RENEWABLE FUELS ASSOCIATION

February 15, 2011

John Courtis
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Mr. Courtis,

As the nation's largest trade association representing U.S. ethanol producers, the Renewable Fuels Association (RFA) appreciates the opportunity to provide comments on the LCFS Expert Workgroup (EWG) final subgroup reports, released by the Air Resources Board (ARB) on January 12, 2011.

While we continue to have concerns with the selective application of indirect greenhouse gas emissions penalties only to crop-based biofuels in the LCFS, RFA strongly agrees with ARB's decision to adopt GTAP model updates as documented in Tyner et al. (2010). Most of the subgroup reports, as well as discussions by the larger EWG during public meetings, indicate that the updated version of GTAP used for Tyner et al. (2010) is superior in many respects to the version of the model originally used by ARB and its contractors for the LCFS. While the Tyner et al. (2010) GTAP model is a major improvement over the version used by ARB for the LCFS, we believe a number of key enhancements are still needed before the model can be reasonably used to estimate ILUC potentially resulting from biofuels expansion. The attached report contains our detailed comments and recommendations for further improvements to the GTAP modeling framework.

Additionally, RFA is requesting that ARB hold a workshop in the spring of 2011 to apprise stakeholders of the agency's research plans and its strategy for integrating the subgroup recommendations into the current program. Please don't hesitate to contact us with any questions or comments regarding the attached report.

Sincerely,

Geoff Cooper

Geoff Cooper
Vice President, Research

Comments of the Renewable Fuels Association (RFA) on the California Air Resources Board LCFS Expert Workgroup Final Subgroup Reports

Tom Darlington, Air Improvement Resource, Inc. (AIR)
And
Geoff Cooper, Renewable Fuels Association (RFA)

1.0 Introduction and Background

In Resolution 09-31, the California Air Resources Board (ARB) directed the Executive Officer to convene an Expert Workgroup (EWG) to assist the Board in refining and improving the land use and indirect effects analysis of transportation fuels for the Low Carbon Fuels Standard (LCFS). This workgroup was tasked with evaluating key factors that might impact the land use values for biofuels including agricultural yield improvements, co-product credits, land emission factors, and other relevant factors. The EWG was further broken down into eight subgroups, each of which focused on specific topical areas that were identified as critical issues by the larger workgroup.

On January 12, 2011, ARB released final reports from each of the eight subgroups and invited comments from interested stakeholders. This report contains the Renewable Fuels Association's (RFA) general comments on the EWG recommendations, specific comments on many of the subgroup reports, and our recommendations pertaining to prioritization of the additional research efforts proposed by the subgroups.

2.0 General Comments and Recommendations

RFA strongly agrees with ARB's decision to adopt GTAP model updates as documented in Tyner et al. (2010).[1] Most of the subgroup reports, as well as discussions by the larger EWG during public meetings, indicate that the updated version of GTAP used for Tyner et al. (2010) is superior in many respects to the version of the model used by ARB and its contractors for the LCFS. Many of the subgroup reports explicitly recommend that ARB adopt the new version of GTAP immediately. While we agree that the "Group 2" modeling runs from Tyner et al. (2010) are superior to the runs conducted by ARB and its contractors for the LCFS (because they use a 2006 baseline rather than a 2001 baseline), we believe the "Group 3" simulations (which consider population expansion and crop yield growth) are a more appropriate "starting point" for refinements to the ILUC emissions estimates in the LCFS. Numerous EWG discussions, as well as many of the final subgroup recommendations, focused on the need to account for future yield growth and food demand growth (for which Tyner et al. used population growth as a proxy) in forthcoming ARB modeling efforts.

While the Tyner et al. (2010) GTAP model is a major improvement over the version used by ARB for the LCFS, we believe a number of key enhancements are still needed before the model can be reasonably used to estimate ILUC potentially resulting from biofuels expansion. Many of those

[1] "Land Use Changes and Consequent CO2 Emissions due to US Corn Ethanol Production: A Comprehensive Analysis", Tyner, Taheripour, Zhunag, Birur, and Baldos, Department of Agricultural Economics, Purdue University, July 2010.

remaining needs are addressed in the sections of this paper that specifically speak to the subgroup reports.

