



June 14, 2023

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**Re: NRDC Recommendations for Updates to the Low Carbon Fuel Standard**

California’s Low Carbon Fuel Standard (“LCFS”) program has advanced transportation decarbonization in the State of California, including by supporting the transition to zero-emissions electric vehicles. At the same time, several unintended consequences of the program have emerged in recent years that undermine its ability to reduce climate emissions and protect communities, as noted by numerous, diverse parties that commented on CARB’s February 22, 2023, LCFS Workshop.<sup>1</sup> CARB cannot delay any longer in addressing these issues.

First, the LCFS currently provides outsized carbon reduction credits to biomethane producers – particularly livestock biomethane producers. This undermines the uptake of the most promising and scalable transportation technologies, such as battery electric vehicles, and potentially *increases* air pollution; for example, from hydrogen production paired with biomethane credits at refineries or from continued combustion of methane which generates significant NOx emissions regardless of the source of that methane.

Second, the LCFS provides incentives for the development of lipid biofuel production on a massive scale without adequately accounting for the land use and carbon impacts of biofuels.

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<sup>1</sup> Numerous parties responding to CARB’s February 2023 Workshop note issues with carbon accounting in the LCFS that lead to adverse impacts for the climate, environment, and communities, including: Animal Legal Defense Fund, Bioenergy Association of California, Center for Food Safety, Central California Environmental Justice Network, Central Valley Air Quality Coalition, Earthjustice, Food & Water Watch, International Council on Clean Transportation, Leadership Counsel for Justice and Accountability, Sierra Club California, and Union of Concerned Scientists. Comments are accessible at [https://www.arb.ca.gov/lispub/comm2/iframe\\_bccommlog2.php?listname=lcf-wkshp-feb23-ws&\\_ga=2.255679752.1654759407.1684780517-1745364582.1672094362](https://www.arb.ca.gov/lispub/comm2/iframe_bccommlog2.php?listname=lcf-wkshp-feb23-ws&_ga=2.255679752.1654759407.1684780517-1745364582.1672094362).

This comes at a significant detriment to the climate, the food system, the environment, and communities living near refineries.

Third, the LCFS program inappropriately credits captured carbon that is utilized for CO<sub>2</sub> enhanced-oil recovery (“EOR”) – a process in which CO<sub>2</sub> is injected into oil fields to “push” more oil towards production wells. This contradicts state legislative policy, which does not support the use of captured CO<sub>2</sub> in the highly carbon intensive and polluting EOR process.

The unintended consequences of the LCFS not only undermine California climate goals, but also contribute to poor local air and water quality and perpetuate environmental injustice by over-incentivizing livestock biomethane and other problematic combustion fuels. These problems must be addressed through improvements to the LCFS. NRDC calls on CARB to take the following steps to ensure the LCFS supports California’s climate targets and commitment to environmental justice:

1. Correct the over-crediting of livestock biomethane by 2024 and support environmentally sustainable livestock production practices.
2. Implement a cap on all lipid-based feedstocks and develop an updated CI score for the fuels associated with those feedstocks.
3. Eliminate LCFS credits for captured carbon that is utilized for EOR, in alignment with SB 1314.
4. Continue and enhance the electric transportation provisions in the LCFS.
5. Require that credited hydrogen be produced only with zero-carbon electricity adhering to the “three pillars” of additionality, deliverability, and hourly matching.

The LCFS can be a tool for driving forward the transition to a cleaner, healthier, and safer transportation sector – but only if CARB ensures LCFS pathways are aligned with California’s climate and environmental justice priorities.

## **I. CARB Should Correct the Over-Crediting of Livestock Biomethane by 2024 and Support Environmentally Sustainable Livestock Production Practices**

Despite the requirement under SB 1383 to meaningfully regulate manure methane by 2024,<sup>2</sup> CARB Staff's proposal for LCFS would continue to distort the carbon emissions benefits of livestock biomethane and continue to subsidize long-lasting capital investments in the industry through 2040 (given that 10 years of payments would be enabled if this issue was corrected starting in 2030) with significant consequences for communities and the climate. The current system of crediting livestock biomethane through the LCFS based on negative carbon intensity ("CI") scores has led to hundreds of millions in subsidies for the livestock biomethane industry. In addition to LCFS credits, hundreds of millions in public funding have also gone to support California's livestock biomethane industry through programs such as the Dairy Digesters Research and Development Program (DDRDP).<sup>3</sup> Yet, these investments in livestock biomethane have had a questionable climate benefit and exacerbate ongoing harm to communities impacted by environmental injustice. As described by Union of Concerned Scientists ("UCS"), this practice of granting negative emissions "goes beyond holding fuel producers accountable to clean up their own supply chains and instead allows a polluting fossil fuel producer in California to avoid making investment in cleaner technology by purchasing what are in effect offsets from the agricultural sector."<sup>4</sup>

