

BIOFUELS IN THE EU:

AN OVERVIEW ON THE EU BIOFUELS POLICY

A REPORT TO IEA BIOENERGY TASK 39

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Editorial

IEA Bioenergy, an implementation agreement of the International Energy Agency and an international collaboration in Bioenergy, aims to accelerate the use of environmentally sound and cost-competitive bioenergy on a sustainable basis, and thereby achieve a substantial contribution to future energy demands. (www.ieabioenergy.com/)

The main objectives of Task 39 "Liquid Biofuels" is to provide participants with comprehensive information that will assist them with the development and deployment of biofuels for transportation fuel use. The Task builds upon the successes of previous efforts to deal with the complex technical and infrastructure issues related to biofuels in a coordinated manner.

IEA Bioenergy Task 39 "Liquid Biofuels from Biomass" is currently composed of 13 countries or regional associations, including Austria, Canada, Denmark, the European Union, Finland, Germany, Ireland, Italy, the Netherlands, South Africa, Sweden, the United States and the United Kingdom. The Task brings together leading researchers and industry pioneers in the bid to successfully introduce biofuels for transportation into the commercial marketplace.

The Task focuses on biodiesel, lignocellulosic ethanol, and on biofuels policy.

The development of biofuels in Europe is mainly determined by the European Union's biofuel policy. This report describes the development of the EU biofuels policy, including steering instruments and established lobby organizations. Furthermore it delivers abstracts of the respective EC documents, and links the reader to the full documents and other relevant websites in the world wide web.

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I. Summary

1. Introduction

The European biofuels market is mainly determined by the European Union's policy and legislation on biofuels. The release of the European Biofuels Directive in 2003 has created a legislative framework in the Member States and set off a rapid increase in biofuels production and use.

The EU has increased its production of biofuels, especially of biodiesel. The entire EU production of biofuels amounted to 3.9 Mio. tonnes in 2005. Especially the biodiesel production has risen from 1.1 Mio. tonnes in 2002 to about 3,1 Mio. tonnes in 2005. In 2006, the biodiesel production in Europe reached about 4.9 Mio. tonnes. Therefore biodiesel continues to be the leading biofuel in the EU with 81.5% of biofuel production and is expected to increase further. The bioethanol part amounts to 18.5% of the European biofuels production. But all in all this represented less than 1% of the whole EU petrol and diesel consumption. The total area used for energy crop production was ca. 2.8 Mio. hectares in 2005 which represents about 3% of the total EU-25 arable land. All in all, there are actually 185 fully operational biodiesel plants in Europe, other plants are under construction. In 2007, capacities for production will therefore reach about 10.2 Mio. tonnes.

The EU policies play a crucial role with regard to the future development and use of renewable energy, especially biofuels. Individual Member States transpose EU policies into their own legislations, thus the EU has to develop policies that address all the issues of its 27 Member States.

Within the EU three main objectives drive the efforts to increase the use of biofuels:

- to increase the security of supply for transport fuels
- to ensure the further competitiveness of the EU and to keep the energy supply in a stable regulatory, and
- to promote environmental sustainability.

Furthermore, biofuels are an interesting new outlook for agriculture and forestry and a major component for regional development.

The EU has already gained experience and knowledge on biofuels and will also export this knowledge. Research should be engaged and technological development encouraged. This needs to be supported by a clear strategy on biofuels.

This report will briefly describe the majority of relevant documents and forward the reader to the relevant websites for further information on biofuels. First the main documents are described, followed by a description of the main steering instruments. An overview on important lobby organisations and a short outlook to further developments will complete the picture of biofuels in the European Union.

2. The most important EU biofuels documents

The first relevant EU document published with regard to biofuels was the European Commission's White Paper for a Community Strategy *"Energy for the future: Renewable Sources of Energy"*. This document sets out a strategy how the share of renewable energies in gross domestic energy consumption can be doubled by 2010 to 12%. It also includes an Action Plan with a timetable how this objective can be achieved. Read more in COM (97) 599.

