ENVIRONMENTAL DEFENSE FUND
finding the ways that work

November 14, 2008

Christina Zhang-Tillman
California Air Resources Board
1001 "I" Street
Sacramento, CA 95812

Re: Comments on Draft Low Carbon Fuel Standard Regulation

Dear Mr. Fletcher and Ms. Zhang-Tillman,

Please accept this letter in support of the ongoing work being performed to develop a Low Carbon Fuel Standard for California. Environmental Defense Fund commends the staff for their continued work and for engaging stakeholders to create a standard that will help catalyze a shift in the transportation fuel sector in California. Further, we acknowledge and appreciate the recognition of our prior comment letters in the LCFS supporting documentation.

In general, Environmental Defense Fund supports the LCFS as proposed, however we also recommend some modifications be made to the proposed structure to maximize the environmental integrity and functionality if the standard. Some of these recommendations are repeated from prior comment letters submitted to the agency, while others are new. Where applicable, we note where prior comment letters expand upon the comments we deliver.

In general, our comment letter is organized in sections based on the following topics:

- **Direct and indirect emissions accounting**: CARB should utilize all tools to accurately account for direct and indirect emissions accounting.
- **Treatment of time in emission accounting**: CARB should reconsider its treatment of time in the emissions calculations.
- **Sustainability protections**: CARB must take sustainability into account in the LCFS rulemaking, or shortly after.
- **Applicability of the standard:** The LCFS approach to cover as many fuels as possible is a valuable step toward driving production of new low carbon fuels.
- **Achievability of the standard:** Recent analysis shows the 10% LCFS requirement can be achieved and will set the state on a path to longer term, larger reductions.
- **Using a single standard credit calculator approach**: CARB should consider combining the credit calculation for fuels.
- **Vehicle Efficiency Adjustments**: More analysis and disclosure of assumptions should support the recommendation of energy efficiency adjustments – especially with reference to use of LCFS over-compliance as AB32 offsets.
- **Incentives in the standard**: CARB should seek to bridge the disconnect between alternative fuel suppliers and vehicle manufacturers.

- **Incentives in the standard**: CARB should expand on the opportunity to reward renewable energy production within the LCFS.
- **Complying with other AB 32 requirements**: CARB should provide a path for meeting air quality and environmental justice protections set forth in AB 32.

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- **CARB should utilize all tools to accurately account for direct and indirect emissions accounting**

**Overall emissions accounting** - Regardless of the emissions, direct or indirect, CARB should strive to develop and utilize the most accurate emissions accounting possible within the Low Carbon Fuel Standard. Further, in addition to decreasing greenhouse gas emissions associated with production, delivery and use of fuels, CARB should use the LCFS as a tool to develop a broader understanding of how various fuel feedstocks and finished products are manufactured and distributed throughout the region, and how fuel providers can be held accountable for tracking the fuel. However, the desire to incentivize data reporting must be tempered by a need to prevent fuel providers from being able to pick the most economically advantageous time to report valuable fuel production information. Rather, the LCFS should strive to have fuel providers capture and report fuel production data as promptly as possible. Environmental Defense Fund generally views the current approach to the LCFS as meeting these goals and looks forward to working with staff further.

**Direct emissions accounting** - For carbon intensity values calculated from direct land use, Environmental Defense Fund agrees with the current approach to develop look-up tables with transparent assumptions overlaid onto a GREET interface. Where it has been necessary to make assumptions or choose a default value for a portion of the fuel production pathway, CARB should clearly indicate the rationale for the decision made as well as attempt to characterize the amount of uncertainty in the estimates.

**Indirect emissions from land use change caused by biofuels** – Over the past year, an increasing body of credible scientific understanding has shown that production of crop based fuels can lead to indirect emissions of greenhouse gases through market mediated land use change. These findings have placed a spotlight on a phenomenon that cannot be overlooked and must be tackled to ensure we are not inadvertently increasing greenhouse gases through activities aimed at reducing them. Further, due to the potential size of the emissions associated with ILUC and the urgent need to find solutions to climate change, it is evident that CARB cannot afford to avoid taking serious action to prevent ILUC emissions from fuels incentivized by the California standard, and moreover, CARB should use all approaches available. However, (as you know), a vigorous debate has ensued regarding how to take ILUC emissions into account.

