

## Biomass Reality Check: Lessons Learned in Massachusetts

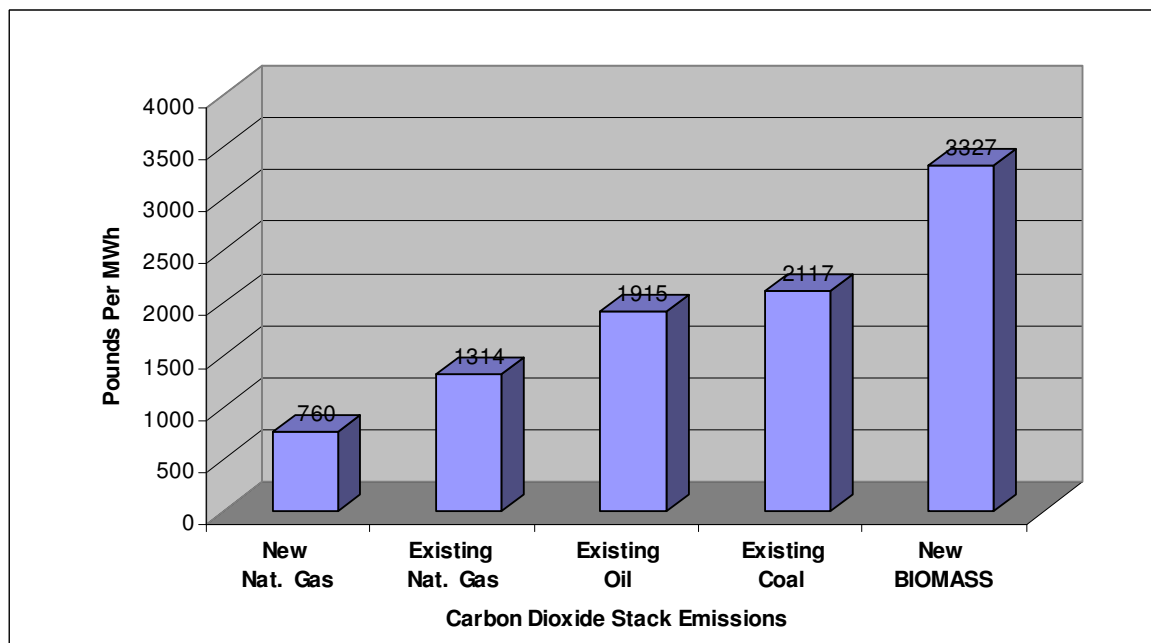
### Biomass Burning and Claims of “Clean and Green” Energy:

While the word “biomass” may conjure up pleasant images, the promotion of this caveman wood-burning technology as “clean and green” may more accurately be described as “greenwashing” by the timber and energy industries attempting to benefit from lucrative “clean” energy subsidies.

Cutting and burning of trees in dirty biomass incinerators is not “green”, nor “clean”, and does not belong in the same category as genuinely green energy solutions such as solar, geothermal, appropriately scaled and located wind and hydro, and importantly, conservation and efficiency.

### A Wood-Fueled Biomass Reality Check:

Contrary to industry claims, wood fueled biomass energy does not reduce carbon dioxide emissions, it increases them. Wood burning biomass power plants emit 50% more CO<sub>2</sub> than existing coal plants and 330% more CO<sub>2</sub> than new natural gas plants. That is not a typo, and is based on the proponents own reports. Since burning wood is so inefficient, burning green, living trees is actually worse than burning coal. Brand new electric biomass power plants emit about 3,300 pounds per megawatt hour of carbon dioxide, while existing coal plants emit 2,100 pounds per megawatt hour, existing oil plants 1,900 pounds per megawatt hour, existing natural gas plants 1,300 pounds per megawatt hour and new natural gas plants 760 pounds per megawatt hour. See: [www.maforests.org/MFWCarb.pdf](http://www.maforests.org/MFWCarb.pdf)



