

BIOFUEL COMPENDIUM

Through research, Great Britain is seriously addressing alternative energy and sustainable living issues in different ways. One of these issues is biofuel production from a number of different sources, including waste materials. The British are also very cognizant of the need to identify and monitor the environmental impacts of the various aspects of the production and processing of biofuels. This compendium provides summaries of some of the most recent research reported in Great Britain. Is there similar research underway in British Columbia? If so, please let us know.

Biofuel Crop Study Warns of Impact¹

Rape-seed crops: The study urges research to fully understand the environmental impact The environment could be threatened by the rush to grow crops for use in biofuels, conservation groups have warned. They estimate that almost 2.5 million acres could be planted with crops for heat and power generation by 2020. In a new report, Bioenergy in the UK, 11 environmental groups say that biofuel crops such as oil-seed rape, willow and miscanthus (elephant grass) could be sown widely but will provide little cover or food for wildlife. And they call for safeguards to be put in place by the Government to prevent further declines in farmland wildlife and to prevent landscape and historic archaeological sites from being damaged. The conservation agencies, including the RSPB, National Trust, CPRE, Council for British Archaeology, and The Wildlife Trusts say they welcome the opportunities bioenergy development brings and say the potential for environmental harm from new energy schemes can be avoided. They say that where farmers are paid to grow bioenergy crops they should also be required to assess their environmental impact. Ian Woodhurst, CPRE's Farming Campaigner and Chair of Link's Farming and Rural Development Group, said:

"It's vital that bioenergy crops deliver the real carbon savings that they promise without damaging the character of our landscapes and our wildlife. With the right crop, in the right place, managed in the right way we can provide our communities with the sustainable energy supplies they need to tackle climate change. But we need to make sure we don't end up with an agro-fuel industry that ends up wrecking the very thing we seek to protect."

Abi Bunker, Agriculture Policy Officer at the RSPB, said:

"This report should serve as a wake-up call to government. Instead of jumping on the bioenergy bandwagon and regretting the damage later, the UK should be developing the bioenergy sector with care, avoiding damage to wildlife and making sure that emissions really are reduced."

Sian Atkinson, Conservation Policy Officer at the Woodland Trust, said:

"This is a crucial time. Bioenergy offers some positive opportunities, not just for reduction of greenhouse gases, but also to improve biodiversity. For example, development of the wood fuel industry could stimulate markets for low-grade timber,

¹ Paul Eccleston©, Telegraph.co.uk, July18, 2007

enabling much-needed restoration of ancient woodland sites planted with conifers. "However, there are also grave risks associated with the development of bioenergy, and we would urge the government to address these concerns as a matter of urgency."

Frances Griffith, Hon Vice-President, Council for British Archaeology, said:

"Although bioenergy offers a good potential avenue for reducing fossil fuel use, we must take care. Some of the establishment and cultivation processes for energy crops cause a great deal of soil disturbance. It is essential that proper advice is taken to ensure that we avoid archaeological sites - they may have survived in the ground for thousands of years, but they can be destroyed forever in an afternoon."

Helen Meech, Senior Policy and Campaigns Officer at the National Trust, said:

"It is crucial that the growth of bioenergy in the UK does not come at a high price - serious damage to our natural and historic environment. We're particularly concerned about potential environmental damage from intensively grown biofuel crops used for transport fuels."

The report calls for:

- (1) Minimum environmental standards and best practice guidelines for all bioenergy developments and government support conditional on meeting these.
- (2) Further research to fully understand the environmental impacts of energy crops.
- (3) Compliance with existing forestry and woodland standards to ensure sensitive management of forestry biomass.
- (4) Restoration of ancient woodland and other areas planted with non-native conifers.

The eleven groups behind the report are members of Wildlife and Countryside Link. They are: Association of Rivers Trusts, Butterfly Conservation, Bat Conservation Trust, Council for British Archaeology, CPRE, The Mammal Society, The National Trust, Plantlife, The RSPB, The Wildlife Trusts, and The Woodland Trust.

