Biomass - Reducing the Cost of Heat in Alaska

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Alaska Energy Authority
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Agenda

- Heating Costs in Alaska
- Technology options
  - Biomass
    - Cordwood
    - Chips
    - Pellets
  - District Heating Infrastructure
  - Other Heating Technologies
  - Combined Heat and Power
- Economic Development Opportunities
- Regional Planning
- EPA Biomass Boiler Emissions Rules
The Burden of Heating in Alaska

Break-down of Energy Costs
- Heating
- Transportation
- Electric (with PCE)

<table>
<thead>
<tr>
<th>Location</th>
<th>Heating</th>
<th>Transportation</th>
<th>Electric (with PCE)</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchorage</td>
<td>17%</td>
<td>70%</td>
<td>13%</td>
<td>$8,182</td>
</tr>
<tr>
<td>Ambler</td>
<td>14%</td>
<td>27%</td>
<td>68%</td>
<td>$7,685</td>
</tr>
<tr>
<td>Bethel</td>
<td>27%</td>
<td>14%</td>
<td>59%</td>
<td>$13,011</td>
</tr>
<tr>
<td>Fairbanks</td>
<td>37%</td>
<td>20%</td>
<td>43%</td>
<td>$9,461</td>
</tr>
<tr>
<td>Southeast - Hydro</td>
<td>43%</td>
<td>25%</td>
<td>32%</td>
<td>$5,368</td>
</tr>
</tbody>
</table>

Source: Alaska Energy Authority Internal Analysis using 2008 Energy Costs
Cordwood Boilers
Gulkana Community Wood-Fired Boiler

RE Fund Grant $500,000
Total Project Cost $500,000
Est Fuel Displaced/yr 14,600 gal
2010 (Oct-Dec) ~3,000 gal
Chip Boilers

Tok School Wood-Fired Boiler
Tok School Wood-Fired Boiler

RE Fund Grant $3,245,349
Total Project Cost $3,805,349
Est Fuel Displaced/yr 50,400 gal
Pellet Boilers

Sealaska Plaza

Total Project Cost $1,400,000
(efficiency upgrade, transportation)

Est Fuel Displaced/yr
35,000 gal

Actual (Nov 19 – Dec 2010)
5000 gal
District Heating Systems

- **Basic Infrastructure that provides heat to multiple buildings**
  - Heating Source (diesel generator, biomass, etc.)
  - Heat Exchangers
  - Circulating pumps
  - Underground piping
  - Controls and Meters

- **Flexible**
  - Can provide heat from multiple, different sources
  - Power systems can be added in the future
  - Can be expanded to grow with a community
Other Heating Options

- Diesel Generator Heat Recovery Systems
- Electric Boilers
  - Excess hydroelectric or wind power to heat community buildings or district heating systems
  - Aides in grid stabilization
- Ground Source Heat Pumps
- Industrial Heat Recovery
  - North Pole Refinery condenser heat is used to heat turbine building
Combined Heat and Power

- Production of electricity and useful thermal energy from a single source of energy
- Small scale biomass technology (less than 2 MW) is emerging
- Demonstration Projects
  - Renewable Energy Fund
    - Cordova (Diesel)
    - Unalaska (Diesel)
    - Kotzebue (Diesel)
    - Chena Power (Biomass)
  - Hoonah Micro-Scale
- Continuing to monitor technology development
Economic Development

- **Lowers energy costs, maintains cash flow within a community, and increases independence**

- **Jobs Creation**
  - Construction
  - Operation/Maintenance
  - Harvest/Thinning/Resource Management

- **Business Opportunities**
  - Equipment Suppliers
  - Construction/Maintenance Services
  - Heat Utilities
  - Wood Pellet Manufacture

- **Forest Products Industry Support**
  - Use for sawmill waste
  - Use for forest health/thinning residue
Next Steps – Regional Planning

- Continue to conduct outreach to educate communities on heating opportunities
- **Incorporate Biomass and other heating options into the SEIRP**
- Initiate additional feasibility studies for biomass and diesel heat recovery
- Pursue partnerships and funding opportunities for design/construction of viable projects
A Quick Word on EPA Boiler Emission Rules

- June 2010 – EPA released biomass, coal, and oil boiler emission rules for comment
  › Annual stack testing for all boilers.
  › Emissions limits for new boilers
  › EPA received over 4000 comments
- Dec 2010 – EPA requested an additional year to rework standards based on comments
  › Courts allowed 30 days
  › Revised rules released Feb 2011
- New Rules – Impact to Biomass in Alaska
  › Small Boilers – boiler tune-up every 2 years
  › Future opportunity for more input
Thank you

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Biomass Strategy

- Continue education and outreach for biomass heating opportunities
- With State Forestry, prioritize and conduct resource assessments to assure sustainable harvest
- “Fill the Pipeline”
  - 3-year plan to conduct feasibility studies including technology and resource assessments
  - Collaboration with Regional, State, and Federal Agencies
  - Utilize state funding as matching for Federal Grants for design/construction
- Support rapid deployment of heating systems in rural Alaska
  - Garn in a Box
- Support Pellet Manufacturing in Alaska