OSU
Oregon State
UNIVERSITY
College of Forestry

Bioenergy Research at Oregon State University

John Sessions

2012 Northwest Bioenergy Research Symposium
November 13, 2012

Overview

- Western Sun Grant Regional Center
- Advanced Hardwoods Biofuels Northwest (AHB) - Hardwood Plantations
- Northwest Advanced Renewables Alliance (NARA) – Softwood Forest Residues
- Priorities – The 3 C's

SunGrant INITIATIVE

- The Sun Grant Initiative
  - A consortium of the nation's land-grant universities addressing national bioenergy and bioproduct challenges at the local level and on a regional scale
- Research supporting the development of –
  - Biobased transportation fuels
  - Biobased products for a green transportation infrastructure

SunGrant INITIATIVE

- Five Regional University Centers
- Engaging agricultural and natural resource colleges in every state and territory
- Working with multiple federal partners

SGI and DOT/RITA

- Research Priorities
- From Biobased energy feedstocks to fuel product
- Including economics, policy options, and environmental impacts

Feedstock Development
- Plant Breeding
- Agronomic Management
- Sustainable Production
- Equipment Technology

Logistics
- Feedstock Production
- Harvest, Delivery, and Storage
- Transportation
- Pre-Processing

Conversion Processes
- Conversion Technologies
- Cost of Production
- Biological Conversion
- Thermochemical Conversion

Systems Analysis
- Industrial Ecology
- Feedstock Transport
- Biofuels Transport
- Delivery Infrastructure

Economics, Marketing and Policy
- Economics and Policy
- Impact on Food, Feed, and Fiber Markets
- Economic Return
- Production Economics

Environmental Impacts
- Life Cycle Analysis
- Greenhouse Gas Emissions
- Carbon and Energy Balance
- NOX Emissions

Some Sun Grant Projects at OSU

- Camelina Trials for Oilseed Production
- Russian Dandelion Production for Natural Rubber and Ethanol Feedstock
- Napier Grass LCA
- Biochar for Soil Amendment and Storm Water Filter
- Supply curve for Western Juniper as Coal Substitute at PGE Boardman Power Plant as well as giant cane and annual sorghum crops

This month issuing an RFP ($800,000) for new projects

For more info contact

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Advanced Hardwoods Biofuels Northwest Projects (AHB) at OSU

Bioenergy Education Project

- Pre-college Education
- Bioenergy Minor
- Professional Science MS degree

Hardwood Genetics and LCA Analysis

More Info? - Ask Rick Gustafson

Northwest Advanced Renewables Alliance Projects (NARA) at OSU

Feedstock Supply

- Spatial Market Equilibrium Models
- Long Term Productivity
- Wildlife Impacts
- Genetic Improvement

Feedstock Logistics

- Biomass Recovery
- Collection and Transport Cost Models
- Moisture Management
- Grinding to Specifications
- Advanced Trailer Testing and Demonstration

The Three C's

- 1. Cost
- 2. Cost
- 3. Cost

- Other than "minor" technical pretreatment and conversion details – Feedstock collection and transport cost is a major challenge for a 1,000,000 BDT/year facility

Forest Residue Characteristics

- Almost FREE on site
- A large part is at already at roadside -> good
- 30-60% water -> no sugar yield
- 3-5% dirt -> no sugar yield
- 5-12% bark -> low sugar yield
- Expensive to get to roadside – add up to $22/BDT
- Expensive to concentrate if large trucks cannot reach residue piles - add up to $25/BDT
- Expensive to transport - $6-7/BDT per hour of travel time