Biofuel Emission Costs Exceed Those From Fossil Fuels²

Conserving forests and grasslands would be a more efficient way of dealing with CO₂ emissions than using the same land to grow crops for biofuels, according to a new study. Forests could capture as much as nine times more carbon than the emissions saved by switching from fossil fuels to biofuels, the study states. In a policy forum published in *Science* the study's authors said policy makers should focus instead on improving the efficiency of fossil fuel use, conserving existing forests and grasslands and restoring natural habitats on land not needed for growing crops. Authors Prof Renton Righelato of World Land Trust and Dr Dominick Spracklen of School of Earth and Environment, University of Leeds, said that this would remain the case for the next 30 years until carbon-free fuel technologies could be developed and introduced. They say that the growing of crops for biofuels such as ethanol would require very large areas of land if they were to making a significant contribution to cutting CO₂ emissions. The report claims:

² Paul Eccleston©, Telegraph.co.uk, August 16, 2007

"The forestation of an equivalent area of land would sequester two to nine times more carbon over a 30-year period than the emissions avoided by the use of the biofuel. Taking this opportunity cost into account, the emissions cost of liquid biofuels exceeds that of fossil fuels. Moreover, large areas of land would be needed to make significant quantities of fuel. A 10 per cent substitution of petrol and diesel fuel is estimated to require 43 per cent and 38 per cent of current cropland area in the United States and Europe, respectively. As even this low substitution level cannot be met from existing arable land, forests and grasslands would need to be cleared to enable production of the energy crops. Clearance results in the rapid oxidation of carbon stores in the vegetation and soil, creating a large up-front emissions cost that would, in all cases examined here, outweigh the avoided emissions."

Sewage Could Be Used to Heat Half the Homes in Britain³

Up to half the UK's homes could be heated with gas made from waste food or sewage, according to research by the National Grid. The analysis suggested biodegradable waste could be used to make biomethane to be injected into the gas grid, which would help achieve targets to source 15 per cent of all energy from renewables by 2020. The study by Ernst and Young for National Grid also said that in the longer term, biogas could be used to provide up to half the country's domestic gas heating.

Currently a small amount of biogas is produced from landfill and sewage plants but is burnt to produce electricity, and National Grid believes piping the gas to homes would be more efficient. The study said the £10 billion costs of delivering renewable gas compares reasonably with the provision of other types of renewables, such as wind power, and the unit cost of the gas would be similar to other "green" energy sources. It would also provide the country with greater energy security to use waste products generated in the UK to provide gas as North Sea supplies of natural gas tail off. Biogas, which is already being produced and injected into gas grids in Europe, is made through anaerobic digestion of wet waste such as sewage or manure, or through gasification of drier waste or energy crops. Janine Freeman, head of National Grid's sustainable gas group, said:

"Biogas has tremendous potential for delivering large scale renewable heat for the UK but it will require Government commitment to a comprehensive waste policy and the right commercial incentives. Biogas has benefits on so many fronts. It is renewable and could help to meet the target of 15 per cent of all our energy coming from renewable sources by 2020. It provides a solution for what to do with our waste with the decline in landfill capacity and it would help the UK with a secure supply of gas as North Sea sources run down."

The report said there would be no insurmountable technical difficulties in delivering biogas, and with an extensive gas grid in the UK there would be little need for major new infrastructure development. National Grid said the main hurdle would involve getting commercial incentives for waste to be turned into biomethane for injection into the gas grid rather than electricity. A spokeswoman for the Department of Energy and Climate Change said: "Government set out its

³ Telegraph.co.uk, February 02, 2009

policies on recovering energy from waste in its Waste Strategy 2007. "Further work is taking place in the context of our Renewable Energy Strategy to establish what potential might exist for biogas injection to the gas grid."

Farm Wins £500,000 to Turn Pig Muck Into Power⁴

A farm has secured a grant worth more than £500,000 to harness the power of pig muck by turning it into electricity. The company in East Lothian was handed the money to convert slurry and vegetable waste into energy. The Ruchlaw Produce Company in Dunbar, which employs 45 people, is the first farm in south east Scotland to use the technology. The waste is fed into an "anaerobic digester" to create methane and carbon dioxide, which are then be pumped into a biogas plant to generate electricity and hot water for heating. The digester, which will be formally unveiled by Scottish ministers this week, should be able to produce 832MW of electricity and 629MWH of heat.

It is hoped about 2,000 tons of vegetable waste will be gathered by local councils and producers to be converted into green energy, reducing landfill waste. Any extra waste generated from the new plant will be converted into fertiliser and excess fuel will be sold to the National Grid. The company, set on 137 hectares, has 3,200 breeding sows which produce 70,000 pigs a year. The £560,000 grant was secured from Rural Priorities, part of the Scotland Rural Development Programme.

