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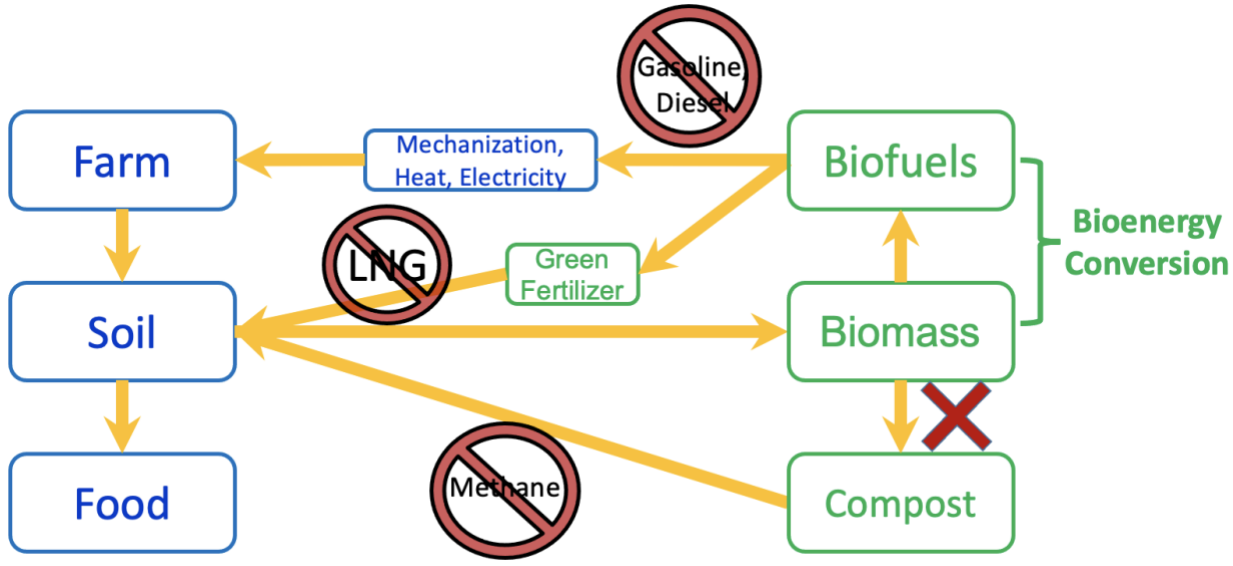
Berkeley Economic Advising and Research, LLC
1442A Walnut Street, Suite 108
Berkeley, CA 94705
www.bearecon.com

Public Comment for CARB's LCFS Program **1/7/22**

Expanding LCFS to Support California Agriculture: Putting waste biomass to work for food security, air quality, job creation, and climate risk reduction

California currently produces an annual flow of more than 50 million metric tons (MMT) of waste biomass per year, the volume of which is rapidly accelerating because of efforts to contain the state's wildfire emergency. Farm and food processing waste comprise over one quarter of this material, and like other biomass it presents a substantial challenge to the state's greenhouse gas (GHG) mitigation goals. Burning agricultural waste has recently been banned because of this and public health risks but hauling this material to landfill merely displaces waste storage capacity while deferring emissions to decomposition. It has long been understood that recycling this material can improve soil productivity, but the traditional methods for this, direct mulching and composting, are relatively inefficient and emission-intensive, requiring storage capacity and contributing significantly to the 20% of global GHG emissions attributable to agriculture.

Figure 1: Green Energy from Agricultural Waste



As a leading state initiative for decarbonization, LCFS is too limited in scope. Transport fuels are not the only significant biogenic pathway to displace fossil fuel use and its attendant environmental damage. Thanks to modern bioenergy science and technology,

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alternatives exist that can largely transform this waste biomass, converting it into biofuels, agrochemicals, and soil amendments that substantially reduce agriculture's carbon footprint while robustly enhancing soil productivity, food security, and rural livelihoods. The primary agrochemical output of this process (Figure 1) is *green fertilizer* produced from biogas. This biogenic chemical has the same productivity benefits as conventional fertilizer, but it also displaces the fossil fuels usually required to produce conventional synthetic fertilizer. Beyond this innovation, other valuable products and services of this biomass conversion include waste reduction, biochar for soil amendment and carbon sequestration, and a variety of other green energy services illustrated in the flowchart. Compared to composting, which directly releases highly radiative methane emissions and also presents health and sanitation risks (including rodents, other vermin, and an array of pathogenic microorganisms), gasification re-forms biogenic carbon into fossil fuel substitutes. While green fertilizer improves soil productivity and agrifood sustainability, it also displaces natural gas. Likewise, biodiesel and biogasoline can displace liquid fossil fuels in farm mechanization, vehicles, heating, and electric power.

Using modern mobile gasification technologies (e.g. https://cariboubiofuels.com/) to process biomass at or near individual farms, all these benefits can be integrated into farm operations, saving money on inputs, adding value, and conferring economic and environmental benefits across rural communities, some of the most disadvantaged in the state.. In addition to the direct values of soil productivity and clean energy services, farms reduce their costs for (and emissions from) conventional energy and agrochemicals. We argue that these bioenergy conversion pathways should be recognized by CARB with LCFS carbon credit certification like livestock waste management is today. Expanding LCFS for biomass conversion would provide additional livelihood benefits to farmers and stimulate further green innovation across California. State-of-the-art biomass conversion can be a potent catalyst for progress, enabling agriculture, forestry, and municipal solid waste management to take fuller partnership in the Golden State's quest for sustained and inclusive prosperity.

Thank you for your consideration.

Respectfully,

David Roland-Holst, PhD
Managing Director, Berkeley Economic Advising and Research
Adjunct Professor, Department of Agricultural and Resource Economics, UC Berkeley
dwrh@berkeley.edu
510-421-0365