

Installation and use of 40Kw Wood Fuelled Boiler

Case Study 1

Introduction

In July 2006 we installed a 40 KW Vigas log fired boiler to provide central heating and hot water.

The house is a five-bedroom three storey Victorian house. A Hoval combination boiler previously heated the house. This was installed in 1968 and could be powered by either solid fuel or kerosene. In practice we only used kerosene, as using solid fuel was very inefficient. The Hoval boiler had an output of 168000 BTUs (approx 50kw).

We had to do something about the heating system in the house for two reasons. The Hoval boiler was beginning to show its 38 years, as a leak had appeared in the cast iron water tank that sits above the boiler unit. Secondly, in comparison to modern boilers, ours was very inefficient. This coupled with nearly 40 pence per litre price for kerosene in 2005 meant that we could not afford to have the central heating on.

We decided to install a 40 kW Vigas boiler. As a back up, and as a means of heating water in the summer, a Grant Euroflame 30 kw boiler.

Plumbing Circuit

The Vigas boiler is effectively in a primary circuit that sends hot water to an accumulator tank. Between the boiler and the accumulator tank are three radiators. These radiators help to shed the 8 kW of heat that the boiler produces even when in slumber mode. A flow pipe from the accumulator returns to the Vigas boiler. The secondary circuit consists of a hot feed going from the accumulator tank to the oil-fired boiler and then onto the central heating circuit and the hot water tank. In this way the oil-fired boiler acts as an automatic back up to the wood fired boiler. Water flows through the oil fired boiler from the accumulator tank, the thermostat in the oil fired boiler senses if the temperature of the water from the accumulator has dropped below the desired temperature and the oil fired boiler will come on. Thus if the Vigas boiler burns out while we are out we will still have hot water on our return. In practice this has not been necessary, for all of the 2006/7

winter the oil-fired boiler was not used.

Fuel Savings

The winter before we installed the Vigas boiler, i.e. November 2005 – April 2006, the Hoval oil boiler used 4200 litres of Kerosene. This was with the central heating in the house being kept to an absolute minimum, probably no more than three weeks through out the winter period. During this period the price of Kerosene reached 39 pence per litre thus 4200 litres = £1638.00. At the current price of 34p/litre this equates to £1428.

Last winter with the central heating on continuously from November till the end of March we burnt approximately 35 cubic metres of hardwood logs. I would estimate that this equates to 30 tonnes of wood. Firewood is in plentiful supply on the farm, but there is an opportunity cost in that this timber could be sold to a local firewood merchant for about £15 per tonne. In addition there is a time cost in cutting the timber into logs I estimate this to be about £3 per tonne. Thus the cost of heating the house with 30 tonnes of wood works out at £540 as against £1428 to heat the house for limited periods with kerosene. Thus equates to an annual saving of £888.

These savings combined with Clear Skies grant of £1500 mean that the payback period, for installing the Vigas log boiler and all the related works is 6.5 years.

Fuel Storage and Usage

We burn predominately hardwood logs. These are seasoned for about 18 months prior to being cut into logs. Logs are cut to 0.5 metres in length and stored in pallet-based boxes. Each box holds about 0.7 cubic metres of logs. The boxes are stored two high and the top box covered with plastic. In this way the logs dry to the required 25% moisture content.

The boiler is situated in a utility room, which opens out to an area at the front of the house where three log boxes are placed. These boxes

will provide ten days worth of fuel and are moved by the farm's Matbro forklift. We transfer logs from the boxes into a trolley (a vertical crate on wheels standing about 7 feet high) this holds all the wood from one pallet box. The trolley is then wheeled from the pallet box to the boiler so that logs can be transferred directly into the boiler without having to go outside. The trolley needs refilling roughly every three days.

If the central heating is on all day, such as on a weekend, the boiler needs filling three times a day. During the week this reduces to two times a day, but this depends a bit on the outside temperature and how you set the thermostat in the house.

Conclusion

There is one area of our installation that needs further consideration - the use of the accumulator tank. I had hoped that we could batch burn wood so that the accumulator tank that would provide hot water for the next two days without having to have the boiler going all the time. In this way we could use wood fuel to provide us with our hot water in the summer. However this is not the case at the moment. Because water from the accumulator tank can flow back around the primary circuit, heat is lost through the 3 radiators which are needed to shed the 8 kw of heat produced by the boiler when it is going. The obvious answer would be a non-return valve but that introduces an impedance to the flow of water, and it could jam and cause a major problem. I would be interested to hear from anyone who has overcome a similar problem.

We are very pleased that we installed the Vigas log boiler. We now enjoy a warm house with a comfortable temperature of 20C in the winter. It is saving us money and keeps the farm tidy by burning up old bits of wood that might otherwise sit about the place.

We were greatly helped in the installation by Dunster Woodfuels who supplied the boiler, G. J. Strong Ltd who fitted the boiler and carried out all the plumbing, and Eco-Exmoor who helped with the Clear Skies grant application and advised on aspects of the installation.



If you would like information on how to go about claiming from the SDF fund for your boiler installation or to check your eligibility, please contact South West Wood Fuels



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