Heating Saint Paul with Wood

Michael Burns & Jeff Guillemette, Ever-Green Energy

Fueling the Future:
The Role of Woody and Agriculture Biomass for Energy Workshop

March 19, 2009
Morris

Sponsored by:
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and

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EVER-GREEN ENERGY™
Saint Paul’s community energy system

Based on:

- Locally-derived renewable fuels
- Combined heat and power
Saint Paul’s community energy system

Most energy from urban wood residuals:

• 1000 tons per day

• Created a new industry for collecting and processing wood waste into fuel
  – More than $10 million into local economy from wood operations
  – Even more indirect benefits
St Paul’s community energy system

- Heats 80% of downtown Saint Paul’s buildings
- 25 MW of electricity; 65 MW thermal energy
- Primary fuel is renewable, clean, urban wood and forest residuals
- Combined heat and power - double the efficiency of conventional electricity-only power plants
- CO₂ reduced by 280,000 tons per year
What is combined heat & power?

Biomass-Fueled Combined Heat and Power

- Urban wood waste
- Processed, stored & transported
- Burned to make steam
- Steam turbine power
- Distribution to power grid
- Local customers
- "Waste" energy heats downtown
- Water returned
Energy efficiency of CHP

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<th>FUEL</th>
<th>ELECTRICITY</th>
<th>WASTE</th>
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<td>33%</td>
<td>67%</td>
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<tr>
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<td>30%</td>
<td>45%</td>
<td>25%</td>
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Fuel diversification (2009)

Before and after wood-fired CHP project…

Before

After

- Biomass
- Oil
- Gas
- Coal
Where does the wood come from?

Tree Waste:
- Municipal parks and forestry operations
- DNR projects
- Land clearers
- Tree removal contractors
- Storm damage
- Diseased trees
- Forest residuals
Fuel Characteristics

- Primarily tree residuals; some clean pallet or construction wood
- High fuel quality standards driven by site logistics and permitted fuel
- All fuel is procured and processed by our affiliate, Environmental Wood Supply
Fuel Statistics

• 280,000 tons per year consumed
• Sized to less than 4 inches
• Typical mixture includes mulch and chips to improve handling
• 25 to 50 percent moisture; long-term average is 35 percent
Thank You!

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