Stimulating Rural Economies with Forest Biomass

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In Perspective...

- How much forest biomass do we have?
- How much energy will it make?
- Should we focus on energy or rural development?
The World Demands More Energy

Biomass at present provides about six percent of Oregon’s energy needs – twice the national average, with the potential for much more. OFRI Special Report, 2007
Bonneville Dam: 1000 MW/hr
= 3.5 Billion Btu/hr
= 1 Bonneville

200 Quadrillion Btu/yr
= 2010 to 2030 Growth of World Energy Consumption
= 6700 new Bonnevilles
# Oregon Forest Lands and Harvests

<table>
<thead>
<tr>
<th>Oregon Land Ownership</th>
<th>Millions of Acres</th>
<th>Current Timber Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Land Area</td>
<td>63.0</td>
<td>3 - 4 bbf/yr</td>
</tr>
<tr>
<td>Total Forest Land</td>
<td>30.5</td>
<td></td>
</tr>
<tr>
<td>Federal</td>
<td>18.2</td>
<td>8%</td>
</tr>
<tr>
<td>Private</td>
<td>10.2</td>
<td>83%</td>
</tr>
<tr>
<td>State, other public</td>
<td>1.1</td>
<td>8%</td>
</tr>
<tr>
<td>Tribal</td>
<td>0.5</td>
<td>1%</td>
</tr>
</tbody>
</table>

60% of Oregon’s forests are restricted by competitive management policies.

Source: OFRI Forest Facts and figures 2009
# Oregon Forest Production, 2005

<table>
<thead>
<tr>
<th>Timber Harvest</th>
<th>4.2 bbf, log scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supplied...</strong></td>
<td></td>
</tr>
<tr>
<td>Softwood lumber</td>
<td>20% (US)</td>
</tr>
<tr>
<td></td>
<td>7.4 bbf, lumber scale</td>
</tr>
<tr>
<td>Industrial panels</td>
<td>14% (NA)</td>
</tr>
<tr>
<td></td>
<td>2,490 m³</td>
</tr>
<tr>
<td>Structural panels</td>
<td>10% (US)</td>
</tr>
<tr>
<td></td>
<td>3,033 mmsf, 3/8”</td>
</tr>
<tr>
<td>P&amp;P, pellets, bark, exports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>???</td>
</tr>
<tr>
<td>Energy</td>
<td>6% (OR)</td>
</tr>
<tr>
<td></td>
<td>6.5 million bdt</td>
</tr>
<tr>
<td></td>
<td>79 trillion BTU</td>
</tr>
<tr>
<td></td>
<td>= 2.7 Bonnevilles</td>
</tr>
</tbody>
</table>

Sources: OFRI, CPA, ODOE, FS
Are we the Saudi Arabia of Biomass?

1. Thin dry-land Federal forests for health and fire
   Yield = 1 million bdt /yr

2. Slash recovery from State and Private harvest sites
   Yield = 2 million bdt/yr

How Much Energy?
3 million bdt/yr = 1.2 Bonnevilles of heat
0.4 Bonnevilles of power

Source: OFRI Special Report, 2007
Comparative Cost of Heat

Assumes advanced combustion technology for all fuels

![Bar Chart]

- Propane @ 2.65/gal
- #2 Heating Oil @ 2.90/gal
- Electricity @ 0.06/kWh
- Natural Gas @ 1.20/therm
- Natural Gas @ 0.80/therm
- Natural Gas @ 0.60/therm
- Coal @ 75/ton
- Wood Pellets @ 200/ton
- Pulp Chips @ 100/bdt
- Fuel Chips @ 55/bdt
- Planer Shavings @ 143/bdt

Source: Forest Service Fuel Value Calculator
Converting Logging Slash to Fuel

Fuel Yield:
0.5 to 1.2 bdt per mbf harvested
Woody Biomass Rural Development Strategy For the Pacific Northwest

Forest-Derived Woody Biomass

- Harvest Residues
- Prescriptive Treatments

Merchant Timber

Lumber
Plywood
Veneer
Pole mills

Residuals

Hog Fuel
Boilers (existing)

Extractors

New Processing Facilities

Biomass Processing Centers (old mill sites)

Pellet & Brick Mills

Power Plants

Utility Heat & Power

Community Heat & Power

Co-products

Institutional Fuel

New Competitive Energy Markets

Liquid Fuels, Co-products

Biorefineries

Repurposed Pulp Mills

Green Field

Purpose-Grown Woody Biomass

Existing Markets

Primary Wood products

Board plants

Hog Fuel Boilers

Pulp & Paper Mills

Shavings & Sawdust

Bark & Scrap

Chips
Essential Elements

1. Bioprocessing Center
   - Receive and process forest biomass
   - Produce a family of products
     - Posts & poles
     - Fuel chips
     - Mulch
     - Compost / soil amendment
     - Heat

2. New energy markets
   - Community heat
   - Institutional heat
# The Biomass Processing Center

## Feed Stocks

- 100,000 bdt/yr (25 truckloads/day)
- Saw-able logs
- Chip-able logs
- Grind-able biomass

## Converted Mill Site

- Truck dump
- Biomass storage yard
- Rolling stock
- Grinder
- Chipper
- Drum debarker
- Screens
- Boiler
- Band Saw
- Edger
- Planer
- Power distribution
- Maintenance shop
- Warehouse
- Shipping dock

## Products

- Boards
- Pulp chips
- Fuel chips
- Hog fuel
- Mulch
- Soil amendment
- Steam

## Jobs

- In the woods
- Truckers
- In the plant
Policy Question: Power Plants or Rural Community Vitality?

- **Power Plant**
  - 50 MW (1/20 BV)
  - 30,000 truck loads/year
  - $150 - 200 million investment

- **School Heat**
  - 3 MMBtu per hr
  - <100 truck loads/year
  - < $1 million investment
Advanced Wood Combustion for Community Heating

High net energy conversion
80-85% v 33% for power

Low capital
Invest in communities not utilities

Minimal transportation “costs”

- Triple win
  - Sustainable jobs
  - Energy independence
  - Economic vitality – money stays home

Pellet fired community heating system in Sweden
Beyond Economics:
Benefits of Wood Chip Heating Systems

- Renewable
- Locally abundant
- Carbon neutral
- Fuel dollars stay local
- Stable fuel prices
- Improve forest health

This large school was converted from electric heat to a hot water system with a new stand-alone wood boiler plant.

Use Woody Biomass as a **TOOL** to Stimulate Rural Communities

- **Simultaneous Development**
  - New biomass processing facilities
  - New biomass markets

- **Focus incentives on small-scale AWC**
  - Enough fuel for 1000+ installations in Oregon
  - Community heating systems may be better markets than power plants
  - Support infrastructure to grow market

- **Increase fuel supply from forest operations**
  - Use “market pull” not “supply push”
Thank you

Questions?