

Promoting and Accelerating the Market Penetration of **Biomass Technology in Scotland**



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EXECUTIVE SUMMARY

The Biomass Energy Group (BEG) was established by the Forum for Renewable Energy Development in Scotland (FREDS) in January 2004. The task assigned to us was to consider 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 context for this is that biomass already provides approximately 60% of total EU renewable energy utilisation and is therefore the most mature and commercially viable renewable technology in the EU. We have concentrated our deliberations on the use of biomass for the generation of electricity and combined heat and power CHP. This is because the issue of support for biomass as a heat source is to be examined on a UK basis. However, many of the recommendations which we make, for example, in relation to the supply chain, planning issues, and information provision, apply equally to the heat sector and, when implemented, will be of benefit to it.

BEG's vision is to develop a biomass industry in Scotland which will lead the UK's efforts in this sector, while supporting sustainable rural development and creating a wealth of jobs across the supply chain.

In order to realise this vision, BEG has developed the following action points (which should be read in conjunction with the full report). They cover a range of issues that we believe need to be tackled if our aspiration for the sector is to be realised.

BEG has concluded that a biomass industry in Scotland has the potential to supply as much as 450 MW of electricity from the wood fuel resource while employing over 2,000 people and stimulating other sectors of the Scottish economy. This is a conservative estimate. The successful development of biomass technology in Scotland using energy crops as the fuel source would further boost electrical output and employment. However, it will take 5 years to lay the foundations for this industry. This report looks at the establishment of the basic infrastructure needed and the partnership between Government and industry that will be required to deliver this potential.

FUEL SUPPLY ISSUES

- **Further work should be undertaken by the Forestry Commission to refine the wood fuel resource estimates in Scotland and to provide more detailed information to wood users and the biomass energy sector. This information should be reviewed/ updated every five years.**
- **The Forestry Commission should keep under close review, in consultation with the industry, the level of support that it provides to the growers of energy crops in Scotland.**

INFRASTRUCTURE ISSUES

- **New biomass plants for CHP and power generation should, where possible, be located in or close to areas of wood fuel availability to minimise possible transport difficulties and costs. The forestry and biomass energy sectors should consider developing integrated sites which would attract a range of wood using activities.**
- **The Scottish Executive and the Enterprise Networks should consider appropriate means to support supply chain infrastructure innovation and development, and with others, should consider local manufacturing of established non-UK products under licence; they should also consider the need for appropriate skills training.**

- Ofgem, the distribution network operators and the transmission operator should ensure fair and financially secure access to the electrical grid at all levels.

THE DEMAND SIDE

- The Scottish Executive and the DTI should acknowledge the continuing need for public sector support for biomass plants for CHP and power generation of all sizes and should give an early commitment that they will work to determine how that need can be met.
- The Scottish Executive should consider how to meet the need for public sector support for CHP plants in particular and also for support infrastructure.

REGULATORY ISSUES

- As part of its planned review of NPPG 6 and PAN 45, the Scottish Executive should at an early date provide updated guidance on biomass developments. This guidance should encourage local authorities to consider the wider impact of biomass projects in relation to sustainable development and the employment impacts of plant.
- All the regulatory agencies must recognise the opportunity which exists to develop renewable power sources (with all the wider inherent benefits). This opportunity will be greatly enhanced by a more proactive approach to overcoming problems.
- SEPA should examine its procedures to ensure consistency of approach in relation to the implementation of legislation relating to waste products and, along with Ofgem, should ensure that information about regulatory issues is made more readily available to the biomass sector.
- SEPA should re-examine how it implements the provisions of the EU Council Directives on waste and on the incineration of waste. Forestry brash, root/stump, lop and top derived from the harvesting of standard timber and any secondary products of primary processing of logs and small round wood should be treated in the same way as short rotation coppice and other energy crops.
- Ofgem and industry should work together to develop secure arrangements whereby Ofgem can certify blended fuels for co-firing as eligible for ROCs at sites other than the power station.

CO-FIRING

- The Scottish Executive should consult on amending the definition of energy crops in the Renewables Obligation (Scotland) Order 2004 to include material derived from any sustainably managed woodland, i.e., a woodland certified to the UK Woodland Assurance Standard.

SECURING A COMPETITIVE ADVANTAGE

- The Scottish Renewables Forum, working with the Scottish Forest Industries Cluster, the Forestry Commission, Scottish Enterprise and Highlands and Islands Enterprise, should develop a customer and industry-led Biomass Energy Network.
- **The Forestry Commission, working with the Biomass Energy Network should consider the appointment of wood fuel information officers to provide advice to all who are interested in developing biomass wood fuel opportunities.**
- **Public awareness and acceptance of biomass as a renewable fuel is crucial. The Scottish Executive should assess the effect of the national information campaign, *Renewable Energy- It's Only Natural* in relation to public knowledge and acceptance of biomass developments and develop a specific campaign to explain, support and reassure on the advantages of biomass energy.**

GENERAL

- **Government and industry should consider any further recommendations for action arising from other studies into the biomass sector; continue to monitor how the sector develops in Scotland; and take further action if that is required.**
- **While this report does not make specific recommendations in relation to heat, given the importance of the heat component in building a mature biomass market, BEG strongly supports the Scottish Executive and DTI's commitment to consider a means by which to support development of renewable heat.. We believe that it would be useful for FREDS to reconvene BEG once the outcome of the relevant UK Government review of the heat sector has been completed, to ascertain whether further action needs to be taken specifically in Scotland.**

We invite Government, industry, and all others concerned to work with FREDS to help take forward the actions that we have identified as being necessary to achieve a viable biomass energy industry in Scotland.

**Forum for Renewable Energy Development in Scotland
Biomass Energy Group**

January 2005

INTRODUCTION

1. The UK Government believes that there is now strong scientific evidence that climate change is happening and that one of the causes is an increase in atmospheric concentrations of greenhouse gases, particularly carbon dioxide released by burning fossil fuels. This needs to be tackled. In its Energy White Paper published in February 2003, the UK Government set the UK on a path to a 60% reduction in its CO₂ emissions by 2050. As part of the effort to achieve that target, the Government believes that we should generate much more of our electricity and heat from low or non-carbon sources. The Scottish Executive has set a target that 18% of the electricity generated in Scotland by 2010 should be from renewable sources, rising to 40% by 2020. The Executive is committed to meeting these targets by promoting a range of technologies, and believes that biomass has the potential to play an important role.
2. The role that biomass might play is likely to be highly significant since it already provides approximately 64% of total EU renewable energy utilisation. Biomass provides approximately 9% of "green electricity" across Europe. In Scotland, however, it has virtually no market penetration whatsoever.
3. Biomass, particularly wood fuel, is accepted as carbon neutral. It can have a positive effect on the environment. It is also a predictable and firm source of energy supply and therefore an important contributor to a diverse energy mix, which is vital to security and continuity of supply.
4. Scottish biomass is uniquely placed within the UK to contribute to both Scottish and UK renewable targets by 2010 rather than 2015 as indicated by the DTI for England and Wales. This is because Scotland has a substantial existing and expanding resource from managed woodlands and secondary sawmill products which can be accessed for wood fuel almost immediately. The biomass industry in Scotland would therefore not require substantial planting of energy crops for initial development of a biomass energy business, although the growing of energy crops would provide a further option to support its expansion. Biomass offers a more efficient utilisation of the existing forestry resources.
5. At its meeting in January 2004, the Forum for Renewable Energy Development in Scotland (FREDS) established a biomass energy group (BEG). The remit of the group is shown at Annex A and our membership is noted at Annex B. Although BEG recognises that there are a number of biomass fuels, for the purposes of this report only forestry, including secondary sawmill products, energy crops and other arable materials are considered.
6. This report summarises our deliberations. It aims to set out the opportunity for Scotland to create a viable biomass industry which will contribute to the attainment of the Executive's renewable electricity targets. BEG is clear that Scotland is not at present realising its considerable potential to develop systems utilising biomass technology. We have considered why this situation has arisen and how it might be changed, and we have made a number of specific recommendations for action.
7. We have concentrated our deliberations on the use of biomass for the generation of electricity and combined heat and power (CHP), for the reason outlined in paragraph 8 below. We recognise, however, the contribution that the production of heat from renewable sources can make to the Government's climate change targets. Indeed, we have noted that in its report of May 2004, the Royal Commission on Environmental Pollution (RCEP) stated that it believed that there is a significant gap in government energy

policy regarding heat production. Supplies of heat form a major part of our total energy (as distinct from electricity) requirement. Biomass is a proven and practical source of heat in many European countries. We believe that the development of power and CHP plants could serve to accelerate the development of supply chains which would be useful in the development of heat plants. To become a properly mature market there is a need to focus on all elements- small scale heat, medium sized CHP and heat, and larger scale power plant (including co-firing). The use of biomass for electricity and CHP, including co-firing, is one of the factors that could stimulate a viable heat sector.

8. We have discussed this with the Scottish Executive. We understand that a response to the RCEP will be made by Government. We have also noted that the Scottish Executive and the DTI have announced that they will be considering the issue of support for renewable heat on a similar timescale to the fundamental review of the GBROs. In the light of these developments, we have concluded that we should not develop recommendations specifically relating to support for the development of biomass heat. However, a number of recommendations that we do make, for example, those relating to the supply chain, to planning guidance, and to information provision, apply equally to biomass heat at large scale as they do to biomass electricity and CHP. **We also believe that it would be useful to re-convene BEG once the outcome of the UK Government review of the heat sector has been completed, to ascertain whether further action needs to be taken specifically in Scotland.**
9. A considerable number of studies have been undertaken into various aspects of developing the use of biomass technologies. BEG has not sought to undertake activity which would replicate this work; rather it has taken account of the findings of these studies in reaching its conclusions. In particular, BEG has considered the conclusions of recent reports by the Royal Commission on Environmental Pollution (1), by WWF and the European Biomass Industry Association (2), and by the Macaulay Land Use Research Institute (3). We have also noted that the European Commission is developing a biomass action plan.
10. In order to assist us to undertake our remit, the Scottish Executive commissioned Future Energy Solutions and Avayl Engineering on behalf of BEG to look at the employment benefits that might be anticipated from the development of biomass plant in Scotland, to identify the financial support schemes currently available and to consider the need for new capital intervention to support further development. And as part of a multi-national, European collaboration called "BIOHEAT II", funded by the European Commission and, in Scotland by Scottish Enterprise, NIFES Consulting Group has commented on the text of this report.
11. In undertaking its remit, BEG has considered three types of biomass fuel - forest materials, energy crops, and arable residues such as straw. It has looked at the issues under a number of broad headings:
 - the fuel supply side (the resource and the supply chain),
 - infrastructure,
 - the demand side (markets and support mechanisms),
 - regulatory issues.
12. BEG has also considered the extent to which a biomass industry can be encouraged initially through co-firing with coal. We have also looked at how the sector is structured and supported elsewhere, in particular in North Rhine Westphalia. The following chapters assess the opportunities for Scotland under each of the key headings and make a number of recommendations for action.

13. It is clear from the work that we have undertaken that there is considerable impetus to develop biomass as a renewable fuel. Scotland is well placed to derive benefit by developing a new business arena for the forestry sector and by improving the Scottish economy through reducing dependence on external fossil fuel supplies and related uncontrolled energy prices. It is likely that further recommendations for action will emerge as a result of consideration of the other work that we have mentioned in paragraph 8 above. **It will be important that all concerned, Government and industry alike, consider any further recommendations for action that others may suggest; continue to monitor how the sector develops at Scottish, UK and European levels; and recognise the long term nature of the objectives, and take further action where required.**

FUEL SUPPLY ISSUES

Biomass Resource

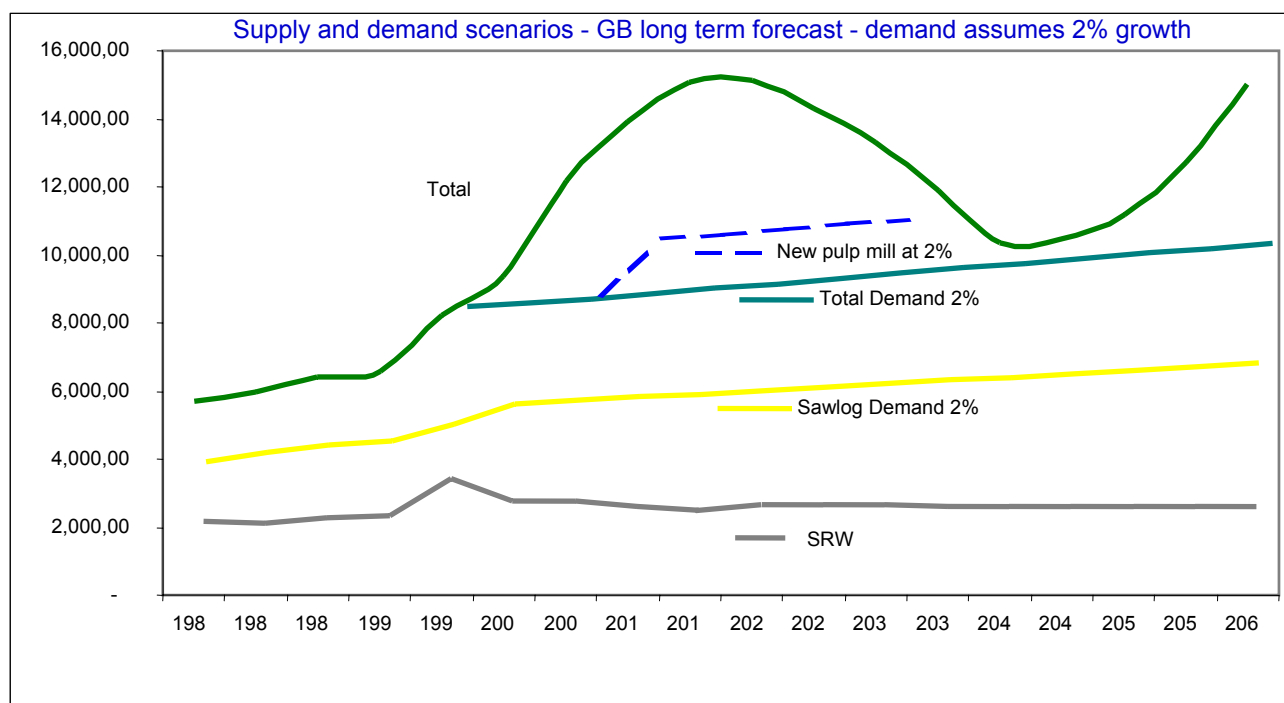
(a) Wood Fuel

14. We expect that fuel supplies will be derived from the Scottish and GB standing forestry resource. In practice, the forestry resource creates opportunities to supply wood fuel from each of the following three sources:

