



Longwood University
Farmville, Virginia
Energy—Heating Plant

SCHOOL

Longwood University is a four-year, state-assisted, co-educational university encompassing 60 acres centrally located in Farmville, Virginia. The institution has a total of 4,700 undergraduate and graduate students and approximately 900 staff and faculty. Best known for teacher preparation, Longwood offers more than 100 majors, minors and concentrations throughout the institution's three colleges: the Cook-Cole College of Arts and Sciences, the College of Business and Economics, and the College of Education and Human Services. The university also offers graduate programs in education, English, sociology, and a new MBA in Retail Management.

ABSTRACT

The current heating plant was originally constructed and commissioned in 1938 and consisted of three water tube boilers fueled by coal. In 1963, another coal-fired boiler was added to supplement the existing system. Throughout the 1960s and early 1970s, the government became increasingly more stringent on air pollution regulations. As a result, the heating plant was converted to oil due its relative low cost. In addition, the air pollution control equipment needed to retrofit the oil fired-boilers was more economical than that required if coal were burned. Two of the original coal-fired boilers remained in place to serve as an emergency backup. During the 1970s when oil prices rose to \$1.00 per gallon, the university conducted a feasibility study on converting the plant back to coal. The feasibility study concluded that \$1.7 million was needed to convert the boilers; the majority of the cost being required for the installation of the proper pollution control equipment in order to comply with air pollution regulations. This measure did not prove to be financially viable for the university. Instead, Longwood received permission from the Environmental Protection Agency (EPA) in 1981 to experiment with burning biomass, specifically sawdust, a byproduct from local sawmills. In 1983, the two remaining 1938 coal-fired boilers were used to conduct pilot tests on burning sawdust. The tests concluded that burning sawdust instead of coal or oil resulted in a significant cost savings and a reduction in harmful emissions. In 2004, the two 1938 converted sawdust boilers were replaced with one Hurst "Hybrid" wood-fired boiler.

GOALS AND OUTCOMES

Today, the single sawdust burning boiler supplies 90 percent of the annual heat and hot water needs of campus. A replacement heating plant is under construction to expand the campus' use of renewable energy. Upon completion in January 2010, the new heating plant will contain two sawdust-fired boilers (one new boiler and one relocated boiler from the old heating plant), each with a steam generating capacity of 20,000 pounds per hour. The new heating plant will also have a sawdust storage facility, sawdust handling system, pollution control devices, auxiliary equipment, administrative office space and space for a third boiler. The sawdust storage facility consists of two silos with a maximum capacity of eight days worth of sawdust. This will help the university in reducing its carbon footprint because tractor trailers are used to haul sawdust from a remote location to campus several times a day. The new heating plant will provide 100 percent of the campus' steam and hot water needs and will be able to accommodate future campus growth. The project will cost \$12 million and is anticipated to save the university a total of

\$500,000.00/year as a result of sawdust being more economical than fuel oil which will be used only as a backup.

Longwood University received a \$4,000 grant from Old Dominion Resource Conservation and Development to partially fund an engineering study to determine the feasibility of producing electricity and chilled water from the steam produced by the two biomass-fueled boilers. This process will use steam in the summer to power steam absorption chillers for building air conditioning and will also recover energy from the steam to generate electricity year-round.

In addition, a long term goal for the heating plant would be to develop a sustainable initiative to establish and manage the entire supply chain of renewable energy in accordance with best management practices in forest and habitat management. As Longwood plans for the future to secure a reliable supply of sawdust, there are two significant issues with purchasing from local sawmills. First, this is a source of fuel dependent upon the market fluctuations in the lumber and wood-pulp industry. Second, there is no assurance that good environmental practices are being utilized throughout the supply chain for this fuel. The positive aspects of using a renewable fuel are potentially being negated through loss of habitat and the failure to replenish clear cut tracts of land. Longwood University believes that by establishing and managing its own timber growing and wood fuel production process would have several long-term advantages –

- Ensure reforestation and sustainably managed timberland
- Serve as a model for the development of sustainable practices for an emerging renewable energy production industry
- Provide long-term, reliable, and consistent source of renewable energy for the University

CONTACT INFORMATION

Contacts

Kelly Martin
Sustainability Coordinator
434-395-2572
martinka2@longwood.edu

Case study submitted by:

Kelly Martin
Sustainability Coordinator
434-395-2572
martinka2@longwood.edu

MORE ABOUT YOUR SCHOOL

Campus Sustainability History

In June 2008, Longwood University received a \$138,000 grant from the Jessie Ball duPont Fund to support the consolidation of Longwood's existing sustainability efforts into an expanded comprehensive program. The grant will also partially fund the hiring of a full-time sustainability coordinator who will develop, implement and direct Longwood's sustainability program. In September 2008, Kelly Martin, a 2007 Longwood graduate, was appointed as the institution's first full-time sustainability coordinator. In spring 2009, Longwood was honored by the National Wildlife Federation as a winner in the annual competition *Chill Out: Campus Solutions to Global Warming*. The video entitled "Longwood . . . Creating a Sustainable Future" can be viewed at <http://www.gogreentube.com/watch.php?v=NDc1NDEx>. Longwood University was also designated a "Virginia Green" site in a statewide campaign to promote environmentally-friendly practices in the tourism industry. The Virginia Green program, coordinated by

the Virginia Department of Environmental Quality (DEQ), recognizes a facility for being "committed to minimizing its environmental impacts by preventing pollution wherever feasible in its operations." Other sustainability efforts consist of a pulper being installed in the dining hall enabling the university to begin composting the food waste with landscaping debris and ash from the heating plant. The dining hall discontinued its use of trays in fall of 2008, in order to conserve water and energy. The university's recycling program collects and recycles paper, newspaper, magazines, aluminum, plastics (1-7) and cardboard. Longwood's Health and Fitness Center has received two awards: Gold Leadership in Energy or Environmental Design (LEED) certification and the Virginia Sustainable Building Network's 2008 Green Innovation Award for Best Green Institutional Project. Sustainability goals were incorporated into the recently completed 2020 Campus Master Plan which includes water, material flows, energy and carbon dioxide and transportation. For additional information about Longwood University's sustainability efforts, please visit www.longwood.edu/sustainability.