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February 2, 2011

Dear Members of the Washington State Legislature,

Several new wood-burning biomass electric power facilities are planned for Washington State. Recently, the Washington Department of Natural Resources provided you with a report stating that generating power from biomass reduces greenhouse gas emissions.[1] We write as climate researchers concerned about the approach to carbon accounting endorsed in that report.

A critical conclusion of the report is that biomass of all kinds, including harvested trees that would otherwise remain standing, should be treated as a "carbon neutral" fuel, an assumption the authors ascribe to the Intergovernmental Panel on Climate Change (IPCC). However, this conclusion is based on a misinterpretation of IPCC accounting, and is inconsistent with the best science of forest carbon accounting. Crafting a biomass policy based on this report's conclusions could lead to an increase in total carbon emissions from the power sector, an increase that would be incompatible with Washington's goals of decreasing greenhouse gas emissions to 1990 levels by 2020, and to no more than 50 percent of 1990 levels by 2050.[2]

The DNR report states:

> The Department of Natural Resources supports the approach wherein a neutrality determination for a State's greenhouse gas emissions from forest biomass energy production is made so long as the state's forest carbon stocks are either stable or increasing. This is the case in Washington's forests. In addition, forest biomass energy production can have positive greenhouse gas results to the extent that it displaces energy production from fossil fuels.

This approach ignores critical factors and makes it likely that greenhouse gas emissions will increase for many years where biomass replaces or displaces fossil fuels. Biomass has a lower energy density than fossil fuels,[3] and is inefficient because its generally high moisture content requires that energy be expended to evaporate water before useful energy can be obtained. Because wood burns at a lower

[1] December 2010 update from Washington State Department of Natural Resources: the "Forest Biomass Initiative".
[2] RCW 70.235.020: Greenhouse gas emissions reductions — Reporting requirements.
[3] At about 213 lb CO2/mmbtu, bone-dry wood produces 182% the CO2 of natural gas, which produces about 117 lb CO2/mmbtu. Differences in facility efficiency account for an even greater gap in stack emissions between biomass and natural gas.

temperature than fossil fuels, the efficiency of electricity production is also lower. This means that in practice, burning biomass emits 150 percent the carbon dioxide of coal, and 300 – 400 percent the CO_2 of natural gas, per kilowatt-hour of electricity generated.

If the biomass burned is truly from "waste" wood normally generated in the course of timber harvesting, then these combustion emissions are approximately equivalent to what would occur over the course of natural decomposition, although they are emitted instantaneously instead of over a longer time period as occurs in nature. However, if fuel is obtained by harvesting trees that would not otherwise be cut, a position that appears to be rationalized in the DNR report, then the carbon "payback period" is decades to more than a century, even if the harvested trees are replaced. The report's approach to carbon accounting does not acknowledge this, instead assuming that the carbon from trees harvested for fuel does not need to be re-grown in place as long as forest carbon stocks remain constant within the state as a whole.

Forests in the northern hemisphere are on balance growing and accumulating carbon for a variety of reasons, and that ongoing growth is helping to hold down the rate of global warming. The DNR report's assumption that as long as forest carbon stocks remain constant, the amount of CO_2 being emitted by bioenergy is balanced by forest carbon uptake[4] disregards this ongoing increase in carbon storage. Using wood for power generation that would otherwise be added to forests thus not only increases the rate of CO_2 emissions per kilowatt-hour but also reduces the critical forest carbon "sink". If forests harvested for energy are allowed to re-grow, that re-growth absorbs carbon dioxide and helps to offset the carbon released from the initial burning of the trees for energy. But paying back the carbon released will nearly always take many decades, and in some cases centuries.

