

Biofuels in Europe: Some legal and corporate social responsibility aspects

Growing world demand for hydrocarbons alongside concerns about security of supply and climate change has led, over the last few years, to rapid growth in the biofuels industry. Biofuels have become a key component in the EU's strategy to reduce greenhouse gases, with an EU wide commitment to a mandatory target of 10% renewable fuels in road transport by 2020, and a potential to cut the oil dependency of transport in Europe by 43 million tonnes of oil equivalent (mtoe) by 2020¹. Political support has also come from the US, with President Bush referring to a target of 20% of fuel from renewable sources in 10 years in his State of the Union speech this year.

The "run on biofuels" extends well beyond the western industrialised nations. This has, in March 2007, been reflected in the creation of the International Biofuels Forum (IBF), a joint project of Brazil, China, India, South Africa, the US and the European Commission.

However, whilst the European Union is introducing mandatory biofuel targets for vehicles (see below), some commentators have questioned whether the increased use of biofuels is ecologically and economically sustainable.



Silke Goldberg

In this article **Silke Goldberg**, an associate in Herbert Smith's London office, examines some of the legal aspects of the growing European biofuels industry, and looks at some issues relevant to the place of biofuels within a corporate social responsibility strategy.

The EU Biofuel Directive

Directive 2003/30/EC (the Biofuel Directive) aims to promote the use of biofuels, or other renewable fuels, to replace diesel or petrol for transport purposes in each Member State, with a view to contributing to objectives such as meeting climate change commitments, environmentally friendly security of supply and promoting renewable energy sources. The deadline for transposing the Biofuel Directive into national law was 31 December 2004. In the absence of a global legal framework for biofuels, the Biofuel Directive is one of the most ambitious multi-jurisdictional biofuel programmes world wide.

Under the Biofuel Directive, Member States have to ensure that a minimum proportion of biofuels and other renewable fuels is placed on their markets, and set national indicative targets. The Biofuel Directive specifies that biofuels has to represent 2% (calculated on the basis of energy content) of all petrol and diesel for

transport purposes placed on their markets by 31 December 2005. By 31 December 2010, this target increases to 5.75%.

For the purpose of meeting the target, biofuels may be made available in any of the following forms:

- as pure biofuels, or at high concentration in mineral oil derivatives, in accordance with specific quality standards for transport applications;
- as biofuels blended in mineral oil derivatives, in accordance with the appropriate European norms describing the technical specifications for transport fuels (EN 228 and EN 590); and
- under certain circumstances, as liquids derived from biofuels, such as ETBE (ethyl-tertiobutyl-ether).

Member States are under an obligation to monitor the effect of the use of biofuels in diesel blends above 5% by non-adapted vehicles and are required, where

appropriate, to take measures to ensure compliance with the relevant Community legislation on emission standards.

Member States also have to ensure that information is given to the public on the availability of biofuels and other renewable fuels. Biofuels, blended in mineral oil derivatives, exceeding the limit value of 5% of fatty-acid-methyl-ester (FAME) or of 5% of bioethanol have to be clearly labelled.

Before 1 July each year, Member States have to report to the Commission on:

- the measures taken to promote the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes;
- the national resources allocated to the production of biomass for energy uses other than transport; and
- the total sales of transport fuel and the share of biofuels, pure or blended, and other renewable fuels placed on the market for the preceding year.

Implementation

In the UK, the main policy vehicle to meet the obligations under the Biofuel Directive is the Renewable Transport Fuel Obligation (RTFO). Powers to set up an RTFO were provided by the Energy Act 2004, with the labelling obligations of the Biofuel Directive being transposed by the Biofuel (Labelling) Regulations 2004². The RTFO will, from April 2008, place an obligation on fuel suppliers to ensure that a percentage of their aggregate sales is made up of biofuels.

In contrast to other EU Member States, who have chosen to implement the targets of the Biofuel Directive by way of tax incentives, the UK has modelled the RTFO on the existing Renewables Obligation in the electricity supply industry. According to the Department for Transport, the RTFO is expected to reduce the carbon emissions from road transport in 2010 by about 750,000 tonnes.

A yet to be appointed administrator will issue RTF Certificates (RTFCs) according to the quantity of renewable fuel on which duty has been paid. Companies will be able to trade RTFCs. If a fuel supplier does not hold enough RTFCs at the end of each compliance period it will have to make a payment (see below) into a buy-out fund. The payment for insufficient RTFCs will be 15 pence per litre in the first year of operation of the RTFO. Until 2008/9, biofuels will also benefit from a 20 pence per litre duty incentive.