**It is not clear that LCFS biomethane credits are an effective way to reduce carbon emissions.** As stated in an Assembly Budget Committee oversight analysis, "In many cases, [dairy digesters] might be a "white elephant" that result in more cost and pollution than if no project was undertaken at all."<sup>5</sup> Assembly staff find that other manure management solutions, such as solar drying pads, may be more effective at reducing emissions from dairies;<sup>6</sup> while

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<sup>2</sup> Senate Bill No. 1383 (Lara), Health and Safety Code § 39730.5(b)(1) (2016), [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201520160SB1383](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383).

<sup>3</sup> Earthjustice at 9-10.

<sup>4</sup> Union of Concerned Scientists, "LCFS workshop comments" (June 2023) at 2 (Accessible at [https://ww2.arb.ca.gov/system/files/webform/public\\_comments/3641/UCS%20LCFS%20comments%20June%202023\\_0.pdf](https://ww2.arb.ca.gov/system/files/webform/public_comments/3641/UCS%20LCFS%20comments%20June%202023_0.pdf)).

<sup>5</sup> California Assembly Budget Committee, Subcommittee Hearing No. 3 on Resources and Transportation (Apr. 19, 2017), at 19, <https://abgt.assembly.ca.gov/sites/abgt.assembly.ca.gov/files/April%2019%20-%20Toxics%20Recycling%20Ag.pdf>.

<sup>6</sup> *Ibid* at 13 and 15, finding that "[D]ue to economies-of-scale, [dairy digesters] are significantly cheaper for the 225 largest dairies," and "[S]ome of the newer manure practices such as converting flush practices to scrape have not been evaluated as rigorously."

scientific research finds that covered manure lagoons at confined animal feeding operations (“CAFOs”) are “not observed to abate [methane] emissions” in some cases.<sup>7</sup> Additionally, natural gas vehicles do not provide significant climate benefits over diesel vehicles, with the International Council on Clean Transportation finding that natural gas tractor-trailers achieve at most “11% lifetime GHG savings relative to a diesel tractor-trailer, even when assuming California achieves its maximum in-state RNG potential.”<sup>8</sup> As a result, relying on digesters at CAFOs to reduce climate pollution from the transportation sector is jeopardizing California’s ability to reach its GHG emissions targets, particularly when it comes at the expense of other more effective solutions for the transportation sector.

**Beyond the questionable climate benefits, LCFS credits directly subsidize CAFOs and combustion fuels that continue to pollute.** Under current LCFS carbon-accounting, pollution-intensive CAFOs are advantaged over livestock operations with sustainable management practices. Anaerobic digestors are most economic for large CAFOs,<sup>9</sup> and even then only with significant upfront and ongoing public subsidies as shown by a recent UC Davis analysis.<sup>10</sup> These CAFOs are the same livestock producers that “drive the greatest source of environmental harm in the form of nitrate pollution in the groundwater, eutrophication of streams and lakes, increased ammonia and other volatile organic compound emissions, and intense, distressing odors and flies.”<sup>11</sup> At large livestock operations, digesters also increase particulate matter and ozone pollution: “For example, approximately 20 digesters would emit the same amount of ozone-forming (smog) pollution as one such power plant, but only produce 3 percent

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<sup>7</sup> Earthjustice at 10, *citing to* Vechi, N. T., et al. "Ammonia and methane emissions from dairy concentrated animal feeding operations in California, using mobile optical remote sensing." *Atmospheric Environment* 293 (2023): 119448, <https://doi.org/10.1016/j.atmosenv.2022.119448>.

<sup>8</sup> O'Malley, Jane, Nikita Pavlenko, and Yi Hyun Kim. "2030 California Renewable Natural Gas Outlook: Resource Assessment, Market Opportunities, and Environmental Performance." International Council on Clean Transportation (May 2023), <https://theicct.org/wp-content/uploads/2023/05/california-rng-outlook-2030-may23.pdf> at ii.

