Ensuring Forest Sustainability in the Development of Wood Biofuels and Bioenergy in the Pacific Coast Region

Wood Biomass Energy Status and Options for Southeast Alaska

Sealaska Corporation
February 25, 2010
1. Introduction, Takeaways

2. Raw Material Supply

3. Viking Lumber Sealaska Investigation

4. Create Southeast Pellet Demand
   a) Urban centers
   b) Rural villages
Introduction

- Sealaska Corporation
- Region of Southeast Alaska
  - 3 - 5 urban communities - hydropower
  - > 25 rural communities – diesel generators
  - Great tidal/hydropower grid potential; great cost

- Overview of our work with multiple parties
- Key takeaways
  1. Significant potential to help villages and Southeast region
  2. Cornerstone to the Obama Administration’s renewable energy policy in our region
Southeast Alaska Land Base

- Island Archipelago
- Home of the Tongass National Forest

<table>
<thead>
<tr>
<th>Land Owner</th>
<th>Total Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glacier Bay National Park</td>
<td>3,283,000</td>
<td>94.6</td>
</tr>
<tr>
<td>Tongass National Forest</td>
<td>16,800,000</td>
<td>94.6</td>
</tr>
<tr>
<td>Village/Urban Corporations</td>
<td>280,000</td>
<td>1.3</td>
</tr>
<tr>
<td>Sealaska Corporation</td>
<td>290,000</td>
<td>1.4</td>
</tr>
<tr>
<td>State of Alaska</td>
<td>296,000</td>
<td>1.4</td>
</tr>
<tr>
<td>Mental Health Trust</td>
<td>214,000</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Sources of Wood Residue Energy Product Raw Material Supply

- Silviculture treatments
  - Precommercial Thinning (PCT)
  - Commercial Thinning (CT)
- Improved timber harvest log utilization
- Wood residues from lumber manufacturing
Conversion Factors

• Spruce
  – 9 green tons per mbf old growth
  – 9 gT/mbf

• Hemlock
  – 12 green tons per mbf old growth
  – 12 gT/mbf

• 2 gTs wood = 1 ton pellets
  (wood is ~ 50% water)
Phase I Analysis

- Viking Lumber/Sealaska joint project
- May 2009

- Viking Lumber produces
  - 50,000 green tons (gT) residual chips - pulp
  - 6,000 gT bark – hog fuel
  - 14,000 gT sawdust – hog fuel
  - 20,000 gT utility logs – pulp

- Conclusion = sufficient supply for a 10,000 ton to 25,000 ton pellet mill
Biomass Harvest

- 430,000 acres clear cut on Tongass National Forest (TNF)
- 160,000 acres on TNF precommercial thinned (PCT)
- 270,000 acres total on TNF no PCT
- 244,000 acres are suitable on TNF for harvest under today’s Tongass Land Management Plan (TLMP) standards
- Restoration management – could be done on unsuitable acres
- Commercial Thinning – all acres
## Southeast Alaska Land Base

<table>
<thead>
<tr>
<th>Land Owner</th>
<th>Total Acres</th>
<th>Subject Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glacier Bay National Park</td>
<td>3,283,000</td>
<td>0</td>
</tr>
<tr>
<td>Tongass National Forest</td>
<td>16,800,000</td>
<td>244,000</td>
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<tr>
<td>Village/Urban Corporations</td>
<td>280,000</td>
<td><strong>196,000</strong></td>
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<tr>
<td>Sealaska Corporation</td>
<td>290,000</td>
<td>81,000</td>
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<tr>
<td>State of Alaska</td>
<td>296,000</td>
<td>21,245</td>
</tr>
<tr>
<td>Mental Health Trust</td>
<td>214,000</td>
<td>1,160</td>
</tr>
</tbody>
</table>

Subject acres are those that have been clear cut by conventional harvest.
Prince of Wales Island

• CROP Analysis
  – TNF new roadside clearing program = **57,000 gT** biomass per year
  – TNF projected harvest of small logs (12” and less) + defective logs = **62,000 gT** per year

• Terra Verde sustained yield analysis
  – all land owners
  – south half of the Tongass
  – Just commercial thin – (CT)
    • **84,400 gT/yr** for years 2010 to 2019
    • **387,600 gT/yr** for years 2020 to 2040
What About Demand?

