EPA Scientific Advisory Board Biogenic Carbon Emissions Panel

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Comments on *DELIBERATIVE DRAFT Report of the Biogenic Carbon Emissions Panel.*

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Dear EPA Scientific Advisory Board Biogenic Carbon Emissions Panel:

Thank you for the opportunity to comment on the Deliberative Draft Report of the Biogenic Carbon Emissions Panel, dated January 19, 2012.

We appreciate and support several very important points in the draft (SAB Report) that indicate the need for substantial revisions in the September, 2011 Framework. These include:

- Categorical treatment (SAB Report p. 14): Combusting biogenic materials for energy cannot be considered "carbon neutral" by definition.
- Additionality (SAB Report pp. 3, 24-25): Forest sequestration is already assumed as part of global carbon cycle and climate models. In order for biogenic emissions to have a net atmospheric effect that is less than stack emissions (BAF<1), management for wood energy feedstocks needs to result in increased growth above business-as-usual, *or* the alternative fate of the materials needs to involve relatively rapid "anyway" emissions as materials decompose or burn.
- Baseline (SAB Report pp. 5-6): Assessing "what the atmosphere sees" as a result of biomass combustion by a regulated facility requires use of an "anticipated baseline". Despite the inherent uncertainty associated with projections, this is the only practicable way to determine net atmospheric impacts of facility emissions.
- Spatial Extent (SAB Report pp. 4, 6, 24): Constant or increasing forest carbon stocks across a broad region cannot serve as a proxy for additionality. First, stocks may have increased even more in the absence of biomass energy use (see baseline). Second, carbon increases on lands not managed for

biomass may mask carbon losses on managed lands. Third, carbon losses in a region may have been even more severe in the absence of treatments that generate wood for energy uses. The definition of regions is essentially arbitrary and would strongly affect BAF values.

- Time (SAB Report pp. 4-5, 21): The time path of carbon recovery after the initial emission from biomass combustion at the stack does matter. [Note: This clear statement is contradicted elsewhere in the report with a statement that the stock change at 100 years post-emission adequately captures climate effects. See below for additional discussion.] The SAB Report (p. 6) cites Cherubini et al. as a possible methodology for capturing time path effects. Several other authors have proposed a similar metric.[1]
- Feedstock Categories (SAB Report pp. 3, 29-30): A BAF for wastes, logging residues and other rapid-recovery sources might be determined through minor modifications of the Framework as proposed. [Note: These computations would also need to reflect any resulting changes in soil carbon stocks, and removals would need to be limited in order to protect forest productivity.] Live trees (roundwood) as source material require more complex calculations that compare an anticipated baseline with a biomass harvest scenario.

We have serious reservations about suggested alternative approaches that would fail to resolve critical issues laid out in both the draft Framework and the SAB Report:

- Certification (SAB Report pp. 7-8, 20-21, 40): Sustainability as defined by SFI (or any other third-party system) does not address carbon on source lands. Adding a carbon criterion to existing certification systems would add cost and reduce consistency. Although this alternative would solve the spatial extent issue by applying to the woodshed of a particular facility, additionality would still require developing an anticipated baseline. This alternative would require better chain-of-custody tracking than currently incorporated in SFI, though systems such as FSC do a bit better.
- Offsets (SAB Report p. 8, 37-40): Offset systems suffer from the identical additionality and leakage problems that EPA is facing, and would be much less uniform than a set of standard presumptions and factors defined by EPA.

A modified BAF approach might be practicable if key remaining complexities can be resolved:

- EPA could use a process similar to that proposed in the Framework to define standard BAF factors for short-recovery materials by category and perhaps region based on expected decay rates, "anyway" emissions (including CH_4 emitted or captured), and previous land use for short-rotation crops.[2] Wastes and residues qualifying for this treatment need to be defined carefully to ensure that soil carbon pools and future forest productivity are protected.

