Biomass Solutions for Southeast: Creating the Demand and the Infrastructure for Commoditization of Wood

Nathan Soboleff: Renewable Energy Program Manager, Haa Aaní, LLC
Economies of Scale

- Boiler sales, installation, and service
- Delivery infrastructure
- Anchor demand loads
- Production
- Lowest prices
- Common place
## Biomass

<table>
<thead>
<tr>
<th></th>
<th>Moisture Content (in %)</th>
<th>Thermal Value Absolute (in BTU/lb)</th>
<th>Transport Density (in lb/ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Pellets</td>
<td>5</td>
<td>7,737</td>
<td>40.5</td>
</tr>
<tr>
<td>Forest wood chips, dry</td>
<td>30</td>
<td>5,416</td>
<td>14.6</td>
</tr>
<tr>
<td>Forest wood chips, wet</td>
<td>60</td>
<td>2,600</td>
<td>19.3</td>
</tr>
<tr>
<td>Heating Oil</td>
<td>-</td>
<td>18,260</td>
<td>52.9</td>
</tr>
</tbody>
</table>
Manufacturing Residues
45.5 mmbf ~ 53,000 Bone Dry Tons/Yr
Silviculture Residues (18,000 Bone Dry Ton/Yr)

- Unthinned
- Thinned
Let's Capture our Dollars

- 71,000 BDT currently available and unused
- Displaces 7,810,000 gallons of heating oil annually
- $31,240,000 @ $4.00/gal leaving our the Southeast Alaska region
Harvest Residuals (currently subject to pulp market)
Biomass for Heat

- Proven track record
- Commercially available to serve all building sizes
- Will lower heating costs (and stable)
- Cost effective to install
- User friendly

- Has not come to Alaska till now
- Users slow to adapt
- Early adapters are spread out
- Users do not see their supply
- All aspects of the industry are not in place for each community
Biomass for Electricity

- High Prices in some communities over $0.65 /kwh
- Solutions exist
- not on a personal use scale (big)
- Big appetities for wood
- Not the highest use of our wood
- Needs to be coupled to a waste heat user
- Not viable with out inter-ties
Southeast Alaska Projects

- USCG Sitka
- USFS Tongass Discovery Center
- GSA KTN Federal Building
- USCG KTN to electric (pellets later)
- USCG Studying Kodiak (10,00 TPY!)

- JNU NOAA USCG ADF&G Joint Use
- Kake School and City Bldgs
- Yakutat Kwann
- T&H Hope Building
- SEARHC
- T&H HUD JNU
- PNW Research Station Juneau*
Pellets = Green Jobs

- No fuel spills
- Pellet storage cheaper than oil tanks
- Industry does not compete with existing oil based companies
- Better utilization of our forest resource
- Add jobs to mills
Commodity Pellets

- 40 lb bags by the pallet (50 bags per pallet)
- By the super sack (US Ton or Metric Tonne)
- Bulk deliveries
- Vending stations
- Distribution Silos
- Individual silos
Commodity Firewood $150 a cord (or less?)

- Palletized cordwood deliveries (possible containerized deliveries)
- Circular Saw Firewood Processor 7+ cords/hr
- Bobcat or like Skid Steer
- Flatbed delivery truck with self-loading forklift
- Extra – facility with covered storage for drying
- Wood source - negotiated from existing operational areas
The Sealaska Plaza Wood Pellet Boiler
Project Timeline

- Fall 2009 Emerging Energy Technology Grant
- Dec 4, 2009 Official News Release
- May 2010 Bulk Delivery Truck Arrives
- October 8, 2010 Boiler Set in Place
- November 19, 2010 Boiler Startup
Before
Sealaska Plaza’s Wood Pellet Boiler:
Viessmann Pyrot 220Kw output
Annual consumption: 280 tons of pellets per year
Wood pellets and ash are moved automatically by screw augers
No visible emissions from the Sealaska Plaza (cleaner than natural gas)
Sealaska Plaza: Proven

- 3,500 hours of successful operation. Since boiler startup November 19, 2010 our boiler has consumed over
- 120 tons of wood pellets which are equivalent to 13,200 gallons of heating oil
- At current prices of heating oil, the Sealaska wood pellet boiler has saved the corporation +$19,044 in heating costs in 5 months
Wood pellets arrive by barge in shipping containers
Wood pellets trans-loaded into delivery truck
Auger delivery truck delivering 20 tons of wood pellets to the Sealaska Plaza silo
Wood Pellet Silo Tank Farm

- Eliminates super sacks, shipping pallets, trans-loading
- Reduced handling
- Reduces delivery costs
- Makes customers “feel more secure”
- Allows our delivery trucks to operate on their own time
Containerized Installation

Nazko School B.C.
Sealaska Heritage Institute Center
Operational Costs

- Delivered wood pellets $300/ton = $2.52/gallon
- $4.17/gallon pellets 40% less
- <10 min/week
- Two 3 hr shut downs a year (~$500 ea)
- Saved over $20,000 this winter and the savings keep coming
Northwest Territory Summary:

425,000 sq/mi – 35,000 residents

(vs Alaska 586,000 sq/mi, +/- 600,000 residents)

• Approx. 15 commercial biomass boiler installations

• Many residential wood pellet stoves (up to 50% fuel savings vs oil/propane).

12,000 tons/yr of pellet consumption, for a population base of 35,000 in just 4 years!
The first wood pellet boilers for a Territorial Government building were installed at the North Slave Correctional Centre in 2006. Arctic Green Energy (AGE) owns and installed the boiler, and sells heat to the Government of the NWTC (GNWT). Thanks to the success of that project, the GNWT is now investing in its own wood pellet boilers for other facilities, where economically viable.

Since the cost to transport wood pellets is higher than that of other fuels, the most viable locations for wood pellet boilers are those closest to the source of wood pellets. Currently, that source is in La Cret in northern Alberta. Therefore, the GNWT is investing in wood pellet boilers in communities on the road network in the South and North Slave regions.
Look around your town

- JNU Federal Building 150,000 gal
- State Office Building 125,000 gal
- Juneau Bartlett Hospital gets a fuel delivery every day!
- Big Apartment complexes
- State leased buildings
- Juneau School district over 1,000,000 gal
The More You Burn…

- The more you save
- The faster you will pay for your system
- Get away from feasibility studies
- Make change-overs common place
- Can you keep your existing system?
Contact:
questions
boiler room tours

Nathan Soboleff
Renewable Energy Program Manager, Haa Aaní, LLC
Nathan.soboleff@sealaska.com
(907) 586-9278