Northwest England
Biomass Woodfuel Strategy

NORTHWEST REGIONAL
forestry framework

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This group is made up of public sector bodies including:

The Mersey Forest
Red Rose Forest
The Forestry Commission
Northwest Regional Development Agency
North West Regional Assembly
Natural England
Lancashire County Council
Cheshire County Council
Cumbria Woodlands
National Farmers Union
UCLAN
Sustainability North West
Envirolink North West
Cheshire EEAC
National Trust
Government Office for the North West

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The Vision

To create conditions under which woodfuel can develop as a viable and self-sufficient energy source in Northwest England, in order to reduce carbon emissions, diversify energy sources, develop markets and add value to the regional economy.

Summary

The basis of this strategy, which has been developed as part of the Northwest Regional Forestry Framework, is to build confidence in woodfuel and allow further developments in the market, through:

- use of existing proven technology
- use (and modification) of existing supply chains
- targeted grant aid to implement technology using a cluster-based approach
- providing encouragement to ensure that vertically integrated wood heat businesses offer heat supply services in the region

What is biomass woodfuel?

In the context of this document, sources of biomass woodfuel include forest and woodland products, energy crops including short rotation coppice (SRC) and Miscanthus, short rotation forestry (SRF), forest residues, co-products from primary processing, arboricultural arisings and reprocessed waste wood and biomass materials that comply with the Waste Incineration Directive (WID).

Current status of the biomass woodfuel supply chain

The Energy White Paper 2003 and the national Planning Policy Statement 22 Renewable Energy provide a robust planning and policy base for renewable electricity. The document “From Power to Prosperity; advancing renewable electricity production in Northwest England” (2001) details the potential for the generation of renewable energy from a range of sources within the region. The publication of the Government’s response to the Biomass Task Force Report represents a real opportunity for progress, offering prospects for delivery at the regional level.

To date, the uptake of the Defra Energy Crops Scheme in the Northwest has been relatively limited and apart from small-scale domestic wood stoves there has been little growth in woodfuel installations. There is evidence that heat generation based on waste wood is well established in the wood processing and manufacturing sector, (with over 250 wood heat boilers installed across the region). However, it appears that the main motivating factors are waste and cost considerations rather than the renewable energy agenda.

Nationally the situation has been a little better, with previous intervention attempts to stimulate the biomass and woodfuel sector having some success. However, barriers to larger scale uptake include:

- Failure of high profile, large-scale projects using unproven technology
- Problems with fuel quality and feed problems
- Imbalance between supply and demand
- Out priced from other fuels, notably mains gas

The economic situation is improving; at the larger scale end of the market with the Renewables Obligation Order, and at the medium to small scale with the significant increases in gas prices. Additionally, the Northwest has a major competitive advantage over other regions as it is home to a significant forestry, timber and paper sector that has existing, efficient raw material supply chains in place that are well placed to serve the woodfuel market as it develops.

To address the barriers to development of the woodfuel market, the Northwest Biomass Woodfuel Strategy seeks to identify and prioritise end use sectors that could readily be supplied from the current and future reserves and public funding.

Potential biomass supply in Northwest England

Forest and woodland products

The Forestry Commission's national resource study has evaluated regional figures for bulk production of timber, woodfuel and biomass. These figures do not include current utilisation or market demand for these products and estimates need to be made to produce realistic figures of availability. The main constraints on primary harvested forestry materials are cost of harvesting, locations of the resource (mainly in the north of the region) and the quality of the product in terms of moisture content and size compared with other biomass resources. These constraints vary, depending on the quantity required and relative proximity of the woodfuel, such that small-scale local users can compete effectively for a large range of timber and wood products for use as woodfuel. However, large-scale users, such as power stations, will be competing in the bulk, lower value timber markets, and ultimately with other woodfuel installations at a national level. In these situations supply and demand is highly limited by the cost and competition for raw material.