<sup>9</sup> Markus Lauer et al., *Making Money from Waste: The Economic Viability of Producing Biogas and Biomethane in the Idaho Dairy Industry*, Applied Energy, Vol. 222 (July 2018), <https://www.sciencedirect.com/science/article/pii/S0306261918305695>; California Assembly Budget Committee, Subcommittee Hearing No. 3 on Resources and Transportation (Apr. 2017), at 14, <https://abgt.assembly.ca.gov/sites/abgt.assembly.ca.gov/files/April%2019%20-%20Toxics%20Recycling%20Ag.pdf>.

<sup>10</sup> Smith, Aaron, UC Davis, “The Value of Methane from Cow Manure” (April 14, 2023), <https://asmith.ucdavis.edu/news/digester-update>.

<sup>11</sup> Earthjustice at 16, *citing to* Ruthie Lazenby, *Rethinking Manure Biogas – Policy Considerations to Promote Equity and Protect the Climate and Environment* (Aug. 2022), [https://www.vermontlaw.edu/sites/default/files/2022-08/Rethinking\\_Manure\\_Biogas.pdf](https://www.vermontlaw.edu/sites/default/files/2022-08/Rethinking_Manure_Biogas.pdf).

of the electricity.”<sup>12</sup> This pollution further harms communities that already experience high levels of pollution throughout the year. Biomethane over-crediting also disadvantages and discourages smaller livestock producers, which are more likely to operate sustainably.

Additionally, LCFS’s methane crediting distorts the relative carbon intensities of LCFS-eligible fuels, favoring air-polluting options such as compressed natural gas (“CNG”) vehicles and steam-methane reformation (“SMR”) produced hydrogen over true zero-emissions options. For example, it allows the biomethane industry to argue that “replacing just 25 percent of a fleet’s diesel trucks with negative carbon intensive RNG from dairy manure can reduce a fleet’s carbon emissions by 100%,”<sup>13</sup> even when these trucks continue to spew harmful air pollution and there is “consensus across CARB’s Scoping Plan, Mobile Source Strategy, and its State Implementation Plan that biomethane should not play a significant long-term role in road transportation.”<sup>14</sup> LCFS’s current carbon accounting is undermining California’s transition to zero-tailpipe-emissions transportation by over-incentivizing methane use in trucks and other combustion-based fuels that pollute and harm communities.

**To effectively mitigate methane emissions from livestock operations and protect communities, CARB should directly regulate livestock methane beginning in 2024** – a policy recommendation supported by Earthjustice, Leadership Counsel for Justice and Accountability (“LCJA”) et al., International Council on Clean Transportation (“ICCT”), and UCS.<sup>15</sup> The current approach of relying on incentives and accepting free venting as an allowable baseline has not been effective in significantly reducing livestock methane emissions and is perpetuating harm to communities located near CAFOs, refineries, and highways. CARB staff and industry argue that regulation may lead to leakage of the livestock industry outside of

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<sup>12</sup> California Assembly Budget Committee, Subcommittee Hearing No. 3 on Resources and Transportation (Apr. 19, 2017), at p. 17, <https://abgt.assembly.ca.gov/sites/abgt.assembly.ca.gov/files/April%2019%20-%20Toxics%20Recycling%20Ag.pdf>.

<sup>13</sup> Clean Energy, “RNG is Decarbonizing Trucking Today” (July 2022), <https://www.freightwaves.com/news/rng-is-decarbonizing-trucking-today>.

<sup>14</sup> Earthjustice at 14, *referencing* CARB, State Strategy for the State Implementation Plan at 57, *including* “measures to accelerate ZEV adoption in the medium- and heavy-duty sectors by setting zero-emission requirements for fleets.”

<sup>15</sup> Earthjustice at 6; International Council on Clean Transportation (“ICCT”), “Comments on the February 23 LCFS Workshop” (Mar. 2023) at 4 (Accessible at <https://www.arb.ca.gov/lists/com-attach/82-lcfs-wkshp-feb23-ws-UTdUN10+UDELPgRb.pdf>); Union of Concerned Scientists (“UCS”), “Comments on the February 22, 2023, Workshop: 1 of 2” (Mar. 2023) at 2 (Accessible at <https://www.arb.ca.gov/lists/com-attach/66-lcfs-wkshp-feb23-ws-Wy4GY1IgVlpRNAVq.pdf>); Leadership Counsel for Justice and Accountability (LCJA) et al., “Comments on Potential Changes to the Low Carbon Fuel Standard Program” (Mar. 2023) at 4 (Accessible at <https://www.arb.ca.gov/lists/com-attach/115-lcfs-wkshp-feb23-ws-UzIXPgBoVmtXJQNC.pdf>).

