Regional Developments of Biomass Energy: 

The West

This Webinar is brought to you by: 

Biomass Thermal Energy Council (BTEC)

With the generous support of the U.S. Forest Service 
Wood Education Resource Center

4 PM ET, November 10, 2011

“The work upon which this publication is based was funded in whole or in part through a grant awarded by the Wood Education and Resource Center, Northeastern Area State and Private Forestry, U.S. Forest Service. This institution is an equal opportunity provider.”
Joseph Seymour - Moderator

- Executive Director - Biomass Thermal Energy Council (BTEC)
Quick notes

- Two Audio Options: Streaming Audio and Dial-In.
  1. Streaming Audio/Computer Speakers (Default)
  2. Dial-In: Use the Audio Panel (right side of screen) to see dial-in instructions. Call-in separately from your telephone.

- Ask questions using the Questions Panel on the right side of your screen.

- The recording of the webinar and the slides will be available after the event. Registrants will be notified by email.
I. Event Introduction - Seymour

Speakers

- Chad Davis, Director, Forest Program, Sustainable Northwest
- Marcus Kauffman, Biomass Resource Specialist, Oregon Department of Forestry
- Angela Farr, Regional Biomass Utilization Coordinator for Regions 1 & 4, USDA Forest Service

Moderator

- Joseph Seymour, Executive Director, BTEC
Presentation Outline

I. Introduction – Joe Seymour
II. Overview of the West – Chad Davis
III. Market Development – Marcus Kauffman
IV. Regional Policy and Practical Approaches – Angela Farr
V. Summary, Q & A, Next Events – Joe Seymour

[Full presentation will be available online, www.biomassthermal.org/resource/webinars.asp]
Introduction to BTEC

The Biomass Thermal Energy Council (BTEC) is the industry trade association dedicated to advancing the use of biomass for heat and other thermal energy applications.

Why was BTEC established?

1. To **advocate for and promote** the industry in the national energy policy debate
2. To **reach out** to and **educate** the public and decision makers on the benefits and advantages of using biomass for heat
3. To develop biomass energy **research and analysis** that enables sound investment and policy decisions
BTEC’s membership*

* As of September 22, 2011
BTEC Membership

Abundant Power
ACT Bioenergy
AFS Energy Systems
Alliance for Green Heat
Alternative Energy Solutions International
American Agriculture Movement
American Biomass
American Wood Fibers
APEX
Bear Mountain Forest Products
Biomass Combustion Systems
Biomass Commodities Corporation
Biomass Energy Resource Center
Biomass Energy Works
Bionera Resources
Biowood Energy
Chip Energy
Clean Power Development
Comcast Equipment
Confluence Energy
Continental Biomass Industries
Control Labs
Corinth Wood Pellet
Cousineau Forest Products
Dejno’s
Ecostrat
Enviva Materials
Ernst Biomass
Forest Energy
FutureMetrics
Green Clean Heat
Indeck Ladysmith
Innovative Natural Resource Solutions
Integrated Biomass Resources
International Renewable Energy Technology Institute
International WoodFuels
Jesse E. Lyman Pellets
Lignetics of Virginia
Maine Energy Systems
Maine Pellet Fuels Association
Marth
Missouri Corn Merchandising Council
Montana Community Development Corporation
National Network of Forest Practitioners
New England Wood Pellet
New Horizon
Northeast Mill Services
PA Pellets
Pellet Technology USA
Pelletco
Piney Wood Pellets
Plum Creek
Pratt & Whitney Power Systems - Turboden
Proe Power Systems
Public Policy Virginia
Rainforest Alliance
Ray Albright
Recast Energy
Renewable Energy Resources
Resource Professionals Group
Richmond Energy Associates
Sandri Companies
Santa Energy Corporation
Sewall Company
Skanden Energy
State University of New York - Environmental Science and Forestry
Tarm Biomass
Twin Ports Testing
University of British Columbia
Vapor Locomotive Company
Vecoplan
Vermont Sustainable Jobs Fund
Vermont Wood Pellet
Vieussmann
West Oregon Wood Products
Western Ag Enterprises
Westervelt Renewable Energy
Wilson Engineering Services
Wisconsin Energy Conservation Corporation
Woodmaster
Zilkha Biomass Energy
Project made possible by the USDA FS WERC

- BTEC awarded a grant from the USDA Forest Service’s Wood Education and Resource Center (WERC) in June 2010 to advance education and outreach on biomass thermal energy.

- The Center's mission is to work with the forest products industry toward sustainable forest products production for the eastern hardwood forest region.

- Previous webinars available at: www.biomassthermal.org/resource.

- All questions and attendee feedback will help form future activities.

