European Commission

Fact Sheet

BIOFUELS IN THE EUROPEAN UNION: AN AGRICULTURAL PERSPECTIVE

Contents

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Introduction

The European Union (EU), in common with the rest of the world, must adapt to the challenges posed by climate change and other environmental issues, and over-dependence on fossil fuel. Faced with the need to reduce greenhouse gas emissions, while at the same time seeking to diversify sources of energy, the EU is re-examining how agriculture can contribute to meeting these challenges.

In the EU, transport is responsible for almost one quarter of greenhouse gas emissions. It is therefore essential to find ways of reducing emissions from transport. Nearly all the energy used for transport comes from oil, for which the EU is heavily dependent on imports. Biofuels provide the best option in the short to medium term to replace a significant share of fossil fuels. Biofuels are processed from biomass, a renewable resource, and can be readily integrated into fuel supply systems.

This fact sheet describes how agriculture can play a role in helping to provide more renewable energy, specifically via the use of biofuels. The EU has a significant potential for the production of biofuels. The fact sheet also outlines the crucial role of EU policies in shaping the future development and use of renewable energy. EU and individual Member States' regulatory and other measures play a key role in determining the level of demand for biofuels. Without clear policies to address demand it is difficult for fledgling biofuel technologies to move from the experimental phase to pilot and then full production status.

EU policies are key to building sufficient critical mass in biofuels, and to buying time for a second generation of biofuels to join the first generation in the fuels market.

"There has never been a better moment to push the case for biofuels. Crude oil prices remain high. We face stringent targets under the Kyoto Protocol. And the recent controversy over imports of Russian gas has underlined the importance of increasing Europe's energy self-sufficiency. Raw materials for biofuel production also provide a potential new outlet for Europe's farmers, who have been freed by CAP reform to become true entrepreneurs."

Mariann Fischer Boel, Commissioner for Agriculture and Rural Development, 8 February 2006

1. Biofuels – the overall context

The EU is at the forefront of international efforts to combat climate change and has played a key role in the development of the two major treaties addressing the issue, the United Nations Framework Convention on Climate Change and its Kyoto Protocol[1]. Biofuels are just one element in the complex strategic debate over how to meet the world's future energy needs. Given that economic, environmental and political issues are trans-national in character, it is natural that the EU should develop policies that address these issues on behalf of all 25 Member States.

a) EU policy for renewable energy

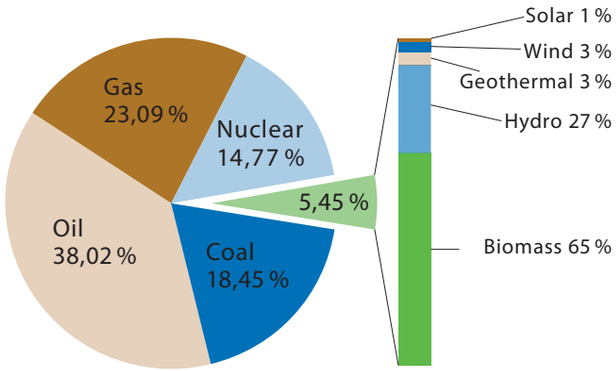
The development of renewable energy – particularly energy from wind, water, solar power and biomass – is a central aim of the EU's energy policy. There are several reasons for this:

- Renewable energy has an important role to play in reducing Carbon Dioxide (CO_2) and other greenhouse gas emissions – a major EU objective
- Increasing the share of renewable energy in the energy balance enhances sustainability. It also helps to improve the security of energy supply by reducing the EU's growing dependence on imported energy sources
- In the medium to long term, renewable energy sources are expected to be able to compete economically with more conventional energy sources

Several of the technologies, especially energy from biomass, but also wind energy, small-scale hydro power, and solar thermal applications, can be economically viable and competitive. But they depend on how rapidly increasing demand and production volumes can bring about the economies of scale necessary for competitiveness with existing large-scale energy generation systems.

The European Commission's White Paper for a Community Strategy 'Energy for the future: Renewable Sources of Energy'[2] sets out a strategy to double the share of renewable energies in gross domestic energy consumption in the EU by 2010 (from the present 6 % to 12 %), including an Action Plan with a timetable for achieving this objective.

Breakdown of Energy Consumption in the EU-25 in 2002 (source Eurostat)



b) Biomass – a potential major source of energy

Biomass is by far the most important renewable energy resource. Around 4 % of the EU's total energy consumption is met from biomass. In December 2005, the Commission published a Biomass Action Plan with the objective of increasing the use of energy derived from forestry, agriculture and waste materials. The plan also sets out a coor-

[1] The 1997 Kyoto Protocol shares the objective, principles and institutions of The United Nations Framework Convention on Climate Change. It significantly strengthens the Convention by committing 'Annex I Parties' to individual, legally-binding targets to limit or reduce their greenhouse gas emissions

[2] COM (97) 599 final of 26.11.1997 - http://europa.eu.int/comm/energy/library/599fi_en.pdf

dinated programme for EU action, including measures to improve the supply of and demand for biomass, to overcome technical barriers, and to develop research.

c) The climate change challenge for the transport sector

In the EU transport is responsible for an estimated 21 % of all greenhouse gas (GHG) emissions that contribute to climate change. This percentage continues to rise as does energy demand for transport. In order to meet sustainability goals, in particular the reduction of GHG emissions agreed under the Kyoto Protocol, it is therefore essential to find ways of reducing emissions from transport. Vehicle manufacturers are developing new models that are cleaner and more fuel efficient. The use of biofuels can also play a role in addressing this objective.

d) Energy dependency

Nearly all the energy used in the EU transport sector comes from oil. It has been estimated that fuel demand for transport will continue to increase up to 2030[3]. Existing oil reserves are limited in quantity and restricted to a few world regions. New reserves exist, but will generally be more difficult to exploit. Securing energy supplies for the future is not only a question of reducing import dependency, but calls for a wide range of policy initiatives, including diversification of sources and technologies.

