Why is Biomass Burning considered "clean and green" in the RES in House Climate Change bill, H.R. 2454? It is neither!

Massachusetts Environmental Energy Alliance (www.massenvironmentalenergy.org)

FACT: Burning biomass for energy emits large amounts of air pollution, and endangers human health

Biomass incinerators produce hundreds of tons of nitrogen oxides (NOx) and volatile organic compounds (VOCs) two ingredients of the **ground-level ozone** dangerous to human respiratory health and the environment. Biomass burning also produces tons of **fine particulate matter (PM)**, a pollutant associated with asthma, heart disease, and cancer for which no safe level is known.[1]

Incredibly, biomass emits as much PM as coal, 1.5 times as much carbon monoxide (CO, a toxic air pollutant), and 1.5 times as much CO_2 (the most important greenhouse gas) as coal.

Pollution (tons per year) to be produced by just 135 MW of biomass energy generation in Massachusetts:[2]

- 492 tons of nitrogen oxides (NOx)
- 98 tons of hazardous air pollutants (HAPs)
- 617 tons of carbon monoxide (CO)
- 165 tons of particulate matter (PM)
- 2.2 million tons of carbon dioxide (CO_2)

For key pollutants, biomass is as dirty as coal[3]

- Megawatt per megawatt, biomass and coal combustion emit about the same amount of particulate matter.
- Biomass burning emits 1.5 times as much carbon monoxide as coal
- Biomass burning emits 1.5 times as much CO_2 as coal.

Despite being nearly as dirty as coal, biomass incineration is formally designated along with wind and solar sources as "Clean Energy" in the American Clean Energy and Security Act of 2009, H.R. 2454. Startlingly, it qualifies for renewable energy credits.

[1] Information on the hazards of particle pollution is available from EPA at http://www.epa.gov/particles/

[2] Emissions data from environmental reports for proposed Russell, Palmer, and Pioneer Renewable Energy plants (Massachusetts).

[3] Coal criteria pollutant emissions data from "Point facility summary" data tables available at EPA's website, http://www.epa.gov/ttn/chief/net/2005inventory.html#inventorydata. CO_2 emissions data from Regional Greenhouse Gas Initiative data, http://www.rggi.org/states/historical_emissions

FACT: Use of biomass is not carbon neutral. It will dramatically increase greenhouse gases.

The concept of carbon neutrality assumes that "biogenic" carbon dioxide released by burning can be readily re-sequestered in new growth.

- However, carbon released by burning actually takes decades to re-sequester, a fact recognized by the Intergovernmental Panel on Climate Change which considers forest harvest and burning to be a source of greenhouse gases.[4]

Carbon dioxide released by biomass burning is unregulated under the provisions of H.R. 2454.

- Not only are emissions from biomass exempted from greenhouse gas accounting, but biomass plants receive renewable energy credits, competing directly with truly carbon neutral energy sources like wind and solar. [cite section of bill if possible]

Greenhouse gas emissions from biomass incinerators are significant. In Massachusetts, three biomass energy plants currently planned will emit 2.2 million tons of CO_2 a year, a 7.8% increase over 2007 CO_2 emissions from the energy sector.

- Despite these large emissions, the 135 megawatts provided by the plants will increase energy generation in Massachusetts by only 1.2%.[5]

[4] IPCC Good practice guidance for land use, land-use change, and forestry. IPCC National Greenhouse Gas Inventories Programme. Also, Johnson, E. 2008. Goodbye to carbon neutral: getting biomass footprints right. Environ Impact Asses Rev, doi:10.1016/j.eiar.2008.11.002; Penman, et al. 2003.

[5] Massachusetts CO2 emissions and energy generation data for 2007 from Energy Information Administration, 2009. State Electricity Profiles 2007. US Dept. of Energy, Washington, DC.

FACT: Biomass harvesting over-exploits forests and degrades their vital carbon sequestration capacity

A single 50-megawatt biomass plant burns about 650,000 tons of trees a year, over a ton of wood a minute.[6] Biomass plants don't just burn forestry "waste" (tops and branches) – **they burn whole trees.** [7] "Thinning" operations for biomass can remove more than half the trees in a forest, so that it takes decades to grow back.

In Massachusetts, the estimated 2,145,000 tons of biomass a year required to fuel the 165 MW of biomass power planned for the state will require **significant new logging.**[8]

- Using numbers from a state report, biomass incinerators will triple the amount of wood that is currently cut, an estimated minimum of 35,000 acres a year.[9]
- Biomass energy is woefully inefficient, averaging only 24% efficiency. Thus, 76% of the energy in the wood burned is wasted. However, 100% of the wood burned generates pollution.

Provisions in HR 2454 that forest biomass be harvested "sustainably" do nothing to speed recovery of forests and re-sequestration of carbon.

- Young trees that grow back after logging sequester just a fraction of the carbon that's been removed, and even 25 years after cutting, new growth on a site is less than half of what was removed.[10]
- Cutting doesn't have to be frequent before the forest becomes incapable of re-sequestering the amount of carbon that's released by burning. Further, logging causes large CO_2 emissions from disturbed soils and logging waste.[11]

[6] The "biomass availability report" prepared for the Massachusetts Department of Energy Resources (DOER) by Innovative Natural Resource Solutions (2007) states that 13,000 tons of biomass are required per MW of generation annually. Environmental impact documents of some plants represent lower fuel needs of about 10,000 tons per MW.

[7] One plant (Russell Biomass) currently in the approval process has whole tree burning written into its air permit; documents for Pioneer Renewable Energy (Greenfield, MA) define "forestry residues" to include whole trees.

[8] The state biomass availability report acknowledges that wood from existing operations is limited and identifies over 845,000 acres in Massachusetts as eligible for biomass extraction, including state parks and forests. The sustainability of the DOER report's figure of 45 green tons per acre has been challenged as excessively high (it is double current extraction levels), since this much wood requires cutting all small trees plus all large "un-merchantable" trees. Lower cutting levels would require logging more acres to provide the same amount of wood.

[9] This acreage value takes into account the approximately 30 MW of power to be generated from construction and demolition debris which will not require new forest cutting, as well as "existing" forest residues reported in the state biomass availability report. Recent cutting levels from Mass Department of Conservation and Recreation, Bureau of Forestry 2005 Stakeholder report.

[10] Data from a Hubbard Brook Long Term Ecological Research (LTER) site study show that recovery from logging takes decades

[11] Data from a Harvard Forest Brook LTER site cutting study quantified CO_2 emissions from soils and forest residues after logging

FACT: Biomass energy wastes water and pollutes rivers

A large-scale biomass plant requires close to a million gallons a day of water for cooling, water that is often taken from nearby rivers.

- Hundreds of thousands of gallons of this water are vaporized in the cooling process
- Plant cooling needs and water takings are greatest in summer when high temperatures already reduce river flows and stress native fish.[12]
- Impacts of water takings will worsen as climate warming and droughts further stress rivers.[13]

Biomass operations contaminate local rivers and water supplies.

- Logging also impacts water quality. Heavy equipment tears up soils, leading to erosion and siltation in nearby streams.
- Heavily contaminated boiler "blow down" (rinse water) is pumped back into rivers at unnaturally high temperatures, making waters too warm and polluted for native coldwater fish

[12] The Russell Biomass environmental impact report shows a linear increase in cooling water needs with temperature

[13] An analysis of Westfield River flows (Russell Biomass location) shows the number and frequency of low-flow events has already increased over historical levels