The levels of obligation for the years 2008/9 to 2010/11 were set out in the 2006 Budget:

Financial Year	Level of Obligation
2008/09	2.5%
2009/10	3.75%
2010/11	5%

It should be noted that these targets have been set on a volume basis for aggregate renewable fuel sales. They do not include separate biodiesel and bioethanol targets and fall below the reference value set out in the Biofuel Directive for 2010.

According to the Department for Transport, this anticipated shortfall follows stakeholder consultation and takes a number of factors into account, including EU fuel quality standards, anticipated sustainability risk in relation to the sourcing of quality biofuels, the time required to build new production capacity (in relation to securing investment and obtaining planning permission for, as well as the construction of, new facilities), time required to develop supply infrastructure (in particular in relation to new storage tanks and securing the investment needed for fuel terminals). The UK Government has also indicated that the RTFO targets could rise beyond 5% after 2010-11, if the relevant infrastructural conditions and vehicle standards are met.

The first phase of the RTFO (2008-11) includes a mandatory carbon and sustainability reporting scheme. Under the scheme, companies have to report on the sourcing of their biofuels or feedstock.

EU Fuel Quality Standards

Directive 98/70/EC relating to the quality of petrol and diesel fuels, and amending Council Directive 93/12/EC, (the Fuel Quality Directive) sets common EU specifications for petrol, diesel and gas oil used in road vehicles, inland waterway barges and non-road mobile machinery such as locomotives, earth moving machinery and tractors. The 5.75% by volume target prescribed by the Biofuel Directive represents the maximum biofuel content allowed under the Fuel Quality Directive. Whilst legislators in Europe may be getting to grips with new requirements and targets, it should be remembered that alternative fuels for transport are already well established in many jurisdictions and, as biofuel proponents are quick to remind us, that the modern day car industry has its roots in biofuels. Henry Ford's model T ran on ethanol and the first generation of diesel engines were designed to run on peanut oil.

Currently all petrol engines can use fuel containing 5% biofuel without modifications or violation of manufacturers' warranties, and some models, including versions of the Saab 9-5 and Ford Focus, have been adapted to take a blend containing 85% biofuel. Biofuel proponents estimate that the trend towards these "E85" motor engines will continue.

In a bid to create the legislative conditions for the future use of biofuels, the European Commission, in January 2007, launched its proposal to review the Fuel Quality Directive to allow up to 3.7% oxygen by mass in "high biofuel petrol" (current value 2.7%), and 10% ethanol by volume. Other minor amendments proposed by the European Commission include changes to the maximum permissible level of sulphur in gas for use in non-road mobile machinery to enable future emissions control technology on these machines. The Department for Transport in the UK is carrying out a consultation on the Commission's proposals which closes on 22 November 2007.

International industry trends and developments

Global production of ethanol doubled between 2000 and 2005, with Brazil and the USA competing for the lead position for ethanol production.

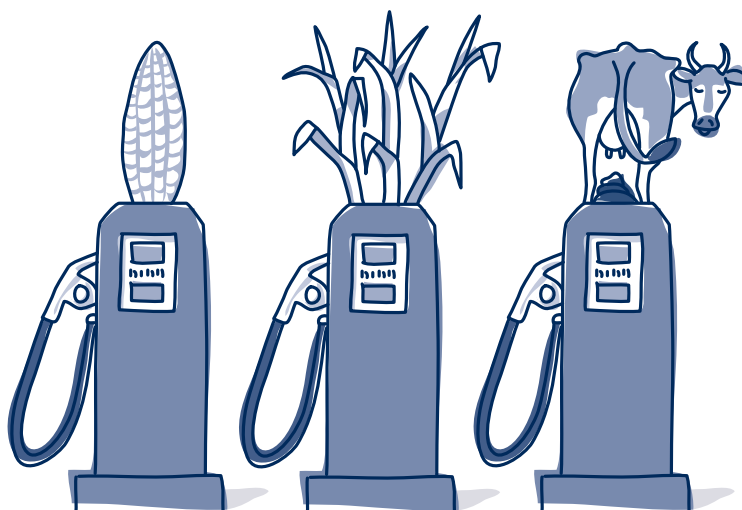
In 2005 Brazil generated some 16 billion litres per year of ethanol from its sugarcane industry and it is reported that eight out of 10 Brazilian cars run on ethanol. Brazil has attracted significant investment from Europe. Germany's MAN Ferrostaal has teamed up with Brazil's Etanalc and Semptra Energy of the US to create the largest ethanol-export company in Brazil, investing US\$8.4 billion building 24 distilleries that should return US\$53 billion in export revenue over a 20 year period. Epuron, another German investment company, has also announced plans to build bioethanol plants in Brazil. In April 2007 Denmark and the Brazilian state oil company, Petrobras, signed a biofuel research co-operation agreement to assist Denmark in fulfilling its obligations under the Biofuel Directive.