Glossary

Biomass
Biomass includes non-food products which are used for various purposes. It has an important role to play as a feedstock material for renewable energy generation, whether for electricity, heating and cooling or for transport fuels. Biomass includes a wide range of products, by-products and waste streams from forestry and agriculture as well as municipal and industrial waste streams. It thus includes trees, arable crops, algae and other plants, agricultural and forest residues, effluents, sewage sludge, manure, industrial by-products and the organic fraction of municipal solid waste. After a conversion process, the biomass can be used to provide heat, electricity or transport fuel, depending on the conversion technology and the type of primary biomass.

Bio-energy
Bio-energy is the energy derived from biomass, including biofuels. Biomass materials include wood, agricultural crops, forestry and agricultural residues and organic waste.

Biofuels
Biofuels are fuels produced from biomass, mainly of agricultural origin. The term commonly applies to liquid transport fuels, but is also used for gas and solid fuels such as wood pellets and chips.

At present, three biofuels account for almost all consumption in the transport sector world-wide:

- ***Bioethanol,*** mainly produced by fermentation of cereals, starch and sugar crops, is currently the world's main biofuel. However, the most frequent use of ethanol in the EU at present is through conversion into derivatives, such as ETBE (ethyl tertiary butyl ether composed of a mixture of ethanol and fossil fuels)
- ***Biodiesel*** produced from oilseeds crops and other raw materials, which until recently was produced almost solely in the EU, is now gaining a foothold in other regions across the world
- ***Biogas*** production, from energy crops and organic wastes, is another available option that is (so far) less developed

Energy crops
Energy crops are those annual and perennial species that are specifically cultivated to produce solid, liquid or gaseous forms of energy, including biofuels. These are mainly: oilseeds crops (rape, soya, sunflower), cereals (wheat, barley, maize, rye), sugar beet, and perennial crops (miscanthus, short rotation coppice, eucalyptus).

A full glossary of biofuels terms can be found in the Commission's Communication 'An EU strategy for biofuels' of February 2006[4].

[3] Study "Energy and transport: outlook to 2030", European Commission, DG Transport and Energy, 2003.

[4] See: http://ec.europa.eu/comm/agriculture/biomass/biofuel/com2006_34_en.pdf, Annex 1

The central importance of energy policy in helping the EU meet the challenges of globalisation was confirmed by EU heads of state and government at their 'Summit' meeting in March 2006, where the Commission presented proposals for the development of a reinvigorated Energy Policy for Europe. In its conclusions the Presidency of the Council identified three main objectives:

- To increase security of supply
- To ensure the competitiveness of EU economies and the affordability of energy supply in a stable regulatory framework
- To promote environmental sustainability.

In this context target consumption shares of 15% for renewable energies and 8% for biofuels, by 2015, were suggested.

e) Agricultural biomass and rural development

In addition to the objectives of finding more renewable sources of energy, and of reducing dependence on fossil fuels, the development of biofuels from agricultural biomass could offer to the agricultural sector, and to rural areas more widely, much needed opportunities for diversification and job creation. This is consistent with the EU's 'Lisbon Strategy', which aims to provide the EU's citizens with better opportunities for growth and employment in an environmentally and socially sustainable way.

Progress in agricultural productivity, changes in the Common Agricultural Policy (CAP), and increasing world competition, mean that the pattern of EU agricultural production will have to adapt. Bio-energy production is an interesting new outlet for agricultural and forestry products which may help in this adaptation process.

2. Biofuels technologies

Encouragement of the production of biofuels, whether for environmental or strategic reasons, is a dynamic process. Until now biofuels have been produced by processing agricultural crops using the available technologies. The challenge is to produce biofuels from diversified raw materials by using innovative processes and technologies that are commercially viable. This includes the short-term improvement of existing technologies and the development of more advanced biofuels, for which the environmental and economic gains are expected to be even more positive.

a) First-generation biofuels

First-generation biofuels can be used in low-percentage blends with conventional fuels in most vehicles and can be distributed through existing infrastructure. Some diesel vehicles can run on 100% biodiesel, and 'flex-fuel' vehicles[5] are already available in many countries around the world. Replacing a percentage of diesel or petrol with biofuels is therefore the simplest way for the transport sector to make an immediate contribution to the Kyoto targets, particularly given that the benefits can apply to entire vehicle fleets.

[5] Cars that run on either gasoline or ethanol

Developing a substitute for diesel has been of particular importance in the European context, given that the EU is currently a net importer of diesel but an exporter of petrol. However, even using the most modern technologies, the cost of EU-produced biofuels makes it difficult for them to compete economically with fossil fuels.

Nevertheless, encouraging the use of currently available biofuels may be seen as an intermediate step to reduce greenhouse gas emissions, diversify transport energy sources, and to prepare the EU economy for other alternatives in the transport sector which are not yet ready.

By actively embracing the global trend towards biofuels and by ensuring their sustainable production, the EU can exploit and export its experience and knowledge, while engaging in research to ensure that we remain in the vanguard of technical developments. A clear strategy for the EU will also be to promote lower production costs.

The construction of plants to produce alternative fuels from diversified raw materials, the introduction of new engine types and the adaptation of the fuel distribution system entail long-term investments which need stable prospects for market demand.

b) Second-generation biofuels and beyond

Advanced conversion technologies are needed for a second generation of biofuels. The second generation technologies will use a wider range of biomass resources – agriculture, forestry and waste materials – and will help to achieve significant reductions in GHG emissions and the costs of fuel production.

One of the most promising second-generation biofuel technologies – ligno-cellulosic processing (e.g. from forest materials) – is already well advanced. Pilot plants have been established in the EU, in Denmark, Spain and Sweden. Other technologies to convert biomass to liquid biofuels (BtL) include Fischer-Tropsch biodiesel and bio-DME (dimethyl ether). Demonstration plants are in operation in Germany and Sweden.

The CARS 21 High Level Group[6] has identified second-generation biofuels as particularly promising and has recommended that their development should be given substantial support.

To prepare for the large-scale use of cost-competitive biofuels, continued research and development is needed to make the new technologies successful. The European Biofuels Technology Platform[7] and other technology platforms can play a vital role in achieving this.