- Forest residues and small round wood direct from the standing forestry resource.
- Secondary products from the forest processing industries
- Recycled timber

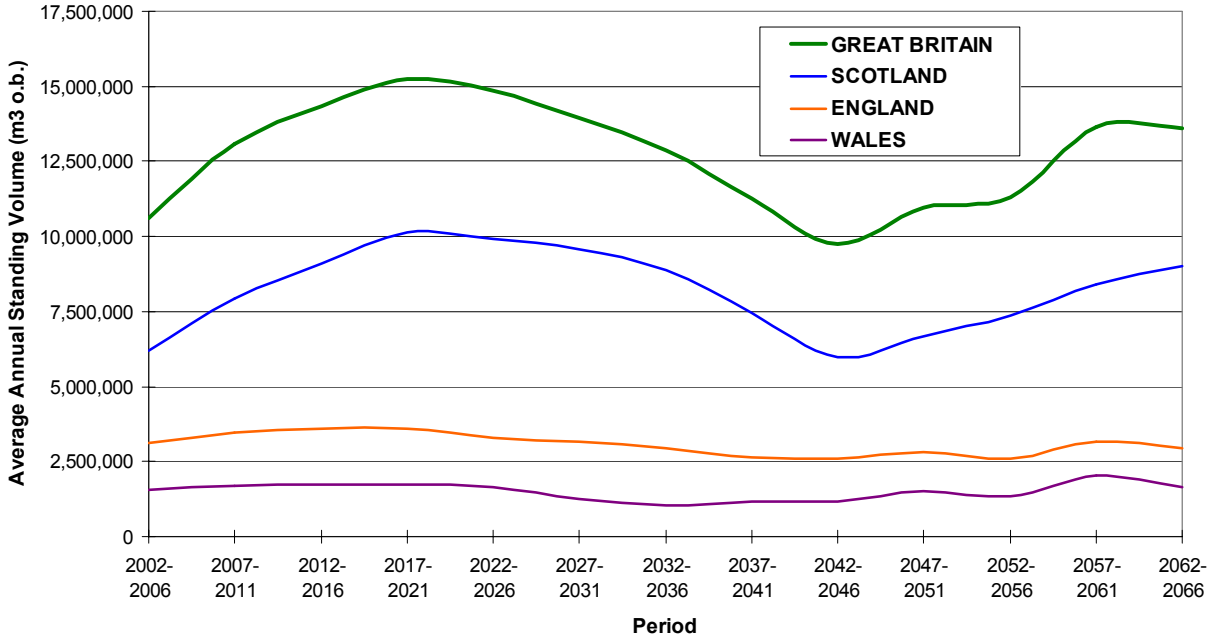
Forestry supply and demand forecasts demonstrate that the development of a biomass energy market will not be constrained by the availability of the fuel resource, although additional resources, such as energy crops, may be necessary as the industry becomes established. Ultimately however, the quantity of wood fuel used by the energy market will be driven by the price that users are capable of paying.

15. Scotland is uniquely positioned to provide large quantities of wood fuel for an emerging biomass energy market since the GB wide forestry resource is predicted to grow well in excess of demand over the next 3 decades; around 60% of that resource is located in Scotland. The following table shows GB wide supply and demand scenarios and illustrates that total supply is expected to exceed total demand by around 5 million cubic metres (or tonnes) within 15 years (even assuming a major new pulp mill investment.)



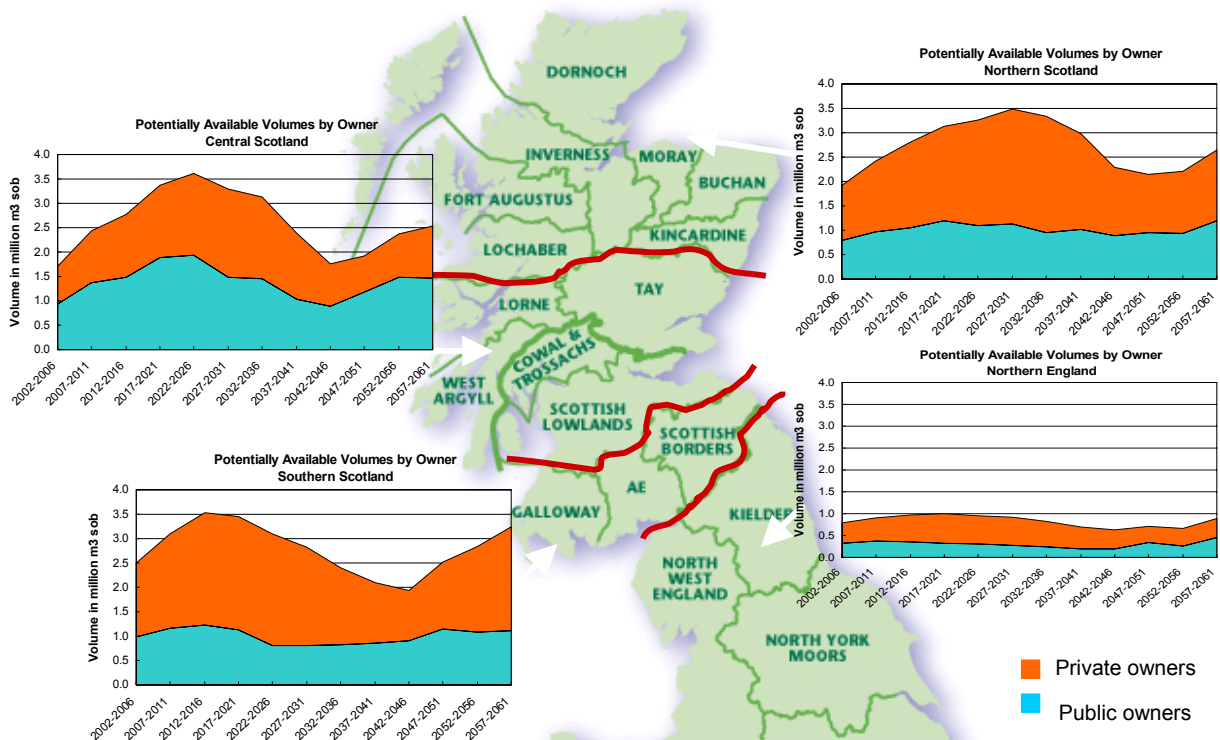
16. The following table illustrates in greater detail Scotland's significance in this predicted increase of supply.

LONGER TERM TREND IN SOFTWOOD AVAILABILITY FOR GREAT BRITAIN BY COUNTRY



17. The following diagram shows where the resources are located in Scotland, and confirms that the future harvest level is likely to be around 5.5 million cubic metres above current use.

The resources are in place and ready for harvest. There are 'concentrations' of resource in the North and South of Scotland, which can be supplemented by drawing wood from N.England. Average 'smoothed' future harvest level is around 9.5 Million M3 (5.5 Mn M3 above current use)



18. The size of the biomass energy market that this amount of resource could support is 440 megawatts¹. This forecast uses the predicted resource available above current use and takes no account of market factors or the fact that much of the resource will be ideal for wood fuel (with a sustained excess of small round wood and defect sawlogs), or that the Scottish Forest Strategy envisages growing the current and predicted resources above these levels. This means market based factors and additional resource growth will provide the potential for a significantly larger biomass energy market than that estimated by simply looking at the unused biomass resource.
19. It can be concluded that the minimum size of the biomass energy market in Scotland based upon the forestry fuel resource could be as much as 450 megawatts of installed capacity, and that other factors, such as the growing of energy crops may greatly increase the supply of wood fuel and hence the installed capacity of the biomass market in Scotland.
20. It would be useful to the biomass sector for further work to be undertaken to refine the wood fuel resource estimates in Scotland and to provide more detailed information. It will also be necessary to put systems in place that will allow 5-yearly review / updating of the data.
21. In making proposals for the development of a predominantly wood fuel based biomass industry, the interests of other users of forestry materials must be taken into account. BEG met with the Wood Panel Industries Federation and also received views from the United Kingdom Forest Products Association. The panel sector had particular concerns that competition for the same raw material could undermine existing markets and increase costs to levels that could result in UK panel board production becoming less competitive.
22. BEG has considered these representations carefully. We believe - and the Wood Panel Industries Federation has confirmed - that it is only in the next few years that competition for secondary sawmill products between themselves and the small number of co-fire biomass end users may result in supply issues. The processing of small round wood for the biomass / co-firing market may release additional material and thus also reduce this potential conflict. There may however be exceptions when considering the use of small round wood for Orientated Strand Board (OSB) production.
23. BEG does not believe that development of new biomass plant will in the short term threaten the resource currently accessed by other wood users. Thereafter, Scotland's forestry resource will increase to a level sufficient to meet the continuing needs of both established wood-using industry and the expanding biomass sector. This conclusion was also reached by the Royal Commission on Environmental Pollution, which stated in its report that "the supply of forestry materials is increasing [on a GB basis] much faster than demand and a significant increase in prices is unlikely to materialise".

(b) Energy Crops and Other Biomass

24. BEG has considered, and taken independent advice on, the potential for energy crop production in Scotland. Solid biomass may be produced from Short Rotation Coppice (SRC) or from giant grasses. There is a considerable literature on growing SRC for biomass production and it is known to grow in Scotland, however there is uncertainty over its sustainable yield on commercial planting here. Of the giant

¹ Based upon 5.5 million cubic metres of wood being equivalent to 5.5 million wet tonnes of wood fuel and a conversion of 1250 wet tonnes per megawatt.

grasses, *Miscanthus* has been widely tested in England, but its viability in Scotland is limited due to its preference for higher temperatures and light intensities than those found in the Scottish climate. Other grasses, such as reed canary grass, derived from Scandinavia, may be better suited with economic advantages for establishment, but further testing is required to ascertain likely yields and appropriate growing practices. The perennial nature of these crops means that the grower must make a long term commitment of land to the production of these crops; therefore confidence in the availability of a market over this period is needed.

25. Straw is produced as a by-product of arable crop enterprises. Sufficient quantities to offer the potential of developing large straw fired energy plants are generated in two areas of Scotland; Aberdeenshire and the Borders. However, Scottish farmers currently have a good market for their straw as animal bedding or feed and it is probable, therefore, that straw heat and power will not generate any significant interest for farm, local community or large scale uses. Logistics of supply also constrain development, with straw for a power station needing to be sourced from within a 50 mile radius of the plant (and preferably as near as possible) to avoid excessive transport costs.
26. With the requirement under the GB Renewables Obligations (GBROs) for an increasing proportion of co-fired biomass to be derived from purpose-grown energy crops (from 2011, 75% of the biomass component will have to be from energy crops), biomass crops will play a role in co-firing projects. Taken with the European aid for energy crops as an area payment, this could be a major driver to encourage planting of energy crops.
27. The land capability classification for agriculture classifies land in Scotland according to the limitations imposed on it by physical and biological factors which impact on its use for agriculture. Scotland has very little class 1 & 2 land which is the best land, capable of growing a full range of crops. The area of class 1 & 2 land in Scotland is 112,600 hectares (1% of Scotland). Class 3 land is capable of producing good yields of a moderate range of crops (cereals, oil seed rape, potatoes, some vegetable crops and grass). The area of class 3 land in Scotland is 1,179,000 hectares (15% of Scotland). Potentially, there are no technical /agronomic reasons for the majority of the class 3 land to be unsuitable for growing biomass energy crops. Class 4 land can only support a narrow range of crops and is primarily used for grass; however, potentially some of the class 4 land could support biomass energy crops where machinery operation is not restricted. Clearly, crop yield would be lower on class 4 land compared to class 3, and there may also be restrictions to access for winter harvesting. In conclusion, from a technical /agronomic perspective, over 15% (all class 3) of the agricultural land in Scotland could support biomass energy crops. The main obstacle to achieving this potential is the development of a viable profitable market, which would encourage farmers and land owners to grow these crops. And of course attention would need to be paid to the environmental and visual impacts involved if large areas of countryside were planted with a monoculture comprising rotation coppice and/or grasses.
28. Recent CAP Reforms with the decoupling of subsidies and the introduction of the single farm payment (SFP) from 1st January 2005 will allow farmers more flexibility and arguably free up land for alternative uses. For many farm businesses, traditional farm production will be unprofitable without subsidy support. Therefore many farmers will either have to radically restructure their business, use their SFP to support their operations, or look for viable alternatives. The renewable energy industry is still in its infancy; however, if viable renewable energy markets emerge, the agricultural sector is likely to be quick to respond to any commercial opportunity.

29. Although not within the remit of the group, we believe that the importance of energy crops grown for bio fuels and animal husbandry by-products from which energy can be economically recovered should not be underestimated by the Scottish Executive when developing sustainable integrated energy policies. There are circumstances where the use of locally produced primary and secondary products for heat recovery (not covered by this report) are the best environmental practice, while generating local jobs and reducing regulatory burdens.