California, but this concern can be addressed through provisions to mitigate out-of-state emissions leakage, as required by SB 1383, rather than eliminating the possibility of direct regulation entirely.<sup>16</sup>

Directly regulating methane emissions would greatly affect the carbon intensity for some pathways by requiring the baseline assumption that methane would be captured, rather than vented or flared, if it were not captured by an anaerobic digester or lagoon. Using CA-GREET, ICCT calculates that the CI of livestock-derived CNG would be approximately 36 gCO<sub>2</sub>e/MJ rather than an average value of -336 gCO<sub>2</sub>e/MJ if this change were enacted.<sup>17</sup> This would prevent over-incentivizing livestock biomethane at the expense of the zero-tailpipe-emissions transportation solutions.

**CARB must also ensure that the accounting for biomethane production emissions is accurate.** Several issues with the LCFS’s livestock biomethane crediting scheme undermine the ability of the LCFS to reduce emissions, including:

- ***CARB's current carbon intensity (CI) estimate fails to account for the fact that the LCFS incentivizes facilities to produce more methane.***<sup>18</sup> The wet manure lagoon storage that is employed by large livestock facilities to harvest biomethane actually *creates* methane that would not otherwise be created by standard, dry manure storage systems.<sup>19</sup> CARB must account for the fact that methane is created where it otherwise would not have been in biomethane crediting schemes.
- ***Livestock biomethane production and transportation results in methane leakage that must be accounted for in lifecycle emission assessments.*** Earthjustice notes that “fugitive emissions from biomethane and biogas supply chains exceed emissions from

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<sup>16</sup> “The regulations include provisions to minimize and mitigate potential leakage to other states or countries, as appropriate.” SB 1383 (Lara 2016)

<sup>17</sup> International Council on Clean Transportation (“ICCT”), “Comments on the February 2023 LCFS Workshop” (Mar. 2023) at 4, stating that the calculation is “[a] simple average of existing, certified pathways. Due to data limitations, we do not have access to the volume-weighted average CI of dairy biogas pathways in the LCFS.” Accessible at <https://www.arb.ca.gov/lists/com-attach/82-lcfs-wkshp-feb23-ws-UTdUN10+UDELPgRb.pdf>.

<sup>18</sup> *Ibid.*

<sup>19</sup> Institute for Governance & Sustainable Development, A Primer on Cutting Methane: The Best Strategy for Slowing Warming in the Decade to 2030 (2023) at 119 [https://www.igsd.org/wp-content/uploads/2022/09/IGSDMethane-Primer\\_2022.pdf](https://www.igsd.org/wp-content/uploads/2022/09/IGSDMethane-Primer_2022.pdf).

the oil and gas industry,”<sup>20</sup> and Center for Biological Diversity (“CBD”) states that the CA-GREET model relies on assumptions about methane leakage that “dramatically underestimate leakage rates and are inconsistent with the best-available science.”<sup>21</sup> The LCFS must account for fugitive methane emissions in livestock biomethane crediting schemes to effectively reduce net SLCPs.

- ***CARB does not fully account for upstream and downstream emissions from livestock biomethane production.*** For example, downstream emissions may reduce the net GHG benefits of digestors, as digested manure may result in much greater nitrous oxide (N<sub>2</sub>O, a powerful greenhouse gas) emissions than undigested manure.<sup>22</sup>

**Importantly, LCFS’s over-crediting of livestock biomethane also perversely incentivizes the production of fossil-derived, SMR-produced hydrogen.** This not only overstates emissions reductions from the LCFS program, but it harms households living near refineries, where hydrogen is produced, in the process.<sup>23</sup>

Under current LCFS carbon accounting, solar-powered electrolytic hydrogen receives a CI score of zero under LCFS. Meanwhile, fossil-derived hydrogen coupled with biomethane credits from CAFOs receives a score of -287 gCO<sub>2</sub>e/MJ.<sup>24</sup> As a result, CARB’s accounting for hydrogen production encourages the operation of existing – and the build-out of *new* – SMR facilities, which emit NO<sub>x</sub>, CO, PM, and other pollutants in communities near refineries.<sup>25</sup> As Earthjustice notes, existing LCFS policies make it more lucrative to run SMR plants and “simply go shopping for biogas credits wherever they are cheapest across North America” than to

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<sup>20</sup> Earthjustice at 12, *citing to* Semra Bakkaloglu et al., Methane Emissions Along Biomethane and Biogas Supply Chains Are Underestimated (June 2022) <https://www.sciencedirect.com/science/article/pii/S2590332222002676>.

