**Project Overview**

The Morris Arboretum received a Green Fund Grant to purchase and install an EPA-certified hydronic heater unit (an outdoor wood-fired boiler) to minimize the need for heating oil to heat the Mechanic's Shop building. Wood is a natural waste product of ongoing horticultural operations, and much of the wood pieces are too large to be chipped for use as mulch. Therefore, this project was intended to not only heat the building with a free and clean fuel source but also to solve a waste problem at the Arboretum.

Adding the E-Classic 1400 wood-fueled heater reduced the building's oil consumption by 66% compared to two years earlier and reduced the cost of fuel oil for the building by 71%. During the 2008-2009 heating season, 1,276 gallons of heating oil were delivered, at a cost of $3,721. During the 2010-2011 season, 424 gallons, at a cost of $1,058 were delivered to the tank supplying the Mechanic’s Shop. Therefore, the wood-fueled heater reduced the building’s heating oil demand by 852 gallons and resulted in a savings of $2,663 compared to the prior year.

See additional photos on page 3.

**Lessons Learned**

At the project’s outset, expectations for weekday system operations included a schedule for staff to add wood to the wood-fired unit during the mornings and late afternoons to maintain comfortable building temperatures throughout the day. Once the wood fuel was exhausted during times of vacancy (nighttime, holidays), the oil-fired heater would take over and maintain the building temperature at a minimum safe level (50°F). One project challenge included accurately estimating the quantity and size of the wood that was needed to fuel the wood-fired unit. Some experimentation was completed by Keith Snyder, Equipment Supervisor and primary occupant of the Mechanic’s Shop building, to
determine thermostat set points that would best reduce the need for supplemental oil heat while minimizing discomfort to early-morning building occupants. Analysis of wood usage after some time of operation suggested that a smaller volume of wood than expected was required to heat the building effectively. This means that supplying the heater in future years will not be a problem. Further evaluation indicated the largest size of wood pieces that would effectively burn, in order to avoid unnecessary cutting and splitting.

Morris Arboretum anticipates future energy-efficiency improvements that will further reduce the building’s heating load, and therefore reduce the demand for heating oil during times when the building is unoccupied.

Press

Penn Current highlights the Waste Wood Project – Read More
The Daily Pennsylvanian features Morris Arboretum’s Green Fund Project – Read More

Additional photos:

ThermoPEX pipe runs underground from the wood-fired outdoor unit and enters the building through the foundation (lower right corner of photo). Copper pipe, insulated and encased in PVC, carries the hot water to a heat-exchanger within the existing forced-air system.
A heat exchanger installed within the existing ductwork allows heat from the wood-fired outdoor unit to be used when available, leaving the oil-fired heating system in place as a backup heat source.