



Woody Biomass Heating System Continues to Warm Students and Staff at Holderness

Nearly a decade ago, administrators at the Holderness School, a private boarding and day school in Holderness, NH, began exploring alternatives to its aging oil heating systems. In addition to reducing their annual heating costs, they wanted to move away from their dependence on fossil fuel and support the community's economy by using locally available fuel resources.

After a sustainability study demonstrated that the school might benefit from a biomass heating system, Holderness secured a U.S. Department of Agriculture (USDA), Forest Service Wood Education and Resource Center (WERC) grant. With this support, the school turned to Wilson Engineering, which specializes in the evaluation and implementation of biomass utilization.

The Holderness School's biomass-fueled heating system has significantly reduced its dependence on fossil fuels. Courtesy photo by Wilson Engineering Services, PC.

The firm worked closely with WERC to develop a feasibility study that helped administrators determine which heating options might be in the school's best interest.

The result? In 2015, with the additional assistance of a \$300,000 grant from New Hampshire Public Utility Commission's Renewable Energy Fund, Holderness installed a biomass-fueled plant that generates heat and hot water for the campus. The plant is powered by wood chips, a byproduct of sustainable timber harvesting and environmentally sound forest management. Since that time, the school has realized a yearly reduction of 111,000 gallons of fuel oil and 10,000 gallons of propane and a reduction of greenhouse gas emissions by over 14,000 metric tonnes. Further, Holderness has contributed nearly \$125,000 annually to the area's economy by using locally sourced fuel.



The plant's boiler system generates heat and hot water for most facilities throughout the school's 600-acre campus. Courtesy photo by Wilson Engineering Services, PC.

Putting the System to the Test

Tony LeMenager, director of facilities at Holderness, explains that the system was connected to 25 buildings, but the campus is expanding. "Recently, we completed the Davis Center, a 35,000-square-foot math and science building. During construction, we had to extend the heating system's hot water piping, but not the capacity of the plant," he says. LeMenager adds that the school is planning to replace about 25,000 square feet of an existing athletics building with a larger structure, which will also connect to the plant. He notes that the plant's single wood-chip boiler currently manages nearly all the school's requirements without having to tap into its backup propane boilers. "We anticipate that the system will continue to carry the load, even with the addition of new structures, barring extremely cold temperatures," he says.

Engaging the Next Generation

The system incorporates computerized management that enables facilities and maintenance staff to monitor biomass energy outputs to campus buildings and shares real-time heating efficiency data. Students can download this data and explore trends in energy efficiency, including which buildings use the most heat and where heat losses occur through the system.

At least once a year, LeMenager does a run-through of the system with Holderness students. He has also taken local elementary school children on a "chips from bin to boiler" tour. "It is

amazing how students—on and off campus—want to explore and understand the environmental and other impacts of our system," he says, adding that Holderness might serve as an example for other organizations exploring biomass energy systems.

More Information

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FAST FACTS

Holderness School's biomass-fueled plant (funded in part by a USDA Forest Service Wood Education and Resource Center (WEC) grant):

- Has reduced the school's use of oil and propane, which, in turn, has reduced greenhouse gas emissions.
- Meets the campus' current heating needs and benefits the local economy through the use of locally sourced fuel.
- Allows students to download system data to analyze and explore trends in energy usage.



The school supports the local economy by using locally sourced wood chips to power the plant. Courtesy photo by Wilson Engineering Services, PC.