

BIOMASS ACTION PLAN FOR SCOTLAND



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BIOMASS ACTION PLAN
FOR SCOTLAND

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FOREWORD



Our vision is to create a cleaner, greener Scotland by obtaining a greater proportion of our country's energy from our own renewable sources.

Behind this desire for change is a recognition that Scotland is already beginning to feel the impact of climate change. There is sound scientific evidence that our climate will change significantly over the coming century. Our Climate Change Programme, "Changing Our Ways", highlighted the need to take action to reduce the impact of our energy usage. It is not an option to do nothing, we must act now.

We are delivering enhanced support measures to bring forward a diverse mix of clean energy sources. Biomass in its many forms has the potential to make a key contribution to our renewable energy and climate change objectives.

Biomass energy has been slow to develop in Scotland, despite our wealth of potential fuel sources. For the sector to grow and develop, it will be essential to have the right framework in place to support development at this early stage.

This action plan sets out a vision for how that framework will be established, and what needs to happen to make progress. Some of this is for the Executive to lead, but business and other public sector agencies must all play their part in helping to maximise the opportunities for growth, jobs and sustainability offered by the expansion of the biomass sector in Scotland.

This action plan is a first step towards getting significant amounts of biomass energy capacity off the ground. It will be complemented by the publication of a renewable heat strategy for Scotland later this year.

We will continue to work in partnership with the key players to pursue this action plan and ensure that biomass can fulfil its potential as a clean, green fuel, providing Scotland with cheap, clean and convenient heat and power.

We invite all interested groups to work with us to make this vision happen and make Scotland a renewables powerhouse.

Handwritten signature of Nicol Stephen in blue ink.

Nicol Stephen MSP
Deputy First Minister and
Minister for Enterprise
and Lifelong Learning

Handwritten signature of Sarah Boyack in blue ink.

Sarah Boyack MSP
Deputy Minister for
Environment and Rural
Development



1. EXECUTIVE SUMMARY

- 1.1 The **aim** of the Biomass Action Plan is to set out a coordinated programme for the development of the biomass sector in Scotland. It summarises the various existing activities, and provides a framework under which they will be coordinated and also supplemented by further actions.
- 1.2 The Scottish Biomass Action Plan has been informed by the EU **Biomass Action Plan**, and shares its aims of promoting economic growth, commitment to renewables and diversification of supply.
- 1.3 Studies looking at the potential for electricity generation have suggested that Scotland's renewable resources could sustain **60GWe** of generating capacity, of which **450MWe** could be derived from biomass. The Scottish sector is starting to grow, with major developments such as E.ON in Lockerbie (**44MWe**), Balcas in Invergordon (**8MWe**) and UPM in Irvine (**25MWe**) all under way now, supported by public funds. The number of smaller heat-only installations is also increasing. But there is still huge potential to develop the market share of biomass and maximise its contribution to the Scottish Climate Change Programme. This development must take account of the range of biomass resources – not only the forestry-derived fuel highlighted in the FREDS (Forum for Renewable Energy Development Scotland) report on biomass, but also from agriculture and waste. Similarly, the demand side comprises not only electricity use, but heat and transport.
- 1.4 **Heat energy** can be produced very efficiently from biomass and deliver significant carbon savings, and indeed over half of the renewable heat supplied to homes and buildings across Europe is from biomass. But in Scotland, while a third of our primary energy consumption is for heat, only a fraction of this comes from biomass. The **main limiting factors** to the further expansion of this sector are equipment capital costs and the availability of trained professionals and accredited installers, while the domestic sector has had an additional barrier of lack of local pellet production. **We are or will be addressing these issues.**
- 1.5 The Executive will produce a **Renewable Heat Strategy**, encompassing bioenergy and other technologies, by the end of 2007, including targets for production of renewable heat up to 2020. In addition, **action is currently being taken on a number of fronts to develop biomass heat.** This includes:
- Awareness raising and information provision, including web-based advice and the networks of Forestry Commission Scotland Woodfuel Information Officers, and SCHRI Development Officers. The sector itself provides a focus for industry discussion through the Scottish Renewables Forum Bioenergy Network, as well as through regional initiatives. Accreditation of installers is encouraged through various measures, but there is clearly a need to increase this activity;
 - Regulation and planning, notably the update of Scottish Planning Policy paper SPP6. This guidance outlines a strategic framework for renewables development, and encourages the identification of sites for new biomass plants through the development plan process;
 - Public procurement. Exemplar projects can already be found across the public sector, but more will need to be done to encourage investor confidence.
 - Financial support through the Scottish

Community & Householder Renewables Initiative (SCHRI) which has to date assisted 20 woodfuel-fired installations at community scale, and 70 household installations. Other schemes include the Highlands and Islands Woodfuel Development Programme, the Carbon Trust's Biomass Heat Acceleration Project, the Renewables Fuel Poverty Pilot, Regional Selective Assistance, demonstrator projects, and the new Scottish Biomass Support Scheme.

1.6 **Electricity from biomass** is significant and contributes to the Executive's long term targets for generation from renewables. Indeed electricity generation through co-firing is currently the largest user of biomass energy in Scotland, although the feedstock is principally imported material in the form of pellets. Electricity from biomass is well supported through a variety of mechanisms. The main source of financial support is the Renewables Obligation (Scotland) and the current review of the Obligation will seek to increase biomass use. The Executive recognises the benefits of generating heat and power together and is keen to encourage the further development of CHP, where we are already performing better than the UK average.

1.7 The **transport biofuels** industry in the UK as a whole is still very young, but large-scale production is established and increasing. The main types of biofuel in use in the transport sector are liquid biodiesel and liquid bioethanol, with a much smaller market for biogas.

- The key incentive for growth in the biofuels sector is the Renewables Transport Fuels Obligation (RTFO) with the UK target for transport biofuel sales of 5% by 2010. The Scottish Executive has adopted this target and supports the introduction of the RTFO.

- Regional Selective Assistance, the Executive's main scheme of financial assistance to create and safeguard employment in the Assisted Areas of Scotland, supported the establishment of the UK's first large scale biodiesel production facility using vegetable oils and animal tallow (Argent Energy), and will help to fund one of Europe's largest biodiesel production facilities (INEOS) at Grangemouth – with the capacity to meet some 35% of the UK's biodiesel needs.

- Support for biofuel crops will be available under the Land Management Contracts to be implemented as part of the Rural Development Plan for Scotland in the course of 2007.
- On procurement, the public sector is leading the way through the Forestry Commission's biofuels programme which now has 120 vehicles running on biofuels blends.

1.8 **Biomass supply** is a key issue in Scotland. In Europe, supply chains are well-developed. But here there is a need for improved assessment of available and future resource, and capacity building; this has been identified as a barrier to growth and development of the sector:

- In the **forestry sector**, Forestry Commission Scotland are looking at ways to boost supply to meet the anticipated demand in the burgeoning biomass sector, with a particular focus on underused materials such as forest residues from brush. Care has to be taken not to displace existing commercial markets, and signposting developers to private sector supply will be key to meeting future demand. Short rotation coppice (SRC) and short rotation forestry (SRF) have been slow to expand in Scotland but Forest Research

will be addressing this issue in forthcoming research. Financial support is available to support both conventional forestry planting and SRC.

- There is a high level of interest from the **farming sector** in the production of energy crops, with oil seed rape being the major biofuel feedstock grown in Scotland. Market confidence should grow further with the announcement of two major biodiesel processing plants in Scotland – at Grangemouth (above) and Rosyth. While there is financial support available to farmers to grow energy crops (through the Aid for Energy Crops scheme), the main drivers for future growth are expected to be market-led.
- The **waste sector** is also an important element of supply. Thermal treatment facilities cover a range of processes including incineration with energy recovery, anaerobic digestion, pyrolysis, gasification, and landfill gas capture. Under the Renewable Obligation (Scotland), only waste containing 90% or more biomass will be eligible to receive Renewable Obligation Certificates. (Exceptions to this rule include the biomass element of waste treated by advanced conversion technologies or in CHP plants.) Financial support is focussed on municipal solid waste through the Strategic Waste Fund provided to local authorities.

1.9 Maintaining the high quality of our environment is an important element in the **development of a sustainable biomass industry**, with potential impacts on soil and water quality, air quality, biodiversity, landscape and GHG emissions. Impacts on the environment from the development of the raw material and use of

biomass for energy will be mitigated through applying best practice in land management, meeting air quality standards and implementing planning regulations.

- 1.10 In **conclusion**, the Biomass Action Plan for Scotland provides a comprehensive picture of the activity being undertaken to develop the sector here and sets out a framework for future policy and support. Key strategic drivers are already in place across the heat, electricity, and transport sectors. On the heat side in particular, the new Scottish Biomass Support Scheme and the publication by the end of 2007 of a Renewable Heat Strategy for Scotland will be important milestones for development.
- 1.11 The **coordination of biomass policy** across the Executive is led by the Renewables and Consents Policy Unit, part of the Energy and Telecommunications Division within the Enterprise, Transport and Lifelong Learning Department. The **Interdepartmental Bioenergy Group**, comprising relevant Executive policy areas, will oversee the implementation of the Plan and ensure that biomass policy is developed in a way that ensures all diverse interests are considered. However, there is a key role for both public authorities and business in progressing the overall aims of the plan. The Executive has made a commitment to work closely with Scottish stakeholders to ensure the Plan continues to be relevant and provides the strategic framework for realising the full potential that a vibrant biomass sector can bring to Scotland.



2. INTRODUCTION

AIMS

2.1 This document sets out the Scottish Executive's Biomass Action Plan for Scotland. The aim of the Plan is to ensure that Scotland's biomass resource is properly supported and exploited, and that it delivers additional economic benefits whilst making a contribution to the ambitious targets for emissions reduction set out in "Changing Our Ways" - Scotland's Climate Change Programme. This Plan, for the first time, sets out a programme for the coordinated development of the biomass sector in Scotland.

2.2 Key aims are:

- to provide a summary of the wide range of existing activities, actions and initiatives;
- to provide a focus for a strategic coordinated approach to developing biomass for energy production across the heat, electricity and transport sectors;
- to identify roles and responsibilities for government, industry and public stakeholders to develop a vibrant bioenergy industry in Scotland; and
- to identify future actions and gaps.

2.1 The Biomass Action Plan for Scotland has been informed by a number of initiatives at an international and national level including:

- the EU Biomass Action plan;
- a number of recent reports into the sector, in particular:
 - Promoting and Accelerating the Market Penetration of

Biomass Technology in Scotland (Scottish Executive, 2005);

- "Changing Our Ways" - Scotland's Climate Change Programme (Scottish Executive, 2006);
- The Scottish Forestry Strategy (Scottish Executive, 2006);
- Woodfuel for Warmth (Sustainable Development Commission Scotland, 2005);
- Environment & Rural Development Committee Inquiry Report into Biomass (March 2006);

- discussions with a wide range of interested groups and key stakeholders both internal and external to the Executive.

STRUCTURE

2.1 The Biomass Action Plan for Scotland reflects the key themes captured in the EU Biomass Action Plan, whilst recognising Scotland's unique circumstances. The Plan will consider current and future demands on biomass for heat electricity and biofuel production in a new expanding marketplace. The main sections of the Plan will consider each of these key areas in more detail:

- wider context
- biomass heating
- electricity from biomass
- transport biofuels

- biomass supply
- environmental impact
- conclusions

2.1 There are some overlaps across the different sections, this is unavoidable and is a reflection of the various uses to which biomass can be put. A framework outlining all the actions is at Annex A.

DEFINITIONS

For the purposes of this report the following definitions are used:

- Biomass – material from forestry, energy crops (such as short rotation coppice and miscanthus) or agricultural plant and animal waste
- Biofuels – any fuel derived from biomass, such as ethanol, biodiesel or methanol
- Bioenergy – energy for heat, electricity or transport generated from renewable biomass



3. WIDER CONTEXT

EUROPE

3.1 Energy is crucial in helping Europe achieve its objectives for growth, jobs and sustainability. High oil and gas prices put the spotlight on Europe's increasing dependency on imported energy. The union is responding to this challenge by putting in place a range of measures to help Europe to reduce dependence on energy imports, increase sustainability and stimulate growth and jobs. The key drivers in the EU Biomass Action Plan can be summarised as:

- the desire for stronger yet sustainable economic growth;
- the need to reduce energy demand;
- the commitment to increase use of renewable energy sources;
- the desire to diversify energy sources, particularly focussing on domestic and sustainable resources;
- the opportunity to enhance international co-operation.