RFA agrees with most of the subgroup recommendations related to prioritization of "must-do" items, and near-term research efforts versus longer-term efforts. However, we disagree with some of the subgroup priority designations due to the likely impacts of model improvements related to the issue in question; those disagreements are noted in the sections addressing individual subgroup reports.

3.0 Elasticity Values Subgroup

RFA generally agrees with the recommendations contained in the Elasticity Values Subgroup report. However, we believe work must begin immediately to improve the constant elasticity of transformation (CET) function within GTAP. This item should be considered by ARB as a short-term, "must-do" item rather than a long-term project. The authors of the Elasticity Values Subgroup report conclude that the method used to estimate the CET is inappropriate, and that the "default" value used for the CET in both the ARB GTAP work and Tyner et al. (2010) results in the model converting too much forestland. Far more forestland is being converted by the GTAP model than is justified by the literature and by the underlying data used to develop the CET function. More detailed comments are outlined in the sections below.

3.1 Yield Elasticity with Respect to Price

We agree with the subgroup's recommendation to "Keep the central value of the yield elasticity with respect to price at 0.25 if only one value can be used for all crops and all countries." Authors of the subgroup report clearly establish a sound rationale for leaving this elasticity set at 0.25. While the literature shows that the short-run response of U.S. yield to price changes is relatively inelastic, there is good reason to assume the long-run responsiveness of yield to price will be much greater.

The subgroup report suggests that, "If this elasticity can be varied, then it should be increased for crops-country combinations that can be double-cropped and it should be decreased for combinations that cannot." More specifically, the authors say, "If differentiation can occur by country, then setting the price yield elasticity to 0.175 for countries with no double-cropping, 0.25 for the U.S., and 0.3 for Brazil and Argentina will provide a more reasonable approximation to reality." This suggestion by the Elasticity Values subgroup is summarized in Table 1 below.

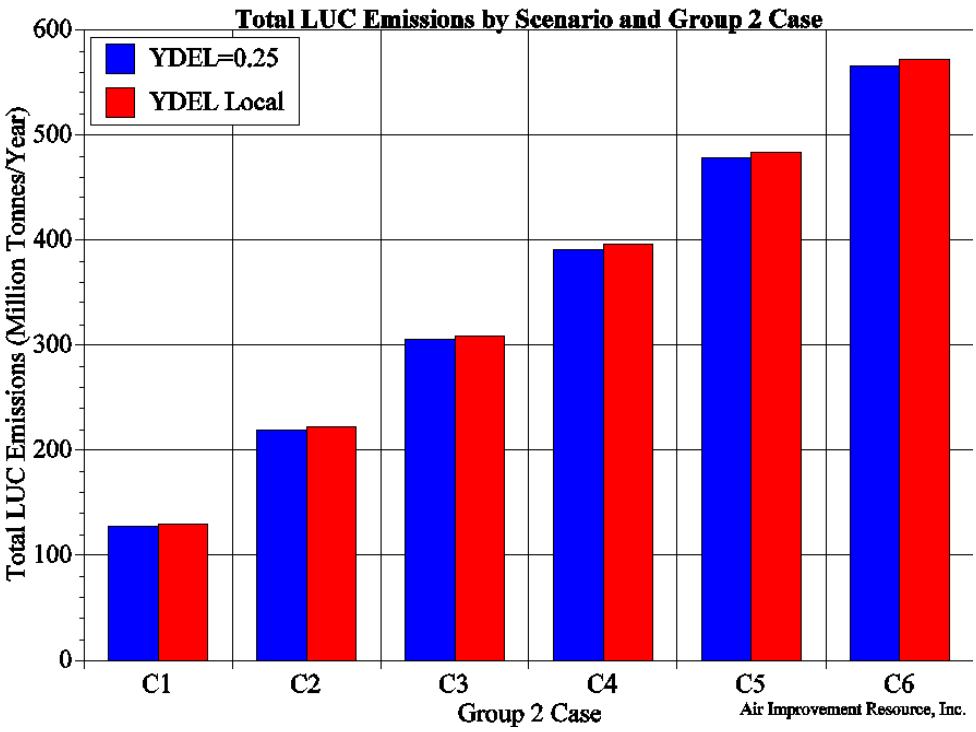
Table 1. Price-Yield Elasticity Options

	Option 1	Option 2
Brazil and Argentina	0.25	0.30
United States	0.25	0.25
Other Countries	0.25	0.175

Option 1 is the method used by Tyner et al. (2010). The Elasticity Values subgroup is recommending the use of 0.3 for Brazil and Argentina because of the frequency of double cropping, 0.25 for the U.S., and 0.175 for countries that have little or no double cropping. We do not know the other countries that practice a significant amount of double-cropping, so to briefly test the sensitivity of model results to the subgroup's recommendation we have set the price yield elasticity for all other countries to 0.175, which assumes little or no double cropping. This is clearly a conservative assumption, because it is likely that many other countries with long growing seasons would practice double-cropping to some extent.