Development will be monitored at EU level with the aim of providing support at the appropriate time for the upgrading of demonstration projects to commercial scale operations. At the same time, guarantees must be given as to the environmental benefits of all new processes and any non-technical barriers to their acceptance will have to be removed.

[6] See: http://europa.eu.int/comm/enterprise/automotive/pagesbackground/competitiveness/cars21.htm
[7] See: http://cordis.europa.eu.int/technology-platforms/home_en.html

3. Production and consumption of biofuels

The latest data on the EU biofuels market are presented here. The market is developing fast, therefore these statistics may quickly become outdated. Nevertheless, they show the extent of production and use of biofuels, and the speed at which the market is expanding.

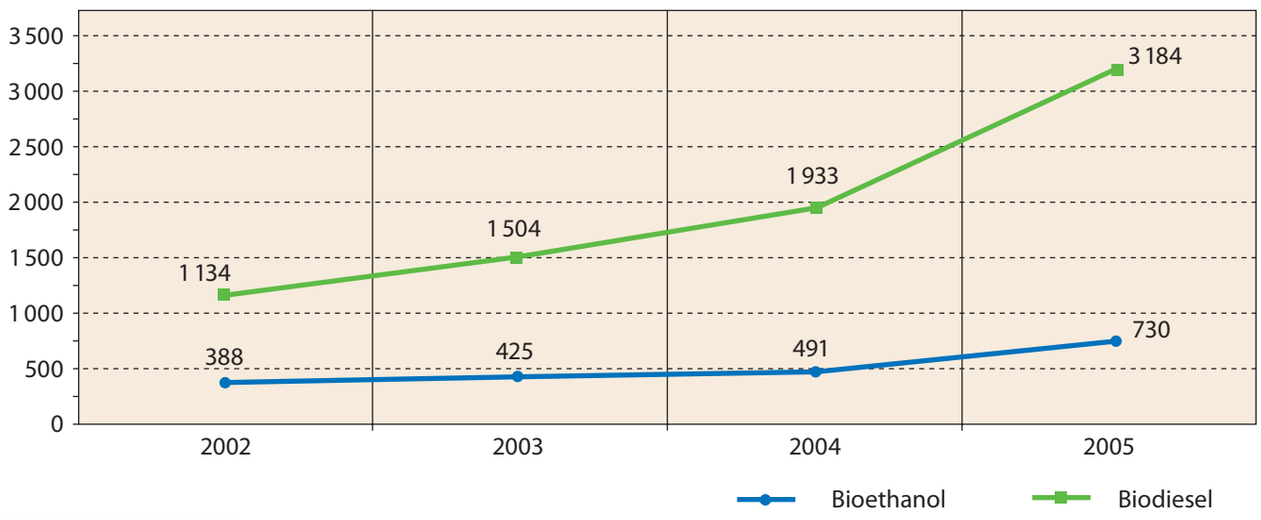
a) The biofuels market in the European Union

The latest years, the EU has notably increased its production of biofuels, in particular of biodiesel, the most important biofuel produced in the EU.

EU production of biofuels was 3.9 million tonnes in 2005[8] with bioethanol accounting for 0.7 million tonnes and biodiesel for 3.2 million tonnes. This represented less than 1 % of EU petrol and diesel consumption. Total production in 2005 increased by over 60 % compared with the previous year, in which 2.4 million tonnes of biofuels were produced[9] (1.9 million tonnes of biodiesel and 0.5 million tonnes of bioethanol).

In 2005 the total area used for energy crop production was around 2.8 million hectares (0.9 million hectares on set-aside, nearly 0.6 million hectares under the energy crops regime – see section 6 – and approximately 1.3 mil-

Trends in the EU production of biofuels (in 1 000 tonnes)



[8] According to estimates provided by the European Biodiesel Board (EBB), the European Union of Ethanol Producers (UEPA) and the European Bioethanol Fuel Association (eBIO)

[9] According to EurObserv'ER (Observatoire des énergies renouvelables), "Le baromètre des biocarburants" (See : http://europa.eu.int/comm/energy/res/sectors/bioenergy_publications_en.htm)

lion hectares without any specific support regime[10]), representing about 3 % of total EU-25 arable land.

EU production of bioethanol is estimated to have used around 1.2 million tonnes of cereals and 1 million tonnes of sugar beet in 2004 as raw materials. This represented 0.4 % of total EU-25 cereals and 0.8 % of sugar beet production. Apart from France, where three-quarters of bioethanol is obtained from sugarbeet, the majority of EU plants process grains (mainly maize, wheat and barley). The leading EU producers of bioethanol are Spain, Germany, Sweden, and France. The leading consumer is Sweden, which takes about 80 % of the quantities imported, mostly from Brazil.

EU biodiesel production is estimated to have used 4.1 million tonnes of rapeseed in 2004, nearly 40 % of EU-25 rapeseed production. This year, it is expected that near 60 % of the rapeseed oil will be used for production of biodiesel and, to a lesser extent, directly as refined rapeseed oil for fuel. The EU is the world's leading region for the production and consumption of biodiesel. Germany is the EU's main producer, followed by France, Italy, and the Czech Republic.

Biofuels production capacity in the EU is developing strongly as a consequence of commitments undertaken by Member States (see figure 1 'National indicative targets for biofuels market share in EU Member States'). Production capacity is estimated at 1.7 million tonnes of bioethanol by the end of 2006 and, with new investments announced, this capacity is likely to treble by the end of 2008. The expected capacity in 2006 will need to process about 3.7 million tonnes of cereals and just over 5 million tonnes of sugarbeet. According to data from the European industry, biodiesel production capacity may reach six million tonnes in 2006 and 8 million tonnes in 2007. In 2006, it is expected that 58 % of EU rapeseed oil will be used for production of biodiesel[11].

[10] This is an estimate as the areas dedicated to biofuels crops outside the existing support schemes are not recorded at present

[11] Oil World, 21 April 2006.

