May 2011

Briefing

Friends of the Earth

Energy from biomass: Straw Man or Future Fuel?

Applications for biomass plants are increasing around the UK. Government incentive schemes are playing a part in this.

Friends of the Earth believes bio-energy has a role to play in bringing down greenhouse gas emissions, but only if it is done in a way that protects wildlife, people's livelihoods and guarantees emissions cuts. Each development must be looked at on an individual basis

This briefing is designed for anyone faced with an energy generating development using biomass as a fuel, in England Wales and Northern Ireland. The briefing will give you advice and information on whether to support or oppose a planned development.

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1. FRIENDS OF THE EARTH'S POSITION ON BIOMASS.

Friends of the Earth supports the use of locally sourced woody biomass/energy crops where this results in significant net reductions in carbon dioxide, while not impacting negatively on biodiversity, air, water and soil quality. There must be mandatory safeguards to ensure that only sustainable sourcing occurs or we will simply be swapping one environmental problem for another. The overall scale of the use of biomass in the UK should be kept to a sustainable level and must not outstrip domestically available biomass resources.

Friends of the Earth supports the following for generating energy from biomass:

- anaerobic digestion of food, sewage sludge and agricultural waste
- wood fuel from **sustainable** UK woodland management, including sawmill and arboricultural waste.
- local energy crops for local consumption
- cereal straw, providing sufficient proportions are ploughed back into the soil to avoid nutrient leaching
- focusing biomass use close to production, for district heating schemes and domestic heating, particularly off the gas network.
- available biomass should always be used in the most efficient way, which is generally to provide heat e.g. in industry or off grid
- biomass use for heat in processes and locations which cannot be electrified e.g. some industrialized processes, off the grid network. This would reduce reliance on coal and oil for generating heat.
- an integrated approach to energy planning that considers the most efficient use of any energy generated and seeks to manage future demand for energy

Friends of the Earth opposes:

- increased biomass imports – the use of biomass should be restricted to the amount that can be grown sustainably in the UK;
- any imports of wood fuel;
- the use of biomass in large scale thermal electricity generation. Higher efficiencies are achieved in generating heat rather than electricity.
- an over-reliance on biomass to generate electricity as this could undermine the development of more efficient electricity generating technologies such as windpower;
- the diversion of land away from food production to energy crop production. Food production must be at the heart of the UK's land use policy.

Friends of the Earth and BIOFUELS

This briefing is concerned with generating energy from *biomass* and not from *bio-fuels.* Friends of the Earth is generally opposed to generating energy from liquid *bio-fuels* from food crops, because without sufficiently rigorous legislation at UK and European Union level it is impossible to guarantee that crops being used to create bio-fuels are sourced or grown

sustainably. For more information on our position on energy from bio-fuels please see our briefing – http://www.foe.co.uk/resource/briefings/agrofuels_fuelling_or_fool.pdf.

Whilst these concerns about sustainability can also apply to certain types of *biomass* used for energy generation, the situation is more complex, depending on the size and fuel source of the development. We set out to examine some of these complexities in this briefing

2. WHAT IS BIOMASS?

Biomass is the (living or recently dead) biological material from which bio-energy is extracted. Biomass is often plant matter grown to produce heat or generate electricity. Examples include timber, miscanthus, straw wood chippings, and biodegradable waste.

Biomass used for heat and power typically falls into one of three categories:

a) Conventional Forestry Management
Biomass is sourced from the management of woodlands and forest. This includes thinning, felling, sawmill residues and parts of trees unsuitable for timber.

b) Dedicated energy crops and agricultural residues
Fast growing crops grown for heat and electricity generation are typically 'woody' perennials, such as miscanthus grass and willow, which can be grown on lower grade land unsuitable for food crops. The harvested crop is chopped, chipped, pelleted or baled and burnt directly in stoves, boilers or dedicated biomass power stations. Biomass can also be sourced from the residues of food crops, such as straw, husks and kernels.

c) Biodegradable wastes and residues
A wide range of biomass wastes and residues are used for undergoing anaerobic digestion treatment to produce biogas. These include sewage sludge, animal manure, chicken litter, waste wood from construction and food waste. [i] For more information on Friends of the Earth's position on bio-waste please see:
http://www.foe.co.uk/resource/briefings/biowaste_guide.pdf

3 HOW IS ENERGY GENERATED?[ii]

a) Electricity: plants designed primarily for the production of electricity are generally larger schemes, in the range of 10 to 40 Mega Watts electrical (MWe). Excess heat generated as part of the process is often not productively used.

b) Heat: plants designed for the production of heat cover a wide range of applications and sizes can range from a few kilowatts (domestic boilers) to above 5 Mega Watts thermal (MWth) (district heating schemes).

c) Combined Heat and Power (CHP): is a system of co-generation, the simultaneous production of more than one form of energy using a single fuel and facility. The primary

product of CHP plants (typically sized from 5 to 30MWth) is the generation of electricity, but the excess heat is used productively. This could be through providing heat for industrial processes or in a district heating scheme.[iii]

