

Why Biomass Wood Energy is Not the Answer

Up in Smoke

By George Wuerthner

After the Smurfit-Stone Container Corp.'s linerboard plant in Missoula Montana announced that it was closing permanently, there have been many people including Montana Governor Switzer, Missoula mayor John Engen and Senator Jon Tester, among others who advocate turning the mill into a biomass energy plant. Northwestern Energy, a company which has expressed interest in using the plant for energy production has already indicated that it would expect more wood from national forests to make the plant economically viable.

The Smurfit Stone conversion to biomass is not alone. There has been a spate of new proposals for new wood burning biomass energy plants sprouting across the country like mushrooms after a rain. Currently there are plans and/or proposals for new biomass power plants in Maine, Vermont, Pennsylvania, Florida, California, Idaho, Oregon and elsewhere. In every instance, these plants are being promoted as "green" technology.

Part of the reason for this "boom" is that taxpayers are providing substantial financial incentives, including tax breaks, government grants, and loan guarantees. The rationale for these taxpayer subsidies is the presumption that biomass is "green" energy. But like other "quick fixes" there has been very little serious scrutiny of biomass real costs and environmental impacts. Whether commercial biomass is a viable alternative to traditional fossil fuels can be questioned.

Before I get into this discussion, I want to state right up front, that coal and other fossil fuels that now provide much of our electrical energy need to be reduced and effectively replaced. But biomass energy is not the way to accomplish this end goal.

BIOMASS BURNING IS POLLUTION

First and foremost, biomass burning isn't green. Burning wood produces huge amounts of pollution. Especially in valleys like Missoula where temperature inversions are common, pollution from a biomass burner will be the source of numerous health ailments. Because of the air pollution and human health concerns, the Oregon Chapter of the American Lung Association, the Massachusetts Medical Society and the Florida Medical Association, have all established policies opposing large-scale biomass plants.

The reason for this medical concern is that even with the best pollution control devices, biomass energy is extremely dirty. For instance, one of the biggest biomass burners now in operation, the McNeil biomass plant in Burlington, Vermont is the number one pollution source in the state, emitting 79 classified pollutants. Biomass releases dioxins, and as much particulates as coal burning, plus carbon monoxide, nitrogen oxide, sulfur dioxide, and contribute to ozone formation.

BIOMASS GENERATES MORE CARBON THAN COAL

Besides ignoring the human health aspects of large scale biomass burning, assertions that biomass energy is "green" is a misnomer. Wood burning generates 50% more carbon dioxide than coal. This is largely a factor of the lower heat content in wood which means to generate the same amount of megawatts requires burning far more wood than coal to achieve the same amount of electricity. Biomass burning releases about 3,300 pounds of carbon dioxide per megawatt, while coal releases 2,100 pounds.

BIOMASS IS NOT CARBON NEUTRAL

Proponents of biomass often claim that biomass is "carbon neutral." The reasoning behind this claim is the fact that growing trees will sequester carbon. On the surface this may make sense, however, it ignores that it takes decades for new forest growth to capture the carbon that is released by trees consumed in a biomass burner. And that assumes there will be new trees

growing—something that one can't assume because climate change could make many places less suitable for forest growth. In an era of climate change, the assumption that a forest cut will grow back on the same site is optimistic at best.

The problem for humanity is that we need to reduce large scale carbon emissions now, not in 50 or 100 years as forests sequester carbon over decades.

BIOMASS ENERGY IS INEFFICIENT

Wood is not nearly as concentrated a heat source as coal, gas, oil, or any other fossil fuel. Most biomass energy operations are only able to capture 20-25% of the latent energy by burning wood. That means one needs to gather and burn more wood to get the same energy value as a more concentrated fuel like coal. That is not to suggest that coal is a good alternative, rather wood is a worse alternative. Especially when you consider the energy used to gather the rather dispersed source of wood and the energy costs of trucking it to a central energy plant. If the entire carbon footprint of wood is considered, biomass creates far more CO₂ with far less energy output than other energy sources.

The McNeil Biomass Plant in Burlington Vermont seldom runs full time because wood, even with all the subsidies (and Vermonters made huge and repeated subsidies to the plant—not counting the “hidden subsidies” like air pollution) wood energy can't compete with other energy sources, even in the Northeast where energy costs are among the highest in the nation. Even though the plant was also retrofitted so it could burn natural gas to increase its competitiveness with other energy sources, the plant still does not operate competitively. It is generally is only used to off- set peak energy loads.

One could argue, of course, that other energy sources like coal are greatly subsidized as well, especially if all environmental costs were considered. But at the very least, all energy sources must be “standardized” so that consumers can make informed decisions about energy—and biomass energy appears to be no more green than other energy sources.

