

# Chop energy costs with a biomass boiler

Installing a biomass boiler could be a relatively cost-effective way for farmers to reduce reliance on heating oil and become energy self-sufficient. **Kevin Lindegaard** reports

**O**il prices may have fallen from their 65p/litre summer peak, but with a recession beckoning, there are many reasons to consider replacing oil boilers with biomass systems and using a small area of land to self-supply wood fuel.

There are a variety of crop options available, such as short-rotation coppice (SRC) willow and short-rotation forestry (SRF). SRC will provide a quick supply of woodchip (three years) or logs (five years plus), but the wood is fairly light and burns quickly. SRF involves growing denser woods, such as ash, hazel and sweet chestnut on longer rotations (8-20 years). A combination of both SRC and SRF could provide a happy medium by accelerating your move to fuel self-sufficiency while ensuring a future supply of quality hardwoods.

## GENERALISED EXAMPLE

A medium-sized farmhouse might require 5000 litres of oil per year, equivalent to around 50,000 kilowatt hours (kWh). A 15-year-old boiler is likely to work at about 65% efficiency, meaning that 32,500kWh is "useful" energy.

A typical farmhouse needs heating for 1200 hours a year at full load. Dividing the energy requirement by the hours at full load means that a 27kW biomass boiler would be required.

To calculate the amount of woodfuel required, it is important

to make another boiler efficiency adjustment. A wood boiler will be around 85% efficient, giving a requirement of 38,235kWh (32,500 ÷ 85%).

If a log boiler was installed you would need nine tonnes a year of air-dried logs. This would take up a space of 22sq m. A woodchip boiler has a higher throughput (around 13t) because woodchip has a higher moisture content (30% compared with 20% for air-dried logs) and therefore lower calorific value. Chips are also less dense and will require more storage space.

## GROWING YOUR OWN

To produce sufficient woodfuel for the above example would require about 1.2ha (3 acres) of SRC in a four-year rotation. This would mean planting 0.3ha per year for four years. Planting machines are available, but at this scale it is possible to hand plant. One hectare normally takes 15 man days, so 0.3ha would take 4.5 man days. SRF has a lower stocking rate but would still take several days to plant; one operative should plant 500-700 seedlings a day.

At this scale you should be able to prepare land, purchase cuttings or seedlings and establish a hectare plot for £2500. There is a 40% Energy Crops Scheme grant available.

## HARVESTING

Large SRC plantations are harvested mechanically, but on a small scale they can be harvested by chainsaws



Farm woodlands could reduce reliance on heating oil considerably.

## WEB LINKS

[www.strawsonsenenergy.co.uk](http://www.strawsonsenenergy.co.uk)  
[www.econenergy.ltd.uk](http://www.econenergy.ltd.uk)  
[www.dragonbc.co.uk](http://www.dragonbc.co.uk)  
[www.jones-nash.co.uk](http://www.jones-nash.co.uk)  
[www.dunsterwoodfuels.co.uk](http://www.dunsterwoodfuels.co.uk)  
[www.ruralenergy.co.uk](http://www.ruralenergy.co.uk)

or brushcutters. SRC grower Ian Brown of Lee Moor Farm in Northumberland harvested 4.5ha in 17 days, followed by two days to clear the field using a telehandler and a further 2.5 days to chip. The labour, hire of the chipper and diesel cost £1600 or £355/ha, equivalent to £31/t of wood chip (at 30% moisture). Bought-in chip is typically £65/t.

Turning your plantations into logs might be more challenging (especially with SRC), although when grown for five years, most of the smaller branches will be outcompeted, leaving thicker stems.

## LOG BOILERS

Log boilers are more hands-on than automatic woodchip boiler

ers, requiring daily loading, but are cheaper with many reasonably priced options. The cheapest 25kW log boilers cost around £7500 fully installed. By contrast the cheapest automatic woodchip boilers cost around £20,000.

A grant of £1500 is available from the Low Carbon Buildings Programme, but to qualify you need minimum standards of insulation and cannot use the heat for farming activities.

Log boilers heat up a large accumulator tank (about 1000 litres in size for a 25kW system) which provides heating for several days. The cheapest systems need manual lighting like a wood stove. If space permits, it might be sensible to retain your fossil fuel system to augment the log boiler.

Eager farmers do not have to wait for woodland to grow before installing a system. Even if you source woodfuel from a local supplier at £70/t, you will pay about 2p/kWh, compared to 4p/kWh for oil at 40p/litre. Woodfuel prices are also more stable than oil.

[fwbusiness@rbi.co.uk](mailto:fwbusiness@rbi.co.uk)

## SYSTEM COMPARISON

	SRC	SRF
Rotation length (years)	3-5	8-20
Yield (odt/ha/yr)	8	5-7
Planting material	20cm cuttings	40-60cm seedlings
Cost	10p per cutting	30p per tree seedling
Stocking rate/ha	15,000	2,500