

Increasing oil costs have encouraged nurseries to explore alternative fuels. Kevin Lindegaard meets the pioneers of biomass systems

Instability in the Middle East is bad news for nursery owners. The price of oil has doubled in the past 18 months and another cold winter with oil at 40p per litre could spell disaster for many.

Yet most growers could turn this situation around to their benefit simply by replacing their fossil-fuel boilers with a biomass system using organic materials, such as waste wood.

Managing director Peter Teisen of Farm 2000 has installed 2,500 biomass boilers over the past 30 years, but he says only a handful of these were heating glasshouses. He says: "The problem is that nursery owners are very busy people, who don't have time to check the boilers."

Yet heating bills will continue to be one of the biggest outgoings for nurseries, so converting to biomass should help them to unlock hidden profit.

Owner Walter Rickard of Willow Brook Nursery in Nuneaton installed his first Farm 2000 boiler back in 1981. He replaced it in 1998 with a batch-loaded boiler, which is fuelled with pallet wood.

As an organic vegetable grower of 40 years, he was very keen to "go green", even though he was paying "next to nothing" for his coal-fed system.

He now uses 20 pallets a day during the heating season, which the company picks up from its distributors when they make deliveries.

"There are oceans of pallets out there," says Rickard. "Our heat is so cheap that we're rather wasteful of it. We don't worry too much about keeping doors closed — anyone else would be shouting 'shut the door'."

Several larger growers have also become concerned about unstable oil prices and have installed, or have plans to install, wood-fired systems (see case studies, overleaf).

Managing director Doug Bradbrook of Ravensworth Nurseries in North Yorkshire installed his Talbotts system last October and is very pleased with his investment, which included a £120,000 shredder. He expects to save about £70,000 per year on fuel costs and pay back the investment in six years.

Midlothian's Pentland Plants is installing a similar-sized Reka boiler in October because the firm can slash its £1m a year oil bill to £70,000-£80,000 by using 2,500 tonnes of wood.

However, director Geoff Parker of Essex-based Parkers Nurseries, which installed a biomass system last autumn, warns that the transition "is not as easy as it seems".

"There is a lot to learn," he says, "and we have had our fair share of teething troubles, particularly in terms of the quality of the fuel supply. It's very important to make sure your fuel supply matches your machine, with a consistent grade and moisture content."

Nevertheless, he feels his business has "definitely done the right thing" and invites other growers to view his system at the Eastgro exhibition, which his nursery will host on 28 September.

Surprisingly, not one of these companies has applied for grant funding to help fund their pioneering decision to switch fuel sources. Parker decided not to bother because, he says, "grants ▶

Blazing the trail



Money to burn: a boiler burning woodchip would cost 1p per kWh, while gas would cost 2.5p and oil just under 4p

are difficult to get and you end up having to jump through too many hoops”.

Pentland Plants partner Richard Spray adds: “Sometimes, you have just got to do it yourself. You might spend time on an application and while you’re waiting for a decision, you might be wasting thousands on fuel.”

However, Government grants for new biomass boilers are expected to be made available in November.

High-profile glasshouses heated with biomass fuels include the Eden Project in Cornwall (which uses a 400kW Binder boiler), the National Botanic Garden of Wales (150kW Nordist boiler) and Bristol City Council’s Blaise Nursery (500kW Binder boiler).

But it appears that more and more nursery owners are following these trail-blazers by weighing up the benefits of wood fuel.

As long as you have ample space to accommodate the boiler and fuel storage – and don’t mind operating a more hands-on heating system – there is ample opportunity to save money. ■

CASE STUDIES

	Ravensthorpe Nurseries	Pentland Plants	Willow Brook Nurseries	Parkers Nursery
Produce	Watch 'Em Grow products, ferns, poinsettias, palms	Bedding plants, plugs, poinsettias	Organic vegetables – cucumbers, tomatoes, aubergines	Patio plants, poinsettias, <i>Cyclamen</i> , geraniums
Boiler size	2,000kW	2,000kW	120kW	700kW
Make and installer	Talbotts	Reka (J Riley Beet Harvesters)	Farm 2000	Thermia (Egni)
When installed	November 2005	To be installed in October 2006	1998	Autumn 2005
Boiler and installation costs	£300,000 plus £120,000 for shredder	£240,000	£13,000 (would cost less than £20,000 today)	£240,000 (including costly ring main)
Glasshouse area (sq m)	10,000	20,000	1,350	20,000
Wood fuel source	Waste timber from joiners, pallets	Recycled and reclaimed timber	Pallets	Chipped waste wood
Wood fuel required per year	1,000 tonnes	2,500 tonnes	20 pallets per day – 80 tonnes per year	2,000 tonnes
Cost of wood fuel	£7 per tonne to shred	£25 per tonne	Free fuel	£20 per tonne
Savings over fossil fuel per annum	£70,000	£200,000	£16,000	£20,000-£30,000
Payback	6 years	1.2 years	1.25 years	8-10 years

