

Waste Management

Thank you for the opportunity to initiate discussions with you on the issue of Biomass GHG Emissions and how they should be addressed in AB 32 plans and programs. I wanted to take this opportunity to further express my initial thoughts as was briefly discussed at the workshop on February 18th.

There are at least 3 major GHG issues associated with the management of biomass:

- GHG emissions from the combustion of biomass used as a source of energy or fuel.
- Storage of sequestered carbon in harvested biomass.
- How GHG reduction offsets may be generated by alternative energy sources using biomass fuels (and other non-biomass sources of renewable energy) to displace the use of fossil fuels.

The workshop on 2/18 really only addressed the first of the above 3 bullets. WM believes that all three will need to be addressed.

GHG Emissions from Combustion of Biomass for Energy

As I mentioned on 2/18, there seems to be 2 basic categories of Biomass Energy:

- Waste derived biomass
- Harvested biomass

With respect to waste biomass, the solid waste industry believes that the combustion of waste biomass should be viewed as *carbon neutral*. That is, CO₂ emissions from the combustion of waste biomass should not be viewed as contributing in any way to climate change. These CO₂ emissions from waste biomass are part of the near term carbon cycle and when diverted from traditional waste management methods are a source of biomass combustion for energy that do not generate anthropogenic CO₂ emissions. Rather, emissions from these sources should be viewed as an extension of the near term carbon cycle and not subject to inclusion in caps. Further, waste biomass to energy should be eligible to generate offset credits due to the displacement of fossil fuel energy production. Sources of carbon neutral waste biomass include landfill and sewage digester gas, biomass to energy facilities, that portion of waste-to-energy combustion that processes biomass, anaerobic digestion, and the thermo-chemical conversion of waste biomass to fuel or energy.

We strongly urge you to familiarize yourselves with the IPCC protocols on waste combustion (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_5_Ch5_IOB.pdf). In particular, please note the following excerpts from this document.

Consistent with the *1996 Guidelines* (IPCC, 1997), only CO₂ emissions resulting from oxidation, during incineration and open burning of carbon in waste of *fossil origin* (e.g., plastics, certain textiles, rubber, liquid solvents, and waste oil) are considered net emissions and should be included in the national CO₂ emissions estimate. *The CO₂ emissions from combustion of*

biomass materials (e.g., paper, food, and wood waste) contained in the waste are biogenic emissions and should not be included in national total emission estimates. However, if incineration of waste is used for

energy purposes, both fossil and biogenic CO₂ emissions should be estimated. *Only fossil CO₂ should be included in national emissions under Energy Sector while biogenic CO₂ should be reported as an information item also in the Energy Sector.*

This language clearly indicates that the intent is only to recognize the components of fossil origin in GHG emission inventories. The biomass fraction of waste should be view as "biogenic" and part of the near-term carbon cycle. Our sector does not mind reporting biomass emissions from combustion -- but they should not be included in inventories or regulated under cap and trade. Also note the following:

The common method for estimating CO₂ emissions from incineration and open burning of waste is based on an estimate of the *fossil carbon* content in the waste combusted, multiplied by the oxidation factor, and converting the product (amount of fossil carbon oxidized) to CO₂. The activity data are the waste inputs into the incinerator or the amount of waste open-burned, and the emission factors are based on the oxidized carbon content of the waste that is of *fossil origin*. Relevant data include the amount and composition of the waste, the dry matter content, the total carbon content, the fossil carbon fraction and the oxidation factor.

As an example of the apparent misunderstanding of waste biomass I suggest you look at the recent report posted on the CARB's LCFS web site regarding, "**Landfill Gas to CNG**" (http://www.arb.ca.gov/fuels/lcfs/100808lcfs_lfg.pdf). Although the source is totally waste biomass fuel (landfill gas) the report still counts the CO₂ emissions from the displaced flaring of the landfill gas as well as the CO₂ emissions from the combustion of the produced CNG that is used as a fuel. Although the overall carbon intensity is very low, it still mischaracterizes the fact that the waste biomass source of the fuel should be considered "carbon neutral" and the CO₂ emissions derived from the combustion of landfill gas and CNG derived from landfill gas should not be counted at all. Only the portion of fossil energy used to produce the LFG to CNG fuel (if any) should be included in determining the overall carbon intensity of CNG produced from LFG.