The Wood Fuel Requirements of Biomass Fired Plant

30. Wood fuel requirements for biomass plants will vary according to the type of conversion facility, its size of operation and the moisture content of the delivered biomass fuel. However, as a rule of thumb most plants fall into the range of 4500 – 5000 oven dry tonnes per year required per megawatt of electricity generating capacity. The lower the efficiency of operation, the greater the amount of feedstock required. Size of plant will, to a large degree, be influenced by the catchment area necessary to source the fuel and hence transport distance and delivered cost of the fuel. The size of a viable project is a balance between being large enough to take advantage of economies of scale (in terms of capital cost) whilst limiting fuel demand to match the fuel supplies from within a local area, therefore avoiding excessive transport costs.
31. BEG believes that a range of sizes of plant could be developed in the biomass sector. Developments scaled to meet local needs and fuel supply offer opportunities to develop the sector in Scotland and to create local fuel supply chains. Small power only generation plants are affected by dis-economies of scale. However, if there is heat recovery and cogeneration, then there is the possibility of additional income from heat sales to aid the overall project viability. The larger plants (over 10 MW installed capacity) are likely to be either for electricity generation or for CHP at industrial sites where there is continuous process heating demand with complimentary demand for electricity. There is scope in future for smaller plants that match local conditions, especially as the technology and market infrastructures develop, and provided that project financing risks can be overcome. Such plants would offer the opportunity to create local supply chains, to provide continuity of employment across a number of sectors and to make a significant contribution to sustainable rural development.

Financial Support for the Supply Side

32. A report produced for BEG by Future Energy Solutions (FES) has identified the availability of a number of financial support schemes to assist production of biomass fuel. These are summarised at Annex C. As identified earlier by the RCEP report, the breadth of available support is both complex and incomplete.
33. As mentioned above, the reform of the Common Agricultural Policy will lead to changes in existing payments to the agricultural sector. Current interpretation suggests that on set-aside land while no additional payment will be offered, there will be no penalty to current set-aside support payments or to future set-aside entitlement payments if land is used for the purpose of growing energy crops. On other land eligible for support, growers will be eligible for 45 Euros per hectare support payment for energy crops up to a limit of 1.5million hectares at an EU level, after which there will be a scale back.

34. As indicated in the previous section of this report, it may be unlikely that energy crops will be grown on a significant scale in Scotland, at least in the short term. Nevertheless, there is already some interest, and the rules under the GBROs applying to co-firing may stimulate more. Financial incentives for growers are likely to be important if this initial interest is to be carried through to action on the ground. We have noted that the current level of support for growing energy crops in Scotland is less than that available in England and Wales. While BEG is not making a specific recommendation as to the level of support that should be available in Scotland, we recommend that this is a matter that should be kept under close review.

Actions

- **Further work should be undertaken by the Forestry Commission to refine the wood fuel resource estimates in Scotland and to provide more detailed information to wood users and the biomass energy sector. This information should be reviewed/ updated every five years.**
- **The Forestry Commission should keep under close review, in consultation with the industry, the level of support that it provides to the growers of energy crops in Scotland.**

INFRASTRUCTURE ISSUES

Electricity Grid

35. Biomass plants for power generation make more efficient use of available capacity in the distribution and transmission network than other forms of renewable power. A biomass power station could be expected to operate for over 8,000 hours per year at rated capacity. The existing electricity infrastructure, which was designed to support traditional patterns of generation, will require to be substantially upgraded in order to facilitate the full exploitation of Scotland's renewable electricity resources. While new generation not exceeding minimum local demand can currently be connected to the distribution system, a greater number of such embedded generation plants may necessitate the strengthening of this system. The three transmission companies in Great Britain - National Grid Transco, Scottish Power Transmission Ltd and Scottish Hydro Electric Transmission Ltd - have also brought forward a number of proposals for the upgrading of the transmission grid. The regulator, Ofgem, announced in August 2004 that it was consulting on proposals to permit additional investment in the Scottish electricity transmission network to help support growth in renewables generation. BEG welcomes this development and believes that the upgrades will play a central role in the expansion of the renewable electricity sector, including, of course, enabling additional output from biomass plants to be released onto the electricity grid.
36. Short to medium term restrictions on access to the grid at distribution and transmission voltages could constrain the deployment of all renewable generation in Scotland including biomass. It is essential that efforts are made by Ofgem, the distribution network operators and the transmission operator to ensure fair and financially secure access to the electrical grid at all levels. BEG believes that Scottish generation, both transmission and distribution, should not be placed at a competitive disadvantage when compared with comparable generation based in England and Wales under the new British Electricity Trading and Transmission Arrangements (BETTA).

Transport

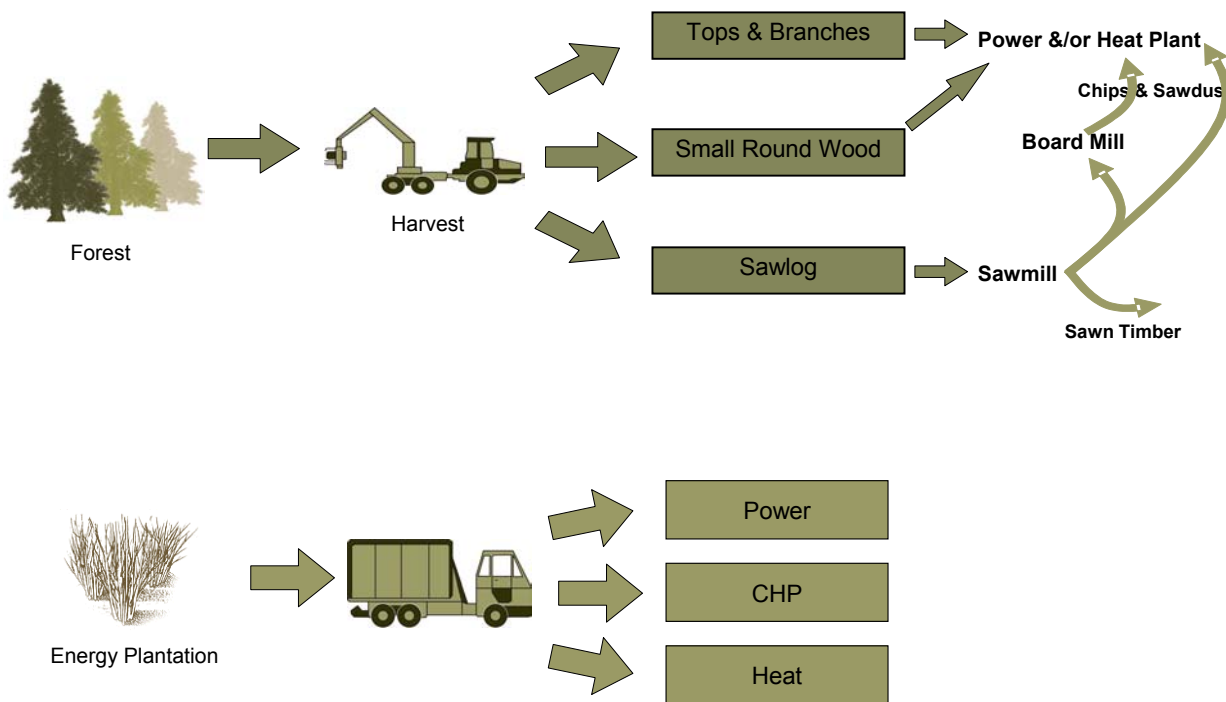
37. Transporting wood fuel is a major issue for the development of a biomass industry in Scotland. Current estimates suggest that a significant proportion of the overall cost of wood supplied to existing markets can be transportation costs. Transport costs are a limiting factor in the price and financial viability of biomass as a fuel. Well located biomass projects, including co-location of integrated energy users of electricity and heat, and innovation in the supply chain present opportunities to reduce cost. Transporting wood fuel by road could also be a significant planning issue for biomass developments.
38. Over recent years there have been increasing reports of haulage operations coming into conflict with Local Authority road requirements and the expectations of communities. This issue has been recognised in the Partnership for a Better Scotland, and the Scottish Executive's Scottish Forestry Strategy which stated that enhancement to transport infrastructure was essential to maximise the value of Scotland's forest resources.
39. The Timber Transport Forum was established as a government / industry partnership in 2000 to provide a mechanism for sharing ideas and best practice. The Forum welcomed the establishment of a Strategic Timber Transport Fund which the Scottish Executive has recently announced.

40. Other initiatives aimed at overcoming local transport problems include agreements between the Forestry Commission and private foresters to develop strategic routes to remove timber. These agreements are generally developed in conjunction with other local interests, such as Local Authorities, which has resulted in a wider focus for works aimed at improving infrastructure for rural communities more generally. The development of biomass plants may lead to an increase in energy crops being planted close to the demand, and would provide a valuable opportunity to minimise the transport element associated with the use of biomass as a fuel.
41. Journey distances by road should also be minimised wherever possible, and that alternative means of transport are utilised where available. While transportation will add to the CO₂ costs of biomass fuels, the Royal Commission on Environmental Pollution believes that these emissions are more than offset by the very low conversion emissions, making biomass even more favourable compared to the fossil fuel alternatives. Nevertheless, it remains important that all steps possible are taken to reduce the distances over which the fuel resource is transported.
42. There is some potential for transport using rail and ship, particularly to the larger plants, and this should be encouraged where this can be shown to be practical and viable. Otherwise, BEG believes that the use of local wood fuel in biomass plant located in or close to areas of supply will offer the most sustainable way forward for Scottish biomass development. There may also be opportunities to develop integrated sites where wood processing and generation using co-products can be encouraged to co-locate. This also fits with the Government's wider aims to reduce carbon emissions by discouraging long distance transportation of fuel and to encourage the use of CHP to maximise energy conversion efficiency.
43. The conversion of existing industrial sites to use biomass for heat and/or power may mean that transportation of wood fuel may be required over some distance although this would be offset if energy crops were subsequently planted locally. Conditioning of wood fuel material at source by stockpiling and air-drying is part of the undeveloped wood fuel supply chain. It would reduce overall transport costs by maximising usable energy transported per truck load, and by reducing moisture content. It would be a trade-off between reduced transport costs and increased wood fuel costs as working capital is tied up in stockpiles during air-drying.

Supply Chain Infrastructure

44. While the marketplace has still to determine how viable supplies of wood fuel materials can be made available for energy projects, one possible scenario is as follows. The wood fuel for use in biomass plants could be obtained by utilising the tops and branches of harvested trees and from the secondary products of the sawmilling industry. Forests could be managed with a view to providing raw material to the sawmilling, pulp and board, and biomass industries. Trees could be harvested in such a fashion that all products are recovered as cost-efficiently as possible. The biomass component could be removed in so-called integrated harvesting systems with product separation in the forest. In some cases the tops and branches might be recovered in a second pass operation. The biomass component might be chipped at site to allow more efficient loading to trailers of transport which would be loaded directly from the chipper/trailer. Alternatively, coniferous brash (lop and top) might be baled in the forest, using currently available Scandinavian brash baling technology, thereby compacting the material for efficient extraction and transport on conventional round timber lorries. Such bales can be stacked, stored and dried before chipping and immediately prior to burning at the power/heat plant. Some short term storage of the fuel might be required and this would be managed with a view to reducing moisture content. Some mixing of biomass fuels of different moisture content might be required to meet the specifications of the conversion facility. The diagram which follows depicts this process.

WOOD FUEL SUPPLY CHAIN



45. The forest industry has already proved innovative in response to a changing market, for example in relation to in-forest chipping, harvesting etc. However, further innovative solutions will be required if the overall efficiency of this sector is to be improved and environmental impact reduced. This would include the development of more specialised harvesting, chipping and extraction machinery to efficiently create the feed stock. This may require support from the public sector via new or existing capital / innovation schemes.
46. There is a lack of biomass equipment manufacturers both in Scotland and indeed in the UK as a whole. Industrial scale CHP and power generation projects are of bespoke design and would use equipment from suppliers around Europe (and elsewhere). The opportunity exists however for strategic collaborations with other countries to engage in formalised technology transfer to encourage local manufacture of proven biomass equipment in Scotland under licence. This possibility should be explored.
47. As the biomass sector grows, it will be necessary to put in place skills training and accreditation to ensure that Scottish service companies in the energy and forestry sub-sectors of the economy are familiar with wood fuels (preparation and trading) and with the related biomass equipment including wood fuel handling and storage.

Actions

- **New biomass plants for CHP and power generation should, where possible, be located in or close to areas of wood fuel availability to minimise possible transport difficulties and costs. The forestry and biomass energy sectors should consider developing integrated sites which would attract a range of wood using activities.**
- **The Scottish Executive and the Enterprise Networks should consider appropriate means to support supply chain infrastructure innovation and development, and with others, should consider local manufacturing of established non-UK products under licence; they should also consider the need for appropriate skills and training.**
- **Ofgem, the distribution network operators and the transmission operator should ensure fair and financially secure access to the electrical grid at all levels.**

THE DEMAND SIDE

Potential Markets

48. Crucial to the commercial success of the biomass sector in Scotland will be its ability to secure a market for its output. The risks are however two fold – cost of fuel supplied to a project and the value of its output. The GBROs are the mechanism by which producers of renewable electricity secure a market for their product. Currently, there is no incentive for heat generated by biomass plant other than capital support for small scale community/householder projects under the Scottish Community and Householder Renewables Initiative.
49. Typically, a Power Purchase Agreement (PPA) will vary between one and twelve years in length, with little incentive for suppliers to enter into agreements beyond this level given the uncertainty of Renewable Obligation Certificate (ROC) values beyond 2015. Generally, an electricity supplier will agree to a ‘must take all’ output from a generator but without any obligation on the generator to provide a specified volume. This has implications for the market value of power produced but given the relative ‘firmness’ of power from biomass plants compared to other forms of intermittent renewable electricity generation it should be able to attract a better wholesale value. The actual value of a PPA is split into a number of different and variable elements, including market value of power, ROC value, ROC recycle payment, Levy Exemption Certificate and embedded benefits. The most valuable element of the PPA is the ROC. BEG welcomes the recent announcements by the DTI and the Scottish Executive that the level of the GBROs will increase in the period to 2015-16, and that the GBROs will continue in place until 2027. Biomass-generated electricity is marginally economic, under current market conditions. Stimulation of a long term market is unlikely to be achieved without additional capital support.
50. The introduction of an Emissions Trading Scheme on 1 January 2005 could offer a further market support mechanism for biomass as under the proposed scheme rules it would realise the full value of carbon trading. The current market levels for carbon suggest that it will trade in a range between €8-9 per tonne of CO₂.