In 2000 the European Commission came forward with the Green Paper *"Towards a European Strategy for the Security of Energy Supply"*. Read more in COM (2000) 769.

The EU *"Biofuels Directive 2003/30/EC"* was published in 2003. It sets reference values for the market share of biofuels, 2% by the end of 2005 and 5.75% by the end of 2010 respectively. The EU Member States are obliged to set national indicative targets, taking into account these reference values. Read more in Directive 2003 (30) EC.

The EU Biofuels Directive has led to the creation of favourable legislative frameworks in most Member States and has therefore triggered rapid market implementation of biofuels. By now all of the Member States have set national targets, most of them aim for the proposed 5.75% market share by 2010 or earlier. Each EU Member State has to send annual reports to the EC, stating the implemented measures, the annual biofuel production and the market share achieved. Read more in Directive 2003 (30) EC.

Necessary related documents are also the *"Energy Taxation Directive"* and the work on the standardisation of transport fuels and biofuels for transport. The Energy Taxation Directive was adopted in October 2003. It encourages Member States to grant tax reductions and tax exemptions in favour of biofuels. These tax concessions may not be implemented without prior authorisation by the Commission. Read more in Directive 2003 (96) EC.

With the *"Fuel Quality Directive 2003/17/EC"* in 2003 the environmental specifications for market fuels were amended to establish specifications for petrol and diesel. The CEN (European Committee for Standardization) has set limits on biodiesel blending to no more than 5% share by volume (or 4.6% in energy terms) for technical reasons. This appears to be an issue that the EC needs to resolve to achieve its goal of 5.75% biofuels share by 2010. Read more in 2003 (17) EC.

Also the CAP – *Common Agricultural Policy* has encouraged the production of energy crops in the EU with direct aids or incentives. Since 1992 these aids have been gradually decoupled from production. The CAP Reform in 2003 has been the latest reform in this direction. The *"Single Payment Scheme"* helps to facilitate the supply of energy crops. Along with this the set-aside obligation has been integrated which allows the cultivation of non-food crops and energy crops on set-aside areas. Read more in CAP Reform.

In December 2005, the Commission published the *"Biomass Action Plan"* describing how the use of energy derived from forestry, agriculture and waste materials can be increased. This plan also includes measures to improve the supply of and demand for biomass and how technical barriers can be overcome. Read more in COM (2005) 628.

The Commission's Communication *"An EU Strategy for Biofuels"* was published in February 2006. In this EU Strategy a range of market-based, legislative and research measures are presented to boost the production of biofuels. It complements the *Biomass Action Plan* of December 2005. Read more in COM (2006) 34.

In 2006 the EC opened a public consultation on the Biofuels Directive that found wide interest in the fast-growing biofuels community and triggered 144 responses. These responses were summarized by the ECN (Energy Research Centre of the Netherlands) in an own report called *“Review of EU Biofuels Directive – Public consultation exercise”* in October 2006. The main outcome was that the Biofuels Directive should be further pursued, and a lot of suggestions were made on possible modifications. Read more in [Review of the EU Biofuels Directive](#).

Basing on the responses gathered through the public consultation in 2006, the Commission reviewed the Biofuels Directive and thereupon published the *“Biofuels Progress Report”* in January 2007. According to this report the Commission estimates that the incorporation rate of biofuels in the EU will be at about 4.2% in 2010. This setback towards the Directive objective of 5.75% must be a sign that the European biofuel production furthermore needs support. Read more in [COM \(2006\) 845](#).

A further evaluation of policy instruments was made under the *“PREMIA”* project. Read more in [PREMIA](#).

