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Woody Biomass' Potential

September 23, 2009

Wisconsin's largest electric utility says that it will ask permission to build a 50-megawatt wood-burning power plant that would go into operation in 2013. It is part of the state's renewable energy mandate and it would be the third such biomass facility announced there this year in what could become a trend in certain regions.

Wood-burning power plants have some key advantages over types of renewable energy programs and namely that such generators are not subject to the whims of the weather -- that they can remain running as long as the wood gets shoveled into the furnace. And in many parts of the nation, such agricultural products are abundant.



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Biomass operations can furthermore work with certain types of coal before the new compound is combusted. It can all be accomplished, say experts, without having to change the fuel-firing system. The result is that the upgrades to the plants are both financially feasible and environmentally friendly. Trees and plants absorb carbon dioxide while alive. But when burned, they produce it. Biomass is thus considered carbon neutral whereas coal is said to be the heaviest contributor to such greenhouse gases.

About 20 utilities in North America are now using wood chips to replace 5-25 percent of the needed coal or natural gas. Among non-hydro renewable sources, biomass plays a key role today with 7,000 megawatts of installed capacity, says the U.S. Department of Energy. It also says that the co-firing of biomass and fossil fuels is the most immediate step that utilities can take to cut their carbon dioxide emissions.

That possibility has taken on even greater definition in Washington where lawmakers may enact a climate change bill this year. As such, utilities around the nation would have to meet certain renewable energy thresholds.

As for We Energies, its \$250 million effort is also to settle a lawsuit with respect to one of its coal-burning power plants. It's similar to a situation that FirstEnergy found itself. That is, a lawsuit filed in 1999 under the Clean Air Act said the Akron, Ohio-based utility had unfairly made upgrades to its older coal-fired facilities so as to increase capacity and not to make necessary repairs. After some adverse court rulings, the utility settled the case and agreed to spend \$200 million to convert two of its coal plants to those that can run on wood chips and which could generate 312 megawatts.

The "settlement improves air quality for the local community and reduces greenhouse gas emissions by requiring the use of a renewable, carbon-neutral fuel to generate electricity," says Cynthia Giles, with EPA's Office of Enforcement and Compliance Assurance. "EPA will seek similar commitments from companies to replace coal-fired

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electric generation with cleaner, renewable energy in future Clean Air Act settlements."

Practical Solution

To be sure, it generally takes twice as much biomass to create the same amount of energy as coal. So, one kilogram of coal produces one unit of energy. To replace that, 2 kilograms of biomass would be required. At the same time, any industrial operation utilizing the technology needs to assure it would have a continuous supply of the underlying feedstock -- and that other industries would not be hurt by any mass transfer of forestry products into power generation.

But co-firing the wood chips along with coal is a more practical solution to global warming concerns. The technology is now working in several U.S. states and also in Europe. Sweden, for example, gets 19 percent of energy from bark, straw and wood chips and expects to receive 40 percent from such sources by 2020. In the case of FirstEnergy, its undertaking will start out using 80 percent wood and 20 percent coal, which is far greater than a typical co-firing operation. A concern in all instances is to assure that the biomass and the coal are compatible before they would be mixed and burned.

Biomass has the eventual potential to generate more kilowatt hours of electricity than any other renewable resource, according to the Energy Department. And it's particularly valuable in those areas where trees are ample and where the wind or sun is not.

Consider Colorado Springs Utilities where the pine beetle has killed huge swaths of forests: Altogether, the power company estimates that 20 years worth of beetle-ridden trees exist and all within a 75-mile radius. Removing the dead trees not only makes room for a healthier forests, it says, but the subsequent quarter-inch wood pellets would be co-fired with coal to reduce carbon emissions. By 2011, it expects that 3 percent of its generation would be fueled by woody biomass.

Some southeastern utilities, meanwhile, are undergoing the same sort of transformation in anticipation of federal mandates requiring them to use more renewable energy. Atlanta-based Southern Co. is expected to build a \$135 million biomass plant while Oglethorpe Power Corp. has bought a 355-acre piece of land to build two such facilities in Georgia.

In Florida, three deals are underway. The Gainesville Regional Utilities just got permission to build a 100-megawatt facility while Duke Energy says it will do the same in Jacksonville and a company called Biomass Gas & Electric says that it plans to build a 42-megawatt plant in the Northwest Florida.

"By using biomass materials, a local renewable resource, this facility will promote our energy independence, add diversity to our fuel supply and shield customers from anticipated increasing fossil-fuel prices," says Gainesville Regional Utilities general manager Bob Hunzinger.

State and federal mandates may ignite the prospects of woody biomass. But its fate will rest more with how it performs and whether it can help reduce overall emissions in a cost-effective manner.

More information is available from Energy Central:

- [Biomass Topic Center](#)
- [Growing Waste to Energy - Combating Global Warming, EnergyBiz, Nov/Dec 2008](#)
- [Waste to Energy Innovation - Higher Temperatures Used to Produce Gas, EnergyBiz, Sept/Oct 2008](#)



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