RFA RENEWABLE FUELS ASSOCIATION

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Cory-Ann Wind
Oregon Clean Fuels Program
Air Quality Planner
Oregon Department of Environmental Quality

RE: Comments on July 27 CFP Advisory Committee Meeting

Dear Ms. Wind,

Thank you for the opportunity to comment on the Oregon Clean Fuels Program (CFP) rulemaking and the July 27 advisory committee discussions. As previously noted, RFA supports low-carbon fuel regulations that are based on sound science, fair and unbiased treatment of all fuel pathways, and open and transparent rulemaking processes.

My comments focus narrowly on Item F from the July 27 advisory committee meeting agenda (Treatment of Land Use Change). RFA was disappointed to learn that Oregon DEQ is proposing to adopt the indirect land use change (ILUC) factors developed by the California Air Resources Board (CARB) for the purposes of carbon intensity scoring under the CFP.

As mentioned by several stakeholders during the committee meeting, the CARB process to establish updated ILUC factors has been divisive, opaque, and based on a number of questionable assumptions and judgment calls. I elaborate below on our concerns with DEQ's proposal and on our recommendations for addressing indirect effects.

1. **DEQ should continue to exclude CI values for indirect effects (including ILUC) until such time as there is broad scientific consensus on the best methodologies to estimate such effects for *all* fuels (including petroleum)**

The ethanol industry has generally supported LCFS and CFP programs that are based on fair and symmetrical CI scoring principles. In fact, ethanol producers have cited British Columbia's Low Carbon Fuel Requirement Regulation and Phase I of Oregon's CFP as examples of "LCFS Policies Done Right," as both programs have, to date, based CI scoring for all fuels on verifiable direct emissions only.

Seven years after the concept of ILUC emissions was introduced in Searchinger *et al*. (2008), there is still no scientific consensus on the best methods for estimating ILUC or other indirect effects. While published estimates of ILUC emissions have trended downward over the past seven years, the latest estimates still exhibit a wide range and high level of uncertainty. Further, the use of uncertain and subjective ILUC penalty factors for regulatory purposes (e.g., CI scoring under the California LCFS) remains highly controversial and polarizing. Indeed, as a result of CARB's decision in 2009 to include ILUC factors, the California LCFS lost the support of important industry, academic, and political stakeholders. By proposing to include indirect effect penalties only for biofuels, Oregon runs the risk of similarly losing the backing of key stakeholder groups at a critical juncture for the program.

The basic tenets of lifecycle analysis (e.g., ISO 14040) require that consistent analytical boundaries be used when evaluating and comparing the relative attributes of various competing products. Thus, if DEQ decides to include predicted ILUC emissions in the analysis for biofuels, it must also consider the potential of other fuels to induce additional emissions through indirect economic effects at the resource margin. It is inarguable that all forms of energy have associated indirect economic effects, many of which have implications for the fuel's lifecycle carbon intensity. Unnasch *et al*. (2009) identified a number of direct and indirect emissions sources that are excluded from most lifecycle analyses of petroleum-based fuels. According to the study:

> …to the extent that economic effects are considered a part of the life cycle analysis of alternative fuels, as is the case with iLUC for biofuels, their effect vis-à-vis petroleum is also of interest. The effect of changes in petroleum supply and price will affect global goods, their movement, and the use of resources and their related GHG emissions.[1]

The challenge for policymakers and regulators is isolating and quantifying those effects in a manner that is scientifically defensible and driven by consensus-based methodologies. Such consensus methods and analytical tools do not yet exist for all fuels, and very little work has been done to even investigate the indirect economic effects of fuels other than crop-based biofuels.

A comment was made during the advisory committee meeting that "**Not including [ILUC] now misrepresents the actual GHG emissions of the fuels.**" This statement underscores a key misconception about CARB's ILUC emissions penalties. CARB's ILUC factors are based on predictive scenario analysis, not verification or measurement of "*actual* GHG emissions." In fact, an independent analysis of empirical land use change data by Babcock & Iqbal (2014) indicates the following:

- "…the primary land use change response of the world's farmers in the last 10 years has been to use available land resources more efficiently rather than to expand the amount of land brought into production."
- "The pattern of recent land use changes suggests that *existing estimates of greenhouse gas emissions caused by land conversions due to biofuel production are too high* because they are based on models that do not allow for increases in non-yield intensification of land use."

Thus, Oregon DEQ should not simply assume that CARB's predictive ILUC factors represent in any way "actual GHG emissions" associated with the biofuels production lifecycle.