The development of a powerful EU biofuels strategy is still ongoing: In March 2006 the European Commission set out its vision for a *“Strategic EU Energy Review”*. In the beginning of 2007 the so-called *“Renewable Energy Roadmap”* and the *“Energy Policy for Europe”* were published, aspiring to a 20% share of renewables in the EU’s energy mix and a minimum target of 10% for biofuels in transport by 2020. Read more in [Latest measures](#).

3. EU steering instruments with regard to biofuels

The main instruments to steer further research and development activities on biofuels are the funding schemes of *FP7* and *IEE* and the implementation of the *EU Biofuels Technology Platform*.

The 7th Framework Programme

In its *7th Framework Programme* the European Commission continues to support the development of biofuels. This domain is seen as one with a strong potential for excellent research and technological development and for converting the results into high social and economic benefits. Special focus is laid on the “bio-refinery” concept as well as on second-generation biofuels. *Read more on the FP7 Website:* http://europa.eu.int/comm/research/future/themes/index_en.cfm

IEE

The *Intelligent Energy – Europe Programme* is the EU’s tool for funding action to improve the conditions to save energy and encourage the use of renewable energy sources in Europe and to move us towards a more energy intelligent Europe.

Intelligent – Energy Europe covers action in the following fields:

- energy efficiency and rational use of resources (SAVE)
- new and renewable energy resources (ALTENER)
- energy in transport (STEER) to promote energy efficiency and the use of new and renewable energies sources in transport, and
- to integrate initiatives combining several of the aforementioned fields or relating to certain Community priorities.

Read more on the IEE Website: http://ec.europa.eu/energy/intelligent/index_en.html

European Biofuels Technology Platform

This industry-led *EU Biofuels Technology Platform* was encouraged by the Commission and aims at providing a common European strategy for the production and use of biofuels for transport. Major biofuels stakeholders are engaged with this platform, representing the agricultural and forestry sector, biofuels industry, oil companies and their distributors, car producers and other research institutes. *Read more on the EU Biofuels Technology Platform Website:* <http://www.biofuelstp.eu/>

4. Lobby organisations

EBB European Biodiesel Board

The *EBB European Biodiesel Board* is a non-profit organisation established in January 1997 and represents the opinion of the EU biodiesel industry. It gathers 55 companies and associations and tries to promote the use of biodiesel in Europe. The EBB member companies account for about 80% of the EU biodiesel production. *Read more on the Website:* www.ebb-eu.org

ebio

Founded in 2005, the *European Bioethanol Fuel Association eBIO* serves as the voice of the European bioethanol fuel industry, providing advocacy, authoritative analysis and important industry data to its members, the European institutions, strategic partners, media and other opinion leaders. Its objectives are to promote the increased production and use of bioethanol fuel, to participate in educational activities, and to provide eBIO Members with the knowledge necessary for informed business decisions. *Read more on the eBIO Website:* <http://www.ebio.org/home.php>

AGQM

The *Arbeitsgemeinschaft Qualitätsmanagement Biodiesel e.V.* (AGQM, working group on quality management of biodiesel) was founded by the most important German producers and marketers of biodiesel with the aim to assure that only quality biodiesel is sold by its members. The implemented quality management has built consumer confidence in Germany. *Read more on the AGQM Website:* <http://www.agqm-biodiesel.de/10.html>

UFOP

In 1990, the *Union zur Förderung von Öl- und Proteinpflanzen e.V.* (UFOP, Union for the Promotion of Oil and Protein Plants) was established by the Society of German Farmers and the Federal Society of German Plant Breeders. All companies, associations and institutions participating in the production, processing and marketing of indigenous oil and protein-bearing plants are gathered under the UFOP banner. In past years, UFOP has produced numerous ideas to optimise agricultural production and to promote sales. It has therefore significantly contributed to the German biodiesel success story. *Read more on the UFOP Website:* http://www.ufop.de/english_news.php

5. Outlook on the further development

In its *Renewable Energy Roadmap*, the Commission has proposed new, legally binding targets for renewables in the overall EU's energy mix (20% by 2020) and for biofuels in transport in special (10% by 2020). Nevertheless, the Member States still need flexibility in promoting renewables according to their potential and priorities. Therefore the EC endorsed in its *Presidency Conclusions* in March 2007 again a 10% minimum binding target to be achieved by all Member States for the share of biofuels in overall EU transport fuels. The binding character of this target aims to afford second-generation biofuels becoming commercially available and the Fuel Quality Directive being amended to allow for adequate levels of blending.