BIOMASS: THE BASICS

Installation cost

The capital cost of biomass systems tends to be higher than fossil fuel systems, but the fuel and running costs are cheaper. A fully installed system will cost £200-£400 per installed kW, depending on the technology used, the amount of pipework and any thermal storage.

There are two stages:

- Installing the biomass boiler and fuel-handling equipment
- Installing the heat main and air heaters

The boiler supplier will probably subcontract out the heat main element. Building a new boiler house might add £30,000-£50,000 to the price, and a drying barn £20,000-£30,000.

Boiler sizing and installation

To maximise efficiency and cost savings, it is crucial not to oversize the boiler. A biomass system should be big enough to keep the site above 5°C, even on the coldest winter night. Thermal storage, such as hot water accumulator tanks, might also help to cut fuel costs.

Wood fuel sources and costs

There are several options, such as clean woodchip from arboricultural arisings,

short rotation coppice or round wood, or untreated waste wood, such as pallets and joinery waste. While you may find a free source of pallets, you should factor in a cost for handling and chipping. Even if you’re paying for wood chip, it is still cheaper than mains gas. A cost of £25 per tonne equates to 1p per kWh, while gas is 2.5p per kWh and oil, at 40p a litre, is just under 4p per kWh. As a rule of thumb, 500 litres of oil equals one tonne of oven-dried wood.

Moisture content and fuel quality

The moisture content (MC) of fuel dictates your choice of boiler technology. A wetter fuel, such as arboricultural arisings (MC above 35 per cent), will need a moving grate boiler, while drier fuels, such as pallets (less than 35 per cent MC), demand a fixed hearth. A moving grate is more expensive, adding about £5,000 to the cost of a 400kW system.

If woodchip is used, it must be stored in a covered area to stop rain raising the MC. Wood chip can be stacked 3-4m high. Some drying will occur from air movement, but energy content will be lost due to composting of the chip. A screener can be used to sift out large pieces before the fuel is put in a hopper.

Space requirements

Wood has a lower energy density than fossil fuels, so you need more to give the same amount of heating. Woodchip takes up 10 times more space than oil, so a nursery must be able to accommodate it. In addition, the space needed for the boiler and hopper is about double that required by an oil boiler.

Biomass boiler grants

A biomass boiler grant is expected to be announced in November. It will probably amount to 40 per cent of the cost difference between a biomass boiler over a new fossil-fuel system.

Maintenance requirements

The ash pan must be emptied regularly – weekly for large boilers. Once or twice a heating season, the boiler may need to be shut down to clean the fire tubes and fuel-handling system. Such routine maintenance can be performed by trained staff. Allow two man-days a season and a £400-£1,000 budget.

Ash

The ash content of wood is less than two per cent, so 100 tonnes of wood a year will leave up to two tonnes of ash.

This can be used as a nitrate fertiliser, but undertake a chemical analysis before using it as some fuels may contain small quantities of heavy metals.

The payback

Depending on the fossil fuel you have replaced and the cost of your wood, the quickest paybacks are for glasshouses with high heat loads that previously used oil or LPG. With a grant, it should be possible to achieve a payback in less than five years, although with bigger installations, the savings might be so large that it will pay for itself in no time.

Planning issues

Boilers under 3MW fall under schedule B of the Environmental Planning Act 1990. They are regulated by the local authority environmental health officer (EHO), whom you should notify prior to installation. There are few restrictions if using clean woodchip. Using clean wood waste in a boiler above 400kW is regulated under Local Air Pollution Prevention & Control (LAPPC) and will need authorisation from the EHO and an annual emissions check. A separate boiler house and fuel store will probably require planning permission.