There are several ways of capturing the stored chemical energy in biomass:

d) Direct combustion

Direct combustion is a mature and reliable technology. It is used to heat space or water (domestic boilers or wood stoves) or to raise steam to drive a steam engine or turbine to generate electricity (mainly co-firing in coal power plants). The fuel is dry biomass including wood pellets, wood chips and energy crops. The equipment ranges from very small wood stoves used for domestic heating, to multi-megawatt plants for electricity production. State-of-the-art systems can achieve efficiencies greater than 90 per cent.
Applications include:
Domestic or single large buildings, such as schools and leisure centres.
District heating
Large scale power or CHP plants.

e) Anaerobic digestion

Anaerobic digestion (AD) is a readily available and proven technology. It involves the decomposition of organic materials. These can be solid or fluid biomass or waste streams, such as agricultural, household and industrial residues and sewage sludge. The decomposition occurs in the absence of air to produce biogas (which is high in methane content). The biogas is then burnt in a gas turbine, internal combustion engine or domestic boilers (through the gas grid) to produce heat and/or electricity.
Applications include:

- community district heating
- biogas cleaned and fed into the existing gas grid.

f) Pyrolysis

Pyrolysis is an emerging and relatively expensive technology. It involves heat treatment of the feedstock (solid biomass or waste) at very high temperatures, in the absence of oxygen. This is similar to traditional charcoal production. Pyrolysis produces a combustible gas or liquid (oil). The fuel produced is used to generate heat and/or electricity in an internal combustion engine or gas turbine. Total electrical efficiencies are approximately 20 per cent. The only application is commercial at a large scale (larger than 2 Mega Watts electrical - MWe).

g) Gasification

Similarly to pyrolysis, gasification is an emerging technology. Solid fuel (solid biomass) undergoes incomplete combustion in a limited air supply to produce a combustible gas – syngas. Syngas can be burned in a boiler, or used as fuel for an engine or gas turbine. The fuel conversion efficiency of the gasification process is in the range of 60 to 70 percent.
Applications include:

- industrial and commercial buildings (100 kilo Watts electrical kWe, and above)

- smaller plants of under 5 MW are becoming more common.

4 DOES GENERATING ENERGY FROM BIOMASS REDUCE CARBON EMISSIONS?

The use of biomass is generally classed as 'carbon neutral' because the CO_2 released by burning is equivalent to the CO_2 absorbed by the plants during their growth. However, other life cycle energy inputs affect this 'carbon neutral' balance, for example emissions that arise from fertilizer production, harvesting, drying and transportation.[iv]

Biomass fuels are much lower in energy and density than fossil fuels. This means that large quantities of biomass must be grown and harvested to produce enough feedstock for combustion in a power station. Transporting large amounts of fuel increases life cycle CO_2 emissions. Biomass energy generation is therefore most suited to small-scale local generation facilities, or operating as heat plants. The range of carbon footprints for biomass is related to the type of organic matter and the way it is burned.[v] Biomass can also be 'co-fired' with fossil fuels in conventional power stations. Replacing a component of the fossil fuel with 'carbon neutral' biomass can reduce the overall CO_2 emissions from these power stations.[vi]

5 ARE SOME BIOMASS FUELS BETTER THAN OTHERS?

In general the unsustainability of a development is often as a result of its size rather than the particular fuel it uses For example, very large-scale power stations are much more likely to rely on imported fuels that will be transported long distances, without guarantees that the fuel source was grown or harvested sustainably. Similarly the types of technology adopted will determine the sustainability of a development. The least efficient use of any woody biomass and energy crop is large-scale thermal electricity generation. Biomass boilers for heat can be 90% efficient in turning biomass energy into usable energy - whereas biomass to electricity is much lower (typically less than 60%) [vii]

a) CONVENTIONAL FORESTRY MANAGEMENT

The effects of large-scale projects, or the cumulative impact of increasing numbers of new wood-fuelled projects, are noted to be problematic. In the UK total wood production is around 8.4 million (dry) tonnes a year. According to the Forestry Commission the number of biomass fired power stations that are being built in the UK will lead to an increase in timber imports from 20 million tonnes now to 50 million tonnes in 2015.[viii]. Such a large new demand for wood is likely to mean more industrial tree plantations, more logging, and thus more deforestation, land-grabbing and climate change, much of it in the global South. Given that the source countries of this wood are likely to still be burning fossil fuels it would be more sustainable to replace fossil fuel demand in the producer country, rather than ship wood to the UK. There is also new research that suggests that cutting down trees for bio-energy makes no sense in tackling climate change as it takes at least 30 years for a tree to absorb the equivalent amount of carbon released by cutting down and burning for fuel[ix].