2. Additional Problems with Adopting CARB ILUC Values for Corn Ethanol

As discussed during the advisory committee meeting, we do not believe CARB's most recent ILUC values for corn ethanol are credible or scientifically defensible. Our main concerns with CARB's analysis are as follows:

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[1] Unnasch. S., et al. (2009). Assessment of Life Cycle GHG Emissions Associated with Petroleum Fuels; Life Cycle Associates Report LCA-6004-3P. 2009. Prepared for New Fuels Alliance. Available at: http://www.newfuelsalliance.org/NFA_PImpacts_v35.pdf

- CARB staff used its own arbitrary values for key elasticities in the GTAP model rather than following the recommendations of its own Expert Work Group and experts at Purdue University, Iowa State University, and other institutions. This had the effect of significantly inflating ILUC values for corn ethanol.
- CARB's GTAP analysis suggests corn ethanol expansion from 2002-2015 caused conversion of forest and grassland in regions where empirical data (Babcock & Iqbal 2014, Langeveld 2014) show there was no such land conversion due to biofuels or any other factor.
- CARB used the AEZ-EF model to assign emissions factors to the land use change results taken from GTAP. The AEZ-EF model is relatively coarse in its treatment of spatial emissions factors compared to other models that are far more detailed (e.g., CCLUB).

The opinion was expressed during the committee meeting that the CARB factors are **"conservative but fair."** We disagree on both counts and want to clarify for the record that such an opinion is not widely held amongst California LCFS stakeholders.

The comment was also made that CARB's use of **Monte Carlo analysis** somehow makes the ILUC values more credible. We disagree with this statement as well; if the base values around which Monte Carlo analysis is performed are arbitrary or inaccurate, then the resulting probability distributions around those values will be meaningless.

Further, it is important to reflect upon what is actually represented by CARB's ILUC factors. CARB's analysis predicted the land use effects of expanding *national* corn ethanol production from 2002 levels to 15 billion gallons. In other words, the CARB analysis penalizes current biofuels for hypothetical ILUC emissions that may or may not have actually occurred in the past as ethanol production expanded to the current 15-billion gallon level. Thus, the CARB factors do not in any way reflect the expected land use emissions of implementing the California LCFS in the 2015-2020 timeframe, and certainly do not simulate the land use effects of implementing an Oregon CFP in the 2016-2025 timeframe.

In reality, corn ethanol production and corn use for ethanol have leveled off over the past four years in the 13-15 billion-gallon-per-year range and is expected to remain in that range through the duration of the CFP program. Accordingly, it seems illogical to suggest that implementation of the CFP in the 2016-2025 timeframe would somehow induce additional corn ethanol ILUC emissions. If the purpose of including ILUC in the CFP program is to account for the policy's potential unintended environmental impacts, adopting the CARB ILUC factors is plainly the wrong approach.

Our concerns with CARB's GTAP modeling and the AEZ-EF model are further developed in great detail in comments we submitted to CARB. I can certainly share these comments with DEQ or the advisory committee if there is interest.

3. If DEQ moves forward with its proposal to include ILUC, the agency should use current Argonne values for corn ethanol

For the reasons outlines above, we do not believe DEQ should move forward at this time with inclusion of ILUC or other indirect effects for CI scoring under the CFP. However, if the agency

does proceed with its proposal to include ILUC, we believe the Argonne GREET/CCLUB values should be used for corn ethanol.

In 2012, Wang et al. published a new version of GREET that, for the first time ever, integrated a methodology (called CCLUB) to estimate ILUC emissions for corn ethanol. On July 1, 2015, I forwarded you the relevant published literature and documentation explaining the development of the new GREET/CCLUB model. Please feel free to share that information with members of the advisory committee if you believe it would be beneficial to the discussion. The GREET/GTAP/CCLUB model amalgam represents a marked advancement over the CARB CA-GREET/GTAP/AEZ-EF model for the following reasons:

- The land use change data entered into CCLUB comes from the latest version of Purdue's GTAP model, with elasticity values recommended by Purdue, Iowa State University, N.C. State University, and others (vs. elasticity values arbitrarily chosen by CARB staff);
- CCLUB treats LUC emissions with a much higher spatial resolution than CARB's AE-ZEF approach (e.g., county-level vs. broad regional);
- CCLUB emission factors are based on actual field measurements of C fluxes via the CENTURY/ DAYCENT tools, which are recognized as the "gold standard" for measuring site-level C fluxes; and
- The CCLUB model has been peer-reviewed and published, whereas we are not aware that the AEZ-EF model has been peer-reviewed and published in the scientific literature.

In short, the Argonne GREET/GTAP/CCLUB framework represents the **state-of-the-art for lifecycle GHG analysis of corn ethanol.** Oregon DEQ has previously committed to using the "best available science" to instruct and inform its CI scoring for the CFP, and disregarding the Argonne GREET/GTAP/CCLUB framework would abdicate that commitment.