Remember to answer the survey at the webinar’s conclusion!
Regional Development: The West

II. Overview of the West - Davis

Chad Davis

- Director of Forest Stewardship Program, Sustainable Northwest

- Overview of the West
Biomass Thermal Energy
Resources for opportunities in the Northwest

Chad Davis
Forest Stewardship Program Director
resources dominated by Federal agencies
## forests by state

<table>
<thead>
<tr>
<th>state</th>
<th>% forested</th>
<th>million acres</th>
<th>% private</th>
<th>private acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington</td>
<td>40.7%</td>
<td>21.3</td>
<td>55.1%</td>
<td>11.7</td>
</tr>
<tr>
<td>Oregon</td>
<td>38.8%</td>
<td>28.8</td>
<td>39.8%</td>
<td>11.4</td>
</tr>
<tr>
<td>California</td>
<td>17.8%</td>
<td>23.7</td>
<td>45.8%</td>
<td>10.9</td>
</tr>
<tr>
<td>Montana</td>
<td>20.6%</td>
<td>22.5</td>
<td>37.6%</td>
<td>8.5</td>
</tr>
<tr>
<td>Idaho</td>
<td>31.8%</td>
<td>23.5</td>
<td>22.4%</td>
<td>5.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>state</th>
<th>% forested</th>
<th>million acres</th>
<th>% private</th>
<th>private acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia</td>
<td>64.2%</td>
<td>24.4</td>
<td>93.0%</td>
<td>22.7</td>
</tr>
<tr>
<td>Alabama</td>
<td>70.6%</td>
<td>22.9</td>
<td>94.7%</td>
<td>21.7</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>78.4%</td>
<td>4.8</td>
<td>85%</td>
<td>4.1</td>
</tr>
</tbody>
</table>

significant public acreage in the West is ‘administratively withdrawn’
from OFRI (2006) study: 1 million BDT per year
life without natural gas?
residential heating

<table>
<thead>
<tr>
<th>(in millions)</th>
<th>OR</th>
<th>WA</th>
<th>ID</th>
<th>MT</th>
<th>CA**</th>
<th>Potential Convert %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>1.7</td>
<td>2.9</td>
<td>0.7</td>
<td>0.5</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>NG</td>
<td>0.35</td>
<td>0.33</td>
<td>0.45</td>
<td>0.59</td>
<td>0.71</td>
<td>1%</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.03</td>
<td>0</td>
<td>50%</td>
</tr>
<tr>
<td>Electricity</td>
<td>0.49</td>
<td>0.53</td>
<td>0.34</td>
<td>0.16</td>
<td>0.22</td>
<td>25%</td>
</tr>
<tr>
<td>LPG</td>
<td>0.02</td>
<td>0.03</td>
<td>0.06</td>
<td>0.13</td>
<td>0.04</td>
<td>90%</td>
</tr>
<tr>
<td>Other/None</td>
<td>0.07</td>
<td>0.05</td>
<td>0.1</td>
<td>0.09</td>
<td>0.03</td>
<td>50%</td>
</tr>
</tbody>
</table>

** Uses source percentages for entire state of CA but household info only for CD 1, 2, and 4.

residential opportunity is ~ 3.0 million tons per year (pellets)
### Process Heat

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>WA</th>
<th>ID</th>
<th>MT</th>
<th>CA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial</strong></td>
<td>4.1</td>
<td>5.8</td>
<td>1.4</td>
<td>0.8</td>
<td>21.4</td>
<td>33.6</td>
</tr>
<tr>
<td><strong>Industrial</strong></td>
<td>2.3</td>
<td>2.8</td>
<td>3.1</td>
<td>2.3</td>
<td>10.0</td>
<td>20.5</td>
</tr>
</tbody>
</table>

### Substitution

<table>
<thead>
<tr>
<th>% substitution</th>
<th>chips (green)</th>
<th>Pellets (dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% subtotal</td>
<td>1.3</td>
<td>0.8</td>
</tr>
<tr>
<td>50% subtotal</td>
<td>2.7</td>
<td>1.6</td>
</tr>
<tr>
<td>100% subtotal</td>
<td>5.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Calculated from EIA data based on distillate end use tables.
Clean Energy Standard?