Even “small” combined heat and power (CHP) biomass burners emit more CO<sub>2</sub> than fossil fuels. Brand new CHP wood burning biomass burners emit about 287 lbs/MMBtu of carbon dioxide, while oil burners emit 232 lbs/MMBtu and natural gas burners about 146 lbs/MMBtu. See page 22 in: [www.manomet.org/sites/manomet.org/files/Manomet\\_Biomass\\_Report\\_Chapter2.pdf](http://www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Chapter2.pdf)

**Biomass reality check (continued):**

Importantly, higher carbon emissions from tree burning, combined with the loss, or reduction, of growth in standing forest stocks through increased cutting of forests for fuel means that forest re-growth does not ever pay back the large biomass “carbon debt” unless *increased* forest cutting *accelerates* forest growth (a very questionable outcome). Otherwise, additional forest removals for biomass fuel eliminates, or reduces, the carbon sequestration benefit currently provided by forests and the carbon debt from higher carbon stack emission rates increases perpetually.

Even under unrealistic ideal theoretical conditions (that are unlikely to occur on the ground), the biomass carbon debt payback takes many decades to centuries. The recently released “Manomet” study, which used biomass friendly modeling assumptions, (see: [www.catf.us/resources/whitepapers/files/201007-Review\\_of\\_the\\_Manomet\\_Biomass\\_Sustainability\\_and\\_Carbon\\_Policy\\_Study.pdf](http://www.catf.us/resources/whitepapers/files/201007-Review_of_the_Manomet_Biomass_Sustainability_and_Carbon_Policy_Study.pdf)) demonstrated that life cycle carbon dioxide emissions in **tree burning biomass electric facilities are worse than coal for 45-75 years** and worse than natural gas for at least a century. The “Manomet” study also demonstrated that tree burning biomass thermal facilities are worse than oil for 15-30 years and worse than natural gas for 60-90 years. See: [www.cleanenergystates.org/JointProjects/RPS/Biomass/Walker\\_Biomass\\_RPS.pdf](http://www.cleanenergystates.org/JointProjects/RPS/Biomass/Walker_Biomass_RPS.pdf) and this report from NPR: [www.wbur.org/2010/06/11/wood-power-plants](http://www.wbur.org/2010/06/11/wood-power-plants)

A recent letter from 90 eminent scientists asks congress not to “cook the books” when accounting for CO2 from bio-energy stating *“clearing or cutting forests for energy, either to burn trees directly in power plants or to replace forests with bio-energy crops, has the net effect of releasing otherwise sequestered carbon into the atmosphere, just like the extraction and burning of fossil fuels. That creates a carbon debt, may reduce ongoing carbon uptake by the forest, and as a result may increase net greenhouse gas emissions for an extended time period and thereby undercut greenhouse gas reductions needed over the next several decades”* See: <http://216.250.243.12/90scientistsletter.pdf>

This “critical accounting error” (identified by Princeton University scientists) of ignoring carbon emissions from tree burning is leading to a false reduction of carbon levels on paper but an actual increase in atmospheric carbon levels ([www.maforests.org/SCIENCE.pdf](http://www.maforests.org/SCIENCE.pdf)) and igniting a “carbon time bomb” according to European scientists. ([www.birdlife.org/eu/pdfs/carbon\\_bomb\\_21\\_06\\_2010.pdf](http://www.birdlife.org/eu/pdfs/carbon_bomb_21_06_2010.pdf))

**Wood burning is not “clean”:**

Not only is wood burning biomass energy worse than fossil fuels for CO2 emissions, but it also usually emits higher rates of conventional pollutants such as particulates, CO, NOx, and VOC’s than fossil fuels. The McNeil biomass plant near Burlington, and touted by biomass proponents, is the number one air-pollution source in the entire state of Vermont and emits 79 pollutants including dioxin. See: [www.planethazard.com/phmapenv.aspx?mode=topten&area=state&state=VT](http://www.planethazard.com/phmapenv.aspx?mode=topten&area=state&state=VT)



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[www.maforests.org/BioCheck.pdf](http://www.maforests.org/BioCheck.pdf)

