Comments of the Green Power Institute on the

Accounting Framework for Assessing Biogenic CO_2 Emissions from Stationary Sources, and March SAB In-Person Meeting

May 21, 2015

Gregg Morris, Director
Green Power Institute
2039 Shattuck Ave., Suite 402
Berkeley, CA 94704

Introduction

The Green Power Institute (GPI) is the renewable energy program of the Pacific Institute for Studies in Development, Environment, and Security, a public-purpose (501(C)(3)), environmental-research institution located in Berkeley, CA. The GPI performs research into the environmental implications of renewable energy production, and advocates for public policies favorable to the development of renewable energy. We gratefully acknowledge funding for the preparation of these comments provided by the U.S. Biomass Power Association.

The GPI submitted technically-oriented comments on the November, 2014, Biogenic Carbon Accounting Framework on March 16, 2015, prior to the SAB in-person meeting in Washington, DC. We stand behind those technical comments, and respond in this set of comments to the content of the March 25-26, 2015, in-person SAB meeting. In this set of comments we argue that the SAB should encourage the EPA to take the approach of assigning default BAFs to defined categories of biomass fuels rather than requiring a facility-specific analysis for each project, we describe the opportunity that the SAB has to expeditiously settle the question of assigning BAF values for the vast majority of the biomass fuels currently used for power production in the U.S. while reserving the time necessary to address the question of assigning BAFs to biomass fuels derived from crop-type resources,[1] we discuss the determination of BAFs for crop-type sources of biomass fuels, and we consider the issues of using radiative forcing as the figure of merit for biogenic greenhouse-gas analysis, and dynamic modeling of carbon stocks and flows to elucidate the temporal dimensions of biogenic greenhouse-gas emissions.

[1] The terms "crop-type resources" or "crops" are used in these comments to refer to biomass fuels that are derived from resources that are grown and/or harvested specifically for the purpose of producing fuel. The distinction being made is with biomass fuels that are derived from the residues and byproducts of activities that are carried out for purposes other than energy production.

Standard BAFs for Defined Fuel Categories

The discussion at the in-person SAB meeting showed that the panel is split on the question of whether to determine standard BAF values for defined categories of biomass fuels. Several of the panelists are clearly in favor of setting standard BAF values for specific categories of biomass fuels, while other panelists expressed reservations about modeling individual feedstocks and/or setting standard or default values for defined categories of biomass fuels.

It is not necessary to assign standard or default BAFs to all categories of biomass fuels in order to assign standard values to some categories of biomass fuels for which the BAFs have already been determined and vetted. Indeed, failure to assign standard BAFs for categories of biomass fuels for which the BAFs are known and accepted will have the undesirable effect of unproductively driving up the future cost of permitting new biomass generating facilities, and re-permitting existing biomass generating facilities.

For example there is broad agreement that diverting wood residues from landfill disposal to use as biomass fuel reduces overall biogenic greenhouse-gas emissions due to the elimination of the landfill CH_4 emissions, even when taking into account the fact that the landfill emissions occur slowly over a period of many years. Given this consensus, which is fully supported by the underlying science, it is appropriate to assign a BAF value of zero to biomass fuels derived from material that is diverted from landfill disposal. Similarly, there is a consensus supported by science that biomass fuels derived from material diverted from open burning, and biomass fuels derived from the residuals of forestry operations conducted for other than energy-production purposes in accordance with sustainable forestry practices, should be assigned BAF values of zero.

Much of the discussion at the in-person meeting concerned the assignment of BAF values to crop-type sources of biomass fuels, such as fuel plantations established on forestland cleared for the purpose of establishing the plantation (see section below – Assigning BAFs to Crop-Type Sources of Biomass Fuels). There are probably several categories of crop-type fuels for which BAFs could be determined. Unlike in the case of fuels derived from residues and byproducts, there is no consensus at this point in time about the appropriate BAF values to assign to different categories of crop-type fuels.

Assigning BAFs to Low-Risk Fuels as the First Course of Action

In our March Comments on the Biogenic Carbon Accounting Framework the GPI pointed out that the current fuel supply for the US biomass energy industry is composed entirely of material that is produced as a byproduct of other activities, and we argued that there is little likelihood that this situation would change in the foreseeable future, due to

economic considerations intrinsic to the production of energy from biomass. Nevertheless, the overwhelming focus of the in-person SAB meeting was on the use of biomass fuels produced from dedicated plantations established following a clear cutting of the existing vegetation on a site.

There is general agreement among the SAB panelists, the EPA staff, and stakeholders that the use of residues and byproducts as fuels deserves a BAF assignment of zero, because the carbon in these materials would be returned to the atmosphere in any case, whether the material is used for energy production, or meets some alternative fate. The BAF that should be used in the case of a fuel plantation established on a pre-existing forest is a much more complicated determination, and there is not a consensus on the SAB, nor among stakeholders, about how to handle these kinds of fuels with respect to the assignment of BAFs.