The current proposal for the LCFS recommends using a quantitative framework to account for ILUC emissions by computing them through macro-economic CGE modeling and assigning them to the lifecycle emissions of particular fuels. Under this approach, fuel providers are incentivized to search for fuels which have lower ILUC emissions because they will receive more favorable treatment (credits) within the LCFS. Environmental Defense Fund believes that current scientific understanding on CGE modeling and land-use change patterns is sufficient to calculate reasonable estimates of ILUC GHG impacts and CARB can fulfill its legal requirements within the LCFS rule-making by using this approach. However, CARB should build in capacity to refine its estimates of ILUC emissions as additional scientific information becomes available and strive to achieve maximum transparency regarding

estimates and assumptions used. Further, to the extent that ILUC emissions calculations are inherently uncertain, CARB should attempt to characterize, quantify and disclose the uncertainty within the public domain.

Although Environmental Defense Fund understands the reasoning behind using a quantitative framework to assign ILUC emissions to various fuels, we also recommend CARB seriously investigate and forward the development and use of qualitative frameworks to prevent or mitigate ILUC directly. Approaches such as widespread adoption of domestic and international carbon caps and international forest carbon frameworks like REDD can preserve biodiversity while reducing emissions and providing developing nations incentives to take serious action on climate change. Further, sustainability initiatives and threshold standards that avoid rewarding fuels produced via deforestation, peat soil loss, and CRP land conversion can act to prevent GHG emissions in both international and domestic settings. These approaches, while somewhat longer-term in development, create durable, consistent and far-reaching approaches to prevent ILUC and reduce planetary GHG emissions.

Environmental Defense Fund recognizes the limited options available to CARB to implement larger qualitative frameworks to prevent (or reduce) ILUC emissions from crop based fuel production. However, potential widespread replication of California's LCFS approach on ILUC emissions both in other states as well as federally and internationally does increase the importance of utilizing all the tools available. Further, to the extent that effective approaches to prevent forest and rangeland conversion are adopted, quantitative methods to calculate ILUC will become less important because the ILUC number will diminish rapidly.

**Other indirect emissions** – Environmental Defense Fund recommends CARB also account for indirect emissions associated with activities other than ILUC from biofuels. For fossil fuel production, although some informal reports have described these emissions as small on a gCO2/MJ basis (due to the large amount of embodied energy in the fuel delivered), equity in accounting would require boundary lines be drawn for lifecycle analysis that are the same as other fuels. Therefore, if new fossil fuel development (e.g. natural gas, tar sands, oil sands, etc.) requires land conversion, mining, trucking or pipeline operation, CARB should consider whether to include that activity in the LCA and clearly state why or why not a particular activity was included. Similarly, for biofuels, CARB should account for indirect emissions associated with use of water in the fuel cultivation and production process, and enable producers to take advantage of efficiency measures that both reduce GHGs and conserve resources.

- **CARB should reconsider the treatment of time in the emissions calculations**

Although considerable attention has been focused on whether the use of CGE models is appropriate for ILUC emissions, another factor worthy of attention is the treatment of time and how emissions are either averaged, discounted, or weighted over a certain time period.

Currently, CARB's LCFS proposal amortizes emissions from land conversion over a 30-year time horizon. The basis for this period appears to be derived from the Searchinger work appearing in *Science* (2008), representing the period over which biofuel production would occur on an area of converted land. However, such amortization represents an averaging approach that both treats emissions from each year equally, and assumes the emissions will cease after the period is over. As both assumptions are subject to debate, Environmental Defense Fund recommends that CARB revisit this approach to both assess whether a 30-year time period respects the urgency of the climate change problem (and the certainty of the land reversion time-period) and whether it offers the most scientifically accurate quantification of the climate forcing potential of carbon dioxide accumulation.

The IPCC has stated that preventing 2 degrees C temperature increase is necessary earth to prevent catastrophic climate change. To accomplish this, urgent action is necessary to reduce GHG emissions ands fast as possible. Choosing a shorter amortization time period would assign a higher value to emissions from land use and would create a larger incentive to source biofuels from feedstocks that do not impact land patterns. Further, to the extent that the amortization period captures the time over which land is certain to be in crop production, a shorter period is more certain than a longer period because the federal RFS only provides volumetric production mandates until 2022.

A recently developed approach that has potential to replace the amortization framework all together is the use of atmospheric decay models that look at accumulation of carbon dioxide in the atmosphere based on its residence time. Where such approaches offer more accurate estimates of the greenhouse gas impacts from ILUC, CARB should evaluate their use in the LCFS.

- **CARB must take sustainability into account in the LCFS rulemaking, or shortly after.**

Although the LCFS is a fuel standard, (in addition to an alternative fuel vehicle efficiency standard by way of the EER), it is important for the CARB to attempt to prevent unwanted side effects stemming from fuel production incentivized by the regulation. This prevention falls under the rubric of taking sustainability into account within the standard. In current form however, the standard does not take environmental harm prevention or sustainability (outside of GHG emissions) into account, and therefore should be changed.

