

Biomass Fuel: Heating the Scottish Borders for Less

A study by the Borders Energy Farming Forum (BEFF) has uncovered the potential for a new industry through utilising local, renewable forest resources to cater for heating demand in the Scottish Borders.

Taking into account the available forest resource in the Borders and the advanced stage of biomass technologies, researchers have calculated how woodchip heating systems could be implemented by locals and the resulting economic benefit to householders and the Borders community at large.

BEFF has studied the feasibility of a woodchip industry based on the available woodland and potential demand, and has established a demonstration cluster that comprises a group of woodland owners. Using this information an outline of the potential woodchip market is detailed below in terms of the **demand** for the industry, the potential to **supply** it and the **saving** to the individual and wider community.

Biomass Fuel: Demand

Of the 50,000 households (June 2007) in the Scottish Borders, an estimated 17,000 are unconnected to the mains gas network. It can be assumed that the vast majority of these rely on kerosene to provide heating.

If around 30% of these oil-heated households in the Borders (approximately 5,000 houses) switched to woodfuel over the next 10 years, each with a wood fuel consumption of between five and 20 tonnes per year; an **area of woodland** of just **one to seven ha** would be needed to sustain this heating requirement.

Biomass Fuel: Supply

The total forest resource of the Borders covers an area of approximately 81,000 Ha, one-third of which is owned by the Forestry Commission, the remainder being privately owned. About 21% of this woodland area is classified as small woodlands of under 10 Ha; and are generally regarded as unviable for commercial forestry. It is these woodlands that could represent a source of local/small scale woodfuel.

Of this resource, the quantity of thinnings and smaller diameters which can be dedicated to biomass production is estimated at 65,000 oven dried tonnes (odt) annually. Given appropriate management, this resource is predicted to increase by 15% over a five year period and is estimated to contain a calorific value of 300 million kWh, potentially catering for the space and water heating requirements of **approximately 40% of the Borders population** presently relying on gas and electricity for fuel.

What's the saving?

The equivalent cost of woodchip required to cater for the heating demand of the average domestic property is **approximately one-third** that of heating oil, as the table below displays:

Heating Oil Vs Woodchip

Dwelling Size (Bedrooms)	Annual Kerosene Consumption (l)	Annual Kerosene Cost (£)	Equivalent Quantity of Wood Chip Required (tonnes)	Cost of Wood Chip (£)	Annual Cost Saving (£)	Percentage Saving on Annual Fuel Bill
3 – 4	3000	1050	5	275	775	74%

Assumptions:

- The average 3 – 4 bedroom domestic property consumes 3000 litres of kerosene per year
- Retail value of kerosene is 35p/litre
- Approximately five tonnes of woodchip provides the equivalent calorific value provided by 3000l kerosene
- Retail value of woodchip is £55/tonne

In very general terms if **5,000 households** were to switch over to wood fuel there would be a total saving of around **25,000,000 litres/year¹** of heating oil. The switch would save the average householder **£775/year** for a three bed house, and up to **£4,000 for some large detached households** (based on the current price of 35p per litre for heating oil). If heating oil prices rise again to recent highs of around 65p per litre, savings will increase further and payback times for initial boiler installation will reduce.

BEFF Demonstration Cluster

The BEFF demonstration cluster encompasses **324 Ha of woodland**. Given that the typical three bedroom household heating requirement can be supplied from a forest area of 1.7 ha, approximately **190 households** can potentially be supplied with heating from this area. This leads to a corresponding **offset of approximately 573,000 litres/year** in heating oil.

Therefore, this cluster of **324 ha of woodland has the potential to create:**

- **A saving of 573,000 litres of kerosene**
- **Offsetting £200,550 value in kerosene sales***
- **A £148,025 saving to consumers in the Borders****

*Based on retail value of kerosene is 35p/litre

**Based on 190 households saving £775/year

Other Benefits of Woodfuel

- **Fuel derived from wood is carbon neutral, clean and renewable**
- **Greater use of woodfuel leads to better management of woodlands, creating a sustainable habitat for wildlife**
- **Local jobs are created in forestry management, harvesting, processing wood and in the installation and maintenance of boiler systems**

¹ Assuming that the average heating oil consumption for a range of house sizes is **5000** litres/year

Concerns

Installation and Payback

Concerns raised during the BEFF study included the cost of initial installation of boilers. However, with the saving on fuel costs, the cost of installation could be offset after around **2.4 years**.

Installation cost of Woodchip Boiler: £4,800*
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Annual saving compared to oil	Installation payback period
£2000 **	2.4 years
£4370 ***	1.1 years

* Boiler size: 20kW (90% efficiency)

** **Bases on costing** £45/tonne woodchip; 35p/l heating oil

*** **Bases on costing** £45/tonne woodchip; 65p/l heating oil

Local Supply Chain

Local confidence in a local supply chain was also a concern. BEFF are confident that all the elements of the chain already exist and the supply chain can be developed in an efficient way using collaboration. Support to establish this supply chain could help boost confidence and kick-start this renewable energy industry in the Borders.