

January 8, 2014

RE: *Method 2B Application, Endicott Biofuels II, LLC, Palm Fatty Acid Distillates to Biodiesel (BIOD012)*

The International Council on Clean Transportation (ICCT) welcomes the opportunity to provide comments on *Method 2B Application, Endicott Biofuels II, LLC, Palm Fatty Acid Distillates to Biodiesel (BIOD012)*. The ICCT is an independent nonprofit organization founded to provide first-rate, unbiased research and technical analysis. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, as well as their fuels, in order to benefit public health and mitigate climate change.

The ICCT has long supported, and welcomes the opportunity to provide comments on, California's Low Carbon Fuel Standard. We commend the Air Resources Board for its continuing efforts to promote cleaner, lower-carbon fuels and for the transparency of the consultative process on new fuel pathways under the LCFS. We hope these comments can help in the development of a robust characterization of the carbon intensity of using palm fatty acid distillate as a biodiesel feedstock.

We would be glad to clarify or elaborate on any points made in the attached comments. If there are any questions, Air Resources Board staff can feel free to contact our Fuels Lead, Dr. Chris Malins (chris@theicct.org).

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Comments on *Method 2B Application, Endicott Biofuels II, LLC, Palm Fatty Acid Distillates to Biodiesel (BIOD012)*

Introduction

The lifecycle analysis proposed by Endicott/Sabine for their palm fatty acid distillate to biodiesel pathway proposes an ultra-low pathway carbon intensity of 10.64 gCO₂e/MJ, a carbon saving of over 80% compared to fossil diesel. Approval of the pathway at this carbon intensity would make this fuel valuable as a compliance fuel under the LCFS – it would deliver similar value in LCFS credits to that available from used cooking oil biodiesel, for instance. The key elements that allow such a low carbon intensity to be reported, as we understand it, are the following:

1. PFAD is treated as a waste/residue, and thus is not assigned any emissions from the palm oil production process;
2. The “Generation of PFAD emissions” are instead based on a system-expansion displacement analysis, which calculates the carbon intensity of the alternate products that will replace PFAD in the economy if material is displaced to biodiesel production use;
3. The alternative use of PFADs that is to be displaced is assumed to be animal feed, and the product replacing PFADs in the market is assumed to be distillers’ grains;
4. It is hypothesized that palm oil production is inelastic to PFAD demand, and that therefore there will be no indirect land use change emissions associated with PFADs;
5. The biodiesel production process, proprietary to Endicott/Sabine, has a relatively low energy intensity;
6. There is a significant credit available for the pitch by-product of the biodiesel production process.

The ICCT is concerned that the assumption made at the third step of this calculation is likely to be unrepresentative of the real market impacts of using PFAD as biodiesel feedstock. The emissions assigned to generation of PFAD are therefore erroneous, and the lifecycle analysis needs to be re-quantified based on a more representative assessment of alternative uses of PFAD. It appears likely that such a reassessment would result in a considerably higher carbon intensity associated with this process.

We note that the Endicott/Sabine “Life-Cycle Analysis Report” has been heavily redacted to preserve commercial confidentiality, and that this makes it difficult to directly assess claims made within the report that are key to the pathway analysis. Indeed, the text of most interest to our response (the details of the market analysis that led Endicott/Sabine to conclude that PFADs would be replaced by distillers’ grains) seems to be almost entirely redacted. We have therefore relied largely on the staff summary of the pathway analysis in constructing these comments. We apologize to

CARB and to Endicott/Sabine if we have misinterpreted any elements of the lifecycle analysis due to making assumptions about text that is not available in its original form, and we would be glad to further assess the fuel pathway if more information and assumptions were made available.