Environmental Defense Fund provided extensive comments on June 5, 2008 to CARB regarding how sustainability could be taken into account within the LCFS. In that comment letter, we argued that the LCFS should utilize a rigorous scientific approach to sustainability while maximizing positive impacts and minimizing negative impacts. One way to do this we argued, is to adopt a modified version of the requirements of the Federal Renewable Fuel Standard (on which we provided specific comments for suggested modifications.) Further, in our comment letter we accepted that time constraints could prevent the development of a comprehensive approach and therefore recommended that CARB, at a minimum, require fuel providers to collect and report the data necessary to create a robust sustainability regulatory framework in the very near future. We also recommended an expansion of the LCFS be started soon after initial adoption in order to prevent unwanted and unforeseen impacts while providing fuel producers time to modify their biomass processing and fuel production practices. Since we filed that letter, researchers at the University of California recommended a similar approach: developing sustainability reporting metrics leading to a broader framework. We therefore respectfully request reconsideration of our full approach, (a modified RFS with up front reporting requirements) and ask CARB to acknowledge that action to prevent environmental harm is a necessary component of the LCFS rulemaking process.

- **Applicability of the standard**

Environmental Defense Fund supports the efforts to structure the LCFS to cover as many fuels as possible. By signaling to producers that alternative fuels produced in appreciable quantities will be treated equitably under the standard, (and rewarded based on the amount of GHG reductions they are able to make compared to traditional fossil fuels), the LCFS can serve as a tool to drive production of low carbon fuels quickly, and at commercial scale. Further, by preventing traditional diesel fuel use from serving as a compliance pathway for fuel providers, the LCFS forces new fuels to be developed rather than expansion of use of liquid fossil fuels.

- **Achievability of the standard**

Recent reports from the University of California, scenario analysis performed by CARB, and our own informal analysis indicates that compliance with the 2020 LCFS reduction mandate can be achieved. Through these analyses, it is apparent that the most likely compliance scenario will entail a mix of alternative fuel options: blending advanced liquid fuels into traditional gasoline and diesel; making lower carbon gaseous fuels, using high percentage blends of liquid fuels; using electricity; and using hydrogen in the vehicle fleet. Further, the AB32 scoping plan discloses that the LCFS should seek to achieve a 25% reduction in carbon intensity by 2030 if the state is to meet its long term emissions reduction targets. Environmental Defense Fund asserts that by transitioning our vehicle fleet to a higher percentage of alternative fuel vehicles and lowering the carbon intensity of the fuel supplied, coupled with an economy with cap on carbon that includes that transportation sector, an ambitious target like 25% by 2030 can be met.

- **CARB should consider combining the credit calculation into a single approach.**

Environmental Defense Fund has commented in the past that the best and easiest method to structure the LCFS is with a single baseline standard applicable to both diesel and gasoline. The major reasoning for using this approach is to create an LCFS that achieves the requisite environmental benefit while remaining administratively simple and low cost to implement. Within those first comments however, we concluded that if CARB used efficiency adjustment factors within the LCFS, the most likely construction of the standard would contain separate gasoline and diesel baselines due to a variety in the compliance options available to fuel providers. Currently, since the proposed standard includes vehicle efficiency adjustment factors for certain alternative fuels, a two standard may be appropriate. However, since neither gasoline nor diesel are adjusted and each have an AFCI value approximately equal to the other, we recommend the use of a single approach to calculating LCFS credits under the standard.

The benefit of a single credit calculation approach would be the elimination of much of the need to track the type of vehicle that particular fuels were being sold to fill. Specifically, for alternative fuels used in combustion engines, (biofuels, CNG and LPG), there would not be a need to track whether fuel sales went to light, medium or heavy duty vehicles. In these instances, rather than using a fuel specific EER to calculate gasoline or diesel volume displacement, LCFS credits would be based on 1) volume of alternative fuel sold and 2) the difference between the AFCI value of the alternative fuel and AFCI value of the fossil baseline. And, since the LCFS credit calculator as proposed does not give diesel or gasoline an efficiency adjustment, the total sales volume of alternative fuels would be the key factor in determining the amount of total fuel displaced, thus automatically adjusting credits according to the inherent engine efficiencies.

Environmental Defense Fund does recognize however, for alternative fuels used in non-combustion engines, (electricity and hydrogen), since the AFCI is based on energy equivalency values determined by the type of vehicle the fuel is used in, producers would likely still need to track and report the type of vehicles sold to.

One caveat to creating a single credit calculator approach versus an approach that separates gasoline and diesel fuel displacement is: Environmental Defense Fund does not support rewarding the increased use of diesel fuel in the state within the LCFS. Therefore, when calculating credits under a single standard LCFS, neither gasoline nor diesel should be able to generate compliance credits under the standard. Of course, as the state moves toward requiring a reduced AFCI of fuels sold, increased use of gasoline or

diesel may provide a debit (or deficit) under the standard as it becomes increasingly above the AFCI baseline.

