Biomass, also known as biofuels or bioenergy, comes from organic matter either directly from plants or indirectly from industrial, commercial, domestic or agricultural products. Biomass is a renewable source of energy that can help emissions of carbon dioxide, the main cause of climate change. However, we need to ensure that biomass projects are developed and operated to minimise impacts on the local environment.

**Government targets**

Currently about 4% of the UK’s electricity supply comes from renewable energy sources. The Government’s target is to increase this to 10% by 2010 and 20% by 2020. The Government identified in its 2003 Energy White Paper the important role that biomass can play in meeting these targets. Biomass is an excellent source of heat, which accounts for over half of energy used in the UK.

To help achieve the Government’s renewables targets, more biomass power plants will need to be set up. This will have an impact on the environment. Issues such as pollutants released into the environment, smell, traffic, and the look of the plant need to be balanced against the positive role that biomass fuels can play in limiting climate change.

**Our work**

We are committed to limiting the effects of climate change by supporting the development of renewable energy sources. In our role as regulator, we are responsible for regulating the environmental performance of biomass power plants under Pollution Prevention and Control (PPC) Regulations. We will also be consulted as part of the planning process. To carry out these roles, we need to fully understand how biomass power plants work and their potential impact on the environment.

Our study focused on the environmental impacts that occur during the production of electricity and heat from biomass energy sources that we regulate. This includes electricity and heat produced through thermal conversion activities (such as combustion, gasification and pyrolysis) with biomass fuels. Biomass fuels include forestry residues, agricultural residues such as straw and chicken litter and energy crops (plants grown specifically to produce fuel, such as various grasses).

**What did we look at?**

- How the main biomass fuels in the UK are produced, collected, harvested and converted.
- Information available on the main impacts of biomass fuels on the environment.
- How the cost of biomass energy compares with conventional fuels and how this is affected by installing technologies to reduce emissions.
What did we find out?

• Biomass is generally accepted as a “green” fuel for energy production as carbon dioxide emissions are much lower than for fossil fuels. Other emissions from biomass plants are also generally lower. Where there are issues with other emissions they can be controlled with improved technology.

• The cost of electricity generated from biomass is higher than conventional fuels. Government crop subsidies and the Renewables Obligation (RO) will provide a major role in the development of biomass fuel.

• The biomass fuels most likely to be used in the UK are: forestry residues, agricultural residues (including straw and poultry litter), wood waste and energy crops.

• Large areas of land are already committed to growing energy crops and looks set increase. Understanding the impact of these crops on the environment is vital.

• The impact of forestry management and the farming of biomass crops is a major issue. We need to understand the impacts on ecosystems, habitats and wildlife.

• Further work is needed to develop equipment and better techniques for growing, harvesting, collecting and storing biomass fuels and disposing of waste ash after combustion.

• Careful design and planning of the site is important to reduce issues such as the way the plant looks, noise, smell and traffic. Involving the local community in planning a new plant is extremely important.

What happens next?

Although large-scale generation of energy from biomass represents only a small proportion of the heat and power generated in the UK at present, Government policy is likely to speed up its development. Many of the issues above will need to be addressed to ensure that biomass is used in an environmentally sensitive way. For more details, please refer to the full technical report of this study, ‘Review of power production from renewable and related sources’.

“Biomass is generally accepted as a ‘green’ fuel for energy production as carbon emissions are much lower than for fossil fuels”

Our changing climate

Climate change is the biggest threat our environment faces. Most scientists now agree it is happening and that human activity is increasing it. The world has not been as warm as it is now for more than a millennium. Nine of the ten warmest years on the global record were between 1995 and 2004. We need to make drastic cuts in our emissions of greenhouse gases to limit the extent of climate change and adapt to the level of climate change that is already unavoidable.

What is the Environment Agency doing?

We are the leading public body protecting and improving the environment in England and Wales. We have a major role in both limiting the scale of climate change by addressing its causes and limiting its impact by adapting to climate change. We regulate industry and waste sites responsible for over 40% of UK emissions of greenhouse gases and are the Competent Authority for the EU Emissions Trading Scheme in England and Wales. We are also a lead player in addressing the impacts of climate change, including increased flood risk, additional stress on our water resources for people and the environment and threats to plant and wildlife.

We are actively researching the effects of climate change and how best to respond to them. Our science programme is helping us to develop risk-based responses to climate change across our activities.

This leaflet is part of a series of information sheets, in which we share the findings of our research and development programme.

For more information

To receive more of these leaflets, an executive summary or the full technical report of this study (Review of power production from renewable and related sources), please contact 08708 506506 or email enquiries@environment-agency.gov.uk

Leaflets and reports are also available on other climate change related studies carried out by the Environment Agency, including Climate change and its impact on waste management, Climate change and its impact on chemical standards, Measuring the impact of climate change, Renewable energy and its impact on the environment and Supporting the development of biomass energy.