PTC
ITC

Renewable Portfolio Standard

Renewable Fuel Standard

Low Carbon Fuel Standard

national energy consumption: even thirds but no thermal driver
# Biomass Options and Forest Restoration

<table>
<thead>
<tr>
<th></th>
<th>Supply (bdt)</th>
<th>Number of Facilities</th>
<th>Price (bdt)</th>
<th>Feedstock Value (millions)</th>
<th>Acres Treated ($350/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 MW plants</td>
<td>250,000</td>
<td>6</td>
<td>35</td>
<td>$52</td>
<td>100,000</td>
</tr>
<tr>
<td>Heat-led projects</td>
<td>50,000</td>
<td>30</td>
<td>60</td>
<td>$90</td>
<td>171,429</td>
</tr>
<tr>
<td>Schools</td>
<td>600</td>
<td>2500</td>
<td>80</td>
<td>$120</td>
<td>228,571</td>
</tr>
</tbody>
</table>

**Total supply 1.5 million bdt per year; uses OFRI’s 1 million bdt per year estimate plus 500K tons from site prep activities**

<table>
<thead>
<tr>
<th>Logging Costs ($/bdt)</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional cut/haul/skid</td>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>Cut-to-length</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Chip on landing</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Hauling</td>
<td>10</td>
<td>40</td>
</tr>
</tbody>
</table>

Assumptions used can be provided by Chad Davis
achieving multiple objectives: Oregon-scale

<table>
<thead>
<tr>
<th>THEORETICAL MIX</th>
<th>supply</th>
<th>feedstock value</th>
<th>energy savings</th>
<th>acres treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 bio-power (existing)</td>
<td>750,000</td>
<td>$26,250,000</td>
<td>$0</td>
<td>37,500</td>
</tr>
<tr>
<td>20 schools</td>
<td>12,000</td>
<td>$960,000</td>
<td>$1,000,000</td>
<td>2,743</td>
</tr>
<tr>
<td>5 downtown districts</td>
<td>50,000</td>
<td>$3,000,000</td>
<td>$4,923,750</td>
<td>8,571</td>
</tr>
<tr>
<td>5 process heat users</td>
<td>250,000</td>
<td>$15,000,000</td>
<td>$24,618,750</td>
<td>42,857</td>
</tr>
<tr>
<td>5 small CHPs</td>
<td>250,000</td>
<td>$15,000,000</td>
<td>$16,494,563</td>
<td>42,857</td>
</tr>
<tr>
<td>total</td>
<td>1,312,000</td>
<td>$60,210,000</td>
<td>$47,037,063</td>
<td>134,529</td>
</tr>
</tbody>
</table>
few pictures from Malheur Lumber
For more information contact:

Chad Davis
cdavis@sustainablenorthwest.org
541-231-4146
twitter: @snwchad
III. Market Development - Kauffman

Marcus Kauffman

- Biomass Resource Specialist, Oregon Department of Forestry

Market Development
Approaches to Increasing Demand

Biomass Thermal Energy Council

Marcus Kauffman
Biomass Resource Specialist
Oregon Department of Forestry
November 10, 2011
Topics

- Current biomass heat market status
  - Key drivers
  - Constraints
- A variety of market-based approaches
  - Education and outreach
  - Market analysis
  - Project development assistance
  - Financing/incentives
- Next steps: where to from here?
Market attributes

- Customers
  - Public sector
    - Schools, hospitals, gov’t offices, campuses
- Limited private sector activity
  - Seeking
    - Costs savings
    - Reliability (no new technology)
    - Energy independence
Challenges with biomass heat

- Customers have limited appetite for new capital improvements
  - Public school budgets very hard hit
  - Unable to take on new debt
  - Can’t afford more maintenance
- Customers largely unaware of product
- Technological system complexity (relative to fossil fuels)
- Strong first cost consciousness
Market drivers

- Cost-neutral capital improvement
- Limited to no technological risk
- No additional maintenance
- Assistance with development
- Local examples
Market Drivers

• Boiler Retrofits
  • Age and condition of existing system (+20 yrs)
  • Ownership (public preferred)
  • Sufficient heat load (space and hot water)
  • Operational capacity (days/yr)
  • Fuel type and price escalation (heating oil and propane preferred)

• Project champion

• Ability to eventually use new raw material (small logs)
at risk to price escalation
Strategies

- Regional market analysis
- Statewide education/outreach/marketing
- Project development assistance
- Financing incentives
Market Analysis

- Data-driven approach
- Identify size of regional market (6 counties)
- Direct project development resources to high priority projects
- Bases on analysis of statewide boiler database
- Has spurred greater interest and resources dedicated to boiler database maintenance and analysis
Education and Outreach

- Statewide Biomass Heat Marketing Project
  - Biomass heat case studies
    - 5 cases
  - Biomass heat community tours
    - 5 tours
  - Potential end users got to see, touch, feel, and discuss if biomass heat was right for them.
  - Resulted in several new leads
Funding Sources

- ARRA State Energy Program (no longer available)
- Oregon Business Energy Tax Credit (BETC)
- Oregon Community Renewable Energy Feasibility
- Oregon SELP Loan
- Oregon SB1149 Funding
- USDA Rural Energy for America Grant
- USDA Community Facilities Grant
- Qualified Zone Academy and Construction Bonds
- NEW: Cool Schools
Challenges of small projects

- **Problem:**
  - Financing can be difficult due to high transaction costs and lack of expertise.

