 13, 2018.

HZI strongly supports California's greenhouse gas (GHG) emission reduction goals and believes that a well-designed LCFS program that incentivizes clean and low-carbon fuels will play a key role in achieving California's GHG emission reduction targets and many co-benefit goals including reductions in oxides of nitrogen (NOx) and particulate matter (PM).

HZI, headquartered in Zurich, is a global leader in energy from waste and other renewable resources. HZI delivers complete turnkey plants and system solutions for energy recovery from waste and other renewable resources. HZI has 10 subsidiaries and more than 500 reference projects worldwide. The subsidiaries that are most relevant to the LCFS programs are: Hitachi Zosen Inova U.S.A. LLC (HZI USA), based in the US; and Hitachi Zosen Inova ETOGAS GmbH (HZI ETOGAS), based in Germany.

HZI USA meets the specific needs of the north and central American markets, and covers a wide range of industry areas including: energy from waste, anaerobic digestion (AD), biomethane upgrade, waste water treatment, hazardous waste management, and some functions related to power-to-gas.

HZI ETOGAS develops and builds turnkey power-to-gas plants based on in-house proprietary technologies. Product segments are power-to-hydrogen, power-to-methane, and hydrogen-to-methane. In 2013 HZI ETOGAS built the largest power-to-methane plant (6.3 MW) for Audi in Germany, which is currently in operation. With our in-house electrolyser and methanation reformer technologies, HZI ETOGAS is uniquely positioned to offer a range of renewable and low carbon solutions to enable zero and near-zero emission vehicles and industrial processes.

While we applaud most of the proposed amendments to the LCFS Regulation, we see a lack of recognition for synthetic methane produced from renewable or low carbon electricity. This is an important gap that would prevent this important technology from entering

California market and contributing to California's GHG emission reduction and co-benefits targets.

With commercially available compressed natural gas (CNG) engines methane can be 90% cleaner in terms of NOx emissions than diesel when combusted, while offering the benefit of near zero PM emissions. Renewable power-to-methane for CNG vehicles further offers the benefit of deep GHG emission reduction. The methanation process is exothermic; no external heat or electricity is required for the process, and the limited efficiency loss should not be used as a reason to discourage this important technology. This is especially true, if the hydrogen reactant is produced with renewable or low carbon electricity.

HZI is committed to supplying low carbon hydrogen wherever there is demand. However, when hydrogen demand is not there, we see the immediate GHG and criteria pollutants reduction co-benefits that renewable power-to-methane technology can bring to California and the society, including:

- Renewable penetration in transportation and other hard to electrify sectors, renewable and locally produced transportation fuel, recycling of CO_2, long term energy storage, and clean fuel jobs in local communities.
- The proposed LCFS amendments showed recognition for methane produced from biomass, which HZI strongly supports. However, biomass resources are limited in amount, scale, and location, and probably would be put in best use if used for jet fuels where no viable alternatives are currently available. Methane produced with renewable electricity and anthropogenic CO_2 offers the needed scale, economic and environmental viability in the near term to address the GHG, NOx, and PM issues in heavy duty transportation, and other hard-to-electrify industrial applications.

For the reasons mentioned above, HZI respectively made the following comments on the proposed LCFS regulation:

1. Renewable natural gas is not clearly defined in the proposed LCFS regulation. The "Biomethane" definition in the regulation does not capture the full range of renewable synthetic natural gas. For example, synthetic natural gas produced from renewable power (via electrolytic H_2) and CO_2 directly captured from air would not fit well within the "biomethane" definition. A more comprehensive definition is needed for renewable natural gas.

2. There is a need to make it explicit that synthetic methane produced from renewable or low carbon electricity and anthropogenic CO_2 is eligible as an opt-in fuel for credit generation under LCFS program, the same treatment as that of bio methane.

3. There is a need to make it explicit that the renewable electricity does not have to be directly supplied for power-to-methane production, and that indirect or book-and-claim accounting is applicable for synthetic methane produced from renewable electricity and anthropogenic CO_2 that is used as a transportation fuel, the same treatment as that of bio methane and hydrogen.

4. There is a need to explicitly make "smart electrolysis carbon intensity (CI) calculation" for hydrogen production an optional "CI calculation step" for the synthetic methane derivative of hydrogen produced from renewable or low carbon electricity.

5. This comment may not be achievable during this rulemaking, but HZI would like to urge staff to explore provisions for establishing a floor price for LCFS credit value, such that industry stakeholders can have the confidence necessary to invest in renewable fuels in California.

HZI understands that CARB staff is working on a tight schedule for the current LCFS rulemaking, so the team at HZI drafted a list of suggested regulation text changes to assist CARB staff in considering and incorporating these changes to the proposed LCFS regulation expeditiously. HZI respectively suggests the following regulation text changes (suggested changes are in bold font):

1. In section "95481. Definitions and Acronyms," add definition "**(125) "Renewable natural gas" means natural gas or methane that is produced from non-petroleum renewable resources including biomethane and synthetic natural gas derived from renewable electrolytic hydrogen and renewable CO_2, and meets standards for injection to a natural gas common carrier pipeline, or for use in natural gas vehicles or natural gas equipment.**"

2. In subsection "§95482. Fuels Subject to Regulation. (b) Opt-In Fuels," add provision **"**§95482.(b)**(7) Synthetic methane produced from renewable or low carbon electricity and anthropogenic CO_2."**

3. In subsection "§95483. Fuel Reporting Entities. (b) For Gaseous Fuels. (1) Designation of First Fuel Reporting Entities For Gaseous Fuels," add provision "§95483.(b)(1)**(F) Synthetic methane produced from renewable or low carbon electricity and anthropogenic CO_2. For synthetic methane produced from renewable or low carbon electricity and anthropogenic CO_2, including its portion of a blend with fossil CNG, the first fuel reporting entity is the producer or importer of the synthetic methane.**"

4. In subsection "§95486.1.(f)(2) *Smart Electrolysis Pathways for Hydrogen Production.* An entity can ****** using average grid electricity, for Hydrogen using smart electrolysis pursuant to section 95488.5 ******," add a few words to the regulation text as follows: "§95486.1.(f)(2) *Smart Electrolysis Pathways for Hydrogen Production.* An entity can ****** using average grid electricity, for Hydrogen **(including Hydrogen that is used in the production of its methane derivative)** using smart electrolysis pursuant to section 95488.5 ******."

5. In subsection "§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 ****** (including hydrogen that is used in the production of a transportation fuel)," add a few words to the regulation text as follows: "§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 ****** (including hydrogen that is used in the production of a transportation fuel **such as its methane derivative**)."

HZI supports the LCFS as a program that helps meet California's deep GHG emission reduction targets while spurring investment in clean, low carbon transportation fuels.

We look forward to working with CARB staff to further refine the LCFS regulation. Please feel free to contact us at: Jens Keiser, Director Business Development & Strategy for Power-to-Gas, E-Mail: jens.keiser@hz-inova.com, for any clarification, questions, or concerns.

Respectfully,

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