AIR utilized the Tyner et al. (2010) GTAP model to evaluate the practical effects of this subgroup recommendation. We compared the ILUC emissions results of a modeling run using the "Option 1" elasticities in Table 1 to the results of a run using "Option 2" elasticities. The results are shown in Figure 1. The land use emissions for Option 2 are slightly higher than Option 1, which means that the reduction in land use emissions in Brazil and Argentina are more than offset by the increase in land use emissions elsewhere. However, the differences between Option 1 and Option 2 were so slight that a change is inadvisable until more research can be performed. Therefore, we concur with the subgroup's recommendation to use 0.25 in all counties, at least until reliable double-cropping estimates are developed for all GTAP regions.

Figure 1.



Some commenters have suggested setting the price/yield elasticity to 0; this is clearly not appropriate for many regions that practice double-cropping (there is currently no allowance in GTAP for double-cropping except through the price/yield elasticity function).

3.2 Elasticity with Respect to Area Expansion

We agree with the subgroup recommendation that "CARB should adopt the version of GTAP that varies the value of this parameter by region as documented in Tyner et al. (2010)." Further, we urge ARB to support additional research aimed at augmenting the limited body of empirical data available to guide the use of this parameter.

3.3 Constant Elasticity of Transformation (CET)

The report includes a long-term recommendation to "…develop a better method to increase flexibility in the function that determines own and cross price substitution elasticities across land cover types." Given the importance of this elasticity and its impact on ILUC results, we believe improvement of the CET function should be a top priority for ARB. Since the CET function effectively controls the amount of forest converted, and because the land use emissions attributed to crop-based biofuels are primarily driven by forest conversion (not pasture conversion), we believe this should be a "must-do" near-term recommendation rather than a long-term recommendation. We are puzzled as to why the Elasticity Values Subgroup made parameterization of CET a long- term recommendation, when the subgroup report clearly pointed out the problems with the current function. Certainly, improving the CET function may require more time and resources than other research priorities, but we believe work should begin immediately on this issue. Unfortunately, the subgroup report did not inform the reader of the magnitude of the impact of varying the CET parameter to reflect less forest conversion. The report states:

> For example, the cross price elasticity of forest land in the U.S. with respect to crop returns is an important factor in GTAP determining how much forest land is converted to cropland in response to biofuels-induced crop price increase. The value for this parameter in GTAP is -0.174: a 10% increase in crop returns decreases forest land by 1.74%. *But this responsiveness is 35 times as great as the maximum response of forest land to crop returns over a 15-year time period using the response of forest land to changes in own forest returns as estimated by Lubowski and Lubowski, Plantinga and Stavins* (emphasis added).

This suggests that GTAP's estimate of how much forest land is converted to cropland in response to increase crop prices is greatly exaggerated. Later, in a discussion in the report about the impacts of including additional unmanaged land, the authors state:

> …the CET function regarding forest land is too high, which needs to be fixed in the long run changing the CET structure. The estimated value of such elasticity is smaller than 0.05 (Ahmed et al., 2008) but the central value used by GTAP is 0.2, since GTAP considers the substitution of the three land types (forest, cropland and pasture) at the same time. *If someone increases the area of forestland in GTAP, it will contribute to a parameterization that already tends to convert more forest than the parameterization suggested by the literature* (emphasis added).

Clearly, conversion of forest drives the land use emission estimates in GTAP. Over-conversion of forest is directly tied to errors related to the model's CET function. In the Tyner et al. (2010) runs, conversion of forest accounts for 70% of the emissions in the "Group 2" model runs (see Table 2).

