



January 7, 2022

Ms. Cheryl Laskowski, Branch Chief
Transportation Fuels Branch
California Air Resources Board
1001 I St
Sacramento, CA 95814

Re: Low Carbon Fuel Standard December 7th, 2021 Workshop

Dear Ms. Laskowski,

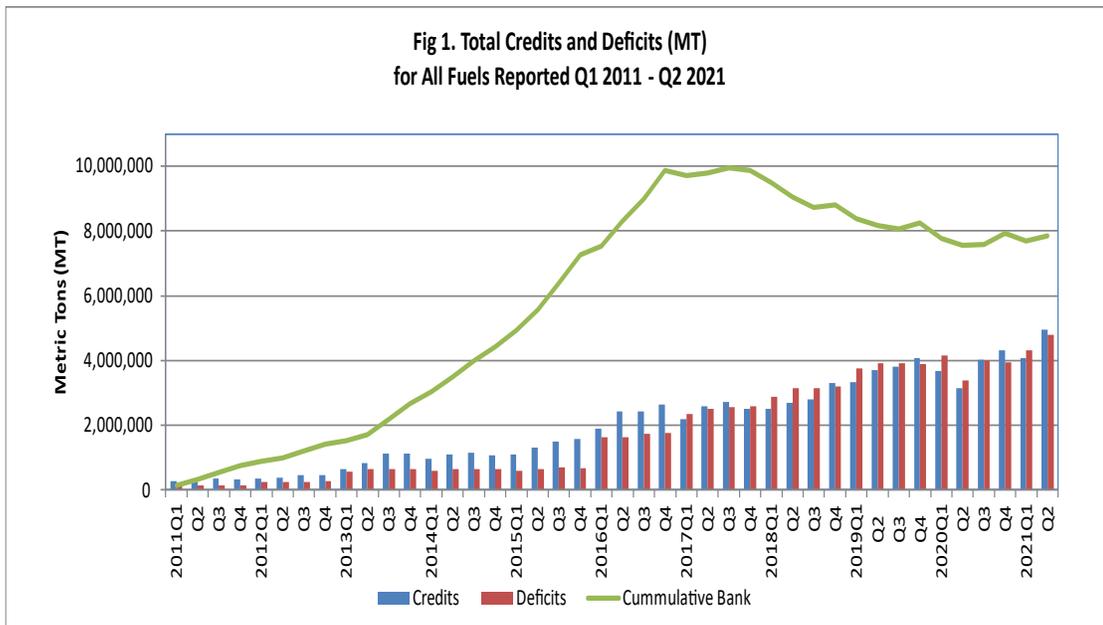
The Renewable Fuels Association (RFA) thanks you for the opportunity to comment on the first workshop on potential changes to the Low Carbon Fuels Standard (LCFS) program held on December 2021. The RFA is an enthusiastic supporter of the LCFS and looks forward to engaging in this process to strengthen and extend the program beyond 2030. The RFA is also working around the country in collaboration with other stakeholders to implement similar programs in other states.

The following comments offer RFA's perspective and are responsive to CARB staff's request for stakeholder input on specific topics.

