Union of Concerned Scientists

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Subject: Comments on November 9th workshop 2 of 3 on feedstock constraints

Safeguards against damaging land use change are needed, not just market signals

Concerns about land use change impacts of crop-based biofuel production have been prominent part of the LCFS policy debate since its inception. The current approach estimates the indirect land use change (ILUC) emissions associated with a fuel pathway using a consequential LCA and adds this ILUC emissions factor to the attributional carbon intensity LCA as market signal to discourage the use of feedstocks associated with land use change. While this approach has discouraged the use of certain feedstocks, it has not provided a reliable safeguard against bad outcomes, including an unsustainable increase in consumption of vegetable oil-based fuels[1]. A more appropriate design for a safeguard would be to directly limit the use of high-risk feedstocks for LCFS compliance to ensure they do not exceed a sustainable level.

The case for risk-based safeguards that cap high risk feedstock utilization

Much has been written about the advantages and disadvantages of attributional versus consequential lifecycle analysis and the implications of combining the two as CARB has done within the LCFS, most recently summarized in the report of the National Academies report on Life Cycle Assessment (LCA) for Low Carbon Fuels [2]. Policy makers have clearly felt compelled to include a mechanism within the LCFS to address the risk that it could contribute to damaging land use changes. They have done this by adding an indirect land use change factor based on consequential LCA to an otherwise attributional LCA. This approach is not the best or only way to address the concern. The recent National Academies report on includes a recommendation supporting the use of consequential LCA to implement safeguards including limits on high-risk feedstocks.

> *Recommendation 9-8: Assessment of the consequential effects from a future proposed policy, such as induced land use change, should be further developed in order to assess the risk of market-mediated effects and emissions attributable to the policy. Consequential assessment can inform the implementation of safeguards within policies such as limits on high-risk feedstocks,*

[1] https://theicct.org/publication/lipids-cap-ca-lcfs-aug22/

[2] National Academies of Sciences, Engineering, and Medicine. 2022. *Current Methods for Life Cycle Analyses of Low-Carbon Transportation Fuels in the United States*. Washington, DC: The National Academies Press. https://doi.org/10.17226/26402.

can inform the development of supplementary policies, identify hotspots, and reduce the likelihood of unintended consequences[3].

Capping the use of high-risk feedstocks at a level that will mitigate their risks is a direct and effective intervention that reflects the nature of the risk posed by land use change. Harmful changes in land use are driven by the scale of utilization of feedstocks. An ILUC score is constant, regardless of scale, so soy oil-based renewable diesel (RD) gets the same ILUC score regardless of whether it is used at a gradually declining rate, a stable rate or at a rate that doubles every year. Clearly the latter poses much greater risks of harmful land use change than the former. A risk-based safeguard would allow for an assessment of different levels of feedstock utilization, and for caps to flow directly from these assessments. For example, an analysis would likely find that stable soy oil utilization in California does not add much risk beyond what is already associated with current federal biofuel policy. However, if utilization of soy-oil based fuels in California grows much faster than yield increases year after year, that would substantially increase the risks of deforestation. Based on this finding, a cap could be set that would increase in line with yield increases. Questions of how to address the scale of production in LCA are discussed in Chapter 4 of the National Academies report, which concludes with the following recommendation.

Recommendation 4-12: Because LCA-based carbon intensities in current LCFS policy are often not structured to capture nonlinear and non-life cycle implications of large changes in fuel and fuel pathway production volume, policymakers should consider potential complementary policy mechanisms[4].

Avoiding damaging land use change goes beyond carbon intensity

Protecting natural lands and avoiding agricultural expansion remains important even if land use emissions can be offset by other types of emissions reductions within a fuel supply chain. Within the existing LCFS framework, ILUC emissions can effectively be offset by other emissions reductions in the biofuel supply chain, such as carbon capture and sequestration or the use of renewable energy to displace fossil fuels in biofuel production. Ironically, even increased use of biofuels can offset the harms caused by land use change associated with increased use of biofuels[5].

