

Using Waste Wood to Boost Energy Savings: Action Floor Systems Biomass Energy System

CASE STUDY



BIOMASS



SOLAR



WIND

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As Action Floor Systems, LLC approached its 20th anniversary in the community of Mercer, Wisconsin, this provider of wood sports-floor options, with customers around the world, faced an energy dilemma. Would the company be able to continue using its own steady stream of hardwood waste to supply steam for process and space heat, or would a failing boiler force it to switch to pricier natural gas?

Action Floor Systems had long recognized the energy resource provided by the wood waste from the manufacturing process for its wood floors. When the company first started, it bought a used gas-fired boiler and converted it to burn wood waste. Even though this boiler did not operate at high efficiency and was labor intensive to operate, it served the company well. For 19 years, it provided most of the steam the operation required. A back-up gas-fired boiler, sized to take the entire load, was used to make up the difference.

Generally, the boilers were operated to maximize the use of the wood-fired boiler and limit the use of the comparatively high-cost natural gas-fired boiler. However, the old wood-fired boiler became less reliable over time, requiring the company to rely more often to the gas-fired boiler, increasing its overall operating costs. Furthermore, the company was concerned about the old wood-fired boiler passing future Wisconsin Department of Natural Resources “stack tests” for particulate emissions, and how much investment might be required to keep the old boiler running.

Action Floor Systems’ owners turned to Focus on Energy for an \$8,600 feasibility study grant that would allow the company to explore its options. They were particularly interested in the idea of replacing the old boiler with a new biomass energy system, rather than simply shutting it down and turning to the natural gas-fired boiler to provide process and space heating steam. The high initial cost of installing a new biomass energy system appeared to be the most daunting challenge. Thanks to Focus on Energy, which also provided a \$200,000 Biomass Implementation Grant, Action Floor Systems was able to proceed with the installation. The total cost of implementing the new biomass energy system was \$1,055,000 with a projected payback period of 3.5 years.



PHOTO COURTESY OF MIKE MALJUSTEAD

Emitting steam from the discharge stack, the new system is up and running. This photo shows the biomass system building with its emission control equipment.

Because Action Floors already had significant experience operating biomass energy systems, it will likely have few issues operating the new system. The new system operates much more efficiently than the old one, meaning that not only can the company rely totally on its wood waste to fill its energy needs; it uses less of that waste to do its job. Action Floors produces more wood waste than it needs for energy, and sells its surplus high-quality hardwood waste to manufacturers of wood-pellet fuel, synthetic deck materials and other products.

The new biomass energy system will use approximately 4,425 tons of wood-residue fuel per year and can produce 16,500 pounds of steam per hour. It will offset approximately 658,300 therms of natural gas each year, saving Action Floor Systems \$302,000 in annual energy costs. The new biomass energy system effectively eliminates the need for Action Floor Systems to use natural gas—stabilizing its energy costs and anchoring the company more firmly within the local economy.



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Date Completed: November 2008

CASE STUDY FACTS

<p>PERSONNEL</p>	<p>Plant Manager: Karl Anderson System Contractor/installer: AFS Energy Systems and the A.L. Anderson Companies, Inc, Lemoyne, Pennsylvania</p>
<p>BUILDING AND SITE</p>	<p>Location: Mercer, Wisconsin Site description: A wood-flooring manufacturing plant specializing in sports flooring</p>
<p>RENEWABLE ENERGY EQUIPMENT</p>	<p>Renewable energy technology: A 500 hp biomass energy system capable of meeting all of the facility's steam needs for manufacturing and space heating Model: AFS FTG Combustion System—24.6 MMBTU/hour Manufacturer: AFS Energy Systems—afsenergy.com</p>
<p>EQUIPMENT COSTS AND BENEFITS</p>	<p>Economic costs and benefits: Total installed cost \$1,055,000 Grant from Focus on Energy: \$200,000 Fossil Fuel Cost Reduction: \$349,000 at 2007 natural gas rates Energy and environmental benefits:</p> <ul style="list-style-type: none"> ■ Natural gas savings of 658,300 therms/year and related reduction of non-renewable, fossil fuel related carbon emissions ■ Improved particulate emissions relative to pre-existing system ■ Equivalent to heating over 670 average Wisconsin homes and removing over 550 cars from the road