With respect to **harvested biomass** should be differentiated from **waste biomass** -- although we acknowledge that, in some cases, the distinction may be difficult to clearly define. Biomass that is derived from a totally waste derived source, such as landfill gas or waste digester gas, should be treated as carbon neutral and simply an extension of the near-term carbon cycle. Harvested biomass, such as mid-western corn ethanol which has been shown by the CARB LCFS staff to have very high overall carbon intensity should be treated differently. The carbon intensity of some harvested biomass fuels, such as Midwestern corn ethanol, is very high due to the reliance on fossil fuels for crop production, transportation and refining of the fuel -- even though the fuel itself is biomass derived. Crops that are harvested specifically to produce a fuel should be evaluated to determine their overall carbon intensity. *However fuels that are totally derived from materials that would otherwise be "wasted" should be viewed as carbon neutral.* Examples of waste derived biomass fuels include: *landfill gas, sewage digester gas, and food and green*

waste digester or gasifier gas. Forest and agricultural debris that would otherwise be wasted should be recognized as carbon neutral waste materials including: forest product mill wastes and residues, dead trees, and agricultural wastes that would otherwise decompose to produce CO2 or CH4. **CO2 emissions from totally waste derived biomass should be viewed by CARB as carbon neutral and simply an extension of the natural near-term carbon cycle.**

GHG Reductions from the Storage of Biomass Sequestered Carbon

The CARB should also consider the impact that stored sequestered carbon has on GHG emissions and global warming. There are several activities that involve the continued storage and preservation of sequestered carbon in biomass materials. These activities include 1) the continue maintenance of in-use forest products (e.g., tables, chairs, books, wood frame houses, etc.), 2) soil carbon storage that can be enhanced by compost and mulch, and 3) landfill carbon storage. In the case of landfills, as much as 50% of the biomass materials that goes into the landfill never decomposes into a greenhouse gas such as CO2 or CH4. These materials are permanently stored in the anaerobic conditions of a landfill and the sequestration of carbon is permanently maintained -- thereby removing this portion of the biomass as a source of CO2 emissions. Some recognition must be afforded those activities that continue to store significant quantities of sequestered carbon -- and thus preventing and lowering GHG emissions from these biomass sources that would otherwise occur.

For example, the solid waste industry recognizes that it is unlikely that any marketable "credits" will ever be generated for the storage of sequestered carbon in landfills. However, the solid waste industry suggests that an overall carbon balance be performed to evaluate the net GHG performance of landfill operations. In this fashion, landfills would be responsible for their net emissions of methane (GWP = 21-25), and at the same time recognized for the amount of sequestered carbon storage that is maintained and preserved in the landfill (in CO2e with a GWP = 1) that can be used to partially offset methane emissions. CARB should consider this issue further.

GHG Reductions from Biomass Derived Energy that Reduces or Offsets Fossil Fuel Energy

CARB should also consider ways that biomass and other renewable energy sources can be further encouraged by recognizing how biomass and renewables offset the need for a like amount of fossil fuel energy generating capacity. As far as we are aware, the only imperfect tool to recognize the value of renewable energy is through the RPS program in California -- which imperfectly values the GHG benefits of biomass and other renewable energy sources. The CARB should evaluate ways that biomass and other renewable energy sources can be further encouraged and incentivized by mechanisms that recognize their full fossil fuel offsetting capability.

Summary

In summary, we recommend that CARB consider the following courses of action with respect to the GHG implications of biomass management in California:

- GHG emissions from the combustion of biomass or biomass derived fuels for energy
 - CO2 from the combustion of waste biomass or waste biomass derived fuels should be considered carbon neutral
 - CO2 from the combustion of harvested biomass should be evaluated for its overall carbon intensity as a fuel (e.g., similar to LCFS).
- GHG Reductions from the Storage of Biomass Sequestered Carbon
 - CARB should evaluate ways that biomass sequestered carbon can be reasonably and responsibly recognized as a GHG reduction strategy
- GHG Reductions from Biomass Derived Energy that Reduces of Offsets Fossil Fuel Energy
 - CARB should evaluate ways that biomass and other renewable derived energy can be directly recognized and credited for reducing dependence on fossil fuel energy

In view of the time constraints of getting this information to you, I have not had a chance to have the issues outlined in this email fully vetted with all the members of the Solid Waste Industry for Climate Solutions (SWICS) -- which are cc'd to this email. However, I have tried to articulate the issues of concern to the SWICS members as best I understand them. There may be some SWICS members that may offer further clarifying comments.

Please let me know if you have any questions about the information provided in this note.
Thanks.

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