



North Central Biomass Energy Feedstock Partnership

Workshop Summary
August 15-17, 2006
Sioux Falls, South Dakota

Partnership Goal

The availability of biomass feedstocks for energy production varies regionally due to differences in production and marketing factors such as soil type, climate, and competing uses. A consistent and reliable supply of biomass feedstocks is paramount to establishing a biorefinery. The goal of the North Central Regional Biomass Partnership is to facilitate the development, evaluation and delivery of existing and emerging biomass feedstocks in an economically feasible and environmentally sustainable manner. We wish to become the “one-stop shop” for biorefinery developers in the north central region seeking information on biomass energy feedstock supply and research on its utilization.

Initial Partnership Collaborators

- North Central Sun Grant Regional Center
- South Dakota State University
- US Department of Energy
- US Department of Agriculture
- Western Governors’ Association
- Great Lakes Council of Governors

Workshop Goal

One of the goals of the first NC Biomass Bioenergy Feedstock workshop was to establish a dialog and working partnership among the entities invited to the workshop and the individual participants in attendance. A second goal was to identify and quantify (if data available) potential agricultural-based biofuel feedstocks in the north central region that could be utilized to meet the 1.3 billion ton feedstock target identified in the US-DOE/USDA Billion-Ton Study.

Workshop Objectives

1. Identify agricultural-based biofuel feedstocks that are (or could be) produced in the north central region.
2. Quantify each feedstock that could be produced in an environmentally sustainable manner and feasibly delivered to a biorefinery.

3. Identify the barriers to sustainable production, harvest, and delivery of the feedstocks to a biorefinery located in the north central region.
4. Suggest policy and or communication tools/resources that could be utilized to facilitate more rapid development and utilization of biomass energy feedstocks.

Nine Working Groups

- ✓ Sustainable Crop Residues
- ✓ Sustainable Starch & Oilseed Crops
- ✓ Sustainable Lignocellulosic Perennial Feedstocks
- ✓ Sustainable Woody Crops
- ✓ Sustainable Forest Resources
- ✓ Resource Economics and Engineering
- ✓ Communications
- ✓ Policy Development and Analysis
- ✓ Environmental Interactions

Summary of Workshop Outcomes

Biomass Feedstock Supply

Crop Residues: 17 residues from existing or potential crops were identified. The majority of the residues was expected to come from small grain (wheat) straw, corn stover, manure, and dried distiller's grains. The projected estimates for crop residues in the Billion Ton Study (428 million tons/year) are thought to be too high. Critical reexamination of the assumptions used to estimate the residue supply must be done and adjusted for regional differences such as yield stability/consistency and temporal variations.

Starch & Oilseed Crops: Project that existing annual row crops in the North Central Region can produce 65 billion gallons of transportation fuels by 2030 while still meeting food, feed and export markets (assume change in rotations: 2yr corn then 1yr soybean or 3yr wheat – 1yr oilseed; plus doubling of yield increases from past 25 years). Ethanol from the crop residues will provide 24 billion gallons of fuel thus 41 billion gallons of fuel will come from directly from the starch and oilseed crops.

Lignocellulosic and Perennial Feedstocks: The North Central Region can exceed the biomass production predictions as outlined in the Billion Ton Report if the economic return for lignocellulosic feedstock exceeds existing agricultural production systems. None of the rangeland and very little (<10%) pasture land will be converted to bioenergy crop production. The land base will come from CRP acres and existing cropland. There are many areas in the North Central Region that can supply a 50 million gallon per year biorefinery with enough lignocellulosic feedstock from within a 25 mile radius.

Woody Crops: Potential crops in the North Central Region include hybrid poplar, cottonwood (native) and willow. Woody crops have the distinct advantage of year-round harvest and self storing. Conceptually model of a mixed cropping system which could produce 400,000 dry tons of biomass per year where 8 to 10 thousand acres of woody crops are planted each year into agricultural and urban landscapes.

Forest Resources: There are forest resources available for both liquid fuels and wood energy. The estimates in the Billion ton Study are reasonable, but anticipate the the North Central Region to contribute 5 to 10 dry tons per year. The supply from public lands is a major source of uncertainty.

Cross-cutting Concerns

Environmental: What are the long-term impacts of consistently removing the majority, if not all, of the biomass from a parcel of land on soil carbon, soil quality, water quality, nutrient cycling, and erosion? What is the value of residues left in place (carbon and nutrients) versus market price?

Wildlife: What impacts will changing current land uses for bioenergy biomass feedstock production have on wildlife populations?

Accuracy of assumptions used in the Billion ton Study: The assumption used in the Billion Ton Report should be reexamined and refined. The 50% yield increase assumption is of greatest concern.

Will the general public accept the proposed changes in land use and biorefineries in their communities?

Research Needs

Testing and genetic improvement of existing and potential biomass crops (agronomic and forestry) for better utilization of nutrients, sunlight and water to produce greater yields.

Investigations are needed into long-term management systems (including perennial and woody crops) that allow for significant biomass production and removal with out degrading the environment or soil resource.

Integrated systems research incorporating several biomass feedstock sources into a diverse agriculture-forestry-urban landscape.

Need to utilize a GIS framework to asses potential supply curves for various feedstocks on a sub-regional level. Also need to model these supply curves and determine the impacts of climatic or land use change and extreme weather events.

Need to develop best management practices for biomass and residue harvest – how much must to be left to maintain the resource?

An accurate assessment of feedstock resources is needed. What is the true cost of production, harvesting, storing and transporting various biomass feedstocks?

Need an economic impact analysis of various biomass production and processing systems at a state and regional level. What effects do feedstock type, composition, and delivery system have on storage and the conversion technology used? Are there economies of scale or should processes be decoupled to save transportation coats?

Expanded research is needed to determine what valuable co-products can be produced along with biofuels to reduce the net cost of energy production.

Research institutions need to partner with industry and producer groups to scale laboratory successes to pilot plants.

Graduate and undergraduate programs in biomass bioenergy are needed to develop the future scientists to continue forward progress and populate the professional positions necessary to manage a biorefinery.

Policy & Communication Issues

Need to develop a resource (internet site) that contains information on feedstock specifications appropriate for various conversion technologies. Include a listing of regional biomass feedstock activities and expertise.

Need to articulate the externalities of a successful bioeconomy to the general public.

Need complementary state and federal policies affecting biomass bioenergy. Processes that consolidate information/requirements and streamline the permitting process.

State and Tribal programs are needed to encourage local equity.

Federal policies are needed to encourage feedstock development (production) and help to mitigate the risk in establishing a biorefinery.

Creation of a biomass community of practice within eXtension

Increase communication on objectives and current activities of the Sun Grant Initiative among all Land Grant Universities. Identify a person of contact at each institution.