

February 20, 2024

Liane M. Randolph
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Letter of Comment on Avoided Methane from Organic Materials and Renewable Power for Process Fuel for Proposed Amendments to the LCFS, posted December 19, 2023.

Dear Chair Randolph:

Life Cycle Associates would like to take this opportunity to provide our comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation, posted on December 19, 2023. This letter is focused on two key components of the proposed amendments: Avoided Methane from Organic Materials and Renewable Power for Process Fuel.

Organic Feedstocks

- CARB is considering that all U.S. landfills are capped and that all U.S. landfill methane emissions are capped up to 75% and that only 25% can be considered leaked and potentially avoided. According to the U.S. EPA, even capped landfills cannot capture more than 50% of its LFG, and that there are numerous landfills in CA and the U.S. which are NOT capped at all. Therefore, CARB's assumptions in the Tier1 OW calculator is conservative.
- The Tier1 OW calculator is limited to CNG production via anaerobic digestion. We recommend that the calculator should apply to all fuels including hydrogen, FT jet, and others and not be limited to CNG via anaerobic digestion. Digestate from AD systems also becomes CO₂ just like feedstock into gasification systems and CARB should not delay the adoption of these technologies.
- We recommend that CARB provide more clarity on the definition of material that was diverted from a landfill versus material that otherwise would be composted as the counterfactual will be difficult to prove. A methane avoidance emission factor that represents the potential alternative fates of landfilling and composting with decomposition to CO₂ will allow for greater clarity in defining the avoided emissions from organic materials.

Processing Power

- That the small amount of power used for processing includes energy used for pumps, compressors and electronic control systems, etc. We recommend that CARB allows the use of grid power with book and claim of RECs for process power used to make hydrogen. These loads do not require large grid drawdown and only use for plant controls, pumps and processing and should not receive any different treatment than power used for electrolysis, especially for projects located in California.

Consequences of Biomass Disposal

I have seen the consequences of inaction on biomass some of them are well known. SB1383 has led the challenges in the handling of urban biomass including wood chips. I don't need to look far to see the consequences. Alongside the roads everywhere you see piles of wood chips, no doubt the consequence of SB1383 and landfill fees that have risen. Better enforcement cannot force the round wood chip into the square hole. Technologies such as the utilization of biomass need to be actively considered and cannot wait another decade. Organic material provides an ideal energy source for synthetic aviation fuel, hydrogen, and other fuels and this resource needs to be examined.



Figure 1. Slash piles from commercial lumber operations are not stored for long periods of time as new trees must be grown.



Figure 2. Biofuel policies could eliminate illegally dumped woodchips which accumulate along CalTrans freeway interchanges. High tipping fees and the challenges associated with composting make biomass energy an attractive option. No integrated polies are in place to deal with the fire hazards such as the Eucalyptus tree that overlooks the scene.

Avoidance Credit for Recovered Organics

The proposed regulation and the associated Tier 1 calculators now allow recovered organics to also generate avoided methane credit similar to urban landscape waste diverted away from landfills. Such an inclusion can be seen in the instruction manual of the OW calculator as shown below:

Field Name	Instructions
2.1 Organic Waste Feedstocks	<p>Select feedstock(s) used by the fuel pathway.</p> <p>“Food Scraps” (FS) is the organic portion of municipal solid waste (MSW) that consists of wastes derived from plants or animals for the explicit preparation for consumption by humans or other animals that is predominantly disposed by landfilling. This includes inedible waste from foods processed or consumed at residences, hospitality facilities (hotels, restaurants, amusement parks, stadiums, special events, etc.), institutions (hospitals, schools, prisons, etc.), and grocery stores. Food scraps do not include liquid wastes, fat/oil/grease (FOG) materials, or other by-products of industrial food processing, manufacturing, and distribution facilities.</p> <p>“Urban Landscaping Waste” (ULW) is organic MSW material collected from landscaping activities, including leaves, grass, branches, and stumps.</p> <p>“Recovered Organics” (RO) is the organic fraction of mixed MSW that is manually or mechanically separated from the waste stream, typically at a materials recovery facility or transfer station.</p> <p>Any other organic waste feedstocks may be modeled as “Other Organic Waste” (OOW).</p>

Similar to the FS or OLW waste pathways, the RO waste pathway also earns an avoided fugitive emissions from landfilling. The RO represents the waste that is separated from the aggregate waste stream at a recovery facility.