3.2 Biomass is one component of the measures needed to achieve these objectives. It is within this wider context of an integrated and coherent energy policy and, in particular, of the promotion of renewable energy sources that the Commission presented its Action Plan. In short, it is a first step towards improving coordination of the bioenergy sector.

SCOTLAND

3.3 Scotland has the potential to be the renewables powerhouse of Europe. We have a unique combination of natural assets, with nearly 60GW of raw electricity generating potential to draw upon, including off-shore and on-shore wind, wave and tidal and biomass. In supporting a diverse mixture of clean energy, our focus is on those renewable technologies yet to establish a significant foothold in Scotland, including biomass, marine and hydrogen.

3.4 The Executive has set ambitious targets to generate 18% of Scotland's electricity from renewable sources (as a proportion of demand) by 2010, rising to 40% by 2020, which we are already well on the way to achieving. The Executive announced in February 2007 it has met the 2010 target early. There are no targets set for the biomass component, however several large-scale projects including the E-ON project at Lockerbie will make a difference and the Executive will monitor the contribution of biomass to ensure it is not missing out.

3.5 There is no available data on current renewable heat use in Scotland, although there is around 177 MWth installed capacity in large-scale projects and around 8 MWth in small-medium scale projects. Targets for heat will be considered as part of the forthcoming Renewable Heat Strategy. Over the next year, the Executive will focus on expanding this market through the development of a Renewable Heat Strategy and the implementation of the Scottish Biomass Support Scheme.

3.6 In terms of biomass use, Changing Our Ways: Scotland's Climate Change Programme (Scottish Executive, 2006) estimates that 750,000 green tonnes of wood will be used by 2010, rising to

1,000,000 green tonnes by 2020. Overall, the report estimates that bioenergy measures will contribute to removals of an additional 0.12 MtC per year by 2010, rising to 0.18 MtC per year by 2015 and 0.23 MtC per year by 2020. With projects in development, these target will be clearly exceeded and there will be increasing competition for timber volume. Expansion of the resource is a key aim for the Scottish Forestry Strategy and a Forward Strategy for Agriculture.

- 3.7 A number of recommendations were made by the Biomass Energy Group (BEG) of the Forum for Renewable Energy Development in Scotland (FREDS), set up in 2002 to bring together government, industry and academia to advise how best to break down the barriers to renewables developments. The group made a series of recommendations, many of which have already been implemented and are discussed throughout the Plan.

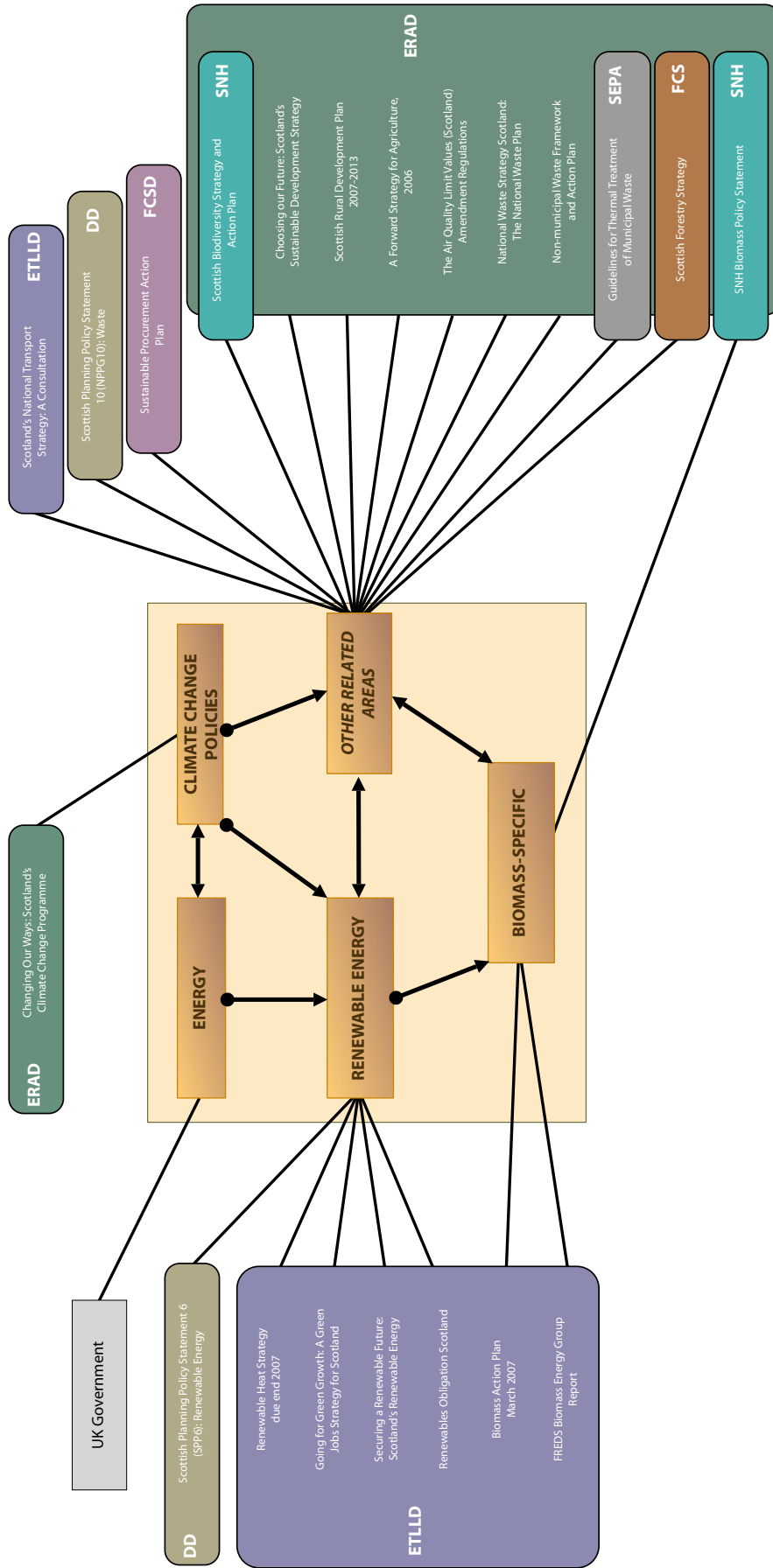
Policy co-ordination

- 3.8 Bioenergy is a cross-cutting topic, bringing together a range of policy areas, including agriculture, forestry, energy, transport, rural development, and climate change. Each area recognises the importance and benefits of developing the biomass sector as part of their overall policy and this is reflected in existing policy documents, including: Securing a Renewable Future: Scotland's Renewable Energy (2003); Going for green growth: a green jobs strategy for Scotland (2005); The Scottish Forestry Strategy (2006), Changing Our Ways: Scotland's Climate Change Programme (2006) and A Forward Strategy for Scottish Agriculture: Next Steps (2006).
- 3.9 The Renewables and Consents Policy Unit, part of the Enterprise, Transport and Lifelong

Learning Department (ETLLD), has the lead role in coordination of biomass policy across the Executive and beyond. However, depending on the subject matter other areas of the Executive can assume a leading role. It is not usual therefore to have a number of policy areas involved in initial discussions on emerging policies and how they might impact on existing or developing policies elsewhere.

- 3.10 In practice, coordination of policies relating to biomass works effectively. An Interdepartmental Bioenergy Group was established to ensure that all relevant Executive policy areas were apprised of biomass developments and to ensure that engagement takes place at an early stage. This group will continue to meet on a regular basis and part of its remit will be to monitor the progress of the Action Plan, as well as ensuring biomass policy is developed in a joined up way across the Executive and its agencies. This will include the need to ensure that the regulatory environment in which the biomass industry operates is developed in a sustainable way. The Group will produce an Annual Report outlining its activity including progress with delivering the Action Plan.
- 3.11 The diagram on the page opposite illustrates the wider context in which bioenergy policy is supported across the Executive.

POLICY MAP





4. SCOTLAND'S ROLE IN THE UK BIOMASS STRATEGY

BACKGROUND

UK Government

- 4.1 Energy policy is mainly a matter for Westminster. The current UK Energy Review will have implications for Scotland. However, the promotion of renewable energy and development of a renewable heat strategy are both devolved to the Executive.
- 4.2 At a UK Government level coordination of biomass policy is led by the Department for Environment, Food and Rural Affairs (DEFRA) or the Department for Trade and Industry (DTI), either individually or jointly depending on the wider subject area. Core governmental bodies come together on the Biomass Implementation Advisory Group, (the Executive is represented on this group) whose remit is to ensure that all Departments are kept apprised of biomass developments.
- 4.3 Defra and DTI are currently working jointly on the development of a UK Biomass Strategy, due for publication during spring 2007. The strategy will define for the first time UK Government policies on biomass for industry, energy and transport in a single document. The aim of the strategy is to encourage the expansion of sustainable biomass production and use in the UK, in order to help address climate change and a number of other key government objectives, such as security of fuel supplies and economic competitiveness. Devolved administrations will input into the strategy. The Biomass Action Plan for Scotland is very much in line with the overall aims of the UK Strategy.

BENEFITS

- 4.4 The key drivers and benefits for biomass in

Scotland are summarised as follows:

Renewable energy

- 4.5 Ministers established the Biomass Energy Group (BEG) in 2004, with the task of considering how biomass, especially forestry products, could make a meaningful contribution to Scotland's renewable energy mix and thus deliver significant environmental and employment benefits. The Scottish Biomass Support Scheme is a first-step to kick-start the sector to realise the opportunities of carbon benefits, job creation and rural diversification from biomass.

Climate Change

- 4.6 The Executive has committed to ambitious targets for Scotland's contribution to the UK's commitment to tackle climate change. The Scottish Climate Change Programme (SCCP) sets a Scottish target to exceed the Scottish share of UK carbon savings by 1 million tonnes of carbon in 2010, totalling 2.7 MtC annually. The SCCP highlights the key role for renewable heat and biomass in helping to meet this target and expects bioenergy measures to contribute removals of 0.23MtC of carbon per year by 2020. It is currently estimated that in the residential sector alone, 80% of energy used goes towards heating and the potential to reduce emissions is significant, which will be taken forward by the Renewable Heat Strategy for Scotland.

Transport

- 4.7 The increased use of biofuels is considered a realistic way of contributing to the UK Government and the Scottish Executive aims of reducing emissions and reducing EU reliance on external fuel sources. The Renewable Transport Fuels Obligation (RTFO) and the UK-wide target

driving the production of biofuels are discussed in more detail in section 7.

- 4.8 Biofuel production currently costs more than conventional transport fuel production. The Chancellor of the Exchequer has therefore set a 20p per litre tax incentive to 2010 for biofuel production to help stimulate this market, and the development and investment in new techniques and processes by transport fuel producers and suppliers. In the longer term, costs should reduce as new sources and a wider range of material, for example lignocellulosic (woody) materials like wood and straw and the organic parts of municipal waste, become more widely available for processing into biofuel.

Forestry

- 4.9 The Scottish Forestry Strategy and its associated implementation plans lay out the forestry sector's role in supporting the development of the bioenergy industry. This ranges from facilitating the development of an efficient and reliable wood fuel supply chain to the provision of dedicated advice through its network of wood fuel information officers. The forestry industry is committed to support the delivery of the Executive's climate change objectives by increasing wood fuel usage and maximising the rural business diversification benefits of developing the bioenergy sector.
- 4.10 A growing biomass industry has the potential to strengthen the economic viability of the Scottish forestry sector by providing a market for lower quality and smaller dimension material. Stimulating this market will encourage active management of neglected woodland which will bring environmental and amenity benefits, for example, through increased thinning of woodlands and encouragement of woodland

regeneration.

Agriculture

- 4.11 There is a need to treat agriculture as part of wider rural development. The increasing importance of this is recognised in the new EU Rural Development Regulation. Scotland's farming industry should be a major driver in sustaining rural development, helping rural communities prosper and contributing to the growth of the rural economy. In terms of biomass, the sector is responding to the growing demand for biomass feedstock and has engaged positively with the biofuels industry. Animal by-products are already being used at the Argent plant for the production of biodiesel and agricultural businesses are working to develop biodiesel production from Oil Seed Rape. There is also significant potential to expand woody biomass production from agricultural land, both from forestry, short rotation coppice and short rotation forestry.

Waste

- 4.12 The amount of waste being produced should be minimised wherever possible. Thereafter, the most appropriate option in most circumstances for waste is recycling. However, there will always be residual amounts of wastes that need to be managed in other ways including waste disposal. Traditionally in Scotland this has been undertaken via landfill. Thermal treatment is an alternative treatment to landfill and is more environmentally preferable according to the waste hierarchy. Thermal treatment can apply to a number of different practices, for example, incineration with energy recovery, anaerobic digestion, pyrolysis, gasification, landfill gas capture. All waste management technologies have some impact on climate change but the

land-filling of waste containing biodegradable materials is the largest single contributor.