A study from the Finnish Environment Institute[x] has shown that the environmental advantages of increased wood energy use will not be as great as previously envisaged. Finland identified that increased demand for wood energy would largely come from logging residues such as branches, treetops and tree stumps, which would otherwise be left in the forest to decompose naturally, wherever logs are harvested for industrial use. The study shows Finnish forests' carbon sink capacity will suffer due to the removal of this additional biomass, effectively cancelling out up to 80% of the greenhouse gas emission reductions that would theoretically be achieved by using more wood energy. The authors emphasise that changes in forest carbon sinks are insufficiently accounted for in many calculations used in climate policy. This can lead to the exaggeration of the climate benefits that can be achieved by using wood energy.

b) ENERGY CROPS

Currently the area of crops in the UK specifically grown for non-transport energy is small (10,000-15,000 hectares). If these crops are to play a significant role in meeting our energy needs it would require a substantial increase in land area. Using land for energy crops, which could otherwise be used to grow food, or animal feed, could increase our reliance on overseas land, drive deforestation, and contribute significant Greenhouse Gas (GHG) emissions[xi]. Preference should be given to local production for local use (eg on farm, within a village/community). This would reduce the need for long distance transport of energy crops for processing. In particular the potential for rotations with food crops in a mixed farming system should be assessed. Food production must be at the heart of the UK's land use policy to meet global food security needs and reduce the energy dependency of the food chain by re-localising our food systems.

Research for the Committee on Climate Change has suggested that 5 million hectares of land could be freed-up if production of meat and dairy was cut in half. Friends of the Earth believes that were this to happen it would also be necessary to use much of this land for other food production and feedstock rather than the UK relying on so much overseas land. This suggests that much less than 5 million hectares may be available for biomass, if any at all.

For many energy crops information is lacking on the effects of cultivation on a commercial scale, and therefore it is unknown whether intensive production would lead to CO_2 increases or savings. Particular energy crops grown in the UK include:

i) Miscanthus

Miscanthus is a woody grass with a deep root structure. Production of agrochemicals for application on miscanthus is energy intensive, although fertiliser requirements are lower than conventional arable crops. It has a high water uptake which places demand on water resources.[xii] Miscanthus cultivated in monoculture plantations will also impact negatively on local biodiversity and landscape, and it can be an invasive plant[xiii].

ii) Short rotation coppice (willow/poplar)

Short rotation coppice (SRC) systems are densely planted high-yielding varieties of willow and poplar that are harvested in 2 – 5 years cycles. SRC can lock carbon into soils through underground rooting systems. This below-ground carbon and associated organic matter can also contribute to improving soil quality and nutrient reserves. SRC plantations have a moderately high water requirement. During establishment there can be a high reliance on pesticides which may continue in monoculture plantations, but can be avoided if a mix of willow varieties is planted. There is a long history of coppice management in the UK that suggests that, if done well, it can improve biodiversity.[xiv] Biodiversity impacts will, however, depend on the crop that is displaced by the SRC plantation.

CASE STUDY – FUEL SOLUTION
Cookstown Leisure Centre – biomass boiler.

This innovative project examined the possibility of heating a large public building with willow biomass fuel at a time when there was no Short Rotation Coppice (SRC) willow being grown in Northern Ireland (NI) to use as a fuel. This project involved the Council working with many partners in the installation of the 500kW boiler and in the planting of SRC willow locally to use as a fuel. The biomass boiler now provides the base load of heat into Cookstown Leisure Centre and uses about 2,000kg of willow chips each day which is grown locally by a consortium of farmers, Northern Bio-Energy Ltd. These farmers by have been able to invest in new technology to assist with the production of a quality chip, and as a result the leisure centre is now able to purchase fuel from a sustainable source with security of supply, all provided from plantations within the district. Monitoring of the system over the past two years has shown that over 250,000 litres of oil have been saved. This equates to a reduction in carbon dioxide emissions of 670 tonnes and financial savings of £32,000 (taking the cost of willow chip into consideration). In addition to the financial savings, and the reduction of carbon emissions from the Leisure Centre, the establishment of willow plantations across the district has already made a significant contribution to biodiversity. Farmers have integrated the plantations within their Countryside Management Scheme activities and this has helped create habitats with a diverse abundance of birds, insects and small mammals. www.agronomy.uhi.ac.uk/Final%20report.pdf

iii) Eucalyptus

Eucalyptus is being used in trials of Short Rotation Forestry systems but at present there is limited information on the impacts in the UK. But studies in the global South have revealed that eucalyptus plantations are notorious for creating “green deserts”.[xv] Preliminary research by the Forestry Commission has shown that eucalyptus plantations have possible negative visual, biodiversity and hydrological impacts.[xvi] It is an invasive species with high water and input requirements.

iv) Dual Agricultural/Energy Crops

There is potential for crops to serve dual purposes, where animal feed is produced as a by-product of energy crop production. This could increase the potential for energy crop production in the UK at the same time as helping to replace imported soy for animal feed with home grown feeds. Independent research is needed to assess the suitability of these co-products for livestock, their impact on intensification of industrialized agriculture, and their potential to achieve genuine and significant reductions in greenhouse gas emissions.

c) BIODEGRADEABLE WASTE AND FOOD WASTE:

i) Food waste

Around 18 - 20 million tonnes of food waste is produced each year in the UK, with household food waste generating 6.7 million tonnes, food manufacturers about 4.1 million tonnes, food service and restaurants about 3 million tones and retailers about 1.6 million tonnes. The remainder is generated by the agricultural and horticultural sector, and commercial food waste (e.g. from hospitals, schools, etc). Food waste makes up around 20 per cent of municipal waste. (see briefing 'Food waste collections'[xvii]) Food waste is best dealt with by separate collection followed by Anaerobic Digestion (AD)[xviii]. And not throwing it away in the first place!

