

Home-grown heating alternative

Why wait for fuel crops to take off as a viable UK energy crop, when you could already harness their potential to fuel the home farm, asks **Kevin Lindegaard**

MENTION BIOMASS to most people interested in the energy crops industry and you will hear one recurring phrase: "It's all a case of chicken and egg."

The trouble is that there's a bottleneck between supply and demand; and which comes first – the building of a power station and signing of a fuel contract, or the speculative farmer growing the crop in the hope that a market emerges?

The failure of the ARBRE Project in Selby, which left over 40 growers without a definite market for their fuel, merely compounded the industry's aversion to taking the first step to release that bottleneck.

But why treat energy crops as another commodity crop for an apparently unenthusiastic market? Home fuelling, to produce heat and power for use on the farm, breaks the deadlock and is already bringing



Renewable energy pioneer John Strawson has 172ha in coppice willow – fuelling the home farm and a local school.

benefits for a group of pioneering UK growers.

In the longer term there is reason for optimism that big electricity markets are about to come on stream. Both Cottam and Drax power stations are accepting SRC from the ex-ARBRE growers, now known as Renewable Energy Growers.

Furthermore, in recognition of previous failures DEFRA has set up a Biomass Task Force, led by former NFU president Sir Ben Gill, to address supply chain issues.

But while the large-scale electricity market continues to develop there is nothing to stop farmers looking for smaller, more local biomass markets. Indeed, the most attractive market could lie on the farmer's very own doorstep.

Growers not connected to the gas network and spending over £6000 a year on oil or LPG are likely to be better off with a biomass boiler (see case study p51).

If they have their own wood supply, so much the better. But if not, they could grow short rotation coppice to meet their heating needs.

That is exactly what a select few are doing around the country (see table, right). The common denomina-

FUEL CROP ENTHUSIASTS

	Ian Brown	Lionel Hill	John Strawson	Gareth Gaunt	Lord Manton
Boiler capacity	80kW Veto	150kW Talbott's	100kW Veto, 150kW Binder	150kW Talbott's	60kW KWB
Installer	Econergy	Talbott's	Econergy, Wood Energy	Talbott's	Econergy
Time in operation	Five years	12 years	18 months	Two years	–
Buildings heated	15,000sq ft (1500sq m) farmhouse, two cottages, cafeteria, training centre and business units	4000sq ft offices, 16 room manor house, swimming pool and flat	4000sq ft offices, farmhouse and office block, local school	18,000sq ft farmhouse and offices, school	Large manor house and two associated cottages
Woodfuel requirements (oven dried t/year)	120	350	50	150	–
Wood source	Local sawmill at present (growing 6ha SRC willow and 15ha poplar for future use)	16ha of willow and arboricultural thinnings	172ha SRC willow (1.5ha harvested a year)	74ha SRC willow (10ha harvested a year)	10ha SRC
Wood storage area	9sq m	60sq m	125sq m	300sq m	–
Pay back	Five years	–	–	Four years	–
Back up boilers	Two oil boilers	Duplicate biomass boiler	Oil boiler	Oil boiler	Two oil boilers
Grant	50% capital grant from Leader 2 (now Leader +)	None	25% bioenergy capital grants	None	25% bioenergy capital grants
Operating/maintenance costs	£300 p/a	–	–	£600 p/a including labour, maintenance and electricity costs	–
Typical maintenance	Daily de-ashing in winter (5 mins), load hopper every 5-6 days in winter and 10-12 days in summer (30 mins)	30 mins a day plus two hours once a week	30 mins a week	Five mins a day de-ashing, 20 mins filling a week	–

tor is that all have high heat demands and plenty of entrepreneurial spirit.

Worcester farmer Lionel Hill has been using willow chips to heat his farm for 12 years. His large heating needs include a manor house, an indoor swimming pool and a suite of con-

verted farm buildings.

Until he installed a 150kW Talbott's boiler, his heating costs were "horrendous". Over the past decade the oil price has doubled. "I'm chuffed to bits that I went down this route," he admits.

Mr Hill put his system in without the current grant aid and says the technology has moved on in leaps and bounds. "There must be hundreds of places up and down the country that would benefit from this sort of heating system."

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Various funding streams are now available for installing biomass boilers. The Bioenergy Capital Grants Scheme is available across the country from various installers and offers 25% funding. The Clear Skies Scheme offers a maximum £1500 to householders, but up to 50% of the capital costs to not-for-profit community organisations.

An obvious beneficial collaboration could therefore be agreed between farmers and local schools. The farmer could apply for the 25% funding for their boiler and produce SRC fuel, whilst the school could apply for the 50% grant.

That is exactly the deal REG director John Strawson struck with his local school in East Drayton. Mr Strawson is the largest ex-ARBRE grower, with 172ha, and is working on small scale ventures as well as setting up a fuel supply company, Renewable Energy Supplies Ltd.

The latter began supplying Cotnam Power Station with SRC "Kool-fuel" wood granules in February.

Mr Strawson believes there has never been a better time to plant energy crops. "With CAP reform and decoupled payments now with us, farmers need to analyse whole farm costs. SRC has one great advantage in being as effective at reducing fixed farm costs as fallow."

Therefore, growing SRC should suit farmers who wish to reduce their farm costs and link this in with other diverse business interests.

Northumberland producer Ian Brown is a good example of that. He was farming 120ha of arable crops before 2002, at which point he decided to convert 15% of his holding to willow and poplar.