Evaluation and Targets

- 4.13 There is a need to evaluate the contribution biomass makes to the wider aims of the Executive, in terms of, for example, sustainable economic development, rural diversification and tackling climate change. However the diverse range of interests covered in this Action Plan does not easily lend itself to setting useful or manageable targets. It is not the intention to purposely avoid target setting. What we can do is measure progress towards those targets already set in the various Executive policy documents which impact on the biomass sector. This information is already included in the document at the relevant section but the key targets are summarised below:
- to generate 18% of Scotland's electricity from renewable sources by 2010, rising to 40% by 2020;
 - to exceed the Scottish share of UK carbon savings by 1 million tonnes of carbon in 2010, totalling 2.7 MtC annually;
 - to increase the percentage of transport fuel from renewable sources to 5% by 2010;
 - commitment to include targets for production of renewable heat for the period up until 2020 as part of the Renewable Heat Strategy.
- 4.14 The Interdepartmental Bioenergy Group will consider progress towards targets as part of its remit.

SUMMARY

Biomass is a cross-cutting topic, as it brings together a range of policy areas, including agriculture, forestry, energy, transport, rural development, and climate change policy. The Renewables and Consents Policy Unit within the Enterprise and Lifelong Learning Department has the lead role in coordinating policy across the Executive and its agencies. Relevant policy areas come together on the Executive's Interdepartmental Bioenergy Group to ensure that co-ordination of policies relating to biomass works effectively, and to monitor implementation of the Action Plan. In addition, the Executive is linked into the work of UK Government through the UK Biomass Implementation Advisory Group.

The benefits from biomass cut across a range of sectors. It is well placed to make a significant contribution to both Scottish and UK renewable targets by 2010. In addition it will help to contribute to targets in Changing Our Ways: Scotland's Climate Change Programme and the Scottish Forestry Strategy. The progress towards targets will be undertaken as part of the work of the Interdepartmental Bioenergy Group.

ACTION TABLE

Lead Department	Action	Timing	Indicator / Output
Forestry Commission Scotland	Refine figures for woodfuel availability in Scotland	2007	Revised woodfuel resource estimate
Forestry Commission Scotland	Examine carbon benefits of alternative bioenergy feedstocks and end uses	2007	Comparative analysis of bioenergy policy scenarios
ETLLD - Renewables	Co-ordinate policies across the Executive, and UK Government, to ensure a strategic framework exists for its development and growth and that all diverse interests are considered	2007	Strategic framework for biomass
ETLLD - Renewables	Undertake evaluation of Plan's contribution towards wider Executive aims	2008	An evaluation report
ETLLD - Renewables	Review Action Plan on an annual basis	December 2007	Review report



5. BIOMASS HEATING

CONTEXT

- 5.1 Around a third of Scotland's primary energy consumption is for heat and although only a small percentage is currently generated by biomass this is a rapidly developing market. Current woodfuel usage is estimated to be around 300,000 oven dried tonnes (odt) per year at the start of 2006, an increase of 117% over the previous year. However, it should be noted that a large proportion of this usage is imported pellets which are used for co-firing to generate electricity. In contrast, of this total, heat production currently uses around 121,000 odt per year of virgin wood and recycled timber in larger scale (>1,000 odt per year) industrial installations.
- 5.2 At the start of 2006, around 4,400 odt per year of wood fuel were being used in small-medium scale (<1,000 odt per year) installations, an increase of 9% over the previous year. The number of small-medium scale heat only installations has increased rapidly over recent years with a total installed capacity of over 8 MWth across 42 projects, including 5 operational woodfuel district heating schemes. Although the local heat only sector comprises only around 2% of the current biomass use, it has the potential for significant expansion and brings many local rural diversification benefits. The main limiting factors to the further expansion of this sector are equipment capital costs and the availability of trained professionals and accredited installers.
- 5.3 Forestry Commission Scotland estimate that around 50,000 odt of traditional wood fuel in the form of logs are used in domestic properties for traditional fires or log burners. However, this sector is also modernising its demands and efficiencies through the use of new, automated systems to provide clean and convenient domestic heating. Wood fuel pellets also offer a clean and

practical alternative to traditional fossil-fuelled systems. The main limiting factor for the growth of this domestic market sector (aside from those already listed) is the lack of pellet production in Scotland. However, the recently announced proposal by Balcas to build a wood fuel pellet manufacturing facility at Invergordon with support from Highlands and Islands Enterprise, and several projects in development will help to provide a Scottish source of pellets in the near future.

SUPPORT MEASURES

- 5.4 The Executive is taking action on a number of fronts to develop biomass heat:

Renewable Heat Strategy

- 5.5 The Executive has made a commitment to produce a Renewable Heat Strategy by the end of 2007. The overall aims of the strategy will be: to maximise the potential of the full range of Scotland's renewable resources; to grow the economy; to contribute to Scotland's Climate Change Programme; and to strengthen energy supply security by ensuring a vibrant market is developed for renewable heat in Scotland. The strategy will lay down targets for production of renewable heat for the period until 2020 and explain how progress towards these targets will be monitored.

Information Provision

- 5.6 Awareness-raising and promotion of the benefits of biomass are essential to create a flourishing biomass industry. The Executive is supporting the provision of information at all levels from public awareness to professional training through a range of measures.

5.7 The Executive recently launched a one-stop shop website for woodfuel information (at www.usewoodfuel.co.uk) which contains a range of information for domestic, commercial and industrial users of woodfuel. The website is also developing a series of case studies to share experiences and best practice. This website links into the DEFRA Biomass Energy Centre website (www.biomassenergycentre.org.uk).

5.8 Advice and support on biomass is available from a range of sources. Forestry Commission Scotland has a network of Woodfuel Information Officers who are providing advice and information to a range of organisations and individuals on installations and supply. The network (full contact details at Annex E) has been extended with the appointment of an officer in South Scotland, to share best practice and experience across the whole of the country.

5.9 In May 2006, the Executive published an Annex to Planning Note (PAN) 45 on microrenewables. This document helped increase awareness of the various technologies available and paragraph 6 provides advice to developers, planners and communities on micro biomass schemes. This supplemented the earlier advice in PAN 45 on other larger scale biomass technologies.

5.10 The network of Scottish Community and Householder Renewables Initiative (SCHRI) Development Officers (full contact details at Annex E) is a useful source of information and advice for a whole range of renewable technologies, including biomass. The network covers the whole of Scotland.

5.11 The renewables sector has also worked on strengthening the presence of the biomass industry in Scotland. The Scottish Renewables Forum Bioenergy Network (BEN) provides a

focus for industry discussion and lobbying on biomass. The Executive supports a post to co-ordinate the work of the BEN.

Regional View

5.12 Regional level advice and support is available from a number of sources, although it varies considerably between regions:

- in Argyll, ALLenergy has developed a high level of expertise in biomass through hands-on involvement in a number of projects;
- the Lanarkshire Biomass Group provides local advice and support, promoting and disseminating information to build on the North Lanarkshire biomass projects; and
- Highland Birchwoods has developed a considerable knowledge base through projects such as the Northern Woodheat and North Sea Bioenergy projects, both EU funded with a number of European partners.

5.13 The Enterprise Networks are actively involved in supporting the biomass sector, examples include:

5.14 **Lanarkshire Biomass Project**, which is a public sector partnership created to develop a commercial biomass project based on burning wood chips to create renewable energy. Partners are North Lanarkshire Council, Central Scotland Forest Trust, Scottish Natural Heritage, Scottish Enterprise and Forward Scotland.

5.15 **Perthshire Biomass Partnership**, which is a network to encourage the development of the local wood fuel market consisting of representatives from Scottish Enterprise Tayside,

Forestry Commission Scotland and Perth and Kinross Council. The project has sought to promote developments in the use of wood fuel for heating at the same time as establishing the local wood fuel supply chain.

- 5.16 **Scottish Enterprise** are working with the **Scottish Forest Industries Cluster**, a group which includes all stakeholders in the sector, to develop knowledge, new products and markets, strengthen links with the wider community, all collaborating to their mutual benefit.
- 5.17 While there are good examples of regions taking a lead in developing the biomass sector, more needs to be done to ensure all regions of Scotland can benefit. There is a need to identify priority areas across Scotland that offer the best opportunity to exploit the bioenergy sector, be that heat, electricity or both. This would allow for better targeting of support from the various stakeholders involved in the sector.

Accreditation

- 5.18 Consumer confidence in equipment and installation is supported by the accreditation of installers through the Clear Skies programme (www.clear-skies.org). However, the number of accredited biomass installers is limited and there is a need to build capacity in the sector to provide greater choice and confidence in the market for consumers. The IGNITE training course run by Rural Development Initiatives has provided a basis for capacity building in the woodfuel sector and the Northern Woodheat training course run by Highland Birchwoods provides technical training for professionals in designing and commissioning woodfuel systems. The Executive is encouraging development of training for designers, engineers and installers of woodfuel equipment and will provide support for

an effective and coordinated accredited training programme.

- 5.19 For the first time, it provides a list of woodfuel suppliers which now covers the whole of Scotland. There is however the need to develop standards for woodfuel quality and allow users to identify suppliers who apply best practice in terms of environmental and quality standards.
- 5.20 Consumers can also refer to approved appliance listings on the Energy Technology List (via www.eca.gov.uk) to ensure the equipment they install meets the minimum emissions standards. Consumers in Smoke Control Areas must also refer to the exempt appliance list (at www.smokecontrolareas.co.uk). The number of appliances is currently limited and equipment suppliers are encouraged to register their equipment.

REGULATION AND PLANNING

- 5.21 In 2006, the Executive consulted on proposed revised planning policies for renewable energy developments. The proposals in draft, Scottish Planning Policy 6: Renewable Energy set out how the development plan process can best support the continued growth of all renewable energy technologies, including biomass, so that development takes place in the context of a long-term and inclusive vision. Responses to the public consultation exercise on the Executive's draft proposals are still being considered. Finalised guidance should be in place by March 2007.
- 5.22 Draft policies indicated that planning authorities should consider the extent to which there are opportunities through development plan policies to identify sites appropriate for new biomass plants in those areas where there are either

existing long-term secure resources or new opportunities available to harness local resources. This does not rule out development applications outwith these areas so long as they satisfactorily address specified broad criteria. In all cases, plans should confirm that the development of new biomass energy plants will be supported subject to local landscape, built and cultural heritage, amenity (including public health and safety), environmental and transportation issues being satisfactorily addressed.

5.23 SEPA has now issued clear guidance entitled “Is it waste – understanding the definition of waste” (www.sepa.org.uk/pdf/guidance/waste/is_it_waste_v2.pdf). The guidance advises that biofuel from timber and other crops is not waste, nor are forestry residues or material produced by the timber processing industry from virgin timber likely to be considered waste. The guidance provides clear advice on a range of biomass sources and the key message is that the concept of waste can not be interpreted restrictively, but must ensure that the environment and human health are safeguarded.

5.24 A draft Scottish Planning Policy (SPP)10 Planning for Waste Management was issued in August 2006 and responses are now being analysed for planned completion of a finalised SPP in spring 2007. The SPP recognises that in rural areas, farmland or forests may determine the best locations for thermal treatment plants designed for biomass.

PUBLIC PROCUREMENT

5.25 As highlighted in “Changing Our Ways” Scotland’s Climate Change Programme the public sector across the UK buys £125 billion worth of goods and services each year. The Executive has a role to play in demonstrating leadership in all aspects

of sustainable public procurement.

5.26 The Executive already promotes best practice across the public sector, and provide advice and support by:

- maintaining a website;
- issuing guidance and advice to public sector procurement officials;
- working with other public bodies;
- providing specific training to the Executive’s procurement staff on how to incorporate sustainable development issues into procurement.

5.27 Once the UK Government has responded to the UK Sustainable Task Force report, the Executive will produce a Scottish Sustainable Procurement Action Plan that will build on progress already made in Scotland and take into account the work of the UK Task force. The Action Plan will also identify key performance indicators and benchmarking opportunities to deliver on the Executive’s ambition to be a leader in this field.

5.28 A number of public organisations are now considering biomass as an alternative source of heating. Exemplar projects can be found at the offices of Scottish Natural Heritage in Aviemore and in three Forestry Commission Scotland offices at Huntly, Dingwall and Inverness where small biomass heating systems have been installed. In the local authority arena, North Lanarkshire Council have led the way, with installations in four council premises and Argyll & Bute Council has installed a woodfuel systems in the new Aqualibrium Centre in Campbeltown. Several other local authorities have projects (both PPP and conventional) in development including

Highland Council, Perth & Kinross Council, Moray Council and Aberdeenshire Council.