Taking the national resource figures, some assumptions have been made to gain a better estimate of actual availability as shown in Table 1. Not shown in the table is the opportunity from the large source of under-managed woodland in the region (approximately 45,000 hectares, which is nearly half of Northwest England's woodlands. It is estimated that this resource could produce 90,000 Oven Dried Tonnes a year.) This will largely have a local end-use.

Co-products from primary processing, arboricultural arisings and reprocessed wood waste

There are a variety of sources here that come either via a waste or residual stream. They can be sawdust or wood chip from sawmilling operations or products reprocessed from waste wood. The quality of this material is fairly consistent and has a lower moisture content than virgin wood materials. In addition, those that start life from the waste stream may have a gate fee attached to them, so even though they have been reprocessed the final product price can be very competitive. The use of waste wood clearly has the potential to reduce the amount of wood going to landfill and is compatible with a cascade recycling approach (recycling followed by energy recovery). There is more recycled and waste wood in the south of the region due to a greater concentration of population and industry.

This resource within the confines of the region, while not large, can potentially meet the demands of a wide range of renewable energy projects and help stimulate a new market for wood energy crops. For example the resource outlined below could heat the equivalent of 72,000 homes or an area the size of Wigan in Lancashire.

Imported materials

Wood pellets are potentially the most important imported material. While there are a few small-scale plants in the UK, wood pellets are a globally traded commodity. They are readily available and of a consistent quality. The other major imports that are used as biomass fuels in co-firing with coal are palm kernel expeller and some other agricultural by-products. These need to be considered in the context of sustainable consumption.

Energy crops including Short Rotation Coppice

Short Rotation Coppice (usually willow) and Miscanthus are the primary energy crops in the UK. To date, planting of energy crops in the Northwest has been limited. Without a guaranteed market, it is difficult to access the available grants and landowners are unlikely to commit to planting.

However there is theoretical potential for expansion, as there is some 400,000 ha of Grade 3 agricultural land currently growing arable crops and intensive grassland, some of which could potentially grow energy crops if the economics and local markets were favourable.

Table 1: Estimated woodfuel resource

Biomass woodfuel resource	Moisture content	Form	Quality	Estimated ODT/yr in NW*	Potential energy**
SRW other (exc Spruce)	~50%	logs	high	7,500	25
Poor quality logs	~50%	logs	med	17,200	57
Branchwood	~50%	branch	low	10,950	36
Energy crops	~50%	chip	high	4,500	150
Arboricultural arisings	~50%	variable	variable	35,000	116
Waste wood (HH & CA))	~20%	variable	variable	220,000	733
Sawmill co-products	~45%	dust & chip	high	20,000	66
Recycled wood (softwood chip)	~15%	chip	high	50,000	166
Total				**325,000**	**1,349**

SRW Short round wood, **HH** Household waste collection, **CA** Civic amenity site, **ODT** Oven dry tonne, * available after accounting for existing use, ** heat only @ 12GJ/t (GWh)

Analysis of biomass woodfuel potential in the Northwest

Strengths	Weaknesses
• Established wood reprocessing sector • Well established forestry sector • Existing raw material supply chains in place • Proven technology available • Existing regional examples of technology	• SRC and miscanthus have an uncertain economic benefit for farmers resulting in a reluctance to commit • Lack of co-ordination between potential supply and demand side of fuel chain • The major forest resource concentrated in certain areas i.e. Cumbria • Projects fail when public funding not forthcoming • History of failure • Existing supply chain is set up for bulk deliveries • Competition with other fuel sources
Opportunities	**Threats**
• Biomass Task Force Report and Government response • Large potential land area • Large number of public buildings • Emerging RDPE priorities • CAP reform Single Payment Scheme • Rising fossil fuel prices • Higher waste wood disposal costs • Growing interest from service engineers and other specifiers • Climate Change Levy, Carbon Tax • Forthcoming EU Directive on Heating and Cooling, Energy Review, Landfill Tax • Large area of under-managed woodland	• Imported material is more price competitive than locally produced fuels • Capital cost of equipment more expensive than gas/oil equivalent • Specific supply chains not well developed for small and medium scale users • Perception that technology is old and unattractive • Change to Energy Crops Scheme from 2007-2013 • Demand for fuel outstrips supply • Limited or no financial support available for the increased costs of installing woodfuel equipment contributes to lack of adoption