The following are the pollution rates for modern institutional or commercial-scale wood burning technologies, particularly school-sized woodchip boilers compared to fossil fuels (lbs/MMBtu).  
page 14: [www.mass.gov/Eoca/docs/doer/pub\\_info/doer\\_pellet\\_guidebook.pdf](http://www.mass.gov/Eoca/docs/doer/pub_info/doer_pellet_guidebook.pdf)

	Wood	Oil	Natural Gas	Propane
Particulates	.100	.014	.007	.004
Carbon Monoxide	.730	.350	.080	.021
Nitrogen Oxides	.165	.143	.090	.154
Sulphur Dioxide	.008	.500	.001	.016

**Please note that the particulate emissions from wood burning data above are 7 times worse than oil, 14 times worse than natural gas and 25 times worse than propane.**

If the argument is made that more advanced control technology could reduce wood pollution numbers, it must be remembered that the same is true for fossil fuel models. A comparison of “apples to apples” should always be made, which would maintain this poor relative showing by wood burning. Often smaller biomass burners do not use the more advanced control technologies.

Due to the particulate pollution from wood fueled biomass burning, the Massachusetts Medical Society ([www.maforests.org/MassMed.pdf](http://www.maforests.org/MassMed.pdf)), the Hampshire Medical Society ([www.maforests.org/HDMS.pdf](http://www.maforests.org/HDMS.pdf)) and the Physicians For Social Responsibility ([www.maforests.org/PSR.pdf](http://www.maforests.org/PSR.pdf)) have come out against wood-burning biomass proposals.

According to the Environmental Protection Agency, “*Particle pollution especially fine particles—contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems.*” ([www.epa.gov/particles/health.html](http://www.epa.gov/particles/health.html))

Asthma in New England is already the worst in the country, and is aggravated by particulates ([www.boston.com/news/health/articles/2010/04/26/scourge\\_of\\_asthma\\_is\\_acute\\_in\\_ne/](http://www.boston.com/news/health/articles/2010/04/26/scourge_of_asthma_is_acute_in_ne/))

The American Heart Association: says “*Short-term exposure to particulate matter (PM) air pollution contributes to acute cardiovascular morbidity and mortality and exposure to elevated PM levels over the long term can reduce life expectancy by a few years. Because the evidence reviewed supports that there is no safe threshold [for PM2.5], it appears that public health benefits would accrue from lowering PM 2.5 concentrations even below present-day annual National Air Quality Standards*” (<http://circ.ahajournals.org/cgi/content/full/121/21/2331>)



Children’s Hospital in Boston says, “*A national epidemiologic study found a strong, consistent correlation between adult diabetes and particulate air pollution that persists after adjustment for other risk factors like obesity and ethnicity. The relationship was seen even at exposure levels below the current Environmental Protection Agency (EPA) safety limit.*”  
<http://healthfreedom.org/2010/11/07/national-study-finds-strong-link-between-diabetes-and-air-pollution/>

Considering the increase in particulate pollution that biomass burners can bring, installing them in hospitals and schools does not seem a logical idea considering the at-risk populations they serve.

**When did cutting and burning forests become “green”? How can we ask poor third world countries to protect *their* forests if we won’t protect ours?**

Wood burning power production is extremely inefficient, a typical power plant burns at about 23% efficiency, so 77% of the trees cut go up in smoke and without producing any energy. This means enormous amounts of forest need to be cut to provide tiny amounts of power. This large fuel demand will lead to increased clearcutting of forests which even biomass consultants have admitted.

**It is very important to realize that the vast majority of the fuel for wood fueled biomass energy in New England would come from living trees, not “waste” wood as pitched to the public.** See: [www.ewg.org/agmag/2010/06/did-they-really-say-that-see-for-yourself/](http://www.ewg.org/agmag/2010/06/did-they-really-say-that-see-for-yourself/) and [www.risiinfo.com/technologyarchives/risi-wood-biomass-market-report-woodfiber-supply.html](http://www.risiinfo.com/technologyarchives/risi-wood-biomass-market-report-woodfiber-supply.html)

The biomass industry includes trees that they call “junk” or “low grade” in their definition of “waste” or “residues” simply because they are a species, or have characteristics, that do not provide high commercial market value. However, to the rest of us, and to nature, these are important trees that filter the air and water, sequester carbon, maintain the soil, attract tourists, and provide wildlife habitat.

