

Richard Corey, Chair  
Michelle Buffington, Co-chair  
LCFS Program Review Advisory Panel  
California Air Resources Board  
1001 "I" Street  
Sacramento, California 95814

**RE:** Comments of the Renewable Fuels Association regarding draft *Low Carbon Fuel Standard 2011 Program Review Report* (October 27, 2011)

Dear Mr. Corey and Ms. Buffington,

Thank you for the opportunity to provide comments in regard to the draft *Low Carbon Fuel Standard 2011 Program Review Report* released at the October 27 Advisory Panel meeting. RFA thanks the Air Resources Board (ARB) for the opportunity to participate in the Advisory Panel process, and we believe the stakeholder discussions were insightful and constructive. Further, we applaud ARB for the highly professional manner in which the Advisory Panel meetings, and the process in general, were conducted.

This letter offers RFA's remarks on each chapter of the draft report to the Board. We offer both general comments and specific recommendations for modifications to the report's text. Each recommendation for modifications to the text is accompanied by a statement of justification for the proposed change.

While we recognize and appreciate the substantial effort of ARB staff to prepare this draft report, we believe several chapters do not sufficiently reflect the discussions of the panel, nor do they provide the information necessary for the Board to properly assess the future efficacy of the LCFS program. Specifically, we believe chapters IV (Advances in Lifecycle Assessment), VI (Meeting the Targets) and VII (Economic Assessment) need significant revision before submission to the Board.

## **I. Executive Summary**

*Specific Recommended Modifications:*

**Page 17: It is the Staff's opinion that c**Consideration of including a flexible compliance mechanism at this time is premature as it would require considerable evaluation and stakeholder dialogue.

*Justification:* As currently worded, the impression could be given that it was the consensus opinion of the Advisory Panel that consideration of a flexible compliance mechanism (FCM) is premature.

Clearly, such an impression would not be accurate, as several panelists suggested ARB should consider an FCM at this time. This recommended modification is meant to clarify that it is the position of *ARB staff* that consideration a flexible compliance mechanism is premature.

## II. Background on the 2011 LCFS Advisory Panel—*No comments*

## III. Advisability for Harmonization

*Specific Recommended Modifications:*

**Page 30:** Land use change effects, both direct and indirect, are also considered in CI valuation for crop-based biofuels.

*Justification:* Clarifies that LUC effects are only considered for crop-based biofuels, as opposed to all regulated fuels.

**Page 32:** Although the methodological approaches of the Oregon LCFS have not been finalized, they appear similar to the California LCFS. However, a key difference is that Oregon DEQ is proposing to delay inclusion of indirect land use change emissions in the regulation's CI scores for biofuels until there is more consensus and certainty surrounding methods to estimate such emissions.

*Justification:* Since one of the purposes of this chapter is to identify areas of harmony and/or disharmony in existing and pending low carbon fuels policies, it is important to point out where key differences exist in policy/regulatory design. The decision to include or exclude ILUC is of central relevance to the overall design and function of a low carbon fuels regulation. Thus, ARB should clearly indicate that Oregon is planning to delay inclusion of ILUC factors in the state's LCFS carbon scoring framework. ARB notes that the British Columbia LCFS does not include ILUC; it should indicate the same for Oregon.

**Page 33:** The Midwestern Governor's Association represents Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Ohio, South Dakota, and Wisconsin. ~~The Advanced Transportation Fuels Advisory Group is currently undertaking studies and discussions of a Low Carbon Fuels Policy. According to the 2010 Low Carbon Fuels Policy Document, proposed recommendations are to use 2005 as baseline for reductions and to require 10 percent reductions within 10 years of implementation. A Low Carbon Fuel Policy (LCFP) Advisory Group was appointed by MGA governor members in 2009 to make recommendations on the design of a regional LCFP. The group released its final recommendations in a 2010 report. According to the report, the group prefers a "unified federal approach" to low carbon fuels policy rather than state or regional policies. Therefore, the report's recommendations were~~