Waste categorization

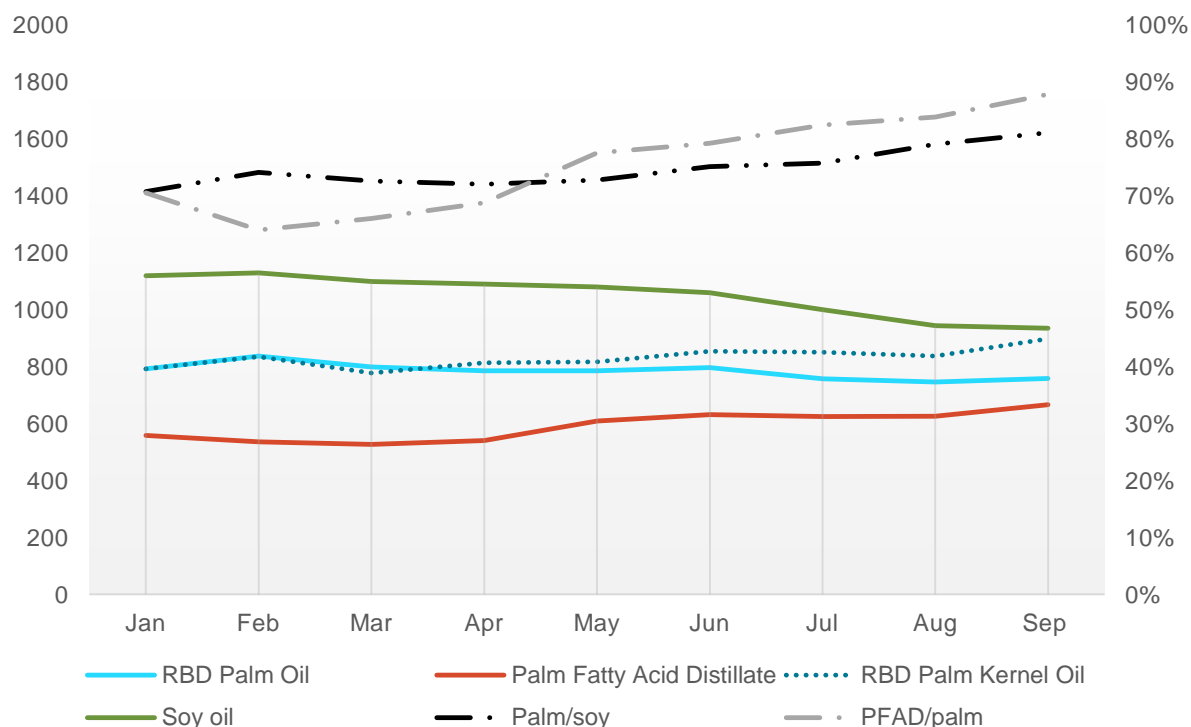
The staff pathway summary states that “those fats or oils that are waste in nature are preferred” by the Davy process. It is not entirely clear to us what is meant by “wastes in nature” in this context. PFADs are produced as co-products of the palm oil production process, a process that is entirely artificial. While co-products of artificial processes may be wasted, it does not seem accurate to categorize them as “wastes in nature”, which implies a value judgment about the feedstock material that is not warranted. Indeed, as almost 100% of PFADs produced as a palm oil co-product have existing market uses, ‘waste’ is a misleading term in the context of this pathway application.

The question of categorization of palm fatty acid distillate as a waste, residue or product has arisen in other jurisdictions. Notably, the UK Government (Department for Transport) commissioned the consultants Ecofys to undertake an analysis of “Products, residues and wastes in the UK palm oil supply chain” to inform the UK Government’s categorization of various feedstocks under the Renewable Transport Fuel Obligation, the UK implementation of the European Renewable Energy Directive (Ecofys, 2011). We attach this Ecofys report with these comments, along with the UK guidance on product categorization. Based on this analysis, the UK Government has categorized PFAD as a ‘product’ for the purposes of the Renewable Energy Directive, and hence ineligible for enhanced incentives (double crediting). The LCFS does not offer incentives for biofuels from wastes and residues in a way comparable to European regulations, but the market analysis by Ecofys is of some relevance to the consideration of alternative uses of PFAD.

Value of PFADs

The staff report identifies PFAD as “a low-value byproduct of the palm oil production process.” While it is indeed a byproduct, we believe that referring to PFAD as low-value understates its market value. Indeed, PFAD generally trades at about 80% of the value of palm oil, and is thus in a similar market position compared to palm as palm in compared to soy. The chart below compares reported market prices for soy oil, palm oil, palm kernel oil and PFAD from January to September 2013, and also shows the ratios of PFAD to palm oil price, and palm oil to soy oil price. Based on market price, if PFAD is to be categorized as low value then one could argue that palm oil itself should be categorized as low value as well. Instead, it should be acknowledged that vegetable oils are high value products, and that even as a byproduct PFAD is a high value material. This matches the finding by Ecofys that PFAD has a value per tonne close to that of palm oil, and significantly over the 15% value threshold that they set for distinguishing co-products from residues.

Comparison of market prices of vegetable oils
(US\$/tonne, left axis) and price ratios (right axis)



PFAD as livestock feed

The Ecofys report for the UK Government identifies three main uses for PFADs – oleochemicals, soap industry and livestock feed. The staff report states that PFAD, “is normally used in the U.S. as a livestock feed supplement.” While this may be somewhat true within the U.S. (we have not been able to identify data to allow a comparable full U.S. market analysis), the focus on the U.S. uses of PFAD is not warranted as Endicott/Sabine clearly identify that the material will be shipped from Southeast Asia. We see no analysis to support an assumption that PFAD for biodiesel will be displaced from U.S. markets, rather than displacing uses in other regions. Those other uses (primarily laundry soap) will certainly not be met by increased use of distillers’ grains. A market analysis to assess what fraction of PFAD is likely to be displaced from the soap/oleochemical and feed markets respectively would be required to identify the real market effects of PFAD use for biodiesel. The full set of replacement products in those markets need to be considered in the assessment of ‘Generation of PFAD emissions’.

