Society of American Foresters
Growing better all the time

September 13, 2010

Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C.
Attention: Docket ID No. EPA-HQ-OAR-2010-0560

Submitted via www.regulations.gov

Re: Call for Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources for Prevention of significant Deterioration (PSD) and Title V Programs (GHG Tailoring Rule)

To Whom It May Concern:

On behalf of the Society of American Foresters (SAF), the national scientific and educational organization representing the forestry profession in the United States with over 14,000 members, please accept the following comments and information for the EPA's Call for Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources (Docket ID No. EPA-HQ-OAR-2010-0560). As the organization chartered to advance the science, education, technology, and practice of forestry for the benefit of society, the SAF has been actively involved with the research, policy and study of woody biomass energy since its inception.

Throughout the years, numerous articles on bioenergy have been published in the *Journal of Forestry* and many of SAF's other peer-reviewed journals. Most comprehensive of these was the SAF's 2008 peer-reviewed report *Forest Management Solutions for Mitigating Climate Change in the United States*. However, the new science and information on bioenergy has evolved at a rapid pace since this report was published. As a result, many issues surrounding the climate benefits and sustainability of biomass have been raised. To address the need for information on this subject, SAF recently commissioned a new task force to update its 2008 Report and address issues such as sustainability and carbon neutrality. Once the task force report is completed, SAF would like to brief the EPA on its findings. Because SAF will be conducting an exhaustive review of these issues for the next six months, we will limit our comments today and suggest references that will be helpful to the EPA.

SAF believes there are other important considerations, such as sustainability, forest regeneration, wildlife habitat, water and soils that must be carefully considered in woody biomass policy. However, because the EPA's Call for Information only refers to treatment of biogenic greenhouse gases for the purposes of the Tailoring Rule, SAF is only commenting and providing information on this specific issue. SAF will elaborate on other important concerns in its task force report.

The issue of carbon neutrality is difficult to discuss because it currently lacks a standardized definition. The term 'carbon neutrality' has different meanings under different analyses. For example, the Manomet Center for Conservation Sciences' "Biomass Sustainability and Carbon Policy Study" (Manomet) analyzed a particular forested site that was hypothetically harvested for bioenergy. Manomet calculated the time for the site to replenish the carbon lost to harvest. This narrow temporal and spatial scale examined only a snapshot in time on one plot of land. The SAF believes that to properly analyze the carbon impact on the forest, research must look at all the ways that forests can address greenhouse gas emissions, which are outlined below. Without focusing on all carbon pools (including forest and product pools), research results can be misleading or even incorrect (Lippke et al., 2010). Additional problems with the Manomet study highlights the need for a standardized definition of 'carbon neutral' appropriate for terrestrial carbon.

Important Considerations

As the EPA reviews the comments and information received, it should consider the following points crucial to the accurate accounting of carbon:

Life Cycle Inventory and Analysis

Using life cycle analysis and/or life cycle inventory across all stages of processing is essential to accurately measure carbon and demonstrates how to achieve improved environmental performance (CORRIM, 2009). A consortium of research institutions has developed science based life cycle measures of all inputs and outputs associated with the use of wood including managing the forest, harvesting, transportation, producing products or biofuels, buildings or other products, maintenance and the products ultimate disposal (IPCC, 2007). The Consortium for Research on Renewable Industrial Materials (CORRIM) has several peer-reviewed published articles on many of the important considerations in SAF's comments. The SAF recommends the EPA review these articles available at www.corrim.org. Life cycle measures provide a consistent way to accurately account for interactions both inside and outside forest boundaries and the environmental impacts from cradle-to-grave. To the contrary, 'partial' accounting methodologies, such as those used in the Manomet report, will likely produce inaccurate or misleading results. Analysis over long periods of time and large areas (Ryan et al., 2010) must be used for global pollutants with effective lifespans measured in centuries. The SAF recommends the EPA review the National Renewable Energy Lab's Life Cycle Analysis database which can be accessed at www.nrel.gov/lci. The SAF also encourages the EPA to carefully review its 2010 Greenhouse Gas Inventory which is currently in the Docket.

Product Substitution

Wood products from sustainably managed forests can be continuously replenished while also benefiting the environment through clean air, water and wildlife habitat (USFS, 2005). The use of wood products can also 'substitute' for the use of alternative materials, such as steel, brick, concrete, aluminum and plastic, all of which are produced from nonrenewable resources that

require significantly more energy to manufacture (Lippke et al. 2010; Malmsheimer et al., 2008). In fact research has demonstrated that the manufacture of nonwood products often produces substantial emissions (Skog, 2007). Figures 1 and 2 (page 4) show this by comparing wood building materials to other non-renewable building materials in a life cycle analysis conducted across all carbon pools. Figure 1 compares wood I-joists and dimensional joists for flooring to steel and concrete structural flooring. The reduced carbon footprint of these wood products compared to steel and concrete is significant. In Figure 2, the results show that kiln dried lumber, plywood and oriented strand board (OSB) have a much smaller carbon footprint compared to concrete (Perez-Garcia et al., 2005). Figure 2 also includes the carbon stored in these wood products. Figure 3 (page 5) shows the substitution value of wood products by including the fossil fuels displaced due to the use of forest products (see the dark purple area labeled 'displaced fossil fuels') (IPCC, 2001).

