Biomass Marketing Opportunities

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Fueling the Future:

The Role of Woody Biomass for Energy Workshop

March 26, 2009

Ponsford

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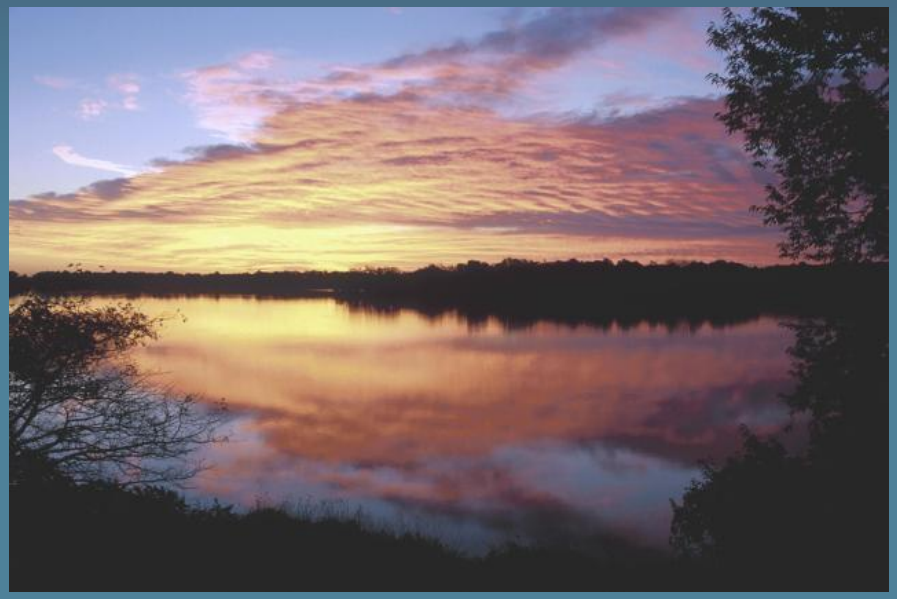
Biomass Marketing Opportunities



By: Mark Lindquist
Biofuels Program Manager

To: ***Biomass for Local Renewable Energy and Economic Development***

March 26, 2009

DNR Mission

- Work with citizens to conserve/manage state's natural resources
- Provide outdoor recreation opportunities
- Provide for commercial uses of natural resources to create sustainable quality of life

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us. - Charles Dickens

Biomass – Always a part of the energy system

Source: US Energy Information Agency

Woody Biomass - Current Industry

- Mill Residue
  - ~ 1.5 million tons
- Green chips from forest operations
  - ~ 0.6 million tons
- Other resources
  - ~ 0.6 million tons

Woody Biomass –Current Industry

- Slash 10- 15% of round wood harvest
- Housing Boom

  4 million cord = 8 million green tons

  1.6 million green ton slash
- Housing Bust

  3 million cord = 6 million green tons

  1.2 million green ton slash

Non-Woody Biomass

- Agricultural Processing by-products
  - Koda Energy
  - Corn-Plus Ethanol
  - Northern Quality Seeds
- Waste Water Treatment
- Manure
  - FirboMin

Energy Market – Current Prices

Price Drivers

- Competing energy prices
- Relative efficiency of fuel
- Capital investment requirements
- Ease of use
- Permitting / regulatory issues

