Case Study 1

Pinkworthy Barn

Oakford, Devon

AUTOMATIC WOODCHIP HEATING

Project Details

Pinkworthy Barn was used as workshops up until 2001 and was heated using a combination of electric heaters and wall mounted LPG burners. During 2001 the 250 square meter workshops were converted to offices and a radiator and underfloor system was fitted throughout. A new wood chip boiler was specified and installed which has sufficient capacity to heat both the offices and the neighbour's swimming pool. Enough spare capacity is available to cater for future additional space heating loads, which includes an existing large house and workshops and a further three bedroom house.

The subterranean boiler house includes an 18m^3 fuel silo with a hinged roof to enable easy dumping of chip using a fore-end loader or agricultural tipping trailer. Locally grown wood is chipped using a fuel-wood chipper to provide dry fuel of a consistent quality and particle size.

The boiler is separated from the existing buildings by 15m and so twin heating pipes were laid underground between them. The pipes are encased in a flexible insulated conduit similar to large drainage pipe and have a very low heat loss. The boiler is therefore able to work effectively at large distances.

How it Works

The silo is a 3m square by 2m deep block-work construction with a central revolving 'agitator' with two sweeper arms. An auger, in an open inclined trough, receives chip from the sweepers and conveys it into the boiler room where the auger continues within a closed

tube. The chip is dropped through a rotary valve seal into a horizontal 'stoker auger' at ground level which feeds the boiler with fuel on demand.

The boiler and feed system is operated by the electronic controller which can be interrogated, via a phone connection, by a remote computer. The boiler has separate fans for primary air, secondary air and exhaust gas extraction, all of which are operated by the controller.

The feature that enables the controller to work so well is the oxygen sensor in the flue. Using the information this provides, the controller can vary the fuel and air supply rates to allow the most efficient burning of the fuel, while giving the heat output from the boiler that is required at that time. An exhaust cyclone is fitted as an option on the flue which makes any fine dust particles drop out of the gases for periodic collection.

On startup from cold some smoke is emitted for a short time, but once under normal running conditions the exhaust is clear and, using correct quality fuel, the emissions are within the strict Austrian and UK regulations for pollution.

Maintenance

Once a week the ash gate is revolved to let ash drop from the combustion chamber into the ash store. Then at intervals of approx. 4-6 weeks (dependant on usage) the ash store is emptied. Other routine mechanical service items are attended to on a longer periodic schedule, such as greasing points on auger bearings. At two points within the heating season (suggested by manufacturer) the dust from the cyclone is emptied and at the same time the heat exchanger tubes of the boiler are swept.

Technical Details

Boiler	Binder - RRK 49-70
Rated Heat output	70kW
Fuel moisture content	<35%
Fuel particle size	up to 25mm cubes
Building size	6m x 3m x 2m high
Chip store volume	18m^3
Power supply	3 phase 16Amp
Distance from buildings	15m in this installation

Devon County Council

Renewable Heat & Power Limited

South West of England
Regional Development Agency

The Countryside Agency