On day two of the SAB in-person meeting, Prof. Woodbury suggested that there was too much emphasis being placed on long-term, long-rotation forest fuels. He proposed that the SAB should devote more of its attention to the topic of what he referred to as lower-risk fuels. The GPI agrees completely. In the opinion of the GPI the SAB has a real opportunity to provide a valuable service to the biomass industry and the renewable energy industries in general by expeditiously memorializing its consensus that biomass fuels derived from residue and byproduct forms of biomass should be assigned a BAF value of zero. After the lower-risk fuels have been dispensed with, it would be reasonable for the SAB to turn its attention to the treatment of biomass fuels derived from crop-type resources.

In fact, by focusing its attention on the use of crop-type biomass fuels while the greenhouse-gas implications of residue and byproduct fuels is left unaddressed, the SAB gives many observers the impression that the existing biomass industry is based on crop-type resources. This is an entirely false impression. This damaging mischaracterization of the existing industry can be easily corrected by the SAB by quickly assigning biomass fuels derived from residues and byproducts a BAF value of zero, and only after that launching into the investigation of how to treat fuels derived from crop-type resources. Disposing of the BAF issue for residue and byproduct fuels upfront could be the single most significant contribution that the Biogenic Carbon SAB could make to the future of biomass energy production in the U.S.

Assigning BAFs to Crop-Type Sources of Biomass Fuels

Although the industry representatives that provided public comments at the beginning of the in-person SAB meeting, and the GPI in our March 16 comments, all asserted that the real-world biomass-power industry uses only residue and byproduct sources of biomass

as fuel, several of the public speakers expressed the view that greatly increased biomass energy production in the U.S. in the future could lead to the harvesting of large swaths of the nation's forests, and the widespread establishment of biomass-fuels plantations. As discussed previously in these comments, the SAB panel as a whole is strongly focused on the effects of the use of crop-type sources of biomass fuel.

It is interesting to note that the SAB has been split on the issue of to what extent considerations of public policy and economics should be brought-to-bear in the determination of how to characterize the biogenic greenhouse-gas emissions associated with biomass-energy production. Some panelists believe that the EPA's Biogenic Accounting Framework should be policy neutral, while others believe that the framework can only be useful or contextual if it is specifically designed to address the policy issues for which its use is intended to provide reliable input information.

Before discussing the issue of BAF factors for crop-type biomass fuels, we wish to discuss the practical implications of assigning a project-in-development an initial BAF value of 1 for its biogenic emissions, even if the assignment is only for a limited period of time (for example several years). It is well known that biomass power plants emit greater quantities of CO_2 through their stacks than fossil-fuel-fired power plants producing the same amount of energy. Assuming that fossil-carbon emissions impose a significant cost penalty to generators using these fuels in the future, if biogenic emissions are treated identically to fossil emissions (BAF = 1), the total cost of carbon-emissions allowances per MWh would be greater for biomass generators than for fossil generators, and the already financially-marginal enterprise of biomass-power generation would collapse, both under competition with both conventional (fossil) resources, and under competition with other renewables. In other words, if a proposed biomass project faces the prospect of having a BAF value of 1 assigned to its emissions, even if only for the initial several years of operations, the project will almost certainly never be developed. That is true no matter how scientifically valid it might be to make such an assignment. Similarly, making the BAF a factor that could be adjusted over time, or periodically, for a given project in response to changing environmental or other factors would act as a death knell to the project.

It is important for the SAB and other parties to understand that the practical outcome of assigning the value of one, or something close to it, for a project's BAF, or making the BAF adjustable over time, would be to kill the project. That is not necessarily a bad thing – the GPI, too, is concerned about the biogenic greenhouse-gas implications of producing energy from crop-type sources of biomass. We are discussing the practical implications of assigning a project a BAF value of 1 simply in the interest of improving understanding among the members of the SAB, EPA staff, and stakeholders to this process, not to support or oppose assigning BAF values of one in appropriate situations.

In fact, one approach that was widely discussed at the in-person meeting is the approach of assigning fuel derived from a clear cut that precedes the establishment of a fuel plantation an initial BAF value of 1, which value is to be used until such time as the initial carbon deficit caused by the harvesting of the standing biomass is offset by the annual savings associated with the operation of the biomass power plant. Once the initial carbon deficit has been eliminated, thereafter the BAF for the fuel drops to zero.

Beyond the practical consideration that no project is likely to developed under these circumstances, the approach itself is unsatisfactory, at least as envisioned by many of the panelists at the in-person meeting. This is so because it entails offsetting the initial carbon deficit caused by removing the standing biomass, by the annual avoidance of fossil-fuel use to provide the same amount of energy. In fact, non-carbon renewables like wind and solar provide carbon-free energy in addition to fossil-fuel avoidance, and the same is true for biomass fuels derived from residues and byproducts (biogenic-carbon neutral plus fossil-fuel avoidance). Fuels derived from crop-type resources should be held to the same standard. That is, they should be fully carbon neutral with respect to biogenic carbon, plus provide the benefit of avoided fossil fuel use.