Financial Support Mechanisms

51. The report produced by Future Energy Solutions has identified the availability of a number of financial support schemes for biomass plant. These are summarised at Annex C.
52. The economic appraisal carried out for BEG (see Annex D) identifies a strong case for Government support for the biomass sector. Without it, it is unlikely that the private sector would be willing to invest in new biomass power plant and economic potential would be lost. The Executive’s objective of meeting its renewable electricity targets through a mix of renewable energy technologies would also be undermined.
53. The existing support schemes, and the market support mechanisms of the GBROs and the Climate Change Levy are valuable. However, the FES study has found that despite efforts to stimulate biomass, the market is not yet commercial and merits further intervention to try and catalyse activity to grow and develop this sector.

54. It is essential that the Scottish Executive and the DTI should consider how best to provide the necessary capital support for biomass energy. The current DTI biomass capital grant scheme has been valuable in providing assistance to power generation projects and various larger heating projects, and we recommend that the DTI continues to keep it under review. The aim should be to enhance the scheme and target areas such as Scotland which have immediately available supplies of biomass wood fuels. Very small projects - at community and householder level - are supported by the Scottish Executive's Scottish Community and Householder Renewables Initiative. The Scottish Executive has recently announced that this Initiative is to be extended for a further three years. In addition, consideration could be given to creating a technology research and development fund aimed at supporting biomass manufacturing capability and a Scottish presence in technology leadership. The role of the ITI Energy will be important in this respect.
55. Where there is a steady demand for heat as well as power generation, then a complementary income stream from heat sales is available to improve the viability of the biomass plant capital investment. CHP plants are inherently more energy efficient in converting primary energy (in this case, wood fuels) to electricity and usable heat (up to 85% efficient conversion compared to 30-35% conversion efficiency from primary energy to electricity only). It follows that public sector support for biomass projects involving power generation should be biased to favour CHP. There is, in our view, a need for the Executive to provide some measure of capital support for good quality biomass CHP projects as well as for infrastructure investment (e.g. chippers, dryers, harvesters, boilers etc). This fits with the findings of the FES study which concluded that gaps in existing support mechanisms have resulted in little support in these areas in particular.

Actions

- **The Scottish Executive and the DTI should acknowledge the continuing need for public sector support for biomass plants for CHP and power generation of all sizes and should give an early commitment that they will work to determine how that need can be met.**
- **The Scottish Executive should consider how to meet the need for public sector support for CHP plants in particular and also for support infrastructure.**

REGULATORY ISSUES

Planning

56. Consent for a new biomass power plant below 50 megawatts MW is the responsibility of Local Authorities under the Town and Country Planning (Scotland) Act 1997 which requires planning decisions to be made in accordance with the 'development plan'. Very few development plans at present contain specific policies on biomass developments, although they do contain other policies that need to be taken into account, such as environmental criteria and protection of natural heritage. Development plans must be regularly reviewed and it is likely that they will progressively include a number of policies to guide biomass developments. The latest plans are moving in this direction, with certain notable examples such as East Ayrshire including positive development plan policies.
57. The Scottish Executive's National Planning Policy Guideline "*Renewable Energy Developments*" (NPPG 6), revised in 2000, asks planning authorities to provide positively for all forms of renewable energy development, but to do so in a way that is compatible with statutory obligations to protect natural and built heritage. The Executive's Planning Advice Note "*Renewable Energy Technologies*" (PAN 45) revised in 2002 provides supplementary advice on issues to be taken into consideration, such as visual intrusion, noise, local ecology and traffic impacts. Specific issues are addressed as done on a case by case basis, but in all cases project developers are expected to demonstrate how they will mitigate any negative impacts.
58. The Executive's planning guidelines and advice referred to above have been welcomed by planning authorities and developers alike. Both documents contain information that is biomass specific. However, the planning guidelines were prepared when there were very few, if any, wood fuel biomass developments in Scotland and interest in biomass energy production is now such that more detailed guidance is necessary. The Scottish Executive intends to review its renewables planning guidance in 2006. However, the issues that BEG has identified require consideration at an earlier stage in order that the developing industry can have the best possible advice. The Executive should consider examining the planning issues around biomass development and issue interim advice in advance of the major review already planned. BEG would be happy to provide input into such work.
59. Projects below 20MWth input do not require IPPC licence and subsequent regulation is the responsibility of the local authority.
60. The modification of other planning guidance and building control regulations relating to housing, commercial and industrial development can assist in the potential inclusion of biomass systems within new or existing developments. This would support the objectives of the Sustainable Building Task Force of the Office of the Deputy Prime Minister.

Regulation

61. A number of regulatory issues were drawn to our attention and we discussed these with representatives of the responsible authorities- Ofgem, the regulator and the Scottish Environment Protection Agency (SEPA). Both assured us that they were anxious to work with the industry to resolve any difficulties that might arise

but pointed to the fact that they could only act within the confines of the appropriate legislation. Whilst we fully understand and acknowledge this position, clear and transparent guidance is essential to ensure that biomass development is not unnecessarily hindered by procedural issues.

62. SEPA has assured us that the Agency was very willing to look at its procedures to ensure greater consistency of approach. Similarly, they have undertaken to discuss regulatory issues with potential developers at an early stage in the planning of a development. BEG welcomes these assurances and recommends that the Scottish Executive keeps the position under review.
63. A fundamental problem that needs to be addressed centres on the classification of certain material as “waste” under the terms of the EU Council Directive on waste (The Framework Directive) and the EU Council Directive on the incineration of waste (The Waste Incineration Directive) and enabling UK/Scottish legislation. Industry has pointed out that if potential biomass materials are classified as “waste” then biomass projects would incur additional costs. Such material would require to be transported by a registered carrier and might need a licence to be burned. Additionally, obtaining planning consent might become more difficult. Industry has also expressed concern that SEPA practice appears to be to treat each supply of biomass material on a case by case basis. In the absence of transparent and clear guidance, such an approach introduces delay, uncertainty and problems with inconsistency of interpretation which hinder investment.
64. BEG has looked at how other EU countries implement the EU Waste Directives, and have visited North Rhine Westphalia to see at first hand the practice there. Our conclusion is that the Directives are being implemented in a more rigorous fashion in Scotland than elsewhere and that this is holding back the development of a wood fuel industry here. We believe that the following categories of wood fuel should not be classified by SEPA as waste and that they should be treated in the same way as short rotation coppice and other energy crops:
 - Forestry brash, lop and top, derived from the harvesting of standing timber; and
 - Any secondary products of primary processing of logs and small round wood, such as bark, butt reducer chips, wood chips and sawdust.
65. We therefore recommend that SEPA should look again at how they implement the provisions, taking account of practice elsewhere.
66. As regulatory issues emerge, BEG encourages SEPA to engage in positive dialogue with industry and ensure there is clear national guidance at the earliest possible stage.
67. A current issue affecting eligibility for ROCs relating to co-firing is the arrangements for the measurement and testing of the biomass fuel used. For commercial reasons, generators want the flexibility to purchase a variety of fuels including pre-blended material. The Royal Commission on Environmental Pollution clearly recommends that “Possibilities for secure arrangements should be investigated whereby Ofgem can certify blended fuels for co-firing as eligible ROCs at sites other than the power station that is going to use them.” Ofgem’s interpretation of the GBROs requires the testing of the component materials individually at the power station. As there is no practicable means to achieve this for pre-blended material,

a barrier is created. Ofgem's concern is that pre-blended fuels would prove difficult to audit, particularly in the case of imported biomass fuels. BEG recognises these concerns but urges industry and Ofgem to work together to identify a solution, as a matter of urgency, and is pleased to note that the current fundamental review of the GBROs will examine this issue. If a solution cannot be found, it could potentially delay the development of the wood fuel infrastructure that co-firing could otherwise stimulate.

68. Later in this report, we discuss and make recommendations in relation to information provision and sharing. We believe that information about regulatory issues should form part of that process.

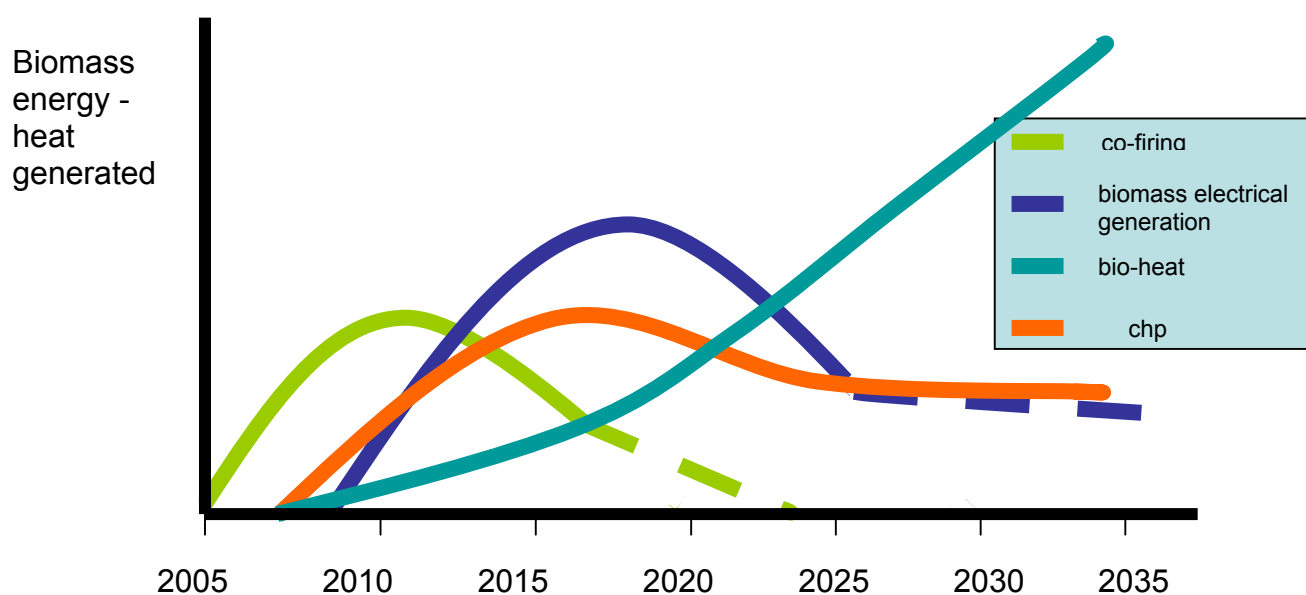
Actions

- **As part of its planned review of NPPG 6 and PAN 45, the Scottish Executive should at an early date provide updated guidance on biomass developments. This guidance should encourage local authorities to consider the wider impact of biomass projects in relation to sustainable development and the employment impacts of plant.**
- **All the regulatory agencies must recognise the opportunity which exists to develop renewable power sources (with all the wider inherent benefits). This opportunity will be greatly enhanced by a more proactive approach to overcoming problems.**
- **SEPA should examine its procedures to ensure consistency of approach in relation to the implementation of legislation relating to waste products and, along with Ofgem, should ensure that information about regulatory issues is made more readily available to the biomass sector.**
- **SEPA should re-examine how it implements the provisions of the EU Council Directives on waste and on the incineration of waste. Forestry brash, root/stump, lop and top derived from the harvesting of standard timber and any (co) products of primary processing of logs and small round wood should be treated in the same way as short rotation coppice and other energy crops.**
- **Ofgem and industry should work together to develop secure arrangements whereby Ofgem can certify blended fuels for co-firing as eligible for ROCs at sites other than the power station.**

CO-FIRING

69. BEG believes that co-firing, in particular in existing coal-fired power stations, has considerable potential to act as a catalyst to the development of a viable biomass electricity industry within Scotland. Co-firing biomass with fossil fuels gives an **immediate** reduction in emissions (particularly in CO₂); it utilises the existing investment in currently operating coal-fired power stations; it utilises existing infrastructure which capitalises on rail transport; it utilises existing grid connections; and, provides the security of electricity supply from proven and reliable generation plants. All these advantages are further supported by the fact that the benefits are immediate – shorter lead in times are necessary whilst planning permissions are obtained and new road and rail links are designed and built.
70. The intention is to achieve a balanced development profile stimulated initially by co-firing during which period substantial investment in mainstream power generation and CHP would be created and which would come on stream as co-firing demand diminished in the period beyond 2010. Concurrently, a steady expansion of biomass demand for smaller scale domestic and district heating could then be established.