Table 2. AIR's Replication of Tyner et al. 2010 Results (Average, 2001 to 15 bgy)

	Annual LUC Emissions (g/MJ)			Percent of Total (%)	
Scenario	Forest	Pasture	Total	Forest	Pasture
Group 1	12.42	7.99	20.41	61	39
Group 2	**12.19**	**5.16**	**17.36**	**70**	**30**
Group 3	9.15	5.07	14.21	64	36

If actual forest converted is less than one-fourth of that predicted, as suggested by Ahmed et al. (2008) (0.05 is one-fourth of 0.2, and the elasticity for forest conversion is "smaller than 0.05"), then the land use emissions for corn ethanol would be about 8.2 g/MJ, instead of 17.4 g/MJ, as indicated in the Tyner et al. (2010) Group 2 modeling.[2] Thus, development of a better method for the CET function is critical to improving the land use change emissions estimates from GTAP for any biofuel feedstock. Additionally, as the Elasticity Values Subgroup correctly points out, if ARB is planning to add more forestland to GTAP to approximate "inaccessible forest," it *must* correct the CET function first; otherwise, this error will be greatly propagated.

4.0 Land Cover Types Subgroup

RFA generally agrees with most of the recommendations in the Land Cover Types Subgroup report. We do, however, wish to comment on several passages from the report. Also, we wish to point out that many of this subgroup's recommendations regarding the types of land converted align well with the Elasticity Values Subgroup's recommendations regarding the CET function. For example, the executive summary of this subgroup's report says:

> Another key issue is estimating which ecosystems are more likely to be cleared. It appears that GTAP currently assumes ecosystems are cleared relative to their availability (i.e., in proportion to their area). However, some ecosystems may be more likely to be cleared than others. Available data should be used to estimate the conversion probability for the different ecosystem types.

This problem arises because the GTAP assigns the same elasticity (via the CET function) of conversion to forest as to pasture (0.2). This is another reason why work on the CET function should be elevated to a top priority for ARB.

[2] This value can be approximated by multiplying the forest emissions by 25%, and adding to the existing pasture emissions. In fact the pasture emissions would be slightly higher, because the forest not converted would become pasture converted. However, this land amount is small compared to the current pasture converted. In addition, the elasticity of forest conversion according to the Elasticity report authors, is "smaller than 0.05." Thus, we would expect the actual emissions to be below 8.2 g/MJ for the Group 2 average emissions for 2001 to 15 bgy if forest conversion were accounted for correctly.

4.1 Land Pools and Conversion

One of the near-term recommendations from this subgroup is to "assess and improve methods to estimate the area of inaccessible forest, particularly in the tropics were the current approach is the weakest..." We do not disagree with the recommendation, but we believe the CET function for forest conversion must be improved first. Otherwise, as stated earlier, the errors resulting from the current CET function (i.e., too much forestland is converted) will only propagate.

We are somewhat surprised that this subgroup was silent on whether to include Conservation Reserve Program (CRP) lands in U.S. modeling. This capability was recently added to the GTAP model by Purdue, but the Tyner et al. (2010) paper did not include CRP land in the modeling. AIR performed some GTAP runs with the Tyner et al. (2010) model that allowed the model to access CRP land. Including CRP land in the modeling runs only reduced land use change emissions by about 2%.[3] AIR was initially surprised that the CRP land had so little effect, because intuitively CRP land (which is former cropland that is now mostly grassland) would more readily come back into agricultural production than forest or other land types. However, there was no accompanying change in the GTAP CET function when CRP was added, so adding CRP land was just like adding a few more million acres of pasture. That is, adding CRP did not change the CET function, which controls the ratio of forest to pasture converted. This effect just once again points to the critical need to revise the CET function in GTAP.

4.2 Background Crop Yield Changes

The subgroup report contains a near-term recommendation to "…correct the methodology used by GTAP to permit an accounting for background yield changes. This can be done by exogenously including a time dependent yield trend in the analysis for corn, soybean and other major grain and oilseed crops." We fully agree with and support this recommendation.

The current method used by ARB and its contractors to account for background yield trends is to correct only the area of land that is used for biofuels for background (i.e., long-term) yield trends.[4] The implicit assumption made by utilizing this method is that the rate of yield improvement on all the rest of the land (not used for biofuel) is perfectly equivalent to increased demand for animal feed. However, if crop yield growth trends exceed the growth in feed demand, extra land is available for other uses. If yield increases are less than the growth in demand, then extra land is not available.