Read more in the document:

http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/ec/93135.pdf .

The EU leaders furthermore agreed that different national targets should be derived from the overall 20% binding EU figure on renewables that also take into account the different national starting points and potentials with regard to renewables. The EC is therefore working on a methodology to calculate how much each Member State must take up of the 20% overall renewable "burden". Countries with a large share of renewables, like Denmark or Austria, will therefore have to contribute a larger share than countries with low sources for renewable energy ("*Burden sharing*").

With regard to standardisation stringent quality requirements should be included. Biodiesel should also be produced from other raw materials than rapeseed oil, because biofuels should not compete against food crops. International standardisation is on the way, fuel standards might be changed to accommodate up to 10% biodiesel in diesel fuel and 10% bioethanol in gasoline.

Furthermore it is undeniable that a balance between food provision and energy needs must be found. Biofuels are still mainly produced from crops that could also be used for food purposes. The availability of food at affordable prices, especially for people living in developing countries, must be guaranteed. Even in the EU some competition on land use could arise. These impacts have to be monitored continuously.

II. Abstracts

Energy for the future – Renewable Sources of Energy: White Paper for a Community Strategy and Action Plan

Reference: COM (1997) 599 final

Publication: 26 November 1997

Website: http://europa.eu.int/comm/energy/library/599fi_en.pdf

The document generally stresses that renewable sources of energy still make a small contribution of less than 6% to the EU's overall gross inland energy consumption although these sources could contribute to reduce dependency on energy imports and the supply of security would increase. In order to achieve a reduction in greenhouse gas emissions, the Union wants to require major energy policy decisions, focusing on reducing energy and carbon intensity in general. The EU's dependence on energy imports is already 50% and expecting to rise, reaching 70% by 2020.

Biomass, including energy crops, wind and solar energy, are regarded as a source with a large unexploited technical potential. The share of renewable energies in the gross inland energy consumption differs widely between Member States. Therefore it is stressed that a long-term stable framework for the development of renewable energies is needed, covering political, legislative, administrative, economic and marketing aspects. Furthermore, as the internal market develops, a Community-wide strategy for renewables is required to avoid imbalances between Member States. The Member States also have to decide on their own specific objectives within this framework. The measures proposed in this White Paper should be adapted to the particular socio-economic, environmental, energy and geographic situation of each Member State.

Different “*strategic goals*” are listed, all directing towards the goal of achieving a 12% of renewables in the Union by 2010.

Annex I shows a preliminary indicative action plan for RES 1998-2010 like overall objectives and internal market measures, the reinforcing of the community policies and supporting measures. Cooperation between the Member States has to be strengthened and special campaigns for “take-off” should be made.

In *Annex II* a “scenario for 2010” is laid down, showing the contribution that each renewable energy sector could make by 2010 towards achieving the objective of 12% share. In separate chapters, biomass, hydro power, wind energy, solar thermal, photovoltaics, geothermal and heat pumps are investigated. An assessment of the costs and benefits is also enclosed. The main contribution of RES growth could come from biomass, tripling the current level of this source. As far as the market sector is concerned, also a “significant increase of biofuel use by 2010” is considered as an important element for achieving the general objective.

In relation to the costs and benefits, the total capital investment needed is estimated on 165 billion ECU for the period 1997-2010 underlining the avoided fuel costs, the potential for creating new jobs, the reduction of the imported fuels and the reduction of CO₂ emissions.