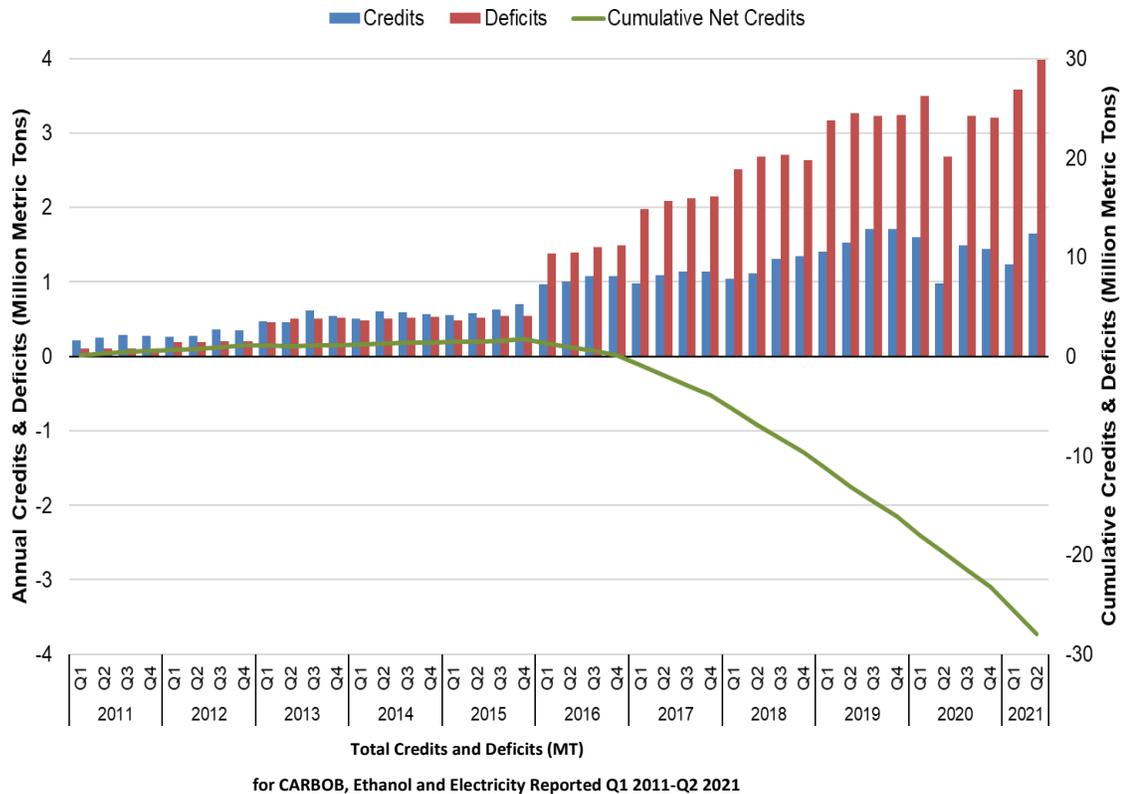
- **The integrity of the LCFS depends on technology neutrality.** The hallmark of success of the LCFS is its market-based technology neutral approach that is driven by the carbon intensity scores of all fuels whether generating credits or deficits. The RFA supports California's goal of carbon neutrality by 2045. This is an aggressive, but achievable goal that will require a broad portfolio of low and zero carbon fuel solutions. Any new policies that are introduced to incentivize new innovations and technology development should be available to all low carbon fuels.
- **RFA supports CARB staff consideration of strengthening the LCFS compliance curves before and after 2030.** This is appropriate to harmonize the LCFS with the goal of carbon neutrality by 2045, and it sends the long-term market signal necessary to encourage the significant new investment in innovative technologies required to meet decarbonization goals. In the early years of the LCFS, political and market uncertainty resulted in low and volatile LCFS credit pricing which dampened investment in lower carbon fuels. In 2018 through the first half of 2021, credit prices held steady in and around \$200 per metric ton, stimulating new investments in growing supplies of lower carbon biofuels, electrification, and refinery improvements. In the last six months,

credit prices have dipped to below \$150 per metric ton, and there is a real risk of not attracting sufficient new investments for the large volumes of low carbon fuels needed in order to meet future compliance targets. Prices have drifted lower due to the success of the program, with projections of over compliance and a significant build in the credit bank balance over the next several years. Quickly moving to a steeper and longer-term compliance curve will send a strong market signal that the ultimate success of the LCFS depends on continued innovation and new investments.

- Higher ethanol blends are necessary to meet a more aggressive LCFS compliance schedule and carbon neutrality goals.** Higher blends of low carbon ethanol in the current gasoline pool represent the nearest term and most affordable path for immediate reductions of GHG emissions from the light duty fleet. Higher ethanol blends are also necessary to meet the longer term need to decarbonize the liquid fuels that will be in the California transportation system for decades to come. The University of California’s Institute of Transportation Studies report, *“Driving California’s Transportation Emissions to Zero”* (April 2021) clearly documented this challenge and pointed repeatedly to the need for the LCFS and complementary policies to drive the substantial volume of liquid fuels remaining in the system to near zero carbon. To date, ethanol has contributed 33 percent of all LCFS credits, with the vast majority from 10 percent ethanol blends (E10). Complementary policies to allow for higher blends of ethanol, E15-E100 are a critical component to the future success of the LCFS. Even with ethanol contributing the largest share of LCFS credits in the program, limiting ethanol to a 10 percent blend has swamped the gasoline pool with net deficits. The first chart shown below is for all fuels showing a net credit balance of approximately 8 million metric tons program to date as reported by CARB.



Looking at the gasoline pool separately, as shown in the chart below, is a different picture, where ethanol and electricity combined as the only current replacements for gasoline are not even close to covering the deficits generated by CARBOB, resulting in a large and growing deficit of nearly 30 million metric tons program to date.



The rapid growth of renewable diesel, which is not capped by volume in the program, has provided the excess credits in the program to cover the gasoline deficits. This is not sustainable, as new supplies of renewable diesel are needed to further displace conventional diesel and gasoline substitutes will need to cover gasoline deficits in a system moving toward carbon neutrality. This will only be possible with the widespread deployment of low to zero carbon ethanol at blends well above 10 percent, along with electrification and other bio-based gasoline substitutes. An important first step is to immediately approve the use of E15 in California. If all gasoline in California were blended with E15, an additional 2 million metric tons of GHG emissions would be reduced annually. Currently, California and Montana are the only two states where E15 is not a legal fuel. For a state that has always been a leader in clean fuels policy, the current prohibition on E15 sales is a particularly dubious distinction.