5.29 The procurement of PPP initiatives is strictly regulated by European Directives and implementing regulations in the United Kingdom such as the Public Works Directive (93 / 37 / EEC) and the Public Services Directive (93 / 50 / EEC). However, the Executive recognises the need to build confidence in the biomass sector at this early stage. As mentioned above, a number of demonstration projects in Scotland have received public support, which will provide an excellent source of information that can be disseminated to organisations looking to install similar systems. The Executive will use these exemplars to develop bespoke information and case studies.

FINANCIAL SUPPORT

5.30 Current support for heating with biomass is available through a number of schemes, targeted at particular groups.

5.31 The **Scottish Community & Householder Renewables Initiative (SCHRI)** is funded by the Executive and managed by the Energy Saving Trust and Highlands and Islands Community Energy Company. It provides funding towards the development and capital costs of renewables projects for communities, as well as assisting technical assessments of project feasibility. To date, support worth over £1.4 million has been allocated to more than 30 wood-fired community projects, including district heating schemes, schools and community centres.

5.32 At the domestic scale, the SCHRI provides support for the installation of a range of household renewable energy technologies, including automated woodfuel heating systems.

Nearly £250,000 of grants have been allocated to householders for the installation of biomass boilers.

5.33 The Executive is also supporting the Carbon Trust's **Biomass Heat Acceleration Project (BHAP)** in Scotland. The aim of the project is to accelerate the development of the biomass-for-heating market in Scotland by focussing on reducing costs and supply chain risks. In the first phase, the BHAP is currently working with 10 existing installations in Scotland.

5.34 **Renewables Fuel Poverty Pilot.** The Executive is undertaking a renewables heating pilot which will run over 2006-08 to look at the potential for including renewable technologies in the fuel poverty programmes in the future. One million pounds will be allocated over the two years to install renewable technologies in a variety of house types and geographic conditions across Scotland.

5.35 **Scottish Biomass Support Scheme.** A key new support measure is the Executive's Scottish Biomass Support Scheme. The £7.5 million funding package will support projects across a range of scales, from both public and private organisations. The Scheme will support both supply chain infrastructure and installations. Its key aims are: strategic transformation of the biomass sector, maximising of carbon savings, maximising support for local economy by creating sustainable green jobs and contributing to renewable energy targets.

5.36 **Regional Selective Assistance (RSA).** The Executive's main scheme of financial assistance to create and safeguard jobs in the Assisted Areas of Scotland can also offer support to bioenergy projects.

5.37 **Demonstration projects.** Prior to the Biomass

Support Scheme, the Executive has supported a number of demonstration projects in Scotland that offer excellent examples of the benefits of biomass energy, and encourage others to follow suit:

- **Queen Margaret University College** - grant funding of £400,000 to support the installation of a biomass plant.
- **Perth and Kinross PPP School Projects** - grant funding of £400,000 to support the installation of biomass heating systems in 6 schools to be build under PPP.
- **Pilot Biomass Grant Scheme in Highlands and Islands** - grant funding of £430,000 to develop 12 biomass installation projects.

5.38 **Rates Relief.** The Scottish Executive will be consulting shortly on providing preferential rating treatment for renewable energy generators. The aim is to incentivise and increase the level of renewable energy generation in Scotland.

5.39 **UK Support.** Additional support for renewable energy is available through a range of UK wide programmes including:

- Enhanced Capital Allowances (www.eca.gov.uk)
- Low Carbon Buildings Programme (www.lcbp.org.uk)

SUMMARY

Scotland has the capacity to become a major player in renewable heat from biomass and this is an area that the Executive will focus on in the coming year. The key initiatives over that period will be the production of a Renewable Heat Strategy and the introduction of a Biomass Support Scheme. Along with Executive support for industry-led development of major biomass heat and power plants, these initiatives will help support the transformation of the biomass sector in Scotland. In addition, we will also ensure that planning regulations and procurement policy offers a supportive environment for renewables projects to develop and grow.

Key areas which will be addressed through the Renewable Heat Strategy to strengthen the biomass heating industry and build public confidence in the sector include:

- advice and support;
- sharing best practice;
- information and training for professionals and installers;
- specifications for equipment; and
- clear and consistent standards for fuel supply.

ACTION TABLE

Lead Department	Action	Timing	Indicators/Outputs
ETLLD - Renewables	Implement Scottish Biomass Support Scheme	Jan 07	Installed thermal capacity CHP capacity Carbon savings Number of district heating schemes
Forestry Commission Scotland	Review uptake and outcomes from IGNITE and Northern Woodheat training programmes	Jan 07	Number of accredited suppliers
ETLLD - Renewables	Develop training courses for professionals and installers	June 07	Number of accredited training courses Number of accredited installers
Forestry Commission Scotland	Work with industry to encourage use of recognised biomass standards	Dec 07	Industry standards for biomass supply
Forestry Commission Scotland	Liaise with relevant Executive departments and external stakeholders to develop information provision on range of biomass	ongoing	Update Woodenergy website Study into commercial viability of alternative crops and biomass
ETLLD - Renewables	Develop a Renewable Heat Strategy	Dec 07	Renewable Heat Strategy
ETLLD - Renewables	Represent Scottish interests within a comprehensive UK Biomass Steering Group	ongoing	Input to UK Heat Strategy
Forestry Commission Scotland	Monitor installations and share best practice	ongoing	Sectoral report
FCSD - Local Taxation	Consult on rates relief for renewable energy generation	2007	Increase take-up by business of renewable sources of energy
ETLLD - Renewables	Identify biomass potential on a regional basis	2007	Growth of local bioenergy sector in Scotland



6. ELECTRICITY FROM BIOMASS

INTRODUCTION

- 6.1 Scotland has enormous renewable electricity generation capacity, with biomass one of a number of potential sources alongside wind, wave, tidal and our existing hydro resource. We are currently on course to meet our target for 18% renewable electricity generation by 2010. However, Ministers are also determined to support the development of as wide a range of renewable technologies as possible. Biomass can help increase that diversity with the added value that generation can provide a controllable baseload, enhancing security of supply.
- 6.2 Electricity generation through co-firing is currently the largest user of biomass in Scotland, although the feedstock is mainly imported material in the form of pellets. Co-firing in Scotland is currently taking place at Cockenzie and Longannet. Consultation on changes to the co-firing rules under the UK Renewables Obligations closed on 5 January 2007.
- 6.3 Proposals for purpose-built biomass plants are also in development and the first large-scale biomass power station is now under construction by E.ON at Steven's Croft, Lockerbie. As discussed below, the Executive also recognises the benefits of combined heat and power generation where practicable and will work with developers to identify opportunities to promote this form of biomass use.

RENEWABLES OBLIGATION

- 6.4 The biomass electricity market is driven by the Renewables Obligation (Scotland), or ROS, which is aligned with almost identical instruments in England and Wales and (more recently) in Northern Ireland. A major review of the Obligations is currently underway, following on

from the Energy Review conclusions announced in the summer 2006. The key considerations include ROC banding, essentially the ability to award more or less support to different technologies or biomass feedstocks depending on their carbon benefits and costs, plus changes to the rules on co-firing. Any changes ultimately arising from these proposals, coupled with more recent changes to the Obligation rules regarding the eligibility of waste could have a significant effect on the development of biomass generation capacity in Scotland.

- 6.5 The progress of the debate on banding is being followed closely by the Executive; subject to agreement on the scope and nature of the required changes, we intend that banding will be introduced to the ROS at the same time as to the other UK Obligations.

Co-firing

- 6.6 As mentioned above, changes to the current co-firing rules are being considered as part of the ongoing consultation on banding. Under the current Obligation rules, the maximum demand for co-firing across the UK is 2.03 TWh, only a small proportion of which is in Scotland.
- 6.7 The current consultation looks at the possibility of removing the cap on co-fired ROCs while reducing the support available by banding co-fired ROCs at a lower rate. This could have the effect of increasing the demand for biomass material for co-firing without flooding the market with ROCs and thus reducing the value of the Obligation to other technologies. Other changes being considered include a requirement for co-firers to provide an annual report to Ofgem on the biomass they have used, its origins and how they have addressed any relevant sustainability issues.

6.8 The consultation also asks for views on retaining a higher banding for co-firing using energy crops, recognising the benefits to farmers of the opportunities for farm diversification and the development of a biomass resource. The Executive however recognises the potential impact on existing industries and the development of purpose-built biomass plants and will consider the issue in detail to ensure the best approach for Scotland.

COMBINED HEAT AND POWER (CHP)

6.9 The Executive recognises that combined heat and power (CHP) generation can make more efficient use of biomass resources and contribute towards the Scottish Share of the UK's carbon emissions. CHP plants can be fired by any fuel, including coal, gas or biomass. Scotland is performing better on introduction of CHP than the UK average with installed capacity in Scotland of around 743 MWe (around 16 per cent of UK CHP capacity).

6.10 CHP is a key component of UK and EU biomass policy. Key support measures include:

- Renewables Obligation Scotland (support for good quality mixed biomass and waste CHP systems)
- Scottish Biomass Support Scheme
- Enhanced Capital Allowances

6.11 There are several proposals for biomass CHP in development, and the Executive has awarded funding to support projects by Balcas in Invergordon, UPM Kymmene in Irvine and the Wick District Heating Scheme.

PLANNING

6.12 The Executive works closely with colleagues in Ofgem, National Grid Company and transmission companies to ensure that its renewable policy is taken fully into account in the planning and operation of the electricity network in Scotland.

6.13 Alongside that the Executive wants to see the planning system make a positive provision for renewable energy developments - as stated earlier in the document, biomass is highlighted to ensure a supportive framework is in place to help the sector to grow to its full potential.

SUMMARY

Electricity from biomass is well supported by the Executive through a variety of mechanisms. The main source of financial support is the Renewables Obligation (Scotland) and the current review will seek to increase biomass use through the RO(S). The Executive recognises the benefits of generating heat and power together and is keen to further encourage the development of CHP, where we are currently already performing better than the UK average.

ACTION TABLE

Lead Department	Action	Timing	Indicators/Outputs
ETLLD - Renewables	To contribute to the RO consultation to ensure Scotland's interests are represented	Jan 07	Increased demand for biomass materials
ETLLD - Renewables	To continue to encourage CHP growth	2007	Increase Scotland's CHP installed capacity from current baseline of 743 MWe
ETLLD - Renewables	To increase Scotland's renewable electricity generation capacity	18% by 2010, 40% by 2020	Increase in energy generated from renewables sources, in particular biomass



7. TRANSPORT BIOFUELS

INTRODUCTION

- 7.1 The Scottish Climate Change Programme and National Transport Strategy provide the context for reducing emissions in the transport sector in Scotland. The Executive is committed to this reduction and transport biofuels are considered a realistic component in the range of sustainable transport measures being developed – from SMART measures, through to use of low carbon vehicles and alternative transport fuels.
- 7.2 The biofuel industry in the UK as a whole is still very young, but large scale production is already established and increasing as more producers are gearing toward future production. The main types of biofuels in use in the transport sector are liquid biodiesel and liquid bioethanol, with a much smaller market for biogas. The key driver for biofuels in Scotland and the UK as a whole is the Renewables Transport Fuels Obligation (RTFO) and the UK-wide target for transport biofuel sales of 5% by 2010.
- 7.3 The largest proportion of vehicle sales is the second hand market and the average age for all licensed vehicles in Scotland is 13 years. Manufacturers are therefore reluctant to warrant engines beyond a 5% biofuel level and biofuels will primarily appear as a blended fuel with conventional fossil and mineral fuels for sale at forecourts. The UK Government has nevertheless signalled that the target may be reviewed post 2010 with the aim of increasing the target beyond 5%.

RENEWABLE TRANSPORT FUEL OBLIGATION (RTFO)

- 7.4 EU Directive 2003/30/EC aims to reduce transport emissions across Europe and provided

the catalyst for action by the UK Government and devolved administrations. In response to the Directive, the UK Government undertook a feasibility study and consultation on the proposal for an RTFO as a mechanism to meet the biofuels target and promote the biofuels market. The study set out to establish the cost-effectiveness, administrative feasibility, regulatory burdens and compatibility of the RTFO with other UK Government objectives.