**focused on future development of a federal LCFP. Among other recommendations, the report suggests that a federal LCFP should delay the inclusion of ILUC until general consensus exists within the scientific community on how best to estimate this effect.**

*Justification:* As a member of both the MGA Advanced Transportation Fuels Advisory Group and Low Carbon Fuel Policy Advisory Group, RFA believes ARB's existing description of the MGA LCFP process is inadequate and fails to properly reflect the key recommendations of the LCFP group. Further, ARB should provide a footnoted reference and link to the MGA LCFP final report (<http://www.midwesterngovernors.org/Publications/LCFPagDoc.pdf>), as was done for the NESCAUM Clean Fuel Standard economic analysis.

**Page 34:** Advanced biofuel is renewable fuel, other than corn **starch**-based ethanol, with lifecycle GHG emissions that are at least 50 percent less than GHG emissions produced by gasoline or diesel.

*Justification:* Clarifies that the EISA definition of "advanced biofuel" means renewable fuel, other than ethanol derived from corn *starch*.

#### **IV. Advances in Lifecycle Assessment**

*General Comments:*

RFA commented on this draft chapter in a letter dated October 21, 2011.<sup>1</sup> We refer ARB staff to that letter, as our comments as of that date still stand. Many, but not all, of the comments and recommended modifications from our October 21 letter are restated below.

In general, RFA believes the draft chapter fails to adequately address most of the questions that were raised by panel members and included in the work plan. Many of the key questions raised in the work plan are not considered until the final page of the draft chapter, and then are only given cursory attention and vague responses. Specifically, the following questions from the work plan were not appropriately addressed:

- What are the criteria for determining whether new studies merit considering adjustments to the program?
- What potential impacts do the advances have on stakeholders? The regulation?
- What is the process for considering and incorporating future advances into the regulation?
- If updates to the lifecycle methodology lead to shifts in the carbon-intensity for a particular or set of fuels, how should the compliance schedule be adjusted to take this into account and ensure a consistent market signal?

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<sup>1</sup> Available at: <http://www.arb.ca.gov/lispub/comm2/bccommlog.php?listname=lcsadvpanmembers-ws>

- How do we balance the need for market certainty with the need for timely integration of advancements in lifecycle analysis?

Further, the chapter does not adequately address CARB's decision to disregard the new version of GREET (version 1.8d.1) as it moves forward with contract work to develop a more "user friendly" version of CA-GREET. While GREET 1.8d.1 does not make any major changes to the model's structure, it does offer significant changes to the default data and assumptions that would result in significant (i.e., more than 5 g/MJ) reductions for most corn ethanol pathways modeled by ARB. We encourage ARB to clearly explain and justify its decision not to incorporate GREET 1.8d.1.

*Specific Recommended Modifications:*

**Page 46:** The land use change effects of a large expansion in biofuel production **will may** occur both domestically and internationally. A sufficiently large increase in biofuel demand in the U.S. **will may** cause non-agricultural land to be converted to cropland both in the U.S. and in countries with agricultural trade relations with the U.S. In order to isolate the land use changes resulting specifically from an increase in biofuel production, one must **determine estimate** the differences in land use between the "world with the increase in biofuel production" and the "world without the increase in biofuel production." Unfortunately, empirical data on land use is not available for at least one of these "worlds." Because of this limitation, a model is required to isolate the **theoretical** differences in land use resulting from a change in biofuel production.

*Justification:* As ARB itself has acknowledged, predictions of ILUC cannot be validated; therefore, ARB should avoid using definitive terminology such as "will." Further, the differences in land use between a "world with the increase in biofuel production" and a "world without the increase in biofuel production" cannot be "determined"; rather, such hypothetical differences can only be "estimated" or "simulated."