ii) Wood and garden waste

Where possible, discarded wood and timber products should be consolidated and reused, or sorted for recycling. Clean untreated waste wood can be processed for higher value non-energy markets (animal bedding, etc.), with energy processing as a last resort. Friends of the Earth has substantial concerns about the thermal processing of contaminated wood, given the evidence of increased pollutant emissions, even in Waste Incineration Directive-compliant energy systems. Parks and garden waste (green waste) is generally too wet and soil-contaminated for combustion, and better treated by well-managed composting (some green waste fines may also be suitable for AD).

ii) Waste cardboard, paper and natural textiles

Where possible, these are best dealt with through separate collection for recycling. If they are too contaminated for recycling, AD is an alternative treatment.

iii) Agricultural waste

We support the use of agricultural wastes such as animal slurries for use in anaerobic digestion (AD). However, we are concerned that AD plants could become over-dependent on inputs from intensive farming. It is therefore important to ensure that AD plants are of an appropriate size and location, and do not create an unsustainable demand for intensively produced feed-stocks.

iv) Sewage sludge

This should be processed through AD where possible.

CASE STUDY – FALSE SOLUTION

Forth Energy biomass power stations in Scotland

Forth Energy are proposing four large biomass power stations in Scotland, including an application for a 100 MW power station in Rosyth which would burn 1 million tonnes of wood a year, up to 90% of it imported. Altogether, the four power stations would burn at least 5.3 million tonnes of wood. Forth Energy make it clear that they will burn wood from trees cut down for this purpose - yet studies show that it takes decades or centuries before the carbon emitted this way is absorbed again by new trees and by soil. They claim the wood will come from Scandinavia and the United States, but are still considering potentially cheaper options. Proposals for new logging and plantations to feed European demand are emerging all over the developing world: in countries like Indonesia, Guyana and Liberia. Without legally binding controls there would be nothing to prevent Forth Energy promising one thing to get planning permission, and then doing another in practice, as MGT Power on Teesside did when dumping plans to get timber from North America in favour of cheap eucalyptus from unsustainable plantations in Brazil. In and around Rosyth, the power station would cause significant emissions of nitrogen dioxide and small particulates, which are linked to respiratory and cardiac disease, as well as dioxins and furans and other toxins. The power station would be sited next to the Firth of Forth. The discharge of warm cooling water with biocides could pose a threat to marine life in an area designated as a Special Protection Area and a RAMSAR Wetland. Although Forth Energy have submitted a Combined Heat and Power feasibility study, the maximum amount of heat they say can be distributed is very small compared to the electricity output.
http://www.foe-scotland.org.uk/biomass-forthenergy

6. WHAT'S THE GOVERNMENT'S POSITION ON BIOMASS?

The Department of Energy and Climate Change's (DECC) approach to increasing the amount of biomass heat and electricity generated and used in the UK is set out in the 2009 Renewable Energy Strategy[xix]. This strategy considers that around 30 percent of the UK's overall 15 percent renewable energy target could come from biomass heat and electricity in 2020.[xx.] The Strategy builds on the action plan set out in the UK Biomass Strategy[xxi].

The European Union Renewable Energy Directive (RED)[xxii] covers renewable energy (and biomass) for any purpose. Therefore transport, heat and power are covered. The RED sets targets for renewable energy generation including biomass – The Government has introduced some financial incentives to promote renewables which are available for biomass plants - There are sustainability criteria in the RED, but these only apply to bioliquids and liquid biofuels – they mean that for biofuel/liquid energy to count towards the renewables targets, or to receive financial incentives, they must comply with the sustainability criteria. This is not the case for biomass.

Article 17 of the RED required the Commission to report on a sustainability scheme for biomass. The EC reported on 25 Feb 2010 with some guidance on what Member States

could cover in sustainability criteria for biomass. The Government is still considering what action they might take on this. See later in this briefing for information on sustainability in planning decisions.[xxiii]

To stimulate renewable energy systems in the UK, Government has introduced the following fiscal measures:

a) Feed-in Tariffs (FITs)

FITs guarantee a long-term premium payment paid for small-scale (under 5 MW) generation of electricity from renewable sources which is fed into the grid. It is paid for by the electricity company. The Government fixes the level of the tariff to be paid for each renewable technology and sets the length of contract. The Government has recently announced a full review of FITs to be concluded by the end of 2011. This will look at issues including tariff levels and eligible technologies – see: http://www.foe.co.uk/resource/briefings/fit_review.pdf

For more information on how FITs work see:
http://www.foe.co.uk/resource/briefing_notes/fit_how_works1.pdf

b) Renewables Obligation Certificates (ROCs)

The Renewables Obligation is the main support scheme for renewable electricity projects in the UK. It places an obligation on UK suppliers of electricity to source an increasing proportion of their electricity from renewable sources. A Renewables Obligation Certificate (ROC) is a green certificate issued to an accredited generator for eligible renewable electricity generated within the United Kingdom and supplied to customers by a licensed electricity supplier. Suppliers meet their obligations by presenting sufficient Renewables Obligation Certificates (ROCs). Where suppliers do not have sufficient ROCs to meet their obligations, they must pay an equivalent amount into a fund, the proceeds of which are paid back on a pro-rata basis to those suppliers that have presented ROCs. The Government intends that suppliers will be subject to a renewables obligation until 31 March 2037. ROCs are administered by the Gas and Electricity Markets Authority whose day to day functions are performed by Ofgem.[xxiv]

c) Renewable Heat Incentive (RHI)

The RHI is similar to Feed-In Tariffs, but for renewable heat. It will come into force in July 2011 for non-domestic installations, and 2012 for domestic installations. Like FITs, tariff rates will be set by Government. It is administered by the official regulator Ofgem and paid for directly by the Treasury.

