



Wisconsin Energy Bureau
Department of Administration



**RENEWABLE
ENERGY
FACT SHEET**

Meeting Wood Industry Energy Needs with Waste Wood

Wisconsin is fortunate to have a thriving wood-based products industry. Both sawmills and wood products companies find that the abundance of timber makes Wisconsin a good place to do business. However, many of these companies are unaware that wood is also a proven renewable energy resource. The wood waste that companies pay to dispose of can be used in their own operations to save energy and improve the environment. Currently, over 170 companies and institutions in Wisconsin use wood for energy.

How Wood Can Meet Your Energy Needs

Wood can help supply space heating, process heating, cooling and electricity. In addition, these can be combined in a process called cogeneration.

Space Heating. Manufacturing and office spaces can be heated with wood. This can be provided by automated industrial space heating furnaces or even with wood stoves that heat small spaces. Automated space heating systems are practical when two to three tons of waste wood is generated per week.

Process Heating. Wood can be used to fuel boilers that produce steam, which is used in high-temperature drying operations, and to drive motors.

Cooling. Wood can be used to power absorption chillers, which are used to dehumidify air for drying and other processes. Absorption chillers can also be used in the refrigeration cycle of conventional, electric-driven chillers.

Electricity. For larger systems (over 500 kW) wood can be used in steam boilers to power electric generators. Electricity may be viable for companies that generate over 40 tons of wood waste per week.

Cogeneration. Waste wood can be used to produce electricity, process and space heat or cooling at the same time. These systems are exceptionally efficient methods of supplying energy.

Benefits of Using Wood Waste

Using your own waste wood for energy makes good sense. A wood energy system can reduce operating costs and improve reliability. At the same time, you increase your business' commitment to the environment.

Using waste wood makes **business sense** in two ways: you eliminate the cost of waste wood disposal and you reduce energy expenses. Potential cost savings of using your own available fuel usually justifies the purchase and operation of a wood energy system over a short period of time.

Using waste wood makes **environmental sense** because it recycles natural resources and reduces the quantity of waste that ends up in landfills. You also offset the use of fossil fuels, which produce more pollution, such as sulfur dioxide. Wood is a renewable resource, as new tree growth captures the carbon dioxide produced in burning wood, creating a zero net carbon effect on the atmosphere.



*Waste pallets are one source of fuel for the wood industry.
Credit: Don Wichert.*

Designing A Wood Energy System

Not all wood types match every energy need. Your wood waste must match the capabilities of your system. You may need to modify an existing energy system to make it compatible with your wood waste, such as customizing equipment for handling, storage facilities and labor. The most important characteristics of wood as a fuel are moisture, density, ash and uniformity. These affect the quantity of energy in the wood, the cost of handling the wood, and the ability of the wood to work in the system.

The **energy** content of wood varies depending on its moisture, density and ash.

Moisture decreases the amount of energy available in wood fuels. For low-temperature heating needs, this may not be a problem. For high-temperature needs, high-moisture fuels are more difficult and require carefully designed systems. Wood is considered low-moisture at under 20 percent by weight. Freshly cut wood can have a moisture content approaching 50 percent by weight.

The **density** of the wood also affects how much energy is available by volume. The less dense the wood is, the more wood is necessary to produce heat. Some systems will not be able to handle the necessary volume of fuel needed if low-density wood is used.

The **consistency** of wood size is important to fuel handling and burning. Many furnaces are designed to handle only one size fuel, although the fuel is processed to a consistent size in systems designed to burn very small pieces of fuel.

For fuel use, waste wood is classified into three categories: green mill residue, dry mill residue and wood chips.

Green mill residue, such as “hogged” bark and sawdust, can be burned in spreader stokers and moving inclined grate furnaces. Because it already has a high moisture content (greater than 20 percent) it can be stored outside in piles, which is the cheapest possible method of storage. However, if it is not uniform it may cause problems in some furnaces.

Dry Mill Residue is low moisture wood (less than 10 percent) that includes sawdust, trimmings and wood from wood-products companies. It can be burned in suspension burners, pile burners and down draft gasifiers. Indoor storage is necessary to prevent added moisture.

Wood Chips such as whole-tree chips, round-wood chips, and clean chips, have very high moisture (about 50 percent) and can be burned in spreader stokers, moving inclined grates and underfeed stokers. Some types of chips may need to be screened so they don't join in handling.

Making Energy Sense

Burning waste wood for energy is a smart choice for many Wisconsin industries. This is why wood energy is the largest source of renewable energy used in Wisconsin, with industries accounting for about half of this.

For More Information

Demand-Side Applications of Renewable Energy

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