- 7.5 The RTFO Scheme is reserved, and the Department for Transport has lead responsibility for overseeing the establishment of the scheme. This is in consultation with devolved administrations and other key stakeholders, and the Executive is a member of the RTFO Project Board.
- 7.6 The UK-wide target for biofuel sales has been set at 5% by 2010 and the Executive has adopted this target and supports the introduction of the RTFO. The UK Government has committed to meet the 2010 target and to introduce the RTFO Scheme and administrator of the obligation from April 2008. The primary legislation for the RTFO scheme is in chapter 5, part 2 of the Energy Act 2004.
- 7.7 The Executive supports the aims of the RTFO which will require transport fuel suppliers to ensure that a percentage of their sales are from a renewable source, intended to deliver carbon savings in the transport sector, and provide a sound platform for private sector investment in renewable fuels infrastructure and technology.

PROCUREMENT

- 7.8 The public transport fleet is leading the way in procurement of biofuels through the Forestry Commission's biofuels programme which now

has 120 vehicles running on biofuel blends. In Scotland, trials are being carried out with 100% biofuel blends from biodiesel and processed used cooking oil (UCO). The EU are looking to bring forward recommendations on the proportion of the public transport fleet running on green fuels in summer 2007.

SECOND GENERATION BIOFUELS

- 7.9 Second generation biofuels can be derived from a number of sources including non-food biomass, dedicated energy crops and biomass resources currently viewed as residue such as straw and forestry thinnings. Advantages include the potential for significant “well to wheel” reductions in greenhouse gas (GHG) emissions and reduced land use requirements as most biomass can be used as a feedstock. Second generation biofuels should also avoid some of the technical problems associated with first generation biofuels such as degradation and material incompatibility associated with first generation biofuels. The first demonstration plants are now beginning to appear in Europe. In the EU Biomass Action Plan, the Commission commits to substantially increasing its support for the development of second generation biofuels through its research budgets.

FINANCIAL SUPPORT

Support for biofuels plants

- 7.10 The Executive supports the aims of the RTFO and in Scotland, Regional Selective Assistance (RSA) grant has been offered to create and safeguard jobs in biofuel production. £1.2 million of RSA was provided to Argent Energy which established the UK's first large scale biodiesel production facility using vegetable oils and animal tallow.

A £9 million RSA grant has been offered to INEOS Enterprises, who will establish Europe's largest single biodiesel production facility at its Grangemouth site in 2008 and will have capacity to meet 35% of the UK biodiesel needs.

Support for biomass production for biofuel

- 7.11 Proposals for supporting investment in small scale renewable energy capacity, including biofuel, are included under Land Management Contracts (LMCs). These will be implemented as part of the new Rural Development Plan for Scotland to be approved by the European Commission in 2007. Support for production of biomass is discussed further in Section 8.

SUMMARY

The biofuel industry in the UK is still relatively young. The key driver for developing the market is the RTFO and the Executive supports its aims. In Scotland support is available through RSA grant for biofuel plant and the new Land Management Contracts will support biofuel crops.

ACTION TABLE

Lead Department	Action	Timing	Indicators/Outputs
ETLLD - Transport	Publish National Transport Strategy	Dec 06	National Transport Strategy
ETLLD - Transport	Engage with the UK's work on the Powering Future Vehicles Strategy	ongoing	Market shift towards lower carbon vehicles
ETLLD - Transport	Introduction of RTFO, to increase percentage of transport fuel from renewable sources	2010	UK biofuel sales 5% by 2010
ERAD - Agriculture	Support for biofuel crops under the Land Management Contracts	2007	Increase in farmers growing biofuel crops
ETLLD - RSA	Continue to support projects from biofuel companies where they create and safeguard jobs.	ongoing	Increase in biofuels plants in Scotland



8. BIOMASS SUPPLY

INTRODUCTION

- 8.1 In Europe, supply chains are well-developed. Some countries have developed standards, and the EU has recently published draft standards to facilitate trade, develop markets and increase consumer confidence. In Scotland there is a need for improved assessments of resource and capacity building and this has been identified as a barrier to growth and development of the sector.

FORESTRY

- 8.2 Forestry is already an extremely important part of Scotland's economy – forests currently cover around 17% of our land area and produce around 7 million m³ of timber a year, with this production set to increase over the coming decade.
- 8.3 Climate change is one of 7 key themes identified in the recently published Scottish Forestry Strategy (SFS). The SFS identifies the key role that forestry can play in mitigating climate change through development of a strong biomass market. A large number of forests are located in rural areas where using wood as a local source of energy can provide new local markets for timber, generate sustainable employment as well as reducing timber haulage distances. Energy crops (such as short rotation coppice or short rotation forestry) can also provide local opportunities for rural diversification.
- 8.4 Between 2001 and 2005, 38,000 hectares of new planting has been achieved. Forestry Commission Scotland is currently looking at ways to boost these planting rates.
- 8.5 Wood can be used as a fuel simply as logs but more commonly it is now processed into a range of fuel products. The greater the uniformity and energy density of the product, the higher its

value. Woodfuel products include logs, bales of residues from the forest; wood chip from sawmills or arboriculture, and pellets and briquettes made from sawdust. The drier the product the greater the energy content and the more value it has as a fuel product. Moisture content can vary from freshly felled wood at 50-60%; air dried at around 20-30% and oven dried at less than 5%.

- 8.6 The most recent production forecast for Scotland's forests estimated available volumes of 6.9 million m³, peaking at 8.9 million m³ in 2017-2021. Whilst much of this material is currently contracted to other markets, there are also other underused materials, such as forest residues from brash which could be available as biomass. Therefore it is currently estimated that the total potentially available volume of, so called, virgin biomass (i.e. wood plus brash) taking into account other markets is approximately 323,000 odt (roughly 650,000 m³) however, this volume estimate is subject to constant revision depending on new forecast data and price changes due to the relative demand for this material from the different wood using sectors. There is also a need to ensure that the level of residue removal does not lead to a loss of long term fertility.
- 8.7 The timber industry has a strong industrial presence in Scotland and a substantial amount of sawmill conversion products are also currently used for industrial on-site heat production. Much of this product has an existing market in the form of industries such as the wood panel sector. However, it is estimated that some might be available for energy production.
- 8.8 Short rotation coppice (SRC) and short rotation forestry (SRF) have been slow to expand in Scotland, with only around 200 ha planted to date, spread geographically from the Borders to Orkney. Proposals for around 5 times that area

are currently in the pipeline, although it will be 3 to 5 years before a harvest can be achieved. The currently available harvest is estimated at around 600 odt. Although limited data is available on Short Rotation Forestry at present, Forest Research are developing a programme to look at the potential for developing this resource.

- 8.9 SEERAD's Analysis of Greenhouse Gas Life Cycle Emissions, Air Pollution Impacts and Economics of Biomass estimates that around 50,000 to 90,000 ha of land would be suitable for SRC planting, although uptake will depend on incentives and relative values of crops.
- 8.10 Given the restricted availability of suitable land in Scotland for growing certain bespoke energy crops and the fact that, in some instances, crops could compete for the same ground there is a clearly established need to undertake a comparative analysis of the suitability, GHG impacts and economic benefits of specific biomass and biofuel crops for available sites.

Financial Support

- 8.11 The Scottish Forestry Grants Scheme (SFGS), introduced in 2000, provides grants for the planting, restructuring and management of existing woodlands. Most grants available under the SFGS closed in August 2006, and will be superseded by new Land Management Contracts (LMCs) in 2007. Under the LMCs forestry options will be available alongside other generic land management and agricultural measures.
- 8.12 On 12 September 2005 the Scottish Executive's grant aid for farmers to establish SRC willow or poplar as an energy crop was brought into line with the equivalent grant in England. The new grant now pays an all-inclusive, flat rate of £1,000 a hectare. Payments will be made to farmers who

have a supply contract with an end user, such as a power generating company.

AGRICULTURE

- 8.13 The agricultural sector is experiencing a high level of interest in the production of energy crops as an alternative market outlet for farmers who can utilise existing agronomy skills. In the medium term, uptake of energy crops has so far been limited but there is significant potential for increase in SRC on agricultural land as demand increases, as discussed above.
- 8.14 Oil Seed Rape (OSR) will be the major biofuel feedstock crop grown in Scotland. It is most appropriate for biodiesel production in Scotland. It is already widely grown and yields are good. A total area of c. 35,000 ha of OSR was planted in Scotland in 2005 producing 124,000 tonnes, of which 9,000 ha was planted as non-food set aside and energy crop. However, it is a relatively expensive feedstock for biodiesel production. Used vegetable oil is the cheapest feedstock at present, but supplies are limited. As a consequence, little OSR is currently used to produce biodiesel in the UK.
- 8.15 Market confidence is building with recent announcement of two major biofuel processing plants in Scotland at Grangemouth and Rosyth. RTFO 5% biofuel inclusion by 2010 will continue demand.
- 8.16 Other agricultural material currently used for bioenergy includes animal tallow used in the Argent biodiesel production plant in Motherwell. A biomass power station using poultry litter has also been operational for several years at Westfield in Fife. There is also some interest in the use of agricultural by-products such as straw, however, as there is already a significant market

in Scotland for straw as animal bedding and feed and it seems unlikely at present that straw would be a competitive feedstock material for combustion to produce energy. In the long term, second generation biofuels derived from straw may be another potential market. Other Scottish companies are progressing the installation of energy recovery facilities that use processed animal by-products, such as meat and bone meal, as the primary feedstock.

- 8.17 The Executive supports the sector in a number of ways. A Forward Strategy for Agriculture (Scotland Executive, 2006) gives a commitment to make business information on emerging and other opportunities (including energy crops and biomass) widely available to farm businesses.
- 8.18 The future of biomass supply from the agricultural sector is likely to follow a pattern of development where:
- the main drivers will come from the market and will require a great deal of effort in building and maintaining healthy and profitable supply chains;
 - the sector will need to look at different scales of production to encourage energy self sufficiency;
 - developments will need to take a regional view;
 - production of energy crops is more suited to the arable areas of Scotland and the reduction in transport costs by having the processing capacity within Scotland will be important;
 - support for small scale (on farm) production of energy through the new LMCs.

Financial support

- 8.19 Aid is available to farmers through the Aid for Energy Crops for areas sown under energy crops at a flat rate of €45 per hectare. Any agricultural raw materials (except sugar beet) may be grown on areas qualifying for aid provided that they are intended primarily for use in the manufacture of either biofuels or electric and thermal energy produced from biomass. The current position in Scotland is that the crop grown is exclusively Oil Seed Rape destined for biofuel manufacture.

WASTE

- 8.20 It is widely recognised that despite our best efforts to recycle as much waste as possible, there will always be some residual waste. All waste management technologies have some impact on climate change. Recycling materials generally uses far less energy (therefore emitting less greenhouse gases) than the extraction and processing of virgin materials and is ahead of incineration or landfill in the waste hierarchy. The National Waste Plan advocates that only residual waste i.e. that which is left after as much recyclable / compostable material as possible is extracted should be used for energy recovery.
- 8.21 There are an estimated 4.3 to 5.2 million tonnes of waste biomass generated each year in Scotland. Current developments are principally aimed at the domestic sector (subject to recycling and landfill diversion targets), accounting for around 0.8 to 1.6 million tonnes, leaving commercial and industrial sectors (3.6 to 4.4 million tonnes) largely underdeveloped.
- 8.22 The term Thermal Treatment can apply to a number of different practices e.g. recycling of construction and demolition waste wood as a

fuel source, incineration with energy recovery, anaerobic digestion, pyrolysis, gasification, landfill gas capture and co-combustion of waste derived fuels in power plants and industrial facilities. Thermal treatment is widely practiced in Europe for the treatment of residual wastes. In Scotland SEPA has published Thermal Treatment Guidelines which indicate that for MSW thermal treatment is a viable option only where it forms part of an integrated approach and is used in such a way as not to impede waste prevention, re-use and recycling. The guidelines also offer strong support for the efficient capture of the energy embedded in waste. Any new thermal treatment facilities would be expected to be as efficient as possible e.g. Combined Heat and Power. Thermal treatment facilities for waste are regulated under the Waste Incineration (Scotland) Regulations 2003.

- 8.23 The type of feedstock used for thermal treatment facilities varies and therefore so do the CO₂ emissions and calorific values. Waste may often include a percentage of biomass i.e. plant and animal matter but may also include non-renewable elements such as plastics. Under the Renewables Obligation (Scotland) Order 2006 only waste containing 90% or more biomass will be eligible to receive Renewable Obligation Certificates. Exceptions to this rule include the biomass element of waste treated by advanced conversion technologies such as gasification or in combined heat and power plants. Mechanical and Biological Treatment (MBT) processes can produce refuse derived fuel (RDF) but a clear market for rdf is yet to emerge.
- 8.24 SEPA Project R50090/PUR Analysis Of Current Waste Biomass Arising And Treatment Methodologies In Scotland details the potential for expansion. SEPA are currently commissioning two further studies, the first to evaluate the energy

potential in waste biomass in Scotland and the second, part funded by SNIFFER, to review the available policy instruments to maximise the recovery of value from waste biomass contained in residual commercial and industrial waste streams.

