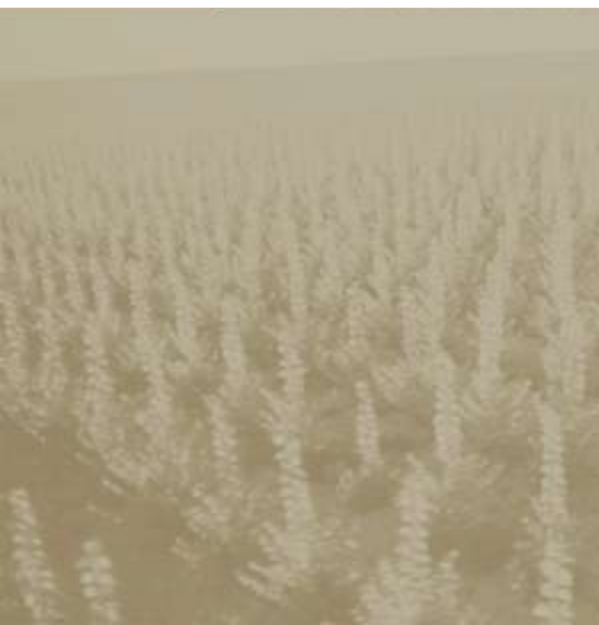


A Resource That Lasts Forever™



GreenWood Renewable Energy Opportunities for Short Rotation Woody Crops

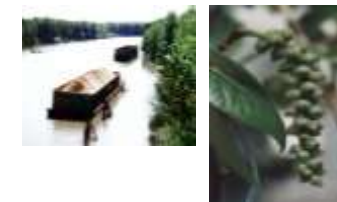


**November
8th, 2010**

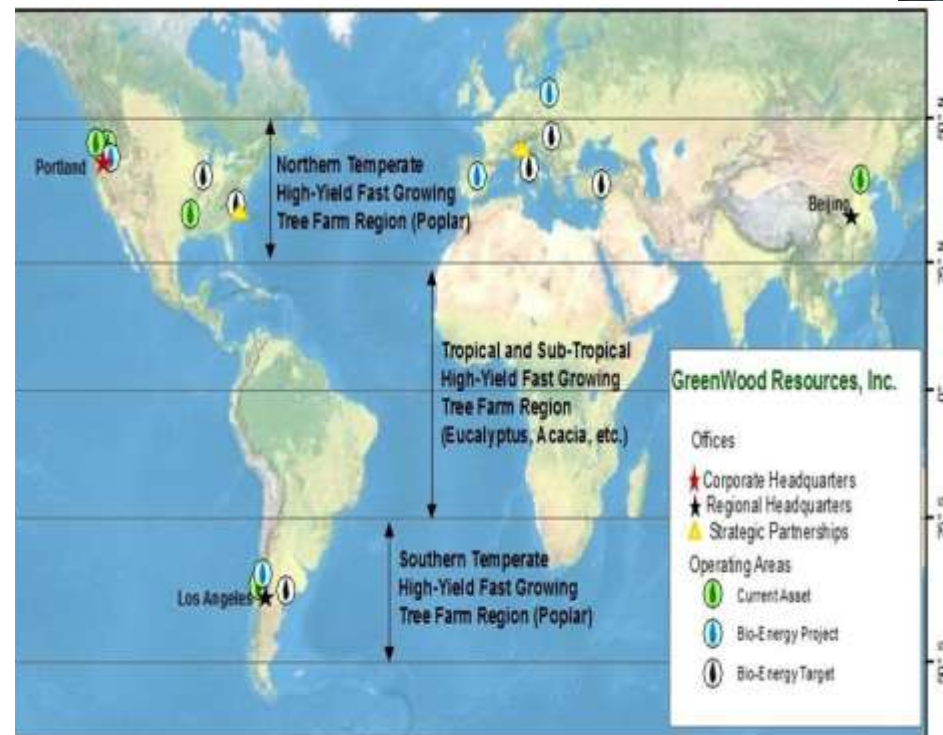
**Washington State Bioenergy
Research Symposium**

About GreenWood Resources

Global Investment and Asset Management Company for Plantation Forestry



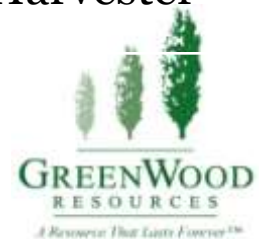
- Founded in 1998 and “dedicated to the innovative development and management of sustainable short rotation high yield tree farms and their products”.
- Employs approximately 70 professionals and office staff.
- US \$410 million under management; Organizing \$500 million global tree farm fund- GreenWood Global Tree Farm Fund (GGTFF).
- Vertically integrated company executing on a global platform.