For the DNR scenario to work, where constant forest inventory guarantees biopower carbon neutrality, forests would need to somehow "compensate" for the net increase in carbon emissions that occurs when trees are cut and burned for energy. However, taking credit for forest carbon uptake that is happening elsewhere (that is, not on the plot that was cut for fuel, but on other forests) is not legitimate, because cutting and burning trees in one place does not by itself increase forest carbon uptake elsewhere. In fact, applying the carbon gains of other forests within the state to the credit of biomass fuel amounts to double-counting, because these gains in other forests are already accounted for in the carbon balance. DNR's approach is similar to declaring that every business in Washington State is profitable, even a business that loses millions of dollars, so long as the State's businesses are profitable in aggregate. In short, the proposal is an accounting scheme with no accountability.

The DNR report claims that the IPCC treats biomass as carbon neutral as long as forest stocks in a country do not decrease, but this is not correct. The IPCC did not assume that the burning of trees has no effect on global warming. The reference is to guidance provided by the IPCC on country-level reporting of all greenhouse gas emissions, which requires that countries report in separate sets of books not only their energy emissions, but also their emissions from land use change. In effect, once trees are harvested for any purpose, IPCC rules require that their carbon be reported as a land use release. Because that carbon is already counted, and to avoid double counting, the IPCC rules appropriately provide that the carbon should not be counted again if the trees are burned for energy.

It is true that on a national basis under the IPCC guidelines the emissions from harvesting trees may be offset by positive land management elsewhere. But that is allowed because a national accounting system intentionally looks at the net sum of positive and negative effects. To evaluate whether any

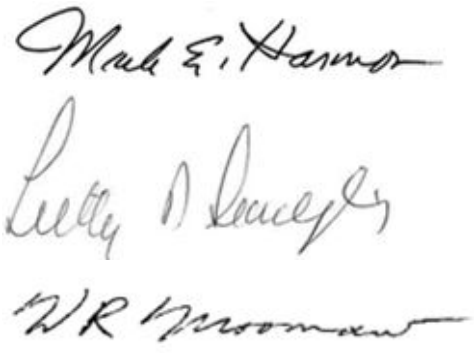
[4] Page 31 of the report

particular bioenergy activity increases emissions, its consequences must be assessed alone rather than hidden by the total mix of a nation's or state's total emissions.

Will Washington's growing biomass power sector rely on increased forest harvesting for fuel? The number and scale of biomass facilities proposed in Washington strongly suggests that new trees will have to be cut to provide fuel for these plants, because mill residues and logging residues are inadequate. A National Renewable Energy Laboratory report[5] establishes that there is only a negligible amount of mill residues in Washington left unused. As for forestry residues, a recent state-level biomass inventory[6] estimates that there are about 3.5 million green tons of residues generated annually in Washington State. However, only about half of this, or 1.75 million tons, is really collectable due to the need to retain material onsite for soil fertility and the logistical constraints of collection. In contrast, the combined wood demand of just the biomass power facilities proposed in Washington is more than 3 million tons of wood per year;[7] and new wood pellet plants and biofuel plants will require another several hundred thousand tons per year, for a combined demand that is currently two to three times the realistically available supply of logging residues in the state.

The amount of new biomass generation currently proposed in Washington would amount to less than 1 percent of the state's electricity generating capacity. Yet even this relatively small amount of power generation seems likely to put new demands on Washington's forests and their delivery of multiple ecosystem services including timber. This will transfer standing forest carbon into the atmosphere, thereby increasing carbon emissions from Washington's power sector. *Simply declaring biomass power to be carbon neutral does not make it so.* Policy must distinguish among sources of biomass if it is to reduce greenhouse gas emissions. We urge you to insist that any use of biomass for fuel require proper carbon accounting that accurately reflects the impact of biomass carbon emissions on achieving Washington State's climate goals.

Thank you for the opportunity to communicate our concerns regarding the impacts of increased biomass electricity production in Washington.



[5] Milbrant, A. A geographic perspective on the current biomass resource availability in the United States. NERL/TP-560-39181. December, 2005.

[6] Washington State Department of Ecology and Washington State University. Biomass Inventory and Bioenergy Assessment. December 2005.

[7] A general rule of thumb is that it requires around 13,000 tons of green biomass to deliver one megawatt of electric power to the grid for one year.