Developing a successful biomass and woodfuel industry in the Northwest

From the SWOT analysis above, the following issues are of importance when defining what the successful establishment and growth of a Northwest biomass and woodfuel sector requires:

- A strong and well-defined national and regional energy policy with funding support with an increase in the use of woodfuel to generate both heat and power as one of its core objectives. Medium-scale heat offers most potential, particularly in municipal buildings

- An approach which recognises the sector will initially develop based on existing supply chains, such as sawmill co-products or reprocessed timber, before a critical mass of demand pulls in primary harvested biomass fuels

- The availability of vertically integrated biomass/wood energy supply companies in the region that offer an easy transition to biomass based systems for end-users

Short rotation coppice

Types of end user

There are several principal categories of woodfuel end user and associated needs. Woodfuel burning equipment varies in scale and complexity depending on end use. Heating equipment ranges from the domestic to industrial scale with a wide variety of equipment available. Electricity may be generated on its own or in conjunction with heat in combined heat and power (CHP) plants. Examples of the wide range of woodfuel burning systems, from small domestic units to community and district heating are described below.

End use categories including priorities (for public sector support) ■ area denotes LOW priority, ■ area denotes MEDIUM priority, ■ area denotes HIGH priority

Market Category and Regional Examples	Key Drivers	Needs and Action	Benefits	Comments	Public Funding Requirement (Rationale)	Outputs	Lead Partners
CO-FIRING e.g. Fiddlers Ferry	Cost Distance to plant Specification of raw material Policy/politics Imported biofuels Value of Renewal Obligation Certificates (ROCs)	Assess cost base of current co-firing options in light of decision for Fiddlers Ferry to opt into Large Combustion Plant Directive (LCPD) 2001/80/CC Assess if supply side can meet this potential demand	Waste wood not going to landfill Increased demand for virgin timber CO_2 savings Megawatts (MWs) of electricity produced	Could make the biggest impact in the Northwest (NW) but concerns over competing with current cost base, fuel handling, and specification and transport issues	£10k officer time to facilitate baseline research. (ROC mechanism provides financial incentive)	Increased use of biomass (however may be imported) Opportunities for NW sourcing Tonnes of carbon saved	Scottish Southern Energy (SSE) and Northwest Regional Development Agency (NWDA) client manager in liaison with Envirolink, NW Community Forests and the Forestry Commission (FC)
DISTRICT HEATING SYSTEMS e.g. housing developments, business parks	Entrenched culture High capital costs Disruption to premises with retrofit	Identify new build projects with potential to adopt technology Gauge support for flagship project Identify opportunities from Housing Market Renewal	Displacement of fossil fuel use Local production of fuels Security of supply	A lot of good will but high capital costs and lack of good, long running UK examples Potential with respect to regeneration projects	No cash (very expensive relative to outputs) Facilitation required	District system Potential market for NW produced fuel Opportunities to act as centre of a cluster of installations	NWDA, FC and local delivery partners, e.g. Community Forests, Woodland Initiatives etc