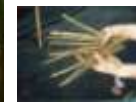
Short Rotation Woody Crop (SRWC) Management



Product	Sawlog	Pulp	Bio-energy
Tree per acre	160-220	400-600	1200-2400
Rotation (yrs)	12-15	6-8	2-5
Regeneration	Nursery Cutting	Nursery Cutting	Coppice
Harvest Technology	Feller-buncher	Feller-buncher	Forage Harvester



R&D Focus: Bio-energy Feedstock Yields and Production Efficiencies



Plant Development

Silviculture

Crop Care

Harvesting-Transport

30 Regional Screening Trials

2 Large-Scale Demonstration Plantings (120 ac)

Current Plantation Management (36,000 ac)

Harvesting Trials-Case New Holland

Identify High Yield Low Input Varietals

Planting Densities Growth and Yield Forecasts

Reduce Inputs Manage for Risks

Harvest Efficiency Reduce Moisture Content



Wood Traits for Energy Production



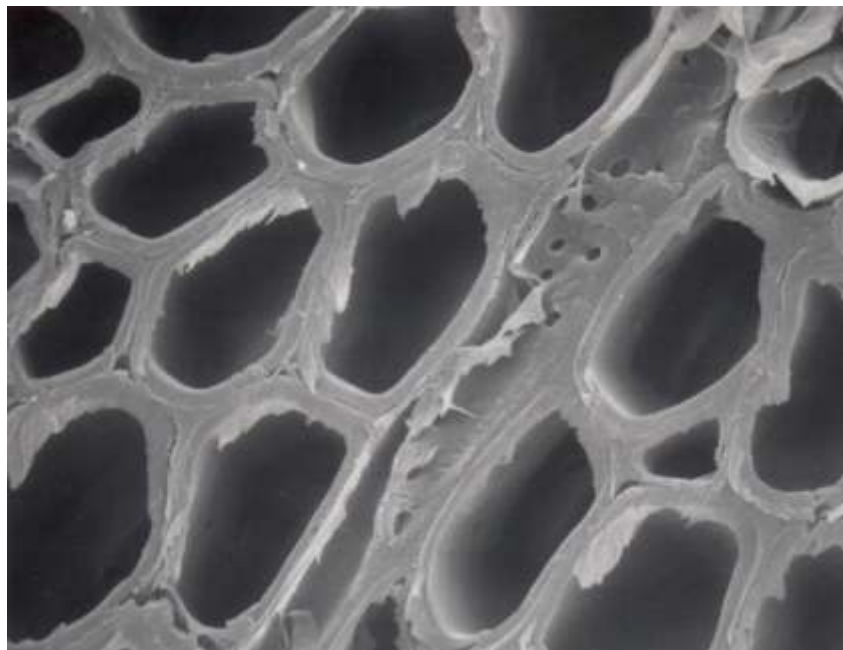
Direct Combustion

- High specific gravity
- High calorific value
- High lignin & extractives contents

Conversion into Biofuel

- High C6 sugar content (glucose, galactose, and mannose)
- Low extractives and ash content
- High S/G lignin ratios

