Wood for Energy

Energising the West Midlands for the 21st Century

Advantage West Midlands
The Development Agency

The Countryside Agency

Forestry Commission

Government Office for the West Midlands

Wood:
Energising the West Midlands for the 21st Century

Background

The Forestry Commission, Advantage West Midlands and the Countryside Agency, with input from the Government Office for the West Midlands recently commissioned DTZ Pieda Consulting to advise on how best to develop a wood energy programme in the West Midlands that would:

- Stimulate urban & rural business growth & employment.
- Contribute to renewable energy targets.
- Promote sustainable woodland & countryside management.

The study, based on analysis of four sub-regional projects with expertise in using wood for energy, provided:

- A strategic approach to wood fuel in the region.
- A robust decision making framework to assess new proposals.

What the study found

The main findings were that the region is well placed to become the leading player in England in wood energy, having:

- Plentiful sources of fuel from forests and wood based manufacturing industry, that could readily be supplemented by energy crops and clean waste wood.

The region's woodlands provide a plentiful renewable resource.

- A core of wood fuel expertise, embracing a number of good demonstration projects.
- A strong manufacturing base, including a leading wood fuel boiler maker

The experience elsewhere

Wood has provided heat for millennia, but only recently has modern technology greatly increased efficiency and automation. In northern Europe and North America, such technology is widely used and markets are large and well developed. In northern Europe, medium sized automated central heating systems, underpinned by capital grant schemes were used to develop the markets, after which large district heating, combined heat and power (CHP) and power schemes were able to develop. Wood now accounts for up to 40% of space heating in rural areas in some countries.

Here in Britain the market is small and the technologies are not yet common. There are comparatively few (perhaps a hundred) automated wood fired central heating systems, mostly in businesses that produce considerable volumes of waste wood that they can use themselves, or on large rural estates. A handful of wood fired power, or CHP schemes are also in operation as of mid 2002. Indigenous suppliers of both fuel and burners are small and few in number.

Scotland, Wales, East Anglia and the South West of England are out in front with the West Midlands close behind.

District heating plants are common in Europe (here in Austria).

Why wood?

Because:

- It makes little net contribution to carbon emissions, helping meet renewables targets.
- Wood is a cheap renewable fuel, being generally more competitive than oil, coal or LPG and occasionally almost competitive with natural gas.
- The fuel can be sourced from woods within the locality, so bringing neglected woods back into management and providing environmental and landscape benefits.

The work necessary can safeguard and create jobs and businesses and contribute to diversification of the rural economy.

Managing local woods provides many benefits.

Alternatively, clean residues from wood processing businesses can be used, reducing their waste disposal costs, aiding their competitiveness and reducing pressure on landfill.

Case Studies

Key observations from four regional case studies are outlined below:

Marches Wood Energy Network Ltd:

- Started in January 2002 by Marches Energy Agency to: identify stakeholders in wood energy; raise awareness and develop opportunities.
- MWEN has: run workshops; produced a strategy; built a network and knows of 70+ organisations and individuals wanting to use wood heat.
- MWEN is now ready to support installations and keen to start an Energy Supply Company (ESCo) but has only 1 employee and little funding for networking role, although it has well developed links with an existing ESCo outside the region.

Herefordshire Sustain Project:

- Begun in February 2001 by Small Woods Association to put woodlands, people and business at the heart of a replicable sustainability project.
- It involves a broad partnership with local estates, Holme Lacy College, Bulmers and others and has plans to use wood from the estates to heat local buildings, including the College, so acting as an educational resource on sustainability courses.
- This well managed project has broad aims and plans new wood heat installations which could serve as excellent demonstration sites.

Pilot projects such as Weobley School help build confidence.