The proposed RHI places heavy reliance on biomass to meet the UK's target for renewable heat, and sets tariff levels accordingly high to encourage take-up, stating *"large scale biomass ... is the cheapest renewable heat option and we expect it to make one of the biggest contributions to the overall effort. We have set the tariff rate to… be high enough for all potential installations covered by this tariff. We believe this is justified to ensure we realise as much of the potential from this area as possible"* [xxv].

The proposed tariff levels for biomass are:

TARIFF	ELIGIBLE SIZE	TARIFF (pence/kWh)
Small biomass	Less than 200 kWth	Tier 1: 7.6
		Tier 2: 1.9
Medium biomass	200 – 999 kWth	Tier 1: 4.7
		Tier 2: 1.9
Large biomass	1000 kWth and above	2.6

The Tier 1 tariff applies annually up to the Tier Break, and the Tier 2 tariff above the Tier Break. The Tier Break is: installed capacity (in kilowatts thermal) x 1,314 peak load hours, i.e.kWth x 1314

The Government proposes that there will be no binding sustainability criteria for biomass until 2013. What these criteria would cover is currently unknown. The Government has indicated that they would be based on criteria that are already being used for transport biofuels so they might be similarly weak. Lessons learnt from transport biofuels suggest that such limited criteria will fail to address the majority of negative social and environmental impacts of biomass used in the UK.

The lack of sustainability criteria for biomass, together with the inclusion of incineration as a renewable heat source, sadly casts a huge shadow over these schemes.[xxvi]

http://www.foe.co.uk/resource/briefings/renewable_heat_incentive.pdf

7. HOW IS BIOMASS ENERGY REGULATED IN THE UK?

There are two 'consents' to think about in relation to power plants, these are, planning permissions and environmental permits.

a) ENVIRONMENTAL PERMITS

A raft of regulations and directives control how and where biomass derived fuels and conversion technologies can be used. These regulations need to be understood by a developer before a biomass heat or power generation project is initiated. These are helpfully listed on the following site, along with information about which body/organisation has responsibility to oversee each type of regulation or directive: http://www.biomassenergycentre.org.uk/portal/page?_pageid=77,20950&_dad=portal&_schema=PORTAL

It is important to note that unlike incinerators, biomass energy generation is **generally** not subject to the Waste Incineration Directive because biomass fuel, such as dedicated energy crops and virgin (untreated) wood, are regarded as “clean” fuels. However some fuels will require a plant to be compliant with the Waste Incineration Directive e.g. if they are planning to burn waste wood which may be contaminated with paint, wood preservatives etc. Friends

of the Earth has serious concerns about waste incineration as a method for generating energy and our position can be found at: www.foe.co.uk/resource/briefings/dirty_truths.pdf

In Northern Ireland pollution permits are issued by the Northern Ireland Environment Agency.[xxvii] Energy policy and permits are the responsibility of the Department for Enterprise, Trade and Investment.[xxviii] In theory they should act in a co-ordinated way and policies should be consistent

b) PLANNING

Depending on the size of a development there are different methods by which planning permissions must be sought.

i) Major Infrastructure Planning

If the proposed development is planning to generate a minimum of 50 Mega Watts (MW), or more, of power, the decision on the development will be made by the Government's Major Infrastructure Planning Unit. This is a new rapid system where Ministers will take the decisions on new infrastructure projects that they deem to be “critical to the country's future economic growth”, covering major or ‘nationally significant’ infrastructure projects for energy, transport, water and waste. There is guidance here: http://www.foe.co.uk/resource/briefings/planning_act_crrp_100.pdf on how to deal with this type of application. All planned new major infrastructure projects will be listed on the Infrastructure Planning Commission website [xxix] in advance of any local consultation that developers will carry out, giving communities an early indication of potential future developments.

ii) **Planning at Local Level**

For a development generating under 50MW of energy, planning permission must be sought from the local planning authority. Understanding the planning system is essential to running a campaign, It's the best way to get your voice heard and influence the decisions being made. Many useful resources to help you get involved in planning applications can be found in our Community Rights resource pack: http://www.foe.co.uk/campaigns/fair_future/rights_resource_pack_13669.html. The pack includes information on Environmental Impact Assessments, and Freedom of Information as well as a step by step guide through the planning process. A useful introduction, “How To Use Your Rights in Planning Applications” is available at http://www.foe.co.uk/resource/how_tos/cyw_55_planning_applications.pdf

For information about planning in Wales please refer to this overview: http://foecentral.foe.co.uk/Aims/NationsRegionsAim/Cymru/Shared%20Documents/Events/Merthyr%20Power%20Up/Briefings/3.1_Welsh_planning_system_an_overview_Jan10.pdf; and the campaigners guide to local development: http://foecentral.foe.co.uk/Aims/NationsRegionsAim/Cymru/Shared%20Documents/Events/Merthyr%20Power%20Up/Briefings/3.2_Campaigners_Guide_to_Local_Development_Plan_wales_Jan10.pdf.

