

February 20, 2024

Ms. Liane Randolph, Chairman
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Low Carbon Fuel Standard (LCFS) Comments

Dear Chair Randolph,

FirstElement Fuel (FEF) is pleased to provide these comments on the proposed changes to the LCFS program detailed in the Staff Report: Initial Statement of Reasons (December 19, 2023)¹. FEF, as you may know, is the largest retail hydrogen refueling station (HRS) provider in California, due to the state's aggressive greenhouse gas emissions policies married to appropriate market incentives embodied in the Low Carbon Fuel Standard (LCFS) regulatory framework. We provide these comments not only as a market participant but also as an enabler of California's hydrogen transportation ambitions and as a business dependent on its success.

First and foremost, we commend you and your staff for the thoughtful proposal, which reflects a balance between strict regulatory goals and economic reasonableness. Due to the large scope of changes, however, some areas regarding hydrogen deserve further refinement to enable greater implementation. These areas are discussed below.

Increased Stringency and Step Down

We agree with staff's recommendation of the 30% reduction in carbon intensity (CI) by 2030 and a 90% reduction in CI by 2040. However, we are concerned that the historically low credit prices² will continue through 2025, so urge bringing the one-time 5% CI step down forward sooner (e.g., at rule adoption through OAL) as well as the auto acceleration mechanism (AAM). The delay in hearing the rule and any further delays in implementation will further stifle any private investments in cleaner transportation fuels, especially HRS. We request the Board implement the 5% step down and AAM sooner than the proposed date of 2025.

Light-Duty (LD) Hydrogen Refueling Infrastructure (HRI) Pathway

The existing LD HRI program has been working as intended, with HRS development solving the chicken-or-egg dilemma of vehicle adoption or fuel availability coming first. The HRI program was meeting or exceeding all of its goals laid out by the CARB Board and LCFS Staff through 2021 while there was a healthy balance of LCFS credit deficits in the marketplace that in turn buoyed LCFS credit prices. The *Program Goals*, and concomitant positive results, are summarized below.

¹ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

² https://r.search.yahoo.com/_ylt=AwrqzbOD88tlcAQAI.ZXNy0A;_ylu=Y29sbwNncTEEEcG9zAzlEdnRpZAMEc2VjA3Ny/RV=2/RE=1709074564/RO=10/RU=https%3a%2f%2fww2.arb.ca.gov%2fresources%2fdocuments%2fmonthly-lcfs-credit-transfer-activity-reports/RK=2/RS=yu36..JOANG2sS86H065qyHr788-

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- 1. Accelerate the development of hydrogen refueling infrastructure capacity.*
The installed capacity of HRS in California more than doubled between 2019, when the HRI program was initially implemented and mid-2022 when LCFS credit prices dramatically fell.
- 2. Unlock private investment as a greater share of hydrogen refueling station capital expenditures.*
The share of public funding for HRS fell from an average of ~70% of project capex plus Operation & Maintenance support to ~30% of project capex and an elimination of Operation & Maintenance support.
- 3. Enable hydrogen station operators to retail hydrogen at a price more indicative of a full-fledged market.*
The average retail price of hydrogen fell to an all-time low in the months following the implementation of HRI, with FEF retailing hydrogen at \$12/kg + tax, nearly price-parity with gasoline.
- 4. Encourage the development of commercial-scale hydrogen stations with higher capacity, capable of supporting growth in the marketplace, including more vehicle classes (such as Medium-Duty hydrogen vehicles).*
As a result of the hydrogen station development spurred by the HRI program, California leads the world in higher-performing, higher-capacity hydrogen stations. Furthermore, setting the capacity cap at 1,200 kg/d in the LD HRI program has led to the development of stations that are robust enough to serve medium-duty (MD) fuel cell electric vehicles (FCEVs), such as large pickup trucks or delivery vans, thus enabling another vehicle segment.
- 5. Encourage good performance of hydrogen refueling stations in the marketplace.*
The “uptime” requirement in the HRI program has incentivized FEF to make significant investments in R&D and engineering to improve equipment performance and uptime, which has also led to the creation of jobs and workforce training.
- 6. Reduce the CI and increase the renewable content of hydrogen sold into the mobility sector.*
As a result of the LD HRI program, FEF increased the renewable content of our hydrogen on average from 33% to over 70% and reduced our CI to zero. CARB data suggests that other hydrogen station operators followed similar trends during the first several years of the LD HRI program.

