

## Wider application

The boiler technology is robust and well developed, but there is a need for woodfuel itself, in order to facilitate mechanical delivery. Woodfuel is a viable option for urban forest, for small to medium size buildings such as schools, clinics, etc. Transport of fuel is a key issue, both in financial and environmental cost terms. Transport to local urban forests is critical to the sustainability of woodfuel energy, but in rural areas.

## Further information

### National Urban Forestry Unit

This leaflet is one of a series produced by the National Urban Forestry Unit which provides a national focus for the exchange of information and good practice. For more like further information on other case studies, or if you have examples of your own, contact:

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### Forest of Mercia

The Forest of Mercia is one of 12 government-backed Community Forests established for wildlife, work, recreation and education around some of England's most beautiful landscapes have great biodiversity and include woodlands, hedgerows, heathland and

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### Further reading

[ETSU B/W5/00241/REP \(1993\)](#)  
*Energy Forestry in the Forest of Mercia*

[ETSU B/U1/000553/REP \(2000\)](#)  
*Shenstone Lodge School: Development and demonstration of a contained woodfuel heating system*

[ETSU B/ U1/00647/REP \(2000\)](#)  
*Shenstone Lodge School heating demonstration project: Phase II Woodfuel from forestry and arboriculture: Good practice guidelines*

[Forest of Mercia \(1999\)](#)  
*A wood energy plan for the Forest of Mercia*

[ETSU B/U1/00570/REP \(2001\)](#)  
*Monitoring Wood Heating Plants 2*

Photography: Talbotts Heating Ltd

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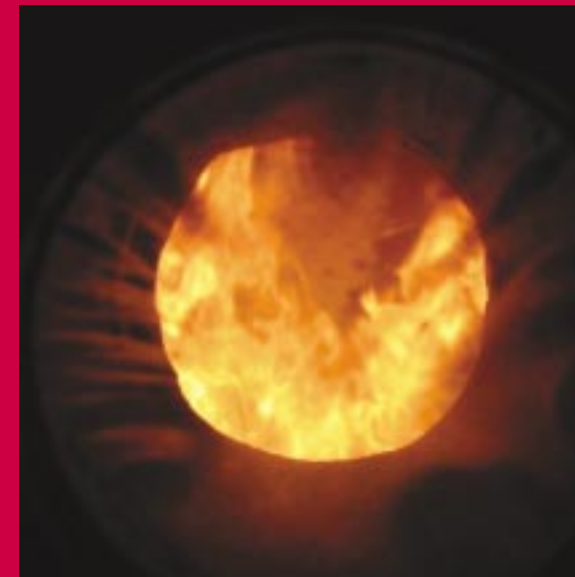


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# Urban Forestry in Practice

## Wood Energy



CASE STUDY 36

# Wood Energy

## Introduction

The burning of non-fossil fuels is being encouraged by the UK Government, as part of a sustainable energy strategy aimed at reducing oil, coal and gas consumption. Biomass, in the form of wood fuel, is one option which is potentially available from specially planted and harvested coppice crops and also from more orthodox waste wood from woodland management. Wood energy is only viable if the points of production and consumption are close together, and this offers an attractive opportunity to provide a renewable energy supply for buildings within an urban forest setting.

## Specific example

### Project name and location

**WOOD ENERGY DEMONSTRATION**, Shenstone Lodge School, Shenstone, Staffordshire, UK.

Grid Reference: SK 111030

### Project partners

- Forest of Mercia Community Forest
- Talbot's Heating Ltd of Stafford
- Sandwell Metropolitan Borough Council

### Project objectives

- To demonstrate new automated woodfuel handling technology
- To demonstrate a stand-alone wood combustion installation
- To test how dependable the woodfuel supply would be within an urban / urban fringe forest context

### Site description

Shenstone Lodge School is in south Staffordshire, and is managed by Sandwell Metropolitan Borough Council. It provides residential accommodation during the school term for boys between the ages of 5-11. The school occupies a substantial Victorian house which is heated by a gas system, consisting of two gas boilers with a combined output of 500 000 BTU (528MJ) They are situated in a purpose-built boiler house.

### Project design

Prior to the setting up of this particular wood energy demonstration, an inventory of the existing woodlands within the Forest of Mercia area was undertaken in order to assess their potential for woodfuel. The wood for the demonstration was to be harvested from three local woods: Shire Oak Park in Brownhills, Cannel Mound in Wimblebury and Watling Street Plantation at Gailey.

The existing gas fired system at Shenstone Lodge was retained in reserve alongside the new wood-fuel boiler. The wood combustion system was housed in a conventional steel haulage container next to the established boiler house. The container was modified to accommodate a standard *Talbot C3* combustion unit, with a 527.5 MJ (500 000 BTU) output capacity, as well as a fuel hopper and automatic feed system. A hydraulic lid was incorporated into the roof of the container to allow woodchips to be delivered via a high-lift trailer, directly into the hopper.

*The system is simple, with woodfuel transferred mechanically from hopper to burner*



Once delivered into the hopper, the woodchips were transferred on a moving floor onto a screw-fed auger which, in turn moved the chips into the combustion chamber via an intermediary rotary valve and a secondary auger screw. The system was connected directly to the existing heating system. Controls within the system were designed to re-employ the gas boilers, in the event of the wood combustion system being out of use.

### Project management

The combustion system was installed in March 1997. The forest based chippers proved unable to provide woodchip that met the boiler manufacturer's requirement for uniform size and moisture content not exceeding 30%. Automated feed systems are generally unable to cope with slivers, since they tend to block the rotary valve and starve the boiler of fuel. As a consequence, woodchips processed from sawmill waste had to be used in the first two heating seasons.

In September 1999 the fuel source was changed to wood pellets, manufactured from woodland derived biomass and agricultural waste. This proved satisfactory.

### Educational benefit

As part of the project, teachers at the school produced an education pack explaining the process of woodland management, woodfuel supply and combustion technology. The education pack was deigned for pupils studying Key Stages 1 and 2 of the National Curriculum.



*Pelletised woodfuel helps the system to run more smoothly, with less risk of blockage*

### Results

During the course of the demonstration, a number of other modifications were undertaken to make the system more effective. The moving floor was made more robust and ventilation within the hopper was increased to prevent condensation.

The technical specification of the combustion system was also modified. The local woodfuel supply chain proved adequate, provided the biomass was processed into fuel pellets of consistent shape and moisture content.

The annual consumption of woodchips was estimated at 70 tonnes and pellets at 40 tonnes. During the 8 week test period when pellets were used the cost of providing heating for the school was £780 compared to £602 for gas. To meet the gas price the pellets would need to achieve a delivered in price of below £40 per tonne. The total tonnage of woodchips could be reduced by ensuring a moisture content of less than 25%.