**McNeil biomass near Burlington Vermont, showing trees, not “waste” used for fuel.  
McNeil is the number 1 pollution source in Vermont.**

<http://planethazard.com/phmapenv.aspx?mode=topten&area=state&state=VT>



Forests are already stressed and being cut at aggressive levels, and increased wood demands would add further pressure and reduce or eliminate the carbon sequestration benefits that we receive from forests. A recent report by the Environmental Working Group documents the dramatic increase in logging and clearcutting that will occur with increased biomass wood demands. See: [www.ewg.org/clearcut-disaster](http://www.ewg.org/clearcut-disaster)

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Large biomass incinerators require so much wood for fuel that they draw supplies from hundreds of miles away from the facility which can help accelerate the spread of destructive pests and pathogens. They can also require so much wood that they take away and/or drive up the cost of wood for other wood based businesses. They can even drive up the cost of firewood for the general public.

<http://biomassmagazine.com/articles/5021/nh-plants-petition-for-intervention-in-laidlaw-ppa>

Additionally, when green wood becomes difficult to obtain or more expensive, the large facilities sometimes switch to burning construction and demolition debris which is even more polluting.

Increased wood demands for biomass do not “improve” forests as often claimed, they of course add to the impacts upon them. Clearcutting is defended and practiced today by many in industry, and will only accelerate with increased wood demands from new facilities. In Maine, where there are already many biomass plants, forests are routinely clearcut including for biomass, exposing the false claim that increased wood demands will “help” forests.. See: [www.maforests.org/MAINE\\_CC.pdf](http://www.maforests.org/MAINE_CC.pdf)

Below is a clearcut in Maine near Moosehead Lake to provide wood for a biomass incinerator.