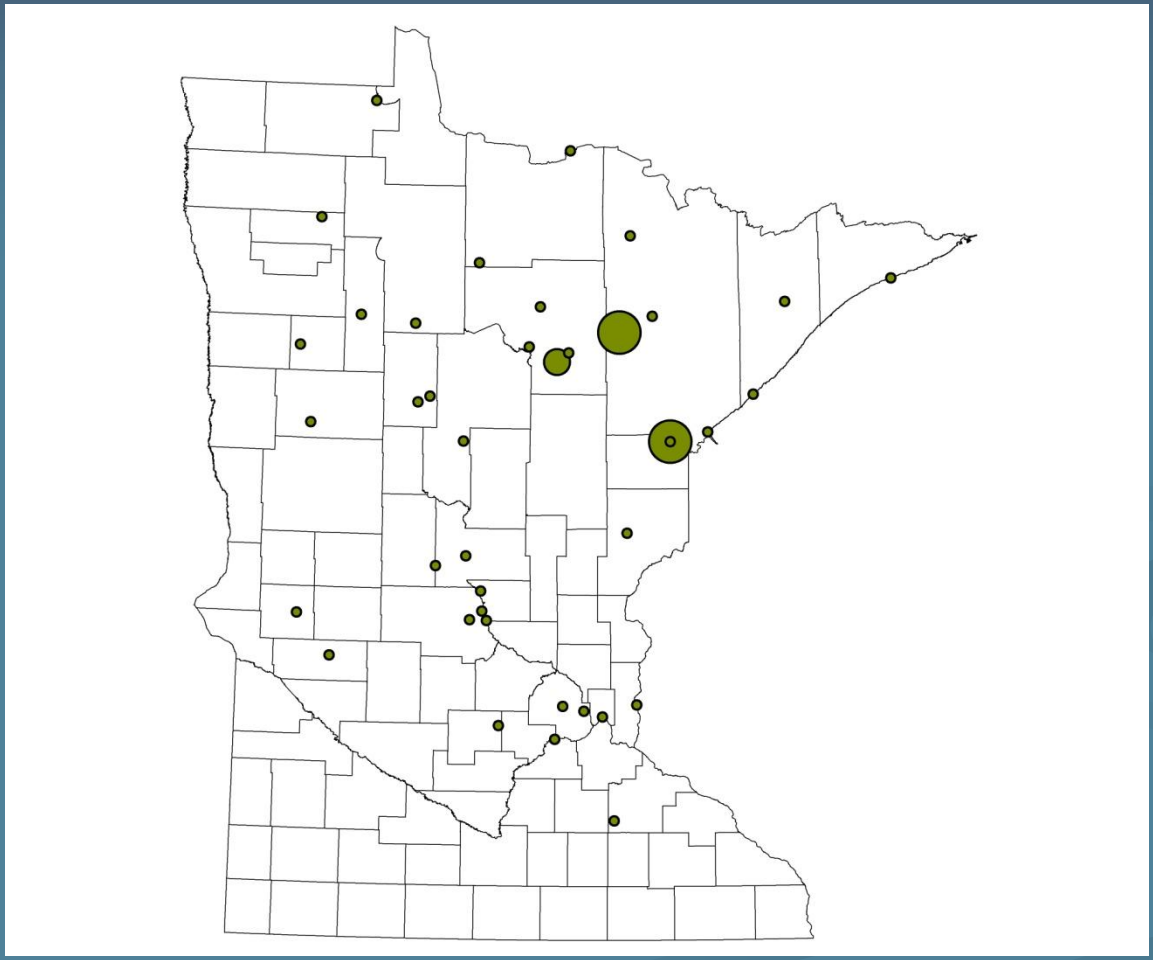
Energy Price Comparisons

Fuel	Unit Price	Unit	$/mmbtu
Coal MN Ave '07	$ 43.00	ton	$2.39
Natural Gas City Gate '08	$ 8.37	mmbtu	$8.37
Nat. Gas Henry Hub 4/08	$4.30	mmbtu	$4.30
Premium Wood Pellets – retail	$250	ton	$15.63
Premium Wood Pellets - wholesale	$ 150.00	ton	$9.38
Corn, So MN	$ 3.50	bu	$9.09
Propane Midwest 07	$ 1.78	gallon	$19.49
Fuel Oil Residential 07	$ 2.59	gallon	$18.50
Green chips	**$ 20.00**	**ton**	**$2.67**

Future Driving Factors

- Long term Natural Renewable as prices
- Federal Cellulosic Fuel Standard
- State and Federal Renewable Electric Stand.
- Greenhouse Regulations
  - Cap and Trade
  - EPA – Clean Air Act

Woody Biomass Market



Major Wood Biomass Consumers

Market	Scale	Forest Biomass
MP – Grant Rapids	300,000 GT	Yes
MP – Duluth	200,000 + GT	Yes
Laurentian Energy	200,000 + GT	Yes - Not sure status
St. Paul Dist. Energy	300,000 GT	Yes
Boise – I-Falls	200,000 + GT	Yes
SAPPI Cloquet	200,000 + GT	Yes
Source: MN DNR, Forestry Biomass User Directory		

Other Large Woody Biomass Users

Market	Scale	Forest Biomass
FibroMin Benson	50,000 – 200,000 GT	Yes
Valley Forest Products Marcell	50,000 – 200,000 GT	Yes - some
Verso	50,000 – 200,000 GT	Potentially
Chippewa Valley Ethanol Company –Benson	50,000 – 200,000 GT	Yes - seeking to transition to corn cobs

Non-Woody Biomass Facilities

- Koda Energy: 176,000 tons
  - Mostly sourced from internal resources
  - Seeking additional supplies
- University of MN Morris: 9,000 tons
  - Technical challenges with gasifier
- FibroMin: Turkey Litter 300,000 tons
  - Augmented with biomass – where available

Biomass – Ill-Defined Development Path

Feedstock

- Mill Residue
- Timber Slash
- Grain
- Crop residue
- Manure
- Urban Wastes
- SRWC
- Prairie grass

Technology

- Combustion
- Gasification
- Pyrolysis
- Fermentation
- Combined Heat and Power

Market

- Industrial Process Heat
- Electric Power
  - Utility
  - On-Site
- Home Heating
- Transportation Fuels
- Chemicals