Several public speakers at the in-person meeting, as well as several members of the SAB, expressed concerns about the harvesting of trees specifically for energy purposes in relationship to some of the current practices used for the production of wood-pellet fuels in the U.S. Southeast, for export to Europe. We note that the harvesting of trees for the purpose of producing wood pellets for use in Europe's carbon markets is an example of a biomass fuel in the category of crop-type resources. The problem with this application is twofold. First, Europe's carbon rules do not distinguish between biomass fuels derived from residue and byproduct forms of biomass, and fuels derived from crop-type resources. Second, even if crop-type biomass fuels were given a default BAF value of zero, projects based on the use of crop-type fuels would be extremely unlikely to be developed in the U.S., due to the high cost of producing crop-type fuels, and the fact that in U.S. markets these types of projects would have to compete with other renewables, such as wind and solar, severely limiting the amount that they would be able to spend for their fuel-production operations.

Near the end of the first day of the in-person meeting, Dr. Rose suggested that the value of carbon could become the main incentive for the large-scale development of biomass energy production in the U.S. in the future. As we mentioned above in our discussion of the European pellet market, biomass power production in the U.S. market will always be tempered by its need to compete with other renewables, no matter what the price of fossil carbon reaches. Thus, in order for the value of carbon to become the main incentive for the large-scale development of biomass energy production in the U.S., biomass power production would have to be benefiting from high carbon values beyond simply being

credited as carbon neutral, for example by earning something like carbon-offset credits for their production of net reductions in biogenic greenhouse-gas emissions, by avoiding methane emissions from landfill disposal or open burning, or by contributing to healthier, more fire-, pest-, and disease-resilient forests. We believe that the science supports, in principle, the awarding of offsets for some categories of biomass fuels, but that the standard of proof for the awarding of offsets should be both more stringent than that for a declaration of carbon-neutrality for a particular category of residue or byproduct fuels, and should always be determined on a project-specific basis. Assuming that the science will not support the awarding of offsets for crop-type biomass fuels, we assert that high carbon prices will never support the expansion of the biomass power industry beyond that which can be fueled with residue and byproduct forms of biomass. In other words, high carbon prices will never provide an incentive for the clearance of standing forests for purposes of energy production in U.S. energy markets due to the need for biomass power producers to compete with other renewables, and the fact that crop-type fuels will not qualify for the issuance of greenhouse-gas emissions offsets.

Radiative Forcing, Dynamic Modeling

Prof. Harmon suggested to the SAB that burning biomass residues in the field is the same as burning them in a power plant, and that therefore the only relevant figure of merit for the determination of biogenic carbon impacts is the size of the biomass-carbon stock that provides the fuel for the biomass power plant. This view is only half correct. It is correct in the sense that stable biomass stocks indicate that the biomass resource in question is not contributing to a buildup of carbon in the atmosphere. It is incorrect in the sense that it completely disregards the fact that the form in which carbon cycles from the biomass to the atmosphere, that is oxidized or reduced (often referred to as CO_2 or CH_4), makes an enormous difference from a greenhouse-gas perspective.

Dr. Skog proposed the use of radiative forcing as a figure of merit, rather than tons of CO_2 emissions, for assessing the greenhouse-gas implications of biogenic carbon emissions. Several members of the SAB expressed agreement with this approach. The best reason for using the measure of radiative forcing as the figure of merit for greenhouse-gas emissions, rather than simply CO_2 emissions, is for situations in which two different greenhouse gases, with different characteristics, need to be compared, such as CO_2 and CH_4. The GPI strongly endorses the use of radiative forcing as the figure of merit in modeling biogenic greenhouse-gas effects, in order to allow the calculations to include both forms of carbon emissions (oxidized, reduced). We use tons of CO_2 equivalents as the measure of radiative forcing in our modeling work.

Dr. Skog also proposed a form of dynamic modeling for biogenic carbon in which the atmospheric burden of biogenic greenhouse gases is tracked over time as the gases are

emitted to the atmosphere, and cleared from the atmosphere. Both prompt and delayed emissions can be modeled using this approach. This is the approach that the GPI developed for purposes of biogenic carbon modeling several years ago in conjunction with a large, integrated, LCA analysis of the use of biomass fuels performed by the US Forest Service for the PIER program in California.[2,3] We strongly endorse this approach as the best way to compare short-lived and long-lived greenhouse gases, while considering the implications of biogenic greenhouse-gas emissions over a long period of time.

[2] USDA Forest Service Pacific Southwest Research Station, Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production, and Other Benefits, CEC report no. CEC-500-2009-080, January 2010. http://www.energy.ca.gov/2009publications/CEC-500-2009-080/index.html.

[3] Morris, G., *Bioenergy and Greenhouse Gases*, Report of the Pacific Institute, May 15, 2008, http://www.pacinst.org/reports/Bioenergy_and_Greenhouse_Gases/Bioenergy_and_Greenhouse_Gases.pdf