Montana DNRC Forestry Division

FORESTRY ASSISTANCE

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Biomass Utilization

Fuels for Schools and Beyond

Promoting Healthy Forests and Communities Using Forest Thinnings for Heat

BIOMASS UTILIZATION

Montana Department of Natural Resources and Conservation

Forestry Division
Forestry Assistance Bureau
Biomass Utilization
Fuels For Schools and Beyond

Facilitate the use of forest biomass waste as a renewable heat and energy source.

Fuels For Schools and Beyond (FFS&B) is an innovative program that promotes healthy communities and forests by encouraging schools and other facilities to use biomass heating systems that burn waste wood from hazardous fuels reduction projects. The program involves a partnership among the Montana DNRC Forestry Division, USDA Forest Service, the Bitter Root Resource Conservation and Development Area and State Foresters in other states (ID, WY, ND, NV, UT).

Fuels For Schools and Beyond is in the second phase of a three-phase program. The first phase involved establishing a demonstration project in each of the six states. During phase two, additional biomass boilers are being installed with grant support. Phase three will transition primary project funding from the USDA Forest Service and states to the private sector. During this second phase, DNRC FFS&B staff provide technical assistance and advice to facilities interested in exploring the feasibility of converting to a biomass boiler, including arranging for engineering assessments and identifying forest biomass suppliers. DNRC administers a competitive grants program through which facilities can apply for funding to help cover the costs of biomass boiler systems, and FFS&B staff help facilities identify additional sources of funding.

Renewable Energy from Waste Wood Saves Money and Improves Environmental Health

Nearly 90% of the boilers used to heat Montana schools and other public facilities are fueled by natural gas. Rising natural gas prices require ever-increasing expenditures from communities; money spent on heating costs is not available for school supplies or additional teachers. At the same time, many of Montana's forests suffer from hazardous fuel densities, putting them at risk for catastrophic wildfires. Hazardous fuels treatment projects typically produce large quantities of unmerchantable wood waste. Converting to biomass boilers fueled by wood waste from hazardous fuels treatment projects can help solve both problems. Wood fuel costs about one-third the price of natural gas per BTU of heat produced. Burning slash in state-of-the art boilers releases far fewer pollutants than open burning or wildfires. Demonstration projects have proven the viability and cost savings of biomass boilers; the potential to replicate this success at other sites is huge. A recent report identified nearly 100 facilities throughout Montana where conversion to biomass boilers would have a payback period under 10 years.

Program Accomplishments

Projects operational	9
Projects underway (in design or construction)	2
Projects funded	11
Preliminary engineering assessments completed	53
Estimated annual CO_2 offset (in metric tons)	4,842

The Fuels For Schools and Beyond Program in Montana

The wildfires of 2000 burned over 350,000 acres and 70 structures in the Bitterroot valley, underscoring the urgent need for fire hazard reduction projects in the wildland urban interface. Because so many areas were in need of treatment, one Darby resident began to research ways that fuels treatment projects could promote local economic development. He discovered that waste wood was being used to heat a number of schools in the northeastern U.S., and approached community leaders with the idea of using slash from hazardous fuels treatment projects to heat Darby's schools.

With the aid of a grant from the USDA Forest Service and assistance from the Bitter Root Resource Conservation and Development Area, the USDA Forest Service Forest Products Laboratory, and the Biomass Energy Resource Center, a biomass boiler system was planned, designed, and installed in Darby and began heating the community's three schools in the fall of 2003.

Exciting Firsts For FFS&B in MT:

- First project incorporating biomass heat in new construction: Glacier High School in Kalispell
- First pellet-fired boilers: Troy and Townsend schools
- First college campus system: University of Montana-Western in Dillon

Fuel cost savings were $34,000 during the biomass boiler's first year of operation, and nearly $160,000 the winter of 2007-2008. Approximately 70 acres of hazardous fuels treatment is sufficient to provide Darby Schools' annual fuel supply.

Eight more Montana schools now have operational biomass boilers, and 2 projects are underway. The Darby project continues to serve as a valuable demonstration and test site. Darby Schools' facilities manager and students have given dozens of tours of the facility, experimented with a variety of fuel types, gathered data on maintenance and operations, and tested the stockpiling of fuel. Their efforts have provided important information for the FFS&B program, and students have gained hands-on experience as part of the science curriculum.

Darby Schools, site of Montana's first FFS&B project

"With recent increases in fuel costs and improved efficiencies in fuel storage, this system will save our school district about $150,000 in heating costs this year. That's good for the taxpayer, the community, our local businesses, and our forests."

Rick Scheele,
School District Facilities Manager and City Mayor
Darby, MT

Fuels for Schools and Beyond Projects in MT	Status	Annual Wood Fuel Use (tons)	Estimated Annual Savings	Date Operational
Darby Public Schools	Installed	750	$160,000	11/03
Victor Public Schools	Installed	500	$27,000	9/04
Philipsburg Public Schools	Installed	400	$52,000	1/05
Thompson Falls Public Schools	Installed	400	$60,000	10/05
Troy Public Schools	Installed	60 (pellets)	$12,500	11/08
Townsend Elementary and H.S.	Installed	250 (pellets)	$19,500	3/07
University of Montana-Western	Installed	3,600	$118,000	2/07
Glacier High School	Installed	1,900	$100,000	10/07
Eureka Public Schools	Installed	960	$103,610	11/07
Deer Lodge Elementary School	Underway	730	$39,980	1/09
Montana State Prison	Funded	1,000	$40,000	1/10

How FFS&B Biomass Heating Systems Work

1. Sources of wood fuel can include slash generated from hazardous fuels treatment projects, forest management activities, and timber operations, as well as residues from urban tree trimmings, right of way clearings, and wood manufacturers and sawmills.

2. Wood waste is run through a chipper or grinder to create fuel.

3. The wood fuel is transported to facilities that heat with biomass.

4. Wood fuel is conveyed automatically to state-of-the art, efficient wood boilers that generate heat while producing far fewer pollutant emissions than opening burning of the same material.

Community Benefits

- **Heating costs are reduced by 30% - 70%**
- **Fire danger is reduced**
- **Costs to landowners for hazardous fuels treatment are lower**
- **New jobs are created in forests and communities**
- **Hands-on resource education is enhanced**
- **Renewable local fuel increases energy independence**

Environmental Benefits

- **Improved forest health**
- **Reduced smoke from open burning**
- **Reduced greenhouse gas emissions**

Above: Darby students perform a moisture content test on wood fuel.

Top right: Open burning produces large quantities of smoke and pollutants.

Bottom right: Burning that same slash in the modern biomass boilers produces less emissions and captures heat that would otherwise be wasted.

Success of Initial Projects Bodes Well for the Future

Work to date has demonstrated the economic and environmental viability of biomass heating systems, and offers the vision of a future where biomass will be a commonplace option to consider when choosing a heating system. The USDA Forest Service was instrumental in funding the first several demonstration projects and has provided an $3.5 million in grants to Montana facilities since 2001. As the program goes forward, grant support will be phased out as a market is established. The initial demonstration projects and projects coming online during the expansion phase have been important test and educational sites for investigating different types of systems, fuel types, system installation issues, and fuel processing and transportation options. As the program moves into the final privatization phase, the knowledge and experience gained during demonstration and expansion will be key resources for facilities exploring the option of biomass heating, and the private sector will have the knowledge and capacity to meet the demand for new systems. The collaboration, investment, and hard work of the FFS&B partners will pay many dividends in terms of healthier Montana communities and forests.

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