

Sustainable energy in practice - Worcestershire County Council's Wood Fuel Project

Introduction

The Weobley Schools biomass demonstration project in Herefordshire, developed by Hereford and Worcester County Council in 1996, was successful in terms of substantially reducing CO₂ emissions from new school buildings. The boiler plant was conventionally procured and the Council retained the risks surrounding fuel supply, quality and consistency, some of which proved problematic in practice. However the design and operation of the wood burning boiler at Weobley had a major influence on the council's thinking regarding low carbon woodfuel heating, and led to the development of a wood fuel heat purchase contract for the Council's second wood-burning installation at County Hall, Worcester.

The approach

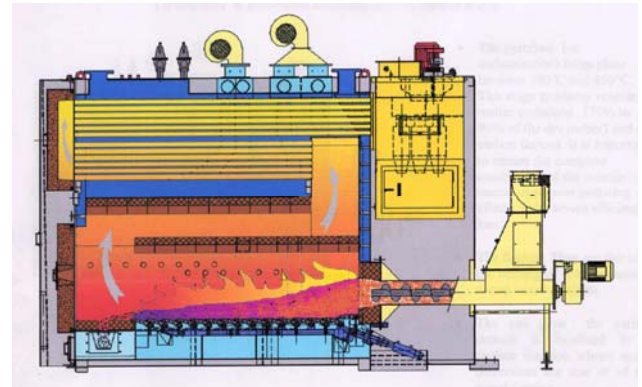
The contract to supply heat to County Hall is a ten year energy services contract with specialist company Econergy Ltd. The



company supplied, installed, owns and operates the boiler plant, which produces around 1.3 million kWh/year of heat from between 500 and 600 tonnes of biomass fuel. Heat is measured by a certificated

heat meter and sold to the Council, at a tariff which was originally linked to the cost of heat energy generated from gas, the existing fuel for the campus. Heat from wood fuel is now substantially cheaper than heat derived from gas, due to recent gas price increases, and the Council has renegotiated the tariff formula with Econergy, thus benefiting from reduced energy costs.

The boiler itself is a Compte Compact DH-V 70 horizontal grate, wet wood chip boiler, rated at 700kW when burning fuel



with 45 per cent moisture content. It is warranted at over 80 per cent efficient over its full output range. Fuel is fed to the boiler via augers from the Econergy-designed roll-on roll-off 'hooklift' bin



system, with two 35m³ steel containers for storage. Each container holds about 9 tonnes of fuel, and the plant burns up to 20 tonnes per week at full load. There is no tipping on-site and no underground bunker, merely a flat concrete pad.

Econergy Ltd undertakes all the operation and maintenance on the plant. A number of operational problems arose in year one and year two but these were of a developmental or 'teething' nature. The plant is now nearing the end of its fourth full season of operation, and no down time has been experienced this year.



The heat purchase contract states that not less than 60% of the wood fuel must be sourced locally, and the majority of which comes in the form of chipped 'slabwood', dry untreated offcuts from two Worcestershire sawmills. In practice, over 90% of the fuel comes from sources within the county of Worcestershire, all fuel being stored and chipped at a local farm less than 7 miles from the site, and delivered by a local haulage contractor.

Achievements

The boiler began generating heat in September 2002 and has been in full operation since then. In a typical winter month, wood fuel provides around 125MWh of heat, approximately half the



total demand of County Hall. Over the 2005/6 heating season, the boiler has so far supplied 1,138,140 kWh of heat generated from over 400 tonnes of wood chip, equivalent to a reduction of the emission of 216 tonnes of CO₂. In total, some 700 tonnes of carbon dioxide emissions have been avoided over the first four years of operation of the wood burning system.

Although the aim of the project was to reduce CO₂ at minimum cost, measurable financial savings have also begun to accrue due to the steep rise in gas prices. These are still to be audited, but early indications suggest that the Council is

currently able to procure heat from wood around 28% cheaper than from natural



gas. This has been confirmed following the negotiation of a second wood heat supply contract with Midlands Wood Fuel for the new Countryside Centre 25kW wood boiler.

Next steps

The council is also installing biomass heating at the Worcester Woods Visitor Centre, and is undertaking feasibility studies at other sites in the County. The council's energy and engineering design teams are providing advice and support to other local authorities and organisations interested in the adoption and promotion of wood fuel energy. Presentations have been given to the Energy Institute, the Institution of Electrical Engineers, local Town Planners, Excellence^{now}, SCEME, COPROP, DeFRA, the Local Government Association, and in association with the Forestry Commission to wood fuel seminars in the region, the West Country, the East Midlands and the North West. Numerous other County and District Councils, elected members and interested organisations continue to visit what is still understood to be the largest and longest-established single wood-burning boiler in the UK public sector.

Further information

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ADDENDUM

Since the above article was published in *SCALA News* in 2006, Worcestershire County Council has constructed and commissioned, or is planning, further biomass heating systems at the following sites:

Bewdley High School – 100kW
Hanley Castle High School – 100kW
Fort Royal Primary School – 100kW
Birchen Coppice Primary School – 150kW
Sutton Park Primary School – 100kW

We have also commissioned our first Ground Source Heat Pump system, a 130kW design at Red Hill Primary School, an award-winning new school in Worcester.

P N Harris
Updated 9 November 2007