The substitution value of wood products must be included in all analyses modeling harvests and carbon loss. Some small scale studies simply assume that once a forest stand is harvested, the harvested wood should be counted as a loss of carbon. But forest management does not occur in a vacuum and in many situations the wood harvested will store carbon for decades or even centuries. In fact, the Department of Energy has developed half-life tables for wood products (see DOE 2006). This type of small scale and partial analysis ignores the carbon benefits of using wood products in place of non-renewable, energy-intensive products.

SAF's *Forest Management Solutions for Mitigating Climate Change in the United States* (Malmsheimer et al., 2008 pp. 33) sums up product substitution well:

Although wood product substitution does not permanently eliminate carbon from the atmosphere, it does sequester carbon for long durations and can offset the use of more GHG-intensive products. When wood is harvested and used to make lumber, furniture, plywood, or other wood products, carbon is sequestered for the life of the given wood product. Once the wood product has served its useful life, landfill management techniques can further delay the conversion of wood to GHG emissions, or the wood can be used for power generation (offsetting generation by fossil fuel-fired power plants) or recycled into other potentially long-lived wood products. Regardless of the particular pathway followed after a product's useful life, wood substitution is a viable and important technique to immediately address climate by preventing GHG emissions.

Figure 1. Reducing Global Warming Potential by Selecting Components in Floor Assemblies (Lippke et al., 2009)

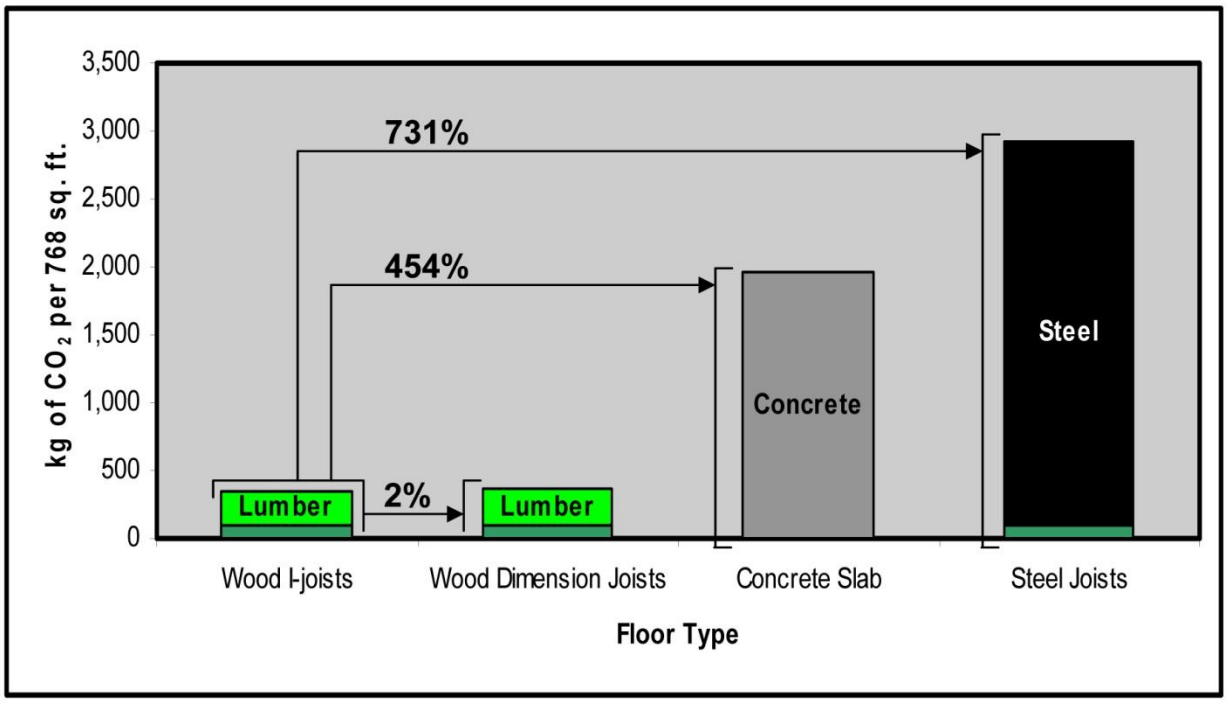


Figure 2. Net Product Life Carbon Emissions (Perez-Garcia et al., 2005)

