Woody Biomass: The Basics

Dana Raines, Onanegozie RC&D Coordinator

Fueling the Future:

The Role of Woody Biomass for Energy Workshop

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Brainerd

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Woody Biomass: The Basics

Dana Raines
RC&D Coordinator
dana.raines@mn.usda.gov
"The fuel of the future is going to come from apples, weeds, sawdust – almost anything. There is fuel in every bit of vegetable matter..."

– Henry Ford, 1925
Woody Biomass:

- Trees and woody plants, including limbs, tops, needles, leaves, and other woody parts.
- Grown in a forest, woodland, or rangeland environment.
- Products or by-products of forest management, restoration or fuel reduction treatments.
- Includes urban forests.
Biomass Feedstocks

- Logging Residues
- Pre-merchandable Thinnings
- Non-commercial Species
- Poor quality Wood
- Salvage Wood
- Mill Waste
- Dedicated energy crops (Willow, Hybrid Poplar)
- Brushlands
- Grasses
- Crop Residues (Corn Stocks)
- The merchantable wood or the conventional forest products component includes the boles and sound dead wood.
- The forest residue fraction suitable for bioenergy and biobased products includes the tops and some fraction of saplings considered to be overstocked.
- The total forest residue resource is about 0.7 billion dry tons.
Benefits of Woody Biomass

**Economic benefits:**

- **Landowners**
  - Increased income potential
  - Reduced site preparation costs
- **Communities**
  - Economic diversification
  - New markets for forest products / New Businesses
  - Energy Independence
Benefits of Woody Biomass

Environmental benefits:

- Carbon Sequestration
- Air Quality
- Reduce Wildfire Risk
- Recovery of Degraded Land
- Wildlife Habitat
- Reduced Mortality due to Insect and Disease
Challenges

- Collection and Harvest
- Sustainability/ Management of the Resource
- Transportation
- Storage
- Processing
- Technology/ Industry Development
- Economics
- Environmental
Why the interest in Biomass?

In 2000, the U.S. used about

100 Quads of energy per year
or
100,000,000,000,000,000,000 BTU’s
U.S. energy consumption by source - 1850-2000

Source: 1850-1949, Energy Perspectives: A Presentation of Major Energy and Energy-Related Data, U.S. Department of the
US energy supply since 1850

Source: EIA
Biomass Math

2 Green Tons (~50% moisture) = 1 Dry Ton (0% moisture)

1 cord of Wood = 1 Dry Ton = 18,000 BTU’s

2 Dry Tons of Wood = 1 Ton of Coal = 200 gal. Fuel Oil
Total = 101.605 Quadrillion

- Petroleum: 40%
- Nuclear Electric Power: 8%
- Natural Gas: 23%
- Coal: 22%
- Renewable Energy: 7%

Total = 6.830 Quadrillion Btu

- Solar Energy: 1%
- Hydroelectric: 36%
- Geothermal Energy: 5%
- Biomass: 53%
- Wind Energy: 5%
Projected U.S. Biofuel Sources

Source: Biomass as Feedstock for a Bioenergy and Bioproducts Industry: Technical Feasibility of a Billion Ton Annual Supply, 2005, DOE and USDA.
Critical components of a sustainable bioenergy and bio-based products value chain

(adapted from IEA Bioenergy Task 31).
Energy Options – Biomass Conversion!