The LCFS should not cause the footprint of agriculture to grow at the expense of natural lands, even if associated emissions are offset by other types of emissions reductions. Safeguards that cap the use high-risk biofuel feedstock at a sustainable level will minimize the risk of harmful land use changes or other bad outcomes. With a cap on high-risk feedstocks in place, the LCFS carbon intensity scores stemming from the attributional portion of the LCA will provide a clear market signal to minimize emissions associated with the production of biofuels, maximizing the emission benefits of a sustainable level of biofuel consumption.

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[3] Ibid. Page 175. https://doi.org/10.17226/26402.

[4] Ibid. Page 69.

[5] Consider a hypothetical biofuel pathway with a CI of 20 g CO2e/MJ from the attributional LCA and two potential feedstocks, one with no ILUC emissions and the other a vegetable oil with 30 g CO2e/MJ ILUC emissions. Assuming a fossil blendstock CI of 100 g CO2e/MJ, a 25 percent blend of the 20 g CO2e/MJ CI fuel would meet a 20 percent CI reduction target, while to meet the same target with the vegetable oil-based fuel would require a 40 percent blend.

Limiting crop-based renewable diesel is a good start, but a comprehensive approach is required

While the preceding discussion focused on the need for feedstock safeguards in general, there are specific dynamics playing out in the LCFS compliance market around crop-based renewable diesel that require urgent action to protect the stability of the LCFS so that it continues to function as designed. The immediate challenge to the LCFS is the rapid relocation into California of the soy-based diesel fuels required for compliance with the advanced biofuel and bio-based diesel mandates of the Renewable Fuel Standard (RFS). This immediate concern could potentially be addressed with the proposed limits on crop-based renewable diesel. However, this reactive intervention may turn out to be inadequate, as the same feedstocks could be redirected to other fuels and excessive demand for other feedstocks could quickly become problematic. To address the concern about excessive feedstock consumption in a proactive and comprehensive manner, we urge CARB to (1) constrain the use of vegetable oil at current levels for all fuel pathways, regardless of the final fuel, (2) set constraints on secondary fats and oils to provide stability for the California market and to avoid fraud or feedstock shuffling, and (3) develop and communicate future limits on the use of all high-risk feedstocks, based on a risk assessment.

Without a cap on crop-based renewable diesel, the LCFS is shifting RFS compliance to California without additional climate benefits.

In 2021 California consumed 44% of U.S. biobased diesel fuel (BBD), rapidly shifting compliance with the RFS into California. This dilutes the impact of the LCFS without increasing total U.S. renewable fuel consumption, since these fuels are already required by the RFS. In earlier years, when California consumed a more proportional share of BBD, the LCFS motivated feedstock switching on favor of lower CI feedstocks and discouraged the use of soy-BBD. However, because the scale of California RD consumption has now exceeded the availability of low CI feedstocks, soy-based RD consumption is rapidly increasing in California. Capping California renewable diesel consumption at a reasonable level would allow BBD production and consumption required by the RFS to be more evenly distributed around the US. With a reasonable share of RFS compliance fuels being used in California, the LCFS can once again motivate additional climate benefits by ensuring the fuels used in California are produced with the lowest carbon intensity feedstocks and processes. Determining the optimal level of CA vegetable oil fuel consumption is complicated, and different stakeholders will have different views. But as argued in our previous paper with ICCT[6], current consumption has risen very quickly and is already very high. Thus CARB should cap compliance at the current level immediately while it undertakes more extensive consideration of how to optimally implement a feedstock constraint.

Constrain the use of all fuels produced from vegetable oils, not only renewable diesel.

