Outline

• About Wisewood, Inc.
• Biomass Heating Basics
• Why Biomass Heat
• What Makes a Project Viable?
• Example Projects
About Wisewood

- **Design/Build**: Biomass energy installations including complete system engineering, procurement and construction (EPC)
- **Technical Consulting**: Feasibility studies, financial modelling, and project management
- **Project Development**: Thermal energy supply from investor and community-owned thermal energy generation assets
- **Territory**: OR, WA, CA, ID, AK, MT
Biomass Heating Basics
What is Biomass?

**Forestry residuals and wood waste**: wood from tree trunks and branches, chipped

**Mill residuals**: a mixture of untreated and treated wood in form of shavings, chips, sawdust

**Compressed wood, pellets, bricks**: untreated wood with limited bark content, compressed by machine

**Construction waste**: untreated wood that has been used in commerce prior to its energetic utilization

**Ag fuels**: straw, grasses, corn stover, purpose-grown feedstocks

Modified from Viessmann Manufacturing
# Biomass Heating Technologies

<table>
<thead>
<tr>
<th>Technology</th>
<th>Pellet boiler</th>
<th>Wood chip boiler</th>
<th>District heating</th>
<th>CHP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel</strong></td>
<td>Pellets and/or clean chips</td>
<td>Hog fuel wood chips</td>
<td>Hog fuel wood chips</td>
<td>Hog fuel wood chips</td>
</tr>
<tr>
<td><strong>Typical Installed Capacity</strong></td>
<td>&lt; 3 MMBtu</td>
<td>1.5 – 10 MMBtu</td>
<td>2 – 10 MMBtu</td>
<td>&gt;10 MMBtu</td>
</tr>
<tr>
<td><strong>User</strong></td>
<td>Single-family homes, light commercial, institutional</td>
<td>Commercial, institutional, and light industrial</td>
<td>Commercial, institutional, municipal, industrial</td>
<td>Industrial and district heating</td>
</tr>
</tbody>
</table>

Adapted from O.Ö. Energiesparverband
Why Biomass Heating
Fossil Fuel Model

Community Institutions $200K

Oil Heat Inc. $185K $15K

LOCAL ECONOMY

GLOBAL ECONOMY

- Services
- Maintenance
- Taxes
Community Energy Model

Community Institutions: $200K
Biomass Community Energy: $140K
LOCAL ECONOMY: $60K

Ongoing:
- Services
- Taxes
- Site lease
- Fuel purchase
- Fuel transport
- Maintenance

Construction:
- Concrete
- Building
- Plumbing
- Electrical

REGIONAL/NATIONAL ECONOMY
What Makes a Viable Project?
Alternative Energy Options

Existing Heating System

Size of Heat Demand

Funding & Incentives

Supply

Project Champion
Alternative Energy Options
Size of Heat Demand

• Larger demand = Larger cost savings
• Cold climates = higher heat demand
Existing Heating System

- Ease of interconnection/conversion
Funding and Incentives

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

Department of Commerce
Innovation is in our nature.

USDA
Rural Development
Committed to the future of rural communities.

FOREST SERVICE
DEPARTMENT OF AGRICULTURE

CRAFT
Lending to people, Investing for resilience

UMPQUA BANK

meyer MEMORIAL TRUST

www.wisewood.us
Project Champion

• We can’t force a project to happen.
Wisewood’s Project Development

- **Level 10**: Feasibility assessment (+/- 25%)
- **Level 20**: Design and engineering (+/- 5%)
- **Level 30**: Design and engineering with stamped drawings, ready to build
- **Level 40**: Construction
Example Projects
Harney Community Energy
District Energy in Oregon’s High Desert
Meyer Memorial Trust

LEAF Credit Enhancement: $500K

Harney County

$500K

EIP Tax Credit Investors

Year 1 Wisewood
- Engineering
- Procurement
- Construction

$1.944M

Year 2 Wisewood
- Operations
- Fueling
- Maintenance

HCE, LLC

HDBC: Purchases assets from HCE, owns, operates, maintains system.

$1.44M + $37.4K

USDA Guarantee

ODOE SELP or other loan

HDBC: Purchases assets from HCE, owns, operates, maintains system.

$1.44M

Physical Assets

$1.944M
Yakima Specialties, Inc.

Increased Profitability Through Wood Waste Utilization, Plant Modernization and Energy Sales
Yakima Specialties
Unique Combination of Industries and Location Creates Multiple Opportunities
Energy Sales Opportunity

Neighboring Industries are Major Consumers of Process Steam from Natural Gas
Thank you!

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