Below I address several comments[2] that were made during the July 27 advisory committee meeting regarding the use of the Argonne model for corn ethanol ILUC estimates:

- **"Argonne doesn't have numbers for many fuels coming to Oregon - soybean or canola biodiesel or sorghum or sugarcane ethanol."** This is not a sufficient reason to ignore the Argonne results for fuel pathways that are included in the Argonne GREET/CCLUB model. DEQ has committed to using the best available science and data to guide its CI scoring, and it is indisputable that the Argonne GREET/CCLUB model represents a significant advance in corn ethanol ILUC analysis over the latest CARB analysis. It should also be noted that the Argonne work represents the expertise and collaboration of a broad group of experts and institutions, including Argonne itself, Oak Ridge National Lab, Purdue University, University of Illinois-Chicago, Iowa State University, N.C. State University, and others. In other words, the Argonne model is much closer to a consensus-based approach than the CARB model. ILUC factors for biofuel pathways that are not included in the new Argonne model could be taken from CARB. It is not at all uncommon for fuel regulations to incorporate or reference parameters,

[2] Comments taken from DEQ meeting summary.
http://www.oregon.gov/deq/RulesandRegulations/Documents/072715CleanFuelsSummary.pdf

specifications, etc. that were developed by different institutions using different methodologies.

- **"There shouldn't be different models for different fuels."** We disagree with this statement and the rationale behind it was not clearly articulated during the advisory committee meeting. The ILUC factors used by DEQ for each fuel should represent the best available science and, to the extent possible, consensus methods. It is not relevant that the best available science for one fuel pathway may come from a different institution than the best available science for other fuel pathways, especially if the same analytical boundary conditions were used. Indeed, both Argonne and CARB use the GREET and GTAP models, and the only major differences between the Argonne model arrangement and the CARB model are: 1) Argonne used GTAP parameters/elasticities recommended by Purdue and other academicians; and 2) Argonne used a more spatially explicit and detailed emissions factor model (CCLUB).
- **"Fuels compete with each other, so using the same model for all fuels makes sense."** While it is technically true that biofuels will compete with petroleum and each other under the CFP, fuel competition is *not* considered in CARB's modeling work. CARB's ILUC scenario analysis isolates each individual biofuel pathway and does not consider the fact that production and use of multiple biofuels expanded simultaneously in the real-world. Rather, CARB's modeling was meant to derive ILUC factors for individual biofuels without regard for how those emissions might change with cross-commodity effects and competition from other fuels. Thus, the CARB ILUC values do not represent land use emissions that would be expected to occur in response to a scenario where multiple biofuels are expanding and competing simultaneously. This has been identified as weakness of both CARB's and EPA's ILUC analyses and was discussed in the TIAX final report on ILUC to DEQ in 2010.[3] In any case, CARB's ILUC factors do not represent the expected ILUC emissions that would occur as a specific result of implementation of the Oregon CFP (nor, for that matter, do they represent the expected specific ILUC impacts of implementation of the CA LCFS). In this sense, the individual CARB ILUC factors are somewhat generic and arbitrary and have no bearing or relationship to ILUC factors for other individual fuels. Thus, there is no defensible rationale for suggesting that all ILUC factors should come from the same model for the sake of reflecting "competition" in the Oregon market.
- **"Regional consistency is valuable when applying LUC values. Prevents shuffling of fuels."** Regional consistency on CI scores is not a sufficient reason to ignore the best available science on specific fuel pathways. Commercial fuel providers deal with regulatory inconsistencies across state lines every single day. For example, different states (and even different cities) often have different fuel taxes and tax incentives, different requirements for gasoline volatility, different gasoline aromatics content maximums, different maximums for ethanol content, and a number of other properties and considerations. These inconsistencies are a commercial reality, and fuel providers have proven that they can and will quickly adjust to different requirements in different markets. Moreover, use of CARB's ILUC factors would contribute to ***greater*** **fuel shuffling—not *less*—**as larger volumes of imported sugarcane ethanol and imported

[3] http://www.deq.state.or.us/aq/committees/docs/lcfs/appendixG.pdf

renewable diesel would be diverted to Oregon, while biofuels currently used in Oregon would be dislocated and forced into new markets. In fact, use of the CARB ILUC factors could ultimately result in grain ethanol that is currently used in Oregon being supplanted by imported sugarcane ethanol, and being rerouted to Brazil to backfill the volume of sugarcane ethanol that was shipped to Oregon! How does this "prevent shuffling"? It is simply disingenuous to suggest that adopting CARB's ILUC factors would result in less fuel shuffling when the experience in California has clearly shown otherwise.

Thank you again for the opportunity to share these comments, and we urge DEQ to continue to exclude ILUC from the CFP regulations. Alternatively, if DEQ feels it must adopt ILUC factors, the agency should use the Argonne GREET/CCLUB values for corn ethanol. Please do not hesitate to contact me with questions or requests for additional information.

Sincerely,

Geoff Cooper
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