

Bioenergy in Wisconsin

The Potential Supply of Forest Biomass and its Relationship to Biodiversity

Executive Summary

Wisconsin's forests, long regarded as one of the state's most valuable natural resources, are now being recognized for their potential to serve as a source of renewable energy and new jobs for rural residents. With its unique set of natural and cultural resources, Wisconsin possesses abundant potential to generate energy from this clean-burning, local fuel. In fact, of the fifty states, Wisconsin ranks among the highest in its potential to produce forest biomass for bioenergy.

Developing the promise of an innovative bioenergy industry faces market challenges and the need to accommodate other state goals. Of particular importance is Wisconsin's tradition of commitment to environmental quality. Further, because electric utilities produce nearly all of the state's electricity, any substantial growth in energy independence will require that electric generating facilities play a significant role. One way to assist utilities' capacity to accomplish this goal is to establish an adequate supply of forest biomass—one that is reliable, economical, and ecologically sustainable.

This report explores existing and potential sources of forest biomass in Wisconsin, and the relationship between biomass production and forest health. Nearly 150 papers and scientific articles were reviewed in order to prepare this document. In addition, interviews with regional experts provided a local perspective.

Wisconsin Forest Resource Potential

Wisconsin fosters a billion tons of woody biomass, and forested acreage is increasing. Harvesting biomass for energy is compatible with many other forest uses. Because it must be competitive with other fuels, only the lowest-value biomass is used to produce bioenergy. The only two economical sources are: 1) residues—waste materials from wood-processing facilities and from wastes that remain on private woodlands after logging or other forest management activities—and 2) energy plantations—trees grown as crops specifically for energy production. Currently, there are no energy plantations in Wisconsin, and therefore, the sole source of bioenergy from forest biomass is derived from waste residues.

Today, Wisconsin's forest-derived bioenergy hinges solely on gleaning wastes from others' harvesting and processing operations. Yet, available residues are in high demand and energy companies must compete with a growing number of other interests. Further, Wisconsin's abundance of residues is largely unrealized because most are never harvested.

Changing patterns of land ownership are also contributing to reduced harvests and limited availability. Wisconsin's forests are being divided into ever-smaller parcels. Increasingly, these new owners are absentee, wealthier, and less engaged in managing their forests. This phenomenon of "parcelization" threatens the availability of biomass, while resulting in a loss of habitat that presents one of the state's greatest threats to conserving biodiversity.

In many cases, biomass removal at current market prices is simply not economical due to small quantities or insufficient local markets. In other cases, although responsible harvest of the fine woody debris, the type most used by the bioenergy industry, is not expected to present a substantial impact on forest health, some parties harbor concerns about how to integrate ecological considerations into harvest methods.

While none exists today, Wisconsin ranks fifth among the fifty states in potential production from energy plantations: with over a million acres of idle crop land and favorable agricultural conditions, the promise is excellent. Careful siting is essential for success, both in productive capacity and acceptable environmental influence. These intensively managed, even-aged woodlots are unique from a habitat perspective. Plantations will not approach the biodiversity present in well-established forests, but when compared to row crops, they offer considerable environmental benefits including improved soil conservation and greater species diversity and abundance.

Conclusions and Recommendations

Wisconsin possesses the ideal natural and cultural resources upon which to build a thriving bioenergy industry. It has abundant capacity to produce a reliable, competitively priced, and ecologically sustainable supply of forest biomass. Developing a fraction of the state's potential would increase the amount of energy produced from forest biomass more than tenfold. Establishing a new industry requires commitment and support: a Wisconsin bioenergy industry will not develop on its own. Thus far, its progress has been hindered by changing priorities and demographics, and a lack of market development.

A robust market for forest residues is the single most important element in a near-term strategy to initiate a bioenergy industry in Wisconsin. Residues are and will always be important: they are the sole source of forest biomass available today and, as such, must serve as the spring board from which to launch a new industry. However, forest productivity and ecologic conditions are site-dependent, and the supply chain involves many participants who hold different objectives. An enhanced forest-planning process can provide a means to reach more private forest owners. It can help them to meet their management objectives and understand their forests' specific limitations and advantages. Because the degree to which residue removal impacts species diversity is expected to be directly related to the intensity of the harvest, of particular importance is establishing the percentage of residues that can be acceptably removed from a given site. Enhanced planning can provide interested parties with the information they need to create an informed and balanced patchwork of working forests and protected areas.

Beyond residues, a serious commitment to long-term stability will require the volume that can only be achieved with energy plantations. Establishing sufficient, well-sited, well-managed energy plantations is the lynchpin to a sustainable supply.

Actively managing Wisconsin's private forest-resource potential will generate benefits for the economy and the environment. With support, Wisconsin can have productive and ecologically sound forests—and launch a flourishing bioenergy industry.