Biomass Marketing Opportunities

Mark Lindquist, Biofuels Coordinator, Minnesota Department of Natural Resources

Fueling the Future:
The Role of Woody Biomass for Energy Workshop

March 26, 2009

Ponsford

Sponsored by:
University of Minnesota Extension, White Earth Tribal College, Natural Resource Conservation Service, Soil and Water Conservation District – Becker County

www.extension.umn.edu/agroforestry
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

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

<table>
<thead>
<tr>
<th>Market</th>
<th>Scale</th>
<th>Forest Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP – Grant Rapids</td>
<td>300,000 GT</td>
<td>Yes</td>
</tr>
<tr>
<td>MP – Duluth</td>
<td>200,000 + GT</td>
<td>Yes</td>
</tr>
<tr>
<td>Laurentian Energy</td>
<td>200,000 + GT</td>
<td>Yes - Not sure status</td>
</tr>
<tr>
<td>St. Paul Dist. Energy</td>
<td>300,000 GT</td>
<td>Yes</td>
</tr>
<tr>
<td>Boise – I-Falls</td>
<td>200,000 + GT</td>
<td>Yes</td>
</tr>
<tr>
<td>SAPPI Cloquet</td>
<td>200,000 + GT</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: MN DNR, Forestry Biomass User Directory
# Other Large Woody Biomass Users

<table>
<thead>
<tr>
<th>Market</th>
<th>Scale</th>
<th>Forest Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>FibroMin Benson</td>
<td>50,000 – 200,000 GT</td>
<td>Yes</td>
</tr>
<tr>
<td>Valley Forest Products Marcell</td>
<td>50,000 – 200,000 GT</td>
<td>Yes - some</td>
</tr>
<tr>
<td>Verso</td>
<td>50,000 – 200,000 GT</td>
<td>Potentially</td>
</tr>
<tr>
<td>Chippewa Valley Ethanol Company – Benson</td>
<td>50,000 – 200,000 GT</td>
<td>Yes - seeking to transition to corn cobs</td>
</tr>
</tbody>
</table>
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 benchmark 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

- Urban Development
- Food
- Energy
- Conservation/Environmental Functions
- Recreation
- Other Industrial Materials
- Fiber - wood
Questions?
mark.lindquist@dnr.state.mn.us

507-359-6038

mndnr.gov