Tyner et al. (2010) comprehensively examined the impacts of yield trends in the longer term utilizing fairly conservative assumptions (see the "Group 3" modeling runs). For the model assumptions, Tyner et al. (2010) used population growth as a proxy for food

[3] See footnote 6.

[4] See Appendix C-10 of ISOR. "Adjustment of GTAP Model Output for Increasing Crop Yields." Correspondence provided by Tom Hertel of Purdue University on 1/11/09.

demand increase. The authors assumed that population would grow globally during the time period of 2006-2015 at the same annual growth rate of 2001-2006. Purdue also assumed a 1% annual growth rate in the yields of all crops in all regions. The 1% rate is excessively low for corn in the U.S., which is the predominant feedstock for ethanol. Tyner et al. (2010) also assumed that regional demand for forest products would increase according to 2001-2006 average annual rates.

The effect of these assumptions for "Group 3" reduced the average land use emission rates for a 2001 to 15 bgy (2015) ethanol shock from 17.36 g/MJ to 14.21 g/MJ (or 18%). The "Group 3" analysis conducted by Purdue demonstrates the importance of taking into account the long-term yield trends on all lands (not just land used to produce biofuel), along with the growth in demand. While more work may be needed to refine assumptions about yield growth and population (food consumption) expansion, the approach used by ARB and Hertel for the LCFS for adjusting for background or long-term yield trends only on land used for biofuels is too simplistic.

5.0 Emissions Factors Subgroup

RFA generally agrees with this group's recommendations for the improvement of emissions factors. Specifically, we agree with the subgroup that ARB should, in the near term, adopt the use of emissions factors based on the Winrock database. Further, ARB should reconsider the inclusion of carbon impacts for non-land conversion activities and storage in hardwood products.

5.1 Biomass Carbon Stock Data

The subgroup report recommends that ARB use "…the Winrock database (with minor refinements to account for recently published carbon maps) to estimate forest carbon stocks for each GTAP AEZ and region." We agree with and support this recommendation because the Winrock data is more recent and detailed than the Woods Hole data currently used by ARB for the LCFS. EPA used the Winrock data for its RFS2 analysis and the methodology for combining this data with the results of economic modeling is described in detail in the RFS2 Regulatory Impact Analysis.

5.2 Long-term Carbon Storage in Hardwood Products (HWP)

The report recommends "including the HWP pool in the ILUC analysis to better reflect the timing of emissions." This is a short-term recommendation of the report. We agree with the comment, but believe inclusion of HWP effects should be considered a "must-do" item rather than simply a "near-term" issue. We believe reliable methods and data are already available for accomplishing this effort.

The report mistakenly says that "EPA evaluated HWP but concluded the numbers are so small that it was not included in the [emissions factors]" (See Table 5.2 of the report). While it is correct that EPA did not include HWP effects for forest areas converted outside of the U.S., EPA did in fact include a factor for HWP effects in the U.S. EPA used

the FASOM model for the U.S., and the FASOM report provided for the final Regulatory Impact Analysis clearly indicates that carbon stored in HWP is included in the FASOM model. The methodology and data used in estimating carbon storage in HWP is quite detailed and outlined in the FASOM report in Section A.1.5.1.1 of Appendix A of the report (pages A-26 to A-35). [5] Apparently, EPA was quite comfortable applying this methodology within the U.S., but not as comfortable applying it outside the U.S.

Regarding whether the HWP effect is too "small" to consider, AIR has shown that it is actually worthy of inclusion in GTAP modeling. In an October 29, 2010 report that was shared with the EWG, AIR removed the HWP effect from the Tyner et al. (2010) modeling, and corn ethanol land use emissions increased by 2-3 g/MJ from about 17.5 g/MJ to 20 g/MJ.[6] Clearly, the HWP effect is significant and needs to be considered. We think the methods and data for applying the HWP factor are fairly well developed in the FASOM report, and this factor could be included in the near term in ARB's GTAP modeling, at least for the U.S.

5.3 Other Non-Land Conversion Emissions

The Emissions Factors subgroup report also provides a short-term recommendation to "consider a broader range of significant indirect emissions from land use changes such as, but not limited to, livestock and rice production." Again, we concur with the recommendation, but believe it should be a "must" recommendation, rather than a "short-term" item. EPA has already included these two factors in their ILUC estimates for the RFS2, and the Emission Factors Subgroup report points out that the input information for making these estimates are readily available for GTAP. Therefore, we see no reason why these factors cannot be easily included in ARB's next series of GTAP runs.