Scenarios for a phased approach to biomass in Scotland



Notes on Diagram:-

- Co-firing: Stimulated by ROCs. An early start enabled by minimal capital investment is limited by the availability of energy crops. The early start stimulates development of the bio-fuel supply chain. Beyond 2016 the future is uncertain

- Biomass generated electricity: Stimulated by ROCs. Investment is very large scale and plants need time to become fully operational. Depending on location may be able to utilise the supply chains developed by co-firing. Beyond 2025 the future is uncertain
- CHP: Stimulated by ROCs. Investment is large but not as large as plants generating electricity only. Depending on location may be able to utilise the supply chains developed for co-firing. In the longer term less electricity is produced to the grid as electricity market futures are uncertain
- Bio-heat: It takes time to grow the market for bio-heat and incentives will be required. Once established, this form of energy becomes popular and is served by a fully developed supply chain and state-of-the-art technology for domestic and district heat applications

71. The rules governing co-firing of biomass and fossil fuel are set out in the Renewables Obligation (Scotland) Order 2004 and are intended to stimulate the growing of energy crops. However, as indicated earlier in this report, the potential for growing energy crops in Scotland may be limited by the availability of suitable land and the immediate availability of standing forestry. As a result, the biomass sector in Scotland is likely to be initially built upon wood fuel, although other crops may well assume increasing significance as the industry develops. Energy crops are currently defined for the purposes of the GBROs as “meaning a plant crop planted after 31 December 1989 and grown primarily for the purpose of being used as fuel”. BEG believes that, given Scotland’s abundant forestry resource, this material, appropriately defined and grown to a certain standard, should also be used for the purposes of co-firing. This timber is a primary natural resource, the harvesting of which is good for Scotland’s economy and population. The location of the crop is relatively close to the power stations (particularly compared to imported timber, and exotics such as olive and nut wastes); and it provides the opportunity for an immediate reduction in CO₂ levels. The alternative of newly planted energy crops would at the very least have a 4 year lead in time from planting to the harvesting of the first commercial crop. BEG believes, therefore, that an amendment should be made to the definition of “energy crops” in the ROS to include all material derived from any woodland managed to the UK Woodland Assurance Standard; the exact wording of the amendment to be determined by the Scottish Executive following consultation.

72. As mentioned in paragraph 66 above, the issues surrounding the use of blended fuel in power stations need to be resolved urgently, if co-firing is to maximise its positive impact on the biomass sector.

Actions

- **The Scottish Executive should consult on amending the definition of energy crops in the Renewables Obligation (Scotland) Order 2004 to include material derived from any sustainably managed woodland, i.e., a woodland certified to the UK Woodland Assurance Standard.**

SECURING A COMPETITIVE ADVANTAGE

International Comparisons

73. The WWF International and Aebiom report, 'Bioelectricity Vision: Achieving 15% of Electricity from Biomass in OECD Countries by 2020' provides detailed information on the use and geographical spread of biomass for electricity and heat production internationally. The International Energy Agency estimates that there was 18.4GW of biomass electrical systems installed in OECD countries in 2000. The bulk of these plants uses forestry and wood processing co-products, and is combined heat and power with the heat used for industrial or district heating purposes. Existing plant is distributed across the three regions of the OECD as follows:-

Region	Biomass generating capacity	Percentage of installed capacity
OECD Europe	6,509MW	1.0%
Of which EU 15	6,259MW	1.4%
OECD North America	8,881MW	1.0%
OECD Pacific	2,983MW	1.0%

Source: WWF International and Aebiom, Bioelectricity Vision: Achieving 15% of Electricity from Biomass in OECD Countries by 2020.

74. Forms of support vary, but are generally either based on feed-in tariffs, bidding competitively for premium price contracts or obligation based schemes, such as in the UK. We have in particular looked at the experience of the North Rhine Westphalia region of Germany. That region currently produces 28% of Germany's electricity, 87% of which is from coal fired generation. In 1996, the State Government launched a 'Future Energies' programme to increase the area's use of renewable resources, in particular biomass, and improved energy efficiency. Through this programme, it supports biomass heat and electricity production for a range of uses (including communities, schools, industrial and district heating, and electricity production). It is specifically interested in, and is financially supporting, the creation of wood pellet plant to supply urban projects. Its programme has enjoyed considerable success since its inception, and the area's use of biomass heat and electricity is growing at an impressive rate.

Economic development opportunities

75. Research and evidence from elsewhere suggests that biomass projects provide higher levels of employment, especially during the operations phase, than other mature renewable technologies. The 2004 Renewable Supply Chain Gap Analysis for the DTI, Scottish Executive, Scottish Enterprise, and Highlands and Islands Enterprise, estimates an average of 6 jobs per MW for biomass which compares favourably with other technologies. The FES study and further work undertaken by Avayl Engineering for BEG also considered the economic benefits associated with project development. This work is summarised in Annex D and includes an analysis of employment prospects under different scenarios. Any activities which would increase biomass deployment in Scotland will not only safeguard existing employment in the wood fuel industry, such as forestry operations and fuel transportation but also provide

positive opportunities for expansion. This mirrors the findings of the Gap Analysis which suggested that given the fragmented nature of the existing fuel supply chain in Scotland it could provide the greatest economic benefit.

Provision of information to industry

76. One of the major factors inhibiting the development of biomass energy systems is the lack of clear and comprehensive guidance both about how they should be developed and about the financial support available. For example, at the large scale production level, where three industries - growers, processors and energy producers- are involved, the individual needs within the fuel supply chain are seldom understood by any single individual. Unless this problem is tackled, we believe that many potential projects will never proceed.
77. We believe that the industry itself has an important role to play. Representative bodies need to ensure that they co-ordinate learning and information sharing and provide expert advice and information. There is a need for a biomass energy industry network which brings together those working in both the supply and the demand sides, including the responsible public sector agencies. Co-ordination of activity is vital. There is a need to facilitate links between suppliers, processors and generators. BEG believes that the Scottish Renewables Forum (SRF) is in the best position to deliver the leadership necessary to establish a biomass energy network and recommends that it should give urgent consideration to this task.
78. We also believe that there is a clear need for one on one advice. The Forestry Commission has appointed a wood fuel project officer with the remit of providing advice to businesses and potential businesses in the north of Scotland and this appointment is already proving valuable. We recommend that the Forestry Commission consider making similar appointments to cover the rest of Scotland, and that the duties of the post holders be extended to providing advice about the use of a range of biomass fuel sources.
79. If our recommendations are accepted, it will be important to ensure that there are clear links between the industry-led group and the officers working in the field. While the mechanics of this will be a matter for those concerned to determine, there is a model available in the Timber Transport Forum, and we recommend that this is considered by both the SRF and by the Forestry Commission, working in partnership.
80. This two pronged approach - an industry-led biomass energy network overseeing the development of comprehensive data and advice and the appointment of project officers who would deliver that advice - will, we believe:
 - create a more unified industry view of wood fuel development requirements;
 - ensure a team of informed advisers is created who can share and disseminate best practice;
 - provide advisers with the correct tools for the job;
 - provide pertinent and accurate investment information;
 - ensure that information remains up to date and relevant;
 - provide detailed and up to date technical information from both within the UK and overseas;
 - promote the use of fuel thus helping meet government targets; and
 - Support the development of training packages and help the delivery of training and development needs.

81. BEG's attention has also been drawn to a scheme that has been established in Wales to provide information to the sector there. This scheme is based on leaflet provision and a web-site. BEG believes that a similar scheme could usefully be considered in Scotland; one which would cover all potential participants in both the supply and demand sides of the sector. The provision of such basic information and its delivery format might be a useful early task for the new industry forum that we have recommended should be established.
82. The success of biomass developments in the planning system is to an extent dependent on public acceptance and support locally. There have been relatively few biomass projects in Scotland to date so there is little experience of public attitudes. However, research that has been undertaken elsewhere in the UK suggests that there is a lack of understanding generally about biomass as a renewable energy resource. This needs to be addressed, not least because of the need for public support in securing planning consent for individual projects. A major information campaign about renewable energy and its benefits - *Renewable Energy It's Only Natural* - is being undertaken on behalf of the Scottish Executive and the Department of Trade and Industry that will include information about energy using biomass. The results of this campaign should be assessed for their effectiveness and , if necessary, further action taken to increase public awareness of the benefits of developing a biomass industry.

Actions

- **The Scottish Renewables Forum, working with the Scottish Forest Industries Cluster, the Forestry Commission, Scottish Enterprise and Highlands and Islands Enterprise, should develop a customer industry-led Biomass Energy Network.**
- **The Forestry Commission, working with the Biomass Energy Network should consider the appointment of wood fuel information officers to provide advice to all who are interested in developing biomass wood fuel opportunities.**
- **Public awareness and acceptance of biomass as a renewable fuel is crucial. The Scottish Executive should assess the effect of the national information campaign, *Renewable Energy It's Only Natural* in relation to public knowledge and acceptance of biomass developments and develop a specific campaign to explain, support and reassure on the advantages of biomass energy.**

CONCLUSIONS, KEY ACTIONS AND MILESTONES

1. There exists a significant opportunities to create a strong biomass industry across Scotland. Through doing so, significant economic and environmental benefits can be achieved. Sustainable job creation in existing sectors, such as forestry, agriculture and sawmilling, offers an immediate stimulus to supporting the development of the sector. Carbon emission reductions and local scale use of indigenous products supporting rural community development are further reasons why Scotland should exploit the opportunity offered by biomass development.
2. BEG has identified the scale of this economic opportunity, but we recognise that this cannot be achieved without concerted effort by both the public sector and industry.
3. Key actions are summarised below; it is the responsibility of a range of partners to ensure they are progressed.

Fuel Supply Issues

- Refined wood fuel estimates should be made available for industry use and planning.
- Level of support necessary to encourage growers of energy crops to be kept under review.

Infrastructure

- New plants to be located, where possible, in areas of wood fuel resource.
- Support targeted at innovation and development of the fuel supply chain to reduce costs and stimulate greater Scottish supply chain content.
- Fair and financially secure access to the electrical grid.

Demand Side

- Government acknowledgement of need for and commitment to public sector support, for infrastructure and CHP plants in particular.

Regulation:

- Revision of detailed planning guidance to support biomass development.
- Regulatory authorities to issue clear and consistent guidance.
- SEPA commitment to review its definition of 'waste' in line with practice elsewhere in Europe.
- Solution identified by Ofgem and industry to current problems associated with pre-blended material and its use in biomass plant for the purposes of ROC eligibility.

Co-firing

- Definition of 'energy crop' changed to include material derived from any woodland certified to the UK Woodland Assurance Standard.

Securing a Competitive Advantage

- Establishment of a customer and industry led Biomass Energy Network
- Appointment of further wood fuel development officers across Scotland.
- Campaign to support greater public awareness and acceptance of biomass as a fuel.

4. It is important that each of these actions is achieved. Especially critical are those relating to the availability of funding support and creation of a supportive regulatory environment without which any substantial project development will be stalled.
5. **BEG urges all those charged with taking forward the actions recommended in this report to do so at the earliest opportunity. We recommend that FREDS should monitor progress on a regular basis and, as previously indicated, we suggest that BEG should be reconvened once conclusions emerge from the results of the UK study into renewable heat.**
6. The establishment of a viable biomass sector would help secure all the benefits that forestry can bring to Scottish rural development, and make a considerable contribution to the Executive's priority of growing the Scottish economy in general. The sector can create and sustain jobs in the forestry, sawmill and agriculture sectors as well as at individual plant level. Many of these jobs in wood fuel production would be in the more remote and rural areas. The sector can therefore make a major contribution to the Scottish Green Jobs strategy. However, we do recognise that this cannot be achieved overnight. It may take a number of years to resolve many of the issues identified in this report and to create the necessary supportive environment in which a biomass industry can flourish.

Terms of Reference of Biomass Energy Group

The Forum for Renewable Energy Development in Scotland (FREDS) biomass energy group will consider and bring forward proposals that will:-

- Create momentum in the development of a biomass industry that will (a) maximise the contribution that forestry, including secondary sawmill products, energy crops, and other arable based agricultural materials can make towards the achievement of a renewables technology mix and (b) contribute to sustainable rural development.

In particular the group will:

- Provide a realistic assessment of the potential biomass resource both within and to Scotland and its suitability to support the growth of the biomass industry;
- Identify the key challenges and opportunities for Scotland, drawing on experience from within the UK and elsewhere;
- Identify the potential for rural regeneration including local wealth creation, and underpinning existing forestry and agriculture sector jobs;
- Suggest measures to overcome the barriers to the development of a biomass supply chain and the growth of a biomass industry;
- Assess the nature and scale of the financial/fiscal challenge to be overcome if biomass is to become commercially available, and suggest measures which could help achieve this;
- Identify any planning or environmental issues that would need to be addressed to support the growth of the biomass industry;
- Suggest how Scotland might secure a competitive advantage in the development of biomass;
- Suggest suitable milestones and targets to promote the development of biomass in Scotland.

