Woodfuel System Information

25 kw Kunzel wood pellet boiler and 500 litre accumulator tank

Introduction

System components: 25kw Kunzel wood pellet boiler, 500 litre accumulator tank

The boiler was fitted in July 2007.

This system supplies heat and domestic hot water to a 1950's-built 3 bedroom brick bungalow near Beauly. The total heated volume is about 250m^3. The boiler, with integral 140kg hopper, is situated, along with a 500 litre accumulator tank in an existing garage about 2 metres from the house.

The owners bought the house in late 2006 and completely renovated it before moving in in Spring 2007. The pellet boiler is their main source of heat and hot water, although they also have a log-burning stove in the living room. During the renovations, the owners also installed cavity wall, loft and underfloor insulation. They also keep the thermostat set low for energy-saving purposes and have made a conscious effort to minimise their fuel requirements.

Their annual pellet usage is 4 tonnes which is less than they had expected.

Why Woodfuel?

When the owners bought the house it required total renovation. They were keen to choose a renewable energy source – environmental reasons and sustainability were the main drivers for this. However, cost of fuel was also an issue, as oil would have been the most realistic non-renewable alternative due to the rural location of their house. They did look into other renewable sources, in particular ground-source heat pumps, but woodfuel was the most suitable. They decided on pellets rather than other forms of woodfuel due to convenience and ease of storage.

Installation

The boiler was fitted in an existing garage, which was highly suited to this purpose as it was very close to the house and had plenty of space for the boiler, accumulator and pellet storage. The house was completely re-plumbed so this was designed to go with the boiler. The building warrant for the renovations included the installation of the boiler.

Finding Information about Woodfuel

Finding information was easy as they had a contact who worked for Highland Birchwoods. They also contacted Highland Council's Energy Advice Centre but did not find them particularly knowledgeable about renewables. They felt that there was no clear source of information available unless you already knew where to look. Even with other renewables e.g. ground source , word of mouth, for example through work colleagues who were also looking into it, was the main way they found information.

Finding Installers

The owners looked for installers by searching the internet and taking advice from Highland Birchwoods. However, finding an installer to actually do the work was not easy. They found that most installers were so busy that they did not make contact quickly, and that there were few based locally. They eventually decided on the installer who was the most responsive, but even this one took months to get back to them initially.

The installer carried out all the scaling and was very professional and efficient. They also gave lots of useful advice about storage requirements. The servicing costs from the installer were extremely high but the owners have found it reasonably straightforward to do the servicing themselves.

Heat Plant	Domestic Pellet Boiler
Max output	25kw
Make	Kunzel
Fuel Type	Wood Pellets
Fuel specification	8mm
Installation date	July 2007
Backup system	Back-up electric water heater and separate woodburning stove in living room
Woodfuel Store Capacity	140kg integral hopper and 1 tonne -2 tonne in reserve in the garage
Annual Woodfuel Use	4 tonnes
Accumulator Tank	500L
Building	
Heated Area	100m^2
Heated volume	250m^3
Building fabric	brick
Building Use	Domestic
Owner	Private
Nearest town	Beauly
Region	Highland

Installation Costs	
Boiler House	Existing garage
Boiler, accumulator tank and installation	£14262.53
Total	£14262.53
Grant aid (£)	£4000
Grant aid %	28%
Source	SCHRI
Cost Comparison	
Previous Fuel Type	Electric storage
Previous Fuel Cost pa (equiv)	£ 1650 (current equivalent for projected energy useage)
Wood Fuel Cost pa	£800
Previous CO2 emissions (Conventionally generated electricity)	8.31 tonnes per annum
Pellet co2 emissions	1.34 tonnes

Finding a Wood Pellet Supplier

The owners found it easy to find suppliers through websites etc., but the main problem was the delivery distances involved. There was a real lack of suppliers based in the Inverness area, and the nearest were in Perthshire and Aberdeenshire. It therefore took a while to sort a supply out, as for financial and environmental reasons, keeping the delivery distance to a minimum was key. Sourcing a supply was done fairly late in the installation process.

They felt that the process could have been made much easier if there was one impartial central place to go to for advice on all aspects of using woodfuel and that this could perhaps be run by an organisation of which suppliers and installers could be members. Overall, they found there was a lack of basic information for the layperson wanting to get started.

For example, information on boilers is available, as is information on plumbing but they are not easily linked together if you do not already have knowledge in this area.

Also, information on how to use multiple renewable resources e.g. woodfuel and solar is difficult to find.

Satisfaction with system

The owners are very happy with their system and have recommended it, and pellets in general, to several others.

Lessons Learned

If the owners were to repeat the process they would install larger radiators (the plumber scaled these but had not worked with a woodfuel boiler before). They would also make better arrangements for storage of loose pellets in order to cut down on plastic bag usage, and to save money. Delivery of loose pellets is not practical to their property at the moment, but they may consider installing a larger hopper that could accept delivery by blower lorry if that option became available in the future.

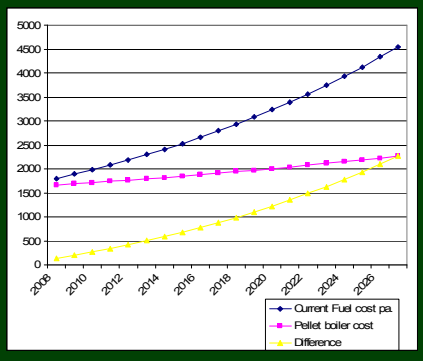
They would advise others thinking of installing a woodfuel to boiler to be careful in choosing a boiler and installer, and to speak to as many others who have been through a woodfuel installation as possible. In particular, pay attention to fuel quality – whilst the owners have not had problems themselves with substandard pellets, they are aware of others who have. Also, whilst their installation was expensive in comparison to others who have sourced a boiler and installed it themselves, there didn't seem to be many heating engineers with knowledge of wood pellet systems in the area if problems occur, so this is something to consider.

Lifetime Costs

Currently the owners are paying £200 per tonne of pellets, and they pick these up from a depot just outside Inverness themselves, so will be incurring their own delivery costs in mileage etc. They are hoping that the overall cost should reduce when wood pellets start to be manufactured locally in the near future.

They are aware that this was an expensive boiler installation, but as discussed above, they found it difficult to get an installer to commit to doing their installation and they were under a significant amount of time pressure to complete their property renovation as there was a time limit on the property they were renting at the time. This highlights the detrimental effect that lack of competition was having on

Assumptions:
Electricity costs rise at 5% pa.
Electricity price based on 3rd quarter 2008 at £0.114 per kwh
Pellet costs rise at 3% pa.
The capital cost of the boiler is paid over 20 years at 6% interest rate
Electricity costs do not include meter charges.



Costs have been derived from the equivalent electricity costs to supply the same amount of energy as supplied by the pellet boiler.

As the owners paid the cost of the boiler at the time of installation, their future heating and hot water fuel costs will be 37% of electricity costs at £ 0.042 per kw hour compared to £ 0.114 for electricity at 2008 prices. There will be an overall saving of £18,400 at 2008 costs over the 20 year life of the boiler when installation costs are taken into account.

Carbon Footprint

The annual carbon dioxide (CO_2) emissions for this system would be 1.34 tonnes. If the same amount of energy were to be supplied by conventionally generated electricity, the emissions would be 6.2 times higher at 8.31 tonnes.

More Woodfuel Information

You can find more information about woodfuel at : http://www.highlandbirchwoods.co.uk and http://www.northernwoodheat.net/

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