However, the regulatory text, particularly the section § 95488.9.(f) (2), does not clearly reflect the same. A simple reading of this provision seems not to include avoided methane credit generation for recovered organics. We propose modifying the language in the following section to accurately reflect inclusion of recovered organics towards generating avoided methane emissions from landfilling.

- (2) A fuel pathway that utilizes an **organic material** may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary diversion from decomposition in a landfill and the associated fugitive methane emissions, provided that:
 - (A) The organic material that is used as a feedstock would otherwise have been disposed of by landfilling, and the diversion is additional to any legal requirement for the diversion of organics from landfill disposal.
 - (B) Any degradable carbon that is not converted to fuel is subsequently treated in an aerobic system or otherwise is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
 - (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.

For additional consistency we also recommend addition of “recovered organics” in all places which specify or define “organic waste” for the purposes of methane credit generation. Few of such places are shown below as examples:

- Tier 1 Classification

REET34.0 model to calculate the pathway CI. The Tier 1 classification includes, but is not limited to, the following fuel pathways:

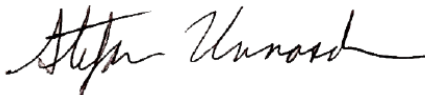
- (1) Ethanol derived from starch or fiber in corn kernels or grain sorghum, and sugarcane;
- (2) Biodiesel produced from feedstocks including but not limited to oilseed crop-derived oils; rendered animal fat, distiller's corn oil, distiller's sorghum oil, and used cooking oil;
- ~~(3)~~ Renewable Diesel, renewable naphtha, alternative jet fuel and renewable propane produced by hydrotreatment of feedstocks in a stand-alone reactor, including ~~but not limited to~~ oilseed crop-derived oils, rendered ~~tallow~~ animal fat, distiller's corn oil, distiller's sorghum oil, and used cooking oil;
- ~~(4)~~ LNG and L-CNG from North American fossil natural gas; also known as Hydroprocessed Ester and Fatty Acid (HEFA) Fuels;
- ~~(5)~~ Biomethane from North American landfills, anaerobic digestion of wastewater sludge, dairy and swine manure, and food, urban landscaping waste, and other organic waste; and

- Temporary Pathways Table

<i>Fuel</i>	<i>Feedstock</i>	<i>Process Energy</i>	<i>CI (gCO₂e/MJ)</i>
Alternative Jet Fuel	Distiller's Corn Oil	Grid electricity/solar and wind electricity and natural gas	65
Alternative Jet Fuel	Any other feedstock	Grid electricity/solar and wind electricity and natural gas	Baseline (2010) CI value for Fossil Jet Fuel
Fossil LNG	Petroleum Natural Gas	N/A	95
Fossil L-CNG	Petroleum Natural Gas	N/A	100
Biomethane CNG	Landfill gas or Municipal Wastewater Sludge	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	7065
Biomethane LNG	Landfill gas or Municipal Wastewater Sludge	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	8580
Biomethane L-CNG/CNG	Landfill gas or Municipal Wastewater Sludge	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	9085
Biomethane CNG	Municipal Wastewater sludge, Food Scraps, Urban Landscaping Waste, or Other Organic Waste	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	45
Biomethane LNG	Municipal Wastewater sludge, Food Scraps, Urban Landscaping Waste, or Other Organic Waste	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	60
Biomethane L-CNG/CNG	Municipal Wastewater sludge, Food Scraps, Urban Landscaping Waste, or Other Organic Waste	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	65
Biomethane CNG / LNG	Dairy Manure and Swine	Grid electricity/solar and wind	

Thank you for your consideration in reviewing our comments and incorporating them into the final regulation. If you have any questions, please reach out to me directly.

Sincerely,



Stefan Unnasch
Managing Director
Life Cycle Associates

