

December 2, 2014

John Courtis, Manager  
Alternative Fuels Section  
California Air Resources Board  
1001 "I" Street  
Sacramento, CA 95814

Subject: Public Workshop to discuss updates to indirect land use change (ILUC) values.

Dear Mr. Courtis,

First thanks to the ARB staff for tireless work to address stakeholder and expert input on ILUC analysis. Back in 2009 when the Board directed the staff to convene an expert work group and address issues raised by that body and others, I for one did not anticipate quite how large a project this would end up being. But with the dedicated work of ARB staff and many contractors and collaborators, I think we have come a long way. The models used in 2009 have been adapted to more carefully model animal feed markets, to take into consideration irrigation, and to adapt the model structure of both GTAP and the associated emissions factor model to take into consideration considerably more detailed information, especially about the US and Brazil. This process enhanced the technical foundation of the LCFS, and also advanced the state of the art on the study of land use changes associated with expanded biofuels production. The board is on sound footing to adopt updated emissions values as part of the LCFS readoption.

But despite this important progress, there remain important areas for continued investigation. The most critical of these is related to palm oil. On November 20<sup>th</sup> ARB released for the first time emissions estimates for palm oil biodiesel. The emissions estimate of 46 g/MJ is not, in itself, implausible. In fact it is quite consistent with EPA's proposal from 2011. I am also attaching the comments we submitted to EPA at that time, arguing that EPA had underestimated the extent of land use change emissions from palm oil. However, without a great deal more information on the analysis behind the number it is hard to evaluate the validity of the assessment. The dynamics of land use change in Indonesia and Malaysia are quite distinct from Brazil or the United States. And while ARB and its contractors have done considerable work to understand these latter two countries, much less investigation has been conducted by ARB into Indonesia and Malaysia. Certainly much less information has been shared with stakeholders.

Palm oil is one of the most important drivers of deforestation, and a significant global source of biofuel. The emissions from palm oil are relevant not only for palm biodiesel itself, but for fuels made from other fats, oils or oil byproducts that may substitute for palm oil in the marketplace. The interconnected markets for biodiesel and renewable diesel feedstocks are complicated and the data is imperfect. Moreover, as ARB staff highlighted, there are likely some structural limitations in GTAP that make it difficult to adjust the model to reflect key market dynamics. But this area of inquiry is clearly critically important going forward. Additional investigation is needed to ensure the link between palm and deforestation is understood, and that California fuel regulations do not inadvertently increase deforestation from palm oil.

This is particularly important because LCFS compliance may lead to a significant increase in the use of fuels made from oils and fats. I urge the ARB to seek expert review of key land use issues raised by palm oil in particular, and large increases in the use of bio-based diesel in general. ARB certainly has important technical work to continue, refining the GTAP model and associated emissions factor models, but a broader perspective on the drivers of palm oil deforestation is also critical to ensure that California's fuel regulations avoid becoming an indirect driver of deforestation and support deforestation-free fuels.

My comments are focused on palm oil because it is a leading driver of deforestation and a weakness in ARB's otherwise strong analysis, but the other areas identified for further long term work are also very important. The forestry issues associated with the treatment of unmanaged land in GTAP are very important to ILUC for all fuels, and especially palm oil, and deserve further attention. Analysis of fertilizer, paddy rice and livestock emissions, and consideration of a dynamic GTAP model is also worthwhile. And as cellulosic biofuels feedstocks scale up and begin to be significant driver of land use change, it will be important to understand their land use impacts.

Finally, I want to address the new study by Babcock and Iqbal. At the highest level, the study suggests that calculations of indirect land use change (ILUC) emissions that ARB finalized in 2009 and related studies US Environmental Protection Agency finalized in 2010 may overestimate ILUC emissions. Of course with the updated analysis the 2009 values are indeed being lowered. But of course there is a lot more to it than that, and I want to comment on four specific points.

- The findings of the Babcock and Iqbal study are strongly connected with the reduced rate of deforestation in Brazil, which is an important success story (see UCS report [Deforestation Success Stories](#) – also my colleague’s papers in [Tropical Conservation Science](#) and [Solutions Journal](#)). This success was no means automatic, and reflects not simply the option value of intensification, but also considerable pressure on soybean traders and the Brazilian government to stop deforestation. Fully accounting for emissions associated with deforestation was part of that pressure, and thus reduced deforestation in Brazil is a success that vindicates the importance of land use change emissions accounting.
- However, while there is an important success to report in Brazilian soy, the Babcock and Iqbal study also demonstrates that for palm oil production just the opposite is true, with substantial expansion on the extensive margin, primarily from deforestation and expansion onto peat, rather than on the intensive margin. This demonstrates the importance of focusing on emissions from palm oil, pushing customers, traders and governments to invest in yield increases and to block expansion into forests and peat. Palm oil is a significant global source of biofuel, and these first ARB estimates to be released require thorough scrutiny before these results will be up to the same standard the corn, sugar and soy results are now. Additional expert work is needed in this area to ensure the links between palm and deforestation are understood.
- Also, while the Babcock and Iqbal’s analysis makes a compelling case that expansion at the intensive margin is important, this kind of intensification can only go so far before the growing season is fully used and the planted land is fully harvested. Furthermore, for perennial tree crops like oil palm oil, double-cropping is not feasible and increasing the proportion of the planted area that is harvested has very limited potential. So the mechanisms Babcock identified cannot continue if biofuels production grows indefinitely. Scale matters, and calibrating biofuels policies to the demand for food and the need for protection of forest and peat is essential to make sure biofuels are productive solution, and don't become a land-use and climate problem.
- Finally, the Babcock and Iqbal study concludes with a promise to extend their analysis into a statistical model that could be incorporated into future attempts at estimating greenhouse gas emissions caused by biofuels or other drivers of agricultural production. This forthcoming model may well enhance the next round of analysis performed by ARB or others, but the opportunity for future improvements is no reason to hold up the updates based on work done over the last five years or the regulation in general. The refinement of models is an ongoing process, and further improvement is always possible. The changes regarding intensification, improved treatment of unmanaged land, and more scrutiny of palm and peat are all warranted. But future changes will need to be incorporated into future policy updates.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Martin", written in a cursive style.

Jeremy Martin, Ph.D., Senior Scientist  
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Enclosure: JOINT SCIENCE AND ENVIRONMENTAL STAKEHOLDER COMMENTS  
ON: Docket No. EPA-HQ-OAR-2011-0542: EPA's analyses of palm oil used as a  
feedstock under the Renewable Fuel Standard (RFS) program. April 27, 2012, National  
Wildlife Federation, Natural Resources Defense Council, Clean Air Task Force, Union of  
Concerned Scientists, World Wildlife Fund

cc: Mike Waugh