As described in previous comments, the major concerns raised by the expanded production of vegetable oil based renewable diesel are the impacts on food prices and agricultural expansion associated with drastically increasing California consumption of vegetable oil feedstocks for fuel. While the recent expansion has been largely confined to renewable diesel, it is plausible that if constraints are applied only to renewable diesel the same vegetable oil feedstocks could instead be used to produce other final products, including renewable jet fuel or renewable gasoline. For this reason, it makes sense to apply

[6] https://theicct.org/publication/lipids-cap-ca-lcfs-aug22/

the feedstock constraint not only to one final fuel, but to all fuels produced from vegetable oil feedstocks.

Secondary fats and oils can also be overutilized and should be constrained now, or in the future.

While the focus on crop-based vegetable oil is understandable, we are concerned that unlimited fuel consumption of fuels made from secondary fats and oils could also become a problem. Given the large incentives available through California and Federal policy combined, California has already become a magnet for secondary fats and oils from across the country and around the world. At a reasonable scale, new uses for secondary feedstocks can be appropriate and beneficial. But given the enormous scale of potential renewable fuel production in California, the scale of secondary feedstocks could undercut California's LCFS and lead to perverse outcomes in markets for secondary fats and oils around the world. Specifically, diverted lipids could be replaced with crop-based oils in other markets, or crop-based oils could be fraudulently manipulated to pass as eligible feedstocks. For this reason, it is prudent to set constraints on secondary fats and oils as well as on crop-based feedstocks. Rather than waiting until clear evidence of a problem arises, it would be better to issue guidance in the current rulemaking based on a market assessment of available feedstock, which would allow fuel producers and other stakeholders more advance notice to make plans consistent with reasonable feedstock utilization.

Other crop-based biofuels could potentially become a problem, which could be avoided with advance guidance on possible future constraints

We agree with comments made at the workshop that the use of crop-based ethanol is sufficiently constrained by gasoline blending limits that it does not require an immediate cap with the same urgency required by soy-based RD. However, this constraint could change as technology to convert starch to RD or other hydrocarbons matures. Federal subsidies for associated technologies including carbon capture and low carbon hydrogen could change the economics of low CI starch to gasoline, diesel or jet fuel production, much as federal subsidies for renewable diesel made it a much more competitive fuel than it would be based purely on LCFS compliance value. A cost effective low-carbon starch to hydrocarbon conversion technology used at an appropriate scale could be valuable complement to other fuel pathways, especially if it scaled up at the same time that corn ethanol for gasoline blending scaled down and producers reduced supply chain emissions. But this same potentially useful pathway would eliminate the blending constraints that currently limit California consumption of starch-based fuels. CARB could wait to see if the scaleup of corn to jet coincides with the ramp-down of ethanol blending, in which case a constraint might not be necessary. But it would be better for all parties If CARB issues guidance long before a problem arises on what level of corn-based fuel consumption is acceptable. This will allow fuel producers to plan for the future based on realistic understanding of the potential market size and timing.

Start with stability while completing a thorough risk assessment

It will take time to develop a risk assessment of land use change and other counterproductive outcomes associated with dramatic expansions of feedstock utilization, which may be challenging within the schedule for the planned 2023 rulemaking. As a first step, CARB should issue preliminary feedstock caps to remain in place until the completion of the risk assessment process. These preliminary caps could be based on an expert elicitation on feedstock availability levels that would minimize disruption and risk of market mediated land use change, or even more simply set to avoid large market changes until risks are

adequately assessed. For example, CARB should immediately cap vegetable oil and other lipid fuels at current levels and commit to a cap on corn utilization for fuel consumed in California if the level exceeds 110% of some average reference level such as 2016-2019.

While fuel producers may object to any limit placed upon their future growth, ultimately it is better to communicate what the state deems sustainable early, to send a signal to the marketplace about the realistic potential size of the market for each feedstock and encourage investment in underutilized feedstocks. Waiting until there is a backlash and then imposing limits once investments have already been made would be more disruptive and discourage future investment at appropriate levels.