Membership of Biomass Energy Group

Jeremy Sainsbury	Natural Power (Co-chair)
Neil Stewart	Head of Renewable Energy Policy Unit, Scottish Executive (Co-chair)
R Craig Campbell	NFU Scotland
Niall Crabb	Scottish Coal
Kevin Devlin	Director, Commercial & Origination, Scottish Power
Ian Forshaw	Head of Policy and Business Development, Forestry Commission Scotland
Elaine Hanton	Highlands and Islands Enterprise (Secretary)
Chris Inglis	Executive Director, Forestry and Timber Association
Professor Paul Mitchell	Director of Research, College of Physical Sciences, Aberdeen University
Richard Palmer	A W Jenkinson Forest Products
Fergus Tickell	Ormsary Estate
Cedric Wilkins	Team Leader, Forest Industries Cluster, Scottish Enterprise

Funding Opportunities for Biomass Projects in Scotland

The following table summarises the opportunities for obtaining funding to support schemes producing heat and electricity from biomass in Scotland. There are many different funding sources and programmes in operation and it is not possible to be comprehensive in such a summary. The aim here is to highlight the main opportunities and provide links to other sources where more detailed information can be found. The funding sources have been categorised according to those relevant to 'Supply' only; 'Demand' only; 'Infrastructure' only; 'Promotion' only and then combination schemes. A useful overview of EU funding schemes for Scotland can be found at <http://www.cec.org.uk/scotland/funding.pdf>

Funding Source and Relevance	Description	Funds Available	Eligibility	Further Information
SUPPLY Forestry Commission research programme	The Programme aims to inform, support and strengthen the policies by which sustainable forestry management can be achieved in Britain. Research in the energy fuels area is conducted by Forest Research, an agency of the Forestry Commission. The Programme is wide ranging, covering all aspects of forestry. Objectives relevant to biofuels are to develop new silvicultural systems, which include SRC for energy systems and the use of forest residues as wood fuel.	Ongoing. Total FC funding is about £10.5million per year. About 10% of this is spent on external contractors, and about £100k per year on energy crops. Work is usually awarded by open tender against a work specification.	Universities, public and private research institutes.	http://www.forestry.gov.uk/research http://www.forestry.gov.uk/research
Scottish Forestry Grants Scheme (SFGS)	SFGS will provide grant aid to encourage the creation and management of woods and forests to provide economic, environmental and social benefits now and in the future. Grants are available for woodland expansion, restocking and stewardship. Biofuels schemes using forest residues may be applicable under the developing community involvement objective. SRC planting grants are covered by the scheme.	Planting grants for SRC are £400/ha on set aside and £600/ha on non set aside. SRC is not eligible for Farmland Premium Payments.	Farmers, foresters and community groups in Scotland.	\$FILE/flyer.pdf
Landfill Tax Credit Scheme (LTCS)	The LTCS was designed to help mitigate the effects of landfill upon local communities. It encourages partnerships between landfill operators, their local communities and the voluntary and public sectors. Landfill tax credits must be spent in compliance with the landfill tax regulations. Projects must fall within one of a number of categories of activity. The categories relevant to biofuels are: projects that involve reclaiming land; projects that reduce or prevent pollution on land; delivery of biodiversity conservation for UK species habitats. Since April 2003, category C, including R&D, is no longer included in the scheme.	Started in 1996. Reformed in 2003. Ongoing. Funding of around £47million will be available in 2004.	Environmental Bodies (EB) approved under the LTCS can obtain money direct from Landfill Operators or through Distributive Environmental Bodies. Other contractors may be able to obtain money through Distributive Environmental Bodies without themselves being EBs.	http://www.lfcs.org.uk/ http://www.entrust.org.uk/about/about_us.asp

DEMAND	The Renewables Obligation (Scotland) Order 2002	The key policy mechanism by which the Scottish Executive is encouraging the growth necessary to reach Scotland's renewable energy targets. It requires all licensed electricity suppliers in Scotland to supply a specific proportion of their electricity from renewables, and provides a number of paths to compliance. Individual suppliers are responsible for demonstrating that compliance to Ofgem through a system of Scottish Renewables Obligation Certificates (SROCs)	The RO runs from 01/04/2002 to 31/03/27	The RO is a requirement on all licensed electricity suppliers. The Obligation is enforced by an order (Scottish Statutory Instrument 2002/163). Compliance is monitored by Ofgem	http://www.scotland-legislation.hmso.gov.uk/legislation/scotland/ssi/2002/20020163.htm http://www.esu.strath.ac.uk/EandEW/eb_sites/01-02/RE_info/ros.htm
The Renewables Obligation (Scotland) Order 2004	To provide more stimulus for energy crop development and to make ROCs available to a wider range of smaller generators whilst maintaining investor confidence in renewables. Amendments to encourage uptake of energy crops are to extend the time for which co-firing is eligible for ROCs from 2011 to 2016, to allow co-firing of any biomass up to 2009, to increase the proportion of biomass that must come from energy crops by stages between 2009 and 2016, and to reduce by stages the amount of ROCs an individual supplier can produce from co-firing. Amendments to allow small generators to participate are to allow annual reporting of renewable electricity supplied, where monthly output is less than 0.5MWh.	The RO runs from 01/04/2004 to 31/03/27	Electricity suppliers in Scotland, particularly those involved in co-firing and small generators. Producers and suppliers of energy crops.	http://www.hmso.gov.uk/legislation/scotland/ssi/2004/20040170.htm	
Climate Change Levy (CCL) exemption for renewable electricity	To encourage generation and consumption of electricity that produces lower levels of carbon emissions.	Part of the climate change levy programme. Started 01/04/2001, ongoing.	Renewable energy generators and suppliers. Users of electricity in Industry, Commerce, Agriculture, Public administration, and the service sector.	http://www.hmce.gov.uk/forms/notices/ccl1-4.htm	
Loan Action Scotland	Loan Action Scotland is funded by the Scottish Executive through the Scottish Energy Efficiency Office in support of Action Energy. Loans may be advanced against a whole range of energy saving measures to enable companies to take action to reduce their energy bills. It is primarily an energy efficiency scheme, but it may be worth discussing whether biomass heating equipment would be eligible.	The scheme provides interest free loans of £5,000 to £50,000. The loans can have a repayment period of up to five years	The loans are available to companies based in Scotland, with up to 250 employees. Companies must be able to demonstrate that the actions proposed will deliver the energy efficiency benefits claimed.	http://www.energy-efficiency.org/howto/help/loan/index.html	
SPUR	SPUR grants assist SMEs to develop new products and processes involving a significant technological advance for the UK industry or sector concerned, up to pre-production prototype stage. It is not directed specifically at bio fuels, but is suggested as a possible route to funding for SMEs who are looking for single company funding.	A fixed grant level of 35% of eligible costs, up to a maximum grant of £150,000 may be offered to projects of between 6 months and 3 years in duration, which involve eligible projects costs of at least £75,000.	Awards can be made to independent businesses and groups with less than 250 employees.	http://www.scotland.gov.uk/about/ELL/D/BG/00016879/innovationpolicy.asp	

<p>Enhanced capital allowances (ECA) Scheme</p>	<p>To encourage businesses to invest in low carbon technologies, and so reduce UK carbon emissions. Biomass boilers are included in the energy saving plant and machinery.</p>	<p>The ECA scheme is an integral part of the Climate Change Levy Programme, and was introduced by the Finance Act of 2001. Sponsoring organisations are the Treasury, DEFRA and The Carbon Trust. It started on 01/04/2001, ongoing. Enhanced Capital Allowances (ECAs) enable a business to claim 100% first-year capital allowances on their spending on qualifying plant and machinery.</p>	<p>All businesses in the charge to UK tax, regardless of size, industrial or commercial sector or location</p>	<p>http://www.eca.gov.uk/</p>
<p>INFRASTRUCTURE</p>				
<p>Bio-energy Infrastructure Scheme</p>	<p>To develop the supply chain required to harvest, store, process and supply biomass to energy end users. Grants will be available to establish producer groups for eligible biomass (currently SRC, miscanthus and other energy grasses, forestry wood fuel and straw). Eligible costs include administrative costs of setting up the group, training and hire/ purchase of specialist equipment and storage space.</p>	<p>DEFRA is currently seeking EC approval for the scheme. Estimated start date is Autumn 2004. A total of £3.5m is available. There will be a maximum grant ceiling of £200,000 per producer group or business. Different % grants will be available for different aspects of the scheme. Set up about 80%, capital about 40%, training about 25%</p>	<p>Farmers, foresters and businesses in the UK looking to supply eligible biomass.</p>	<p>http://www.defra.gov.uk/farm/acu/energy/infrastructure.htm</p>
<p>PROMOTION</p>				
<p>DTI Technology Programme: Knowledge Transfer Networks</p>	<p>The objective is to improve the UKs innovation performance by increasing the depth, breadth and speed of transfer of information into UK businesses. Networks will be focussed on the Technology programme priority areas, which include biofuels.</p>	<p>Calls will be through the Technology Programme. No information on the funds allocated to KTN is yet available.</p>	<p>UK organisations, and ideally including international participants.</p>	<p>http://www.dti.gov.uk/ktn/</p>
<p>Environment Funding Handbook</p>	<p>A summary guide to sources, procedures and practices of environmental project funding. Aims to increase engagement in issues of local governance through projects leading to environmental enhancement and sustainable development at the local level.</p>	<p>Summarises range of funding sources, not specifically for biomass, but for environmental and sustainable development.</p>	<p>Summary details for each scheme available.</p>	<p>www.eurpoa.eu.int/comm/environment/funding/handbook_2004.pdf</p>
<p>IEA Bioenergy Agreement</p>	<p>To accelerate the use of environmentally sound, sustainable and cost competitive bioenergy technologies, thereby contributing substantially to future energy demands. To achieve this by encouraging co-operation and information exchange between countries that have national programmes in bioenergy research, development and deployment. There are currently 12 tasks open under the agreement covering all aspects of biofuel production and utilisation. The UK is a member of all but one.</p>	<p>Ongoing. Most current tasks are running until 2006. Governments of participating countries contribute to the Agreement. Individual organisations party to specific tasks provide staff and facilities for tasks.</p>	<p>A range of organisations represent countries on the various tasks. IEA Bioenergy is particularly interested in involving more industrial organisations.</p>	<p>http://www.ieabioenergy.com/ourwork.php</p>

<p>COMBINATION</p> <p>DTI Technology Programme: New and Renewable Energy CR&D</p>	<p>The Programme aims to improve the competitiveness of both renewable energy and the UK industry and to further understand the prospects for renewable energy. It is focused on high quality, innovative industrial R&D projects. The Biofuels sub programme covers all aspects of production of biofuels from both purpose-grown crops and agricultural residues. It also supports projects on novel conversion technologies to produce electricity, heat and transport fuels.</p>	<p>Currently £18million/year from the DTI. Projects must be collaborative, with an industry-industry or industry-academic partnership. Each project must have matching funds from an industrial sponsor. Levels of matching funding required vary from 25% to 65% depending on the types of research and status of the proposing company. The Programme started in 1973 and is ongoing. There is a call for proposals twice a year. Companies should send in an outline proposal against the specifications set out in the call documentation.</p>	<p>UK companies</p>	<p>http://www.dti.gov.uk/energy/renewables/support/research_development.shtml</p>
<p>Agri Industrial Materials (AIMS) Programme</p>	<p>The Department for Environment, Food and Rural Affairs (DEFRA) funds scientific research to support the making and implementation of DEFRA policy. The aim of projects funded under the AIMS Programme is the improvement and management of bioenergy crops to contribute to sustainable development and greenhouse gas reduction. Research is targeted at biomass crop improvement, in particular by improving yield and disease resistance by crop breeding.</p>	<p>The Programme is ongoing. £1.9 million in ad hoc tender calls and non-competitive commissioned research will be 100% funded from DEFRA. Projects accepted for the Sustainable Arable LINK Programme, managed by DEFRA, require a minimum 50% industry funding.</p>	<p>Universities, public and private R&D institutions</p>	<p>http://aims.defra.gov.uk/default.asp</p>
<p>Bio-energy Capital Grants scheme.</p>	<p>This scheme aims to provide investment support for biomass schemes that find it difficult to compete in the Renewables Obligation because of the high costs of the feedstock and the lack of maturity of the industry in the UK. It is particularly geared towards energy crops schemes. Support is also available for CHP and heating schemes.</p>	<p>The scheme is a joint initiative funded by DTI and NOF (New Opportunities Fund), with input from DEFRA. The scheme opened in April 02 and ends in 2005. It is currently closed to further applications. Grants of approximately 30% of investment costs for biomass electricity and heat schemes. Total budget £66 million. £5 million set aside for heat, balance for electricity.</p>	<p>Industry throughout the UK.</p>	<p>http://www.dti.gov.uk/energy/renewables/support/capital_grants.shtml</p>

<p>Sustainable Power Generation and Supply (Supergen)</p>	<p>SUPERGEN is part of the EPSRC Infrastructure and Environment Programme. This programme aims to contribute to UK environmental emissions targets through a radical improvement in the sustainability of power generation and supply. SUPERGEN is a Programme of basic research. Biomass, biofuels and energy crop utilisation is one of four themes for the first phase of this Programme. Within this theme the potential for power generation systems utilising energy crops and agricultural crops will be examined, and the research is striving for a carbon neutral cycle.</p>	<p>£25m for SUPERGEN over 5 years, starting September 01. £3million over 4 years from research councils for biofuels project. 35%-50% funding for each project is expected to be contributed by industrial partners. The Carbon Trust, through its Carbon Vision Programme, is contributing an additional £4-6million to SUPERGEN to expand activities in areas in line with their low carbon technology priorities.</p>	<p>Only UK Universities, public research Institutes and not for profit research organisations can apply for EPSRC funding. Each project must form a Research Consortium, including both universities and industry.</p>	<p>http://www.epsrc.ac.uk/WebSite/default.aspx?CID=9179&ZoneID=3&MenuID=1615 http://www.supergen-bioenergy.net/</p>
<p>Bio-energy Capital Grants scheme.</p>	<p>This scheme aims to provide investment support for biomass schemes that find it difficult to compete in the Renewables Obligation because of the high costs of the feedstock and the lack of maturity of the industry in the UK. It is particularly geared towards energy crops schemes. Support is also available for CHP and heating schemes.</p>	<p>The scheme is a joint initiative funded by DTI and NOF (New Opportunities Fund), with input from DEFRA. The scheme opened in April 02 and ends in 2005. It is currently closed to further applications. Grants of approximately 30% of investment costs for biomass electricity and heat schemes. Total budget £66 million. £5 million set aside for heat, balance for electricity.</p>	<p>Industry throughout the UK.</p>	<p>http://www.dti.gov.uk/energy/renewables/support/capital_grants.shtml</p>
<p>Develop Low carbon Technologies</p>	<p>Support of RD&D projects is one thread of the Carbon Trust Programme to Develop Low Carbon Technologies. The aim is to support the Trust's goals to reduce GHG emissions and move to a low carbon economy. The trust wants to support ground-breaking projects that demonstrate a potential to reduce greenhouse gas emissions. Projects must show genuine innovation, a clear need or demand for the outputs of the project and benefits to the UK. The Trust has published a 'Low Carbon Technology Assessment' which gives guidance on their priority areas for research. Biomass for local heat and electricity are in their priority areas.</p>	<p>Started in May 02, and ongoing. Several calls per year. Details of calls and procedures on carbon trust website. £6.6million spent on RDD projects in 2003. All projects are expected to have industry contribution. Industry contributed £18.6million to these projects in 2003. Individual projects can receive from £20-£250k funding.</p>	<p>Any UK organisations, e.g. research establishments, SMEs, local authorities and public sector bodies.</p>	<p>http://www.thecarbontrust.co.uk/carbontrust/low_carbon_tech/dlct2_1.html</p>