[12] The data are expressed in thousands of tonnes (1 tonne = 1 250 litres)

EU production of biofuels (1 000 tonnes)[12]

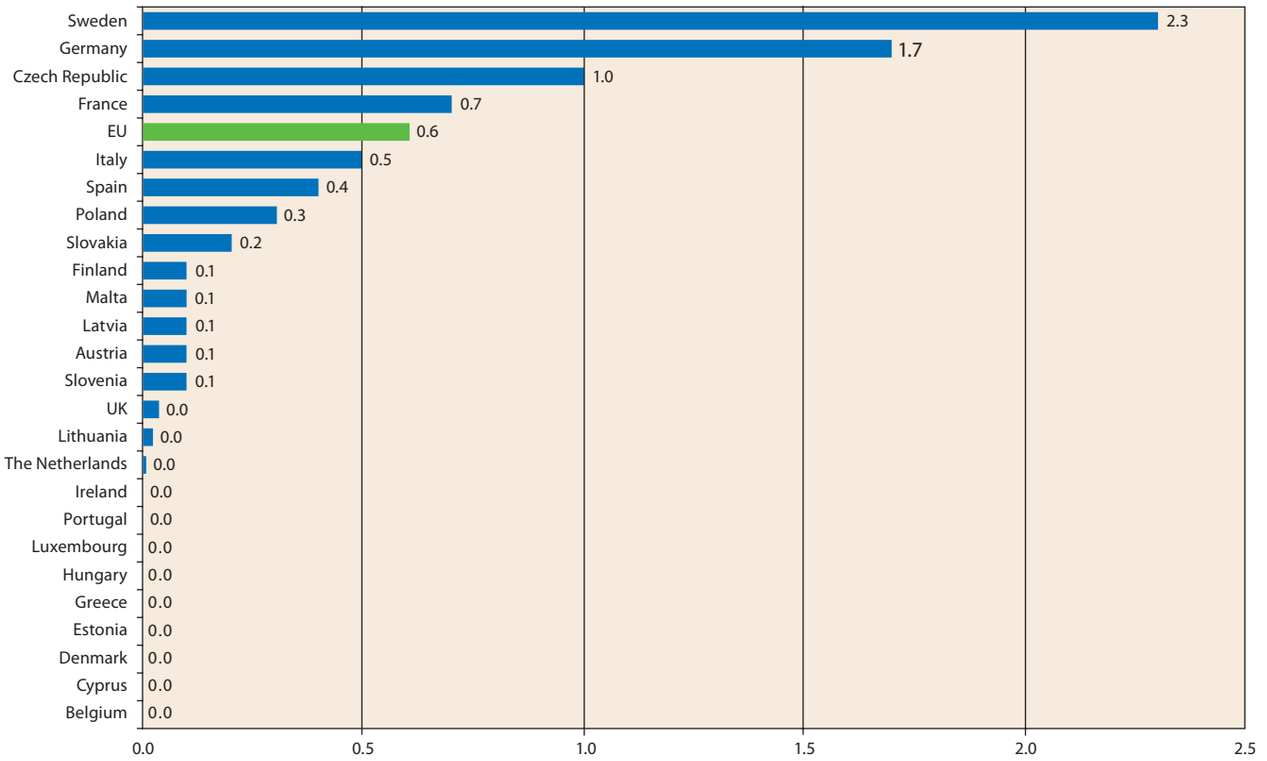
	Biodiesel		Bioethanol	
	2005	**2004**	**2005**	**2004**
Germany	1 669	1 035	135	20
France	492	348	115	102
Italy	396	320	6	-
Austria	85	57	-	-
Spain	73	13	243	194
Denmark	71	70	-	-
UK	51	9	-	-
Sweden	1	1.4	123	52
Finland	-	-	10	-
Czech Republic	133	60	-	-
Slovakia	78	15	-	-
Hungary	-	-	28	-
Lithuania	7	5	6	-
Poland	100	-	51	36
Slovenia	8	-	-	-
Estonia	7	-	-	-
Latvia	5	-	10	-
The Nederlands	-	-	6	-
Greece	3	-	-	-
Malta	2	-	-	-
Cyprus	1	-	-	-
Belgium	1	-	-	-
Portugal	1	-	-	-
Wine intervention stocks*	-	-	-	87
EU-25	**3 184**	**1 933.4**	**730**	**491**

Sources: EBB (biodiesel), EurObserv'ER 2005 (bioethanol 2004), eBIO (bioethanol estimations for 2005).

*In 2005, the production based on wine intervention stocks purchases (about 185.000 tonnes) is included in the production of each country.

Data from 2005 show that consumption of biofuels varies significantly between Member States. Sweden is the most important consumer of biofuels (2.3 % of diesel and petrol used), followed by Germany, the Czech Republic and France, all above the EU average of 0.6 % of total fuel use (see figure 1 – 'Share of biofuels consumption in EU Member States').

Share of biofuels consumption in EU Member States, 2004 (% energy content)[13]



b) World biofuels production

Bioethanol is currently the world's leading biofuel. Biodiesel, until recently only produced in significant quantities in the EU, is now gaining a foothold in several parts of the world. Biogas comes third and has so far made a breakthrough only in Sweden. In 2005 world production of bioethanol for fuel use was approximately 26.9 million tonnes. This represents around 2% of global petrol use. Production is set to increase by around 15% in 2006 to reach 31 million tonnes.

Brazil is the world's leading producer of bioethanol, with nearly 13 million tonnes produced, followed by the United States with 11.8 million tonnes of production. Brazil's sugarcane area is constantly being extended in order to meet growing domestic and export demand. With around one million flex-fuel cars expected to be on Brazil's roads by the end of 2005, the availability of bioethanol for export could be reduced, at least in the short term. In the US bioethanol output is expanding at an unprecedented rate and is expected to match that of Brazil in 2006.