The single factor that has caused the LD HRI program to fall short of its goals in recent months is the imbalance of LCFS credits in the marketplace which has depressed LCFS credit prices. Depressed LCFS credit prices have resulted in a near standstill of LD HRS development, a dramatic increase in retail hydrogen prices throughout the state, and a reduction in performance by several hydrogen refueling station operators (while FEF continues to make strides in improving hydrogen station performance, nearly every other hydrogen station operator in California has seen a reduction in performance).

Several historical outcomes of the LD HRI program performance and participation suggest that the program *as originally designed* is well-balanced and was extremely successful at achieving its targeted goals if there was a healthy balance of LCFS credits-to-deficits in the marketplace.

For example:

- There was never a “gold rush” to develop HRS, suggesting that the incentive was appropriate and not overly generous;
- The program was effective in hitting all 6 of its goals very shortly after implementation (this can be tracked with data), suggesting that the program was effectively designed; and
- When LCFS credit prices fell dramatically in 2022, the program stopped incentivizing the development of HRS and the retail price of hydrogen rose, again suggesting that the incentive was appropriate and not overly generous.

So, we agree with the staff recommendation to extend the LD HRI program but urge elimination of the new constraints imposed on the program, namely the more restrictive 10-year crediting period, the 600 kg/d capacity cap, and crediting only if within low-income, rural and disadvantaged communities (DACs). The specific justifications for each are summarized below:

- Limiting LD HRI crediting to 10 years creates risk and uncertainty for the continued operation of LD/MD HRS and hydrogen fuel availability beyond 10 years that could inhibit FCEV adoption. This uncertainty will also further limit private investment in HRS. We urge the CARB to maintain the efficacy of the existing LD HRI program by keeping 15 years crediting duration.
- Reducing the station capacity eligible for LD HRI crediting from 1,200 kg/d to 600 kg/d will severely undersize stations at sub-economic size. The LD HRI Capacity Cap was originally established at 1,200 kg/d to support HRS with at least three (3) dispensers as the minimum viable size. As MD hydrogen trucks are introduced, these will typically fill at the neighborhood fueling stations established under the LD HRI program rather than HD HRS stations along freeways (i.e., truck stops). Each MD FCEV may fill with twice the amount of hydrogen as each LD FCEV, making HRS capacity established under the existing LD HRS program even *more* important today than ever. We urge the CARB to maintain the lasting benefits of the LD HRI program by keeping the station Capacity Cap at 1,200 kg/d.
- Supporting stations with HRI crediting only in low-income, rural and DACs will hinder the fueling network coverage that is essential to FCEV adoption. Many practical constraints already limit the viable locations for new HRS, so adding the additional location requirements will certainly cause gaps. Furthermore, environmental justice advocates have argued that HRS would not benefit but rather create *further burden* to these communities by enabling greater traffic, congestion and idling fossil-fueled vehicles in those areas due to a station. A better solution is to enable greater ZEV incentives for those communities rather than requiring infrastructure.

We urge the Board to simply extend the LD HRI program “as is” and revisit in a few years to ensure the program is operating as intended and serving disadvantaged communities. We also request grandfathering on-going CEC projects awarded under the existing LD HRI program since

these projects have been delayed due to the pandemic, the recent financial crisis in California, and the historically low credit prices.

Heavy-Duty HRI

The hydrogen industry stakeholders have worked with staff to draft a workable HD HRI program, and for the most part, we agree with the resulting capacity credit outline. From our experience over 10 years as the largest developer and operator of LD HRS, now looking toward HD HRS, we expect the 6,000 kg/d station Capacity Cap and 2.5% HD HRI Market Cap to be sufficient and the CARB action to establish the HD HRI program to be similarly effective as the existing LD HRI program.