**Is increased wood burning worth the negative pollution, global warming, wildlife, biodiversity and forest impacts?**

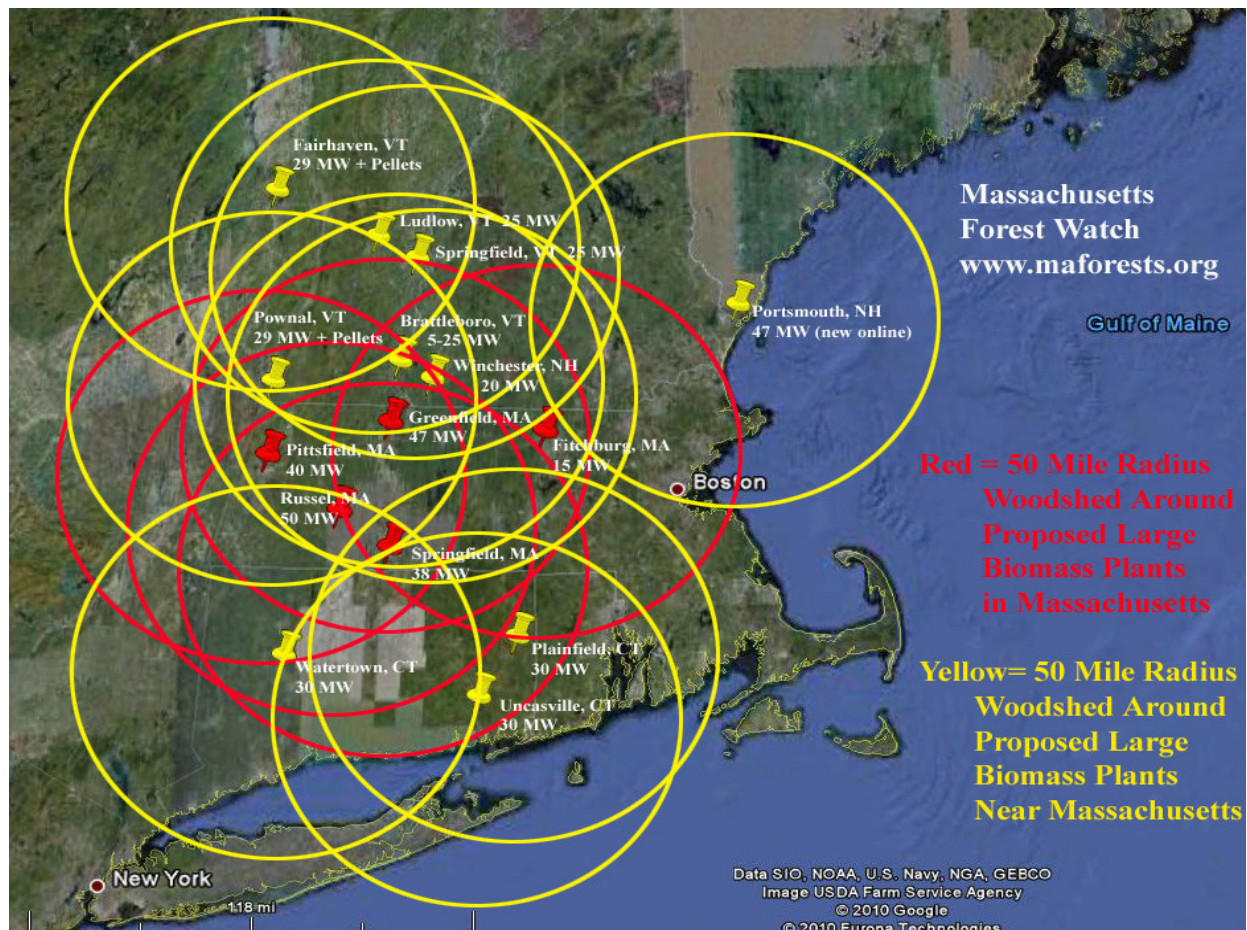
While the exact amounts depend on the state, radical increases in cutting of forests on the order of 100-300% over current levels increases statewide heat and electric energy production only about 1 to 2%. See [www.maforests.org/Biomess.pdf](http://www.maforests.org/Biomess.pdf)

Instead, achievable and economical conservation and efficiency measures could reduce our energy use by 30%. “Phantom” loads alone, for example when our TV is plugged in but not on, account for 5% of our electric use, and could easily be avoided by using power strips. Conservation and efficiency measures cost 0.03 cents per kw versus 0.09 cents per kw for new production. Solar, geothermal, appropriately scaled and located wind and hydro produce genuinely clean new energy.