In North America, Primafuel is set to invest US\$90 million to construct a 60 million gallons per year alternative fuel plant on 14 acres of port land. Upon completion of the plant almost 25% of the biodiesel produced in the US

will originate from West Sacramento. In June 2007 E3 BioFuels launched the world's first closed-loop ethanol plant in Mead, Nebraska. The US\$80 million development is fuelled largely by biogas from animal waste instead of coal or natural gas. This patented technology virtually eliminates the need for fossil fuels in the production of ethanol. It will produce 25 million gallons of ethanol a year and consume 300,000 tonnes of manure. On the east coast, a US\$250 million biofuels ethanol plant is under development in Fulton, New York. The facility will produce 114 million gallons of corn ethanol per year and is expected to be completed in December 2007.

Africa and Asia are also making substantial inroads in biofuel production. Projects in Africa include a US\$550 million biofuel plant in Corrumane, Mozambique. It is expected that the plant, once complete, will produce 226 million litres of ethanol and biodiesel. In India, a bioethanol programme calls for 5% ethanol blends throughout most of the country, seeking to raise this requirement to 10% and 20% ethanol. In China the government is making 10% ethanol blends mandatory in five provinces that account for 16% of the nation's passenger cars.

In the UK developers are also responding to the new demand for production capacity. Herbert Smith recently advised British Sugar on a three-way joint venture with BP and DuPont to build a £225 million ethanol plant which may be converted to produce biobutanol. Biobutanol is of special interest as it can be blended into gasoline at higher concentrations than existing biofuels without the need to convert vehicles. It is also reported to offer better fuel economy than gasoline-ethanol blends and might prove of interest in the current debate about EU fuel specifications. In addition, BP and D1 Oil plc have recently announced significant new investments in the biofuel sector.



Biofuels and corporate social responsibility

Corporate social responsibility issues are placing pressure on the biofuels industry, with concerns around the role of energy demand in food crop price volatility and the economic pressures to convert rainforest to agricultural land. Biofuels' green credentials are also under scrutiny.

In 2003 the European Council of Automotive Research, CONCAWE (the European association for environment, health and safety in refining and distribution set up by a number of international oil companies), and the Joint Research Centre of the European Commission published the first findings of a joint evaluation of the "Well-to-Wheels" energy use and greenhouse gas emissions for a wide range of potential future fuels. An updated version of the report was published in 2007.

Whilst the report suggested that first generation biofuels can save up to 60% carbon emissions, and second generation biofuels up to 80%, as compared to using fossil fuels, it pointed out that the fossil energy and greenhouse gas savings of conventionally produced biofuels such as ethanol and biodiesel are critically dependent on manufacturing processes and the use of any by-products. Emissions from biofuels typically stem from fertilisers and processing, transportation of the relevant biomass, and transport of the biofuels to the end consumer.

In particular, the greenhouse gas balance of certain biofuels is uncertain due to nitrous oxide emissions from agriculture. Biofuels generated from rapeseed and corn have been criticised in particular for producing more greenhouse emissions than they save compared to conventional fuels.

Fears of rising food prices as a result of biofuel agriculture has, for example, led the National Development and Reform Commission of China to stop granting new ethanol licences for cereal crop based biofuel projects. Increasing demand for corn in Mexico, which imports 30% of its corn from the US, and associated price augmentations for the cereal have been linked to the pressure placed on the Mexican corn market by demand for corn crops as feedstock for biofuels in the US. To avoid future distortions of its national corn market, the Mexican congress is, as part of a bill to promote and develop biofuels (Ley de Promoción y Desarrollo de los Bioenergéticos), encouraging the development of sugar cane as a feedstock for biofuel produced in Mexico and debating a specific exclusion on the use of corn.

Other environmental and social concerns in relation to unsustainably produced biofuels are linked to deforestation and threats to biodiversity as a result of increased competition between food and biofuel crops for arable land.

Jatropha, fuel of the future?

In the wake of the sustainability of biofuels debate, one plant seems to be emerging as a future feedstock of choice for transport and, potentially, power generation. Originally native to Central America, the jatropha plant grows in tropical and subtropical climates and can survive tough climate conditions, including, apparently, three consecutive years of drought.

The low costs associated with jatropha make it yet more attractive. According to reports in *The Times* (18 July 2007), the cost of 1,000 jatropha saplings (enough for one acre) in Pakistan is about £50, and 1 kilogramme of jatropha seeds in India costs circa 7 pence. Every 8,000 hectares of the plant can run a 1.5 megawatt power station, enough to power 2,500 homes. When the seeds are crushed, the resulting oil can be burnt in a standard diesel car, while the residue can also be processed into biomass to power electricity plants.

