Integrated Biomass Energy Campus: Creating value from woody biomass in Northeast Oregon

Lynn Jungwirth
The Watershed Center
Hayfork, California

Special thanks to Nils Christoffersen: Wallowa Resources, Enterprise, Oregon
And Dylan Kruse, Sustainable Northwest
Portland, Oregon
Before we begin

• Energy is just one piece of the puzzle
• Jobs....jobs....jobs
• Oh, and infrastructure
• Bigger picture, broader whole
• The “New Forest Economy”
• Resonance and replicability
• You can do it too...and here’s how
A few stark realities...
Public Forest Land in Eastern Oregon

- Over 60% of the 3 national forests in eastern Oregon are at risk of catastrophic wildfire (2009)
- USFS spent over $145 million in Wallowa County alone on fire suppression last 20 years.
- Impact to watershed function, endangered species recovery, recreational opportunities, and jobs.
- Restoration and biomass utilization = win-win.
Figure 12-7. Cost of biomass electricity as a function of biomass fuel cost
Figure 7-5. Forest biomass supply curves for potential conversion sites in Baker, Union and Wallowa Counties.
Table ES-1. Biomass supply quantity and weighted average biomass cost delivered to potential plant sites in Baker, Union and Wallowa Counties

<table>
<thead>
<tr>
<th>Supply type</th>
<th>Quantity (GT/year)</th>
<th>Average cost ($/GT delivered)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baker County</td>
</tr>
<tr>
<td>Biomass ethanol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural residue</td>
<td>80,009</td>
<td>35.24</td>
</tr>
<tr>
<td>Forest biomass</td>
<td>425,934</td>
<td>48.66</td>
</tr>
<tr>
<td>Mill chips</td>
<td>308,794</td>
<td>25.39</td>
</tr>
<tr>
<td>Veneer cores</td>
<td>1,458</td>
<td>12.46</td>
</tr>
<tr>
<td>Total</td>
<td>816,195</td>
<td>38.47</td>
</tr>
<tr>
<td>Biomass power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest biomass</td>
<td>425,934</td>
<td>48.66</td>
</tr>
<tr>
<td>Mill chips</td>
<td>308,794</td>
<td>25.39</td>
</tr>
<tr>
<td>Veneer cores</td>
<td>1,458</td>
<td>12.46</td>
</tr>
<tr>
<td>Total</td>
<td>736,186</td>
<td>38.22</td>
</tr>
</tbody>
</table>
NE Oregon Biomass Assessment

Blue Mountains Assessment – Across 3 Counties

- 251,000 overstocked acres on USFS in commercial management zone.
- Timber harvesting on 16,100 acres of this area could result in a positive net value – producing 9,000 GT per year over 20 years.
- Limited funding and markets to support thinning on remaining overstocked land (234,900 acres).

Table 3-3. Estimates of annual biomass generation from overstocked land

<table>
<thead>
<tr>
<th>Biomass source</th>
<th>Total overstocked area (acres)</th>
<th>Annual treated area (acres)</th>
<th>Total biomass generated (GT)</th>
<th>Annual biomass generation over a 20-year time frame (GT/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber harvest on economically viable forest land</td>
<td>16,100</td>
<td>850</td>
<td>176,316</td>
<td>8,816</td>
</tr>
<tr>
<td>Thinning overstocked forest land</td>
<td>234,900</td>
<td>11,745</td>
<td>2,349,000</td>
<td>117,450</td>
</tr>
<tr>
<td>Total</td>
<td>251,000</td>
<td>12,595</td>
<td>2,525,316</td>
<td>126,266</td>
</tr>
</tbody>
</table>
Haypen 3 stewardship contract

Biomass – (1.0”-4.9”)
23% of cut trees per acre.

Pulp fiber – (5.0”-6.9”)
33% of cut trees per acre.
Timber Harvest in Wallowa County:
Average by Decade (mbf) - Projection for 2010-2019

Industrial Forests
Private Forests
Public Lands
TOTALS
“Typical” forest supply chain

- Sawmill
- Plywood mill
- Post & pole
- Pulp-mill

Distances:
- 45 miles
- 65 miles
- 85 miles
- 125 miles

Percentage:
- 60%
- 4%
- 1%
- 35%
The solution...

Integrated Biomass Energy Campus!

“IBEC”
Integrated campus supply chain

Long saw logs directly to mill

Integrated Campus
45 miles

Short Saw & Pulp
60%

Firewood/
Densified
25%

Residuals
15%

Post & pole

Everything else to Campus

Energy
Whole-tree yarding of small logs / woody biomass for shipment to integrated campus.
Monthly Boiler Revenue and Costs

Fuel Cost - $3564 (at $18/ton)
Maintenance - $350
Labor - $1350
Electricity Sales/Value - $5040
Thermal Sales - $5000

Net Revenue - $4776

Assumes limited thermal markets: potential to increase thermal sales value and net revenue with additional thermal users.
Benefit 1: Reduced in-woods harvesting and trucking costs, and lesser site impacts

- Reduced harvest cost per acre, due to simplified and reduced in-the-woods sorting and processing

- Higher recovery rate in volume of small log and biomass materials, and less breakage

- Smaller landings result in less site disturbance
Benefit 2: Integrated and diversified merchandising and marketing

• Reduced raw material cost for Campus businesses

• Operational advantages to inventory, labor sharing, and market adaptation

• Operational synergies for marketing and delivery
**Benefit 3: Economic Diversity, Stability, and Predictability**

- Local ownership and control
- Circulating payroll and revenue dollars
- Job creation, both on site and in the woods
- Utilization of the human and infrastructure capital, and continuation of Wallowa County’s forest products heritage.
Benefit 4: Increased forest health and restoration

• Increase in acres treated for hazardous fuel reduction

• Reduced cost to tax payers associated with forest restoration

• Improved air quality, and reduced cost of weed control
Benefit 5: Additional supply to regional mills and forest products customers

• Increased tons per acre removed

• Improved harvest economics
Photo courtesy of Marcus Kauffman
County-Scale Impacts

• Employment
  • 25-30 jobs on-site, 18 in the woods (>1% of the workforce)

• Catalyst to forest management
  • Markets for 100,000 - 130,000 tons of woody biomass
  • Support management costs for 10,000 to 20,000 acres
  • $3,000,000+ in delivered log / biomass payments to landowners

• Biomass energy benefits
  • 1 MW of electricity / 5 million BTU’s of heat
  • Offset of 1 metric ton of carbon
  • Retain ~$500,000 in energy payments in local economy
It takes a village

- Passionate, and knowledgeable management

- Public-private partnerships
  - Low-cost working capital - NMTC
  - County government support

- Non-profit partnerships
  - Technical assistance
  - Maintaining the triple-bottom line
  - Equity stake
Questions?

• Nils Christoffersen, Wallowa Resources
  • nils@wallowaresources.org; (541) 426-8053

• Dylan Kruse, Sustainable Northwest
  • dkruse@sustainablenorthwest.org; (503) 221-6911

• Or visit Integrated Biomass Resources:
  • http://www.integratedbiomass.com/