In Asia, Thailand is building over a dozen ethanol plants which use sugar cane and rice husks as their feedstock. Thailand's ethanol production capacity could rise to 1.5 million tonnes per year. Pakistan, the world's largest exporter of molasses, is launching a domestic bioethanol

[13] The sources are National reports under the Biofuels Directive, except Greece, Italy, and Lithuania in which cases total fuel consumption is based on reporting for Fuel Quality Monitoring, and total biofuels consumption based on Biomass Action Plan data

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World fuel ethanol production (1 000 tonnes)		
	2005	**2004**
Brazil	12 900	11 700
United States	11 800	10 300
Canada	200	200
European Union	730	491
Asia, of which China India Thailand	1 090 800 240 50	885 800 80 5
Australia	50	32
Colombia	120	-
World	**26 890**	**23 608**

Source: F.O. Licht's, World ethanol and Biofuels Report, May 2006.

programme to absorb some of its estimated 400 000 tonnes production capacity. India is also developing its bioethanol production from sugar cane. China's ethanol industry comprises over 200 production facilities in 11 provinces, capable of producing more than 10 million tonnes of ethanol each year. Several ACP[14] sugar-producing countries plan to diversify into bioethanol, but whether many of them will be able to produce at sufficiently low cost to be competitive is uncertain. Nor is the potential for biofuel production limited to countries that grow sugar cane. Nigeria is considering the use of cassava, of which it is the world's leading producer. Other crops, such as sweet sorghum (for bioethanol) and jatropha (for biodiesel), require lower fertiliser input, are more resistant to drought and can be grown in any region of the world. However, yield volatility may reduce their long-term profitability.

[14] African, Caribbean and Pacific states

In countries where a large-scale expansion of feedstock production is likely to take place, there may be environmental concerns related to pressures on eco-sensitive areas such as rainforests. There may also be concerns regarding the effects on soil fertility, water availability and quality, and the use of pesticides. These concerns need specific investigation and quantification and, if necessary, should be addressed. EU development policy will aim to help some developing countries capture the benefits offered by biofuels, while addressing these concerns in an appropriate way.

Like the EU, a number of countries have set short and long-term targets for the percentage or quantity of biofuels to be incorporated into conventional fuel. Measures to encourage biofuel development include: tax incentives such as waivers of excise and/or fuel tax (United States) making the fuel cheaper to buy than conventional petrol or diesel; and, grant and loan programmes for the construction of processing plants or the development of feedstock (Australia).


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4. Biofuels trade

Biofuels and their raw materials are traded on world markets. If the EU is to meet its targets for the use of biofuels as a percentage share of the overall EU fossil fuel market, some imports of biofuels may be required. So trade in biofuels will be important in the short to medium term while domestic production of biofuels is still developing. Over the longer term, second generation biofuels should come 'on stream', improving the EU's own biofuels production capacity.

a) Biodiesel trade

Biodiesel imports into the EU are subject to an *ad valorem* duty of 6.5 %. However, there is no significant external trade, since the EU is by far the world's biggest producer. Biodiesel generated from imported soya and palm oil can be mixed in low percentages with rapeseed biodiesel, without major problems. However, for technical reasons (under current EU specifications) rapeseed oil is a more efficient raw material for biodiesel production.

b) Bioethanol trade

Bioethanol is traded under several different tariff 'codes'. Most external trade of bioethanol has taken place as 'denatured and undenatured alcohol'[15]. Such alcohols, if imported from developing countries, enjoy (in most cases) preferential treatment – imports totalled on average more than 2.5 million hectolitres per year from 2002 to 2004. But it is not possible to establish from trade data whether or not imported alcohol is used in the fuel ethanol sector in the EU. Increasing quantities of bioethanol are imported as 'bioethanol blended with petrol'. Bioethanol is also imported blended in ETBE.

The main countries exporting bioethanol to the EU are Brazil, Egypt, Guatemala, Pakistan, Ukraine and the United States. Some (e. g. Ukraine) enjoy reduced tariffs on these exports; others have duty-free access (e. g. Pakistan, Egypt). Over the 2002–2004 period approximately 70 % of imports were traded under preferential conditions (almost 61 % were duty-free, while 9 % benefited from some type of duty reduction). Those preferential trade terms are granted mainly to poorer developing countries, under two regimes – the Generalised System of Preferences, including, *inter alia*, the Everything But Arms (EBA) initiative[16], and the Cotonou Agreement[17].

[15] Denatured alcohol – Ethyl alcohol to which a poisonous substance, such as acetone or methanol, has been added to make it unfit for consumption
[16] See: http://europa.eu.int/comm/trade/issues/global/gsp/eba/index_en.htm
[17] See: http://europa.eu.int/comm/development/body/cotonou/index_en.htm

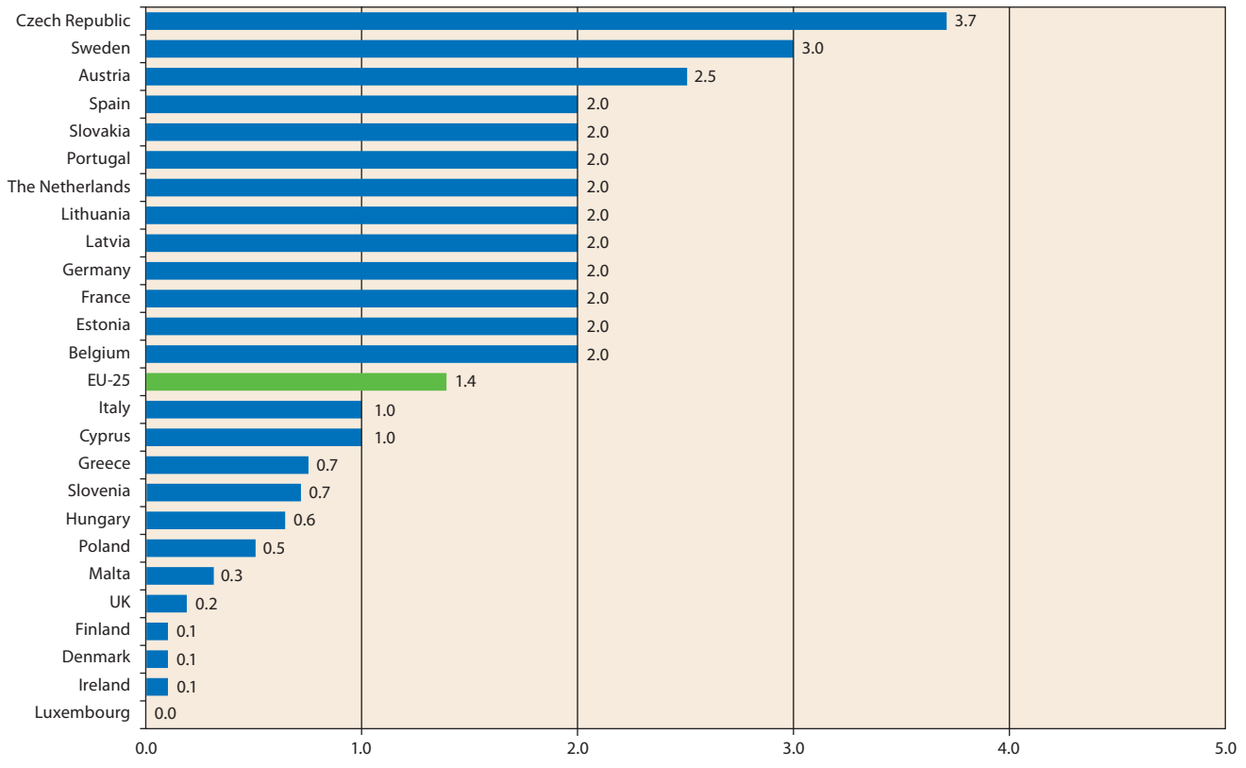
5. The EU regulatory environment for biofuels – how demand is shaped by policy tools