- 8.25 The current infrastructure for the production of energy from waste includes:
- 77,844 tonnes (2.3%) of municipal waste was incinerated in Scotland in 2005-06 at two plants – one in Shetland and one in Dundee. The Shetland plant serves a district heating scheme but does not generate any electricity. The Dundee plant generates electricity for the national grid although plans are underway to investigate the potential for heat use from this facility.
 - Using the Strategic Waste Fund, Comhairle nan Eilean Siar (Western Isles Council) has recently built an Anaerobic Digestion plant which treats source separated household bio-waste. This produces a bio-gas which fuels a 290kW Combined Heat and Power engine. One is also under construction in Moray which will use animal waste.
 - Seven on-farm digesters dealing with cattle slurries as part of diffuse pollution reduction. All generate biogas for internal use (not connected to the grid).
 - Over 90 composting plants mostly treating green waste but increasingly animal and food waste are being considered. Biomass treatment by composting currently is in the order of 500,000 tonnes from all sectors (domestic, commercial and industrial).
 - Scottish Power are currently in the

process of developing a 21.2 MWe waste incineration directive compliant biomass power station at Longannet which will come into full commercial operation in 2010. Once operational this plant will require approximately 135,000 tonnes of biomass per annum comprising approximately 60,000 tonnes of wood waste (e.g. chemically treated timber, plywood, chipboard, demolition waste etc.) and 75,000 tonnes of sewage sludge pellets.

Financial support

- 8.26 The Strategic Waste Fund (SWF) is the main source of funding for local authorities wanting to develop infrastructure to treat residual waste. SWF funding is only available for municipal solid waste treatment in line with the National Waste Plan. Bids (Strategic Outline Cases) to the Strategic Waste Fund have been received from local authorities for the treatment of residual waste. Many of these bids include proposals for Energy from Waste facilities and these are currently being considered by Ministers. The Waste and Resources Action Programme (www.wrap.org.uk) can advise on business opportunities arising from recycling and composting, including occasional capital grant schemes to support recycling and composting infrastructure, which can include support for Anaerobic Digestion.

SUPPLY CHAIN

- 8.27 Local small-scale woodfuel supply chains are well-developed in a number of areas, particularly in the Highlands & Islands where assistance has been available through the Highlands & Islands Woodfuel Development Programme. Supply chain development has also been supported by grant awards through the SFGS Developing Farm Woodland Energy and DEFRA Bioenergy

Infrastructure Scheme. Through these schemes, funding of over £750,000 has been awarded to 18 businesses for supply chain infrastructure to local woodfuel markets and to large-scale CHP and power projects.

- 8.28 The new Scottish Biomass Support Scheme will extend this funding support for further development of the supply chain for biomass across Scotland.
- 8.29 It is vitally important for customer confidence to have fuel which is fit for purpose and delivered to a quality standard and specification. This has been demonstrated time and time again internationally. Clear technical specifications are needed which can be incorporated into supply contracts. The European Union has developed specifications and standards: CEN TC335 for solid biofuels and CEN TC343 for solid recovered fuels.
- 8.30 There is a need to build capacity in the supply chain and the Executive is supporting skills development through the IGNITE training programme run by the Rural Development Initiative. In 2006, the Programme has assisted around 50 businesses to gain accredited training in woodfuel. However there is a role for industry to lead on accreditation.

INFORMATION PROVISION

- 8.31 Forestry Commission Scotland (FCS) publishes a wide range of information for growers of biomass. The Scottish Forestry Strategy has laid out a vision for the future of Scotland's forests and biomass production is an important component of that vision.
- 8.32 FCS has a network of Woodfuel Information Officers providing advice and support to business,

funded in partnership with the Scottish Executive, EU, Scottish Enterprise and Scottish Borders Woodland Partnership. FCS has also developed the Woodenergy website (www.usewoodfuel.co.uk) to make information on woodfuel widely available. In addition, numerous seminars and workshops have been held across Scotland to promote biomass to a range of audiences.

- 8.33 FCS is undertaking a variety of research activities to improve data on biomass including an annual woodfuel usage survey, a market intelligence briefing on biofuels and a report to assess current installations. FCS also liaises at a UK level to promote sharing experiences and dissemination of best practice.
- 8.34 The Executive is committed through its Forward Strategy for Scottish Agriculture to provide farm businesses with information on emerging opportunities for energy crops and biomass. FCS is also working with the National Farmers Union Scotland to promote fuel biomass within the farming community.
- 8.35 The forestry and agricultural industries also have a key role to play in developing the biomass sector. The Scottish Forest Industries Cluster has developed a range of publications and briefings on woodenergy and industry groups such as Scottish Renewables and CONFOR are engaging in market development.
- 8.36 WRAP provides advice, which can include financial support on anaerobic digestion and the use of compost to grow energy crops such as short rotation coppice.

SUMMARY

Development of the biomass sector will require an improved assessment of the available resource. FCS are looking at ways to boost planting rates and how to utilise underused materials from forest residues to facilitate the development of the woodfuel sector. Significant potential exists to increase short rotation coppice on agricultural land to meet growing demand and provide an alternative market outlet for farmers. Alongside that, market confidence is building for oil seed rape, assisted by the support announced for biofuel processing plants and implementation of the RTFO. Given the existing potential of Scotland's forest, this is a key area to focus on in developing the biomass sector. In addition, there are significant biomass resources in the agricultural sector, such as energy crops and tallow, and also in the waste sector. Ongoing financial support, supply chain development and information provision are critical to the development of the biomass resource across all these sectors.

ACTION TABLE

Lead Department	Action	Timing	Indicators/Outputs
ERAD - Agriculture	Continue to provide targeted grant aid for the establishment and management of bespoke energy crops	2007	Implementation of Land Management Contracts
ETLLD - Renewables	Ensure biomass forms part of a Renewable Heat Strategy	2007	Renewable Heat Strategy
Forestry Commission Scotland	Support biomass use for renewable energy by facilitating development of an efficient and reliable wood fuel supply chain	ongoing	Number of biomass supply businesses Volume of biomass
Forestry Commission Scotland	Encourage increased wood fuel usage to help achieve the Climate Change Programme targets	ongoing	Volume of biomass used Woodfuel Usage
Forestry Commission Scotland	Continue to monitor woodfuel usage	ongoing	Woodfuel Usage Survey
ERAD - Agriculture	Provide advice and information to landowners on planting, growing, managing and marketing energy crops	Jan 07	Study into commercial viability of alternative crops and biomass
ERAD - Waste	Strategic Waste Fund - evaluation of Strategic Outline Cases	ongoing	Infrastructure for treating residual and biodegradable municipal waste
ERAD - Waste	Offer support via WRAP Organics Capital Support Programme for Scotland, for composting and anaerobic digestion	closing date for capital programme 6 Feb 07	Recycling and composting infrastructure (including anaerobic digestion for processing biodegradable waste)
ERAD - Waste	Encourage, through the framework of the National Waste Plan, partnership working, particularly between neighbouring local authorities, and/or others, to jointly develop appropriate thermal treatment plants where this has been identified as Best Practicable Environmental Option (BPEO)	ongoing	Increase in thermal treatment plans covering more than one local authority area
SEPA	Evaluate the energy potential in waste biomass in Scotland and review available policy instruments to maximise the recovery of value from waste biomass in commercial and industrial waste streams.	June 2007	Report on energy potential of waste biomass and policy options for the management of residual commercial and industrial wastes



9. ENVIRONMENTAL IMPACTS

INTRODUCTION

- 9.1 Maintaining the high quality of our environment is an important element in the development of a sustainable biomass industry. There are a number of potential environmental impacts associated with the development of the raw materials and use of biomass for energy. How significant these impacts are will depend on a number of factors, which can be mitigated against in many cases through the use of best practice in land management and adherence to air quality standards and planning regulations. Some of the general principles are touched on below. Those issues relating to natural heritage are also developed in more detail in Scottish Natural Heritage's "Biomass Energy & The Natural Heritage" Policy Statement, due to be published shortly.

PRODUCTION OF THE RAW MATERIALS

- 9.2 The impacts on the environment from the development of a biomass feedstock will depend on the land use the biomass crop is replacing, the choice of crop and the way it is managed. However all public incentives supporting the establishment of such crops must follow general consultative arrangements provided for under the relevant grant scheme and this process will help to address environmental considerations. For woody biomass, the UK Forestry Standard covers the sustainable basis of all forestry practice in the UK.

Soil & Water Quality

- 9.3 Potential impacts on the soil quality from the growth and harvesting of wood biomass feedstocks are largely addressed through compliance with the

UK Forestry Standard and associated guidance such as the Forestry Commission's Forest and Soil Conservation Guidelines (1998). These are currently under revision and are due to go to consultation in 2007/08. Under CAP reform, to receive the Single Farm Payment, farmers must comply with the requirements of the Good Agricultural Environmental Conditions (GAEC) covering soil erosion, maintenance of soil organic matter levels, maintenance of soil structure, minimum levels of maintenance and avoidance of deterioration of habitats.

- 9.4 Potential impacts on water quality are closely linked to effects on the soil and are covered by the Forest Water Guidelines and the Water Environment (Controlled Activities Scotland) Regulations 2005 and General Binding Rules for Controlling Diffuse Pollution due for publication in Spring 2007. Certain biomass feedstocks, particularly willow SRC, have high water demands and care should be taken to avoid depletion of the water table in areas with low water availability. However, compliance with the UK Forestry Standard should mitigate against any potential problems. The UK Woodland Assurance Standard additionally provides a voluntary certification process for forest owners. Furthermore, compliance with Forest Nature Conservation Guidelines (1990) and the revision due out in 2007 will ensure plantations are not established in areas of conservation value. It is worth noting that taking land out of agricultural use and into forestry in nitrate vulnerable zones (NVZs) will have beneficial implications for water quality in these areas. For agricultural crops, farmers within NVZs must comply with the requirements in the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2003.

Waste

- 9.5 By using residual waste from the waste management stream which would otherwise go to landfill, thermal treatment facilities have the potential to reduce risks of leachate and soil and water contamination. It also avoids the production in landfill sites of methane which is powerful climate change gas.

Biodiversity

- 9.6 In the development of domestic biomass feedstocks, it is likely that set aside will be extensively used for the growth of energy crops. This has the potential to have a significant positive impact on biodiversity, the nature and extent of which will depend on the environmental quality of the set aside and the type of crop it is replaced by. On marginal land with low biodiversity SRC could benefit biodiversity, and could also have a role as a corridor between isolated habitats, though buffer zones may be required to preserve edge habitats and open spaces in some areas to allow for species movements.
- 9.7 To prevent any significant environmental impacts, all woodland creation, including SRC, falls within the potential scope of the Environmental Impact Assessment Regulations. Any public support for woodland creation requires adherence to the UK Forestry Standard and associated guidelines, and is subject to statutory consultation. This ensures that priority open habitats are protected, and that woodland creation proposals take full account of biodiversity considerations.
- 9.8 Growing demand for woody biomass could encourage active management of neglected woodland which can bring environmental and amenity benefits, for example through encouragement of woodland regeneration. The

UK Forestry Standard, and associated Forests and Nature Conservation Guidelines, lay out appropriate standards for in-forest retention of deadwood and old trees as part of the woodland ecosystem.

- 9.9 Soil biodiversity and freshwater ecosystems could be negatively affected by an increase in fertiliser application. Conversion to forestry is unlikely to increase fertiliser use compared to agricultural practice and compliance with the Forestry Commission's Forest and Soil Conservation Guidelines (1998) should mitigate any potential problem. The application of sewage sludge, where considered, is controlled by the Waste Management Licensing Amendment (Scotland) Acts 2003, 2004 and must conform to current guidance which will prevent toxic build-up and bio-hazards (see Forestry Commission's Information Note: "Use of sewage sludges and composts in forestry" published 2006). The current Controlled Activities Regulations and the imminent Diffuse Pollution General Binding Rules (see Water Environment and Water Services (Scotland) Act 2005) provide further statutory regulation.
- 9.10 The current and growing demand for biofuels is also leading to a global market for biofuels feedstock. The Executive will consider how imports of biofuels or their raw materials can be quality assured to guarantee they are derived from sustainable sources.