**Biomass Subsidies Creating a Bio-Monster:**

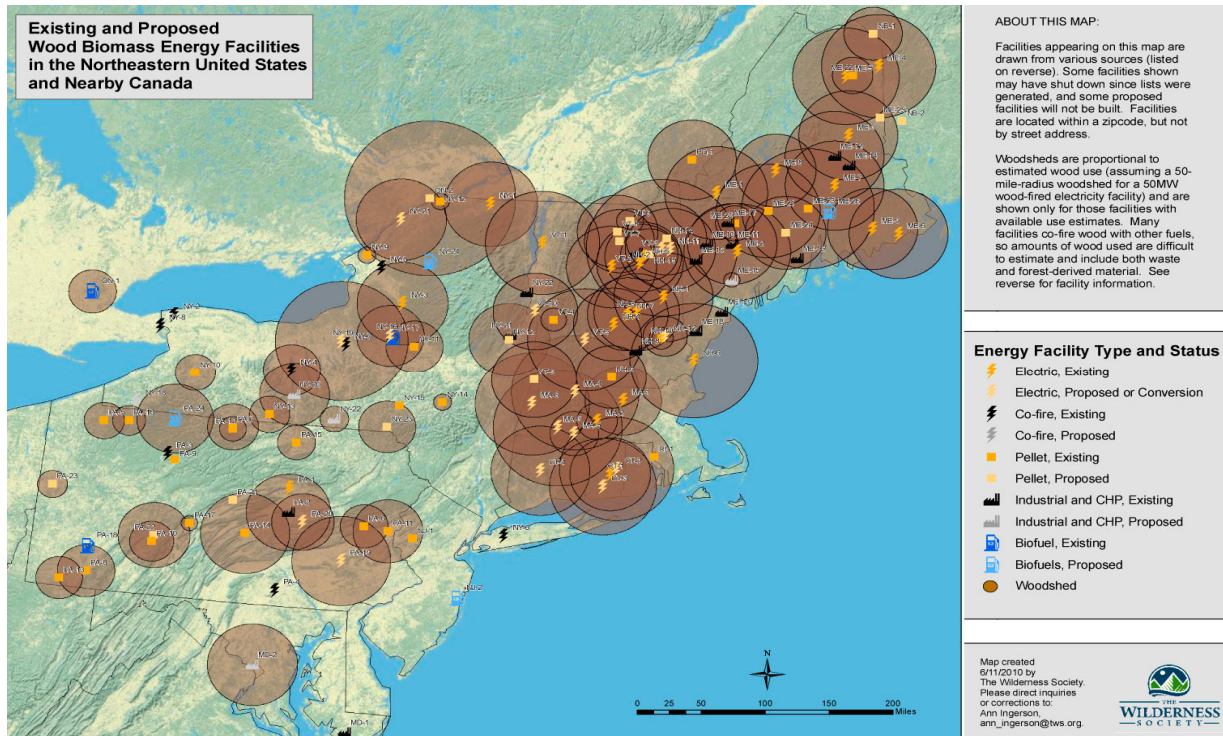
The reason these biomass incinerators are popping up like mushrooms on a rainy Seattle day is because of the enormous public subsidies being directed their way. A typical 50 MW facility is eligible for about \$80 million dollars from a federal stimulus cash grant and about \$25 million dollars in annual public subsidies. Imagine all the genuinely clean jobs and energy that could instead be created with that money by installing solar panels and insulating homes. Rather than 25-50 or so destructive jobs cutting and burning forests, the \$25 million dollar annual subsidy alone could instead be used to support 500 clean and green jobs at \$50,000 per year.

**Map of Proposed Large Biomass Plants in Southern New England**



Tourists and recreationists come from around the world to visit our “Golden Goose” forests, which supports a large tourist industry in New England. They will not come to see forests cut, chipped, burned and belched into the atmosphere in industrial burners.

## Northeast Existing and Proposed Large Biomass Facilities and Overlapping Woodsheds



### Summary:

At this time of polluted air, global warming, already stressed forests and bankrupt governments, there is no reasonable argument for forcing taxpayers to subsidize the construction of new dirty, carbon belching, forest degrading biomass incinerators, for minimal amounts of power that we don't need, often just to further enrich already wealthy out of state investors.

These policies will lead to increased clearcutting, air pollution, and greenhouse gas emissions while simultaneously draining our public coffers, the exact opposite of what we need to do right now.

“Green” tax-payer subsidies and other incentives should only be directed toward genuinely green technologies that produce clean, non-carbon emitting energy, and local jobs.

### In Short, “Clean” Energy Does Not Come Out Of A Smokestack.

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Massachusetts Forest Watch, is an all volunteer citizen watchdog group formed to protect public forests and promote genuinely “clean” and “green” energy solutions. See: [www.maforests.org](http://www.maforests.org)

For a powerpoint presentation about biomass and clearcutting of public forests, see: [www.maforests.org/hcc.pdf](http://www.maforests.org/hcc.pdf) (50 MB) For other forest and biomass links, see: [www.maforests.org/Links.pdf](http://www.maforests.org/Links.pdf)

This report with live internet links can be found at: [www.maforests.org/BioCheck.pdf](http://www.maforests.org/BioCheck.pdf)