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California Air Resources Board
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Reference: **Comments on ethanol pathway in CA_GREET2, Error in Biogenic VOC**

Dear ARB Staff,

Life Cycle Associates would like to take this opportunity to provide our comments on the dry mill corn ethanol pathway in CA_GREET2.0. Please refer to our letter dated October 24, 2014 and September 22, 2014 for previous communication regarding the same.

In our previous letters, we highlighted the erroneous inclusion of biogenic VOC emissions during ethanol production and T&D phase as fully oxidized GHG emissions. In the earlier versions of CA_GREET, the fugitive VOC emissions were included as fully oxidized GHG emissions and added to the corn ethanol WTT carbon intensity. Non-combustions VOC emissions at the production plant as well as during the T&D phase were included in the CI. This adds an unjustified, systematic burden on the carbon-neutral corn ethanol pathway as the carbon source of the VOC is biogenic and should be considered carbon neutral in terms of carbon intensity calculation.

In the current CA_GREET version, ARB has already corrected the error associated to the T&D phase by subtracting the biogenic VOC emissions in the GHG calculation cell. Please refer to the cell J434 in the EtOH sheet of CA_GREET2.0 tier 1 model. The VOC emissions are first added to the cell J429 as a part of criteria pollutant calculation. But then are subtracted in the cell J434 to calculate the GHG emissions associated to the T&D phase.

The model also appropriately calculates the loss factor based on these fugitive VOC emissions in the cells DG338 and DH338 for the production phase. However, the non-combustion VOC emissions generated during the production phase are still erroneously added to the GHG emissions during production phase. The VOC emissions added to the cell I429 (from M377) are converted to fully oxidized GHG emissions in the cell I434 without any accounting for their biogenic nature.

There are multiple methods of correcting this error. The simplest and most straight forward way of rectifying this is to apply the same treatment to this VOC as the fugitive VOC in the T&D phase. The amount of non-combustion VOCs (M377) should be subtracted from the cell I429 before the application of the carbon content factors from the Fuel_Specs sheet. This effectively makes the GWP of the biogenic VOC to be zero without creating any error in the loss factor calculation or other pathway phases.

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Correcting for this reduces the pathway CI by about 0.007 g/MJ which may seem like a small number. But it should be noted that this is a systematic error which affects each and every certified corn ethanol pathway and every gallon of corn ethanol sold in California. Over the total volume of corn ethanol sold in California, such a small change in CI generates an impact. It is also critical from a consistency perspective to treat the emissions from all biogenic sources equally.

More importantly, the CA_GREET model defines the basis for GHG calculations under the LCFS. Scholars, students, analysts, and of course affected parties look to the model to define the methods for GHG analysis. So, simple math errors should be corrected to avoid misunderstandings.

Thank you for your consideration.

Best Regards,

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