Evaluation Criteria – Wood Quality



Specific gravity: .265 to .373

Lignin: 21.9 to 26.0 percent

Glucan: 41.1 to 48.0 percent

S/G Lignin Ratio: 1.1 to 2.5

Fiber wall thickness: 5.1 to 7.2 μm

Microfibril angle: 9 to 21 degrees

Select US GWR Bio-energy Trials

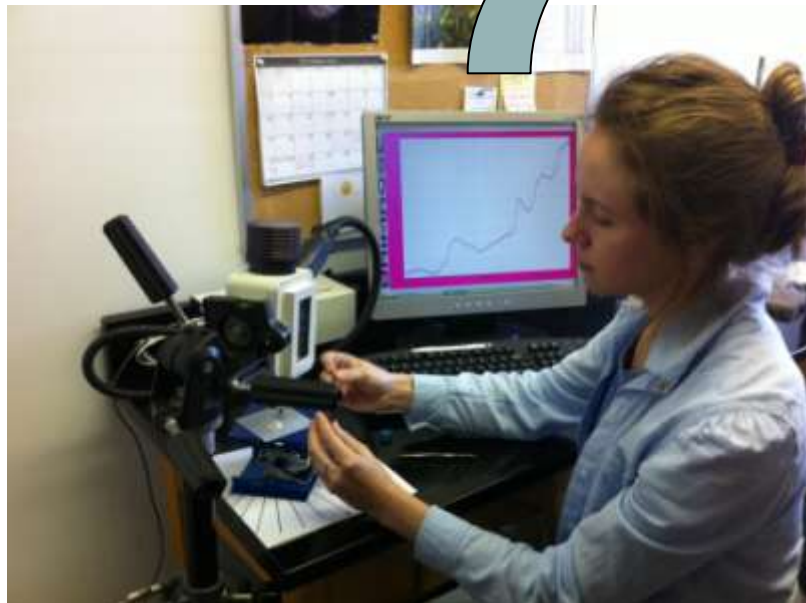
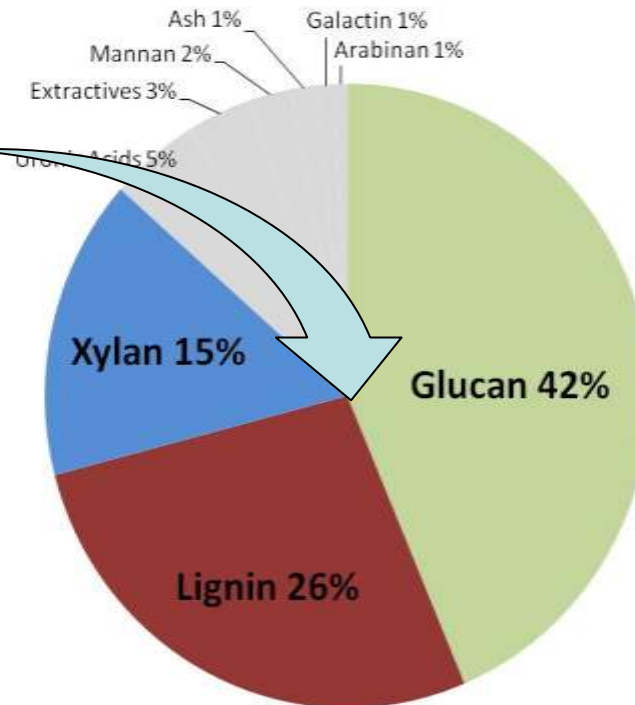


Near Infrared Spectroscopy: Rapid Assessment of Chemical Properties



Develop near infrared spectroscopy (NIRS) models for predicting:

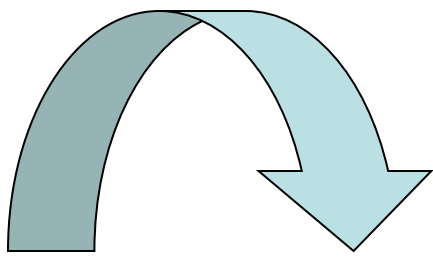
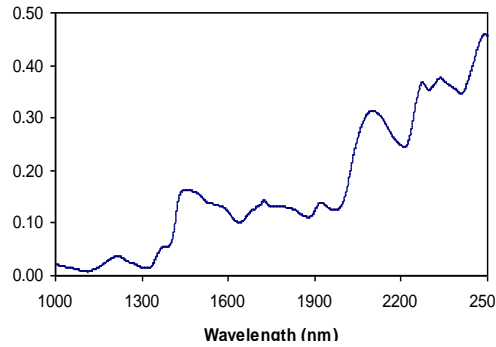
- Specific gravity and calorific value
- Chemical composition



Principle of NIR Modeling



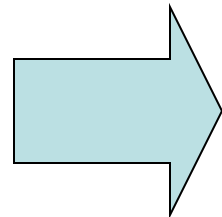
NIR spectra



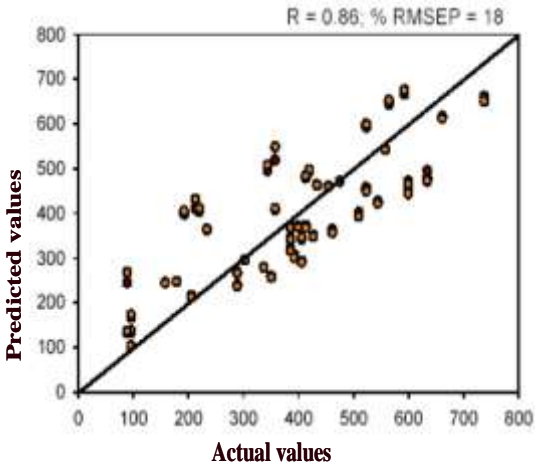
Multivariate Analysis calibration model

The Unscrambler - [chemanalysts]

