Life Cycle Associates

Stefan Unnasch
1. 650.461.9048 Direct
unnasch@LifeCycleAssociates.com
884 Portola Road, Suite A11
Portola Valley, CA 94028 USA

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California Air Resources Board
1001 I Street
Sacramento, CA 95814
Rajinder Sahota
Deputy Executive Officer, Climate Change and Research

Several items in the 15-day notice which are worthy of reconsideration. These include changes in the categorization of biomass, the treatment of renewable power for hydrogen production, and modifications to the Tier1 HEFA calculator.

The Biomass Gap

While identifying biomass used in wildfire reduction, CARB has not provided a detailed approach to quantifying emissions associated with other types of biomass. The lack of such transparent guidance impinges the ability to plan and execute biofuel projects that can deliver alternative biomass residue fates for hard-to-decarbonize sectors such as sustainable aviation fuel. As a result, these types of biomass residues may continue to emit GHG emissions associated with business-as-usual conventional fates, e.g., burning and decomposition, as uncertainty of their treatment in the LCFS increases perceived investor risk.

The proposed modifications to the rule exclude industrial forest residue from source specific feedstocks. Please review the attached report "Biomass Accounting Principles, Alternative Fates, and Verification" prepared by Life Cycle Associates. It provides extensive background on GHG emissions associated with biomass and its alternative fate. The report could provide support for a design pathway for biomass as a feedstock or process fuel.

Regrettably, during the course of this rulemaking, CARB did not hold a workshop to discuss and examine the many complexities presented by forest biomass. CARB also did not share with stakeholders the extensive new language pertaining to forest biomass contained in the 15-Day Changes in §95488.8(g)(1)(A)(3) and the approximately six pages of new language proposed to be added to §95488.9(g).

We respectfully submit that this LCFS proposal would have benefitted from a stricter reading of the California Administrative Procedure Act particularly given the tremendous wildfire risk in California that is fueled by such massive and dangerous quantities of forest biomass that the State has established a million-acre fire treatment strategy as further discussed by the comment letter of the California Forestry Association.

From our perspective, the forest biomass scheme proposed in the 15-Day Changes is unworkable. We do not think it feasible to propose simple fixes to make the scheme workable and would recommend that it be completely redesigned. However, we think this redesign is a process that will require many months if not a year. We also think it imperative that the many positive changes that CARB has made to the LCFS program should not be further delayed in terms of implementation. Therefore, we would recommend that CARB delete all of the new language pertaining to woody biomass from the LCFS rulemaking package and initiate a separate focused rulemaking that involves stakeholders and California agencies with forestry expertise in the process.

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RECs for Hydrogen

Changes made to the regulation and not adjusted in the 15-day package include the exclusion of the use of RECs for hydrogen production to make fuel in:
§ 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

(i) *Indirect Accounting for Low-CI Electricity, Biomethane, and Low-CI Hydrogen*.
(1) *Book-and-Claim Accounting for Low-CI Electricity Supplied as a Transportation Fuel, Direct Air Capture projects, or Used to Produce Hydrogen as a transportation fuel.* Reporting entities may use indirect accounting mechanisms for low-CI electricity supplied as a transportation fuel, for hydrogen production and processing for hydrogen used as a transportation fuel, or for direct air capture projects, provided the conditions set forth below are met:

This language limits the use of hydrogen only for transportation and excludes its use in fuel production including hydrogen boost for syngas to SAF, HEFA hydrotreated, and other hydrotreating processes. This is a change from the current regulation and warrants some reconsideration as the use of low CI hydrogen is an essential component of many fuel strategies and allowed in policies such as CORSIA. The exclusion of hydrogen to produce fuel was not addressed robustly in workshops. So; allow us to identify some of the pros and cons of limiting the use of RECs for the production of hydrogen by electrolysis.

First, CARB's focus is on the promotion of zero emission hydrogen vehicles and the use of low CI hydrogen in other applications would appear to be misdirecting the hydrogen for the production of liquid fuels. However, the limitation on hydrogen fuel cell vehicles lies in the fueling infrastructure and availability of vehicles and new electrolysis capacity would be built as part of new fuel production facilities including e-fuels and biomass waste to SAF. Therefore, hydrogen produced from new electrolysis facilities for e-fuels would not necessarily be available for transportation applications in California.

Secondly, ARB might be concerned about stacking of incentives electrolysis from hydrogen that complies with the three pillars of. Renewable production would receive a $3 per kilogram incentive under section 45v of the inflation reduction act. The additional LCFS credit would correspond to another $0.65 per kilogram at credit prices of $50 per tonne. This incentive would accrue to the renewable diesel producer but would be tied to the generation of RECs. Note that the development of renewable hydrogen projects is very challenging and complying with the three pillars will require new ways of tracking renewables and much of the incentive may be passed on to the consumer due to competition if stacking of incentives results in over crediting. Certainly, over crediting is an issue and may relate to some of the consternation regarding RNG pathways. However, developing new technologies is costly and the principles of technology neutrality are generally inconsistent with the assessment of profits and losses of fuel developers.

Finally, ARB may have been concerned about the leveraging of RNG to CNG to hydrogen via electrolysis with the CI becoming more and more negative with every loss in the system. This effectively becomes a form of gearing which ARB has addressed by placing a 50% efficiency limit on biogas to power projects. Many SAF projects are targeting the use of renewable electricity for SAF based on solar and wind. The key point is that the availability of renewable power and

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renewable hydrogen do not drive the transport market, the availability of vehicle and fueling/ charging infrastructure are the limiting factors.

Tier1 HEFA Calculator

Several changes were introduced in the tier 1 HEFA calculator. First, the GHG emissions from tailpipe from diesel increased from 0.76 to 3.5 g CO_2e/MJ. This large increase is due to the higher rate of N_2O emissions from diesel vehicles in the future based on the EMFAC model which are readily confirmed by running the on-line EMFAC model. While the N_2O emissions from heavy-duty vehicles are likely part of another CARB comment process, the significant impact on GHG emissions is so noteworthy that the phenomenon could be discussed. A N_2O emissions increasing due to NO_x controls? Is this an appropriate trade-off? Note that the increase in N_2O our emissions has little effect on credit generation for HEFA diesel as the baseline will also increase and more credits will be generated from zero emission vehicles. However. the same N_2O a factor is applied to SAF. There is no reason to expect N_2O emissions from jet turbine engines to increase in the future as the fleet is not turning over and the core engine technology is based on combustion with high excess air rates and low N_2O emissions. The solution to this calculator issues is simple. Simply add several more rows to the calculator with exhaust emissions and a total CI for each fuel product. This approach is only reasonable as each fuel product is assigned its own fuel pathway code. Since the fuel pathway code can accommodate a unique CI providing the unique CI for SAF would be a very simple solution to this issue.

Finally, the tier 1 HEFA calculator allows for the use of source specific CI values for hydrogen. These CI values are based on the Tier 1 hydrogen calculator. However, they include standard values for compression and chilling. Hydrogen used in HEFA facilities which is transported by pipeline would not require the same level of compression and chilling as a hydrogen fueling station. We recommend that either these emission sources are excluded or that the hydrogen producer could provide data in the Tier 1 hydrogen calculator for HEFA supply. This level of detail is relatively straightforward and should not require a tier 2 out application.

Thank you for your consideration.

Best Regards,

Stefan Unnasch
Managing Director
Life Cycle Associates, LLC