6.0 Co-product Credits Subgroup

RFA supports all of the recommendations and priorities suggested by the Co-product Credits Subgroup. In particular, we agree with the near-term recommendation that ARB "…should re-evaluate its use of a 1:1 displacement of feed corn by DGS to include other components (e.g., SBM, fat, and urea) and available data on displacement ratios as a function of animal by type and region."

6.1 Simultaneous Shock Versus Isolated Shocks

One other important issue raised by this subgroup is that the economic models used to estimate ILUC (GTAP and the FASOM/FAPRI framework used by EPA) substantially inflate the amount of land conversion (and, in turn, ILUC emissions) when each biofuel

[5] U.S. Agricultural and Forestry Impacts of the Energy Independence and Security Act: FASOM Results and Model Description, Final Report, Beach and McCarl, January 2010.
[6] "Corn Ethanol Land Use Emissions with Recent Expert Working Group Recommendations", October 29, 2010, Air Improvement Resource for Renewable Fuels Association.

increase is modeled in isolation of other biofuel volume increases. That is, when all biofuel volumes are increased simultaneously in the model, the predicted amount of land conversion falls precipitously. In its discussion of near-term recommendations, the subgroup says ARB's original GTAP results "…are inconsistent with respect to estimated land use change, i.e., the area converted as a result of the corn shock plus the soy shock is not equal to running the model with the two shocks combined."

The authors further state that "It may be possible to resolve this issue by holding the corn shock constant and running multiple soybean volume shocks, then hold the soybean shock constant and vary the corn shock." We strongly encourage ARB to perform a simultaneous shock in which all biofuel volumes are allowed to increase concomitantly.

This issue, as it pertains to EPA's modeling work, is discussed in detail in a letter from RFA to EPA Administrator Lisa Jackson.[7] In reality, several types of biofuels (e.g., grain ethanol, sugarcane ethanol, soy biodiesel, etc.) are simultaneously increasing in volume, and additional feedstocks are likely to be added. Thus, modeling each biofuel one at a time (the current method) does not represent reality.

AIR used the Tyner et al. (2010) model to perform land use modeling for an "ethanol only" case, a "biodiesel only" case, and combined ethanol and biodiesel case. The results are shown in Table 3 below. In the ethanol only case, slightly more than 2 million hectares of pasture and forest are converted to crops. The biodiesel only case converts 1.2 million hectares to crops. However, the combined case converts only 407,000 hectares to crops. At this time, we are not able to explain why the model is converting far less acres for the combined case than either of the "only" cases. Nonetheless, it is a fact that volumes of different biofuels will be increased simultaneously in the real world. Accordingly, when ARB estimates land use emissions for various biofuels and feedstocks, it should determine the total emissions from a combined feedstock run, and allocate emissions to each of the biofuels.

Table 3. GTAP Modeling of Various Scenarios (uses Tyner 2010 Model) – Group 2 Results (hectares)

	Forest	Grassland	Crops
Ethanol Only (2001 to 15 bgy)	-661,943	-1,375,188	2,037,324
Biodiesel Only (2001 to 1 bgy)	-345,564	-870,656	1,215,595
Ethanol + Biodiesel (2001 to 15 bgy ETOH and 1 bgy Biodiesel simultaneously)	-66,067	-340,803	407,004

7.0 Indirect Effects of Other Fuels Subgroup

RFA agrees with and supports all of the recommendations in this subgroup's report, as well as the suggestions for prioritization. Specifically, we strongly support the subgroup's recommendation that

[7] Letter from RFA President Bob Dinneen to EPA Administrator Lisa Jackson. August 4, 2010. Available at: http://www.ethanolrfa.org/page/-/Letter%20to%20EPA%20Re_RFS2%20LUC%20Emissions.pdf?nocdn=1

"The LCFS should carbon score fuels symmetrically In terms of their evaluation of direct and indirect effects, thereby creating a level playing field for all fuel types." We strongly encourage ARB to initiate a comprehensive program to research the potential market-mediated effects and marginal impacts associated with all fuels regulated under the LCFS.