Worcestershire County Council:

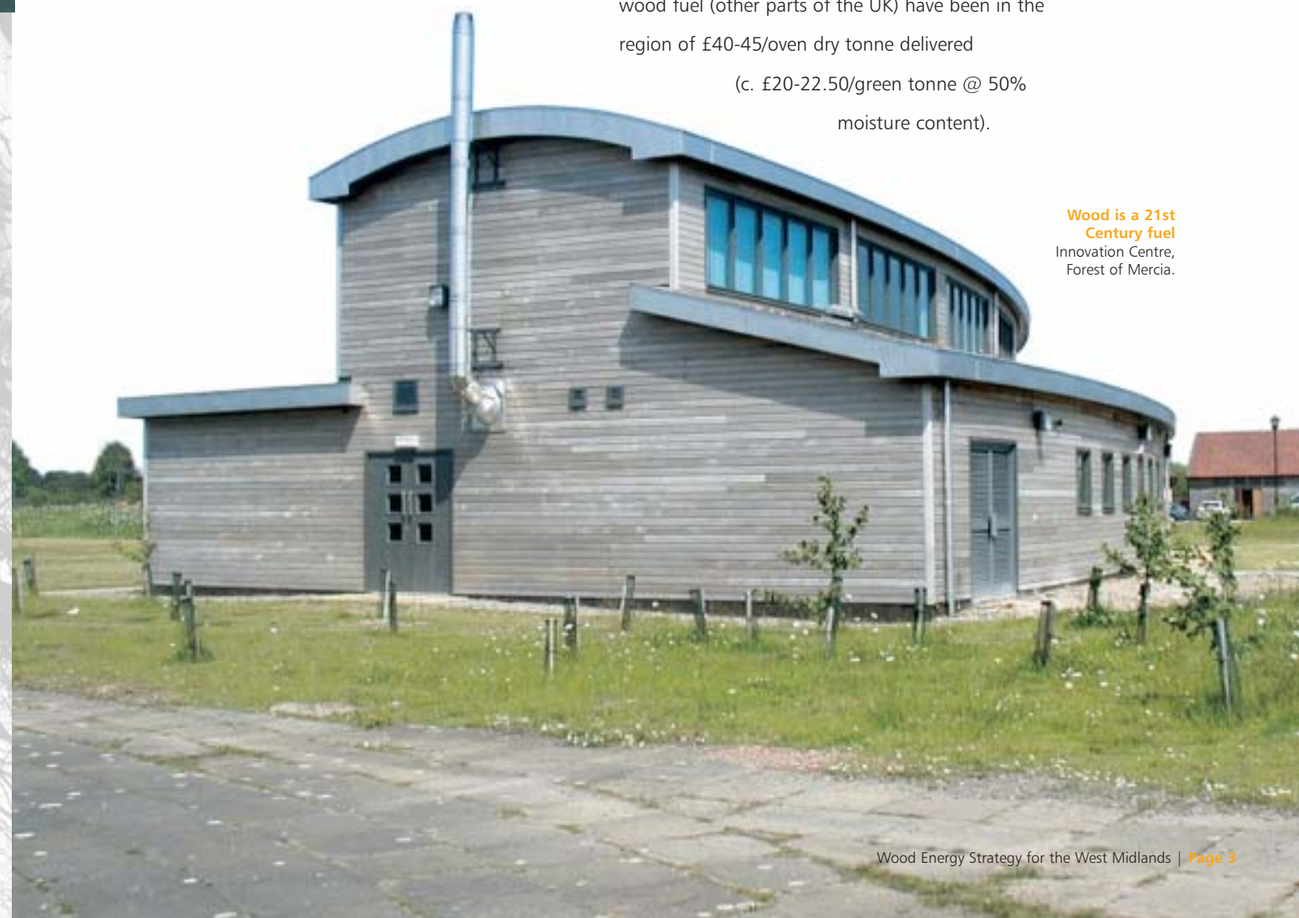
- Building on experience at Weobley School, the Council has installed a 700kW wood fired central heating system at County Hall, with plans to extend to a neighbouring school and replicate on other sites.
- The principal drivers are: reducing net carbon emissions and setting an example to local businesses.
- It works via a contract with a private sector ESCo and there is no public subsidy, although the total cost is a little higher over the next ten years than an equivalent gas fired system: It gives best value per tonne of carbon saved.

Forest of Mercia:

- The Forest of Mercia, one of the 12 Community Forests nationally, started in 1990 with local authority and other partners has trialled wood heating (pellets and logs) although fuel supply is seen as a key constraint.
- A school and the project offices have been heated with wood and an action plan for extending wood fuel use produced.
- A 'cluster' of wood fuel users is planned to stimulate private sector uptake.

Where will the wood come from?

