Bioenergy Association of California

September 15, 2014

Mr. Todd Sax, Assistant Chief
Mobile Source Control Division
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Re: Biofuels in ARB's Technology Assessment of Transportation Fuels

Dear Mr. Sax:

I submit these comments on behalf of the Bioenergy Association of California (BAC), which represents more than 50 public agencies, private companies and local governments working to develop low carbon fuels, renewable electricity and pipeline biogas made from organic waste. BAC strongly supports ARB's goal of accelerating the production of cleaner, lower carbon fuels and offers the responses below to ARB's questions related to biofuels generated from organic waste.

BAC represents both public and private sector members working to promote sustainable bioenergy development. BAC's public sector members include air and water quality agencies, sanitation, solid waste, environmental protection and other public agencies. Its private sector members include waste, energy, technology, carbon, finance, engineering, agriculture and other interests related to bioenergy development.

BAC offers the following responses to the questions posed in ARB's September 3 presentation on Technology Assessment of Transportation Fuels.

1. Can Biofuels be the only solution for our 2050 GHG Targets?

Biofuels are not the only solution for California's GHG targets, but they a critical pathway to reduce GHG emissions from the transportation sector. As both ARB and the California Energy Commission (CEC) have recognized, transportation fuels from organic waste are the lowest carbon fuels in existence, not just significantly lower carbon than other liquid or gaseous fuels, but lower carbon per

mile than electric or fuel cell vehicles. Although organic waste based fuels can only provide 10 to 15 percent of California's transportation fuels, the GHG reductions from those fuels would be several times greater than that.

Converting organic waste to transportation fuels can reduce GHG emissions by tens of millions of metric tons of CO_2. In addition to displacing fossil fuel use, organic waste based fuels reduce GHG emissions by capturing and destroying methane, which is 28 to 84 times more potent a climate pollutant than CO_2.[1] Increasing organic waste based fuels can also help to cut black carbon emissions from wildfire, which causes 52 percent of all black carbon emissions in California,[2] and from open field burning of forest and agricultural waste. Fuels from diverted organic waste also reduce emissions from landfill disposal.

Both UC Davis and the CEC estimate that the technical potential of fuels from organic waste is more than 2 billion gasoline gallon equivalents (gge) per year.[3] Other estimates are three to five times that amount.[4] Even if the technical potential of organic waste based fuels is only 2 billion gge per year, that is more than 10 percent of California's on-road vehicle fuel consumption and enough to replace almost two-thirds of California's diesel consumption. The GHG reductions, air quality and other benefits of converting organic waste to energy are summarized in the chart below.

GHG Reductions and Other Benefits of Biofuels

SECTOR	GHG REDUCTION (million metric tons)	BENEFITS
Diverted Municipal Organic Waste	5-10 MMT CO_2e / year (not including fossil fuel displacement)	• Reduced landfill waste • Revenue and/or energy for local governments • Production of organic fertilizers
Landfill Gas	6.77 MMT CO_2e / year (not including fossil fuel displacement)	• Reduced pollution and environmental justice impacts from diesel and fossil fuels
Livestock Waste	6 MMT CO_2e / year (not including fossil fuel displacement)	• Reduced odor, air and water pollution • Revenue for dairies • Production of organic fertilizer

[1] *First Update to the Climate Change Scoping Plan*, California Air Resources Board, May 2014, at page 18.
[2] Id. at page 21.
[33] *Transportation Fuels: ARB Technology Assessment,"* presented September 3, 2014, at slides 15-16.
[4] Id. at slides 17-19, summarizing assessments by the US Department of Energy and the California Council on Science and Technology.

Agricultural Waste	Not yet calculated	• Reduced air pollution from open field burns • Production of organic fertilizer and soil amendments
Wastewater Treatment Biogas	3 MMT CO_2e / year (not including fossil fuel displacement)	• Produce revenue and/or energy for local governments • Reduced pollution from fossil fuels • Production of organic fertilizer and soil amendments
Forest Waste	Can reduce GHG emissions from wildfire by 65 percent or more[5]	• Protect health and safety • Reduce air pollution • Protect infrastructure and forest ecosystem • Save hundreds of millions in annual wildfire damages • Provide energy and/or revenues to rural communities

2. What is the relative emission benefit of switching to alternative transportation fuels and technologies?

BAC is very concerned that ARB's September 3 presentation largely ignored biogas in the discussion of relative emissions benefits from different fuels. The presentation on relative emissions benefits omitted biogas except for landfill gas used to generate renewable hydrogen for fuel cell vehicles.[6]

There is no greater emissions benefit than switching from fossil fuels to organic waste based fuels (biogas). According to ARB's Look-Up Table, switching to biogas reduces GHG emissions from gasoline and diesel by 80 to 95 percent. Switching to biogas generated from diverted food waste and large wastewater treatment facilities can reduce GHG emissions by more than 100 percent since those fuels have negative carbon intensities.

The relative emissions benefit of switching to biogas is also much greater than switching to ethanol, biodiesel or other biofuels. Biogas cuts GHG emissions by two to ten times as much as ethanol and biodiesel do. Biogas also poses fewer

[5] "*Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production and Other Benefits,"* prepared for the California Energy Commission by the US Department of Agriculture, January 2010. CEC-500-2009-080.