Biofuel Requirements For Cars May Help Destroy the Rainforest, Watchdog Says⁵

Using biofuel in vehicles could be destructive to the rainforest as well as leading to higher green house gas emissions than using just petrol and diesel, a fuels watchdog has claimed. Fuel providers are compelled to add an increasing proportion of biofuel to diesel and petrol under the Renewable Transport Fuels Obligation. This year 3.23 per cent must be made up of biofuel and by 2020 that increases to 13 per cent. However, the first annual report by the Renewable Fuels Agency (RFA) claims that fuel companies are exploiting a loop hole which means they are not required to disclose the origin of nearly half the biofuel supplied to filling stations in 2009. Last year Esso reported the source of only 6 per cent of its biofuel while BP reported 27 per cent. Shell, the best performing of the main oil companies, only revealed two thirds of its biofuels origins.

Palm oil is the cheapest fuel to buy and is used by most companies to meet part of their biofuels obligation. However, it is also the most damaging to the environment due to the CO₂ released when forest is burnt down to create plantations. The RFA said: "The large proportion of unknown previous land use is of concern. If even a small proportion of this was carbon-rich grassland or forestland, it could have substantially reduced the carbon savings resulting from the renewable transport fuels obligation as a whole, or even resulted in a net release of carbon." Indonesia is the third largest CO₂ emitter after America and China due to the expansion of the palm oil industry.

⁴ Simon Johnson©, Telegraph.co.uk, September 20, 2009

⁵ Telegraph.co.uk, January 29, 2010

Oil companies can provide certified sustainable palm oil which is slightly more expensive but last year only 0.5 per cent of the 127 million litres of palm oil added to petrol and diesel came from sources approved by the Roundtable on Sustainable Palm Oil, an international monitoring body. The RFA report named Chevron, Murco and Topaz as failing to report any of the requirements under the RTFO.

Grass Cuttings To Be Used As Biofuel⁶

Grass cuttings could soon be used to power cars, under a scheme to transform garden waste into biofuel. According to the Carbon Trust, the carbon footprint of this new pyrolysis biofuel could potentially save 95 per cent of carbon compared to fossil fuels. The Carbon Trust has announced it is working with the University of York to research how using microwave technology could turn garden and wood waste into biofuel. Using microwaves, the waste is heated in the absence of oxygen through a process called pyrolysis. The research will look at how this process could be used to produce a biofuel to blend with fossil fuel or use as a pure fuel.

According to the Carbon Trust, the carbon footprint of this new pyrolysis biofuel could potentially save 95 per cent of carbon compared to fossil fuels. The trust also announced the creation of a new consortium of British businesses led by Axion Energy, which will aim to enhance existing pyrolysis technology to produce biofuels created from organic waste materials en masse. The consortium aims to produce its first biofuel from a pilot plant in 2014.

Tom Delay, chief executive of the Carbon Trust, said:

"Genuinely sustainable biofuels will be critical to help reduce the UK's transport emissions. By developing a method which overcomes the issues associated with some existing biofuels the UK has a vital role to play. In just a few years pyrolysis could change the way in which we produce biofuels and by 2020 be a commercially viable option. Within a decade we could see a network of mini biofuel refineries sited near landfill sites and other waste sources across Britain. "This unique consortium demonstrates the UK's strength in a crucial low-carbon technology and could lead the world in developing the cheapest and greenest of biofuels."

The consortium, which is using funding from the Department for Transport and the Department of Energy and Climate Change, also aims to significantly increase production of biofuel. They estimate this will save seven million tonnes of carbon, the equivalent to the annual emissions of three million cars. Regarding the consortium, Sadiq Khan, the Transport Minister, said: "Many biofuels such as those from waste, have the potential to provide significant carbon reductions. The challenge is identifying and developing those biofuels which deliver the most environmental benefits. This is exactly what we are doing by leading the way in conducting research into biofuel sustainability and production." Earlier this year, the first annual report by the Renewable Fuels Agency, a fuels watchdog, found that using biofuel in vehicles could be destructive to the rainforest as well as lead to higher green house gas emissions than using just petrol or diesel

Compiled and synthesized by:
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⁶ Chris Irvine©, Telegrph.co.uk, March 15, 2010