Mr Brown received a 50% capital grant from Leader 2 (now Leader +) to install an 80kW Veto boiler with Econergy. His reduced farming



Warmed by willow... East Drayton school in Notts.



activities enabled him to develop a gourmet cooking business and derive a return from selling heat to various business units.

Gareth Gaunt, another ex-ARBRE grower and director of REG, has a 150kW Talbott's boiler and sells heat to the office occupants of his converted farm buildings. His heating charges are the same as if the system was run on oil. "Wood heating shouldn't be cheaper, if anything it should attract a premium."

Mr Gaunt is also a firm believer in other biomass operations, such as wood pellet stoves for small heat demands less than 50kW. He also thinks farmers should consider micro-generation, using combined heat and power systems to produce 100-250kW of electricity.

There are already several UK designed 100kW biomass CHP systems offered by Talbott's and Rural Generation. The sector offers the potential for significant added value, he believes, since most farmers have buildings that are unlikely to face planning issues.

For our fifth heat entrepreneur, Lord Manton of Market Wheaton, SRC now accounts for 10ha of his land to heat his manor house and two associated cottages. Unfortunately he still has to rely on his inefficient oil boilers because of current issues with the wood chip specification.

Other farmers should learn from his experience and ensure they can match the wood chip produced by the harvester to an appropriate boiler, he says.

Despite those teething problems Lord Manton is convinced of the potential for small scale heating. "Producing fuel for your own energy needs and supplying local markets within five miles has got to be the way forward," he says. ■

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Warming to willow... Short rotation coppice is fuelling John Strawson's fledgling energy crops enterprise

BIOMASS INSTALLERS

- **Talbott's:**
01785 213 366,
www.talbotts.co.uk
- **Econergy:**
08700 545 554,
www.econergy.ltd.co.uk
- **Wood Energy:**
01398 351 349,
www.woodenergyltd.co.uk
- **Rural Generation:**
02871 358 215,
www.ruralgeneration.com

CASE STUDY: FEASIBILITY OF USING SRC WILLOW

This is based on a current heat requirement of 250MWh which is equivalent to 25,000 litres of oil a year. Two grant levels are considered.

Boiler logistics	Bioenergy capital grants (25% funding)	Clear Skies (50% funding)
Boiler output	100kW	100kW
Installed cost	£30,000	£30,000
Grant aid	£7,500	£15,000
Net capital expenditure	£22,500	£15,000
Operation and maintenance costs	£600 p/a	£600 p/a
Boiler seasonal efficiency	85%	85%
Wood fuel required (oven dry)	41t p/a	41t p/a
Total SRC needed (at yields of 10 oven dry t/ha a year)	4.5ha (harvest 1.5ha p/a)	4.5ha (harvest 1.5ha p/a)
Moisture content	30%	30%
Wood chip storage requirements	290sq m	290sq m

SRC establishment and management costs on arable set-aside based over five harvests (16 years)

Establishment grant	1000
Establishment costs	1685*
Sub total	-685
Total for 4.5ha	-3,082.50
Avg single farm payment (£235/ha x 16 years) ¹	+3,760
Total for 4.5ha	+16,920
Management costs eg harvesting and spraying (£440/ha x five harvests)	-2,200
Total for 4.5ha	-9,900
Avg fixed costs (£200/ha x 16 years)	-3,200
Total for 4.5ha	-14,400
Total cost of SRC fuel production	-10,462.50

* Based on Farm management pocketbook 2005 by John Nix

¹ An energy crops payment of €45/ha can be claimed if grown on non set-aside. However, a farmer planting SRC and installing a boiler in the same year would have to wait three years for their own supply of wood fuel. Hence in years 1-3 wood chips would have to be bought from a local source at an approximate price of £45/oven dry tonne delivered.

Amount of fuel needed	41odt p/a
Total for 16 years	656
Cost of wood fuel (years 1-3)	£45/odt
Total wood fuel costs (years 1-3)	-5,535
Cost of wood fuel (years 4-16)	£20.08/odt
Total cost of SRC fuel production (years 4-16)	-10,462.5
Average cost of wood fuel	£24.39/odt
Total cost of wood fuel (16 years)	-15,997.50
Full load equivalent hours operation	1350 hours p/a
Energy produced a year	135,000 kWh
Effective cost of wood fuel per unit heat (41 odt x £cost/135,000kWh)	0.61p/kWh

Total cost analysis

Running costs of boiler p/a	-£600
Cost of fuel p/a	-£999.84
Total annual costs	-£1,599.84
Current costs for oil @ 25p/litre	£6,250
Total saving a year	£4,650.16
Simple payback	4.84 years @ 25% funding 3.23 years @ 50% funding

Hence a farmer with a heat requirement of 250MWh a year would be able to pay back the cost of the boiler in 4.84 years if awarded a 25% grant and the price of oil stays at 25p/litre. At 50% funding the pay back is reduced to 3.23 years. The table below shows that if the oil price rises the pay back (at 25% grant funding) is reduced considerably.

	Oil fuel costs	Wood fuel costs	Total saving a year	Pay back @ 25% grant funding
25p/litre	£6,250	£1,600	£4,650	4.84 years
30p/litre	£7,500	£1,600	£5,900	3.81 years
35p/litre	£8,750	£1,600	£7,150	3.15 years
40p/litre	£10,000	£1,600	£8,400	2.67 years