**Page 58:** The elasticity subgroup, as part of its final Expert Workgroup recommendations suggested that ARB should maintain a **central** value of 0.25 for this elasticity.

*Justification:* Clarifies that the Expert Workgroup recommended a central value of 0.25, meaning values below *and above* 0.25 are plausible and should be used for sensitivity analysis.

**Page 58:** In this report, Professor Berry demonstrates that several research papers, including those which form the basis of the Keeney-Hertel yield-price elasticity estimate of 0.25, find that the **short-run** yield-price elasticity cannot be distinguished from zero.

*Justification:* Clarifies that the Berry work focused on the *short-run* response of yields to price, whereas the recommendation from the Expert Workgroup to use a central value of 0.25 takes into account the longer-term responsiveness of yield to price.

**Page 59:** The reduction of food and feed consumption has ~~a very significant~~ an effect on the amount of land conversion and consequently the LUC carbon intensity value.

*Justification:* ARB's GTAP contractor, Prof. Wally Tyner, describes estimated LUC emissions as being "somewhat sensitive" to holding food/feed consumption constant. Prof. Tyner's sensitivity work for ARB also shows a 10 percent increase in land cover change in the case where food/feed consumption is held constant in developing nations. Thus, describing the effect as "very significant" overstates the impact on LUC carbon intensity values. Further, Prof. Tyner's interim report for ARB states, "These results indicate that biofuels have a minor impact on changes in food consumption."

~~Pages 59-60: If the models are properly estimating the response of food and feed consumption to price changes induced by biofuel expansion, the potential impacts on human welfare are significant. These impacts are estimated in reports published by De Hoyos and Medvedev<sup>53</sup> and by Goklany<sup>54</sup>. De Hoyos's work estimates the price increases and poverty effects from the growth of crop-based biofuels over the time period of 2004 to 2010 due to existing global mandates for corn and sugarcane ethanol and biodiesel (e.g. the Renewable Fuel Standard). The modeling suggests that food commodity price increases, occurring in response to biofuel production, are heavily biased toward poorer regions of the world. In turn, these price increases are estimated to result in an additional 32 million people falling below the extreme poverty level and an additional 47 million falling below the moderate poverty level for the time period of 2004 to 2010. The increase in poverty is concentrated in two regions: South Asia and Sub-Saharan Africa, with by far the greatest impact in South Asia. Goklany's work builds upon De Hoya's results and develops what he describes as an —exploratory analysis<sup>11</sup> that provides an —order of magnitude<sup>11</sup> estimate of death and disease increases in developing countries. Goklany estimates 192,000 hunger-related excess deaths in 2010 and 6.7 million Disability Adjusted Life Years (DALYs) lost to hunger-related disease in response to global biofuel expansion between 2004 and 2010.~~

~~We want to be careful to point out that the estimates presented by De Hoyos and Medvedev and by Goklany are relevant to existing crop-based biofuel production levels that are largely mandated by government programs. The market signal from the California LCFS to increase production of crop-based biofuels relative to the existing global mandates is expected to be extremely small. Moreover, this market signal is expected~~

~~to diminish over time as second- and third-generation biofuels become commercialized and replace crop-based biofuels as viable alternative fuels within the LCFS.~~

*Justification:* If the ARB report is intended to reflect the deliberations of the Advisory Panel, this entire section must be extracted from the document. It bears no relevance to panel discussions, nor does it address in any way the focus of the chapter, which is “advances in lifecycle analysis.” Further, it is wholly inappropriate to include a reference to the Goklany paper in this chapter. The Goklany work was not peer-reviewed and appeared in an open-source journal that has been rebuked by the mainstream medical profession and is not listed in major academic literature search databases. RFA strongly recommends retracting this reference from the chapter, as it substantially undermines the credibility of the ARB authors of this chapter. Additionally, ARB staff’s assertion that “the potential impacts (of biofuel expansion) on human welfare are significant” is at odds with the findings of Prof. Tyner, who states in the interim report that “...biofuels have a minor impact on changes in food consumption, with the largest impact being in the US (0.27%).”

