Biomass Marketing Opportunities

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Fueling the Future:

The Role of Woody Biomass for Energy Workshop

April 2, 2009

Brainerd

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Biomass Marketing Opportunities

By: Mark Lindquist
Biofuels Program Manager

To: **Fueling the Future — The Role of Woody Biomass for Energy**

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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, A

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

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	ton	$2.39
Natural Gas City Gate '08	$8.37	mmbtu	$8.37
Nat. Gas: Henry Hub 5/08	$3.80	mmbtu	$3.80
Premium Wood Pellets – retail	$250	ton	$15.63
Premium Wood Pellets - wholesale	$150	Ton	$9.38
Green chips	**$25**	**ton**	**$3.33**
Green chips	**$40**	**ton**	**$5.33**

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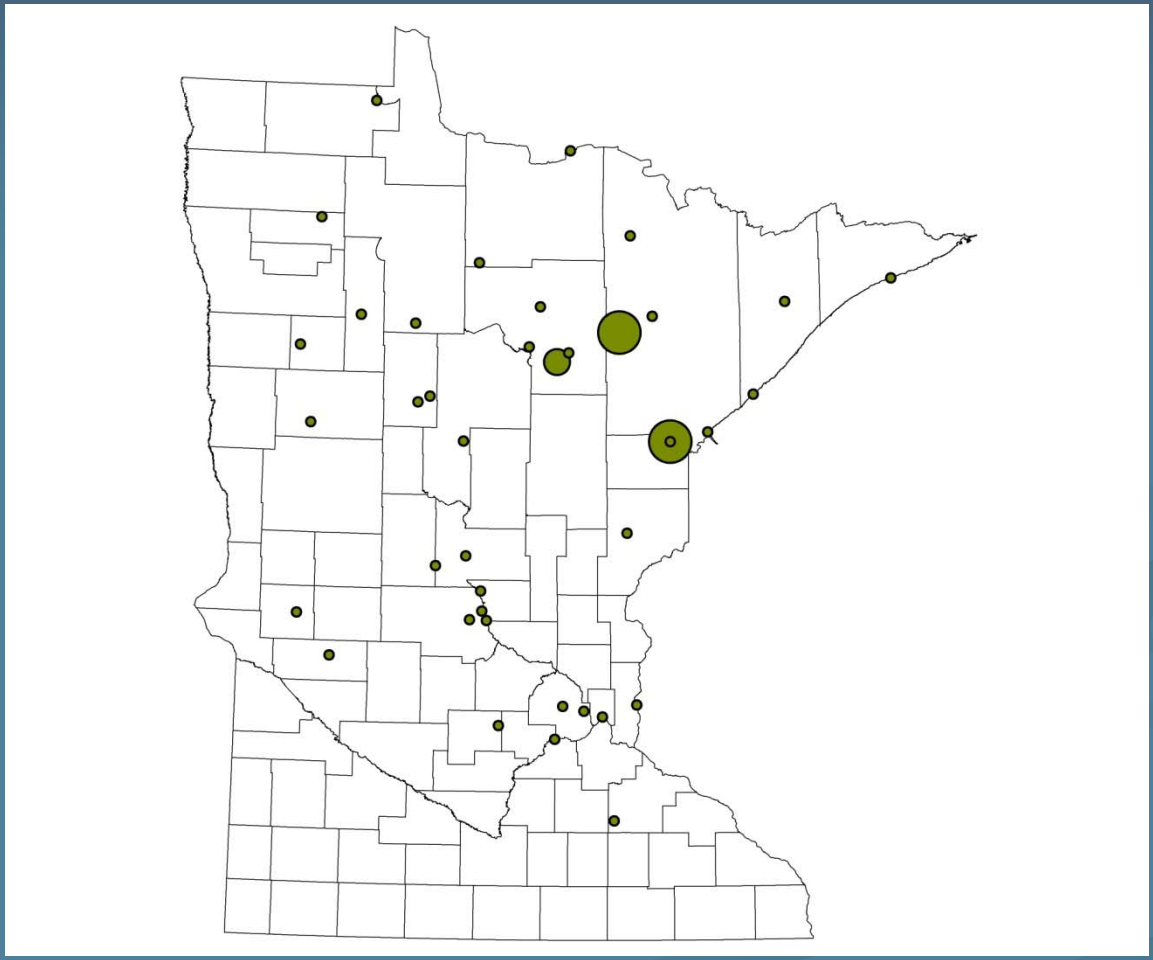
Fuel	Unit Price	Unit	$/mmbtu
Premium Wood Pellets – retail	$250	ton	$15.63
Premium Wood Pellets - wholesale	$150	Ton	$9.38
Corn, So MN –elevator price	$3.50	bu.	$9.09
Propane Midwest 07	$1.78	gallon	$19.49
Fuel Oil Residential 07	$2.59	gallon	$18.50
Fuel Oil Residential 3/09	$1.85	gallon	$13.21
Green chips	**$25**	**ton**	**$3.33**
Green chips	**$40**	**ton**	**$5.33**

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
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
CVEC –Benson	50,000 – 200,000 GT	Yes - transition to corn cobs
Source: MN DNR, Forestry Biomass User Directory		

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 woody biomass

Future Driving Factors

- Long term price trends for oil and gas
- Federal Cellulosic Fuel Standard
- State and Federal Renewable Electric Standard.
- Greenhouse Gas Regulations
  - Cap and Trade
  - EPA – Clean Air Act

Biomass – Ill-Defined Development Path

Feedstock

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

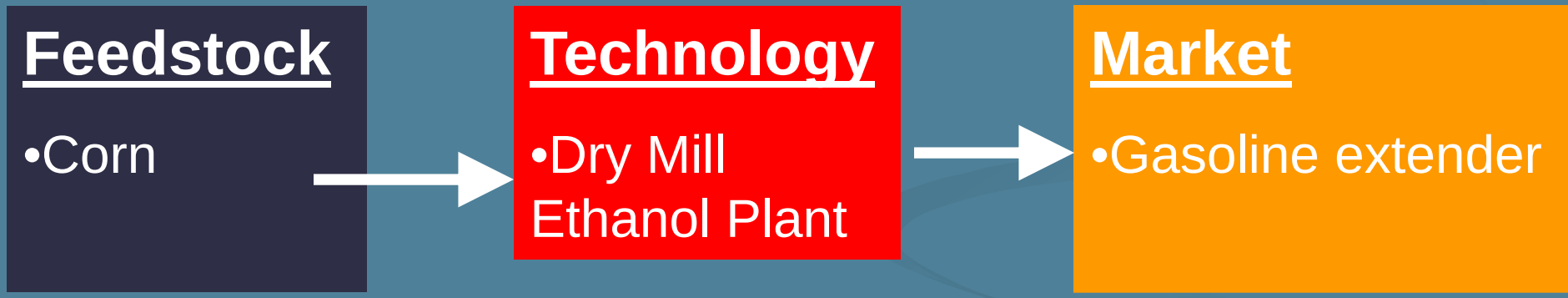
Technology

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

Market

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

Biomass – Well-Defined Development Path



Key Observations

- Biomass prices are benchmarked against coal or natural gas
- 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

Where is the market going?

- Biomass development path is not well defined – competing visions
- Better broad-based understanding of the size of the biomass supply
- Need more definition of the most strategic and beneficial use of biomass

Key Observations

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

Questions?

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