Market Category and Regional Examples	Key Drivers	Needs and Action	Benefits	Comments	Public Funding Requirement (Rationale)	Outputs	Lead Partners
MEDIUM SCALE HEATING (Public buildings, business units, glasshouses, leisure centres, schools etc) e.g. Lancashire Wildlife Trust and Kingsmead School, Cheshire	Space heating Conversion from coal Off mains gas areas Cheshire structure plan (10% on site generation from renewable sources for major new developments)	Identify and target potential users Encourage and identify political support Encourage helpful policy frameworks RDA support for flagship examples of best practice A need to assist with the increased capital and installation costs compared to gas/oil equipment	Displace fossil fuel Opportunity for local supply chains Diversifying energy sources	Potential with respect to regeneration projects	£250,000 pilot project supplying gap funding for capital equipment	Clusters (leading to critical mass) of installations Installed capacity Markets for raw materials GVA (£)	NWDA providing funding to deliver value to the region Government Office North West (GONW) to identify opportunities in public buildings
WOOD MANUFACTURING COMPANIES e.g. 250+ Talbot's units	Space heating Wood waste on site (increasing disposal costs)	Identify and target potential users Collaborate with equipment suppliers to market concept	Increase in installed capacity Less landfill Reduced costs for business	Tried and tested many examples, worth chasing up remaining potential and promoting Enhanced Capital Allowance (ECA) Little expansion left in sector Competition for waste wood resource (e.g. panelboard sector)	Nil (financially viable) Work with equipment manufacturers to promote	Carbon reduction (tonnes) Landfill reduced (tonnes) Installed capacity (MW) Cost savings (£)	Collaboration with boiler manufacturers for joint promotional materials and events
SMALL SCALE CHP e.g. Biomass Engineering Ltd	Fuel cost differential between fossil fuels and woodfuel Specification Technology Capital cost Wood waste on site	Identify and target potential users, e.g. medium scale industrial sites	Use of wood waste on site Reducing CO_2 emissions Market for timber	A few technical problems but good regional potential with local manufacturer	Nil (investments will be based on sound economic criteria)	Carbon reduction (tonnes) Landfill reduced (tonnes) Installed capacity (MW) Cost savings (£)	Private sector lead but potential for joint promotional work.

Market Category and Regional Examples	Key Drivers	Needs and Action	Benefits	Comments	Public Funding Requirement (Rationale)	Outputs	Lead Partners
PROCESS HEAT e.g. Bells of Lazonby Sonnae	Climate Change Levy Emissions trading Fuel cost	Assess potential (e.g. number of potential sites with process heat requirement)	Waste wood not going to landfill Heating bills reduced by diverting waste to fuel		£30k to identify potential and priorities	Carbon reduction (tonnes) Landfill reduced (tonnes) Installed capacity (MW) Cost savings (£)	Joint private sector and public sector awareness raising opportunities
SMALL SCALE DOMESTIC HEAT (sole heat source) e.g. Vale Royal study of solid fuel heating 2004	Area off mains gas Capital cost of installations Convenience	Map off gas areas Information on available technology, costs, grants etc Handholding customers	Small scale added value markets	Worth promoting in rural areas Potential from regular supply of wood and promotion of pellet boilers to this sector	Promotion of existing funding schemes such as Low Carbon Buildings Programme Supply chain may require intervention to ensure ability to delivers small volumes (£100k or rely on 2nd round of Bio-energy Infrastructure scheme).	Multiple small installations in off-gas areas Link with clusters of medium scale facilities where appropriate	Energy Savings Trust (EST) Low Carbon Buidings Programme
SMALL SCALE DOMESTIC HEAT (ambience/ visual)	Lifestyle market Cleanliness Convenience Feel good factor Smokeless zones	Map smokeless zones Map Index of Multiple Deprivation (IMD) in reverse (to identify affluent areas) Delivery and storage systems Existing coal and firewood merchants	Displacement of coal Potential high value market for logs	Little carbon offset but good high value market for local logs	Limited – main need is for marketing mechanisms	Markets for low quality timber and arb waste (tonnes)	Private sector lead

Regional priorities, strategies and resources

This biomass woodfuel strategy needs to complement European and National policy and existing regional actions and activity. This strategy should provide the rationale for public intervention in those areas where public funding is being considered.