BIOMASS SANITIZES AND MINES OUR FORESTS

The dispersed nature of wood as a fuel source combined with its low energy value means any sizeable energy plant must burn a lot of wood. For instance, the McNeil 50 megawatt biomass plant in Burlington, Vermont would require roughly 32,500 acres of forest each year if running at near full capacity and entirely on wood. Wood for the McNeil Plant is trucked and even shipped on trains from as far away as Massachusetts, New Hampshire, Quebec and Maine.

Biomass proponents often suggest that wood as a consequence of forest thinning to improve “forest health” (logging a forest to improve health of a forest ecosystem is an oxymoron.) will provide the fuel for plant operations. For instance, one of the assumptions of Senator Tester's Montana Forest Jobs bill is that thinned forests will provide a ready source of biomass for energy production. But in many cases, there are limits on the economic viability of trucking wood any distance to a central energy plant. Again without huge subsidies, this simply does not make economic sense.

Biomass forest is even worse for forest ecosystems than clearcutting. Biomass energy tends to utilize the entire tree, including the bole, crown, and branches. This robs a forest of nutrients, and disrupts energy cycles.

Worse yet, such biomass removal ignores the important role of dead trees to sustain the forest ecosystems. Dead trees are not a “wasted” resource. They provide home and food for thousands of species, including 45% of all bird species in the Nation. Dead trees that fall to the ground are used by insects, small mammals, amphibians and reptiles for shelter and even potentially food. Dead trees that fall into streams are important physical components of aquatic ecosystems and provide critical habitat for many fish and other aquatic species. Removal of dead wood is mining the forest.

Keep in mind that logging activities are not benign. Logging typically requires some kind of access, often roads which are a major source of sedimentation in streams, and disrupt natural subsurface water flow. Logging can disturb sensitive wildlife like grizzly bear and even elk are

known to abandon locations with active logging. Logging can spread weeds. And finally since large amounts of forest carbon are actually tied up in the soils, soil disturbance from logging is especially damaging, often releasing substantial additional amounts of carbon over and above what is released up a smoke stack.

BIOMASS ENERGY USES LARGE AMOUNTS OF WATER

A large-scale biomass plant (50 MW) uses close to a million gallons of water a day for cooling. Most of that water is lost from the watershed since approximately 85% is lost as steam. Water channeled back into a river or stream typically has a pollution cost as well, including higher water temperatures that negatively impact fisheries, especially trout. Since cooling need is greatest in warm weather, removal of water from rivers occurs just when flows are lowest, and fish are most susceptible to temperature stress.

BIOMASS ENERGY SAPS FUNDS FROM OTHER TRULY GREEN ENERGY SOURCES LIKE SOLAR

Since biomass energy is eligible for state renewable portfolio standards (RPS), it has captured the bulk of funding intended to move the country away from fossil fuels. For example, in Vermont, 90% of the RPS is from “smokestack” sources—mostly biomass incineration. This pattern holds throughout many other parts of the country. Biomass energy is thus burning up funds that could and should be going into other energy programs like energy conservation, solar and insulation of buildings.

PUBLIC FORESTS WILL BE LOGGED FOR BIOMASS ENERGY

Many of the climate bills circulating in Congress, as well as Montana Senator Jon Tester’s Montana Jobs and Wilderness bill, target public forests for the wood supply. Some include roadless lands and proposed wilderness, as a source for wood biomass. One federal study suggests that 368 million tons of wood could be removed from our national forests every year—of course this study did not include the ecological costs that physical removal of this much would have on forest ecosystems.

The Biomass Crop Assistance Program, or BCAP, which was quietly put into the 2008 farm bill has so far given away more than a half billion dollars in a matching payment program for businesses that cut and collect biomass from national forests and Bureau of Land Management lands. And according to a recent Washington Post story, the Obama administration has already sent \$23 million to biomass energy companies, and is poised to send another half billion.

And it is not only federal forests that are in jeopardy. Many states are eyeing their own state forests for biomass energy. For instance, Maine recently unveiled a new plan known as the Great Maine Forest Initiative which will pay timber companies to grow trees for biomass energy.

JOB LOSSES

Ironically one of the main justifications for biomass energy is the creation of jobs, yet the wood biomass rush is having unintended consequences for other forest products industries. Companies that rely upon surplus wood chips to produce fiberboard, cabinet makers, and furniture are scrambling to find wood fiber for their products. Considering that these industries are secondary producers of products, the biomass rush could threaten more jobs than it may create.

BOTTOM LINE

Large scale wood biomass energy is neither green, nor truly economical. It is also not ecologically sustainable and jeopardizes our forest ecosystems. It is a distraction that funnels funds and attention away from other more truly worthwhile energy options, in particular, the need for a massive energy conservation program, and changes in our lifestyles that will in the end provide truly green alternatives to coal and other fossil fuels.

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