

New studies sully reputation of biomass as clean and green

March 28 2011, By Kyung M. Song

Simpson Tacoma Kraft would seem like one of the greener power plants. It boils water by burning sawdust, bark and wood shavings from saw mills and pulp mills, funneling the resulting high-pressure steam into a turbine to generate electricity.

Such power produced from [biomass](#) - tree trimmings, scrap lumber and other [plant material](#) - is a small but growing part of the nation's quest for renewable energy. The goal is to curb demand for imported oil by supplanting coal, natural gas and other fossil fuels and to reduce greenhouse-gas emissions blamed for altering the climate.

The technology enjoys wide political support and public subsidies at least in part because of the belief that it is carbon neutral. That is, carbon dioxide released from burning wood is equivalent to the amount of carbon absorbed during the tree's growth.

But now, sophisticated calculations are casting doubts on the merits of biomass-produced power. Some researchers have concluded that, when it comes to carbon dioxide, biomass could be more polluting - at least in the short term - than coal, and much worse than natural gas. Burning biomass is dirtier at the outset, they argue, and recouping that higher initial release of carbon could take years or even decades of forest growth.

"It's hard to imagine a more polluting and less efficient alternative source of energy than biomass," said Richard Wiles, former co-founder

of Environmental Working Group, a research and advocacy group in Washington, D.C.

Biomass supporters dismiss that contention, noting wood emits the same amount of carbon whether it's burned or left to decay in the forest. The net change in [atmospheric carbon dioxide](#), they say, is zero.

Yet, doubts about carbon neutrality could well alter the future of the biomass industry in Washington state and elsewhere. Thanks to its forests, the state is among the nation's largest producers of biomass power, generating enough to meet electricity demands of Tacoma and Spokane.

A dozen plants, all located in Western Washington except for two, produce power from wood byproducts from mills and forest waste. Four proposed projects are waiting to join the grid - provided they can overcome regulatory hurdles and legal opposition from environmentalists.

Challenges to biomass's "clean" credentials also could pose policy repercussions. Since taking office in 2009, state Public Lands Commissioner Peter Goldmark has made pursuit of biomass energy a signature initiative. Gov. Chris Gregoire and Democratic Sens. Maria Cantwell and Patty Murray also are strong proponents.

Taxpayers, too, hold a stake. That's by virtue of hundreds of millions of dollars in subsidies and federal grants for biomass projects, along with an estimated 14,000 biomass jobs across the nation.

Although carbon math is complex, critics level two main strikes against biomass.

First, because of its high moisture, wood yields less energy compared

with more efficient fuels. Generating the same amount of electricity from biomass emits 45 percent more carbon dioxide than coal and almost 300 percent more than an efficient natural-gas power plant, according to a 2010 study by the Manomet Center for Conservation Sciences, a nonprofit environmental research organization. The study was commissioned by the Massachusetts Department of Energy Resources.

Second, burning biomass releases carbon dioxide instantly, while repaying that carbon debt through new tree growth takes years. Just how long depends on many factors, including the biomass source, what was done with it before and the fossil fuel it displaces.

Replacing coal-fired electricity by burning tree tops and other wood waste, for instance, might take 10 years to recoup the carbon, said Thomas Walker, a resource economist and team leader of the Manomet study. But if whole trees were harvested for feedstock - something the industry says it doesn't do - and the resulting electricity replaced cleaner-burning natural gas, Walker said, payback might take a century.

The timing matters because the nation has pledged to reduce [greenhouse gas emissions](#) by 17 percent from 2005 levels by 2020 and dramatically more in subsequent decades.

"The interesting question is how much bioenergy do you want to promote from systems that have greater short-term potential to increase greenhouse gases?" Walker said.

The clashing views on biomass went on display in January when the Environmental Protection Agency decided to punt on the question of whether biomass boilers would be required to account for their carbon emissions the same way as other polluters. The agency decided to exempt biomass for three years, reversing its position from a year

earlier.

Some health groups, in addition, worry about other gases and chemicals emitted from burning biomass, including sulfur oxides, carbon monoxide and dioxin.

Rick Gustafson, a professor at the University of Washington's School of Forest Resources, criticized the EPA's earlier decision to treat biomass and fossil fuels under the same emissions rules.

Gustafson acknowledges carbon benefits of biomass could take years to accrue. Yet, carbon from biomass fundamentally pays for itself as long as standing trees aren't being depleted, he said.

"If the forest is growing," Gustafson said, "it has to be carbon neutral."

But Mark Harmon, a climate researcher at Oregon State University, said forests in the Northern Hemisphere on balance are always expanding. So crediting biomass for [carbon](#) sequestered in new trees amounts to double counting, he contends.

Harmon said he believes biomass has the potential to worsen climate change for years before it helps. While some debris from logging is burned deliberately, much of it is left to decompose slowly.

"If your investment doesn't pay off in your lifetime," Harmon said, "that really isn't helping very much. We need to solve this in the next 20 years. Fifty years will be too late."

Goldmark, the public lands commissioner, said his aggressive push for biomass energy has myriad reasons. They include combating global warming, raising revenue from selling logging waste and thinning forests to avert wildfires.

Nonetheless, earlier this month he weighed in against what would have been the largest free-standing biomass facility in Washington, the Adage plant in Shelton. In a letter to the Mason County Board of Commissioners, Goldmark questioned the \$250 million project's viability, saying it would require more wood waste to operate than could be had from a reasonable hauling distance.

Shortage of feedstock could force biomass plants to harvest trees just for fuel. The industry says it doesn't do that, although critics say some plants do burn whole-tree chips as well as trees that are unsuited for lumber or pulp.

Duke Energy and Areva, Adage's joint partners, dropped plans for the Shelton plant on March 13, citing a weak market for renewable energy.

As an alternative to fossil fuels, biomass enjoys heavy public subsidies.

Federal tax credits, for instance, cover 30 percent of the eligible cost of a new project. And biomass harvesters in Washington receive a state business tax credit of \$3 per ton. That's slated to go up to \$5 per ton in July 2013.

Bob Cleaves, president of the Biomass Power Association, a trade group, called the subsidies critical, adding he does not know if the industry could sustain itself without public assistance.

For Simpson Tacoma Kraft, the federal tax credit alone covered \$17 million of the company's \$90 million-plus tab to convert the plant to produce biomass electricity.

Simpson has been burning biomass since the 1920s, generating steam to manufacture shipping boxes and containers. Thanks to the 2009 expansion, Simpson now takes that steam and generates 40 megawatts of

electricity, allowing the plant to become largely energy self-sufficient, said Dave McEntee, vice president of Simpson Investment, a privately held Tacoma firm that owns the mill.

But because biomass power fetches a premium in the open market, where many utilities must meet quotas on using renewable energy, Simpson sells its electricity to California and replaces it with lower-cost power from the city of Tacoma.

McEntee said Simpson would not have converted the plant without the reliable supply of wood waste from its adjacent saw mill and other operators around Tacoma. That, coupled with tax credits and market premiums for biomass power, has proved Simpson's investment a smart bet, McEntee said.

"In my view, what we do is biomass done right," he said.

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