Opportunities to Use Woody Biomass for Energy and Other Biobased Products

Sabina Dhungana (Biomass Forester)
October 20th, 2011
Wood Resources and Waste

• Wood Waste
  – Wood processing by products
    • Primary
    • Secondary
  – Community tree waste
    • Municipal Arborist
    • Commercial Arborist
    • Electric utility tree waste

• Wood residues from Forest Management
833 Entities Surveyed

- 716 Wood waste supply sources
  - 410 individual businesses
  - 105 counties
  - 201 cities
- 117 Organizations and individuals
- 50% response rate
• 262,000 green tons

– 69%, 182 thousand tons currently disposed through burn sites and landfills

KANSAS FOREST SERVICE
WOOD WASTE SUPPLY ASSESSMENT

Green Tons
- Counties < 500
- Counties 500 - 1,000
- Counties 1,000-2,000
- Counties 2,000-3,000
- Counties > 8,000

Projection: NAD 1983
By: Ryan McFarland
August 2009

Camas Creek Enterprises Inc.
Natural Resource Solutions

KANSAS STATE UNIVERSITY
Research and Extension
KANSAS FOREST SERVICE
WOOD WASTE SUPPLY ASSESSMENT

Supply Source
- City Buffered
- Suppliers in Buffer Zone
- Other Suppliers
- Interstate

Projection: GCS NAD 1983
By: Ryan McHugh
September 2008

Camas Creek Enterprises Inc.
Natural Resource Solutions

KANSAS FOREST SERVICE
Kansas State University
Research and Extension
## Suppliers for Different Cities

<table>
<thead>
<tr>
<th>CITY</th>
<th>TOTAL WOOD WASTE</th>
<th>POTENTIALLY AVAILABLE</th>
<th>SUPPLIER COUNT</th>
<th>DISPOSAL SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>KANSAS CITY</td>
<td>79,222</td>
<td>70,785</td>
<td>162</td>
<td>11</td>
</tr>
<tr>
<td>WICHITA</td>
<td>70,594</td>
<td>62,534</td>
<td>129</td>
<td>10</td>
</tr>
<tr>
<td>TOPEKA</td>
<td>39,624</td>
<td>29,388</td>
<td>137</td>
<td>14</td>
</tr>
<tr>
<td>PITTSBURG</td>
<td>29,783</td>
<td>16,177</td>
<td>39</td>
<td>15</td>
</tr>
<tr>
<td>SALINA</td>
<td>10,948</td>
<td>8,435</td>
<td>57</td>
<td>11</td>
</tr>
<tr>
<td>HAYS</td>
<td>7,223</td>
<td>6,086</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>GARDEN CITY</td>
<td>4,078</td>
<td>3,351</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>
Kansas Boiler Survey

- 400 boilers more than 40 years old
- 24 – 7 operations
- Engineering assessments to date show cost saving ranging from 45% when converted from natural gas to 75% when converted from fuel oil.
## Wood energy projects and savings

<table>
<thead>
<tr>
<th>Facility</th>
<th>Square Footage</th>
<th>Annual Wood Consumption Green Tons</th>
<th>Estimated Annual Energy Cost Savings</th>
<th>Date Operational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derby, MT Public Schools</td>
<td>82,000</td>
<td>750</td>
<td>$90,000</td>
<td>November 2003</td>
</tr>
<tr>
<td>Ely, NV Public Schools</td>
<td>36,400</td>
<td>300</td>
<td>$35,000</td>
<td>February 2005</td>
</tr>
<tr>
<td>Council, ID Public Schools</td>
<td>60,000</td>
<td>300</td>
<td>$59,000</td>
<td>September 2005</td>
</tr>
<tr>
<td>Thompson Falls, MT Public Schools</td>
<td>60,500</td>
<td>400</td>
<td>$60,000</td>
<td>October 2005</td>
</tr>
<tr>
<td>University MT, Western Campus</td>
<td>471,000</td>
<td>3800</td>
<td>$118,000</td>
<td>February 2007</td>
</tr>
<tr>
<td>Townsend, MT Elementary and High Schools</td>
<td>120,000</td>
<td>170 (Wood Pellets)</td>
<td>$19,000</td>
<td>March 2007</td>
</tr>
<tr>
<td>Deer Lodge, MT Elementary</td>
<td>38,000</td>
<td>730</td>
<td>$35,500</td>
<td>October 2008</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6280</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Wood energy projects and savings

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</thead>
<tbody>
<tr>
<td>Mountain View-Birch Tree Liberty Jr/Sr High School</td>
<td>93,330</td>
<td>260</td>
<td>$32,836</td>
</tr>
<tr>
<td>Perry County School Main Campus</td>
<td>152,631</td>
<td>435</td>
<td>$30,109</td>
</tr>
<tr>
<td>Eminence R-I Elementary School</td>
<td>17,966</td>
<td>30</td>
<td>$22,000</td>
</tr>
<tr>
<td>Gainesville High School</td>
<td>76,370</td>
<td>243</td>
<td>$37,000.</td>
</tr>
<tr>
<td>Ellington Schools; Shannon County, Missouri</td>
<td>95,982</td>
<td>223</td>
<td>$30,000.</td>
</tr>
<tr>
<td>Steelville Elementary and Middle School;</td>
<td>125,200</td>
<td>283</td>
<td>$41,000.</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,474</strong></td>
<td></td>
<td><strong>$151,945</strong></td>
</tr>
</tbody>
</table>
What kind of system ???
We are working with:

- Winfield schools, Southwestern College, Morris County, Riley County Schools (Good Potential Project)
- Hayden High School in Topeka, and
- East Kansas Agri – Energy (Good Potential Project)
  - Low Carbon Fuel Standards
  - Chanute, Ks Wood Pyrolysis
  - Cedar Oil Extraction. (Meeting is on Saturday).
KFS efforts

• Prefeasibility technical assistance
• Arrange tours of operating systems
• System manufacturer references
• Engineering service provider references
• Air permitting references
• Funding references
• Case studies
• Information and education
Prefeasibility report includes:

- A description of heating system
- An estimate of annual fuel cost
- Design of one potential option for a wood utilization project.
- Recommended biomass energy system sizing, fuel storage sizing, and interconnection and/or modification to the schools internal heating distribution system;
- An estimate cost saving from by wood utilization
- A site plan showing the wood utilization system, fuel storage, and any distribution
- piping
- Estimated cost for project installment.
Thank you very much
Any questions?