For Northern Ireland planning resources please see:
http://www.foe.co.uk/northern_ireland_resource.html and specifically on planning
http://www.foe.co.uk/resource/action_guides/ni_planning_guide.pdf

It is important to note that if you decide to get involved in a planning case there are certain issues that are regarded as "material considerations" and must be investigated by your Planning Authority. Therefore it is vital to build your case (for or against) on these "material considerations" which include issues such as air pollution, induced transport, wildlife and habitat impacts (more guidance on these "material considerations" are given in our planning guides). Whether the sustainability of the biomass source is a material consideration in planning decisions is an evolving area.

In granting planning permission for a Helius Energy biomass power station at Avonmouth in Bristol, in March 2010, the Secretary of State for Energy and Climate Change acknowledged that it is important that biomass is sustainably sourced. He referred to the EC report on biomass sustainability and potential forthcoming action from the Government, and the sustainability reporting required for any biomass power stations receiving ROCs (see above), He said that sustainability issues are dealt with sufficiently through certain restrictions on the fuel type to be used at the plant and on the quantity of biomass that can be delivered by road.

Also in Bristol, W4B applied for planning permission for a biofuel power plant (confusingly sustainability has been dealt with differently at EU and national level depending on whether the fuel is biomass, or biofuel). Friends of the Earth's Rights & Justice Centre assisted Biofuelwatch and other objectors in making legal submissions. The Secretary of State found that fuel sustainability could be a material consideration. In his decision he said that this only applied to bioliquids, not biomass, but taken with the statements in Helius and on principle, our view is that sustainability of biomass fuel is also a material consideration, and should be considered in every planning decision.

8. CONCLUSION

Friends of the Earth believes that biomass has a role to play in meeting our energy needs. However, there are dangers.

- Too great a use of biomass can set up economic pressures for land, leading to habitat destruction which undermines biodiversity and the benefits it brings to poor people, as well as the very carbon benefits used to justify the biomass use.
- It can push up food prices, potentially increasing hunger and leading to indirect habitat loss.
- Intensive production of energy crops can damage biodiversity and undermine the carbon benefits of displacing fossil fuels.

Friends of the Earth believes the Government should introduce a framework to govern biomass use as part of an overall strategy to reduce carbon emissions and protect biodiversity. This should include:

- a limit on the amount of biomass used for energy, to ensure that overall demand can be accommodated alongside other demands for land e.g. food production and nature conservation
- legally-binding standards to ensure the biomass is produced in a sustainable way (social and environmental)
- measures to ensure that biomass is converted to energy in an efficient manner to maximize its benefits.

Energy from biomass will need to be part of the UK energy mix in future in order to ensure that carbon dioxide (CO_2) emissions are reduced in line with national and international commitments. However, this is a complex area and we hope we have highlighted the issues to look out for when individual applications are submitted. Once you have read this briefing, if you feel you need further support or information you can contact either your Friends of the Earth Regional Campaigner http://www.foe.co.uk/community/local_groups/staff_support.html or Biofuelwatch (http://www.biofuelwatch.org.uk/contact.php).

The following appendices contain information that you may want to use as a "checklist" in your campaign.

APPENDIX ONE – INFORMATION TO INCLUDE IN YOUR CAMPAIGN

POSSIBLE BENEFITS OF BIOMASS USE

- CO_2 emissions reductions compared to conventional generating plants, especially if locally sourced fuel is used for heat in small-scale plants
- If sustainable forestry practices are encouraged it could include benefits to biodiversity (through coppicing etc), - http://www.swan-network.org.uk/uploads/documents/698_biomass_for_renewable_energy.pdf
- Small-scale plants could form affordable schemes for community energy ownership and the associated community benefits
- The heat sector in particular could stimulate the biomass industry, with positive effects in agriculture and the rural economy.
- Improved energy security
- Meeting UK energy demand in a more sustainable way than conventional fossil-fuel generation
- Woody energy crops such as short rotation coppice (SRC) can be grown on low grade land, and so need not necessarily compete with food crops, and can be used, if managed well, to improve soils and biodiversity.
- Job creation
- Biomass heat generation can provide a cheap sustainable heat resource, a useful tool in tackling fuel poverty in areas of deprivation, if properly planned/sited and accompanied by other measures such as insulation.
- Biomass heat generation can replace coal for industrial sites, industrial processes and off grid locations
- It is a productive use for certain waste by-products e.g. sewage, animal slurry

- Farm diversification to serve local renewable energy markets could have rural economic benefits if in line with a sustainable biomass strategy, localised supply chains and the over-riding priority of land use for food production.

