444 Castro Street, Suite 710
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January 7, 2022

Dr. Cheryl Laskowski
California Air Resources Board
1001 I Street
Sacramento, CA 95812

RE: Low Carbon Fuel Standard Public Workshop: Potential Future Changes to the LCFS Program

Dear Dr. Laskowski,

H Cycle, LLC ("H Cycle") appreciates your time in hosting the public workshop on Potential Future Changes to the Low Carbon Fuel Standard ("LCFS") Program on December 7, 2021, as well as the opportunity to provide comments regarding these changes. Below you will find our reactions and recommendations to Program changes recently proposed by the California Air Resources Board ("CARB"), as well as key topics identified here by H Cycle. We believe the below considerations will benefit the overall market for both the LCFS Program and California's emerging low-carbon hydrogen sector.

About H Cycle

H Cycle is a developer of low-cost, low-carbon hydrogen production facilities that deploy a proven waste-to-hydrogen thermal conversion technology. Our solution is capable of utilizing a diverse composition of waste feedstocks (municipal, agricultural, forest) to produce valuable gas product, allowing us to displace methane emissions from landfill disposal and support California's waste diversion targets under Senate Bill 1383. The non-combustion waste-to-gas conversion process delivers low-carbon hydrogen that can be used as an emerging energy source for decarbonizing hard-to-abate sectors such as refining and heavy-duty trucking, as well as existing fossil-fueled power plants and other industrial applications like cement production. H Cycle is backed by Azimuth Capital Management, and counts Omni Conversion Technologies and the Larsen and Lam Climate Initiative amongst its key partners. We are excited to work with CARB to deploy our solution and support the State in meeting its climate, sustainability and air quality goals.

Comments Summary

The list of LCFS Program changes that H Cycle finds relevant to its business are listed below. We hope that CARB will consider all these issues as it moves forward with the LCFS rulemaking, and in potential future workshops before then.

1. Allowance of book-and-claim accounting for low-carbon intensity ("CI") electricity for hydrogen production through non-electrolysis technologies
2. Establishment of declining CI compliance targets post-2030; strengthening pre-2030 compliance targets

3. Development of a new Tier 1 CI calculator for hydrogen pathways
4. Preferential allocation of low-CI hydrogen to specific fuel pathways used for reporting
5. Allowance for hydrogen production facilities not co-located with refineries to generate LCFS credits under the Refinery Investment Provision
6. Allowance of book-and-claim accounting of new or expanded low-CI hydrogen injected into hydrogen pipelines

Chief among H Cycle's recommendations is to allow book-and-claim accounting for low-carbon electricity used for hydrogen production through non-electrolysis technologies. We believe that only allowing electrolysis to enjoy the benefits of indirect accounting, as is currently stipulated under Section 95488.8(i)(1) of the LCFS Regulation, for low-carbon electricity is unfair to other low-carbon hydrogen production technologies and limits the growth of the emerging hydrogen sector in California. More details on this matter are provided below.

Comments Detail and Background

Allowance of book-and-claim accounting for low-CI electricity for hydrogen production through non-electrolysis technologies

H Cycle strongly recommends that the LCFS Program allow the book-and-claim accounting for the low-carbon electricity required for low-CI hydrogen production through methods beyond electrolysis, particularly methods involving recognized conversion pathways for biogenic feedstocks. Under existing regulations for hydrogen as a transportation fuel, indirect accounting (i.e. renewable energy power purchase agreements, renewable energy certificates purchases) for low-carbon electricity is only allowed for the production of hydrogen through electrolysis. In scenarios where such indirect accounting is not allowed, the environmental attributes of low-carbon electricity can only be captured by a non-electrolysis hydrogen facility if there is a direct connection from the generation source to the facility (i.e., behind-the-meter). H Cycle believes this is an unnecessary and unfair restriction, considering there are many low-carbon hydrogen production solutions that do not involve electrolysis and can benefit from low-carbon electricity supply.

This includes pathways for biogenic feedstocks that can achieve similar or better (i.e., negative carbon) emissions outcomes than electrolysis; and that simultaneously advance State goals around short-lived climate pollutant reductions, waste and forest management, avoided agricultural burning and other priorities. For these pathways, just like for electrolysis, there are many considerations that will affect where to site a hydrogen production facility, which would warrant separating the hydrogen production facility from a renewable electricity generation site. Hydrogen production may require closer proximity to biogenic feedstocks and/or hydrogen offtakers, rather than a source of renewable electricity, in order to minimize costs, transportation emissions and other potential impacts.