<sup>21</sup> Center for Biological Diversity (“CBD”), “Comments on Potential Changes to the Low Carbon Fuel Standard Program” (Mar. 2023) at 1. Accessible at <https://www.arb.ca.gov/lists/com-attach/90-lcfs-wkshp-feb23-ws-ATNcaQZYWToANVQL.pdf>.

<sup>22</sup> Michael A. Holly, Rebecca A. Larson, J. Mark Powell, Matthew D. Ruark, Horacio Aguirre-Villegas, Greenhouse gas and ammonia emissions from digested and separated dairy manure during storage and after land application, *Agriculture, Ecosystems & Environment*, Volume 239, 2017, Pages 410-419, ISSN 0167-8809, <https://doi.org/10.1016/j.agee.2017.02.007>. (<https://www.sciencedirect.com/science/article/pii/S0167880917300701>)

<sup>23</sup> UCS at 3.

<sup>24</sup> Earthjustice at 15, *citing to* Sara Gersen, Reclaiming Hydrogen for a Renewable Future: Distinguishing Oil & Gas Industry Spin from Zero Emissions Solutions (at slide 5), <https://efiling.energy.ca.gov/GetDocument.aspx?tn=243619>.

<sup>25</sup> Earthjustice at 5, *citing to* Sun et al, Criteria Air Pollutants and Greenhouse Gas Emissions from Hydrogen Production in U.S. Steam Methane Reforming Facilities, *Env’t Sci. & Tech.*, Vol. 53 (Apr. 2019), [www.osti.gov/pages/servlets/purl/1546962](http://www.osti.gov/pages/servlets/purl/1546962); UCS at 3.

produce green, electrolytic hydrogen.<sup>26</sup> The State Implementation Plan requires reducing emissions from smokestacks, but LCFS sends an opposite signal. CARB must address this distorted incentive to produce grey hydrogen by adopting our recommendation to directly regulate dairy methane emissions.

CARB has no time to waste in correcting the accounting for livestock biomethane in the LCFS. In addition to detracting from California’s climate goals by over-crediting the value of livestock biomethane, the current incentive levels discourage sustainable livestock production practices by making them less able to compete with subsidized CAFOs and exacerbates the environmental justice harms of large livestock operations. CARB cannot wait until 2030 to address these issues: we urge you to act now to protect communities and our progress on climate.

## **II. Cap the Use of Lipid Biofuel Feedstocks to Support Sustainable Land Use and Reduce Greenhouse Gas Emissions**

The LCFS has incentivized production of biofuels from lipid feedstocks that are part of the food system – most notably soybean oil – at an unprecedented scale. Recently, two Bay Area refineries, both located in disadvantaged communities of color, were issued permits to convert to production of renewable diesel at a scale that dwarfs existing projects of this type in California and elsewhere, with operators in both cases justifying the conversion based on the LCFS.<sup>27</sup> These conversions (also occurring at smaller refineries in Southern California) are consistent with the larger recent trend of biomass-based diesel (BBD) growing steeply as a share of California’s alternative fuels market, from 1% to 50% between 2011 and 2021; a concomitant growth in BBD credit generation from 8% to 45%; and a dramatic increase in California’s share of the BBD fuel pool.<sup>28</sup> Over this same time period, California has driven feedstock supply away from other states due to the limited availability of lipid feedstocks (*i.e.*, vegetable oils and waste oils).<sup>29</sup> While earlier on this shift was mostly in waste oils, food crop oils – especially soybean

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<sup>26</sup> Earthjustice at 15.

<sup>27</sup> CBD at 8, citing Rodeo Renewed Project Draft Environmental Impact Report (October 2021), <https://www.contracosta.ca.gov/DocumentCenter/View/72880/Rodeo-Renewed-Project-DEIR-October-2021-PDF>.

<sup>28</sup> ICCT at 8, citing California Air Resources Board, “LCFS Data Dashboard,” accessed July 16, 2021,

<https://ww3.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm>.