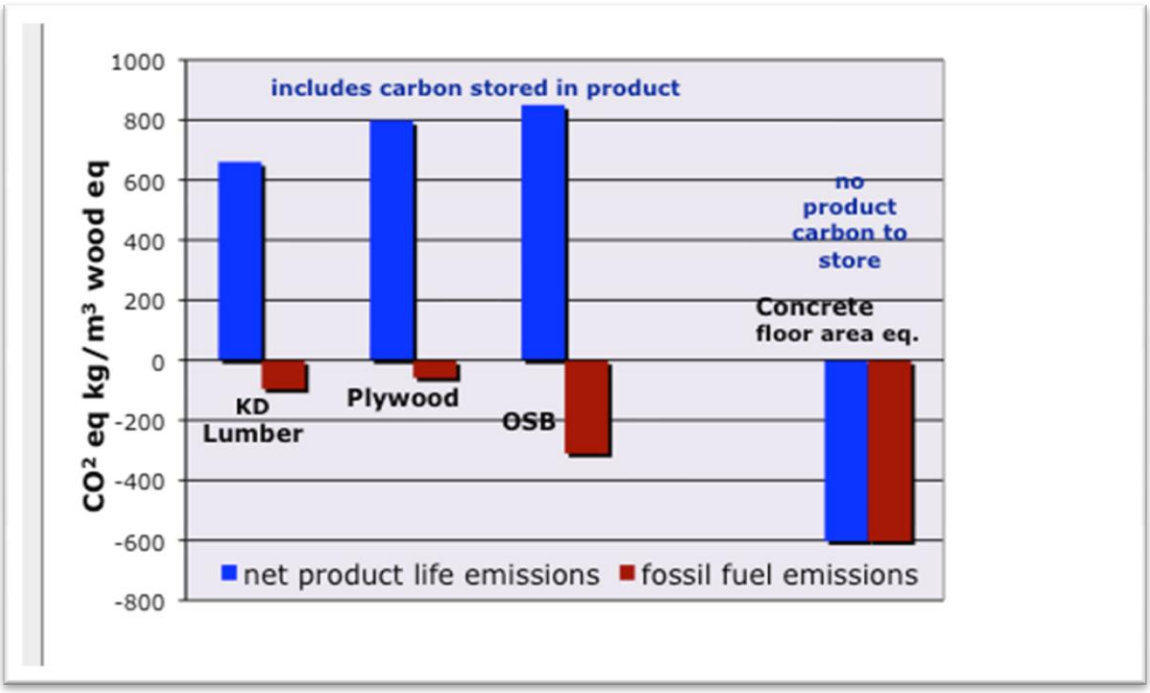
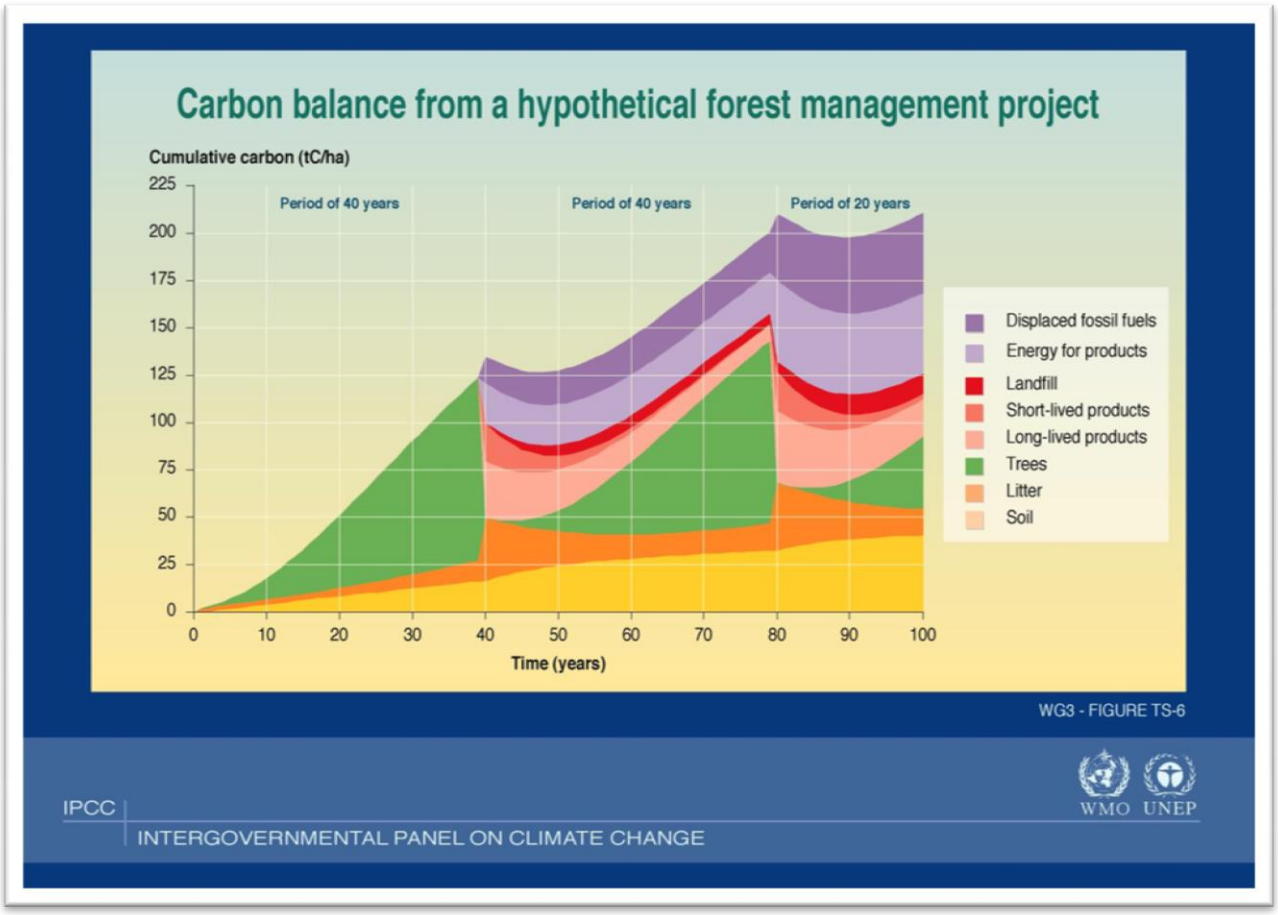


