Biomass Boiler Types and Installations

Eastern Idaho Biomass Energy Workshop
Lost Trail Ski Resort
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Gasification, Suspension Burning, Furnaces and Dryers

[Diagram showing gasification process with images of industrial equipment and a flowchart of the process.]
Combustion

Moss

Lynndale
Combustion

Biomass Combustion Systems

Top View of Combustion Base

Side View of Combustion Base
Combustion

Hurst
Combustion

Nexterra
Pellet System Diagram
Case Studies

A. Cordwood Systems
B. Briquette/Pellet Boiler Systems
C. Turn Key Wood Pellet Systems
D. Slab on Grade Chip Boiler Systems
E. Surge Bin Green Chip Boiler Systems
F. Split Slab Green Chip Boiler Systems
G. Concrete Bunker Green Chip Boiler Systems
Case Study A: Cordwood Boiler

6 x the heat (cutting, hauling, splitting, stacking, hauling & feeding) Minimize handling of cordwood
Case Study A: Cordwood Boiler

Galena – Y-K Elder Assisted Living Facility
Pre-fabricated building, boilers, piping, and wood storage
Case Study A: Cordwood Boiler

Galena – Y-K Elder Assisted Living Facility
3- boilers, thermal storage, wood storage
Case Study A: Cordwood Boiler

UAF – Fort Yukon Campus
Installed in an existing building
Case Study B: Wood Pellet Boiler

St. Maries School District
Site constraints
600,000 BTU Steam boiler
Fuel variation
Case Study: Pellet Boiler

Troy School District
A. Very small boiler/steam
B. Ash content of all tree pellets.
Case Study: Pellet Boiler

Townsend School District
A. $0.79 propane
B. Retrofit boilers for fuel oil & pellets
C. Ash content of all tree pellets.
D. Climate Trust support.
Case Study C: Turn Key Pellet

Harney District Hospital
A. Turn Key pellet boiler/storage
B. Heat pump system.
Case Study D: Slab on Grade Chip

- Slab on Grade
- Dry wood fuel on site.
- Chip directly into trailer, feed fuel onto belt conveyor.
Case Study E: Day Bin System

Bismarck Public Works Facility
A. Located in existing building.
B. Fuel available on site, blend ash with compost.
C. High moisture content fuel.
Case Study: Surge Bin System

Thompson Falls School District.
A. Existing Steam System.
C. Energy Conservation/Distribution
Case Study F: Split Slab
New Construction

Glacier High School
A. Integrated wood heat during schematic design.
B. Wood heating system cost ½ freestanding.
C. Wood heating system meets ½ peak load 95% annual.
D. Modifications to conveying equipment for hog fuel.
Case Study F: Split Slab District Heating

Eureka School District.
A USDA REDLG, FFS Grant, Climate Trust, Intercap
B. Central steam plant/ connect to 3 buildings.
C. Wood fuel: live floor, dump, pneumatic or belt.
D. Fast Track/GCCM construction method.
E. First Assessment: January 2004
Case Study G: Concrete Bunker/District Heating

Darby School District
A. Steam & hot water system.
B. ~$1.00/gallon fuel oil.
Wood Chip Fuel Handling
Wood Chip Boiler
Case Study G: Concrete Bunker/Slab On Grade

Alaska Gateway School District
A. Access to wood fuel in winter
B. Air Quality
C. Combined Heat/Power
D. Future greenhouse/local food
Case Study G: Bunker/ Fuel Dryer

City of Craig, AK/Craig School District.
A. Remote location/project timing.
B. Base load of city pool.
C. Extensive distribution network.
D. Moisture content of wood fuel.
Case Study: Existing Building, Gasifier

University of Montana-Western.
A. Limited room for fuel storage.
B. Limited room for combustion system.
C. Size of system not optimal.
Case Study: Gasifier/Absorption Chiller

Santa Fe Community College
Not a CTA Project
Chiptec System
Absorption Chiller
Case Study: Campus District Heating

- Not CTA projects
- University of Idaho
- Central Michigan University
- Chadron State University
- State of Vermont Capitol Complex
- Middlebury College
- Colby College
- Dartmouth College: Sachem Village
Case Study: Large Scale District Heat, Power & Chilled Water

- Not CTA project
- District Energy Saint Paul
- 31 million SF
- www.districtenergy.com
Case Study: Large Scale Power Production

- Not CTA projects

- Renegy, Snowflake, AZ: 24 MW
- Decker Energy International, Cadillac, MI: 40 MW
- Grayling Generating Station, Grayling, MI: 38 MW, 300,000 tons per year
- McNeil Generating Station, Burlington, VT: 50 MW
Questions?

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