H Cycle's solution is a low-carbon hydrogen technology that utilizes biogenic materials (which the EPA & IPCC define as part of the circular carbon cycle) and displaces emissions from landfill waste disposal. We believe it should be considered a low-CI solution in the same light as electrolysis in the eyes of the Program – both can achieve greater levels of decarbonization through low-carbon electricity procurement. Furthermore, lifting the existing book-and-claim restriction will help grow not only the clean hydrogen industry but also the suppliers of zero-carbon power. As the levelized cost of renewable technologies such

as wind and solar continues to fall, the LCFS Program should not limit the benefits of sourcing renewable electricity to any one specific hydrogen production technology.

Establishment of declining CI compliance targets post-2030; strengthening pre-2030 compliance targets

H Cycle supports the further lowering of CI compliance targets beyond the year 2030, as well as the strengthening of the existing pre-2030 compliance targets. Strengthening pre-2030 targets keeps the LCFS credit market robust as more low-carbon transportation solutions are deployed in the near term, and incentivizes obligated parties to continue the progress they have made in decarbonizing their operations. Stronger targets post-2030 provide the investment community with assurance of a valuable long-term LFCS market and unlock long-term financing solutions for the developers of low-carbon technologies. Lastly, H Cycle recommends that the Program expand the definition of obligated parties to intrastate aviation and maritime applications, in order to further bolster the LCFS market, incentivize innovation and drive investment in California's clean transportation sector.

Development of a new Tier 1 CI calculator for hydrogen pathways

H Cycle is supportive of the development of a new Tier 1 CI calculator for hydrogen pathways. We have observed that throughout the LCFS Program, the list of recognized hydrogen pathways is limited to those for steam methane reforming ("SMR") and electrolysis technologies. H Cycle's technology is a conversion solution for biogenic materials that produces low-carbon hydrogen without being in the SMR or electrolysis categories, which complicates our process for obtaining an LCFS pathway designation. In general, H Cycle looks forward to the development of processes that expedite the pathway approval and implementation of biogenic feedstock conversion and other low-CI hydrogen solutions.

Preferential allocation of low-CI hydrogen to specific fuel pathways used for reporting

H Cycle requests clarification on the details of CARB's intent and the nature of this proposed change to the LCFS Program. H Cycle's understanding is that such a modification to the existing Program regulations would allow 100% of the environmental attributes of low-carbon hydrogen supply to accrue to an LCFS-obligated facility that delivers fuel to both California and other markets. As an example, today if a fuel facility utilized low-CI hydrogen inputs, and it delivered 10% of its fuel product to California and 90% to non-California markets, then the facility would only accrue 10% of the low-carbon attributes associated with that hydrogen input. H Cycle's interpretation is that the proposed change would allow for 100% accrual of the low-carbon attributes to the portion of fuel sold into California in this example. Under such an interpretation, H Cycle would be supportive of this change to the Program. However, H Cycle would not support preferential allocation if it were to allow a corporation to apply this concept to multiple fuel facilities across different geographies – preferential allocation should apply only at the facility level. We would appreciate if CARB could clarify its intent with this provision.

Allowance for hydrogen production facilities not co-located with refineries to generate LCFS credits under the Refinery Investment Provision

H Cycle supports the Program's proposed update to allow off-site hydrogen production facilities to generate LCFS credits under the Refinery Investment Credit Program. We have observed a lack of available real estate onsite or adjacent to many of the existing refineries in California that could be used for the

development of new hydrogen production facilities, particularly new facilities with low-CI processes. Additionally, in some circumstances, locating hydrogen production closer to feedstocks can reduce costs. Allowing for the generation of credits by refineries that invest in hydrogen provided by off-site facilities is essential for clean hydrogen to supply a refining industry in need of immediate low-carbon feedstock solutions.

Allowance of book-and-claim accounting of new or expanded low-CI hydrogen injected into hydrogen pipelines

H Cycle is supportive of allowing book-and-claim accounting of low-CI hydrogen injected into hydrogen pipelines, so long as either a) such pipelines are connected to customers in California, or b) the proportion of end-use fuel produced by such hydrogen is physically delivered to California. We foresee hydrogen pipelines as important to the proliferation of low-carbon hydrogen supply, particularly given the difficulty in developing low-CI hydrogen production facilities directly onsite with refineries or pumping stations, as well as the comparatively expensive cost and energy-intensive nature of transporting hydrogen via trucks.

Conclusion

H Cycle thanks the California Air Resources Board for its consideration of our input regarding potential upcoming changes to the LCFS Program. Please do not hesitate to contact us if any further input or clarification would be helpful. We look forward to continuing to support the Program and providing input towards this process.

Sincerely,

Scott Gardner
Chief Commercial Officer