- **More analysis and disclosure of assumptions should support the recommendation of energy efficiency adjustments – especially with reference to use of LCFS over-compliance as AB32 offsets.**

As discussed in prior comment letters, Environmental Defense Fund does not recommend the use of efficiency adjustment factors for alterative fuels (and vehicles) within the LCFS. However, based on the supporting documentation and comments of staff in rule development workshops, we understand the admirable desire to provide incentives to low carbon fuels such as electricity and hydrogen. Primarily due to the high carbon intensity of electricity production in the western region, without the EER such fuels would be calculated to deliver a carbon disbenefit compared to traditional fossil fuels. By creating an efficiency adjustment that applies to both the energy differential between fuels as well as the volume differential associated with increased vehicle efficiency, the EER creates a considerable benefit to sellers of these fuels for use in vehicles.

Since the EER is such a highly integrated component of the LCFS, Environmental Defense Fund recommends considerably more concentration and discussion be devoted to the development of the EER factors in the final staff report and rule workshops. Since the calculating the efficiency of various vehicles entails the use of uncertain assumptions, understanding those assumptions and the size of the uncertainty will be necessary to accurately calculate the amount carbon credit achieved by LCFS over-compliance. Further, since LCFS over-compliance is referenced as a potential carbon offset in an AB32 program[1], understanding the accuracy of the emission reduction calculation is critical to making sure emissions are not under or over accounted.

- **CARB should seek to bridge the disconnect between alternative fuel suppliers and vehicle manufacturers**

One interpretation of the purpose of the EER adjustment is to provide incentives to produce more vehicles that use alternative fuel and to provide incentives to innovate within the vehicle production industry. However, since LCFS credits are awarded to fuel providers and not vehicle manufacturers, a disconnect may exist between the goal of the standard and the mechanism used to achieve the goal. Further, since electric utilities in California must provide electric power when requested from consumers through the use of their outlets, increasing use of energy by plugging in cars or producing hydrogen may allow LCFS credits to flow to utilities without requiring fuel providers to take action.[2] Of course, providing incentives to produce and purchase alternative fuel vehicles may also be within the realm of programs like AB32 and Pavley II. CARB should therefore seek to engage fuel providers and/or vehicle manufacturers to create a bridge between LCFS credits from fuel supply and the vehicle production needed to utilize available fuels.

- **CARB should expand on the opportunity to reward renewable energy production within the LCFS**

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[1] Environmental Defense Fund strongly discourages the use of LCFS over-compliance as offsets in an AB32 cap-and-trade program. See Environmental Defense Fund Comment Letter on Proposed concept outline comments (May 5, 2008)

[2] Although comments from stakeholders posted on the CARB public comment website have indicated that some LCFS credit revenue would likely be used to develop fueling infrastructure throughout the state.

In prior comment letters on the LCFS, Environmental Defense Fund discussed the opportunity for the LCFS to help lower the carbon intensity of the electricity production in the state. During the October workshop, staff discussed the potential development of a mechanism within the LCFS to incentivize the production and sale of renewable electricity into transportation vehicles. Although the structure of such a mechanism could take several forms, the concept of rewarding renewable energy production is one we fully support. Unfortunately however, with EER adjustments granted to electric and hydrogen vehicles, any carbon intensity improvement will be tempered by the extent to which the EER adjusts the AFCI value of the fuel. For example, with an EER adjustment of 3.8 (Battery Electric Vehicles), a reduction in the AFCI value for electricity will be the gCO2eg/MJ improvement divided by 3.8.

- **CARB should provide a path for meeting air quality and environmental justice protections set forth in AB 32.**

The LCFS is a major regulation that seeks to drive innovation and transform California's transportation system. According to reports from the California Energy Commission and University of California, achieving large reductions in the AFCI of our transportation fuels will most likely require a mix of solutions like use of low carbon biofuels, renewable fossil fuels, electrified transport, hydrogen, low carbon compressed gases and others. However, to achieve the requirements of AB 32, the CARB must perform an analysis for the LCFS to assess the potential for air quality and environmental justice impacts, and include important safeguards to prevent back-sliding and environmental harm. Environmental Defense Fund looks forward to working with CARB to develop these analyses and tools, and respectfully request CARB develop a timeline for completing them.

Again, thank you for your attention on this matter. Please feel free to contact me with any questions or concerns you have.

Sincerely,

Timothy O'Connor
Attorney - California Climate Initiative
Environmental Defense Fund

Cc:
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