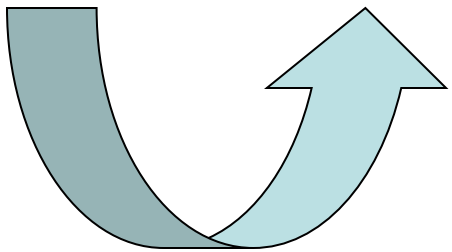
	extractives	ash	lignin	glucan	xylan
	1	2	3	4	5
1	3.1200	0.5000	22.4100	42.3700	18.5500
2	3.2600	0.4000	21.6100	48.6000	17.0200
3	2.9400	0.5700	21.6000	43.7600	16.1800
4	4.0400	0.8000	26.7100	45.3300	14.1300
5	2.1100	0.3300	26.4100	47.0800	14.8300



Validation



Property of interest
(*Specific gravity...*)
measured in the
laboratory

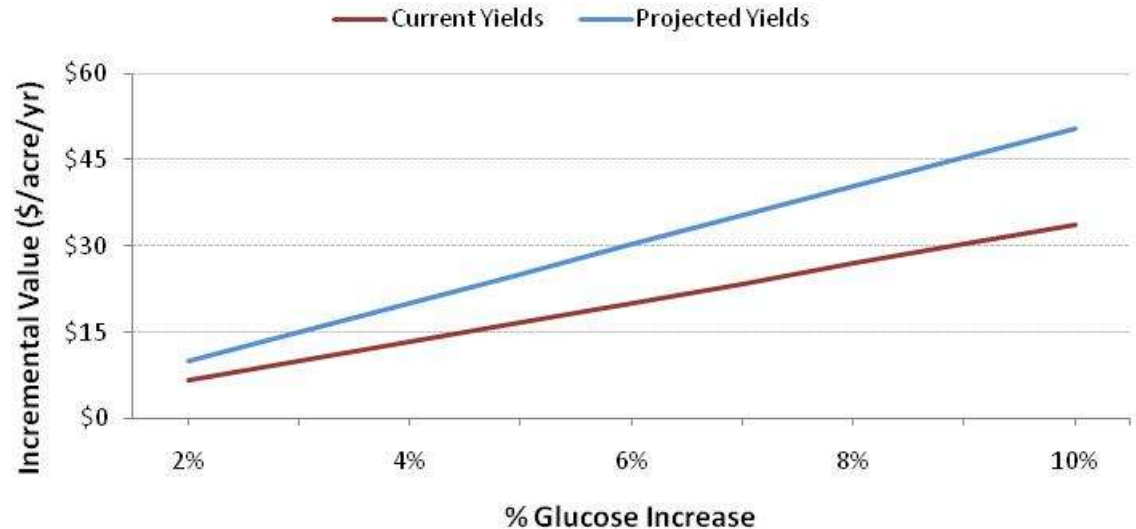


Driving Economics with Focused R&D: Varietal Selection for Increased Glucose



Impacts of Higher Glucose Content

- Drives revenue on a per ton basis
- In combination with projected yields will have a material impact on investment returns
- Potentially lower conversion costs for the end user

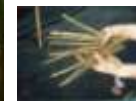


Site Adaptability-Feedstock Sustainability

Increasing Water Use Efficiency- Breeding Poplar Genetics from Inner Mongolia

Populus simonii was indentified during an acquisition due diligence project in Inner Mongolia.

Varietal offspring screened for the ratio of C12 and C13 isotopes to determine water use efficiency.

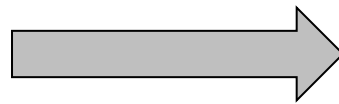


Case NewHolland Harvester Trials



Key Research Issues

- Timing of harvest: coppice response, moisture & chemical content
- Chip quality: reducing dirt content is key for bio-energy and biofuel converters



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