Grinder Working at Roadside

Grinding at a Centralized Collection Point

Van Options

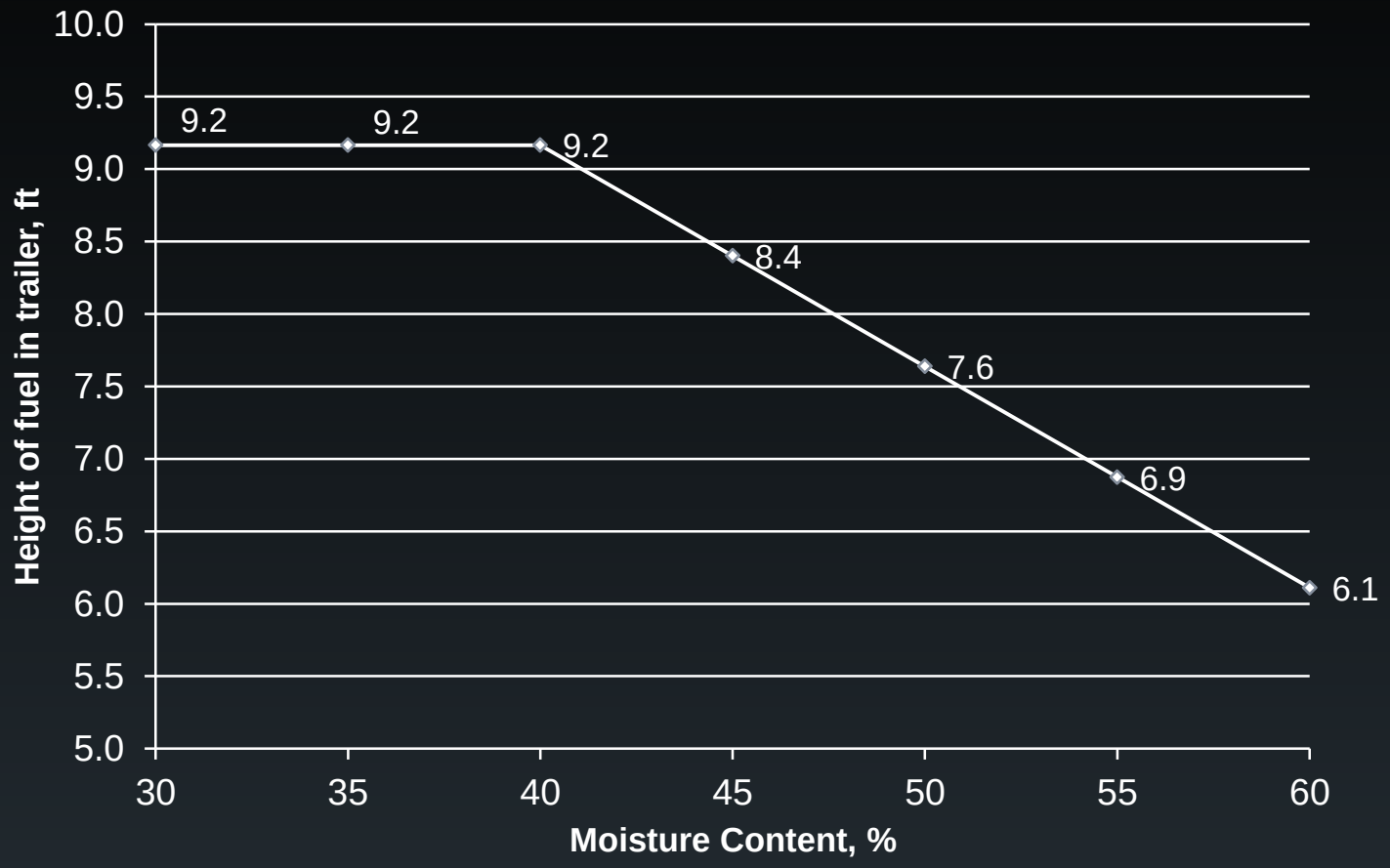
32-ft Van for Doubles

48-ft Stinger-Steered Van

48-ft Van Self-steering Axles

53-ft 4 Axle Van

Biomass Height in Trailer



48-ft trailer, 8.3 ft wide, dry bulk density (hogfuel) = 9.3 pounds per cubic foot.

Technical Opportunities – Increase Sugar Content Per Truck Load

- Reduce Moisture Content
- Screen Fine Material (mostly bark and dirt)
- Increase Large Truck Access (advanced design vehicles)
- Densify Before Transport (blow, vibrate, compact)

Concluding Remarks

- Lots of Challenges
- Lots of Opportunities

Thank you