

MARYLAND DEPARTMENT OF NATURAL RESOURCES



Supporting a Thermal Biomass Industry:
Wood Supply & Logistics

Biomass Bootcamp
Catonsville, Maryland


February 23, 2015



1




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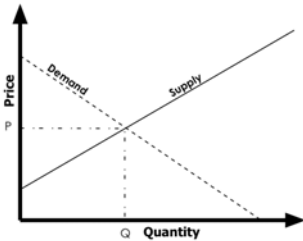


3 Questions Always Asked:


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?"



2



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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

Inventory Year	Growth (million ft³)	Removals (million ft³)	Mortality (million ft³)
1999	112	85	40
2008	180	70	45

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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


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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.



5

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Natural Wood Waste Recycling Facilities

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

Occasional tipping fees.

Mulch market is driver.



6


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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.



7


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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.



8


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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.



9

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Zones & Drivers

<u>Supplier Type</u>	<u>Range</u>	<u>Primary driver</u>
• Arborists	<20 miles	(cost/convenience)
• NWWF	+30miles	(vs. mulch prices)
• Loggers	+50 miles	(cost of diesel)
• Sawmills	+75 miles	(vs. paper chip)
• Aggregator	+75 miles	(\$/BTU)

10

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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***

11

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Price Stability

Year	Oil \$/MMBTU	Wood \$/MMBTU
86	5.0	4.0
87	5.5	4.0
88	5.0	4.0
89	6.0	4.0
90	8.0	4.0
91	7.0	4.0
92	6.5	4.0
93	6.0	4.0
94	6.0	4.0
95	6.0	4.0
96	7.5	4.0
97	7.0	4.0
98	5.0	4.0
99	7.5	4.0
2000	8.0	4.0
2001	10.0	4.0
2002	8.5	4.0
2003	9.0	4.5
2004	13.0	5.0
2005	18.0	6.0
2006	23.0	7.0
2007	28.0	8.0

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

12

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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.

13

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For more information



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Wood – the natural choice.

14

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