

State

States

Wisconsin

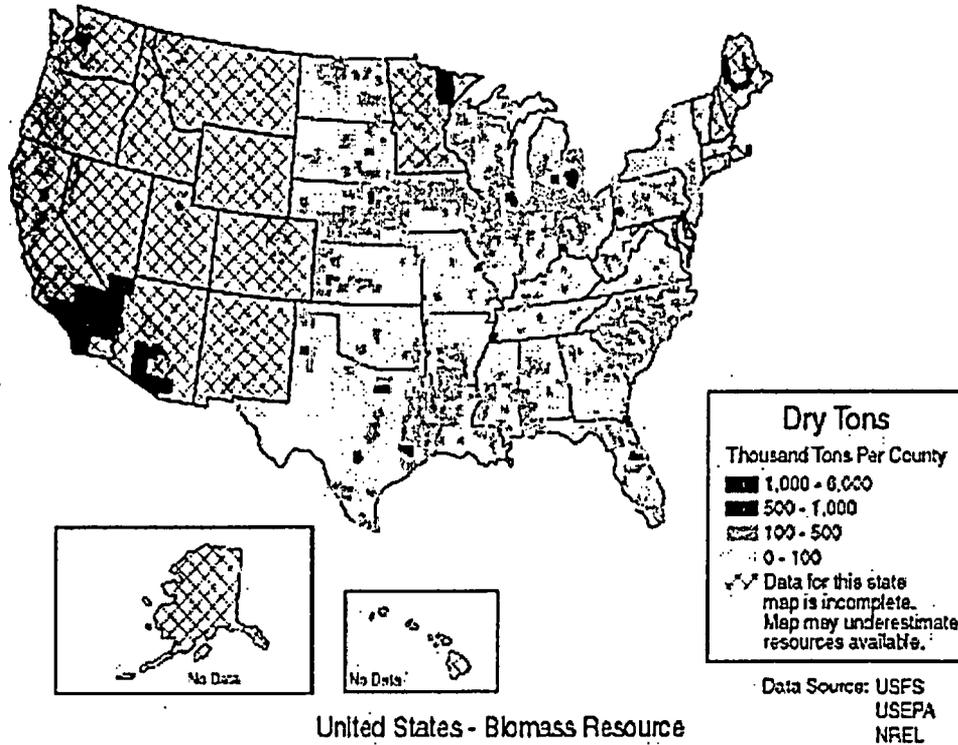
Wisconsin Bioenergy Resources

All plant or plant-derived material—"biomass"—from trees and grasses, agricultural crops, agricultural or forestry residues, and waste materials from plant products can be used to produce "bioenergy."

For heating applications or electricity generation, biomass can be burned in its solid form, or first converted into liquid or gaseous fuels for energy sources. Biomass power technologies convert renewable biomass fuels into heat and electricity using modern boilers, gasifiers, turbines, generators, fuel cells, and other methods.

For transportation use, liquid fuels made from biomass (biofuels), fill the bill best. The two most common biofuels used in the United States today are ethanol and biodiesel. While they can each be used as alternative fuels, both are more frequently used as additives to conventional fuels to reduce toxic air emissions and improve performance.

Biomass materials that are byproducts from activities such as wood products manufacturing, construction, agriculture, and forest harvesting or management are referred to as "residues." Residues can be inexpensive and clean sources of biomass. Using biomass residues as a fuel can avoid fossil-fuel purchases while reducing the costs and environmental impacts of disposal. In the future, fast growing grasses, shrubs, and trees (also referred to as "energy crops") could be grown specifically for use as fuels to meet a growing demand for sustainable electricity and transportation fuels.



Please note that biomass availability can vary significantly from one locality to the next. These maps and data are intended to provide a general indication of a region's biomass availability. Only municipal waste, mill and forest residues and select crop residues are considered in this map. Some areas not shown on the map that are near urban or manufacturing centers, or areas with agricultural residues that have not been considered, may have excellent biomass resource availability.

Wisconsin Biomass Power Resources

Recent studies indicate that Wisconsin has an excellent biomass resource potential.

An estimated 21.8 billion kWh of electricity could be generated using renewable biomass fuels in Wisconsin. This is enough electricity to fully supply the annual needs of 2,176,000 average homes, or 120 percent of the residential electricity use in Wisconsin. These biomass resource supply figures are based on estimates for five general categories of biomass: urban residues, mill residues, forest residues, agricultural residues, and energy crops. Of these potential biomass supplies and the quantities cited below, most forest residues, agricultural residues, and energy crops are not presently economic for energy use. New tax credits or incentives, increased monetary valuation of environmental benefits, or sustained high prices for fossil fuels could make these fuel sources more economic in the future.