CONCERNS ABOUT BIOMASS USE

- Imported energy crops may create a number of additional negative impacts including deforestation, biodiversity loss, land rights, worker conditions.
- Energy conversion inefficiency of some generating systems e.g. large-scale thermal electricity
- additional emissions from fuel transportation, harvesting and fertilizer use.
- air quality impacts. Burning some fuels can cause significant emissions of nitrogen dioxide and small particulates as well as dioxins and furans which are toxic. In general larger plants can have better pollution abatement equipment. – for more please see http://www.environmental-protection.org.uk/air-quality-and-climate.
- induced traffic (e.g. lorry transport)
- displacement of agricultural land – could promote an over-reliance on imports of food and animal feedstock
- lack of regulation – no EU standards on sustainability or originating product on imported fuels
- large increase in generating plants leads to increased competition for limited fuel sources e.g. miscanthus
- destroying carbon sinks e.g. via forest/woodland clearances
- indirect emissions which occur if existing agricultural land is used to grow biomass crops. Demand for the original crop remains the same and so production of this crop will move to other land. This could be new land cleared from grassland or forest
- Taking 'waste' away from the traditional agricultural cycle - for example collecting corn stalks instead of ploughing them in, reduces soil quality, leads to erosion and increases water/fertiliser usage.
- Biomass use for electricity generation may undermine the development of more efficient technologies e.g. wind

APPENDIX TWO – USEFUL QUESTIONS

QUESTIONS TO ASK THE DEVELOPER

- How big is the proposed plant and what is its generating capacity?
- What fuel is to be used and how is it sourced (including country of origin)?
- How is the fuel source grown e.g. plantations?
- Has the proposed development completed an Environmental Impact Assessment?
- How far will the fuel be transported?
- How sustainable is the fuel to be used, what guarantees can you give?
- If the preferred fuel becomes more expensive/harder to source in the future would you be using alternative fuels and, if so, what are they?
- Is there anything that legally binds you to use your intended fuel source, or can you switch to another source at any time?

- What calculations have you made of the total greenhouse gas emissions (GHGs) that will be produced once the development is operational? (including transportation emissions, emissions associated with the energy crop e.g. fertilisers)
- What type of technology will you be utilising?
- If generating electricity will you be utilising Combined Heat and Power (CHP)?
- What transport access will be required and how much extra traffic will the operation generate?
- Would you be willing to commit to an agreement by consent within your planning permit to source only sustainable fuel?
- How much wood/feedstock (in tonnes) will you be using per year?
- Will you be consulting environmental groups like Friends of the Earth?
- Are you planning to use any fuels that would require you to be compliant with the Waste Incineration Directive?

QUESTIONS TO ASK YOUR PLANNING AUTHORITY

You can also raise the questions we have outlined above with your Planning Authority, and suggest that these are key issues which you would expect to be covered by the planning application. Additionally other questions to ask include:

- Will the proposed development be required to complete an Environmental Impact Assessment? And if not, why not?
- Is the site proposed for development suitable for other forms of renewable energy generation (e.g. wind power)?
- Is the proposed site in, or in proximity to, an Air Quality Management Area (AQMA)?
- Does the application conform to the Local Authority policies on renewable energy, transport, any policies adopted for that particular location?
- Does the application conflict with policies in the Core Strategy?

APPENDIX FOUR- FURTHER INFORMATION

- Minimising greenhouse gas emissions from biomass energy generation - http://www.environment-agency.gov.uk/static/documents/Research/Minimising_greenhouse_gas_emissions_from_biomass_energy__generation.pdf
- Biomass used for energy generation in the UK - http://www.renewables-map.co.uk/biomass.asp
- Air Quality impacts of Biomass Boilers: http://www.newenergyfocus.com/do/ecco/view_item?listid=1&listcatid=32&listitemid=3593
- Regulation of Energy from Solid Biomass Plants - http://www.biomassenergycentre.org.uk/pls/portal/docs/PAGE/RESOURCES/REF_LIB_RES/PUBLICATIONS/REGULATION%20OF%20ENERGY%20DEFRA.PDF
- Planning Renewables – Biomass Policy - http://www.planningrenewables.org.uk/resourcebank/biomass/policy/index.cfm