**Page 60:** The results of these sensitivity runs show that the LUC estimate is **highly somewhat** sensitive to the allowed reduction in food consumption within the model. ARB staff is evaluating these sensitivity runs as well as seeking stakeholder comments.

*Justification:* ARB’s GTAP contractor, Prof. Wally Tyner, describes estimated land cover changes as being “somewhat sensitive” to holding food/feed consumption constant. ARB’s current language overstates the sensitivity of the results.

## **V. Technology Assessment, Supply, and Availability**

### *General Comments:*

We believe the discussion in this chapter regarding the outlook for E15, E85, and flex-fuel vehicles (FFVs) is inadequate. The chapter suggests E15 will not be used in California for “several years” and only then if the state “decides to move in that direction” (we note that two of the eight compliance scenarios show some E15 being used, but not until 2016). Yet, ARB staff does not elaborate on why it believes E15 will not be a practical fuel option in the mid-term or why the state may decide not to “move in the direction” of allowing E15. Only vague references to the need for E15 “testing and rule development” are offered. ARB should provide more explicit detail in this chapter about the current outlook for E15 adoption in the state, including specific information on technical and regulatory barriers (such as the need for alterations to the “predictive model”).

In regard to E85 and FFVs, we believe ARB staff failed to comprehensively examine the challenges to expanding E85 use in the state. ARB simplistically assumes that dramatic growth in E85 use will result from projected growth in FFV sales. Unless steps are taken to overcome barriers to broader E85 adoption in California, we believe the CEC and ARB projections of E85 demand are overly

optimistic. Further, we question the basis of ARB's assumption that foreign automakers will increase FFV production to 50 percent by 2019; we have seen no indication that the foreign automakers intend to ramp up FFV production to such a degree.

As the trade association representing ethanol producers, we obviously have a strong interest in expanding the use of E85 and FFVs, and we agree that E85 can and should be an important compliance tool for the LCFS program. However, several significant challenges remain to increasing E85 demand in the state; we believe the draft report does not adequately consider these obstacles and possible options for overcoming them. As acknowledged by ARB in this chapter, the expiration of VEETC is likely to have a "particularly severe" impact on E85 sales. While ARB appears to recognize that failure to extend VEETC could substantially undermine E85 sales, it nonetheless assumes significant use of E85 in six of the eight gasoline compliance scenarios (with four of scenarios assuming between 1.0 and 2.84 billion gallons of E85 will be used by 2020).

While ARB mentions the challenge associated with VEETC expiration, there is no discussion of other acute obstacles facing E85 in the state. For example, CAFE credits for FFVs are being phased down beginning in 2014 and are phased out entirely by 2019, reducing the incentive for automakers to manufacture FFVs. Further, beginning in 2016, automakers must somehow generate "proof" that FFVs are operating on alternative fuel in order to receive CAFE credits for the vehicles. ARB does not mention these challenges and their possible effects on FFV and E85 sales. An additional challenge to E85 in California is the fact that FFVs have so far been unable to meet state SULEZ or PZEV emissions standards when operating on E85. This has restricted sales of FFVs in California, according to General Motors.<sup>2</sup> ARB staff should seriously acknowledge these challenges in the report and elaborate on why and how they think these challenges will be overcome to allow substantial use of E85 in the future, as assumed in the compliance scenarios.

Again, we strongly support the expansion of E85 (and other ethanol blends above E10) in California and believe the success or failure of the LCFS depends largely on the use of these blends, as evidenced by several of the new compliance scenarios. However, we believe there are real challenges to increasing E85 demand in the state that deserve serious consideration by ARB. We encourage ARB to more rigorously analyze these challenges and work with stakeholders on strategies for overcoming them.