8.0 Comparative Modeling Subgroup

This subgroup's report brought out a number of important issues and challenges with the economic models currently used for ILUC analysis and made a number of significant recommendations. While many of this subgroup's recommendations are long-term in nature, RFA believes some issues can be addressed in the near term.

8.1 Background Yield Growth and Population Growth

This subgroup recommended that ARB utilize the "Group 2" simulations from the Tyner et al. (2010) GTAP model, but also suggested that ARB further assess "[o]ptions for developing a dynamic model version of GTAP…" While we agree with the recommendation to use the improved GTAP model, as discussed elsewhere in this report, we believe ARB should use the "Group 3" approach that takes population increases and background yield changes into account.

We believe the "Group 3" simulations represent a much more dynamic approach, as suggested by this subgroup. The "Group 3" approach developed by Purdue in Tyner et al. (2010) is a first attempt at a dynamic GTAP model being recommended by this group. As indicated by other subgroup reports, the effects of background yield growth on land use change are significant. Since this approach has already been pioneered and demonstrated by Purdue, we see no reason not to develop it further for near-term modeling envisioned by ARB. The "Group 3" approach likely can be improved with relatively little effort. For example, the use of crop- and region-specific yield improvements and population growth factors could be incorporated.

8.2 GTAP Versus FAPRI/FASOM and Other Models

The Comparative Models Subgroup report also discusses the fact that EPA used FAPRI and FASOM, while ARB used the single model GTAP. The subgroup further encouraged ARB to consider using proprietary models, such as EPA's FASOM/FAPRI framework, to compare to GTAP. While it may be useful to perform comparative modeling with alternative modeling systems, we disagree with the recommendation to consider models that are proprietary and/or not publicly available.

To the extent it could, AIR reviewed EPA's use of FASOM and FAPRI for the RFS. Unfortunately, no one outside of the core group of users that run FAPRI can duplicate EPA's results. One can duplicate the FASOM model results for EPA, but the originator of the model has carefully concealed all of the changes incorporated into the model. Thus, the version of FASOM used for the RFS is not truly transparent. A third significant concern is that, unlike GTAP, the models are not integrated between U.S. and non-U.S.

regions. This problem simply cannot be overcome by assuring that the inputs are the same. The two main drivers of land use change in these models are commodity price increases and U.S. export changes. Even though the two models have essentially the same inputs, they predict very different changes in commodity price impacts and U.S. export changes. Thus, using them together to predict land use changes is a fundamentally flawed approach.

We commend ARB for selecting a model that is publicly available and is more transparent than other options. RFA believes that ARB should continue to focus its efforts on improving models that are widely available and transparent, not on models that are proprietary, have hidden features, or raise more questions than they answer.

8.3 Differences in Method Between CARB and EPA

The subgroup brings up a critical point about the differences in methodology between ARB and EPA. The report states:

> Further, EPA evaluates new biofuels in the context of the change in the quantity of renewable fuel from a known and explicit base from the implementation of the policy. CARB-LCFS does not, it scores the fuel based on an arbitrary change in a quantity of fuel produced unrelated to the policy context….the choice between these two approaches influences the model choice and would potentially result in two different answers if one expects non-linearities in the market behavior and agricultural and energy policies…

This difference in basic approaches of evaluating ILUC emissions is the primary reason that ARB does not currently evaluate other indirect effects (e.g., changes in livestock emissions, rice cultivation emissions, crop-switching effects) and their effects on emissions other than land use change emissions. These points were also raised by the Co-products Subgroup and Emissions Factors Subgroup. Including these other known indirect effects, which is not difficult, would improve ARB's analysis.

9.0 Conclusion

Overall, RFA believes the EWG process was useful and advanced the understanding of the challenges associated with modeling ILUC. The subgroup reports are helpful in identifying and discussing a number of areas in ARB's analysis that require improvement and/or modification. As described in these comments, we believe much work remains to be done to further improve and enhance the ILUC methodology used by ARB for the LCFS. We believe the subgroup reports are a good starting point for ARB improvements and we hope the agency will move as expeditiously as possible to act on the recommendations of the subgroups and interested stakeholders. RFA and AIR will provide to ARB all of our GTAP files, inputs, and other information used for the original analysis discussed in this paper.

Additionally, RFA is requesting that ARB hold a workshop in the spring of 2011 to apprise stakeholders of the agency's research plans and its strategy for integrating the subgroup recommendations into the current program.