CO₂ emission reduction results from the technical assessment and represents the full expected reduction. Net employment figures in the renewable energy sector are, according to this paper, very difficult to predict but there is no doubt that the proactive move towards such energy sources will lead to significant new employment activities.

Also the creation of new business opportunities for exports and an expansion of the European renewables technologies are possible.

It is emphasised that the Strategy and Action Plan must be flexible and updated over time according to experience.

As internal market measures fiscal and financial supporting in favour of renewable energies is underlined, like flexible depreciation for investments, start up subsidies and favourable tax treatment but also so-called "green funds" addressed to capital markets and public renewable energy funds.

In case of *liquid biofuels*, specific measures are regarded as necessary tool in raising the market share. The promotion of biofuels should be coherent with the Auto Oil Programme and the European policy on fuel quality. The full cycle of environmental costs and benefits is seen as the most necessary element to look on. As the most important element is seen the reduction of production costs. Therefore, an increased use of liquid biofuels can only be obtained in case of tax relief and subsidised raw material production.

The promotion of *Combined Heat and Power (CHP)* is seen of large importance for the implementation of biomass as energy source. Furthermore, the Commission's *White Paper on Growth, Competitiveness and Employment* is mentioned as an important element for further action. With the strengthening of these market forces, production costs can be lowered. Aid opportunities for renewable energies shall also increase the weight given to RES within the energy programs. Furthermore, the Community will give general support to regional and local projects in the framework of its promotional programs such as ALTENER. Regional funds invested in renewable energy sources could contribute to increased income and standards of living in less favoured regions.

Because of the fact that agriculture is a key sector for the increase of renewable energies, biomass should be fully implemented by using all available fiscal and industrial instrumentals. The Common Agricultural Policy will contribute in different ways like developing energy crops, utilising more agricultural and forestry residues as a reliable source of raw material, granting direct payments for arable crops and creating set-aside conditionals on the respect of environmental provisions.

Several actions are planned to enforce the market acceptability and consumer protection like campaigns for the "take-off" of renewables. The Commission will establish the necessary framework and provide technical and financial assistance to coordinate all these actions. Also the implication of all interested parties in promoting renewables is seen as important like municipalities, car and oil industries, industry associations, farmers associations, forest-based industries and cooperatives. Also cost estimates and investment plans are drawn up including the total investment costs, the public funding and the avoided fuel costs and external benefits.

Because of the fact that liquid biofuels are the least competitive product from biomass, it is important to ensure the growth in the fuel market. Long-term alternatives are needed because of the fact that the energy demand in the transport sector is expected to grow strongly and, in association with it, the emission problems and the external dependence. Biofuels are seen as a source with an overall positive energy balance, although varying from crop to crop and depending on the crop replaced.

An increase in the use of biofuels will depend crucially on closing the gap between the production costs and the costs of competitive fuels. The most productive crop species

for liquid biofuels with the maximum benefit and minimum environmental impact have to be selected, taken respect of biodiversity.

Green Paper: Towards a European Strategy for the Security of Energy Supply

Reference: COM (2000) 769

Publication: November 2000

Webpage: [http://eur-](http://eur-lex.europa.eu/smartapi/cgi/sqa_doc?smartapi!celexplus!prod!DocNumber&lg=en&type)

[lex.europa.eu/smartapi/cgi/sqa_doc?smartapi!celexplus!prod!DocNumber&lg=en&type](http://eur-lex.europa.eu/smartapi/cgi/sqa_doc?smartapi!celexplus!prod!DocNumber&lg=en&type)
[doc=COMfinal&an_doc=2000&nu_doc=769](http://eur-lex.europa.eu/smartapi/cgi/sqa_doc?smartapi!celexplus!prod!DocNumber&lg=en&type)

The Green Paper stresses the importance of biomass in relation to supply security. Whereas the entire energy supply is at risk, all usage is promoted: generation of heat and electricity using biomass and the production of biofuels. It is stated that “the enormous potential of forest and agricultural residues has so far not been exploited”. Advantages concern the emission of greenhouse gases (“between 40 and 80 % less than fossil fuels”), local environment (“less particulate and carbon monoxide and hydroxide”), and social aspects (“job creation in rural areas”). It is also stressed that intense agricultural production forms are undesirable.