The potential supply of wood in the West Midlands much exceeds present demand. Foreseeable demand can be met through wood from woodlands and clean waste from wood processing and manufacture (eg used packaging and pallets). Creation of The National Forest will provide a significant extra and growing resource, with c. 500ha of new woodland per year. Cost will be a critical factor, but currently there is a surplus of low grade material that could be used. Figures quoted for wood fuel (other parts of the UK) have been in the region of £40-45/oven dry tonne delivered (c. £20-22.50/green tonne @ 50% moisture content).



Wood is a 21st Century fuel
Innovation Centre, Forest of Mercia.

Where will the wood come from?

Wood chips of consistent size and moisture content can and are being produced, from local woodlands, and are the cheapest wood based fuel. To be successful, the chip characteristics must be closely matched to the needs of the chosen boiler, and quality must be carefully controlled.

Pellets made from sawdust and small wood particles are a very convenient, though more expensive fuel for central heating boilers. They are usually made in large plants, and are traded internationally. There are no such plants in the region. Soon small pelletisers may be imported and indigenous pellets will become available.

Energy crops such as willow (Short Rotation Coppice) and miscanthus (a fast growing perennial grass) are being trialled in the UK. Farmers will be reluctant to plant them without a market. Typically large multi-megawatt power and CHP plants create such a market, but such large projects are expensive and take time to set up. One small to medium sized scheme of this sort is being developed in South Staffordshire under SRB6, with proof of concept not expected until 2007 and another is proposed for Hereford.

Quality chips matched to the boiler are vital.

So what's the problem?

The main barriers to wider adoption of wood energy are:

- Lack of awareness that wood is a viable fuel.
- Lack of knowledge about how to go about buying and using wood heat, and lack of associated skills.
- Lack of fuel supply infrastructure.
- Undeveloped markets, both public and private.
- High initial cost of wood burning plant and fuel supply infrastructure.

Where do We Go from Here:

The Strategy

Key messages:

- Build on experience from the region and elsewhere, so enabling the West Midlands to achieve leadership in England.
- Tackle all of the market barriers identified above, so that each of its components impact on more than one barrier, so providing robustness.
- Focus on the easy, low risk things that can quickly make a difference to installed capacity.
- This should deliver real growth in the short to medium term (one to three years) whilst building a platform for sustained and broader growth in future.

In Europe growers cooperatives own local energy companies that manage fuel supply and sell heat to customers.

The Strategy

The European experience

The countries of northern Europe focused on medium sized wood fired central heating systems in the first instance, moving to larger scale district heating and power generation once a firm foundation was in place. They used wood chip as fuel, and used generous capital grant schemes to kick start the process. Their wholehearted approach has clearly worked well. A similar route should be followed here.

Creating a market

The only way to achieve critical mass, high volumes and hence lower plant costs is through market expansion. First the public sector market should be sized and public sector managers strongly encouraged and helped to consider wood as a viable alternative fuel. Co-firing should be considered.
The various 'clusters' of potential users, both public and private, already identified, should be helped to get together to set up fuel supply chains and install boilers, using their own endeavours or engaging an ESCo.

Getting the message across

This is vital if people are to consider wood, make wise buying decisions, and be able to operate and maintain systems. A single Regional Networking Organisation should be created to raise profile, signpost people to sources of expertise, provide advice to both suppliers and users, including mentoring and support of new ESCos.

More boilers will reduce costs and help mainstream the technology.

Short rotation coppice willow and other crops have an important role and allow farmers to diversify.

In order to overcome lack of awareness of wood as a viable fuel, a high profile regional 'champion' should be identified and put to work, backed up by a series of promotional events and a carefully targeted public relations campaign.

Training of heating engineers will be important, because they must be able to correctly specify systems, understand the relationship between boilers and their fuel, and be able to maintain systems too.

Getting boilers installed and wood into boilers

The best stimulus for the creation of fuel supply chains is an expanding and visible market; private sector suppliers are likely to fulfil the need. These might be existing or new ESCos, groups of farmers, or individuals. A Regional Networking Organisation is likely to be very useful in helping emerging supply chains effectively meet customer need.

