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February 20, 2024

Chair Liane Randolph and the Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: World Energy's Comments on the Proposed Amendments to the Low Carbon Fuel Standard

Dear Chair Randolph and Members of the Board,

World Energy values the opportunity to provide comments on the proposed amendments to the Low Carbon Fuel Standard (LCFS). We also wish to thank your staff for their hard work in updating the regulations in a timely manner. The LCFS continues to play a significant role in helping California transition to cleaner transportation and remains a model policy for other jurisdictions hoping to achieve similar emission reductions.

World Energy is one of the largest and longest-serving advanced clean energy suppliers in North America. We were the world's first producer of sustainable aviation fuel (SAF) and remain leaders in the field of renewable fuels. Our facility in Paramount, CA is in the final stages of conversion from a petroleum refinery to a 100% renewable fuels bio-refinery. When completed, World Energy's Paramount facility is projected to increase production capacity to approximately 350 million gallons of low carbon fuels per year.

We have made significant investments in continuously reducing the carbon intensity of our fuels and producing very-low carbon fuels for the California market. We have fuel pathways providing up to an 85% reduction in carbon intensity. Our fuels have helped the LCFS program meet and exceed its targets, and our Paramount plant is a premiere example of the clean energy future. World Energy continues our commitment to reduce transportation emissions including investing $4 billion in scaled manufacturing and new technologies to achieve our goal of supplying 1 billion gallons of sustainable aviation fuel annually by 2030.

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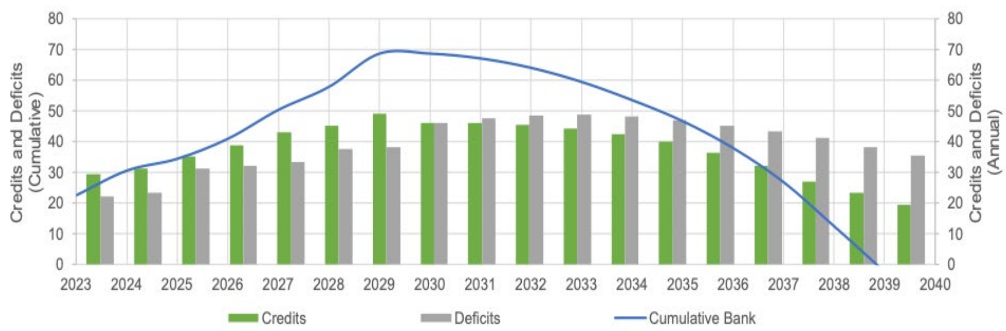
World Energy wishes to provide the following comments in response to the proposed amendments to the LCFS:

2030 Target
Increasing the 2030 target to 30% reduction is a step in the right direction, however, we urge CARB to consider a more ambitious target. As we see the market reacts to the large balance in the credit bank, weighed against a 30% reduction target, the corresponding drop in market prices makes it clear that more carbon reductions are possible.

Along with other stakeholders, World Energy has been working with ICF to model the LCFS targets. The recent ICF modeling relative to the ISOR[1] highlights that 30% CI by 2030 is still conservative and will leave an estimated 70 million in excess credits in 2029 (Figure 2). With such a large credit bank, program investors will have a low incentive to further invest in the newest technologies and innovations in carbon reduction. The ICF "Central Case" modeling shows more aggressive 2030 CI targets of 41-44% are readily achievable given the anticipated fuel volumes and CI reductions across various fuel pathways.

Figure 2. Credit-Deficit Balance in the ICF ISOR Case



In addition to increasing the 2030 targets, we recommend CARB consider changes to the proposed step-down and Auto Acceleration Mechanism (AAM).

Step Down
Increasing the step-down by at least 2% (for a total step-down of at least 7%) will right-size the current credit to deficit ratio and allow for the current robust credit bank to be utilized. This could potentially abate an immediate trigger of the Auto Acceleration Mechanism in its first eligible year.

[1] https://static1.squarespace.com/static/5b57ab49f407b4a7ffa44ffa/t/65cd3c74d1a72f445cdc7a7e/1707949173143/ICFReport2024.pdf

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Auto Acceleration Mechanism
The proposed Auto Acceleration Mechanism is an important new concept for credit generators in the LCFS. World Energy is very supportive of this proposal. The initial staff proposal is strong, but World Energy has a couple of suggestions for the proposed design. First and most important, our modeling suggests that the proposed 2030 target and 5% step-down will only serve to increase the credit bank and dampen investment in low carbon fuels. Moving the first eligible date of the AAM forward may be necessary to allow for the AAM to "catch" any near-term adjustments needed. In the current proposed amendments, the Executive Officer will announce whether the AAM has been triggered starting in May 2027, with an effective date in January 2028. Instead, a first eligible trigger announcement in 2026 for a 2027 effective date would be more appropriate. While the staff proposal is likely giving the market time to "adjust" to the new 2030 targets after a 2025 implementation, our experience is that the market reacts in real time. As of February 2024, the market has already modeled, reacted to, and priced the proposed 2030 targets, and the result has been a *decrease* in credit price. The current credit price reflects the market's belief that the package of design details is insufficient to draw down the credit bank precipitously. In that instance, the AAM is needed as soon as possible to help with a large oversupply of credits. With the current pace of the market and size of the credit bank, the AAM will be needed as soon as possible to recalibrate the program and account for the many GHG emissions that would go unaddressed if the AAM is delayed.