Under present price parities with fossil fuels, additional demand for biofuels can only be created by policy measures. Development of production thus depends heavily on the EU and national actions to support biofuels and on the setting of targets for biofuels market share.

The political and regulatory environment for biofuels lies within the broader EU strategy for renewable energy.

The EU has already gone beyond the drafting of white papers and action plans. Specific legislation and other measures have been put in place to stimulate both demand for and production of biofuels. This fact sheet is focusing on transport, which is responsible for around

National indicative targets for biofuels market share in EU Member States, 2005[18]



[18] Note: sources are national reports under the biofuels directive and direct communication with the Commission. The national reports are available at: http://europa.eu.int/comm/energy/res/legislation/biofuels_en.htm. Member States were required to set 2005 targets in 2004 and are required to set 2010 targets in 2007. There is no requirement for intermediate targets to be set. The EU-25 figure is the average of the national targets. The UK figure for 2005 assumes a 50–50 split between bioethanol and biodiesel.

21 % of the EU's harmful greenhouse gas emissions. The EU is supporting biofuels with the objectives of reducing greenhouse gas emissions, boosting the decarbonisation of transport fuels, diversifying fuel supply sources and developing long-term replacements for fossil oil. The development of biofuel production is also expected to offer new opportunities to diversify income and employment in rural areas.

Many important measures can only be taken at Member State level. At EU level a wide variety of incentives have been put in place to stimulate demand for biofuels:

a) General encouragement of sustainable transport

Efforts are being made to improve public transport, to encourage the use of environmentally-friendly modes of transport where possible, and to rationalise the transport of goods[19]. The Commission has tabled a proposal for a Directive on the promotion of clean and efficient road transport vehicles[20], including those using high blends of biofuels.

b) Biofuels targets

In 2003 the Biofuels Directive on the promotion of the use of biofuels and other renewable fuels for transport set out ambitious targets for the deployment of biofuels. It set reference values at EU level of a 2 % market share for biofuels in 2005 and a 5.75 % share in 2010. Targets usually consist of a specific share of biofuels in total fuel marketed (see figure 2). Although there have been marked increases of production and use in recent years, the current market share has not yet reached the EU policy target. Success depends on the combined results of all Member States' measures. There is a mixed picture as to whether Member States have attained their targets.

General policy papers and legislation adopted

White Paper
on renewable energies – November 1997

Green Paper
on security of energy supply – November 2000

Biofuels Directive – May 2003

Energy Taxation Directive – October 2003

Biomass Action Plan – December 2005

EU Strategy for Biofuels – February 2006

c) Tax incentives

The Energy Taxation Directive[21] adopted in October 2003 makes it possible for Member States to grant tax reductions/exemptions in favour of biofuels, under certain conditions. These tax concessions are considered as state aids, which may not be implemented without prior authorisation by the European Commission. The Commission's assessment aims to avoid undue distortions of competition and is based on EU guidelines on state aid for environmental protection[22].

[19] See the White Paper on European transport policy for 2010 – COM(2001) 370 final
[20] COM (2005) 634.
[21] See: http://europa.eu.int/comm/taxation_customs/taxation/excise_duties/energy_products/legislation/index_en.htm
[22] http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/c_037/c_03720010203en00030015.pdf of 2001

"Bioölwerk Magdeburg", © UFOP e. V.

d) Support from regional policy

Many of the regions covered by the European Regional Development Fund[23], particularly in rural regions in Central and Eastern Europe, have the potential to use biomass to generate economic growth and employment. Support for biomass, including biofuels, is an important objective for cohesion policy[24]. It can be allocated for initiatives such as the retraining of farmers and the provision of equipment for biomass producers, as well as for investment in facilities that produce biofuels[25].

[23] See: http://europa.eu.int/scadplus/leg/en/lvb/l60015.htm
[24] The Cohesion Fund was set up in 1993 to provide financial help for projects in the fields of environment and transport infrastructure (in poorer Member States)
[25] For more information see: http://europa.eu.int/comm/agriculture/biomass/biofuel/index_en.htm

6. Agricultural measures in place

For many years the CAP has encouraged the production of energy crops in the EU, either via direct aids or indirect forms of incentive. Since 1992, successive reforms of the CAP have progressively replaced support from market and price management by direct aids, gradually decoupled[26] from production. This has helped to increase the competitiveness of EU agricultural production for all possible outlets, including biofuels. The 2003 CAP reform is the latest step in this direction.

a) Various CAP measures

The CAP reform process is particularly important to improve the competitiveness of cereals, which are currently one of the major feedstocks for EU biofuels production. The 'decoupling' of income support from production, which results from the replacement of the various direct aids by a Single Payment Scheme introduced by the 2003 CAP reform, will help to facilitate the supply of energy crops.