<sup>29</sup> *Id.*, citing Zhou, Yuanrong, Baldino, Chelsea, and Searle, Stephanie, “Potential Biomass-Based Diesel Production in the United States by 2032.” (ICCT, 2020). <https://theicct.org/publication/potential-biomass-based-dieselproduction-in-the-united-states-by-2032/>



oil, planned to be used at both converted Bay Area refineries – has spiked in use as a credited feedstock, with soy-based renewable diesel making up 17% of BBD volumes credited through the 3<sup>rd</sup> quarter of 2022.<sup>30</sup>

This trend is projected to continue if crediting remains unchanged, with the growth of renewable diesel continuing to dominate LCFS compliance. For example, the growth of renewable diesel and biodiesel together would rise to 2.5 billion gallons in 2030 from the 2021 consumption level of approximately 1.2 billion gallons. Due to the limits of waste oil collection, it is likely that this would need to be met primarily with additional virgin vegetable oils, such as soy oil derived from increased domestic crushing. To meet additional demand, approximately 170 million gallons could come from increased waste oil collection; the remainder, or 1.1 billion gallons, would be sourced from increased soy oil production or imports.<sup>31</sup>

This large-volume shift toward credited production of lipid-based biofuels threatens multiple deleterious effects. In the first instance, it directly incentivizes increased production, leading to the clearing of new land to meet increased demand.<sup>32</sup> Additionally, it indirectly incentivizes production of other oils in the food crop market that are used fungibly with those oils, including palm oil. Heavy use of soybean oil thus not only risks food instability by driving up crop prices, but also risks substitution of palm oil in markets intended for soybean exports.<sup>33</sup> Expansion of palm oil production resulting from crop substitution would have particularly severe greenhouse gas and other environmental impacts.<sup>34</sup> The palm oil industry is a source of pollutants and greenhouse gas emissions in two ways: deforestation and the processing of palm oil. Fires clearing the way for a palm oil plantation are a major source of air pollution that adversely affect human health; agrochemicals associated with palm oil plantations are dangerous for terrestrial and aquatic ecosystems.<sup>35</sup> Palm oil production also proliferates in highly

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<sup>30</sup> ICCT at 10.

<sup>31</sup> *Id.* at 9-10, citing Jane O’Malley et al., “Setting a Lipids Cap under the California Low Carbon Fuel Standard” (ICCT, August 2, 2022), <https://theicct.org/wpcontent/uploads/2022/08/lipids-cap-ca-lcfs-aug22.pdf>

<sup>32</sup> See Appendix I: Detailed Analysis for Indirect Land Use Change in Low Carbon Fuel Standard Regulation Staff Report: Initial Statement of Reasons for Proposed Rulemaking, California Air Resources Board, Jan 2015, I-1, <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2015/lcfs2015/lcfs15appi.pdf>.

<sup>33</sup> ICCT at 10, citing O’Malley et al.

<sup>34</sup> See Petrenko, C., Paltseva, J., and Searle, S. *Ecological Impacts of Palm Oil Expansion in Indonesia*, International Council on Clean Transportation, Jul 2016. [https://theicct.org/sites/default/files/publications/Indonesia-palm-oil-expansion\\_ICCT\\_july2016.pdf](https://theicct.org/sites/default/files/publications/Indonesia-palm-oil-expansion_ICCT_july2016.pdf) (accessed Dec 8, 2021).

<sup>35</sup> *Id.*, pp. 7-11.

productive biodiversity hotspots like Indonesia and the Brazilian Amazon, where massive deforestation and attendant species loss can dramatically affect both global biodiversity and the climate.<sup>36</sup>

Conversion of land to lipid feedstock production, whether directly or through fungible crop substitution, thus increases the carbon impact of these feedstocks in ways not fully accounted for in LCFS CI calculations, as well as causing multiple other environmental impacts. Additionally, increasing soy demand risks undermining Renewable Fuel Standard targets, and distorting LCFS credit markets.<sup>37</sup> Conversions of petroleum refineries to biofuel production also saddle overburdened refinery communities with years more of harmful pollution at or above levels associated with petroleum refining, when environmental justice and public health concerns – as well as the most recent CARB scoping plan – would counsel phasing out refining in line with in-state demand. Moreover, combusting biodiesel and renewable diesel in vehicles produces NOx emissions, which will perpetuate environmental justice and health harms for communities living near highways.

Together with ICCT, UCS, Earthjustice, CBD, and CBE, we therefore support implementation of a cap on lipid-derived biofuels to mitigate the economic and environmental sustainability risks associated with these fuels. We note that multiple proposals have been put forward for the structure of such a cap, including ICCT’s proposal for an annually-reviewed energy-based cap, which would preserve the incentive to improve per-MJ carbon intensity;<sup>38</sup> and Earthjustice’s proposal for an updated risk assessment to sort fuels and feedstocks into risk categories to be used in planning declining caps aimed at ultimate phaseout of high-risk fuels.<sup>39</sup> We do not have a position on the specific form a cap should take, but believe some form of cap to curb the unanticipated and harmful growth in the use of food crop lipid feedstocks is essential.