- **Biofuel producers should qualify for book and claim credits for RNG in the pipeline utilized to substitute for natural gas in the biofuel production process.** This modification to the LCFS would be consistent with the principles of technology neutrality and further incentivizing private investment in low carbon fuels. It is also analogous with the book and claim accounting that is currently allowed for hydrogen producers utilizing pipeline RNG in the manufacturing process of hydrogen for fuel. To ensure fairness, consistency, and neutrality across all low carbon fuel pathways, CARB should allow all low-carbon fuel producers to use the same accounting procedures. Combining RNG for process fuel with carbon capture and sequestration (CCS) projects that are now in the planning stages at many ethanol facilities, moves the industry to the production of ultra-low to zero carbon ethanol. All RFA members have committed to carbon neutral ethanol production by 2050 or sooner. The right policy support from the LCFS facilitates this valuable contribution in meeting the state's climate goals.
- **RFA strongly supports incorporating site specific agricultural inputs into fuel pathways.** RFA appreciates CARB staff's openness to consider this modification to the LCFS. A significant portion (roughly half) of the full life cycle carbon intensity of ethanol is from the agricultural production of the feedstocks. With the increasing employment of no till, cover cropping, and other modern precision agricultural practices, farmers have quantified the ability to significantly lower the carbon intensity of feedstock production while also increasing soil carbon levels. These practices result in carbon scoring well below the current averages employed in the CA-GREET model. Currently, the CA-GREET model does not allow ethanol producers to incorporate these practices and carbon reductions into their pathway carbon intensity scores. Providing site specific input analysis will further incentivize these carbon efficient agricultural practices, resulting in lower carbon ethanol production and contributing to a more successful LCFS. RFA looks forward to working with CARB staff and other agricultural and academic stakeholders to systematically address CARB's questions regarding verification and permanence.
- **The land use change values in the modelling should conform to updated analytical and empirical data.** A recent analysis by a collaboration of researchers from Environmental Health Engineering, MIT, Tufts and Harvard concluded that a land use change (LUC) emissions value for corn ethanol of 3.9 g/MJ represents the most credible evolution of the science on the topic. Oregon's Clean Fuels Program uses the Argonne GREET model values of 6.8 g/MJ. These lower values are supported by recent analyses of land use patterns by Purdue University, the U.S. Departments of Energy and Agriculture, University of Illinois, and other institutions. Both values are well below California LCFS value of 19.8 g/MJ, which has not been updated since 2014. The Argonne GREET model is the basis for the entire life cycle analysis in the LCFS, so it is consistent to use Argonne GREET for land use change values as well. Argonne updates its model regularly (typically on an annual basis) to incorporate the best science on all variables. Additionally, in the

interest of technology neutrality and with the rapid increase in battery-electric vehicles, the land use impacts of mineral extraction for battery production should also be evaluated¹, along with the land use implications of expanded wind and solar electricity generation².

- **A combination of a high concentration of low to zero carbon ethanol combined with more efficient engines is an opportunity to define new Energy Economy Ratios (EERs).** The high octane of ethanol combined with a plug-in hybrid higher compression engine qualifies as a ZEV and represents an opportunity for defining a new EER. Specifically, our analysis has shown that the use of a high-octane (98 RON) blend containing 30 percent ethanol in a high-compression ratio engine would result in a drivetrain energy efficiency improvement of 11 percent, equating to an EER of 1.11.
- **RFA applauds CARBs commitment to support the exportability of the LCFS.** Many other jurisdictions across the country are now considering LCFS type programs and California is the leader. The successful policy framework of the LCFS is an excellent model for developing new programs outside of California, but its attractiveness to other jurisdictions depends on maintaining a technology neutral, market-based structure. RFA believes that protecting the integrity of a performance based standard and working on incorporating site specific agricultural inputs improves the exportability of the LCFS program.

RFA urges CARB staff to move expeditiously to make these modifications to the LCFS. The most recent UN IPCC report and subsequent COP 26 meeting in Glasgow make alarmingly clear the imperative of further reducing GHG emissions immediately. The cumulative impacts of not reducing GHG emissions as soon as possible can be catastrophic. A combination of higher ethanol blends with the ongoing decrease in the carbon intensity of ethanol presents a practical and cost-effective opportunity for immediate and long term GHG reductions in the LCFS.

¹ See, for example, International Energy Agency. "The Role of Critical Minerals in Clean Energy Transitions." May 2021. The report shows highly variable EV carbon intensity based on the minerals used. Mining and processing of cobalt sulfate, for example, is four times more carbon intensive than mining and processing of zinc. <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>

² A recent study published in Nature, for example, found that the land cover changes, including indirect effects, associated with significant expansion in solar "...will likely cause a net release of carbon ranging from 0 to 50 gCO₂/kWh [0-180 g CO₂/MJ], depending on the region, scale of expansion, solar technology efficiency and land management practices in solar parks." See: van de Ven, DJ., Capellan-Peréz, I., Arto, I. *et al.* The potential land requirements and related land use change emissions of solar energy. *Sci Rep* **11**, 2907 (2021). <https://doi.org/10.1038/s41598-021-82042-5>

RFA looks forward to working with CARB staff and other stakeholders in this important process of strengthening and extending the successful LCFS program.

Sincerely,

Kelly Davis
VP of Regulatory Affairs