



WOOD^{to} ENERGY

Case Study

Wood Power Heats a Public School

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Rowan County High School is located in Morehead, Kentucky, a small rural town of 6,000 people in the Appalachian foothills just outside Daniel Boone National Forest. It is the only high school serving Rowan County in the eastern coal field region of Kentucky.

Formed in 1865 from what originally were parts of Morgan County and Fleming County, Rowan County today is home to 22,000 residents. Its breathtaking vistas and many special events and attractions—including the Poppy Mountain Bluegrass Festival and muskie fishing on Cave Run Lake—please residents and visitors alike. But Rowan County's bountiful natural resources do more than provide scenic beauty and recreational opportunities; they also help provide clean air and water, wildlife habitat, and numerous wood products.

In the early 1980s, members of the Rowan County Board of Education found themselves asking challenging

questions about how to meet growing energy demands. Charged with the task of building a new high school and ensuring a reliable and affordable source of space heat, the board considered numerous fuel options including wood, coal, and natural gas, as well as purchasing electricity from the local power grid. The board's decision to use woody biomass offered an environmentally and economically sound solution for heating the new school building, while also providing a market for waste sawdust material produced by local timber and lumber companies (Figure 1).

The school's sawdust combustion unit was installed in 1982 by Energy Resource Systems of Minneapolis, Minnesota. In 2007, this same unit continues to generate enough energy to heat the 125,000-square-foot high school building and a nearby 60,000-square-foot vocational technical institute. The combustion unit, which

burns nearly 756 tons of pure sawdust each year, is capable of generating a maximum energy output of 0.15 thermal megawatts (MW). One-third of the steam output produced by the unit is sold to Rowan Technical College to meet its utility needs at a cost comparable to using natural gas. The facility has enjoyed public support since its construction.

Many of the school's fuel suppliers are local lumberyards operated by residents who are also alumni of the Rowan County school district. The district has been able to maintain a suitable level of hardwood sawdust to meet its heating needs.



Figure 1. The high school's wood-to-energy facility provides a market for local sawdust. PHOTO COURTESY OF MISSISSIPPI ALTERNATIVE ENERGY ENTERPRISE.

The sawdust is stored at a 120-ton silo located on campus. An auger system located at the base of the silo dispenses the sawdust into a metering bin, which is automatically controlled by steam demand. Combustion occurs on an inclined grate system supplied with underfire air. The temperature of the combustion unit is controlled by regulating the amount of underfire air, or heat, entering the system. The fuel is injected into the boiler via a pneumatic, or pressurized air, system. The manufacturer installed a pollution control feature, a multitube collector, to remove particulate matter such as ash and soot. Steam from the boiler is used to heat hot water, which is circulated via pipes throughout the two buildings.

The board has encountered a few minor challenges with the unit's operation. One recurring issue involves calibrating the unit's controls to provide optimal energy output—especially during the summer months when the unit runs alongside the school's cooling system—to generate energy for the vocational technical institute. The supply of sawdust also is unreliable at times, due to a decline in timber-related activities as well as competition from a growing number of wood-fired facilities in the region.

Despite these few challenges, the board—whose motto is “Together We Can!”—considers the project a success.

With relatively few maintenance problems, the cost savings enjoyed by the school far outweigh those of other fuel options. The board's decision to install a combustion unit at the initial price of \$347,000 was well worth the cost. Rowan County High School is the only public school in the district that can claim it is actually paid to make classrooms comfortable for its students with an environmentally friendly source of heat. As a bonus, the school saves an estimated \$21,000 per year thanks to its woody biomass combustion unit.

For more information regarding specific concerns about wood-to-energy facilities, refer to the other fact sheets, case studies, and community economic profiles available in this series at <http://www.interfacesouth.org/woodybiomass>. Additional information is available at <http://www.forestbioenergy.net>.

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