

Nebraska Forest Service

WOODY BIOMASS ENERGY IN NEBRASKA: AN UNTAPPED RESOURCE



UNIVERSITY OF
Nebraska

Energy security is a vital issue in America and Nebraska. Heavy dependence on fossil fuels obtained from politically volatile areas, an emerging consensus that carbon emissions must be substantially reduced, and dramatically increasing costs for fuel oil and natural gas are driving the need for alternative energy sources in Nebraska and nationally. Further, Nebraska's rural communities are facing serious economic declines in many areas.

Woody biomass is a carbon-neutral, clean burning, renewable energy resource that can help solve these problems. Nebraska-grown wood is an underutilized, plentiful, economic energy resource that can revitalize our rural economies. To achieve this, financial support from the government is needed.

WOOD ENERGY CAN HELP SOLVE PRESSING PROBLEMS IN NEBRASKA BY:

- reducing Nebraska's energy dependence on fossil fuels;
- creating jobs and new sources of income in depressed rural areas;
- reducing forest fuel loads and risk of catastrophic wildfires;
- creating markets for eastern redcedar cleared from grazing lands;
- addressing scarce water issues in drought-stressed watersheds through forest management; and
- creating more productive, healthier forests and revitalized rural communities.



NEBRASKA'S WOODY BIOMASS RESOURCES

- There is an assured supply of wood in Nebraska to support strategically located woody biomass-based enterprises.
- Nebraska has 1.24 million acres of forest with 38 million dry tons of standing woody biomass. *Almost none of this wood resource is utilized.*
- These forests produce at least 1.8 million net tons of wood per year, every year in perpetuity. *Converting 33 percent (600,000 tons) of this annual growth would produce approximately 38 million gallons of cellulosic ethanol/year.*
- Tens of thousands of tons of waste wood from utility and arborist clearing and pruning operations that are produced annually are not utilized.
- Rapidly growing forest fuel reduction programs in the Pine Ridge and Niobrara Valley produce tens of thousands of tons of wood/year.

CURRENT USES OF WOODY BIOMASS FOR INSTITUTIONAL HEATING AND COOLING IN NEBRASKA

- Since 1991 Chadron State College has used wood energy to heat its campus. With the addition of a 600-ton wood-fired chiller in 2005, CSC now uses 9,000 tons of wood chips/year to heat and cool more than 1 million feet of building space.
- Since 1995 the Lied Lodge at Arbor Day Farm has burned 3,200 tons of wood per year to heat and cool 500,000 square feet of space.



COMPLETED ENGINEERING FEASIBILITY STUDIES FOR CONVERSION TO WOODY BIOMASS ENERGY

<u>INSTITUTION*</u>	<u>ECONOMIC FEASIBILITY</u>	<u>COST</u>	<u>PAYBACK PERIOD**</u>	<u>ESTIMATED ANNUAL BIOMASS USAGE (TONS)</u>
Chadron Community Hospital	Positive	\$443,000	17 years	350
Crow Butte Resources, Inc.	Positive	\$717,000	13.9 years	350
Nebraska College of Technical Agriculture	Positive	\$675,000	13.5 years	1,040
Peru State College	Positive	\$1.1 million	6.0 years	3,200

*Many other institutions (schools, hospitals, large business facilities, etc.) could be economically converted to woody biomass energy.

**Payback periods shorten as costs increase for natural gas and fuel oil.

OTHER EMERGING OPPORTUNITIES FOR WOOD ENERGY IN NEBRASKA

Cellulosic ethanol

- Emerging technologies show great promise for converting low-quality wood to ethanol.

Electrical power generation

- Wood could be used to co-fire coal-burning power plants, reducing air pollution and offsetting carbon emissions.

Energy source for industrial applications

- Replacing natural gas with woody biomass would increase the profitability of corn ethanol plants and reduce net carbon emissions.

Industrial energy products

- Businesses that process wood into pelletized fuels show excellent potential for operation in rural forested areas.

BARRIERS TO WOODY BIOMASS UTILIZATION

Conversion costs:

- Despite positive feasibility studies and short payback periods, Nebraska institutions have not been able to raise adequate funds for conversion to woody biomass utilization.

Inadequate number of harvesting and processing contractors

- The current limited number of woody biomass markets in Nebraska has restricted the number of harvesting and processing contractors. Experience shows, however, that with new markets, new entrepreneurs will emerge.

Public Policy

- Currently, there is little public financial support for institutions to convert to woody biomass energy.

WHAT IS NEEDED NOW TO MAKE A REAL DIFFERENCE IN OUR ENERGY SECURITY?

The best near-term opportunity with the largest potential return on public investment is to foster the conversion of large institutions to wood energy for heating and cooling. This can be achieved through a publicly funded woody biomass institutional conversion cost-share program that would assist institutions wishing to convert to woody biomass as an energy source.

The Nebraska Forest Service: Improving peoples' lives by protecting, utilizing and enhancing Nebraska's tree and forest resources.

Dr. Scott Josiah
State Forester & Director
(402) 472-1467
sjosiah2@unl.edu

Nebraska Forest Service
103 Plant Industry Building
Lincoln, NE 68583-0815
(402) 472-2944
www.nfs.unl.edu

Dennis Adams
Marketing & Utilization
Program Leader
(402) 472-5822
dadams2@unl.edu