However, for the same reasons elaborated above, we urge staff to create the new HD HRI pathway incorporating the parameters proven effective in the existing LD HRI pathway rather than the more restrictive current proposal. In particular, we urge a 15-year HRI crediting period, rather than the proposed 10-year limitation, and the elimination of the location requirements.

- Limiting HD HRI crediting to 10 years creates risk and uncertainty for the continued operation of HD HRS and hydrogen fuel availability beyond 10 years, which could inhibit HD FCEV adoption, especially amongst commercial fleets operating HD FCEV seeking long-term certainty in their operations. With the higher cost of HD HRS and long-term investment horizon of commercial fleets, the need for at least 15-year HRI crediting period is even more essential for HD HRS. We urge the CARB to establish efficacy in the HD HRI program with a 15-year crediting duration.
- Limiting HD HRI to locations within one mile of a ready or pending FHA Alternative Fuel Corridor, next to truck parking, or having received funding from a state or federal competitive grant program are too restrictive, unnecessary and will hinder the fueling network coverage that is essential to commercial fleet adoption of HD FCEV. Many existing truck stops fueling diesel truck fleets are further than 1 mile from FHA Alternative Fuel Corridors and not adjacent to truck parking, and we know that there are existing HD HRS locations that will serve significant truck volumes that are also NOT within one mile of a FHA corridor (e.g., the 60 Freeway and warehousing centers in the Inland Empire). We urge the location restrictions be removed entirely, or at least increased to a more reasonable five (5) miles with exceptions that allow for local or regional funding (as opposed to only state or federal) programs since there are Air District grant programs that vet station locations in their grants.

We recommend the Board adopt the HD HRI with a 15-year crediting period and without the location constraints, or at least allow the Executive Officer case-by-case discretion in the location approval.

Decarbonizing Hydrogen Fuel: 80% Renewables by 2030

The LCFS policy with HRI pathways has proven effective for the rapid decarbonization of hydrogen fuel. Per LCFS reporting, the hydrogen sold for transportation in California was rapidly decarbonized after the HRI was established, to 33 gCO₂e/MJ average in 2022³. In contrast, the electricity in the California grid in 2022, at 77 gCO₂e/MJ, was more than double the carbon

³ <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>

intensity⁴. So, we know that reducing the *carbon intensity* of hydrogen fuel to mitigate climate change is an effective weapon, and we also recognize that renewable sources for hydrogen production will be the ultimate pathway for transportation. However, the needed scale and cost of renewable-source hydrogen feedstocks take time to develop, at the project level as well as at utility scale with renewable power generation. Requiring 80% renewable content by January 1, 2030 is too soon and may prove counter-productive to the primary intent of LCFS policy to decarbonize fuels. We urge the Board to keep the existing 40% requirement for renewable content and conduct periodic check-ins on the average renewable content before mandating an increase.

Station Capacity Modeling: HyCAP and HyScape

Although not addressed in the regulatory package, we understand and agree the modeling for HD HRS capacity using the HyCAP model is essential for determining the HD HRS capacity credits, while continued use of the HyScape model is appropriate for determining the LD HRS capacity credits. However, we urge staff to provide certainty in the LCFS regulation that multi-use stations serving LD/MD and HD FCEV will be eligible to certify into both the LD HRI and HD HRI pathways. Furthermore, we recommend this be implemented with an iterative approach using both HyScape (LD/MD) and HyCAP (HD) models to ensure consistent and equitable treatment. We are involved with the NREL working group for HyCAP, and are confident in the implementation of this approach.

Finally, we wish to thank the CARB Board and staff for allowing us to comment. The LCFS is the most important regulation for the hydrogen refueling infrastructure industry, and the HRI programs are the keys to our continued viability. We look forward to working through these issues with staff prior to Board adoption.

Sincerely,



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Chief Public Policy & Programs Officer
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⁴ https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2022_elec_update.pdf