Regardless of the form of cap imposed, we believe it is vital in revisiting this aspect of the LCFS that CARB update the CI scores associated with lipid feedstock biofuels. The re-analysis should consider specifically the impact of large-scale development on land use impacts,

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<sup>36</sup> *Id.*

<sup>37</sup> ICCT at 10.

<sup>38</sup> ICCT at 11.

<sup>39</sup> Earthjustice at 19.

which cannot be presumed to be linearly correlated with volume; and should also take into account the fungibility of food crop oils such as soybean oil with palm oil.

### **III. Eliminate LCFS Credits for Captured Carbon that is Utilized for Enhanced Oil Recovery**

NRDC supports calls from CBD, Earthjustice, and UCS to remove CCS-related enhanced oil recovery (“EOR”) from the LCFS.<sup>40</sup> Despite California’s clear stand against CCS-associated EOR within the State, CARB’s LCFS door remains open to incentivizing this same harmful practice outside the State’s borders. Under the LCFS CCS Protocol, applicable CCS projects are those “that capture carbon dioxide and sequester it onshore, in either saline or depleted oil and gas reservoirs, or oil and gas reservoirs used for CO<sub>2</sub>-enhanced oil recovery (CO<sub>2</sub>- EOR).”<sup>41</sup>

The ban on CCS-derived CO<sub>2</sub> in EOR pertains to both the carbon and non-carbon pollution associated with EOR. SB 1314 recognizes that incentivizing EOR is incompatible with California’s carbon-neutrality policies, declaring that “the purpose of carbon capture technologies, and carbon capture and sequestration, is to facilitate the transition to a carbon-neutral society and not to facilitate continued dependence upon fossil fuel production.”<sup>42</sup> Additionally, EOR is a risk to communities living near it, threatening toxic air pollution, harm to groundwater, and a risk of blowouts.<sup>43</sup>

### **IV. Continue and Enhance the Electric Transportation Provisions in the LCFS**

The LCFS should continue providing credits for various types of electric transportation, including electric forklifts and light duty vehicles, and should expand incentives for medium and heavy duty charging and electric vessels, aircraft, and off-road equipment. Electric transportation technologies are critical to cost-effectively reach California’s climate targets while reducing

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<sup>40</sup> CBD at 1; Earthjustice at 19; UCS at 3.

<sup>41</sup> CBD at 2, citing CARB, Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard at 7 (Aug. 13, 2018) (emphasis added). CCS projects are eligible for LCFS participation under the Tier 2 pathway. See 17 Cal. Code Regs. § 95488.1(d)(7)(B).

<sup>42</sup> Earthjustice at 20, *citing* Senate Bill 1314 (2022), § 2 (codified at Cal. Pub. Res. Code § 3132).

<sup>43</sup> CBD at 2, *citing* Clean Water Action, The Environmental Risks and Oversight of Enhanced Oil Recovery in the United States at 5 (2017),

<https://www.cleanwater.org/sites/default/files/docs/publications/The%20Environmental%20Risks%20and%20Oversight%20of%20Enhanced%20Oil%20Recovery%20in%20the%20United%20States.pdf> (CWA EOR Report).

tailpipe emissions and related impacts to communities, and the LCFS should support their deployment.

The current structure of credit generation, whereby electric distribution utilities earn credits for residential charging, owners of the charging equipment earn the nonresidential credits, and various parties can earn incremental credits, is appropriate and should remain unchanged.<sup>44</sup> However, the spending requirement on electric distribution utilities, called the Clean Fuel Rewards program, should be ended given the recent adoption of federal tax credits for new and used passenger electric vehicles under the Inflation Reduction Act. Instead, electric utilities should be required to utilize the credit value primarily to help EV adoption by lower-income households, to improve access in communities that do not have access to charging, as well as to accelerate the transition to electrified medium-duty, heavy duty, and non-road vehicles and equipment.