- **Solution:**
  - Find ways to bundle projects to access lower cost capital.
Where to from here?

- Expand biomass thermal market
  - Analyze demand in other regions of state
  - Retrofits and new construction
  - Pursue boiler utility model to reduce first cost
- Create district heating market
  - Improve and enhance education and outreach
  - Provide robust technical assistance
  - Provide low cost capital
  - Invest in commercial-scale demonstration project
Angela Farr

- Regional Biomass Utilization Coordinator for Regions 1 & 4, USDA Forest Service

- Regional Policy and Practical Approaches
Thermal Biomass

Policy Issues in the West

Angela Farr
US Forest Service
Biomass Thermal Energy Council
Webinar November 2011
Policy Issues in the West

- Lack of incentives for thermal renewables
- Traditional construction
- Forestry policies
- Energy policies
- Air Quality
Western Applications

- Small, rural, dispersed
- Cost/benefit more challenging
- More access to natural gas
Woody Biomass Fuel Sources

- Slash from forest management
- Residues from manufacturers
  - Post and Pole
  - Sawmills
  - House logs
- Power line/development clearing
- Local landfill/urban waste
How much does it take?

- Darby heats 3 schools with 700-1000 green tons of chips/year.
- Thinning operations produce 10-20+ tons of slash/acre.
- 35-100 acres heat Darby schools for a year.
What do they burn?
Fuel Processing & Delivery

- High initial cost equipment
- What infrastructure is already available?
- Scale of use is important
- Clustering projects helps
Forestry Policies

- Trust Mandates
- Required/ incentivized removal
- Forest Road Specifications
- Forest Road Closures
- Transportation incentives
- Market development incentives
Energy Policy

- Carrots or Sticks?
- Tax incentives vs. grants?
- Lack of parity with other renewables
- Carbon balance questions
Financing

- Carbon Offsets
- Performance Contracting
- Utility Coops
- Farm Bill/ USDA RD
Air Quality

- Combustion over 1800° F
- More particulates/ No\textsubscript{x} than Natural Gas
- Far less than slash burning
- Seasonal vs. annual effects
Air Quality

Pollutant Emission Rates by Fuel Type (lb/MMBtu)

- Particulate Matter
- Nitrogen Oxides
- Carbon Monoxide

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Particulate Matter</th>
<th>Nitrogen Oxides</th>
<th>Carbon Monoxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels for Schools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood Boiler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal - Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distillate Fuel Oil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 6 Fuel Oil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas - Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propane</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pollutant Emission Rates for Wood Boilers and Fire Activities

<table>
<thead>
<tr>
<th>Pollutant Type</th>
<th>Darby Wood Boiler</th>
<th>Thompson Falls Wood Boiler</th>
<th>Wildfire</th>
<th>Prescribed Burning</th>
<th>Slash Pile Burning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate Matter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thank You!

Angela Farr  
Biomass Utilization Coordinator  
USDA Forest Service  
Missoula, MT  
329-3521  
afarr@fs.fed.us

www.fuelsforschools.info
Q & A

Ask questions using the Questions Panel on the right side of your screen.

All questions and comments will be recorded and incorporated in the webinar summary report.

Also, please take a few moments to answer the survey questions after the conclusion of the webcast.
Other Resources

- Interviews with key industry leaders (10+, also on iTunes Podcasts)
- Factsheets (biomass background, job data, technology, etc.)
- Presentation (comprehensive program information)

All Resources are available here: biomassthermal.org/resources
Upcoming Events

- **BTEC Annual Membership Meeting** – November 15
  - Visit our event website for more information
    www.biomassthermal.org/events/membershipMeeting2011.asp

- **Biomass Thermal DC Summit** – November 16
  - Visit our event website for more information
    www.biomassthermal.org/events/thermalsummit.asp

  - Come see what Biomass Heat can do for your customers, your clients, and your community!
  - Call for Abstracts Deadline: December 1, 2011!
  - More information is available at: www.nebiomassheat.com
Upcoming Webinars

**Next Webinars:**

Regional Developments of Biomass Energy:

- *The Midwest* – November 21, 2011 at 1 PM ET

Attendees of today’s webinar will receive timely notification of these webinars.
More Information

- **This Webinar will be available** by Monday, Nov. 14.
- **Sign up** to receive BTEC news at on our website.
- **Join BTEC for:**
  - Frequent and timely regulatory, policy and market intelligence updates
  - Business Development opportunities and networking with other biomass leaders
  - Visibility as a supporter of the market’s growth
  - Discounts to nearly all major biomass industry events in the U.S.

For more info or to join, go to: [www.biomassthermal.org/membership](http://www.biomassthermal.org/membership)
Thank you!

If you want to learn more about the biomass thermal industry, BTEC, or membership, visit www.biomassthermal.org