

Society of Wood Science and Technology (SWST) Position On
Advantages of using lignocellulosic biomass rather than food products for bioenergy

A Position Paper Submitted by the Policy and Critical Issues Committee – July 2010

The Issue

Woody or lignocellulosic biomass has always been used by humans for energy for heating and cooking. Wood continues to be the most common solid fuel globally and is the most important bio-based fuel in the United States. There is a desire now to produce more liquid transportation fuels from woody biomass sources. Major drivers for this conversion in the United States (US) have been the Energy Independence and Security Act of 2007 (EISA), which mandates 36 billion gallons of renewable biofuels (fuels made from biological raw materials) by 2022, as well as a series of federal and state subsidies.

Most biomass-derived transportation fuels are currently made from crops that are also potential foods – e.g. corn and soybeans. The potential exists to convert woody biomass to transportation fuels and this potential offers some important advantages over the use of food crops. SWST members should be ready to explain the benefits of using woody biomass rather than annual crop-related biomass for biofuels so that policy makers can make science-based decisions.

Some of the potential advantages of woody biomass over annual crop-based biomass are:

- Can be kept on the stump and harvested when markets are most favorable
- After harvesting, can be stored longer before deteriorating
- Requires relatively little irrigation and fertilizer
- Forests provides soil and water quality protection and habitat for a variety of wildlife
- Harvesting woody biomass can help maintain and enhance forest health and productivity

Background

The US consumes about 25% of all the energy generated in the world. Today, renewable resources make up only 6% of that, with 3% coming from woody biomass sources.¹ Lignin, a residue of the wood pulping process, is a major source of energy for process steam and electrical generation at pulp mills, with some mills selling the excess electricity. The drying of lumber is very energy intensive and most of this energy is supplied by burning wood residues from the sawmilling process.

Moving towards non-fossil energy resources and away from an 86% fossil fuel dependence (the remaining 8% is nuclear) is likely to be one of the most important issues of the 21st century. Drivers for this change include domestic energy security, the finite nature of fossil fuels, the desire for rural economic development and climate change considerations. Although the consumption of woody biomass has been increasing for some uses including co-firing with coal for electrical generation and wood pellets for home heating, very little woody biomass is currently converted to liquid transportation fuels.

While some biomass-based materials, including woody biomass have a clear advantage for diesel substitutes when made through the Fischer-Tropsch synthesis, this advantage does not clearly translate to ethanol as a gasoline substitute. Ethanol as a transportation fuel has recently grown in the United States an average of 25% per year to about 9 billion gallons in 2008. This increase can be attributed in part to the United States Federal subsidy of 45 cents per gallon of ethanol produced and mandated blending volumes. The increase in the use of ethanol for fuel has increased corn prices, boosted the demand for cropland, and raised the price of animal food.²

The technology for producing ethanol from woody biomass has been available for more than one-hundred years, but the economic viability has been questionable.³ The US is rich in productive forested lands, having the third largest forest volume in the world. Because complex technical, economic, and environmental issues confront policy makers in determining whether woody biomass or food crops should be used for ethanol and other fuels production, our membership, with their specific knowledge of wood properties and conversion technology, is uniquely positioned to provide information to policy leaders and the general public on these issues.

¹ Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Supply. US. Dept. of Energy. Oak Ridge National Laboratory. April 2005

² Congressional Budget Office Paper. The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions, April 2009.

³ Biomass Research and Development Initiative, Increasing Feedstock Production for Biofuels: Economic Drivers, Environmental Implications, and the Role of Research, December 2008

Challenges

The price of petroleum has a strong impact on the capital available for investment in renewable energy production projects. For example, the extreme volatility of prices in the US, ranging from \$147 to \$34 per barrel in recent years, has made investors wary of providing capital for new biofuel facilities. Whether the increase in the use of woody biomass for bioenergy is rapid or sluggish depends on some artificial and institutional deterrents and incentives, as well as economic and environmental concerns. Some important challenges to growth in use of woody biomass for bioenergy are:

- Woody biomass is often grown in large, relatively inaccessible areas;
- The wood-processing industry can be skeptical about the potential to use more wood for bioenergy, over the service life of the facility, because competition already exists for woody biomass resources;
- The US has not moved in a clear direction on how or whether to mitigate climate change, and it is very uncertain how forest biomass will relate to any coming mitigation strategies.

Each of these challenges is also an opportunity for fostering research that will advance science-based decisions needed to move toward a greater use of woody biomass.

Specific Actions to Encourage Bioenergy Development

The growing political unrest in the world has increased the public's concerns over the US's ability to sustain its energy dependency from ever increasing petroleum imports. The mandated surge from 9 billion gallons of crop based ethanol to 36 billion gallons by 2022 should put pressure on the corn ethanol industry and provide opportunities for woody biomass-based ethanol. Additional research focused on selecting the best feedstock, improving energy conversion efficiency, finding new conversion pathways and reducing the processing costs will continue to increase the production efficiencies of woody biomass-based energy products. The science and technology needed to advance the increased utilization of woody and crop-based biomass for bioenergy, when combined with public commitment, could result in an increase in the energy independence of the US and will have positive global environmental benefits.

Our society now needs to take an advocacy position on the effective use of woody biomass combined with and compared to annual crop-based biomass for energy, if energy independence and greenhouse gas reduction objectives are to be achieved. SWST should take a leadership role in encouraging the development of novel energy generation processes from woody biomass. Specific recommendations include:

- Support an increase in government and private funding of woody biomass energy research;
- Encourage collaborative research and education projects that focus on woody biomass-based energy products;
- Encourage identification of sustainable biomass supplies from public and private forests;
- Educate the public, private enterprise, and the policy makers on the value of managing a sustainable woody biomass resource for energy products beneficial to society's needs;
- Advocate for the use of woody biomass based energy, especially relative to that derived from annual-crops.

POSITION STATEMENT

Woody biomass offers clear advantages and should play a substantial role in meeting future global energy requirements. SWST supports the sustainable utilization of woody biomass for energy production. Members of SWST have unique expertise in the utilization and processing of woody biomass for energy. SWST and its members can support the development of woody biomass-based energy systems and to advocate for the development of a science-based argument in support of woody biomass for bioenergy.