- Environment Agency – Biomass – carbon sink or carbon sinner? - http://www.environment-agency.gov.uk/static/documents/Leisure/Biomass__carbon_sink_or_carbon_sinner_summary_report.pdf
- Royal Committee on Environmental Pollution (RCEP) – Biomass Report. - http://www.rcep.org.uk/reports/sr-2004-biomass/documents/BiomassReport.pdf
- Government Response to the RCEP Biomass Report - http://www.rcep.org.uk/reports/sr-2004-biomass/documents/biomass-response.pdf
- Bioenergy – a carbon accounting time bomb - http://www.birdlife.org/eu/pdfs/Bioenergy_a_carbon_accounting_time_bomb_FINAL.pdf
- The use of palm oil for biofuel and as biomass for energy - http://www.foe.co.uk/resource/briefings/palm_oil_biofuel_position.pdf
- Biofuel power stations - campaign notes http://www.foe.co.uk/resource/briefing_notes/biofuel_power_stations_cam.pdf
- Supporting renewable energy projects- http://www.foe.co.uk/resource/guides/supporting_renewables.pdf
- Environmental Impacts of Biomass Energy Options - http://www.scotland.gov.uk/Publications/2006/09/22094104/6
- Arup Study into renewable energy technologies: http://www.foe.co.uk/resource/reports/fit_for_future.pdf
- Getting Serious About Green Energy - http://www.foe.co.uk/resource/briefings/getting_serious_about_green_energy.pdf
- Renewables factsheet - http://www.foe.co.uk/resource/factsheets/renewable_energy.pdf
- Anaerobic Digestion Factsheet - http://www.foe.co.uk/resource/briefings/anaerobic_digestion.pdf
- Renewables Obligation: Fuel measurement and sampling guidance for biomass generation – OFGEM - http://www.ofgem.gov.uk/sustainability/environment/RenewablObl/Documents1/FMS%20final.pdf
- Forestry Commission position on Woodfuel - http://www.forestry.gov.uk/pdf/Woodfuel_meets_the_challenge.pdf/$FILE/Woodfuel_meets_the_challenge.pdf
- Compare Renewables: this site considers 8 renewable technologies to allow you to assess whether they are appropriate for your area- http://www.idea.gov.uk/idk/core/page.do?pageId=23051802
- The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom - http://comeap.org.uk/images/stories/Documents/Reports/COMEAP_Mortality_Effects_2010.pdf

[i] Source: http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/explained/bioenergy/heat_power/heat_power.aspx

[ii] http://www.idea.gov.uk/idk/core/page.do?pageId=24052489

[iii] **Combined Heat and Power:** a highly efficient co-generation system. Is used for the generation of electricity from gas, coal, or biomass, where the heat which would normally be wasted is captured and used locally. Traditional electricity generation disposes of this valuable heat resource as a waste product - as witnessed by the huge cooling towers visible at large power plants. The heat generated can be used in the same location, or can be shared with adjoining homes, offices and industrial sites via an underground system of highly insulated pipes, known as a district heating network. It is a highly effective method of energy use, achieving efficiencies of 80% or more.

[iv] Source: http://www.parliament.uk/documents/post/postpn268.pdf

[v] e.g. Combustion of low density miscanthus results in higher life cycle emissions (93gCO2eq/kWh), than gasification of higher density wood-chip (25gCO2eq/kWh).

[vi] An explanation of how the Carbon Footprint of different types of electricity generation is calculated can be found here - http://www.parliament.uk/documents/post/postpn268.pdf

[vii] http://www.cse.org.uk/pdf/sof1113.pdf http://www1.eere.energy.gov/biomass/abcs_biopower.html

[viii] http://www.timesonline.co.uk/tol/news/environment/article6918024.ece

[ix] http://www.birdlife.org/eu/pdfs/Bioenergy_Joanneum_Research.pdf

[x] http://www.ymparisto.fi/default.asp?contentid=375136&lan=en&clan=en

[xi] Audsley, E., Brander, M., Chatterton, J., Murphy-Bokern, D., Webster, C., and Williams, A. (2009). *How low can we go? An assessment of greenhouse gas emissions from the UK food system and the scope to reduce them by 2050.* FCRN-WWF-UK.

[xii] http://www.calu.bangor.ac.uk/Technical%20leaflets/010101%20Intro%20to%20Miscanthusv6.pdf

[xiii] "The Weedy Truth About Biofuels": http://www.invasives.org.au/documents/file/reports/isc_biofuels_revised_march08.pdf

[xiv] http://www.biomassenergycentre.org.uk/pls/portal/docs/PAGE/BEC_TECHNICAL/SOURCES%20OF%20BIOMASS/ENERGY%20CROPS/SHORT%20ROTATION%20ENERGY%20CROPS/SHORT%20ROTATION%20COPPICE/SRC%20VIEW%20EDIT%2018%2012%202007%20IT.PDF

[xv] http://www.grain.org/seedling_files/seed-06-07-3.pdf

[xvi] http://www.forestry.gov.uk/pdf/SRFFinalReport27Feb.pdf/$FILE/SRFFinalReport27Feb.pdf

[xvii] www.foe.co.uk/resource/briefings/food_waste.pdf

[xviii] www.foe.co.uk/resource/briefings/anaerobic_digestion.pdf

[xix] http://www.decc.gov.uk/en/content/cms/consultations/cons_res/cons_res.aspx.

[xx] The main section on biomass is from paragraphs 4.120 to 4.196 (pages 103-128).

[xxi] http://www.decc.gov.uk/en/content/cms/consultations/cons_res/cons_res.aspx

[xxii] http://ec.europa.eu/energy/renewables/index_en.htm

[xxiii] Source: http://www.foe.co.uk/resource/briefing_notes/biofuel_power_stations_cam.pdf

[xxiv] www.ofgem.gov.uk/Sustainability/Environment/RenewablObl/Pages/RenewablObl.aspx

[xxv] DECC 'Renewable Heat Incentive' (March 2011) p53 note 20

[xxvi] http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/policy/incentive/incentive.aspx

[xxvii] See: http://www.doeni.gov.uk/niea/pollution-home/ippc.htm

[xxviii] http://www.detini.gov.uk/deti-energy-index/deti-energy-sustainable.htm

[xxix] http://infrastructure.independent.gov.uk/projects/website