Even within the feed market, it is unlikely that distillers’ grains would replace PFADs displaced into biodiesel production. For one thing, the supply of distillers’ grains is relatively inelastic, given that they are a co-product of ethanol production and that feed demand is a relatively weak driver of ethanol production. Indeed, this observation that demand for lower-value co-products is a weak driver of co-product production is actually made by Endicott/Sabine in a different context, where they argue that PFAD

demand would not result (directly) in increased palm oil area. Because the supply of distillers' grains is (relatively) inelastic, the marginal feed in the U.S. is far more likely to be feed corn, and to a lesser extent soy meal (c.f. <http://www.theicct.org/displacement-ratios-us-corn-ddgs> for ICCT's analysis of U.S. feed markets). Even therefore if reduced availability of PFAD as feed resulted in increased dry-feed demand, we believe that this is more likely to be met by increased corn or soy production (both of which have indirect land use emissions implications) than by increased distillers' grains supply.

More importantly, it is unlikely that dry-feed (corn feed, soy meal, DDGS etc.) would be an appropriate replacement for PFAD. PFAD has added value in ruminant livestock rations as a 'rumen-protected fat'. Rumen-protected fats are used as a feed supplement where "what's needed is a way to raise the energy density of the overall ration." Fats like PFAD have a higher metabolizable energy density than feeds like distillers' grains, or other dry feed. The advantage of PFAD over other oils (say straight palm oil) is that it does not inhibit the ability of the rumen to break down fiber (see http://www.progressivedairy.com/index.php?option=com_content&id=5279:the-case-for-rumen-protected-fats&Itemid=72#article; <http://www.tridentfeeds.co.uk/news-events/news/understanding-rumen-protected-fats/>; Atil and Idris, 2000). Distillers' grains trade at of the order of \$200 per ton (http://www.ams.usda.gov/mnreports/nw_gr115.txt), well below the price of PFAD. If a comparable quantity of distillers' grains could substitute PFAD in animal feed, this would already have been done. Rather, reduced availability of PFAD in the feed market would either drive increased consumption of alternative rumen-protected fats, or result in reduced cattle growth rates in the event that appropriate substitutes were not available. Again, a proper market analysis would be necessary to identify which products are in reality likely to replace PFAD in the market (other fats, a switch to some alternative feed system or a need to raise additional head of cattle).

In summary, the assumption that PFAD will be replaced by distillers' grains is unwarranted on three counts:

1. Much PFAD is used in soap/oleochemical manufacture. This has been ignored.
2. PFAD has a role in livestock feed distinct from that of dry feed, and that cannot be fulfilled by distillers' grains.
3. The supply of distillers' grains is inelastic compared to the supply of corn feed and soy meal. The marginal feed product must have a relatively elastic supply.

Overall, we note that as palm oil is the world's 'marginal oil', we believe that it is very likely that an increase in PFAD use for biodiesel would have the follow-on effect of increasing palm oil demand, in which case there could be substantial indirect land use change consequences. The evidence available does not support the assumption that the proposed PFAD pathway is immune from indirect land use impacts.

Coproduct credit for pitch

According to the CARB staff comments, "The co-product credit for pitch was calculated based on its ability to displace Number 6 fuel oil in such vessels [ships]." The ICCT is

not familiar with the market for this fuel in the marine context. For this coproduct credit to be based on marine use, we would expect that the pitch-based fuel has been certified for marine applications. If the market for pitch-based marine fuel does not yet exist, it would be appropriate for CARB to consider alternative potential uses, or the possibility that usage may be limited.

Summary

The displacement analysis of the products that are likely to replace PFAD in the market if more PFAD is used for biodiesel is crucial to the analysis of this biofuel pathway. While Endicott/Sabine have proposed a hypothesis that the market impact of increased PFAD utilization will be increased use of distillers' grains as feed, this hypothesis is not supported by any available evidence or market data. The pathway analysis also ignores entirely the soap/oleochemicals market, an important PFAD market. A more comprehensive market analysis, likely including indirect land use change emissions consideration for palm oil, should be undertaken before this pathway's full carbon intensity is quantified and the fuel is approved for LCFS credits.

References

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