It is important that regional actions are aligned with the actions arising from the Government response to the Biomass Task Force, including the development of the England Woodfuel and Biomass Strategies. One of the key points in the Government's response to the Biomass Task Force Report was the announcement of the Forestry Commission's new Biomass Energy Centre as a major new hub for bio-energy advice and best practice for farmers, industry and the public. www.biomassenergycentre.org.uk

The Regional Forestry Framework Action Plan (see page 11) was published in summer 2006 and contains six actions that relate to biomass woodfuel. The actions are being delivered by a range of partners in the region. **www.iwood.org.uk**

The Northwest Regional Development Agency Climate Change Action Plan 'Rising to the Challenge', was launched in November 2006. It contains a specific action (action 27) to develop the market and regional supply chain for biomass and biofuels including energy from waste, waste wood for biomass and the co-firing potential of biomass in larger schemes. The provision of NWDA funds for transformational energy projects is critical to the uptake of biomass woodfuel in the region. This should be complemented with a cross agency approach with links to the private sector and voluntary organisations to realise the potential of biomass in the region. **www.nwda.co.uk**

The Regional Spatial Strategy the Sustainable Energy Strategy, and North West Best Practice Design Guide (**www.nwra.gov.uk**) both offer opportunities for biomass woodfuel to be considered as a renewable energy source. The NWRA, supported by a regional partnership, has recently launched a new database "The Carbon Connection" connecting sustainable energy people and showcasing climate change solutions in the North West. **www.carbonconnection-nw.info**

The Northwest Regional Forestry Framework

As referenced on page 10, the Northwest Regional Forestry Framework, "Agenda for Growth" includes six actions to promote the use of biomass woodfuel, and the growth of the sector within the region. Ranging from the development of a demonstration facility to the wider research into the role of trees and forestry in the low carbon economy, all six actions are currently being delivered by a wider partnership of organisations:

	Action	Outputs	Outcomes	Lead body (in bold), Partners	Key Resource £	06 07	07 08	08 09
33	Facilitate and promote, to the whole supply chain, the benefits and opportunities of biomass energy and carbon savings	3 regional meetings held to promote the uptake of all types of wood biomass	Increase in the production of biomass and the demand for the product Work with RDPE objectives	• **NE** Farm Demonstration activity	NE	X		
34	Access Capital Grants Scheme funding to assist in the installation of medium-sized biomass boilers to stimulate supply chain development	Installation of 3 medium-sized boilers in the region	Provide best practice examples in the region Assist in the establishment of the supply chain	• **NWDA** Transformational Energy Projects	NWDA potential fund for all energy projects	X	X	
35	Advocacy for the biomass sector in the North West (including under managed woodland, processing by-products and Short Rotation Coppice)	North West Woodfuel Biomass Strategy created by Autumn 2006	Assist in the promotion of the biomass technology through independent regional advice and links to the national Biomass Energy Centre Information to be used to spatially target activity	• **North West Biomass Contacts Group** • FC • Biomass Task Force (BTF) • NSF	CFNW, Woodland Initiatives	X	X	X
36	Provide regional information to planners and developers on the opportunities for biomass installations and use in relation to Planning Policy Statement 22 Renewable Energy	Regional guidance produced by Spring 2007	Recognition of biomass opportunities by planners and developers Embed biomass as mainstream renewable alternative	• **GONW** • NWRA	GONW		X	
37	Develop demonstration facility for biomass installations	Demonstration centre	Integration of biomass with sustainable building technology	• **NSF** • Cumbria Woodlands • Cumbria Vision	Cumbria Vision		X	X
38	Research the role of trees, woodland and forestry in the low carbon economy	Research papers, theses and documents with appropriate recommendations	Increased knowledge and awareness	• **NSF** • Tyndall Centre • Sustainability Northwest • Other Universities	Energy Research Centre (ERC), Research Councils	X	X	X

(Taken from Agenda for Growth, Making it Happen – 2006-2009 Action Plan)

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For more information about Agenda for Growth, the Northwest Regional Forestry Framework (which this Biomass strategy forms part of), please contact:

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