

Part of a wood gasification system, this plant has been in use over 10 years by Burke-Parsons-Bowlby in Stanton, Kentucky. The plant uses stored sawdust which is heated at a controlled rate and releases methane gas. This gas is then piped to a boiler and ignited. The hot water from that boiler is then used to heat dry kilns and wood treating chemicals.

Woody Biomass, an Emerging Market

Photos courtesy: Terry Conners

Editors Note:

High oil prices and concerns over national security have brought about a resurgence of interest in turning wood into energy. Technology now allows us to think about woody biomass fueling cars, powering industries, efficiently heating our homes. In Kentucky we have two predominant sources of woody biomass: residues from sawmills and wood industries, and parts of trees left in the woods after a sawtimber harvest. Residues from traditional timber harvests could potentially be sold as biomass and efforts are underway in Kentucky to determine the economic costs and benefits of using these residues for fuel. Analysis of woody biomass fuels in Arkansas indicates that the fuel industry can pay more for woody biomass than is currently being paid for pulpwood. To help ensure that woodland owners are up to speed on this potential market the Kentucky Woodlands Magazine is providing a series of short articles on woody biomass that will run in the next several issues.

By Terry Conners

Communities all across the nation are finding that increasing populations mean increasing energy demands, and oftentimes the energy supplier is an ocean away. Here in Kentucky we have an abundant supply of coal for electricity, but some people have questioned whether we should seek out alternatives to fossil fuels to meet at least some of our needs. In recent years, several ideas have been proposed to turn wood into a clean, renewable energy supply. Not every method is going to work equally well; some methods can be implemented for homes and small businesses, and some are practical only for larger facilities. All will require guaranteed wood supplies. This article will provide you with a basic understanding of what wood energy is all about, and introduces some important concepts behind using wood for energy.

Why Is There Interest in Generating Heat and Power from Wood?

“Biomass” is a term used to describe plant materials, especially plant materials that can be converted to some form of energy or fuel. Biofuels (fuels made from biomass) are attractive sources of energy because they don’t come from fossil fuels; because they’re renewable, they are thought to be “carbon-neutral.” This phrase means that the carbon released when these materials are finally used for energy is absorbed at about the same rate by the plant materials grown to replace what is used to begin with. Wood is one kind of biomass that has interested people, but there are other kinds of plant materials that might be used as well. You have probably heard about converting corn to ethanol, for example, and some people have been working on energy projects involving switchgrass as well. The federal Biofuels Initiative, “30 x ‘30,” calls for producing 30 percent of this nation’s energy from biomass by the year 2030. Some of this energy may come from converting chemicals like starch or cellulose from corn or trees to alcohol, but wood can also be used to generate heat and power through combustion.

Interest in using wood for energy stems largely from the fact that wood is a locally produced, renewable resource that is readily available in many parts of the United States. Wood can be stored in many forms—firewood, chips, and even pellets—making wood available for use year round. It has the potential to play an important role in reducing our country’s dependence on oil, and there is a great deal



of interest in how to make this practicable in both industry and government. Even the most enthusiastic proponents of woody biomass as an energy source acknowledge that it does not represent a silver-bullet solution to our energy quest. No one solution (such as solar energy, increased efficiency, nuclear energy, biodiesel, or wood) can solve our energy challenges alone; it is more productive to look at each potential source as a piece of the puzzle. The question is not about which one of these energy alternatives we should use, but rather how we can utilize all of the feasible alternatives in combination.

How Do I Know If a Wood-to-Energy Facility Is Right for My Area?