The set-aside[27] obligation, introduced with the 1992 reform as a tool to balance the cereals market, has been integrated into the Single Payment Scheme. Production is not normally allowed on set-aside land, but the cultivation of non-food crops (including energy crops) is authorised if the use of the biomass for energy is guaranteed either by a contract or by the farmer.

About 0.9 million hectares of the EU's set-aside area were used for non-food production in 2005, of which 0.85 million hectares were used for growing oilseeds for biodiesel. The biggest producers of oilseeds on set-aside land are France and Germany, followed by the United Kingdom and Spain.

Political agreement was reached in autumn 2005 on a major reform of the EU sugar support regime. Sugar beet produced for bioethanol can be grown on set-aside areas

[26] Decoupling means breaking the link between the direct aid a farmer receives and the production or areas grown of a specific crop
[27] Set-aside is the term that refers to the removal of farmland from production, usually with the overall aim of reducing the production of arable crops, in particular cereals. Farmers producing a significant amount of arable crops are required to 'set aside' a proportion of their land as a condition for receiving support payments. The current percentage is 10 % of the land eligible for the single payment scheme. Small farms are exempted.

and benefit from the energy crop aid (see below), and will continue to be exempt from production quotas.

Under its market policies, the Commission has made use of the possibility of selling alcohol from the distillation of wine out of intervention stocks for energy purposes. However, this is not a sustainable source for biofuel production. In 2005, for the first time, a tender for rye from intervention stocks was opened specifically for bioethanol production. The Commission will carefully assess the opportunities for additional processing of cereals from existing intervention stocks into biofuels.

b) Aid for energy crops

A special aid for energy crops was introduced by the 2003 CAP reform. A premium of EUR 45 per hectare is available, within a 'maximum guaranteed area' of 1.5 million hectares across the EU. If applications exceed the guaranteed area ceiling, the premium is reduced proportionally. However, the aid scheme was far from fully subscribed in its first two years in operation. The total area supported in 2004 was around 300 000 hectares and nearly 570 000 hectares in 2005 (about 38 % of the maximum guaranteed area). Germany, France and the UK are the Member States that made most use of this support scheme. A report on this scheme was due to be published by the Commission in autumn 2006.

c) Rural development policy

In the EU's new rural development policy for the years 2007–2013[28], various support measures are designed to encourage the development of renewable energy. They include, *inter alia*, support for investments on or near farms in sectors such as biomass processing, bioenergy installations, and the use of unused biomass by forest holders.

More specifically, in its 'Community Strategic Guidelines for Rural Development' (2006)[29], the Commission encourages Member States to offer support for a number of key actions in the field of renewable energy, including biofuels. These include new product outlets which can offer high value added. It is recommended, for example, that support is offered for investment and training in the field of non-food production, creating innovative new outlets for production or helping the development of renewable energy materials, and biomass processing capacity.

[28] Council Regulation N° 1698/2005 of 20 September 2005 on support for rural development by the European Fund for Rural Development (EAFDR) (OJ L 277, 21.10.2005)

[29] See: http://ec.europa.eu/comm/agriculture/capreform/rdguidelines/index_en.htm

7. The research and development effort at EU level

Production and use of biofuels in the EU is still at the developmental stage. It is vital for a significant research and development effort to bear fruit if the EU is to reach the goals it has set itself for increasing the use of biofuels. Much work is being done at Member State level, however there is a role for EU-wide research programmes as well.

The European Commission, in its 7th Framework (research) Programme[30], proposes to continue its support for the development of biofuels and strengthening of the competitiveness of the biofuel industry. High priority is being given to research into the 'bio-refinery' concept (i.e. finding valuable uses for all parts of the plants providing biomass), and to second-generation biofuels.

EU-funded research has already been instrumental in the development and growth of the EU biofuels industry. For example, the EUROBIODIESEL[31] project launched in 1992 demonstrated the technical and economic feasibility of producing and using biodiesel without significant technical problems in tractors, buses and cars. The recently launched Integrated Projects RENEW[32] and NILE[33] are key actions in the development of second-generation biofuels aiming at pilot plant scale production.

The industry-led European Biofuels Technology Platform, encouraged by the Commission, aims at providing and implementing a common European vision and strategy for the production and use of biofuels, in particular for transport applications. Major European biofuels stakeholders are represented, including the agricultural and

[30] See: http://europa.eu.int/comm/research/future/themes/index_en.cfm

[31] 'Utilisation of Vegetable Oils and Their Derivatives as Diesel Fuel'

[32] See: http://europa.eu.int/comm/research/energy/nn/nn_rt/nn_rt_bm/article_2820_en.htm#1

[33] See: http://icadc.cordis.lu/fep-cgi/srchidadb?CALLER=NEWS_INNO&SESSION=&ACTION=D&RCN=EN_RCN_ID:24719

forestry sectors, biofuels industry, oil companies and fuel distributors, car manufacturers, food industry, and research institutes.

Other technology platforms, such as 'Plants for the Future', 'Forest-based Sector' and 'Sustainable Chemistry' will also increase the knowledge base for biofuel production. Actions at European level (e.g. ERA-NET[34]) in the field of biomass will further improve the cost-effectiveness of research and technological development funding through programme coordination and the initiation of joint activities at national and regional level.

8. The EU Strategy for Biofuels – the most recent initiative

On 8 February 2006 the European Commission adopted an ambitious EU Strategy for Biofuels, with a range of potential market-based, legislative and research measures to boost production of fuels from agricultural raw materials. This complements the Biomass Action Plan put forward in December 2005. The Commission's Communication outlining the strategy sets out three main aims:

- **To promote biofuels in both the EU and developing countries**
- **To prepare for large-scale use of biofuels by improving their cost competitiveness and increasing research into 'second generation' fuels**
- **To support developing countries where biofuel production could stimulate sustainable economic growth**

Increased use of biofuels will bring numerous benefits by reducing Europe's dependence on fossil fuel imports, reducing greenhouse gas emissions, providing new outlets for farmers and opening up new economic possibilities in several developing countries.

