



*Innovative people throughout the Highlands are turning to wood as the fuel of the future for homes and businesses. This series of factsheets features interviews with some of the pioneers who have been leading the way on woodfuel. The factsheets have been produced as part of the PELLETime project, a European collaboration between partners in Finland, Iceland, Scotland and Sweden.*

## The Lovat - Beaully

The Lovat Arms Hotel in Beaully is renowned for the warmth of its welcome, and is a magnet for visitors from across the globe.

However it's only recently the warmth of the building has come up to a par with the rest of the hospitality.

Built 140 years ago as a shooting lodge for the Frasers of Lovat, the handsome sandstone building has been heated by an inefficient mix of methods, ranging from open fires to calor gas boilers.

Now, thanks to a state-of-the art Froeling wood pellet boiler, the Lovat Arms is cosy throughout for the first time in its history.

Central heating has been installed in the public areas and in all the bedrooms and and public areas, keeping temperatures consistent throughout the hotel.

The Lovat Arms has been owned and operated by Fraser (Beaully) Limited over 20 years, and attracts Fraser clan members from throughout the world, keen to trace their roots in this beautiful part of the Highlands. Many come back again and again - as do the coach parties which frequent the hotel from Easter to October.

"The new boiler has transformed the place in terms of comfort," said non-executive director David Edes, "Regular guests are amazed by how warm it is these days!"

The constant struggle to keep the hotel warm, and spiraling costs of oil, electricity and gas, triggered the decision to install a new heating system in 2010.

Support and advice available from organisations such as Forestry Commission Scotland and the Carbon Trust helped convince the owners that biomass was the way forward.

"Making the hotel more environmentally friendly was one aspect of the decision to choose the wood fuel system, and the fact that we could get a grant and interest free loan to help cover the capital costs of installing really helped," David said. "To take out electric heating and install a wet system is a major capital cost and obtaining commercial funding in the current financial climate is very difficult - getting a grant and a loan made it viable."

"Beaully has no mains gas, so we were heating the hotel with a mixture of storage & panel heaters, electric fires, calor gas boilers and oil, as well as open fires; our energy bills were getting higher and higher and it was becoming a problem."

### The system

At the heart of the system is a 220 kilowatt Froeling pellet boiler, which burns at 600°C, heating water which is stored in two buffer tanks with a combined capacity of 4,200 litres. Should the wood fuel boiler fail, a back-up oil boiler switches in automatically with a warning

## The facts

Total cost of system	£150,000
Boiler	Froeling Turbomatic
Heat capacity	220 kilowatts
Hot water buffer capacity	4,200 litres
Fuel	Wood pellets
Fuel storage	10 metre modified shipping container
Number of radiators	70 (plus 4 staff rooms with underfloor heating)
Annual fuel usage	92 tonnes

light outside the boiler house, also wired to reception alerting staff to any issues with the system.

Water is heated in the wood pellet boiler until the buffer tanks reach 81°C, it is then circulated from the boiler house to the main parts hotel through insulated underground pipes. The water then passes through a manifold which distributes hot water to the central heating and to two heat exchangers to provide the hotels hot water.

When the temperature in the buffer tanks drop to 70°C the boiler cuts back in and bringing the temperature back up to 81°C.

Staff quarters behind the hotel are also kept warm by under floor heating fed by the system.



### Costs and funding

The total cost of the system was £150,000, paid for by a 50% grant from Forestry Commission Scotland and an interest free loan from the Carbon Trust.

### Greening the business

The fact the Lovat Arms is a historic building places considerable restrictions on alterations that can be made. The owners are keen to replace the windows with draught free, double glazed units but this is not permitted as it is a listed building. Improvements are made to the insulation whenever renovations are being done, all light bulbs are energy saving and the hotel sources food locally whenever possible.

There is a growing level of interest from guests in the environmental measures taken. "It's not something clients tended to show interest before, but since we've had the wood fuel boiler some of them have asked about it," David said. "And the longstanding guests keep commenting on how nice it is to be warm!"

"Now some of the tour companies that use the hotel are putting the fact we're using wood pellets for heating into their literature. The German and Dutch tourists tend to be more eco conscious and the companies are using that as a selling point. We're planning to use the fact we are heated by renewable energy in our own marketing."

### Fuel

Pellets are supplied by Brites of Invergordon, who have forged strong business links with the Lovat Arms. "The fact there was a pellet factory just up the road in Invergordon was one of the main reasons we decided to go for pellets - if you're going to reduce your carbon footprint transport distances have to be taken into account," David said.

"We looked into chips but decided against them because of reports of problems with jamming and consistency of quality - for us it was a priority to have an automatic system that would require minimal attention.

In March 2011 the Lovat Arms was paying £175 per ton plus VAT for pellets - a higher price than they had anticipated when commissioning the boiler in 2010. In the first ten months of its operation, the boiler has used 70 tons of pellets - and produced only a tiny box of waste. "We've been amazed by how little ash it produces - and how consistently fine and clean the ash is," said David. "We haven't emptied the ashcan since having the boiler installed in June 2010 and everyone who has looked at it reckons it perfect, because the boiler is burning so efficiently."

### Conclusion

Overall, the management team at the Lovat Arms are very happy with the new boiler and guests and staff alike are delighted with the cosy temperature and lashings of hot water it provides.

However getting the system installed while the hotel was operating wasn't without its problems. "We operated right the way through, apart from two days when we didn't have any hot water," David recalls.

"It had its moments - all the carpets and floorboards had to be lifted and pipe work put in place. We had water backing up and overflowing when the heat exchangers were put onto mains water pressure. In retrospect I'd say one of the most important things is to make sure the installer does a full site survey before they start. If problems are anticipated before the job starts they can be avoided. In a way we were guinea pigs for fitting this kind of system in an old hotel and a lot was learned from the experience."

David also stresses the importance of prompt service in case of problems. "A hotel operates 24 hours a day 365 days of the year and biomass companies need to be like any other heating suppliers and be on call."

He doesn't think the hotel has made great financial savings from installing the system - partially due to the fact that pellet costs have risen 33 percent since the original calculations were made. Another factor he says wasn't accounted for in original calculations was the £180 a month it costs for the electricity to run the boiler house.

However, David says, the effectiveness of the new system has made it worthwhile. "For the first time in 140 years this building is warm everywhere and that really is excellent."



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