

Comments for the Biogenic Carbon Emissions Panel of the EPA SAB March 25, 2015 by Professor William Moomaw of Tufts University [william.moomaw@tufts.edu](mailto:william.moomaw@tufts.edu)

Thank you for the opportunity to speak before the panel today on proposed carbon accounting rules for biogenic emissions from energy production. I facilitated one of the first carbon offset projects for fossil fuel power plants in 1989 and more recently was a coordinating lead author of the 2011 IPCC Special Report Renewable Energy and Climate Change (SRREN).

EPA is to be commended for moving to reduce carbon dioxide emissions from power plants by implementing the Clean Power Plant rule. We are at a critical juncture with carbon dioxide emissions exceeding 400ppm. However, replacing fossil fuels with woody biomass will add substantially to carbon dioxide emissions. Wood produces more carbon per unit of heat than coal, and less electricity per unit of heat. As a result, wood fired electricity releases 50% more carbon dioxide than coal per MWh. To produce just 4% of US electricity from biomass will require a 70% increase in the annual US timber harvest. If the area dedicated to that extra woody biomass were instead covered in PV solar panels, it would sustainably produce 50-80 times the electricity with truly zero emissions.

There has been a major focus on whether or not “sustainable forest management” can be declared “carbon neutral.” This is the wrong debate. It is argued that if cutting (and burning) of forest wood is done at a rate equal to the rate of regrowth, the burning is carbon neutral. All that this means is that the total amount of carbon in the forest is constant, but *less than* it would be if the forest were left to reach its full steady state of growth and decay. The carbon that is missing from the forest is unfortunately in the atmosphere.

The timeframe should be that of the policy goal. Biomass is considered renewable and zero carbon because carbon dioxide released from burning trees is replaced when a new tree regrows and absorbs an equal amount. Burning a tree takes a matter of minutes. It takes from 30 to 100 years to grow a replacement tree that absorbs carbon dioxide equal to what was released. During that regrowth period, carbon dioxide is in the atmosphere trapping heat and increasing the planetary temperature. So the benefit of energy production is immediate as is the surge of carbon dioxide - just as if a fossil fuel had been burned. The benefit of removal is however a long slow process achieved only in the distant future. In economics, it is conventional to value future benefits with a discount factor. If one uses a 5% annual discount rate and is burning trees with a rapid regrowth rate of 30 years, the benefit value of carbon dioxide absorption is only about half of the damage cost from the pulse of carbon. So perhaps two trees should be planted. How does EPA intend to include discounting in its accounting?

How are production carbon emissions considered, and what about insurance? Trees are cut with a chain saw, transported in trucks, and chipped by large machines. Each step requires petroleum-based fuels and releases about 10% of the energy and carbon content of processed wood. As anyone who has attempted to burn wood knows; if it is green and wet, it does not burn well. Heat drying as is done for wood pellets requires an additional

10-15% of the wood energy. So even with the assumptions used in declaring carbon neutrality there is a 20-25% excess of emissions over removal. Also, not all trees regrow. Vast forest fires in the American west release large amounts of carbon dioxide each year. Insect infestations have killed thousands of square miles of trees in the Rocky Mountains. One needs an “insurance policy” of growing additional trees to be certain that regrowth goals are met. The uptake of carbon dioxide by the Amazon forest has dropped by half in the past 20 years suggesting that we may be losing this critical role of forests.

EPA accounting rules must be consistent with IPCC protocols. The woodchips and pellets the US is now shipping to the UK are burned in power plants and counted as zero carbon. They must be reported as emissions from the US as land use changes. They may not be ignored.

States that have renewable portfolio standards give RECs for biomass on the same basis as solar, wind and hydro. If this practice becomes nationalized under EPA rules, all taxpayers and ratepayers will be paying others to put more carbon dioxide into the atmosphere. This is why Massachusetts set conditions. To receive half a REC, half the heat energy from a woody biomass power plant must be utilized, and 60% must be utilized to receive full credit. The heat component of this may not be used to dry wood or pellets for burning.

Let me conclude with these recommendations.

1. Accounting must be from the perspective of the atmosphere, and any credits must be additional to what would have happened had the wood not been used as fuel.
2. The accounting must be on an individual power plant basis not on a vague notion of sustainably managed forests.
3. All relevant emissions must be included in any accounting system.
4. The timeframe should be that of the policy goal.
5. We need to be expanding forests and their rate of growth to actively remove carbon dioxide from the atmosphere.
6. EPA accounting must be the same as the atmosphere is using. The deterioration of the climate will let us know if we have failed to do so.