Industry has already picked up on opportunities generated by jatropha farming, with BP and D1 Oils having entered into a US\$160 million partnership to cultivate jatropha on around 1 million hectares of land in Southern Africa, India, South East Asia and Central and South America.

D1 Oils is already growing 430,000 acres of the plant to feed its biodiesel operation at Teesside, England, following a large planting programme in India and has acquired two further trial sites of 1,235 acres in West Java, Indonesia. If successful, these will become a 25,000 acre plantation. At the end of September, D1 Oils also announced a co-operation agreement with KeyGene NV of the Netherlands to pursue molecular genetics research in jatropha.

However, warnings about jatropha competing with food crops for arable land in Africa remain a concern together with potential health issues. Western Australia's Agriculture Protection Board has placed a state-wide ban on jatropha as it is classified as an invasive plant and highly toxic to humans and livestock.

Conclusions

Biofuels have become a key component in the search for alternative energy in industrialised and developing countries alike. As the industry grows, investment opportunities will continue to arise globally. However, a number of environmental and social concerns will need to be addressed to enable biofuels to reach their full economic and ecological potential. Second generation biofuels with lower greenhouse gas emissions as well as sustainable sourcing of feedstock, from sugar cane and potentially jatropha, combined with sustainability certification may prove to be part of the solution.

Biofuels – Terminology guide

Biobutanol

Biobutanol is produced by fermentation of crops in an almost identical process to that which produces bioethanol, but is considered to be more efficient and is able to enhance the performance of ethanol blends in petrol. It does not absorb water in the same way as ethanol and so can be added at the refinery instead of having to be shipped separately and blended with petrol closer to the filling station.

Biodiesel

Biodiesel is a fuel equivalent to regular diesel, it is processed fuel derived from biological sources (such as vegetable oil) which can be used in un-modified diesel-engine vehicles. It is bio-degradable and non-toxic.

Bioethanol

Bioethanol is the principle fuel used as a petrol substitute for road transport vehicles. It is mainly produced by the sugar fermentation process. The main source of sugar required to produce ethanol comes from crops such as wheat, sugar cane, sugar beet and oil seed rape.

Biofuel

Biofuels are any solid, liquid or gas fuel consisting of, or deriving from, biomass. Biofuel is considered a means of reducing greenhouse gas emissions and increasing energy security by providing an alternative to fossil fuels.

Biogas

Biogas is a mixture comprising mainly methane and carbon dioxide. It is produced when organic matter decomposes in the absence of oxygen. This can take place in a landfill site to give landfill gas or in an anaerobic digester to give biogas. Sewage gas is biogas produced by the digestion of sewage sludge.

Biohydrogen

Biohydrogen is hydrogen converted from methane which has been produced during anaerobic digestion from biomass, and/or from the biodegradable fraction of waste. It is used as biofuel.

Biomass

Biomass refers to living and recently dead biological material which can be used as fuel or for industrial production. Most commonly, biomass refers to plant matter grown for use as biofuel, but it also includes plant or animal matter used for production of fibres, chemicals or heat. Biomass may also include biodegradable wastes that can be burnt as fuel. It excludes organic material which has been transformed by geological processes into substances such as coal or petroleum. It is usually measured by dry weight, and is the total mass of living matter.

Biomethanol

Biomethanol is methanol produced from biomass, to be used as biofuel in a similar way to bioethanol. However, due to necessary extra safety precautions needed during production, it has not been as widely developed as a replacement for petrol.

Pure vegetable oil

This is oil produced from plants through pressing, extraction or comparable procedures. The oil may be crude or refined but can be used in its chemically unmodified state, when compatible with the type of engines involved and the corresponding emission requirements.

Syngas and synthetic biofuels

Syngas is a synthetic natural gas mixture containing carbon monoxide and hydrogen and is generated by the gasification of a carbon containing fuel, eg biomass. Syngas is similar to natural gas and can be cleaned and conditioned to form a feedstock for production of methanol and ammonia. Synthetic biofuels are synthetic hydrocarbons or mixtures of synthetic hydrocarbons, which have been produced from gasified biomass, liquefied via the Fischer-Tropsch process. This process is a catalysed chemical reaction in which carbon monoxide and hydrogen are converted into liquid hydrocarbons of various forms.

footnotes

1. COM, 2006, 845, 2006, *Biofuels Progress Report*: http://ec.europa.eu/energy/energy_policy/doc/08_biofuels_progress_report_annex_en.pdf.
2. Statutory Instrument 2004 No. 3349.