Supporting a Thermal Biomass Industry:

**Wood Supply & Logistics**

Biomass Bootcamp
Catonsville, Maryland

February 23, 2015

3 Questions Always Asked:
1. How much wood is there?
2. Who will supply it?
3. When will it run out?

The real question being asked:
“What will it cost tomorrow?”
Sustainable

- 334 million tons of live trees.
- 2.5 million acres (43% of MD)
- Growing 2.6x more than removals.
- Literally grows in your backyard.
- Diverse: Urban & Rural

SUPPLIERS

Supplier network is in place and highly diverse, which is advantageous for price stability and fuel delivery reliability.

- NWWF/Landfills
- Sawmills
- Loggers
- Arborists
- Aggregators
Arborists

- Generate wood on a daily basis as a by-product of their business.
- Paid for maintaining trees, not for volume of wood produced.
- Fuel market would be valued chiefly for convenience and cost minimization.
- Time more important.
- A reasonable estimate of daily production for an arborist crew is 1.5 tons of wood chips per crew.

Natural Wood Waste Recycling Facilities

29 NWWFs
293,181 tons
(Source: MDE, 2010.)

Occasional tipping fees.

Mulch market is driver.
Loggers

- Roughly 50% of each tree felled for sawlog markets is left in woods to decay.
- Estimated 170 million tons of slash generated annually.
- Loggers with energy markets can do better silviculture.
- Fuel market augments product mix.
- Major investment of capital and operation management.
- Will seek long-term relationship.

Sawmills

- 20+ mills. 160,000 tons coarse residues
- Produce the highest quality fuel chip.
- Already have a market through paper industry.
- Will likely not be interested in severing ties with paper market entirely, but will likely be interested in diversifying their customer base.
Aggregators

- purchase raw materials from the businesses outlined above.
- further process the material.
- offset seasonal production variances.
- consistent quality fuel.
- dampen price fluctuations.
- simplicity of managing fuel deliveries.

Zones & Drivers

<table>
<thead>
<tr>
<th>Supplier Type</th>
<th>Range</th>
<th>Primary driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arborists</td>
<td>&lt;20 miles</td>
<td>(cost/convenience)</td>
</tr>
<tr>
<td>NWWF</td>
<td>+30 miles</td>
<td>(vs. mulch prices)</td>
</tr>
<tr>
<td>Loggers</td>
<td>+50 miles</td>
<td>(cost of diesel)</td>
</tr>
<tr>
<td>Sawmills</td>
<td>+75 miles</td>
<td>(vs. paper chip)</td>
</tr>
<tr>
<td>Aggregator</td>
<td>+75 miles</td>
<td>($/BTU)</td>
</tr>
</tbody>
</table>
Potential Available Volume

- NWWF 280,000 tons
- Arborists 600,000 tons
- Loggers 86,000 tons
- Sawmills 160,000 tons
- Aggregators (market response)
- Total 825,000+ tons

...enough for 10 CHPs and 65 schools

Price Stability

Oil would need to be less than $1.00/gal to have the same $/mMBtu value as wood chips at $49/ton
Conclusions

• Wood is abundant and sustainable.
• Supplier base is diverse.
• Suppliers will be different by region.
• By-products are an advantage: keeps cost low, diversifies supplier base.
• Price stability.
• Larger facilities will likely contract with an aggregator.
• Small facilities can partner with local producers.

For more information

Daniel R. Rider
Forest Stewardship & Utilization
Maryland DNR Forest Service
Tawes State Office Building
580 Taylor Avenue, E-1
Annapolis, MD 21401
(410) 260-8583 desk
(410) 440-0647 cell
DRider@dnr.state.md.us

Wood—the natural choice.