[6] ARB presentation, above, at slides 23 and 32. Slide 23 does not include biogas at all and slide 32 only includes it indirectly as a source of renewable hydrogen.

sustainability issues such as land use changes, water and fertilizer consumption, impacts on food prices, etc. In addition, both the anaerobic digestion and gasification processes used to convert organic waste to fuels produce coproducts such as biosolids and biochar that can further reduce GHG emissions by providing organic soil amendments and reducing water demand.

Biogas also has lower GHG emissions than electric or fuel cell vehicles and can provide a renewable source of electricity or hydrogen for those vehicles.

3. What is the impact of methane leakage from the natural gas distribution system on established emission rates?

As the AB 32 Scoping Plan Update makes clear, methane leaks from natural gas drilling and distribution are only a fraction of the methane generated from livestock, wastewater treatment and landfills.[7] While important to address leaks from the natural gas sector, reducing methane from organic waste by converting it to transportation fuels can provide several times greater GHG reductions than stopping methane leaks from natural gas. This is particularly true in the dairy and agricultural sectors, where methane emissions are not capped under AB 32. In other words, nearly 100 percent of those emissions are "leaked" into the atmosphere.

In determining the impact of methane leakage on lifecycle emissions, it is critical to distinguish natural gas from biogas. Above all, biogas does not involve drilling and, therefore, has no emissions associated with drilling. Biogas production is also not collocated with petroleum production the way that natural gas usually is.[8]

Most often, biogas is used onsite to fuel vehicles, as at Waste Management's Altamont Landfill Gas to LNG facility, which fuels its trucks at the landfill, and Clean World's biogas production facility at the Sacramento Transfer Station, which has a fueling station onsite. Neither of these facilities, nor most biogas to transportation fuel facilities in development, use or plan to use pipeline injection. They have, therefore, very little or no methane leakage associated with distribution of the gas.

In assessing methane leakage from biogas production, it is also important to assess different technologies, waste sources and sizes of operations. As the studies cited in ARB's September 3 presentation make clear, size matters, as does waste type and location. As the Brandt study, cited in the September 3 presentation, noted, high leakage rates in many of the current studies are unlikely to be representative going forward.[9] In addition, while there may be some leakage from agricultural and dairy facilities, where methane is not currently regulated, methane leaks from landfills are highly regulated and quickly

[7] *First Update to the Climate Change Scoping Plan*, California Air Resources Board, May 2014, at pages 23-25.

[8] ARB presentation, above, at slide 61.

[9] ARB presentation, above, at slide 57.

corrected.

BAC urges ARB not to generalize about methane leakage and not to assume leakage rates for biogas that represents averages across different waste types or averages that include natural gas leaks. As the staff presentation made clear, better studies and data about methane leakage will be available in the coming years. BAC urges ARB not to revise carbon intensity levels of organic waste based fuels until more accurate and sector-specific data is available.

4. What infrastructure improvements are needed to facilitate the use of emerging fuels?

Investing in bioenergy infrastructure is the most important step California can take to increase transportation fuels from organic waste. The technology is proven, as are the GHG reduction and other benefits, and the underlying fuel source – organic waste – already exists. It does not need to be drilled, fracked or planted. What it needs is the infrastructure to convert organic waste to fuels.

Increasing production of fuels from organic waste will require significant infrastructure investments in three areas; 1) facilities to generate and/or capture the biogas from organic waste; 2) facilities to compress or liquefy the gas - or to extract the hydrogen - for use as a transportation fuel; and 3) facilities to condition the gas for pipeline injection and to interconnect to those pipelines, when the biogas source is not collocated with fleets or large vehicle users.

California needs to invest in more facilities to produce biogas from organic waste. CalRecycle has estimated that California needs at least 100 new anaerobic digestion facilities to divert food and other organic waste from landfills. California also needs to invest in transportation fuel production at landfills, which currently flare almost half the methane that they generate in California. California's wastewater treatment facilities, which produce the very lowest carbon transportation fuels, also need infrastructure investments. Currently, 97 wastewater treatment plants lack anaerobic digestion onsite and 42 large wastewater treatment plants that have anaerobic digestion onsite simply flare their biogas rather than produce transportation fuels or electricity with it. There are only about a dozen dairy digesters in California, although there are more than a thousand dairies, and the dairy digesters that exist produce electricity rather than transportation fuels. The agricultural and forestry sectors have no waste to fuels facilities at all.

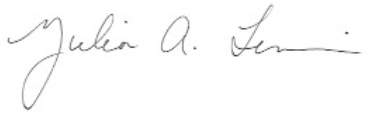
In recent grant solicitations by CalRecycle (cap and trade revenues) and the California Energy Commission (AB 118 funding), the programs were significantly oversubscribed, with the agencies receiving proposals worth many times more dollars than the agencies had available. Increasing the amount of cap and trade revenues, the percentage of AB 118 funds, and other funding for bioenergy infrastructure will be critical to capture the GHG reductions and other benefits of converting organic waste to fuels and electricity.

Conclusion

Transportation fuels from organic waste offer the greatest GHG reductions – by far – of any transportation fuels available. When used in place of diesel, biogas also cuts toxic air contaminants, black carbon and other pollutants. It reduces landfilling, can help reduce the wildfire impacts, produces beneficial coproducts like biochar and biosolids that reduce the need for petroleum based fertilizers, and can produce jobs and revenues in every region of the state.

For all these reasons, we urge ARB to increase its focus on organic waste based fuels and to support the increased use of cap and trade revenues, AB 118 funding and other funds to invest in the infrastructure needed to convert organic waste to fuels and capture the many benefits of those fuels.

Sincerely,



Julia A. Levin
Executive Director