<p>Scottish Community and Householder Renewables Initiative (SCHRI)</p>	<p>SCHRI is sponsored by the Scottish Executive, and managed jointly by EST and HIE. Its aim is to assist the development of new community and household renewable schemes in Scotland. The SCHRI is a one-stop shop that offers help to community groups at every stage of developing renewable energy projects. 10 development officers provide local advice and support throughout Scotland</p>	<p>100% grants of up to £10k are available for scoping/ feasibility studies. Grants of up to £100k are available for capital projects; here matching funding is highly desirable though not always essential. A total budget of £3.7 million is available over 3 years. The scheme started in Jan 03 and runs for 3 years.</p>	<p>Community groups and householders in Scotland.</p>	<p>Energy Saving Trust - Scottish Community and Householder Renewables Initiative</p>
<p>Farm Business Development Scheme</p>	<p>This is an innovative business development scheme sponsored by the Scottish Executive. It aims to increase quality of life and prosperity in rural Scotland by providing grant assistance for farming families wishing to diversify either within or outside agriculture. Diversification areas relevant to biomass are Alternative Agricultural Production, Retailing of processed products and processing of forest products.</p>	<p>A maximum of 50% funding is available. It is a discretionary and competitive scheme, with a maximum grant of £25k for each eligible business. The scheme started in July 2001, and is ongoing.</p>	<p>Farming families in Scotland.</p>	<p>http://www.sled.org.uk/ruralsup.htm</p>
<p>SMART Scotland</p>	<p>SMART:SCOTLAND is intended to help small businesses to improve their competitiveness by developing new, highly innovative and commercially viable products or processes to the benefit of the national economy. It is not directed specifically at biofuels, but is suggested as a possible route to funding for SMEs who are looking for single company funding.</p>	<p>Successful applicants receive funding of 75% of the cost of carrying out a technical and commercial feasibility study lasting between 6 and 18 months. The maximum award is £50,000. Winners who successfully complete their projects and who require further assistance to develop a pre-production prototype can get further support through the SPUR programme.</p>	<p>It is a competition open to individuals planning to start a new business and to existing small independent firms and groups with less than 50 employees. Entries may be submitted at any time, with judging taking place 3 times per year.</p>	<p>http://www.scotland.gov.uk/about/ELL/D/BGI/00016879/Innovationgrants.aspx</p>
<p>Woodfuel development programme</p>	<p>Set up by the Highlands and Islands Wood Fuel Group using funds from SCHRI. The Programme is run in partnership with the Forestry Commission. The Programme aims to provide help, advice and funding to develop 6 local 'clusters' of wood fuel suppliers and users.</p>	<p>The Programme has funds for equipment from the European Regional Development Fund, which is in some areas augmented with regional development funding. The £216900 from ERDF requires 50% match funding.</p>	<p>Small and medium sized businesses in 6 areas of the Highlands and Islands.</p>	<p>www.fc.gov.scotland/Wfuelnet.pdf www.hie.co.uk/ale/wood-fuel.html</p>
<p>Rural Development Forestry</p>	<p>A survey has been done of examples in the UK of local community groups who are involved in the management of local forestry/ woodland, and who are benefiting from the resource. The majority of the groups (33) were found in Scotland. To date, none of these has set up biomass schemes, but these would be a good group to target with information on biomass schemes/ discuss the feasibility of schemes.</p>	<p>Many sources of funding have been used for the projects to date. One of the recommendations is that funding should be available to set up such groups, and that subsequent funding opportunities for groups increased. In particular advice and access to funds should be made simpler.</p>		<p>http://www.forestry.gov.uk/forestry/HC0U-4U4J96</p>

<p>Community Energy Programme</p>	<p>The programme aims to deliver a sustainable market in community heating. This programme offers information, advice and grant funding to support the installation of new community heating schemes, or to refurbish or expand existing schemes. The heat can be supplied from CHP, boilers using conventional or renewable fuels (including wood) or from waste heat from industrial processes.</p> <p>The Sixth Framework Programme (FP6) is the Union's main instrument for the funding of research and technological development (RTD) in Europe. Support for energy research and demonstration is provided under a sub-programme called "Sustainable energy systems", which has five priority areas:</p> <ul style="list-style-type: none"> • Technological development and integration of renewable energy sources in the energy system, including storage, distribution and use. This includes applications for the production of heat and/or electricity from biomass, biofuels and waste derived fuels. • Energy savings and energy efficiency. • Development of alternative motor fuels. • Development of fuel cells and their application, in particular for transport and hydrogen storage. • Reduced use and clean burning of fossil fuels, especially coal. <p>The SES programme is implemented in two parts:</p> <ul style="list-style-type: none"> • Activities having an impact in the short and medium term. The focus here is on integrated demonstration-type actions with a typical research component of up to about 20% and including, where appropriate, pre-normative research, energy technology integration, dissemination and technology transfer activities. The risks to be addressed are mainly technological and might include market related and financial issues. Projects funded under this part of the programme are managed by DG Energy and Transport. • Activities having an impact in the medium and longer term. The focus here is on research and development activities (including pre-normative and socio-economic research and the validation of technical and economic feasibility in pilot plants and prototypes), research-related networking activities, training and dissemination activities. The 	<p>The programme is funded by DEFRA and jointly managed by the Energy Saving Trust and the Carbon Trust. It started in 2002 and the last call for proposals is Jan 2005. £50m is available in the programme, with £48m for capital grants and the remainder for development support.</p> <p>The overall FP6 budget covering the four-year period 2003 - 2006 is EUR 17.5 billion, making up 3.9% of the Union's total budget (2001).</p> <p>The Sustainable energy systems (SES) sub-programme has a budget of EUR 810 million. There are no national quotas for FP6 funds.</p> <p>There is a range of funding "instruments" available under SES, each with its own requirements and rules. In general FP6 is looking for large, highly collaborative projects involving organisations from across the EU and Accession states. Research activities are generally supported at up to 50% of costs (100% of "additional" costs for universities) and 35% for the demonstration elements of projects.</p> <p>A call for proposals for short and medium term actions was issued in June 2004 and a call for medium and longer term actions is expected in September 2004, both closing in December 2004 (budget EUR 132M). A final set of calls on a similar timetable is planned for 2005 (budget EUR 123M).</p> <p>It is crucial for proposers to consult the detail of each call to assess the eligibility of their idea and it is suggested that proposers make full use of the help facilities available prior to preparing a proposal.</p>	<p>UK Public sector customers are eligible. Private sector customers can be served by a scheme where the main customer is public sector.</p> <p>FP6 is open to all legal entities such as industrial companies, universities, end-users and SMEs. Projects need a multi-national partnership involving a minimum of 3 eligible countries (for example Member States, Accession Countries, and Associated States). There may be particular requirements on the number of Member States or Accession Countries to be involved, for example a minimum</p>	<p>http://www.est.org.uk/communityenergy/aboutenergy/</p> <p>The UK's Helpline for the FP6 Sustainable energy systems Programme can provide advice on all aspects of the programme and publishes a regular newsletter: Tel: 0161-874-3636 Fax: 0161-874-3644 Email: energie@enviros.com http://www.dti.gov.uk/ent/energie/</p> <p>The Commission's main Web site for FP6 is at: http://europa.eu.int/comm/research/fp6/index_en.html and the home page for SES is at: http://www.cordis.lu/sustdev/energy/home.html</p> <p>The DG TREN Web site for FP6 is: http://europa.eu.int/comm/dgs/energy_transport/td6/index_en.htm</p>
<p>EU 6th RTD Framework Programme</p>				

<p>EU Intelligent Energy Europe Programme (EIE)</p>	<p><i>main risks to be addressed are scientific and technological rather than market and financial. Projects funded under this part of the programme are managed by DG Research.</i></p> <p>EIE is the Community's support programme for non-technological actions in the field of energy efficiency (EE) and renewable energy (RE) sources. The EIE programme differs from FP6 as it addresses the "soft" barriers to energy policy and implementation, moving on from R&D activities to address the barriers to market uptake of new technologies. A key aspect of the programme is integration: integration of RUE and RES (support for combined promotion of demand management and supply from renewables wherever possible), integration of different actors, different instruments and different legislation. In contrast to FP6 the EIE programme will not support costs related to investments in technologies. The programme will support promotional activities in the very broad sense with an emphasis on removing market barriers to the increased use of energy efficiency and renewable energy sources. The implementation of the EIE programme is based around a Global Work Programme 2003-2006 which outlines the programme's priorities ("key actions"), the administrative and financial arrangements, evaluation procedure and indicative planning of the Calls for the whole programme duration until 2006. The Annual Work Programme 2003 outlines the priorities for the Call for Proposals 2003 and the Call for Tenders 2003 and the financial resources available. The programme has four fields: SAVE: Improvement of energy efficiency and rational use of energy, particularly in the building and industry sectors. ALTENER: Promotion of new and renewable energy sources for production of electricity and heat and their integration into the local environment and energy systems. STEER: Support for initiatives relating to all energy aspects of transport. COOPENER: Support for initiatives relating to the promotion of RE sources and EE in developing countries. There are also a number of "horizontal key actions" supported under EIE, including support for setting up local and regional energy management agencies.</p>	<p>The overall budget of the programme is EUR 200M, with an indicative allocation between the fields of EUR 70M for SAVE, EUR 80M for ALTENER, EUR 33M for STEER and EUR 18M for COOPENER. It is intended to launch at least three calls for proposals in 2003, 2004 and 2005.</p> <p>The first Call for Proposals was launched in December 2003 and closed in April 2004. It is expected to fund about 80 projects from a budget of EUR 42M.</p> <p>Community funding is offered as co-financing, generally up to a maximum of 50% of the eligible costs. It is crucial for proposers to consult the detail of each call to assess the eligibility of their idea and it is suggested that proposers make full use of the help facilities available prior to preparing a proposal.</p>	<p>The December 2003 call for proposals was open to (public or private) legal persons from EU Member States, from countries of the European Economic Area (EEA) and those candidate countries and accession countries which signed a Memorandum of Understanding for 2003 (Bulgaria).</p>	<p>The UK's Helpline for EIE is the same as for FP6: Tel: 0161-874-3636 Fax: 0161-874-3644 Email: energate@enviros.com http://www.dfi.gov.uk/ent/energie/</p> <p>The DG TREN Web site for EIE is: http://europa.eu.int/comm/energy/intel/igent/index_en.html</p> <p>The Commission's Web site for energy agencies is at: http://www.managenergy.net/</p> <p>To receive news regarding the EIE programme you can send an email with "news" as subject to: tren-intelligentenergy@cec.eu.int</p>
<p>EU LIFE Programme</p>	<p>LIFE, the Financial Instrument for the Environment, introduced in 1992, is one of the spearheads of the European Union's environmental policy. It co-finances projects in three areas: Nature, Environment and Third Countries. Although the programme is not targeted specifically at energy, the close relationship between the two areas makes it worth looking at.</p>	<p>The European Union has allocated approximately EUR 300 million for LIFE-Environment for the period 2000-2004. The rate of Community co-financing can be up to 30% for projects generating substantial net revenue, 50% in other cases. The financial contribution rarely exceeds EUR 1M.</p>	<p>LIFE is open to all EU countries, some candidate countries (to date Romania) and some third countries bordering the south of the Mediterranean and the Baltic Sea.</p>	<p>The Commission's LIFE Web site is at: http://europa.eu.int/comm/environment/life/home.htm</p> <p>Enquiries for LIFE Environment in the UK should be initially directed to:</p>