Landscape

- 9.11 For woody biomass, the Scottish Forestry Strategy recognises the importance of forestry in the landscape. Although SRC is usually managed on 3 to 5 years rotations, it has some physical characteristics of woodland and grows tall enough to create a three dimensional mass

in the landscape. Establishing and managing SRC in currently open arable landscapes will result in potential impacts on landscape character and visual amenity, which requires careful consideration. These impacts can be mitigated through adherence to guidance in the Forestry Commission Guideline Note: Short rotation coppice in the landscape (2001), which is an expansion of the essential forest and woodland design advice for such arable landscapes contained in the Lowland Landscape Design Guidelines (1992).

Greenhouse Gas balances

- 9.12 Greenhouse Gas (GHG) emissions can depend on a variety of factors such as crop choice and variety; soil type; how it is managed; distance of processing plant from source and others. It is important that the net GHG emissions reductions from all stages in feedstock production, from land management to biomass use for energy are considered. For example carbon savings from fossil-fuel substitution, or the carbon sequestration functions of forests, should not be lost through inappropriate forestry practices disturbing organic soils. This is addressed through sustainable forest management principles set out in the UK Forestry Standard. A comprehensive study of the factors affecting GHG balance of biomass feedstocks, Review of Greenhouse Gas Life Cycle Emissions, Air Pollution Impacts and Economics of Biomass Production and Consumption in Scotland, has been published by SEERAD. This highlights that the greatest carbon savings are likely to be derived from wood for heat. Combined heat and power (CHP) generation offers particular opportunities for maximising the energy generation capacity of biomass. Although carbon savings from biofuels are typically much lower, they replace fossil fuels where few alternatives currently exist.

Mitigation

- 9.13 The development of good management practices has the potential to address many of these possible impacts. This can include thinning practices to promote biodiversity, appropriate management of native broadleaved woodlands as a biomass resource, correct choice of felling and extraction systems and the sequencing of harvesting, multi-species coppicing to enhance biodiversity, improving long term soil fertility and providing biological resistance to pests. The application of the UK Forestry Standard and its associated guidelines, coupled with the expansion of certification schemes, would ensure that good practice is widely adopted, and this should apply to domestic feedstocks and imports.

USE OF BIOMASS FOR ENERGY

Air Quality

- 9.14 All local authorities, under the Environment Act 1995, are required to review and assess air quality in their area against a set of health based objectives for certain pollutants. These objectives are outlined in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland. If this work suggests that any objective will not be achieved by the required date, the local authority concerned must declare an Air Quality Management Area and produce an action plan outlining how it intends to tackle the issues identified.
- 9.15 Most of the air quality problems identified to date have been in large urban areas and are caused by vehicle emissions. Industrial emissions are less of an issue than in the past helped by the fact that SEPA regulates large industrial installations in line with the requirements of the relevant

legislation.

- 9.16 Any moves towards increased emissions from industrial or domestic actives involving biomass will be looked at cautiously by both SEPA and local authorities.
- 9.17 First impressions are that the effects will be minimal in the short term, given that any initiatives are probably going to be small scale, and any larger ones will be regulated by SEPA as described above.
- 9.18 Government approved biomass technology is listed on the Energy Technology List (www.eca.gov.uk), which meets the minimum emissions standards. In Smoke Control Areas, installation must also comply with the exempt appliance list (www.smokecontrolareas.co.uk). The number of appliances is currently limited and equipment suppliers should be encouraged to register their equipment.
- 9.19 Existing measures to ensure the continued high quality of our environment include the Air Quality Strategy, the Smoke Control Regime and regulation by SEPA of plants over 0.4 MW or which plan to utilise waste as a feedstock. Future measures include regular reviews of the Air Quality Strategy and Smoke Control Regimes, including lists of approved appliances.

ACTION TABLE

Lead Department	Action	Timing	Indicators/Outputs
Forestry Commission Scotland	Implementation of the relevant Forest Guidelines & UK Forestry Standard	ongoing	SFS Implementation Plan
Forestry Commission Scotland	Encourage the forestry sector to take part in the Scottish Executive's National Waste Plan	ongoing	SFS Implementation Plan
ERAD - Biodiversity	Continue to implement the Scottish Biodiversity Strategy	ongoing	Growth of biomass industry is developed in a sustainable way
ERAD - Climate Change	Examine ways to secure compliance with environmental legislation without imposing undue costs or constraints on farm businesses	ongoing	Growth of biomass industry is developed in a sustainable way
ERAD - Climate Change	Ensure grant conditions for the Scottish Biomass Support Scheme promote best environmental practice	ongoing	Growth of biomass industry is developed in a sustainable way
ERAD - Climate Change	Regularly review AQS and Smoke Control regime, including list of approved appliances	ongoing	List of approved appliances



10.CONCLUSIONS

- 10.1 The Biomass Action Plan for Scotland for the first time pulls together a comprehensive picture of the breadth of initiatives and actions being taken forward by the public and private sectors to develop the bioenergy industry in Scotland. The wealth of activities and range of stakeholders demonstrates the considerable momentum towards a vibrant bioenergy industry Scotland, offering benefits of economic development, jobs, energy security and helping meet our commitments under “Changing Our Ways” - the Scottish Climate Change Programme. The aim of the Biomass Action Plan is to ensure development takes place in a strategic and coordinated way.
- 10.2 Key strategic developments are already in place across the heat, electricity and transport sectors. Support for electricity generation is already in place and the Executive will be contributing to the UK Energy Review to ensure biomass can contribute to our targets. The construction of the first purpose-built biomass plant in Scotland by E.ON is a first step in building up a large-scale biomass industry. Development of the heat market both for heat-only and CHP is a key objective and will be a focus for the Executive over the coming year. This is demonstrated by the support provided for two new key developments, the proposals for CHP by Balcas at Invergordon and UPM Caledonian Paper at Irvine which mark a giant leap forward in biomass development. The Renewable Heat Strategy and the Scottish Biomass Support Scheme will strengthen this sector and mark a step-change in the development of the industry. For transport, the Renewables Transport Fuels Obligation and the National Transport Strategy to be published next year also demonstrate our commitment to supporting this sector.
- 10.3 The Action Plan will provide a focus for the public sector, industry and individuals to maximise the opportunities for growth, jobs and sustainability offered by the expansion of a biomass sector. It sets out a framework to take forward and expand the supply and use of biomass for heat, electricity and transport. Given the cross-cutting nature of biomass policy, future development will be influenced by key developments such as the incentives available through LMCs, Air Quality Standards and environmental policy initiatives.
- 10.4 The Action Plan also identifies actions being taken across planning, procurement and regulation by the Scottish public sector to provide a positive framework for the development of biomass while ensuring we maintain our commitment to high standards of environmental quality and meeting commitments on public procurement. Public procurement is a key driver for development. A number of public sector organisations have already installed biomass equipment and taken a lead in the use of biofuels.
- 10.5 The Interdepartmental Bioenergy Group, comprising relevant Executive policy areas, will oversee the implementation of the Action Plan to ensure that biomass policy is developed in a way that considers all diverse interests and ensures a strategic approach is adopted.
- 10.6 **In addition, the Executive will continue to engage external stakeholders to ensure we collectively move the sector forward.**

ANNEX A - Framework for action

The framework outlined over the next few pages identifies roles and responsibilities for taking forward the various actions identified in the Action Plan. This will provide the focus for monitoring the delivery of the Plan. The Executive has made a commitment to work closely with Scottish stakeholders to ensure the Plan continues to be relevant and provides the strategic framework for realising the full potential that a vibrant biomass sector can bring to Scotland.

The following abbreviations are used:

AFSFA	A Forward Strategy for Scottish Agriculture
BAPfS	Biomass Action Plan for Scotland
DD	Development Department, Scottish Executive
ERAD	Environment and Rural Affairs Department, Scottish Executive
ETLLD	Enterprise, Transport & Lifelong Learning Department, Scottish Executive
FCS	Forestry Commission (Scotland)
FCSD	Finance and Central Services Department, Scottish Executive
HIE	Highlands and Islands Enterprise
NTS	National Transport Strategy
NWS	National Waste Strategy
R&CPU	Renewables & Consents Policy Unit, ETLLD, Scottish Executive
RHS	Renewable Heat Strategy
ROS	Renewables Obligation (Scotland) Order
RSA	Regional Selective Assistance
SCCP	Scottish Climate Change Programme
SEPA	Scottish Environment Protection Agency
SFS	Scottish Forestry Strategy
SNH	Scottish Natural Heritage

ANNEX B - Related policy documents

SCOTTISH POLICY DOCUMENTS

A Forward Strategy for Scottish Agriculture, 2005.

www.scotland.gov.uk/Topics/Agriculture/Agricultural-Policy/17289/7902

A Forward Strategy for Scottish Agriculture: Next Steps, 2006.

www.scotland.gov.uk/Topics/Agriculture/Agricultural-Policy/17289/7902

Choosing our Future: Scotland's Sustainable Development Strategy

www.scotland.gov.uk/Publications/2005/12/1493902/39032

Draft Scottish Planning Policy statement 6 (NPPG 6)

www.scotland.gov.uk/Publications/2006/07/10150621/0

FREDS Biomass Energy Group report: Promoting and Accelerating the Market Penetration of Biomass Technology in Scotland, 2005

www.scotland.gov.uk/Topics/Business-Industry/infrastructure/19185/17883

Going for green growth: a green jobs strategy for Scotland, 2005

www.scotland.gov.uk/Topics/Business-Industry/Enterprise/18320/13232

Non-municipal Waste Framework and Action Plan

Scottish Biodiversity Strategy and Action Plan

www.biodiversityscotland.gov.uk/pageType1.php?id=2&type=1&navID=27

Scottish Climate Change Programme, 2006

www.scotland.gov.uk/Topics/Environment/Climate-Change/16327/4825

Scottish Executive response to ERDC biomass enquiry, 2006.

Scottish Forestry Strategy, 2006

www.forestry.gov.uk/forestry/INFD-6AGGZW

Scottish National Waste Plan, 2003

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Scottish National Waste Strategy, 1999

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Scottish Parliament ERDC: Inquiry into developments in the biomass industry, 2006

www.scottish.parliament.uk/business/committees/environment/reports-06/rar06-04-Vol01.htm

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Scottish Planning Policy statement 10 – waste

www.scotland.gov.uk/Publications/2006/08/11100231/0

Scottish Rural Development Plan 2000-2006

www.scotland.gov.uk/Publications/2005/06/17151608/16110

Scottish Rural Development Plan 2007-2013

www.scotland.gov.uk/Topics/Rural/RDR/Intro

Securing a renewable future: Scotland's Renewable Energy, 2003

www.scotland.gov.uk/Publications/2003/03/16850/20554

White Paper: Scotland's Transport Future, 2004. www.scotland.gov.uk/Publications/2004/06/stfwp/0

UK Policy Documents

Biomass Task Force report, 2006. www.defra.gov.uk/farm/crops/industrial/energy/biomass-taskforce/index.htm
Government response to Biomass Task Force report, 2006. www.defra.gov.uk/farm/crops/industrial/energy/biomass-taskforce/index.htm
Power from the People: UK Microgeneration Strategy. www.dti.gov.uk/energy/sources/sustainable/microgeneration/strategy/page27594.html
Recommendations of the Sustainable Procurement Task Force. www.sustainable-development.gov.uk/government/task-forces/procurement/index.htm
Securing the Future: UK Government Sustainable Development Strategy. www.sustainable-development.gov.uk/publications/uk-strategy/index.htm
UK biofuels strategy, . www.dft.gov.uk/stellent/groups/dft_roads/documents/divisionhomepage/037864.hcsp
UK Climate Change Programme 2006. www.defra.gov.uk/environment/climatechange/uk/ukccp/index.htm
UK Energy Review, 2006. www.dti.gov.uk/energy/review/page31995.html
UK Energy White Paper, 2003. www.dti.gov.uk/energy/policy-strategy/energy-white-paper/page21223.html
UK National non-food crops strategy, www.defra.gov.uk/farm/crops/industrial/non-food/index.htm
UK Sustainable Development Action Plans. www.defra.gov.uk/environment/sustainable/action-plan.htm
UK Parliament EFRA committee bioenergy inquiry. www.parliament.uk/parliamentary_committees/environment_food_and_rural_affairs/efra_climate_change_bioenergy.cfm
UK Air Quality Strategy. www.defra.gov.uk/environment/airquality/strategy/pdf/foreword.pdf
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Directive on the promotion of cogeneration, 2004. CO 2004/8. www.managenergy.net/products/R81.htm
Doing more with Less, Green Paper on Energy Efficiency, 2005. COM 2005/265. ec.europa.eu/energy/efficiency/index_en.htm
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EU Energy Performance of Buildings Directive, 2002. COM 2002/91/EC. www.managenergy.net/products/R210.htm
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Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy, 2006. COM 2006/105. ec.europa.eu/energy/green-paper-energy/index_en.htm

