

Most farmers are familiar with the notion of supplying fuel crops to power stations. But what about becoming a power generator yourself? **Kevin Lindegaard** looks at an up-and-coming area

# CHP

## COULD YOU BE A POWER PRODUCER?

Where will our electricity come from in 20 or 30 years' time? From big, centralised power-producing plants that run on gas, coal, nuclear, wind, wave-power or biomass?

Maybe, but if many European countries are anything to go by, it could be much smaller community CHP power plants providing power for the local town or village that will satisfy a lot of our energy needs.

And it's go-ahead farmers, with their ability to grow fuel crops – and the space to install this new generation of micro-generation plants – that are ideally placed to take on this role.

### What is CHP?

Combined heat and power (CHP) is a very efficient way of generating electricity and usable heat in a single process.

Conventional electricity generation is quite inefficient (about 25% in coal-fired power stations) whereas using the heat element gives efficiencies of above 75% and cuts carbon dioxide emissions too.

In large CHP schemes the ratio of heat production to electricity production is about 4:1, but in smaller systems it falls to 2:1 so a unit capable of producing 100kW of electricity will produce 150-200kW of heat.

### Who makes these generators?

Talbot's in Staffordshire sells a 100kW biomass generator and Biomass Engineering in Merseyside has a 250kW system that can be linked together in modules to produce a mini power station.

Econergy has a licence to install a 400kW system designed by the Italian manufacturer Turboden while Belgian manufacturer Xylo-watt offers a range of equipment from 150kW-1.5mW.

### Is my farm suitable for a CHP installation?

You should ideally have a use for the heat for a CHP scheme to be viable (see below). The ideal situation would be to have a large redundant barn where the CHP unit and fuel storage area can be housed.

A 250kW unit would need an area of 10x15m and headroom of 4m. A similar space would be required for storing a week's worth of wood chip. A front-end loader would be needed to fill a hopper every 6-8 hours.

### What can I use the heat for?

In most situations, you should look for a local use for the heat for at least 4000 hours per year.

If you have farm offices you could sell heat to your tenants and other potential partners could be a local school, hotel or leisure centre. A 100kW unit would produce enough heat 0.2 acres of glass-

houses and some of the heat could be used for drying crops, industrial processes and even cold storage.

### Do I need planning permission?

The CHP unit can be accommodated in a barn so the only visual intrusion will come from a 3-5m high flue. The planning requirements would be broadly similar to those if you were putting a grain dryer on your farm, but it is important that you talk to your Local Authority planning officers at an early stage.

### What about emissions?

If you are using wood chip from round wood or energy crops then you shouldn't need to monitor emissions. If you are using clean waste wood like sawmill by-products you might need a Part B Pollution Prevention Control permit



Left: waste wood is cheapest fuel. Right: Talbot's has a 250kW unit.

which costs £300, although this is only required for installations larger than 400kW.

In most cases you won't need to continuously monitor emissions but this depends again on the purity of the wood chip and the size of the project.

### How much will it cost?

Expect to pay £2000-2600 per kW installed. So a 100kW unit would cost about £260,000 and a top-end 250kW system would cost £650,000 including grid connection.

### What about connecting to the Grid?

Unless you are supplying electricity to a large hotel or similar big end user you will be looking to export to the National Grid.

The connection costs depend on the size of the installation. A 100kW system might simply



require new transformers (£5-10,000) as most farms already have a £150kW supply. If no existing connection exists or for schemes of above 250kW, connection costs are £200-£500/kW installed so a 250 kW system might cost between anything between £50,000 and £125,000.

### How much fuel do I need?

A 100kW system needs about 1000t while a 250kW system would need 1875t of air-dried wood for 8000 hours' annual use – 19-36t/week.

### What sources of fuel can I use?

The cost of feedstock is crucial to making the figures stack up.

You may be able to get paid to take reclaimed wood that would otherwise go to landfill. Such wood currently incurs a landfill tax of £18/t plus a gate fee at the tip, which takes the cost of disposal up to £25-30/t.

Contact your local authority to see how much clean wood waste they are sending to landfill and whether they would be interested in paying you a reduced fee to take it off their hands.

The Landfill Directive begins to kick in in 2007, at which time wood waste will be excluded from tips, so offering your council and alternative might be very welcome.