[1] See, O'Hare, M., Plevin, R.J., Martin, J.I., Jones, A.D., Kendall, A., and Hopson, E. (2009) Proper accounting for time increases crop-based biofuels' greenhouse gas deficit versus petroleum. Environ. Res. Lett. 4: 024001 (7pp) doi:10.1088/1748-9326/4/2/024001, stacks.iop.org/ERL/4/024001; Anderson-Teixera, K. and Delucia, E.H. (2010) The greenhouse gas value of ecosystems. Global Change Biology, doi: 10.1111/j.1365-2486.2010.02220; Sathre, R. and Gustavsson, L. (2011) Time-dependent climate benefits of using forest residues to substitute fossil fuels. Biomass and bioenergy 35:2506-2516.

[2] Sathre and Gustavsson (2011) note that cumulative radiative forcing is relatively insensitive to decay rate of forest residues, so generic factors would have acceptable levels of uncertainty.

- EPA could assign BAF=1 for live tree (roundwood) sources, with the option for regulated facilities to petition for more favorable treatment by demonstrating offsetting sequestration on source lands.
    - EPA could define a standard methodology for use by facilities requesting an alternative BAF – e.g accepted forest growth and harvest models and standard parameters based on woodshed characteristics for the anticipated baseline and biomass-use scenarios.
    - The SAB Report (p. 30) mentions the complexity of modeling a regional anticipated baseline and suggests use of FASOM for modeling. As the Report points out (p. 31), most of the regional unknowns that affect forecasts would cancel out between the without-biomass and with-biomass scenarios. Stand-level modeling representing typical management in the woodshed of a particular facility would be less complex.
    - The cumulative radiative forcing metric proposed by Cherubini and others might be used to calculate a BAF by comparing an emissions pulse without recapture to the same emissions pulse with biological recapture over time. Simplistic assumptions about management (even age under a well-defined rotation with all biomass used for energy, followed by full carbon recovery over time) would need to be changed to reflect actual practice with and without bioenergy use.

      In some passages, the draft Report appears to support capturing carbon recovery paths over time by means of such an index (SAB Report p. 6); while other passages appear to support a single assessment date at 100 years after emission (SAB Report pp. 11-12, 18, 23, 25). Measuring net climate impacts OVER 100 years (Cherubini et al. and others – see note 1) is not the same as measuring AT 100 years, and the former approach is critical to reflect warming due to a temporary CO_2 elevation.

      The assumption in some Report passages (p. 11) that the emissions pathway to year 100 does not matter seems to be based on a very narrow modeling exercise. This exercise uses peak warming as the sole climate change metric and assumes a fixed cumulative emissions burden. This restricted formulation does not reflect the rate of change (which might affect the ability of natural and human systems to adapt), or weigh immediate damage more heavily than later (presumably it is desirable to delay flooding, drought and other climate effects even when the eventual equilibrium temperature is the same). Nor does it reflect the possibility that cumulative emissions will be lower if we begin reductions sooner.

    - Using either a GWP index or a static reference point, EPA will need to determine the time period over which effects will be evaluated. This time period is partly a policy choice, but EPA should consider the likelihood of crossing critical thresholds that trigger severe or irreversible damage (e.g. methane from melting permafrost, reduced albedo from melting ice-caps, or massive forest dieback). To depict the rate of removal of CO_2 from the atmosphere over time, Cherubini et al. used a simple growth model and Bern equations to estimate the effects of ocean and terrestrial sinks. This approach assumes that site-specific vegetative carbon recovery and ocean and terrestrial sinks will all continue to function as they do today – a highly unlikely assumption. If a GWP index is used to calculate BAF, assumptions should incorporate current and evolving knowledge about failing sinks and

feedback thresholds, including the uncertainty that forest regrowth will occur as expected given climate stresses. The index should also reflect emissions of all greenhouse gases, not just CO_2.

- A modified BAF approach would require documenting feedstock sources by category. The Report states that tracking feedstocks would be too difficult (p. 27), although documenting sources would be equally necessary for suggested alternative certification or offset approaches. It would be helpful for the SAB to outline the nature of the obstacles – if they are truly overwhelming, the EPA may be forced to fall back on a categorical inclusion for all biogenic emissions as a second-best solution.

We thank the SAB and EPA for wrestling with these difficult carbon accounting issues, and for inviting comment through an open process.

Sincerely,

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