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ANNEX C - Support measures in Scotland

Description	Energy use & fuel targeted	Target sector	Status	Further information
Scottish Biomass Support Scheme Capital grants for biomass installations and woody biomass supply chain infrastructure	Installations: Heat, electricity Supply: biomass	Public and private (excludes householders)	Launched Jan 2007	SBSS: www.scotland.gov.uk/Topics/Business-Industry/Infrastructure/19185/BioSupport/BioSupportIntro
Renewables Obligation (Scotland)	Electricity	Electricity generators	Ongoing – parallel consultation	
Scottish Community and Householder Renewables Initiative (SCHRI) Grants for community and domestic microgeneration installations.	Heat, electricity	Domestic and community	Ongoing	www.est.org.uk/schri/
Highlands and Islands Wood Fuel Development Programme Grants for wood fuel suppliers and end users.	Installations: heat Supply: woody biomass	SMEs	Closed 2006	www.forestry.gov.uk/newsrele.nsf/web-allbysubject/
Scottish Forestry Grant Scheme Grant funding for forestry and woodland management.	Woody biomass	Forestry sector	Closed 2006	www.forestry.gov.uk/forestry/infid-5zg3bp
Strategic Timber Transport Fund Aims to facilitate the sustainable transport of timber in rural areas of Scotland.	Woody biomass	Forestry and timber industry	Available until April 2008	www.forestry.gov.uk/forestry/infid-6a6lxt
East of Scotland & West of Scotland Woodfuel Development Programmes Provide expert, local assistance to people or businesses looking to use or supply wood fuel.	Woody biomass	All – biomass supply and demand	Ongoing	www.usewoodfuel.co.uk/ContactUs.stm
Farm and Agricultural Business Development Schemes Assistance towards farm diversification, including bioenergy.	All	Agricultural sector	Both close in 2006	www.sac.ac.uk/consultancy/farmdiversification/aboutfd/grantinfo/
Fuel Poverty and renewables pilot scheme Pilot scheme to assess the potential for using renewable energy to tackle fuel poverty.	Heat	Domestic		www.est.org.uk/schri/community/view.cfm?articleid=444&archive=1
Loan Action Scotland Interest-free loans to SMEs for projects to reduce energy costs – can include biomass.	All	SMEs		www.est.org.uk/housingbuildings/funding/scottishbusiness/financialassistance/

Description	Energy use & fuel targeted	Target sector	Status	Further information
Strategic Waste Fund Funding for local authorities to develop infrastructure to treat municipal solid waste.	Supply: Waste	Local Authorities		
Scottish Executive Business Support Funding available from a number of sources. Could be used to support biomass activities.	All (not focused on biomass)	Business	Ongoing	www.scotland.gov.uk/Topics/Business-Industry/support/16879/6780
Scottish Enterprise	All	Business		
HIE	All	Business		
Biomass Heat Acceleration Project Reduce costs and address supply chain risks in biomass heat market. Assistance available for existing and new projects & suppliers.	Heat	All – biomass supply and demand	Launched October 2005	www.carbontrust.co.uk/technology/technologyaccelerator/biomass.htm
IGNITE Scotland Training for businesses operating in the wood fuel industry	Woody biomass	Biomass supply	Ongoing	www.ruraldevelopment.org.uk/content.asp?id=75
WRAP Funding available for biomass waste energy schemes.	All (waste)	All	Ongoing	www.wrap.org.uk/businesses/support_for_recycling_businesses/investment/capital_grant.html
Enhanced Capital Allowances Encourages businesses to invest in low carbon technologies, including biomass boilers.	Heat, electricity	Business	Ongoing	www.eca.gov.uk
Regional Selective Assistance Main scheme of financial assistance to create and safeguard jobs in the assisted areas of Scotland	All	Business	ongoing	www.rsascotland.gov.uk

EU support measures

Description	Energy use & fuel targeted	Target sector	Status	Further information
EU emissions trading scheme EU-wide scheme for large CO ₂ emitting plant. Emissions are capped and quotas can be traded.	Electricity, heat	Large industrial emitters	Ongoing. Phase 2 runs from 2008-2012.	www.defra.gov.uk/environment/climatechange/trading/eu/index.htm
EU Intelligent Energy Programme Promotes energy efficiency (SAVE), the increased use of renewable energy resources (ALTENER), and sustainable energy in transport (STEER)	All	All – biomass supply and demand	Call for proposals ended Oct 06. Next in Spring 07.	europa.eu.int/comm/energy/intelligent/index_en.html
European Structural Funds, 2007-2013 Regional assistance available for economic development, including biomass projects	All	All	Under consultation	www.scotland.gov.uk/Topics/Business-Industry/support/17404/8392
EU 7th RTD Framework Programme Funding for research and technical development. Includes a focus on biomass energy.	All	Research	Launch due January 07	cordis.europa.eu/fp7
EU LIFE programme Finances projects that address community environmental interests	All (not focused on biomass)	All	Closed	www.defra.gov.uk/environment/life/index.htm ec.europa.eu/environment/life/news/futureoflife.htm
European Investment Bank Funding is available for renewable energy projects	All (not focused on biomass)	All	Ongoing	www.eib.europa.eu
EU support for SMEs Support targeted on SMEs is available from a number of EU sources. Follow the links provided for further advice.	All (not focused on biomass)	Business	Ongoing	www.scottish-enterprise.com/euroinfocentre www.euro-info.co.uk/

ANNEX D - Glossary

ACRONYMS AND OTHER ABBREVIATIONS

AD	Anaerobic Digestion
BEG	FREDS Biomass Energy Group
BEN	Scottish Renewables Forum Bioenergy Network
BHAP	Carbon Trust Biomass Heat Acceleration Programme
CAP	Common Agricultural Policy
CHP	Combined Heat and Power
CO ₂	Carbon dioxide
CONFOR	Confederation of Forest Industries
COSLA	Convention of Scottish Local Authorities
DEFRA	Department for Environment, Food and Rural Affairs
DTI	Department of Trade and Industry
EC	European Council/European Commission
EEAC	Energy Efficiency Advice Centre
EPBD	Energy Performance of Buildings Directive
ERDC	Environment and Rural Development Committee
EST	Energy Saving Trust
ECA	Enhanced Capital Allowances
ETS	Emissions Trading Scheme
EU	European Union
EU ETS	European Union Emissions Trading Scheme
FCS	Forestry Commission Scotland
FREDS	The Forum for Renewable Energy Development in Scotland
GAEC	Good Agricultural and Environmental Condition
GHG	Greenhouse gases
GW	Gigawatt (unit of power)
kWh	Kilowatt hours
LCBP	Low Carbon Building Programme
LMCs	Land Management Contracts
MBT	Mechanical and Biological Treatment (of waste)
MSW	Municipal Solid Waste
MW	Megawatt (unit of power)
MWe	Megawatt electrical capacity
MWth	Megawatt thermal capacity
MtC	Million tonnes of carbon
Netcen	National Environmental Technology Centre
NFUS	National Farmers Union Scotland
NPPG	National Planning Policy Guideline
NTS	National Transport Strategy
NVZ	Nitrate Vulnerable Zone
NWP	National Waste Plan

Odt	Oven dried tonnes (in relation to wood fuel)
Ofgem	The Office of Gas and Electricity Markets.
OSR	Oil Seed Rape
PAN	Planning Advice Note
PEPFAA	The Prevention of Environmental Pollution from Agricultural Activity
PPC	Pollution Prevention and Control
PPP	Public Private Partnership
RDR	Rural Development Regulations
ROC	Renewables Obligation Certificate
ROS	The Renewables Obligation (Scotland)
RSA	Regional Selective Assistance
RTFO	Renewable Transport Fuel Obligation
SBSA	Scottish Building Standards Agency
SBSS	Scottish Biomass Support Scheme
SCHRI	Scottish Community and Household Renewables Initiative
SCCP	Scottish Climate Change Programme
SEA	Strategic Environmental Assessment
SEFCSD	Scottish Executive Finance and Central Services Department
SEPA	Scottish Environment Protection Agency
SEETLLD	Scottish Executive Enterprise Transport and Lifelong Learning Department
SEERAD	Scottish Executive Environment and Rural Affairs Department
SFGS	Scottish Forestry Grants Scheme
SNH	Scottish Natural Heritage
SMEs	Small and Medium sized Enterprises
SNH	Scottish Natural Heritage
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
SPP	Scottish Planning Policy
SRC	Short Rotation Coppice
SRF	Short Rotation Forestry
SWF	Strategic Waste Fund
TWh	Terawatt hours
UKCCPUK	Climate Change Programme
UKCIP	UK Climate Impacts Programme
UKWAS	UK Woodland Assurance Scheme
WEWS	The Water Environment and Water Services
WRAP	The Waste and Resources Action Programme

DEFINITIONS

Anaerobic digestion is the breakdown of organic matter by bacteria in the absence of oxygen. This process is used to generate energy (electricity or heat).

Biodiversity is the existence of a wide range of different types of organisms in a given place at a given time.

Bioenergy is energy from heat, electricity and transport generated from renewable biomass.

Biofuel is any fuel derived from biomass, such as ethanol, biodiesel and methanol

Biomass is biological material which can be derived from forestry, energy crops (such as short rotation coppice and miscanthus) agricultural plant and animal waste.

Brash is the branch-wood and leaf material that is generally too small in diameter to be considered part of the timber product from a harvesting site.

Carbon emissions a term generally used to describe the level of carbon, usually in the form of carbon dioxide, exhausted into the atmosphere by a process.

Carbon neutral (low carbon) a term used to describe processes that have a zero or very low contribution to atmospheric carbon. Using woodfuel for heat and power can be described as carbon neutral because the carbon emitted during combustion is equal to the carbon absorbed by the trees when they were growing.

CHP a term used to describe systems that derive and utilise both thermal and electricity energy from a given fuel source.

Combustion is the process of converting fuel into heat energy.

Coppice is the practice of harvesting the above ground part of a tree for timber and allowing the new shoots to re-grow in a cycle normally extending over a number of years.

District heating scheme a system by which heat is distributed via underground pipe-work from a single centralised boiler to a number of individual users, usually domestic dwellings.

Energy crop typically a crop of trees, woody plants or grasses grown for the purpose of providing biomass for energy.

Enhanced Capital Allowances enable businesses to claim 100% first year capital allowances on investments in energy saving technologies and products.

Fossil fuels are fossilised fuel such as coal, mineral oil and natural gas. When burnt fossil fuel releases carbon into the atmosphere that has been trapped beneath the earth's surface for millions of years. Thus fossil fuel use can contribute to an increase in current atmospheric greenhouse gases and lead to global warming.

Gasification is conversion of solid material such as woodchip into a gas for use as a fuel.

GHG or greenhouse gases are gaseous components of the atmosphere that contribute to the greenhouse effect.

LMC or Land Management Contracts are the mechanism for delivering support to rural Scotland.

Miscanthus is a grass often planted as an energy crop.

Moisture content (mc%) is the percentage by weight of water in a material.
Oven dry tonne (odt) – 1 tonne of material (woodfuel) at 0% moisture content.

Pellets are small diameter cylindrical section of compressed sawdust formed by passing dry sawdust under high pressure through a die. Usually between 6-8mm in diameter and 10 to 30mm in length.

Pyrolysis is the chemical decomposition of woodchips by the action of heat to produce a liquid fuel.

Renewable energy is energy that has been obtained from a potentially infinite resource such as wood, sunshine or the wind.

Renewable fuel is fuel that is considered to be an infinite resource if its source is sustainably managed. Examples can include woodfuel, miscanthus or the wind.

Short rotation coppice is the practice of growing and harvesting the above ground part of a crop, usually of willow, for biomass and then allowing new shoots to regrow from the harvested stumps (also known as stools) in a short cycle (3 to 5 years).

Short rotation forestry is the practice of growing a specific crop of trees, usually poplar, for biomass over a relatively short rotation (usually no more than 15 years).

Solid fuel is fuel in solid form, typically wood or coal, often used in stoves, open fires and some boilers.

Sustainable is meeting the needs of the present without compromising the ability of future generations to meet their needs.

Sustainable forest management is the process of managing forests to provide goods and services without degradation of the site quality, and without a decline in the yield of goods and services over time. These goods and services can be disparate and may include, for example, timber, amenity value, inherent biodiversity, landscape value (see 'sustainable').

Woodchips are small fragments of timber sliced from a larger log or piece of timber by a chipper, usually to a specified size.

ANNEX E - List of contacts

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