

Estimate of the Sustainable Energy Resource in Wisconsin's Forests

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Although predictions call for the price of natural gas to continue to increase faster than other sources of energy, the Wisconsin Public Service Commission permitted over 1,500 MW of merchant gas-fired generating capacity between 2000 and 2002 (Vicerman 2002). During that time period “at least 15 medium to large [Wisconsin] sawmills have closed their doors”. (Akhtar, 2004). This report investigates the potential sustainable energy supply available in Wisconsin's forests; an important piece of the puzzle as to whether or not Wisconsin should consider investing in pro-woody-biomass energy policies to support the Wisconsin economy and increase stability in energy costs.

Calculations

The study considers four potential sources of wood for energy in Wisconsin.

- 1.Un-harvested Growth
- 2.Harvest Residues
- 3.Primary Mill Residues
- 4.Urban Wood Waste

Un-harvested growth is the difference between annual growth and annual harvest. Harvest residues include residues from all logging in the state. Primary mill residues include

The study uses the volumetric assessment of Wisconsin's forest available in the Department of Agriculture's latest Wisconsin Forest Statistics from 1996, and uses urban waste estimates from a 1995 MLSE&Associates report prepared for the state of Wisconsin. Calculations were completed for each of the five state forest survey units.

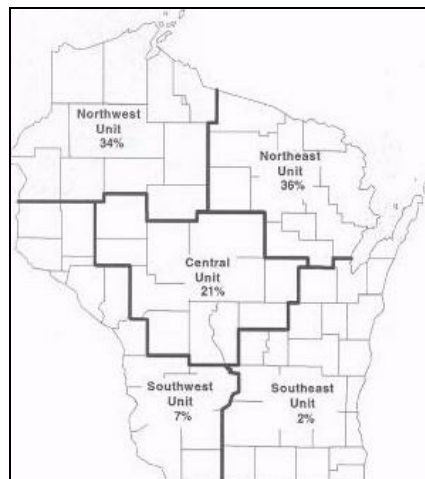


Figure 1 The five state forest survey units.

The study normalizes the species-specific green wood volume data from the Forest Statistics to oven-dry mass data per forest survey unit. Once the total potential oven-dry mass is calculated, 8500 but/lb of oven dry wood is used to estimate energy content per forest survey unit.

Assumptions

This analysis is a very preliminary assessment of the *potential* forest biomass resource in the state of

Wisconsin; the results represent a theoretical ceiling. There are many assumptions in this work including the accuracy of the State of Wisconsin's Forest Statistics, and the accessibility of wood even on private lands. This is a supply calculation and therefore does not look at energy required to collect the wood or the efficiency of extracting the energy. It is also important to note that the mass-basis energy content for wood in this document is for oven-dry wood. For economic reasons this is not a likely scenario.

Results

Wisconsin forests, as they stood in 1996 with the above assumptions in place could have provided 740 Million therms, or almost 19% of the state natural gas demand in 2004. With urban waste included the potential was there to have meet up to 30%.

The Northeastern forest survey unit has the greatest sustainable forest biomass potential followed closely by the Southwestern and Northwestern forest survey units respectively.

The Southweteren forest survey unit placed well due to the fact that the prevalent species in the region have more dense wood material. On average there is 6000 pounds more biomass available per 1000 ft³ harvested

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in the Southwestern forest survey unit than in the Northeastern unit. This is particularly of interest to those concerned about competing with the paper industry that focuses primarily on the central and northern regions of the state for their pulp wood harvests.

Of the potential contribution of the four different sources of wood for energy only primary mill residues stood out in the fact that almost all residues are currently utilized, the other three potential sources are almost equivalent in potential supply.

Although there are many hurdles to implementing strong policies in support of forest-biomass energy, the potential to displace 19% of statewide natural gas demand is worth of attention. And research regarding efficient harvest and conversion of forest biomass should be pursued.

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Total Potential Annual Sustainable Energy From Wisconsin Standing Trees, Harvest Residues, Primary Mill Residues, and Urban Waste, Divided by Forest Survey Unit. (MMBTU)

	NW	NE	Cntrl	SW	SE	Total
Un-harvested Growth	10820896	10064170	7404152	8692802	7681548	44663568
Harvest Residue	11378081	11477686	7744511	10064608	1044055	41708942
Primary Mill Res.(unused)	68255	23290	80410	16490	15470	203915
Urban Waste	0	0	3180190	1547085	41753955	46481230
Total	22267232	21565146	18409263	20320985	50495028	133057655