*Specific Recommended Modifications:*

**Page 71:** In general, ethanol consumption in the State is expected to increase due to policy directives, such as the LCFS and RFS2. ~~as well as subsidies.~~

*Justification:* As ARB acknowledges elsewhere in the draft report, it is unlikely that ethanol tax credits will be renewed upon their expiry at the end of 2011. Thus, we are unsure of what

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<sup>2</sup> See GM presentation to U.S. Department of Energy Western Region Clean Cities Coordinator Peer Exchange. Available at: <http://www.netl.doe.gov/publications/proceedings/08/clean-cities-ca/pdfs/6.24Tues/Ehlmann%20%26%20Okabayashi%20-%20GM.pdf>

“subsidies” ARB is referring to in this statement. In any case, the term “policy directives” can be read to include any tax credits, grants and other supports that may stimulate ethanol production.

**Page 94:** The Volumetric Ethanol Excise Tax Credit (VEETC) is a federal policy to subsidize the **production blending** of ethanol **with gasoline** in the United States. It is set to expire at the end of 2011, and **all some** indications are that its expiration **will may** result in an ethanol price increase and an associated decrease in the demand for ethanol fuels. The effect on E85 is likely to be particularly severe, with the price of the fuel likely to increase significantly, possibly exceeding the price of gasoline **on an energy basis**.

*Justification:* Clarifies that VEETC is intended to stimulate ethanol blending by providing gasoline blenders a tax credit for using ethanol. Most analyses of which we are aware suggest ethanol wholesale prices *fall*—not rise—as the result of VEETC expiration (see, for instance, “US Biofuels Baseline and impact of extending the \$0.45 ethanol blenders credit” FAPRI. June 2011).

**Page 95:** In 2010, the EPA promulgated the RFS2 regulation, which requires that **46 21** billion gallons of advanced biofuels and 36 total gallons of biofuels be produced in the U.S. by 2022.

*Justification:* The RFS2 requires 21 billion gallons of advanced biofuels by 2022, not 16 billion gallons as stated.

## **VI. Meeting the Targets and Assessment of Whether Adjustments Are Needed & Appendixes V-B and V-C**

### *General Comments:*

Overall, this chapter lacks sufficient explanation of the basis for the assumptions used in the updated gasoline standard compliance scenarios. ARB staff should describe how the assumptions for each scenario were developed. Additionally, some attempt should be made to characterize the plausibility of the assumptions under various economic conditions. Challenges to the realization of the assumptions should also be identified and discussed. For example, ARB offers no basis or reasoning for the various assumptions regarding FFV E85 refueling frequency, timing of the commercial introduction of drop-in fuels, sugarcane import volumes, the share of U.S. cellulosic ethanol production that comes to California, and other important factors.

Further, RFA believes the compliance scenarios should be instructed by the economic analysis. It seems unreasonable that possible compliance scenarios can be developed without making some concrete assumptions about future economic conditions. The mix of fuels used for LCFS compliance ultimately will be determined by economics. As such, tangible and supportable assumptions must be made regarding the market value of LCFS carbon credits (i.e., the marginal value of 1 g/MJ of CI reduction), biofuel production costs and market prices, RFS2 RIN values, alternative fuel vehicle



production costs and market prices, gasoline and diesel prices, and several other important economic variables. Specifically, the nexus of the price of the physical fuel source and its compliance value to regulated parties (i.e., the fuel's value in reducing CI) must be better understood. We strongly encourage ARB to consider linking the compliance scenarios to the economic analysis.

In regard to Appendix V-B, we agree with ARB's statement that new or modified corn ethanol pathways (i.e., via the Method 2A/2B process) have contributed more credits than ARB initially expected. However, even though several new corn ethanol pathways with lower CI scores have been approved, most Midwest corn ethanol still will not be viewed as viable for compliance by the 2013-2015 timeframe.