The Communication announcing the strategy[35] was accompanied by an Impact Assessment[36] which presents different policy options. Based on this assessment the Communication recommends a regulated, market-based approach to encourage the development of biofuels. While existing technologies do not at present offer cost-competitive solutions for the EU, the benefits of encouraging the development of biofuels should outweigh the costs. The development of second generation technologies, in which research and development has an important role, could further contribute to the cost effectiveness of biofuels.

To reach the levels of fossil fuel replacement required at EU level for the transport sector, the Communication calls for a balanced approach in encouraging both domestic production and imports of biofuels.

[34] See: http://europa.eu.int/comm/research/fp6/index_en.cfm?p=9_eranet
[35] See: http://europa.eu.int/comm/agriculture/biomass/biofuel/com2006_34_en.pdf
[36] See: http://europa.eu.int/comm/agriculture/biomass/biofuel/sec2006_142_en.pdf

The Strategy outlines a number of actions that the Commission will take to promote production and use of biofuels, within seven key policy axes (i.e. aims). These are:

1. Stimulating demand for biofuels
A report will be published in 2006 on the implementation of and possible revision of the Biofuels Directive. Member States should be encouraged to favour biofuels (including second generation products), and consideration will also be given to biofuel obligations.

2. Capturing environmental benefits
The Commission will examine how biofuels can best contribute to meeting GHG emissions targets, work to ensure sustainability of biofuel feedstock cultivation, and look again at limits on biofuel content in petrol and diesel.

3. Developing production and distribution of biofuels
The Commission will encourage Member States and regions to take into account the benefits of biofuels and other bio-energy when preparing their national frameworks and operational plans under cohesion policy[37] and rural development policy[38].

4. Extending supplies of feedstock
The supply of raw materials is crucial to the success of the strategy as they also represent the primary cost component in the biofuels production process. To increase the supply potential the Commission has made sugar production for bioethanol eligible for CAP support schemes and presented a Forest Action Plan which encourages more efficient mobilization of wood residues. The Commission will also assess the energy crop scheme, inform farmers and forest owners, and assess the possibilities for using animal by-products and clean waste.

5. Enhancing trade opportunities
The Commission will assess the possibility of putting forward a proposal for separate customs codes for biofuels. It will pursue this in trade talks with ethanol-producing countries and propose amendments to the 'biodiesel standard'.

6. Supporting developing countries
The Commission will ensure that measures for ACP countries affected by the EU sugar reform can be used to support the development of bioethanol production, develop a Biofuels Assistance Package for developing countries and examine how best to assist national and regional biofuel platforms.

7. Research and development
The Commission will continue to support the development of an industry-led European Biofuel Technology Platform which will make recommendations for research in this sector. Biofuels will have a high priority in the 7th Framework Programme, in particular the second generation technologies and new integrated refining methods (the 'biorefinery' concept[39]). Through its Intelligent Energy Europe Programme, the Commission will support market introduction and the dissemination of proven technologies.

[37] The EU's cohesion policy is built on the assumption that redistribution between richer and poorer regions in Europe is needed in order to balance out the effects of further economic integration
[38] See: http://ec.europa.eu/agriculture/rur/index_en.htm
[39] The co-production of fuels, other forms of energy (heat and power), and co-products in integrated bio-refineries will enhance the overall economy and competitiveness of biofuels

9. The next steps

The Biofuels Strategy adopted by the European Commission in February 2006 announces that next steps in EU biofuels policy should concentrate on three areas:

- **An assessment of the Biofuels Directive and its possible revision**
- **A proposal for the revision of the Fuel Quality Directive**
- **A report on the implementation of the energy crop premium introduced by the 2003 CAP reform**

a) Review of the Biofuels Directive

The Directive sets biofuels targets and governs how to react to them. The review will assess whether the 2010 target for biofuel use will be met, and will consider whether national targets for the market share of biofuels should be made mandatory. The Commission's report will also consider the measures to promote biofuels for the post-2010 period.

b) Revision of the Fuel Quality Directive

The Commission will propose a revision of the Fuel Quality Directive to reconsider the quantitative limits of ethanol content on petrol. The Commission will also review the quantitative limits on ethers and biodiesel.

c) Report on the energy crops scheme

The 2003 reform of the CAP introduced the energy crops scheme, which aims to encourage further production of energy crops for biofuels production while also improving the options for farmers to diversify. In 2003 it was agreed that this scheme should be reviewed in 2006. The report will assess the two years of implementation of the scheme and its effectiveness, and recommend the necessary adjustments.

d) Trade issues

The EU needs continuously to assess the trade aspects of biofuels. It will almost certainly need to supplement its own feedstocks for biofuels with imported materials over the short to medium term. To facilitate trade there may need to be adjustments to customs codes for biofuels. The lack of a specific customs classification for biofuels prevents quantification of the exact amount of imported ethanol, oilseeds and vegetable oil ultimately used in the transport sector. In its multilateral and bilateral trade agreements the EU will need a balanced approach which respects the interests of both domestic producers and EU trading partners.

Attention must be paid to the need to maintain a balance between the food provision and energy needs of the EU's citizens. It should not be forgotten that biofuels are currently produced almost entirely from crops that can also be used for food purposes. Concerns have been voiced that, as global biofuel demand grows, the availability of food at an affordable price in developing countries could be threatened and even that, in the EU, there could be competition for land between production for food/feed and biomass provision for energy. The impact of biofuel demand will need to be continuously monitored.

10. Useful sites for further information

European Commission Directorate-General for Agriculture and Rural Development
See: http://europa.eu.int/comm/agriculture/biomass/biofuel/index_en.htm

European Commission Directorate-General for Transport and Energy
See: http://europa.eu.int/comm/energy/res/index_en.htm

and

http://europa.eu.int/comm/transport/index_en.html

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