The WERC Woody Biomass Technical Assistance Team

The Challenge

Communities, schools, universities, hospitals, and businesses across the Nation are experiencing increasing energy costs. Many are looking at renewable energy alternatives. One of the oldest and most widely used renewable energy alternatives is wood, or more specifically, woody biomass—the woody parts of plants, such as the limbs and tops of harvested trees, that can't be sold in traditional markets.

Many forest landowners and managers are currently reporting fewer markets, particularly for low-quality timber, which makes it more difficult to continue to own forest land. Many forest industries are having difficulty selling the wood residues created when they process logs into lumber. In other locations, drought, insect attacks, or lack of forest management results in increased amounts of woody debris on the forest floor, which raises concerns about wildfires.

Woody biomass—whether it comes from the forest, urban tree care activities, or forest industries—can provide a clean, renewable, and reasonably priced energy alternative. However, it is critical that systems that use woody biomass be properly designed and operated to ensure the most efficient and effective use of this fuel.

The Solution

The Wood Education and Resource Center (WERC) serves the 35 States of the eastern hardwood region. WERC's mission is to foster interaction and exchange information with the forest products industry to enhance opportunities to sustainably produce forest products in the region it serves. As energy prices increased in this region, the Center's staff identified a need for good technical assistance for facility owners and managers who were considering conversions to wood energy. Very few consulting firms are serving this market. Advances in wood energy technology from Europe are not being fully utilized in the United States.

As a result, WERC developed the Woody Biomass Technical Assistance Team (the Team). This Team is a partnership between WERC and three private firms that provides technical assistance for using woody biomass. These three firms, the WERC Woody Biomass Coordinator, and key contacts in each State Forester's office provide targeted technical assistance to facility owners and managers that are considering using wood energy.

Resulting Benefits

The benefits of the Team were realized immediately. The Team is providing extensive support to the Missouri Fuels for Schools and Beyond project that was initiated with a $6.0 million American Recovery and Reinvestment Act grant. The Team worked with the Missouri Department of Conservation to review funding applications from 12 schools. The Team provided a technical review of each site and developed a preliminary design for each facility to ensure that the installed system would not increase the school's operating costs once the project was in place.

Veterans Administration personnel and the WERC Technical Assistance Team visit the wood-fired combined heating and power system at the Lockheed Martin System Integration facility in Owego, NY.

The Team helped the WERC Woody Biomass Coordinator develop responses to a new EPA boiler rule. The technical analysis of the new rule provided by Team members enabled the Forest Service to effectively convince the EPA to make changes in the boiler rule that favored the use of wood as a solid fuel.

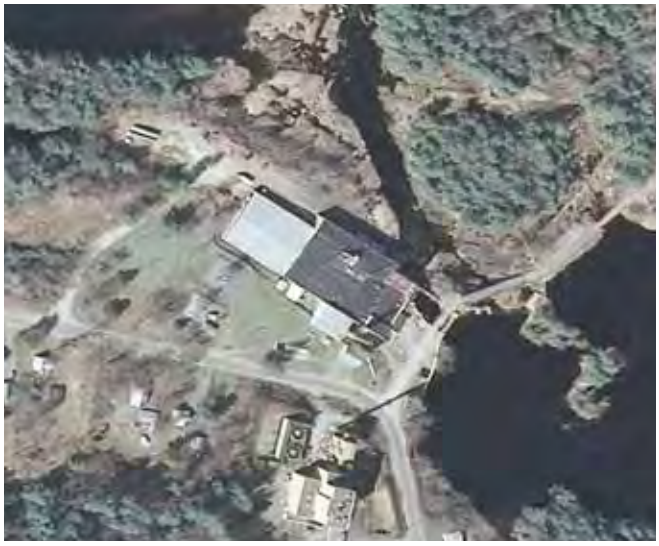
The Team has conducted over 100 analyses of facilities considering conversion to wood energy. They have identified more than 50 facilities that can use woody biomass to reduce both their fuel costs and carbon footprint. Some project highlights include:

University of Wisconsin System – Stevens Point

The Team reviewed the current UW-Stevens Point system and recommended an $8.13 million project that eliminates the use of coal and creates a wood-fueled combined heat and power system with these benefits:

- Capacity to supply 89 percent of the annual steam demand from biomass
- Hedge against volatility in fossil fuel markets
- First-year energy savings of $791,000 vs. current coal and gas energy costs
- First-year energy savings of $1,141,000 vs. all 100 percent natural gas firing
- $18.2 million, 25-year Net Present Value over current coal and gas fuel use
- $25.7 million, 25-year Net Present Value over switching to all natural gas

Chillicothe Veterans Administration Hospital, Chillicothe, OH



Burrows Paper Company, Lyons Falls, NY

Chillicothe Veterans Administration (VA) Hospital – Chillicothe, OH

Private consultants conducted two studies that indicated that wood was a good option for the facility; however, both studies contained major flaws (poor fuel handling and expensive electricity generation). The Team reviewed both analyses and redesigned the proposed system to improve system efficiency, generate low-cost electricity, and reduce operational costs. Prior to final system selection, the Team coordinated site visits for VA staff, the Corps of Engineers, and project contractors to see several types of biomass combustion units. The proposed system is a 600 hp (20.1 mmBtu/hr) biomass boiler with a 350 kW single-stage backpressure steam turbine and generator. It is estimated that the incremental cost to generate electricity with biomass will be approximately $0.04/kWh. Project savings will range from $400,000 to $1,000,000 based on natural gas prices.

Burrows Paper Company – Lyons Falls, NY

Burrows Paper is a small, family-owned paper company headquartered in Lyons Falls, NY. They manufacture recycled paper products. At the request of the local economic development agency, the Team conducted a prefeasibility study followed by a more indepth analysis of the potential for a combined heating and power system at the plant. Based on the analysis, Burrows Paper is moving forward with a project that will:

- Provide 100 percent steam generation backup with the existing single natural gas boiler
- Have the capacity to provide 98 percent of annual steam demand with an alternative fuel to natural gas
- Hedge against price volatility in the natural gas market
- Provide first-year energy/operating cost savings of ~$800,000
- Have an $8.5 Million 25-year Net Present Value
- Have a Year 1 expenditure of $545,000 on 18,200 tons of locally sourced renewable wood chip fuel
- Temporarily create or retain 29 FTE positions
- Create or retain 7 long-term FTE positions in the local forest products industry

Sharing Success

WERC is committed to supporting owners and managers of facilities throughout the eastern hardwood region who are considering using wood to meet their energy needs. For more information, contact WERC Woody Biomass Coordinator Lew McCreery by calling 304–285–1538 or sending an e-mail to lmccreery@fs.fed.us.

USDA Forest Service
Northeastern Area
State and Private Forestry

April 2011

For more information, contact:

Tony Ferguson, Area Director
11 Campus Blvd., Suite 200
Newtown Square, PA 19073
Phone: 610–557–4103
E-mail: tferguson@fs.fed.us

Steve Milauskas, WERC Director
301 Hardwood Drive
Princeton, WV, 24740
Phone: 304–487–1510
E-mail: smilauskas@fs.fed.us