Figure 3. Carbon Balance from a Hypothetical Forest Management Project (adapted from IPCC, 2001)



Energy Substitution

Greenhouse gas emissions can be reduced through the substitution of biomass energy for fossil fuels that emit more greenhouse gases per unit (Malmsheimer et al., 2008). Life cycle analysis includes the fossil fuel emissions from biomass harvesting, transportation, feedstock preparation and processing. Nonetheless, research has demonstrated that these emissions *are more* than offset by the substitution of biomass energy for fossil fuels—illustrated by the purple portions of the graphic in Figure 3. While looking at biomass energy substitution alone may show a moderate carbon benefit, looking at energy substitution combined with wood products substitution shows a substantial carbon *benefit*.

Carbon Neutrality

To ensure the 'carbon neutrality' of woody biomass, terrestrial carbon inventories must be stable or increasing. The United States, Europe and Canada have sophisticated and accurate forest inventories and all have stable or increasing forest carbon inventories. The United States has roughly 750 million acres of forestland and this number has been stable since the 1930's (Alvarez, 2007). Though forestland has been lost to development, other forestland has been gained (mostly due to abandoned agricultural land). In the U.S., forest growth has exceeded harvest for several decades resulting in the average standing volume of wood per acre nation-wide increasing by about fifty percent since 1952 (Smith et al., 2009). The United States and Europe both have a net "growth to harvest" ratio of about 1.6, meaning that forest growth exceeds removals by roughly sixty percent (Smith et al., 2009). Again according to *Forest Resources of the United States* (Smith et al., 2009), since the 1990's, timber production in the United States has generally declined even though consumption has stayed relatively stable; this gap in U.S. production has been filled with imported forest products. On a national level, it is clear that the United States is increasing its forest carbon inventories and this trend is likely to continue.

As long as the United State's current trend of increasing terrestrial carbon stocks continues or is stable, the EPA, for the purposes of the Tailoring Rule, should consider biomass energy production in the U.S. 'carbon neutral'. The carbon dioxide released from woody biomass has been in circulation in the atmosphere and is actively cycling as part of the global carbon cycle. The CO_2 released from burning woody biomass was absorbed as part of the biogenic carbon cycle where plants absorb CO_2 as they grow (through photosynthesis), and release carbon in various forms as they decay or are burned. This cycle releases *no new* CO_2 into the atmosphere. In contrast, the carbon released from fossil fuels has been long separated from the active cycling of the global carbon cycle and *adds* to the total amount of carbon in active circulation. Burning fossil fuels leads to an increase in the total amount of carbon in circulation among the atmosphere, biosphere and oceans. This important fact must be considered by the EPA as it makes a determination on biogenic CO_2 .

The Society of American Foresters appreciates the opportunity to provide information and comments on the EPA's Call for Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources. We look forward to providing additional information in the future.

Attachments

Academic & Scientist letter to U.S. Congress

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