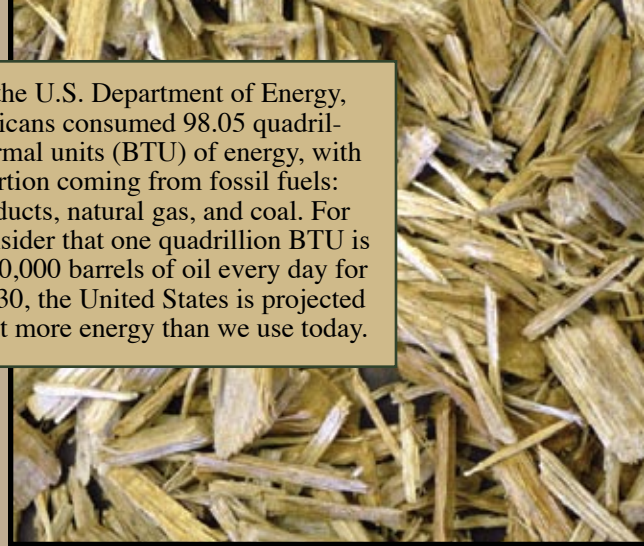
Before loggers can start thinking about delivering woody biomass from a harvesting operation and before woodland owners can start thinking about making a profit from biomass a market must exist. Successful, sustainable markets involve long-term commitments from both buyers and sellers, and both sides must make money. The following questions can help you decide whether woody biomass might have a future as an energy source in your area.

1. Is there sufficient woody biomass supply? Is it available in sufficient quantities? Biomass can come from harvesting operations or as by-products from wood industries such as sawmills or furniture manufacturers, but regardless of the source, when it is used for energy, it has to be available year round in consistent amounts. The source of biomass used for energy has to be fairly close to the power generating facility; otherwise, the cost of hauling it will approach the energy value of the woody debris.
2. Some biomass is available from conventional sawtimber harvests and forest practices such as timber stand improvement or from municipal tree removals and so on. In some areas these sources might generate enough material to sustain continuous power generation. In other areas this might not be the case, and it must be determined whether the community would be willing to support landowners who might choose to grow fast-growing trees exclusively for energy use to provide a dependable source of woody biomass for an energy facility (an "Energy Farm"). Is sufficient land available for an Energy Farm?
3. Are the economics of obtaining the woody biomass attractive? Even though some "waste" material is inevitably produced by local wood industries such as sawmills, these materials still have value for other uses; they may be used on-site for heat generation, for example, or they may be sold to other companies for use as horse bedding, mulch, or pulp chips. What is needed is an abundant, clean, and reliable source of unused wood.
4. Is there an increasing demand for power or steam locally? Is an industrial park or new municipal building in your community's plans? Are there power facilities in your area that can sell electricity on the grid? If conversion of biomass to alcohol is contemplated, a community will need an ample supply of water and good transportation access.
5. Are investors interested in erecting the power generating or conversion facilities required?



Electric substations like this one in Winchester, KY are common sights, indicative of our state's need for power for residential and industrial uses.

According to the U.S. Department of Energy, in 2004 Americans consumed 98.05 quadrillion British thermal units (BTU) of energy, with the largest portion coming from fossil fuels: petroleum products, natural gas, and coal. For comparison, consider that one quadrillion BTU is equivalent to 470,000 barrels of oil every day for one year. By 2030, the United States is projected to use 34 percent more energy than we use today.



Wood chips like these can be used for paper, playground surfaces, mulch – and potentially energy.

How Do I Find Out More about Using Wood to Produce Energy?

There are a number of important questions that each community should discuss before deciding to use wood to generate electricity, combined heat and power, or alcohol. Sources of wood, cost of wood, competition from other fuels, competition for wood, transportation, sustainability of forests, economic impact of using wood, and how the wood is converted to energy may be some of the issues to explore. Other articles in this series will discuss some of these concerns as we learn about the potential for converting wood to energy here in Kentucky. Additional information is also available at <http://www.forestbioenergy.net>.

Thanks to Martha C. Monroe, Associate Professor and Richard Plate, Outreach Research Associate, School of Forest Resources and Conservation, University of Florida, Gainesville, Florida, for their contributions to this article.

About the Author:

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