Key Observations

- Biomass supply is small compared to energy market (MN Btus used = 120 million DRY tons)
- Just a few large projects could drive significant price shifts
- Industrial coal prices are the bench mark for biomass
- Nat. Gas prices drove interest

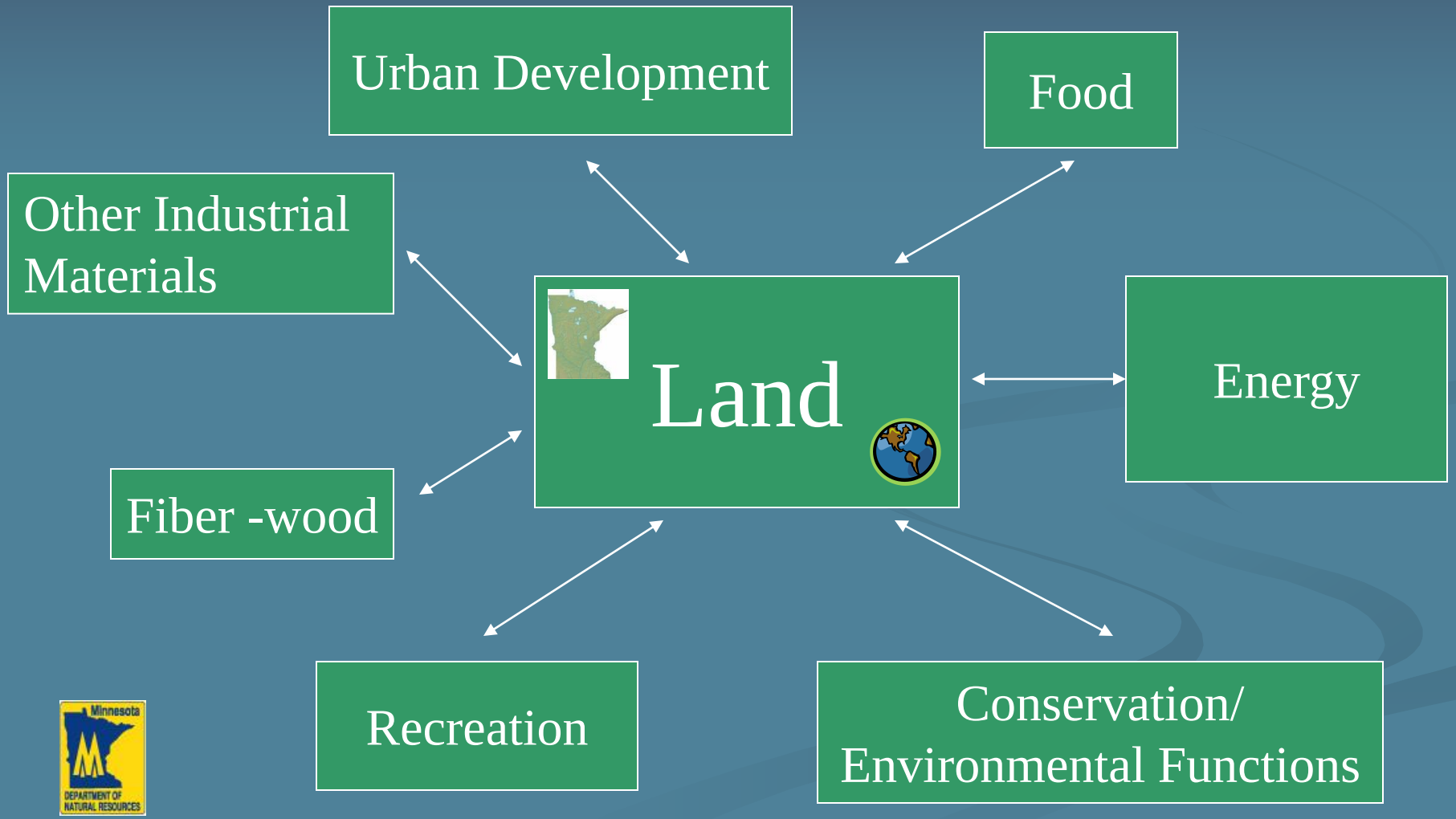
Key Observations

- High and rising natural gas prices drove interest
- Volatility and uncertainty in nat gas market impacts biomass
- Densification improves fuel value, but adds significant cost

Where is the market going?

- Stand alone Power plants – not likely
- Existing industrial solid fuel boilers
- Power is likely only in CHP facilities
- Off-setting high cost fuels in residential / commercial
- Pressure to expand pellet export to EU
- Cellulosic Biofuels - ???

Sustainability & the Land



Questions?

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