Wood is the most commonly used biomass fuel for heat and power. The most economic sources of wood fuels are usually urban residues and mill residues. **Urban residues** used for power generation consist mainly of chips and grindings of clean, non-hazardous wood from construction activities, woody yard and right-of-way trimmings, and discarded wood products such as waste pallets and crates. Local governments can encourage segregation of clean wood from other forms

of municipal waste to help ensure its re-use for mulch, energy, and other markets. Using clean and segregated biomass materials for electricity generation recovers their energy value while avoiding landfill disposal. Mill residues, such as sawdust, bark, and wood scraps from paper, lumber, and furniture manufacturing operations are typically very clean and can be used as fuel by a wide range of biomass energy systems. The estimated supplies of urban and mill residues available for energy uses in Wisconsin are 639,000 and 1,892,000 dry tons per year, respectively. For a report on supplies of low-cost biomass residues in the United States, click the following link: [Urban Wood Waste \(PDF 1.13 MB\)](#). [Download Acrobat Reader](#).

Forest residues include underutilized logging residues, imperfect commercial trees, dead wood, and other non-commercial trees that need to be thinned from crowded, unhealthy, fire-prone forests. Because of their sparseness and remote location, these residues are usually more expensive to recover than urban and mill residues. The estimated supply of forest residues for Wisconsin is 1,138,000 dry tons per year.

Agricultural residues are the biomass materials remaining after harvesting agricultural crops. These residues include wheat straw, corn stover (leaves, stalks, and cobs), orchard trimmings, rice straw and husks, and bagasse (sugar cane residue). Due to the high costs for recovering most agricultural residues, they are not yet widely used for energy purposes; however, they can offer a sizeable biomass resource if supply infrastructures are developed to economically recover and deliver them to energy facilities. An estimated 5,180,000 dry tons per year is available from corn stover and wheat straw in Wisconsin.

Energy crops are crops developed and grown specifically for fuel. These crops are carefully selected to be fast-growing, drought and pest resistant, and readily harvested alternative crops. Energy crops include fast-growing trees, shrubs, and grasses such as hybrid poplars, hybrid willows, and switchgrass, respectively. In addition to environmental benefits, energy crops can provide income benefits for farmers and rural land owners. For Wisconsin, the production potential for energy crops is estimated at 6,114,000 dry tons per year.

Wisconsin Biofuel Resources

A detailed estimate of Wisconsin's biofuel resources will be available on this site in the near future. In general, current U.S. ethanol production is based largely on the starch in kernels of field corn, the nation's largest agricultural crop. (The predominant use of field corn is for animal feed. Current ethanol production uses only about 7% of the crop.) Any starch or sugar crop, however, can now be used to make ethanol.

As commercialization of advanced bioethanol technology makes possible ethanol production from biomass other than starch and sugar, vast additional resources will become available to supplement ethanol production from corn kernels. The first advanced bioethanol technology plants will likely use "opportunity" feedstocks such as paper mill or food processing wastes, that are from concentrated sources and now have low value or must be disposed. In the intermediate future, ethanol can be made from agricultural residues such as corn stover (stalks and husks—roughly equivalent in mass to the corn grain crop), or forestry residues such as from lumber mills or from forest thinning to reduce fire danger near urban areas. In the long term, ethanol could be made from dedicated energy crops of fast-growing trees and grasses such as poplars and switchgrass.

Current U.S. biodiesel production is based largely on oil from soybeans and recycled restaurant cooking oils. Both of these are currently in surplus and biodiesel production uses only a very minor fraction of available supply. Any animal fat or vegetable oil, however, can be used to make biodiesel.

Additional Bioenergy Resource Information

For information on bioenergy resources and projects in your area, contact your [regional biomass energy program representative](#).

For more information about biomass feedstocks and supplies in the United States, click [here](#), or go to the [Bioenergy Feedstock Development Program home page](#). The data cited above on biomass potential for Wisconsin (and other states in the U.S.) were obtained from the following reference:

[Biomass Feedstock Availability in the United States: 1999 State-Level Analysis](#) Marie E. Walsh, et. al., Oak Ridge National Laboratory, Oak Ridge, TN, April 30, 1999, Updated January, 2000.

To see USDA maps of biomass resource concentrations in the United States, click one of the following:

- [Dominant Land Cover/Use for the U.S.](#)
- [Tree Coverage in the U.S.](#)
- [Grass/Herbaceous Cover in the U.S.](#)
- [Crop Cover in the U.S.](#)
- [Shrub Cover in the U.S.](#)
- [Total Animal Units in the U.S. from which Manure is Recoverable](#)
- [Beef Density in the U.S.](#)
- [Dairy Density in the U.S.](#)
- [Swine Density in the U.S.](#)
- [Poultry Density in the U.S.](#)

For other USDA land-use maps, click [here](#).

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