- Interviewed 82 stores in Alaska
- 32 sell pellets (40 # bags)
- All Alaska TOTAL demand = 2,359 tons
- Southeast Alaska demand = 190 tons
- Pellet manufactures are from
  - Oregon
  - Idaho
  - Washington
  - Missouri
  - British Columbia
Conclusions

1. Raw Material Supply = no problem
2. Manufacturing technology = no problem
3. Southeast manufacturing has a shipping advantage in Southeast Alaska over other manufacturers
4. Southeast not likely to compete to rest of Alaska

5. **LACK OF DEMAND IN SOUTHEAST ALASKA IS THE PROBLEM!**
Southeast Aggregated Demand

- Electric usage as indicator for pellet demand
- Identified 12 districts throughout Southeast Alaska
- Public facility buildings within 1,000 feet of each other
  - Harbor offices
  - Police offices
  - City Hall
  - Aquatic center
  - Schools
  - USFS
  - USCG
  - Medical
  - State buildings
- 6 green lbs = 1 kWh

<table>
<thead>
<tr>
<th>Community</th>
<th>Aggregated kWh/yr</th>
<th>gT/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yakutat</td>
<td>68,724</td>
<td>206</td>
</tr>
<tr>
<td>Juneau USFS</td>
<td>352,512</td>
<td>976</td>
</tr>
<tr>
<td>Hoonah</td>
<td>41,472</td>
<td>124</td>
</tr>
<tr>
<td>Sitka</td>
<td>1,794,040</td>
<td>5,385</td>
</tr>
<tr>
<td>Petersburg</td>
<td>?</td>
<td>?</td>
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<tr>
<td>Wrangell</td>
<td>663,840</td>
<td>1,992</td>
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<td>Thorne Bay</td>
<td>102,750</td>
<td>308</td>
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<tr>
<td>Craig</td>
<td>?</td>
<td>?</td>
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<td>Klawock</td>
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<tr>
<td>Ketchikan USCG</td>
<td>4,081,080</td>
<td>12,243</td>
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<tr>
<td>Ketchikan</td>
<td>972,120</td>
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<tr>
<td>Ketchikan USFS</td>
<td>254,000</td>
<td>762</td>
</tr>
<tr>
<td><strong>Total (gT/yr)</strong></td>
<td><strong>25,116</strong></td>
<td></td>
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</table>
Strategy

• Create Southeast Alaska commercial/industrial urban and rural anchor wood pellet demand

• Create SE Alaska urban and rural residential wood pellet demand

• Conducive for Southeast Alaska wood pellet producer
SIGNATURE PROJECT

Convert Sealaska Plaza to Wood Pellet Heat
Factbox:

- Approx. 350 employees
- Approx. Turnover of $100,000,000 in 2007
- Over 30 years of experience
- More than 15,000 systems running worldwide
The PYROT®
from 512,000 BTU to 1,800,000 BTU
(Sealaska is 750,000 BTU)
PYROT® - The Rotary Combustion
Revolutionary Biomass Combustion

1) Feed auger and Grate
2) De-ashing system
3) Ignition fan
4) Rotary combustion chamber
5) Triple pass heat exchanger
6) Induced draft fan
DISTRICT HEATING

- CENTRAL BOILER HOUSE
- DISTRIBUTION GRID UNDERGROUND
- CUSTOMERS PAY FOR ENERGY
- IDEALLY SUITED FOR GROUPS OF LARGER INSTALLATIONS
The PYROT®- Rotating Fire System is heating apartments, Hannover, Germany
Pyrot 400 kw
Soccer Field Norway

• Fuel: Pellets
Island Hothouse Inc.
in Ladysmith BC - Canada

PYRTEC 1000
(they are tomatoes!)
Rural Village Opportunities

- 50 cents per kWh
- $3 - $6/gallon diesel
- Local small sawmill
- Create heat and electricity
- Village of Hoonah
- Pt Sophia tourist facility
- Greenhouse

BioMax Unit
The End