<p>Support for SMEs (small and medium enterprises)</p>	<p>LIFE-Environment actions aim to implement the Community policy and legislation on the environment in the European Union and candidate countries. This approach enables demonstration and development of new methods for the protection and the enhancement of the environment. The specific objective of LIFE-Environment is to contribute to the development of innovative techniques and methods by co-financing demonstration projects.</p> <p>The LIFE Regulation defines five areas eligible for funding:</p> <ul style="list-style-type: none"> • land-use development and planning; • water management; • reduction of the environmental impact of economic activities; • waste management; • reduction of the environmental impact of products through an integrated product policy. <p>SMEs provide two thirds of EU employment and business turnover and are very active in the renewable energy sector. However it is often difficult for SMEs to exploit their innovative potential because of lack of resources, capital or contacts outside their region or country. Whilst the EU's programmes encourage the participation of SMEs, it is often difficult for SMEs to meet all of the criteria necessary to be successful. To address this situation the EU has developed a wide range of initiatives aimed specifically at the needs of SMEs.</p>	<p>The LIFE programme funds innovative projects that are scaling up from laboratory or pilot scale, but does not fund major investment projects.</p> <p>Calls for proposals take place on an annual basis and UK proposals are submitted through DEFRA. The most recent call requires final proposals to be submitted to DEFRA by the end of September 2004.</p> <p>The current LIFE III programme is scheduled to expire on 31 December 2004 but the European Commission has proposed an extension through the close of 2006. The Commission proposes allocating EUR 317 million to cover the period from 1 January 2005 to 31 December 2006. Although the Regulation for the extension of LIFE III has not yet been formally adopted by the Council, the Commission has nevertheless decided to publish all the necessary information to allow potential applicants to begin preparing their applications.</p> <p>There are many varied funding opportunities available to SMEs so it is difficult to provide an accurate overall figure. The SME Programme for Enterprise and Entrepreneurship has a budget of EUR 450 million (2001-2005). Useful overviews of SME initiatives can be seen at: http://europa.eu.int/comm/enterprise/entrepreneurship/sme_en.pdf and http://www.sbs.gov.uk/default.php?page=eufunding/default.php</p>	<p>A SME is a small to medium-sized enterprise with fewer than 250 full-time equivalent employees and either an annual turnover of up to EUR 40 million or an annual balance sheet of up to EUR 27 million and is not more than 25% owned by one or more non-SMEs.</p>	<p>Department of Environment, Food and Rural Affairs (DEFRA) Europe Environment Division Mr. Robbie Craig Zone 5/H15 - Ashdown House, 123, Victoria Street UK - London SW1E 6DE Tel: +44 20 7082 8562 Fax: +44 20 7944 3089 E-mail: Robbie.Craig@defra.gsi.gov.uk</p> <p>The UK's LIFE Web site is: http://www.defra.gov.uk/environment/life/index.htm</p>
<p>European Investment Bank</p>	<p>The European Investment Bank (EIB), the financing institution of the European Union, was created by the Treaty of Rome. The members of the EIB are the Member States of the European Union, who have all subscribed to the Bank's capital. The task of the European Investment Bank is to contribute towards the integration, balanced development and economic and social cohesion of</p>	<p>EIB lending for projects that contribute towards safeguarding the environment and improving the quality of life, both within and outside the European Union, totalled some EUR 9 billion in 2001.</p> <p>Within the European Union, in addition to the EUR 6 billion made available in the form of individual loans (i.e. around 30% of overall individual lending within the EU), an estimated</p>	<p>EIB's clients are public and private sector bodies and enterprises. As a rule, the Bank normally only lends up to half of the capital required for a project. The Bank usually finances larger scale projects directly. It supports small investments, e.g. between EUR 40,000 to EUR 25 million, and the activities of SME's indirectly</p>	<p>Information for SMEs in Scotland can be obtained from the two European Information Centres based in Glasgow (Tel. 0141 228 2797) and Inverness (Tel. 01463 702560 / 715400). Their Web sites are, respectively http://www.scottish-enterprise.com/euroinfocentre and http://www.euro-info.co.uk/</p> <p>Visit the EIB Web site at: http://www.eib.org</p> <p>The EIB publishes a wide range of brochures aimed at both professionals and the general public. An EIB factsheet for the UK is available from: http://www.eib.org/Attachments/country/uk_en.pdf</p>

	<p>development and economic and social cohesion of the Member Countries. To this end, it raises on the markets substantial volumes of funds which it directs on the most favourable terms towards financing capital projects according with the objectives of the Union.</p> <p>The EIB offers various financing facilities to support projects, depending on eligibility and project category. The EIB attaches special importance to the appraisal of projects. The Project list discloses new projects which have reached an advanced stage in the discussions on possible EIB involvement. The complete list of signed contracts is published under the Loans activity section. Ex-post evaluation provides information on the Bank's self evaluation process.</p>	<p>EUR 2 billion was allocated, under global loans, for smaller-scale public environmental projects.</p> <p>In 2001 loans were advanced for both energy saving projects (EUR 790 million) and energy substitution projects (EUR 723 million).</p>	<p>through its global loans.</p> <p>A Global Loan is a structure under which a domestic partner bank receives a credit line together with a mandate to apply the credits to EIB eligible projects.</p>	<p>In 2002 the EIB produced a paper outlining its support to renewable energy investment, the constraints faced by the Bank, its objectives and strategy for the future, and the EU policy context: http://www.eib.org/Attachments/strategies/renewenergy_en.pdf</p>
<p>EU Structural Funds</p>	<p>The EU's Structural Funds are designed to provide financial support to the EU's less prosperous regions and social groups. Representing one third of the EU's total budget, they are made up of a number of separate Funds and targeted at clearly defined priorities (known as Objectives). The funds are disbursed through multi-annual programmes managed at the regional and national level, based on strategies drawn up in partnership between the regions, Member States and the European Commission. In addition to the "Objective Programmes" funds are disbursed through a set of "Community Initiatives" with specific objectives.</p> <p>The current tranche of funding covers the period 2000 to 2006; the situation beyond 2006 is under discussion. During the current period all areas of Scotland are eligible for at least some of the available funds; the Highlands and Islands are also covered by a Special Transitional Programme following their loss of Objective 1 status.</p> <p>Two schemes to streamline the application of regional funding in Member States following enlargement of the EU are currently under discussion: LASA (Lesser Amounts of State Aid) and LET (Limited Effects on Trade).</p> <p>Detailed opportunities at a regional level should be explored by approaching those responsible for managing the funds. There are many sources of advice that can also be consulted.</p>	<p>During the current "programming period" (2000-2006) the Structural Funds account for EUR 213 billion (one third of EU's total budget). Of this, over £1.6 billion are earmarked for use in Scotland, requiring more than matched funding from the public and private sectors.</p> <p>The disbursement of Structural Funds are governed by strategic priorities set at a regional level; in some cases these make specific mention of support for exploitation of renewable energy sources.</p> <p>There are opportunities for biomass projects under many of the Objectives and Initiatives, though these will not necessarily be specifically earmarked for energy projects. The scale of projects supported varies enormously and projects may be eligible for a grant of up to 50%.</p>	<p>In most cases, applications for finance from the Structural Funds must be submitted by recognised organisations which are supported by a public body. Eligible bodies include the Public sector, Local Authorities, the Voluntary Sector, Registered Charities, Community Groups, Training Organisations, Education Establishments and the Private Sector (subject to special conditions).</p>	<p>Structural Funds in Scotland are the responsibility of the Scottish Executive. The Structural Funds Web site can be found at: http://www.scotland.gov.uk/about/FC/SD/ESF/00017404/page733495496_a_sdx</p> <p>PMEs (Programme Management Executives) operate regionally working in delivery partnership with local organisations: East of Scotland European Partnership (www.esep.co.uk/) Highlands & Islands Partnership Programme (www.hipp.org.uk/) South of Scotland European Partnership (www.sosep.org/) Strathclyde European Partnership (www.wsep.co.uk/)</p> <p>The HIE Web site has many useful links to other sources of information in this area: http://www.hie.co.uk/EU-funding.html</p>

BIOMASS ENERGY- THE CASE FOR GOVERNMENT SUPPORT

Biomass Research Report Summary:

Financing the Development of a Biomass Energy Industry in Scotland

Research Studies undertaken by Future Energy Solutions and Avayl Engineering

Introduction

1. The Scottish Executive commissioned Future Energy Solutions (FES) to conduct a study into the nature and scale of the financial/fiscal challenge to be overcome if biomass is to become a commercially viable energy source in Scotland, and to suggest measures which could help achieve this.
2. FES produced a final draft of the report in September 2004. The full report and appendices will be published on the Scottish Executive website. This summary note sets out the key findings and recommendations.

Objectives

3. The study investigated the following objectives:
 - The potential employment benefits from the development of biomass plant in Scotland.
 - The financial support schemes for biomass projects currently available at Scotland, UK and EU level.
 - The views of key stakeholders to determine if there is a need for a capital grant based support scheme and, if so, the form that that support should take.
 - The justification, components and operational requirements for such a scheme.

Recommendations for Scottish Biomass Capital Grant Schemes

4. The study concluded that a new capital grant scheme was both required and justifiable. While the main priority should be to fund energy conversion plant, it also recommended that it would be worthwhile considering support for other links in the supply chain such as for wood processing equipment.
5. Specific recommendations were as follows:
 - Market intervention for supporting good quality biomass Combined Heat and Power (CHP) is justified on environmental and social grounds. Market failures can occur for various reasons, but they all result in the same outcome: price does not reflect the "true" cost. In the electricity market the price of a unit of generation from a coal or gas plant does not reflect all the costs of production, as the damage to the environment from emissions is not reflected in the price, and currently there are no existing funding schemes for biomass CHP to offset the favourable economics of fossil fuel technologies. Furthermore this is the most environmentally beneficially option (supported by the Royal Commission on Environmental Pollution). Full CHP process optimisation should be prioritised.

- There is also a case for supporting larger heat-only projects on the grounds that this would help in developing credible fuel supply infrastructures.
- There is also a strong case for supporting 'infrastructure for biomass energy projects' e.g. chippers, dryers, harvesters, pellet production facility, on the grounds that the sector is currently poorly developed.
- The case for supporting merchant power generation is less persuasive because schemes already exist that provide support for this sector. This option is assigned a lower priority status.
- State Aids clearance will need to be secured if the decision is taken to proceed.
- A two-stage application process is recommended, with initial funding targeted at 'feasibility studies', as a way of increasing the chances of successful plant development and operation.
- Performance data from supported projects should be collected to develop a set of 'good performance benchmark data' for supporting future financing applications.
- Extensive promotion of the scheme will be required to promote awareness and raise the profile of biomass developments generally.

Existing Financial Support Schemes

6. Despite the plethora of financial schemes (or information sources) that could be potentially available to support firms' already active, or wishing to becoming active, in the biomass field most of these are aimed at encouraging innovative advances in technology whereas the present need is for a scheme to underwrite the initial capital investment costs of already proven biomass technology, thereby stimulating commercial scale development. The report reviews 32 funding schemes at UK and EU level categorised according to: supply, demand, infrastructure, promotion or any combination.
7. Information is provided which:
 - Briefly describes each scheme
 - Indicates the total amount of funding available
 - Indicates if the scheme is currently open to bids
 - Indicates the level of funding available for individual projects
 - Outlines eligibility criteria
 - Details how to apply
 - Provides website links

Justification for New Capital Grants Schemes

8. The study considered the existing support available to ensure any proposed scheme did not duplicate current efforts to assist market development. In addition, a workshop was held during the study to bring together a wide range of stakeholder interests in biomass. Following the culmination of these activities, it was concluded that despite concerted efforts, the biomass market is not fully commercial and merits intervention to try and catalyse activity and develop the sector.

Draft Blueprint for Capital Grant Schemes

9. The report presents a table summarising the stages involved in establishing a grant aid scheme. Further work would be required to ensure compatibility with State Aids Procurement regulations. In terms of scheme assessment, it is recommended that the focus should be on quantifying the benefits; assessing the best value to the Executive and in particular in assessing the credibility of the proposer to deliver successful projects.

Employment and Environmental Impacts

10. To augment information contained within the FES report, the Scottish Executive commissioned Ayayl Engineering in November 2004 to focus on potential employment impacts of biomass. Permanent employment opportunities are associated with the fuel supply chain and transportation, and these are similar irrespective of the form of the biomass plant. A summary of the employment prospects and carbon dioxide displacement is shown in the tables below.

Employment Impacts

11. To calculate employment impacts, assumptions were made in relation to the potential additional generation capacity the data from which was mainly derived from the DTI Gap analysis upper case for Scotland, namely based on
- a 40% Scottish Renewables target
 - a mixed renewable technology scenario (referred to as Example 2 in Gap Analysis) as opposed to a high wind scenario (Example 1)
 - on current demand levels (21 TWh)
12. Based on this additional generation capacity modelled by 2020 is 691MWe² (out of a total of 4,869MWe required for Scotland) split as follows;

Domestic boilers	8MW
Industrial & Commercial Heating	40MW
Co-firing	70MW ³
CHP 2MW - 10MW and Merchant power plant	573MW ⁴
Total	691MW

² This compares to 1334MW of Marine capacity estimated in the Gap Analysis for the same case.

³ FES report suggests 60MW to 100MW range

⁴ As per Gap Analysis – Biomass & Advanced Biomass totals

13. The total job years, average jobs, jobs/MW and peak jobs are estimated to 2020 split as follows;

Category	Job Years	Average Jobs	Job Years/MW	Peak Jobs (around 2018)
Domestic boilers	146	9	18.2	12
Industrial & Commercial Heating	677	40	16.9	65
Co-firing	1584	93	22.6	131
CHP 2MW - 10MW and Merchant power plant	14979	881	26.1	2,214
Total	17,386	1,023	25.2	2,421 (fte)

14. The above figures include direct, indirect, induced and export jobs involved in development, construction, manufacturing, operations and fuel supply. In general, manufacturing is assumed to have a UK content of circa 60%.

15. It should be noted that the above estimates of generation capacity and employment relate only to the use of wood fuel and do not take into account the potential of energy crops. They are therefore conservative estimates of the potential of the biomass sector.

Carbon Dioxide Displacement

Option	CO ₂ Displacement	Fossil CO ₂ Emitted
CHP heat	260g CO ₂ /kWh (replaces oil heating)	
CHP electricity	540g CO ₂ /kWh (replaces generating mix)	65g CO ₂ /kWh
Industrial heating	260g CO ₂ /kWh (replaces oil heating)	
Merchant Power	540g CO ₂ /kWh (replaces generating mix)	65g CO ₂ /kWh
Co-firing	1016g CO ₂ /kWh (replaces coal)	65g CO ₂ /kWh
Domestic	260g CO ₂ /kWh	

