By the Numbers

500,000 BTUs/hr

51,000 square feet

5 building district heating system

3 Frohling FHG Tuurbo 3000 Wood Gasification Boilers

1,500-gallon thermal storage

4,000 acres of woodlands

$830,000 total project cost

Harvard Forest

Founded in 1907, Harvard Forest is a research facility that develops and implements interdisciplinary research and educational programs. With 4,000 acres of land, scientists and collaborators explore conservation, environmental change, land-use history, and more.

In 2013, Harvard Forest decided to replace its ailing cordwood boiler and oil burner with three modern cordwood gasification boilers. The system heats five buildings on campus, including the museum, offices, and lab space. The boilers are housed in the pole barn, along with a 1,500-gallon capacity thermal storage tank and the carpentry shop. The back-up propane boiler is needed on colder nights.

Wood is regularly removed for trail maintenance, forest management activities, and as part of research endeavors, so Harvard Forest has ample available fuel. The wood is seasoned on a windy hill near the boilers, and a daily supply of wood is kept inside the boiler room. Benefits of the new system include 31% reduction in cost to heat per square foot per heating degree day, significant shift from fossil fuels to renewable wood, and local sourcing of heating energy.

As part of its research efforts, Harvard Forest carefully monitors the heat output of the boilers and the moisture content of the fuel. Harvard Forest would like to add a fourth boiler which will be able to tolerate cordwood with a higher moisture content and provide 200,000 BTUs/hr. This will reduce propane use on cold days and raise the efficiency of the system.

The total project cost was $830,000, which included heating equipment, building construction, new forestry equipment, and project design. It was funded by grants from the U.S. Forest Service Wood Education Resource Center, and internal financing from Harvard University and Harvard Forest.

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