

# Woodfuel System Information Card

**50kw Baxi log boiler and 2,500 litre accumulator tank and 8.4m<sup>2</sup> of Solar Panels in an integrated system**

## Introduction

### System components:

Baxi 50 kw log boiler, 2500 litre accumulator tank and 8.4 m<sup>2</sup> of solar panels in an integrated system.

Fitted in Spring 2008

This system supplies heating and domestic hot water to a modern timber-framed block built 5 bedroom detached house. The total heated volume is about 480 m<sup>3</sup>. The log boiler and accumulator tank are situated in a single garage about 3 metres from the main building. Solar panels on the roof of the garage supply supplementary heat to the accumulator tank.

The owners have removed the old oil fired central heating boiler and rely on the log boiler for all heating and domestic hot water. They have fitted a wood burning Rayburn which is used for cooking and have a woodburning stove.

In the summer, the boiler requires to be lit every 8 - 11 days, depending on the amount of supplementary solar gain. The water remains above 40° C for this time. One burn takes about 30 kg of soft wood.

The owners process their own firewood, and anticipate an annual usage of 12 - 15 tonnes per year.

## Design Parameters

### The system was required to:

Meet all of the heat and hot water needs of the house from renewable sources  
Replace an oil boiler that had reached the end of its service life  
Fit into the existing garage  
Operate without requiring daily or day long attention

## Installation process

### Statutory:

The boiler was fitted into an existing garage, and retrofitted to the existing house plumbing as part of a renovation project. The building warrant for the renovations included the installation of the boiler .

### Installers:

Installation proved to be complicated because the system involves solar panels as well as the boiler. The main contractor was primarily a solar panel engineer, and it proved to be very useful to have the full co operation of the log boiler supplier to ensure that the two systems were properly integrated. The requirement for accredited installers for both technologies made the grant process more difficult, and complicated the process of obtaining a commissioning certificate. It was felt that the solar engineer gained very useful experience



## Heat Plant

Max output	50 kwh
Make	Baxi automated log burner
Fuel Type	Log
Fuel specification	500 mm log at about 10 cm diameter.
Max Moisture content	25%
Installation date	Spring 2008
Backup system	None
Woodfuel Store Capacity	N/A
Annual Woodfuel Use	12 - 14 tonnes (estimated)
Accumulator Tank	2500 litres
Solar Panels	8.4 m <sup>2</sup>

## Building

Heated Area	220 m <sup>3</sup>
Heated volume	480 m <sup>3</sup>
Building fabric	Wood frame block built modern.
Building Use	Domestic
Owner	Private
Nearest town	Dingwall
Region	Highland

## Installation Costs

Boiler House	N/A
Boiler	£ 11 000

Solar	£ 4100
Total	£ 15100
Grant aid (£)	£ 5500
Grant aid %	30 % per technology
Source	SCHRI

## Cost Comparison

Previous Fuel Type	oil
Previous Fuel Cost pa	£1800 at 2007 prices.
Wood Fuel Cost pa	£ 500

## Why Woodfuel?

The owners had previous experience of using woodfuel and good contacts with local suppliers. They did not want to install a pellet system because of the energy required to process and deliver them. It was also felt that the price of pellets would track the oil price, but unprocessed wood prices would remain relatively stable.

The owners source and process their own fuel by buying timber from the forestry sector. They cut it into 50 cm lengths and chop it to the required size. A log-fired system was chosen because it was felt that there will always be an affordable supply of fuel.

### How easy was it to find information on woodfuel heating?

There is a lot of information on web sites which made research easier. This was more complicated than replacing one oil boiler with another. It was difficult to find experts who could explain the advantages of different systems, and choosing the right system required a lot of determination. It would have been easier if there was a source of knowledgeable independent advice.

### What would have made the process easier?

The ability to talk to existing users and to see working examples.

An internet forum would have been helpful. It would have been useful to be able to read about other peoples experiences and to be able to send messages to more experienced users. There were some problems that had to be solved which had probably already been overcome by others.

### Are you happy with the system?

Yes, but it is early days. The system has only been installed for two months. Support and advice from the boiler supplier has been very useful, but there is a learning period required to make the best use of the new system.

The boiler only needs to be fired every 8 to 11 days when there is good solar gain, and every 5 to 8 days when it is overcast. The boiler needs to be lit less than the owners had initially expected in the summer. As it was fitted in the Spring, there is no data on the number of firings required in the winter.

### What would you do differently ?

Possibly fit a 3000 rather than 2500 litre tank. Thorough research carried out before fitting the system and the advice from the installers means that the system is all that we expected it to be.

### What would have made the process easier ?

It would have been easier if the supplier could recommend an installer, and if integrating the biomass and solar systems could have been more of a routine operation. Working with two installers on two systems made the installation more complicated than was necessary.

The SCHRI grant system was complicated by the need to employ accredited installers and to apply for different grants for two different technologies.

### Would you recommend the system to others?

Yes if they are willing to make the commitment to process the firewood or can get it delivered in the right sizes and moisture content.

### What lessons would you pass on to others?

Costs may be slightly higher than original estimates. Each system needs to be tailored to the requirements of individual buildings.

Be prepared to do a lot of research before deciding which system is right for you.

## Lifetime Costs

Replacing a domestic oil boiler with an automated log boiler, accumulator tank and solar panels:

#### Assumptions:

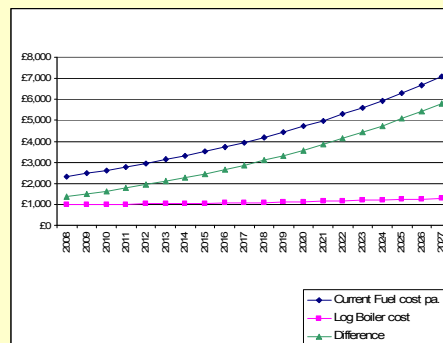
Oil costs rise at 5% pa.

Oil price based on 2<sup>nd</sup> quarter 2008 at £0.104 per kwh

Wood costs rise at 3% pa.

The capital cost of the boiler is paid over 20 years at 6% interest rate

No capital costs for replacing the oil boiler have been included



As the system has not been running for a year, costs have been estimated. Costs are based on previous energy use from the oil system. Some of the previous energy costs will be supplied from the solar panels. Additional heat will be supplied from the Rayburn and wood burning stove. These will be supplementary rather than the main heat sources.

Woodfuel prices have been based on the delivery price and no cost has been attributed to the labour costs of cutting and chopping the wood.

The inflation rate for oil (5%) will multiply the cost by about 2.5 over 20 years. The current price of heating oil has doubled in the last three years.

Based on the above assumptions, the cost of running the automated log boiler in a five bedroom house will be less in 2027 than the cost of running an oil boiler in 2008. The overall saving in 20 years will be £ 64,000 at today's prices.



### Carbon dioxide savings.

Based on the estimated previous use of oil, the energy demand of the building is about 25 mwh per annum. An oil burning system would produce about 8.68 tonnes of carbon dioxide (CO<sub>2</sub>)

Assuming that all of this energy is supplied by logs, the CO<sub>2</sub> emissions will be about 0.52 tonnes, or 6% of the oil emissions. This will be further reduced by some of the energy being supplied from the solar panels.

More Woodfuel Information

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