Alternative Jet Fuel (AJF) / Sustainable Aviation Fuel (SAF)
World Energy sees alignment between the staff proposal to include intrastate jet fuel under the provisions of the LCFS and the goals of the program, which are to abate climate impacts from the state's transportation sector. As AJF continues to develop and grow in the state, including incentives within the LCFS will only serve as encouragement for increasing production of AJF. World Energy is hopeful that it will foster additional growth in the use of AJF as a low-CI alternative for aviation in California.

Book-and-Claim
<u>Hydrogen</u>
World Energy would also like to express our support for the extension of book-and-claim to additional fuels like hydrogen. Book-and-claim is essential in maintaining and promoting the success of the LCFS program. It has enabled many GHG emission reductions and encourages more low-CI fuels to enter the California market. In part, World Energy believes that book-and-claim plays an important role for carbon reductions to happen wherever possible, without necessitating an unnecessary (and carbon intensive) shipment of products to disparate locations.

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As CARB proposes including book-and-claim for hydrogen, we support the addition as it will aid in the deployment of renewable hydrogen in the state, a crucial component to transitioning California's hard-to-decarbonize transportation and other technologies.

One key area for improvement in the book-and-claim proposal is extending the provisions outside California, consistent with other LCFS provisions. The current proposal calls for a California pipeline connection in §95488.8(i)(3)(A). The requirement as written favors only in-state hydrogen pipelines and does not provide incentives for renewable fuel production outside California. Absent this allowance, CARB is implicitly providing no incentive for low carbon hydrogen over fossil-based hydrogen for fuels produced in other states. In order to advantage low CI hydrogen across the country, allowing book-and-claim for interconnected regional hydrogen pipelines will be necessary to overcome traditional hydrogen's cost advantages. As such, World Energy recommends modifying §95488.8(i)(3)(A) as follows:

Low-CI hydrogen is injected into a dedicated hydrogen pipeline physically connected to <u>a distribution system or a production facility that provides transportation fuel to California.</u>

<u>Electricity</u>
World Energy appreciates the introduction of power sourcing flexibility as proposed under the draft regulation in §95488.8(i)(1). This is important for facilities like our Paramount plant, which is in a dense urban area. Our plant's location will require us to site more remote new renewable energy projects, like the Mojave Desert, which will be within the same balancing authority but may not have a direct, dedicated connection. We believe in further reducing the CI of the fuels we produce at our plants but look to CARB for an investment signal in the value of this lower carbon electricity. To this end, there are key restrictions within the proposal that may not serve to advance the market.

Specifically, the proposal under §95488.8(i)(1)(C) should be broadened to apply to other renewable fuel / project types, including SAF. This will provide incentives for World Energy and other producers to further lower the CI of the electricity used to produce our renewable fuels, beyond what is available from the grid. We urge CARB to consider that biorefinery locations will frequently be near other industrial and distribution infrastructure, whereas new renewable energy generation will necessarily be sited in more remote areas of the state. Writing the regulation with respect to these land use realities will help World Energy and future renewable fuel production within the state's boundaries.

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Sustainability Criteria and Soil Carbon Accumulation

We encourage CARB to recognize the low carbon regenerative agriculture practices used in the production of low carbon biofuels that minimize negative impacts of agriculture and encourage the environmental benefits (soil carbon restoration and GHG impacts) of bio-based fuels. EU RED now recognizes soil carbon accumulation in their lifecycle carbon assessments as described in Annex V – "Methodology for Determining the Emission Savings from Soil Carbon Accumulation Via Improved Agricultural Management" and there are new procedures through the Geneva based sustainability organization, RSB, to implement these practices.[1,1]

We encourage CARB to study and adopt current research from the EU which recognizes the use of biochar as a carbon negative soil amendment, a practice that has significant potential to reduce atmospheric CO2 and simultaneously sequester and restore healthy soil carbon through agricultural practices.

Ocean-going and Marine Vessels

Given the addition of intrastate fossil jet as a deficit generator in the LCFS proposed amendments, World Energy requests CARB to consider adding ocean-going and marine vessels to the program. Like aviation, ocean-going and marine vessels are hard-to-decarbonize and represent more than 150% of the GHG emissions from aviation. Similar to the other success stories of the LCFS, including ocean-going and marine vessels can signal for long-term investment in finding low-CI solutions. While this may not be an issue that staff can incorporate in this rulemaking period, we encourage staff to begin the learning process now for a future program update. One early example is biodiesel testing (B100) on Canada Steamship Lines in their Great Lakes / St Lawrence Seaway fleet.[1]

On January 1, 2024, the EU added maritime fuels into their ETS carbon trading system[1] and the International Maritime Organization (IMO) is following the lead of the International Civil Aviation Organization in their commitment to reduce GHG emissions similar to the commercial aviation industry.[1] Similar to California's lower carbon aviation fuel goals, California can encourage lower carbon maritime fuels through the LCFS program.

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[2]https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32022R09

[3]https://rsb.org/2024/01/16/rsb-receives-positive-assessment-to-implementing-regulation-under-eu-red/

[4]https://cslships.com/news/csl-successfully-completes-worlds-largest-b100-biofuel-tests/
[5]https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector_en
[6]https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global- shipping-adopted-.aspx

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We appreciate CARB staff's work on this important regulation and the opportunity to provide these comments.

Sincerely,

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