Other possible sources of wood might be businesses producing

large volumes of wood co-products who are looking to reduce their waste disposal costs. You could try furniture or cricket bat manufacturers, saw mills etc.

### Can I grow my own fuel?

At least 50ha (120 acres) would be needed for a 100kW system, but the economics are questionable. You can produce miscanthus and SRC willow for £15-20/t but if you can sell the chip for £30/t into a local scheme then you would probably be better off doing that.

The economic viability of this aspect will no doubt improve as fossil fuel prices continue to spiral upwards.

Whichever fuel you use, bear in mind that efficient electricity production depends on moisture content and chip size. Wetter wood can be used in certain circumstances but some of the energy produced will be needed to dry the chip. Also long, straggly chips can clog up the auger feed and increase the downtime of your system.

### Is it profitable?

It depends on whether you have a cheap source of fuel and a paying recipient for your heat. Shop around to see who will buy your electricity for the highest price.

There are several Government incentives to stimulate electricity production from renewables including Renewables Obligation

### MORE INFORMATION

#### GENERAL

**Combined Heat and Power Association** ([www.chpa.co.uk](http://www.chpa.co.uk))  
**Ofgem** ([www.ofgem.gov.uk](http://www.ofgem.gov.uk))  
**Environment Agency** ([www.environment-agency.gov.uk](http://www.environment-agency.gov.uk))

#### RENEWABLE ENERGY SUPPLIERS

**Good Energy** ([www.good-energy.co.uk](http://www.good-energy.co.uk))  
**Green Energy UK** ([www.greenenergy.uk.com](http://www.greenenergy.uk.com))  
**Eon-UK** ([www.eon-uk.com](http://www.eon-uk.com))  
**Npower Renewables** ([www.npower-renewables.com](http://www.npower-renewables.com))

#### CHP MANUFACTURERS

**Biomass Engineering** ([www.biomass.uk.com](http://www.biomass.uk.com))  
**Talbot's** ([www.talbot's.co.uk](http://www.talbot's.co.uk))  
**Turboden** ([www.woodenergy.co.uk](http://www.woodenergy.co.uk))  
**Xylo-watt** ([www.xylo-watt.be](http://www.xylo-watt.be))

#### FUNDING

[www.biglotteryfund.org.uk/programmes/renewable/](http://www.biglotteryfund.org.uk/programmes/renewable/)  
[www.woodenergybusiness.co.uk](http://www.woodenergybusiness.co.uk)

## HA looks ahead

\* Harper Adams installed a Talbot's 100kW CHP unit in October 2005.

When fully operational, it will provide 25% of the university's electricity needs and 70-80% of its heating requirements. Good-quality waste wood is currently used, but miscanthus and SRC willow will be tested.

Assuming 8000 operating hours/yr and good-spec wood chip, the unit could provide a gross return of £80,000 depending on current prices for energy and Renewables Obligation Certificates.

It will also reduce CO<sub>2</sub> emissions by an estimated 264t/yr.

## Get the gen on our tour

\* Could generating renewable energy earn money for your farming business? Find out by joining one of two *Farmers Weekly* Tours to Austria and Germany on 16 July and 8 October.

Arranged by the Agricultural Travel Bureau and led by one of its members, the tours will explore the potential, practicalities and pitfalls of making money from renewable energy. Both countries are world leaders in the production of biodiesel, biogas, geothermal and wind energy.

The seven-day tours will start in Frankfurt, Germany and end in Vienna after visits to farms, production plants and farmers' organisations dedicated to unlocking the potential of biofuel.

Included on the itinerary are a visit to a biodiesel factory which uses oilseed rape as feedstock and an engineering company which modifies tractor engines and others to run on biodiesel.

Also planned are visits to farms, one of which presses its own rape for fuel, Bavarian farmers' experience of growing crops for biofuel and a farm in Austria with its own biogas plant.

### MORE INFORMATION

\* Prices depend on numbers travelling. For booking forms and more information contact Jill Lewis, Agricultural Travel Bureau Ltd, 14 Chain Lane, Newark, Nottinghamshire NG24 1AU. Or you can telephone (01636 705 612), fax (01636 707 600) or email [jill.lewis@barfieldtravel.co.uk](mailto:jill.lewis@barfieldtravel.co.uk)