A major constraint to growth is the high cost of wood heat boilers. There are two potential ways round this barrier that must be used in parallel. In Europe, capital grant schemes have offered up to 50% of the capital cost. There are various schemes available in the UK, though none may be ideally suited to this strategy: they should be promoted anyway. Serious consideration should be given to setting up a regional capital grant scheme, though there is a need to ensure compliance with State Aid rules and this may take some time. Failing that, an alternative source of finance is essential. Any organisations in receipt of a grant should be asked to act as much needed demonstration sites. ESCos can offer a parallel route. Where boiler utilisation is high, it may be financially viable for a company to raise capital, supply the boiler, and recoup the cost of boiler and finance from the payments for heat. However, this cannot work under all circumstances.

Town v country

In order to raise environmental awareness, and awareness of wood fuel in particular, at least some installations should be in urban areas.

Checking we're still heading in the right direction

This strategy should be reviewed after three years in order to take account of the expected rapid rate of change in this sector, and advanced in the following areas:

Contaminated Waste Wood (e.g. old doors)
It is possible to generate heat and power from waste wood, so reducing the volume that presently goes to landfill. However, when burned it emits pollutants and so is regarded as incineration. In the future it may be economic to put in place power generating, wood burning incineration. This option should be watched, and reviewed in three years.

Wood Pellets
Potentially these are an ideal fuel for automated wood heating. However, they are expensive and are often imported. Should local production become feasible in the future, with consequent benefits for regional business, jobs, woodlands and the rural economy, they should be incorporated into the strategy.

Energy Crops
Energy crops offer alternative income streams for the rural economy, and a diversity of fuel for heat and power generation. Various experiments and installations are underway around the country. Should these prove to be successful and economic, the strategy should expand to include them.

How to Get It Going:

The Action Plan

A number of actions can be put into effect quickly. Priorities are:

- Publicise this strategy, so all players know of the region's determination to act.
- Create and resource a Regional Networking Organisation, perhaps via a partnership of Marches Wood Energy Network and Heartwoods, to:

- Promote wood energy across the region.
- Foster the formation of localised 'clusters' of users.
- Mentor organisations wanting to install wood energy systems and help them make informed choices.
- Provide virtual business incubation, should community groups etc want to set up their own energy supply companies.
- Provide a service to provide information and knowledge concerning wood energy, including sign-posting enquirers towards reputable sources of expertise.
- Organise occasional training courses, maybe in partnership with regional colleges, particularly for heating engineers.
- Raise the profile of wood energy via appointment of a regional 'champion', PR and promotional events.
- Investigate the feasibility of creating a regional capital grants scheme, and if the obstacles are not insurmountable, set it up as soon as possible. Otherwise establish an alternative soft finance facility. All recipients to be required to offer their sites for demonstration purposes.
- Establish an accurate baseline of regional installed capacity, for future monitoring purposes.
- Establish the potential size of the public sector market (number of boilers due for replacement over 10 years) and inform potential suppliers; they can then plan on that basis. Strongly encourage all public sector organisations to consider wood whenever a boiler is due for replacement.
- Support any national scheme to accredit wood energy suppliers.

Workshops & training events using demonstration sites are key.

Further reading

- DTZ Pieda 2002 Wood Energy Strategy for the West Midlands Parts I & II.
- DEFRA 2002 Bioenergy: A Growing Energy Supply Grants booklet: www.defra.gov.uk/farm/acu/energy/bioenergy-leaflet.pdf
- British Biogen 1999 Wood Fuel from Forestry and Arboriculture Good Practice Guidelines: www.britishbiogen.co.uk/gpg/wfgpg/wfgpgfront.htm
- British Biogen 1999 Short Rotation Coppice for Energy Production Good Practice Guidelines: www.britishbiogen.co.uk/gpg/srcgpg/srcgpgenrgyprod.htm
- Household and Community Grants Scheme: www.clear-skies.org

Case Studies

- Econergy 2002 Worcestershire County Hall Case Study: www.econergy.ltd.uk/econergy_heat_technology_infosheets.html
- Various case studies from the Marches: www.mwen.org.uk/page6.html
- Stafford Biomass & Renewable Energy Business Support Project: www.nscci.co.uk/homepage.htm

A copy of this publication can be downloaded from:

www.forestry.gov.uk/pdf/wmwoodenergystrategy.pdf/$file/wmwoodenergystrategy.pdf

Forestry Commission

For more information, contact:

West Midlands Conservancy
Government Buildings
Block B
Whittington Road
Worcester WR5 2FR

Tel: 01905 761220
Fax: 01905 761222
http://www.forestry.gov.uk