Additionally, the Fast Charge Infrastructure (FCI) provisions that provide capacity credits for direct current fast charging (DCFC) for light-duty vehicles should be extended to 2035 instead of expiring in 2025. The LCFS has helped to spur the build out of the initial, public-access fast-charging infrastructure needs for passenger vehicles as the state transitions to 100% Zero Emission Vehicle requirements by 2035. Based on discussions with numerous charging infrastructure providers, the FCI provisions have been critical for improving the business case for public fast charging stations. In addition, CARB's rulemaking should create a new capacity credit program to improve the business case for medium- and heavy-duty charging (where multiple fleets use a charging location). Given the need to accelerate medium- and heavy-duty charging to meet existing CARB regulations and the cost barriers to charging project developers in terms of the large capital outlays and planning required several years ahead of actual utilization for truck electrification projects, this new medium- and heavy-duty FCI program should be much larger than the current FCI program.

Finally, CARB should allow more types of electric transportation technologies to earn credits in the LCFS. Currently other fuels can earn credits for most end-use applications, but

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<sup>44</sup> Examples of non-residential credits include charging of light-duty, medium-duty, heavy-duty and non-road vehicles away from home, fixed guideway electrification, and fleet charging of vehicles, marine vessels, material handling equipment, aircraft and similar non-road equipment.

many types of electric vessels, aircraft, and off-road equipment cannot because they lack an approved Energy Economy Ratio (“EER”). Companies investing in emerging electric technologies, many of whom are start-ups, do not have the expertise and funds to go through the detailed application to CARB for an EER. The solution is for CARB to establish conservative default EERs (e.g., 3.0) that can be used by these emerging electric transportation technologies. This default set of EERs would incentivize electrification in hard-to-reach electric transportation applications such as mining equipment, agricultural equipment, forest equipment, boats, marine vessels, ferries, aircraft, locomotives, tow-tractors, sweepers and other off-road equipment. In addition, because a 3.0 EER is not optimal, some industries would still be motivated to submit an application to CARB in order to establish a higher, more favorable EER. Supporting the development of clean, electric transportation technologies is essential to meeting California’s climate goals while reducing air pollution and health harms to vulnerable communities.

**V. Green hydrogen must be produced according to the “three pillars” of additionality, deliverability, and hourly matching in order to receive a CI of zero.**

Where green hydrogen is credited, it should be produced with clean electricity and aligned with the three pillars<sup>45</sup> of additionality, deliverability, and hourly matching in order to receive a carbon intensity of zero.

- **Additionality:** The requirement that an electrolyzer demonstrate that it helped drive the deployment of a new clean energy project that would otherwise not have been built. This is intuitive: if an electrolyzer is creating new demand on a fossil-dominated grid, it should help secure new clean energy supply.
- **Deliverability:** It stands to reason that for an electrolyzer to claim that a clean energy project is offsetting its grid electricity consumption by displacing fossil fuels, the clean energy project needs to be delivering power into the same grid where the electrolyzer is located and displacing fossil electricity in proportion to the fossil electricity drawn by the electrolyzer.
- **Temporal matching:** Emissions on the grid vary widely depending on the time of day: when the sun is shining during the day or wind is copious at night, emissions are lower as

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<sup>45</sup> Rachel Fakhry, NRDC blog, “Success of IRA Hydrogen Tax Credit Hinges on IRS and DOE” (December 8, 2022): <https://www.nrdc.org/bio/rachel-fakhry/success-ira-hydrogen-tax-credit-hinges-irs-and-doe>.

wind and solar projects – where those are present—generate electricity. In contrast, when wind and solar generation is paltry and electricity demand is high, emissions can be very high due to the utilization of coal and gas plants. An electrolyzer drawing grid power should only be allowed to claim that its consumption is offset by clean energy during times when this clean energy is actually generating. Therefore, there needs to be a strong correlation, or “temporal matching,” between times of electrolyzer operations and times of clean energy generation.

## **VI. Conclusion**

NRDC appreciates the opportunity to shape the LCFS Program, which – if updated as described here – can help drive the transition to a cleaner, healthier, and safer transportation sector. Importantly, the work on fuels done by the LCFS should be secondary to the direct regulation and support for zero-emissions cars and trucks. California and other states should prioritize the transition to zero-emissions vehicles (ZEV) first through programs such as Advanced Clean Cars II and Advanced Clean Trucks. After those primary steps are taken, the adoption and implementation of a LCFS should focus on supporting and accelerating this transition to ZEV through renewable electricity and green electrolytic hydrogen, followed by lowering the carbon-intensity of the remaining liquid fuels needed.

Sincerely,

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cc:

Chair Liane Randolph and Members of the CARB Board  
Environmental Justice Advisory Committee Members  
Rajinder Sahota, Chanell Fletcher, Jamie Callahan