

Advanced Hardwood Biofuels Northwest ***Laying the foundation for a PNW biofuels industry***

Pulp & Paper Industry ***Raw Material Acquisition & Transportation Logistics***

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Oil Refineries & Pulp Mills

Similar Yet Different

- *Transportation Systems*
- *Scale*
- *Liquids vs Solids*



Pulp Mill Demand

Typical Daily Chip Usage

150 truckloads/day (2,250 bdt)

Working Inventory

750-1,125 truckloads

(11,250-16,875 bdt)



Pulp Mill Furnish

Systems & Product Determine Furnish

- *Softwood Chips*
- *Hardwood Chips*
- *Sawdust*
- *Recycled Paper*



Residual Chips & Sawdust

Sawmills
Veneer Mills



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Whole Log Chips

- *3rd Party Owned Whole Log Chipping Facility*
- *Pulp Mill Located Wood Yards*
- *Pulp Mill Owned Remote Whole Log Chipping Facility*



Why multiple sourcing strategies?

- *Fiber Security*
- *Cost*
- *Inventory Management*
 - *Just In Time*
- *Logistics*



Metrics

- *Bone Dry Ton-Measure of Purchase*
 - 50% of green weight
- *Green Ton/Truckload*
 - 28-31 green ton/truck load
- *Green Ton/Barge-River*
 - 1,200-3,000 green ton/barge load
- *Green Ton/Barge-Ocean*
 - 3,000-6,000 green ton/barge load
- *Green Ton/Rail Car*
 - 150-200 green ton/car load



Location

Pulp Mill/Raw Material Source

- *Water Access*
 - *Ocean*
 - *River*
- *Rail*
- *Truck*



Mill Site/Sourcing Material Handling Infrastructure



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Available Transportation Systems



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Aggregation

Logs

- *Whole Log Chip Yards*
 - *Pulp Mill Owned*
 - *3rd Party Ownership*



Chips

- *Pulp Mill Owned Chip Yards*
- *3rd Party Owned Chip Yards*
- *Reloads*



Sourcing Model

How are you going to execute!

Annual Demand

- *On-Site Storage Capacity*
- *Buffer Volume*

Sources

- *Residual*
 - *Base Volume*
- *Whole Log*
 - *Surge Volume*
 - *Pulp Mill Owned*
 - *3rd Party Ownership*



Transportation Model

Systems

- *Water*
 - *Barge availability & schedule*
 - *Contract terms*
- *Rail*
 - *Car availability & schedule*
 - *Contract terms*
- *Truck*
 - *Availability*
 - *Contract terms*



Economic Modeling

Costing

- *Reload*
 - *\$6-\$8/bdt*
- *Barge*
 - *\$11-\$13/bdt*
- *Rail*
- *Truck*
 - *\$100/Hr*



Optimization!

Opportunities

- *Back haul opportunities for barge/truck*
- *Opportunistic buying*
- *Increasing distance-Increasing competitiveness*
 - *Ocean barge*
 - *River barge*
 - *Rail*
 - *Truck*



Execution

- *Maintain Multiple Suppliers*
- *Negotiate and Execute Supply Agreements*
- *Transportation*
 - *Pulp Mill Buyer Arranges Transportation*
 - *Supplier Arranges Transportation*
- *Review on Quarterly Basis*



Changing Environment

- *Pulp Mill demands go up or down*
- *Suppliers curtail or go out of business*
- *Fuel costs increase/decrease*
- *Seasonal impacts*
 - *Spring breakup*
 - *Lock closure*
- *Competitors Influence*



Conclusion

- *Pulp & Paper Industry is well established with installed systems of sourcing raw material furnish*
- *Bio-refineries will be of similar scale and use similar if not the same furnish*
- *Transportation systems are in place and under utilized with the correct equipment to transport both P&P and Bio-refinery furnish*
- *Costs of transport and storage will be the same for P&P & Bio-refinery furnish*
- *Economics of the Bio-refineries will determine the ability to access furnish using established transportation and storage facilities*



Thank you

Questions?



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