



WONDER FUELS?

With fuel prices at record levels again, could cheap wheat and woodchip replace expensive oil and lpg as the fuel of choice for heating farmhouses, farm cottages and buildings?

Andrew Pearce and **Kevin Lindegaard** look at what two firms have to offer

Farm2000

REDDITCH, WORCS

There is something not quite right about burning a staple foodstuff to warm your home. Yet the Scandinavians have been doing it for years, and over here the rising price of oil now makes thinking the unthinkable rather easier.

Using grain for heat can slash your domestic bill by about 50%, and you will be doing your bit to reduce global warming by not

firing on fossil fuel. Of course, there is a catch: Although long established abroad, the technology is pretty new to the UK and not cheap. Buying without asking the right questions and doing the maths will lead to tears.

WHAT'S DIFFERENT ABOUT A GRAIN BURNER?

Traditional biomass burners are batch fired – fed with wood or straw one or more times a day. Burners for granular materials (grain, woodchip) are auger-fed automatically, according to demand. Air is force-fed to the combustion area for a rapid primary burn. Some 50% of biomass energy is held in the resulting volatile gases, which are burnt simultaneously in a secondary air supply to release the remaining heat and prevent smoke and soot formation.

Almost any biomass that can be auger-fed – grain, grain tailings, woodchip, rapeseed mash, chopped rape straw, miscanthus grass and more.

Grain at 15% moisture contains slightly more energy than woodchip at 25%. Of the cereals, oats offers a little more heat potential than wheat or barley. Wheat is most prone to forming clinker.

IS MUCH INPUT REQUIRED FROM THE USER?

Farms usually have the equipment to bulk-handle cereals to the boiler hopper. Cereals produce more ash than wood, and clinker can form. Automatic riddling and ash removal (both optional on some boilers) can deal with both. Otherwise ash removal is required once or twice every week, and cleaning of boiler tubes is needed every two or three weeks. Both jobs takes a few minutes.

WHICH TYPE AND SIZE?

Operating flexibility comes from the ability to use the widest range of fuels; for example, grain, most sizes of woodchip and chopped

straws. Look for a boiler whose output can be automatically modulated down to a low percentage of maximum, ensuring that it can still be used through most of the summer. Woodchip is a good backup. The energy used in dicing wood is more than offset by increased boiler efficiency. Compared with burning logs, 30%-50% less woodchip is needed for a given heat release and the burn is smokeless.

WHAT'S THE BOTTOM LINE?

Take a typical five-bedroom farmhouse with an existing 45kW oil-fired burner. Farm2000 would probably suggest supplementing it with a biomass burner of about two-thirds the output (30kW), which will run continuously rather than periodically. The smaller burner saves capital cost and, run hard, it delivers high efficiency. Help may be needed from the original plant in the dead of winter, but the new boiler will still supply 95% of annual requirement.

A 30kW auger-fed biomass boiler with a grain hopper (rather than a woodchip version) costs about £9000 installed, plus VAT. If the farmhouse uses 8000 litres of oil a year at 35.5p/litre, the bill is £2840.

Of the 8000 litres, 95% will be replaced by grain – that is, 7600 litres costing £2698. One litre of heating oil is equivalent to 2.3kg-2.5kg grain, so a maximum 19t of cereals will heat the house for a year.

If grain is £70/t to produce, the bill is £1330. Thus you save £1368 (49.3%) a year by burning grain rather than oil. Which suggests that at current prices, a biomass boiler will pay for itself in 6.6 years, progressively sooner as the cost of oil rises, or if inputs can be reduced on grain destined for the fire. Given good maintenance, installation service life is at least 15 years.

Andrew Pearce



Farm2000's Peter Teisen with one of the company's grain boilers.



Grain boilers do produce ash and also generate clinker. But maintenance requirements are generally low.

Treco

CULLOMPTON, DEVON

Devon farmer Gordon Traill, whose company Treco sells and installs Italian-produced grain boilers, is convinced that this is the hassle-free way to use biomass energy.

"Everyone seems to make biomass complicated and it isn't," he says. "What people want is a reasonably-priced machine that can burn a cheap, readily available and easily storable fuel. What could be simpler than that?"

He now brings in Sicilian-made Tatano Kalorina boilers, which he feels combine good heavy engineering (the smallest boilers in the range weigh 300kg) and the ability to burn almost anything. Though the boilers can run on wheat, crushed rape and wood pellets, wheat has performed most consistently. Each comes with a 90kg hopper that holds a week's supply of wheat as standard, but most farmers would probably want to make up a bigger hopper to last several weeks.

The main competitors to grain boilers in terms of potential savings are woodchip or pellet boilers. Both have their place, he says, with the former very cost-effective

in large installations. But the need for a large space to store bulky wood chips and the industrial feel of the units can put people off.

Pellet boilers (like grain boilers) are more suitable for the domestic market and could be easily accommodated by anyone with a reasonably sized farmhouse. But the price of wood pellets (about £150/t) is twice that of wheat. As more pellet producers come on stream prices will come down, but it will be several years until pellet and wheat price meet.

One downside of grain boilers is that they generate ash and clinker. The boiler needs to be de-ashed weekly and the boiler



Biomass isn't complicated, says Gordon Traill.

pipes checked and cleaned every two to three weeks, but this is not particularly onerous, he says.

Servicing needs to be done annually, but involves mainly cleaning and checking, so most farmers should be able to do it themselves.

BUSINESS CASE

A five- to six-bedroom farmhouse with a heating bill of £2500 a year would make significant savings by converting to the firm's 30kW, £3700 grain boiler, says Mr Traill. Based on current oil and wheat prices, such a system would need about 18t of grain a year and would pay back the extra cost of installation in two years compared with a new oil or LPG system.

The boilers are guaranteed for two years, but life expectancy should be 15-20 years.

Larger boilers would be suitable for commercial applications such as heating farm offices and cottages, light industrial buildings and glasshouses. Heat in the form of hot water can be transferred via well-insulated pipes to cottages and outbuildings several hundred yards away. In cases where converted buildings are occupied by tenants, the heat could be sold to the end user via a heat meter.

Kevin Lindegaard

GRANTS

These are available under the Low Carbon Buildings Programme, a new two-tier grant system that came into force last month and replaced the previous Clear Skies grants.

* Stream 1 gives a maximum grant of £1500 for domestic-use or part-domestic, part-commercial boilers, but the grant cannot account for more than 30% of the cost (excluding VAT) of the boiler and installation. So only set-ups costing more than £5000 (ex VAT) will get the full £1500. It opened for applications on 24 Mar 2006.

* Stream 2 is for bigger commercial-use set-ups and is expected to give a grant that covers 40% of the boiler and installation costs. It is probably for bigger projects than most farmers would be tackling.

* In both cases you have to use an accredited installer to get the grant and have to have installed energy efficiency features like 270mm of loft insulation, cavity wall insulation, low-energy lightbulbs, room thermostats and programmable timers.

* For more details on both grants see: www.est.org.uk/housingbuildings/funding/lowcarbonbuildings/

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Other domestic-scale biomass burner makers:

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Manco Energy Ltd

01430 828 660
www.mancoenergy.com

Foundation Firewood

01763 849 468
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Louth Tractors Ltd

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