In Appendix V-C, ARB outlines assumptions that are common to all of the new compliance scenarios. One of the common assumptions is that the average CI value of corn ethanol decreases considerably (25%) from 2011 to 2020. The compliance scenario spreadsheets released by ARB show that the assumed CI reductions come entirely from decreased direct emissions and that the ILUC penalty is maintained at 30 g/MJ through 2020. Thus, CARB assumes average direct emissions are 36 g/MJ by 2020. While we absolutely agree that the average CI of corn ethanol will continue to decrease as new technologies are adopted and further efficiency gains are realized, we believe ARB should explain in detail the assumptions that were used to estimate future corn ethanol direct emissions. RFA agrees that average corn ethanol CI scores can indeed fall to the range of 50-65 g/MJ *including ILUC* by 2020. However, we believe achieving such a range on average would require ARB to reduce the ILUC penalty for corn ethanol to the levels recently estimated (i.e., 10-15 g/MJ) by Tyner et al. (July 2010) and Laborde (October 2011).<sup>3</sup>

We believe ARB should also consider examining scenarios that include the potential effects of High Carbon Intensity Crude Oil (HCICO) provisions on the annual base deficit. Implementation of a HCICO provision could potentially increase the number of deficits generated, meaning more credits would be needed for compliance.

In general, we encourage ARB to add more detailed information explaining how the assumptions and scenarios were developed and add discussion on the plausibility of the assumptions.

## **VII. Economic Assessment**

### *General Comments:*

We understand that the charge to ARB staff for this chapter was to develop an economic assessment that is "technically sound, but not comprehensive or exhaustive." Unfortunately, we believe the economic assessment chapter does not provide the essential information necessary to assess, even at a high level, the possible economic effects of the LCFS on biofuel producers,

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<sup>3</sup> Tyner et al: <http://www.arb.ca.gov/fuels/lcfs/workgroups/ewg/0710purdue-iluc-corn-etoh-final.pdf>  
Laborde: [http://trade.ec.europa.eu/doclib/docs/2011/october/tradoc\\_148289.pdf](http://trade.ec.europa.eu/doclib/docs/2011/october/tradoc_148289.pdf)

regulated parties, and consumers. The chapter fails to offer concrete assumptions regarding the future prices of the key regulated fuel sources, prices and availability of alternative fuel vehicle technologies, and the value of LCFS credits. Without assumptions on these factors and others, it is extremely difficult—if not impossible—to examine the plausible economic effects of the policy and possible compliance costs.

As stated earlier, RFA believes the compliance scenarios should be instructed by the economic analysis. It seems unreasonable that possible compliance scenarios can be developed without making some concrete assumptions about future economic conditions. The mix of fuels used for LCFS compliance ultimately will be determined by economics. As such, tangible and supportable assumptions must be made regarding the market value of LCFS carbon credits (i.e., the marginal value of 1 g/MJ of CI reduction), biofuel production costs and market prices, RFS2 RIN values, alternative fuel vehicle production costs and market prices, gasoline and diesel prices, natural gas and electricity prices, and several other important economic variables. Specifically, the nexus of the price of the physical fuel source and its compliance value to regulated parties (i.e., the fuel's value in reducing CI) must be better understood.

We encourage ARB staff to revisit this chapter prior to submittal of the final report to the Board. An attempt should be made to provide concrete assumptions related to the important economic variables described above.

### **VIII. Environmental Impacts** –*No Comments*

### **IX. High Carbon Intensity Crude Oil**—*No Comments*

### **X. LCFS Credit Market**—*No Comments*

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Thank you again for considering these comments and RFA's input throughout the Advisory Panel process. We look forward to working with ARB to refine the report prior to its submission to the Board at the December hearing.

If you have any questions or comments regarding the contents of this letter, please don't hesitate to contact me at 636.594.2284 or [gcooper@ethanolrfa.org](mailto:gcooper@ethanolrfa.org).

Sincerely,



Geoff Cooper  
Vice President, Research