Moreover, it is emphasised that the current Community legislation is often working counterproductive to the need for security of supply, for tax exemption for biofuel is not allowed other than in pilot projects. The final report on the Green Paper (2002) adds that in the longer term it might be technically possible to replace 20% of the petrol and diesel used for road transport by the year 2020, if a proper framework of incentives is set up.

A number of 13 ‘*guidelines for debate*’ are listed, of which two are directly linked to biofuels and the transport sector. The first question is whether co-ordinated EU action is required for a share of 20% in total fuel consumption by the year 2020. Several viewpoints are mentioned in the final report on the Green Paper, generally putting the matter in a broader perspective, pointing out several aspects of large-scale biomass growing and proposing to use demand growth control measures to reduce energy demand of the transport sector. The second question addresses the way corrective action can be taken for energy saving in the transport sector by substituting road haulage by rail transport.

The discussion on the use of biofuels in the EU in both the White Paper and Green Paper mentioned above did not lead to the development of concrete biofuel-specific national policies in many EU Member States. However, in June 2001, it did result in two EU directive proposals on the promotion of biofuels.

Directive 2003/30/EC on the promotion of the use of biofuels or renewable fuels for transport

Reference: 2003/30/EC

Publication: 8 May 2003

Website: http://ec.europa.eu/energy/res/legislation/doc/biofuels/en_final.pdf

In November 2001, the EC proposed a new legislation to promote the use of alternative fuels for transport. A regulatory package including an action plan and two proposals for Directives which would establish minimum biofuel content in transportation fuels and allow reduced taxation rates for biofuels has been adopted (COM(2001) 547).

According to the EC the use of fuels derived from agricultural sources (i.e. biofuels) is the technology with the greatest potential in the short to medium term. The action plan outlines a strategy to achieve a 20% substitution of diesel and gasoline fuels by alternative fuels in the road transport sector by 2020. It concludes that only three options would have the potential to achieve individually more than 5% of total transport fuel consumption over the next 20 years: (1) *biofuels* which are already available, (2) *natural gas* in the medium term and (3) *hydrogen* and *fuel cells* in the long term.

Directive 2003/30/EC sets a minimum percentage of biofuels (according to energy contents) to replace diesel or gasoline in transportation and sets an obligation on Member States to ensure that as from 2005 these biofuel quotas are met in practice. The proposed schedule for the compulsory biofuel share is: 2005 - 2%; 2006 - 2.75%; 2007 - 3.5%; 2008 - 4.25%; 2009 - 5%; 2010 - 5.75%.

EU Member States had until 31 December 2004 to implement this guideline in their national legal systems and had to define which biofuel targets they intended to achieve by December 2005. The considerations that accompany the guideline include the fact that Member States can facilitate the use of biofuels in public transport. The Member States are expected to inform the general public of the fact that biofuels are available and, if more than 5% biofuels are mixed with conventional fuels, this must be stated clearly on the pump at the petrol station.

The adopted action plan includes the following objectives:

- to reduce the European Union's dependency on foreign supply for oil.
- to contribute to the achievement of the European Union's greenhouse gases emission reduction objective as decided in Kyoto (an 8% reduction of greenhouse gases emissions by 2010)
- to meet the objective of substituting 20% of traditional fuels by alternative fuels in the road transport sector by 2020.

At least, the products listed here are: biodiesel, bioethanol, biogas, biomethanol, biodimethylether, bio-ETBE, bio-MTBE, synthetic biofuels, bio-hydrogen, and pure vegetable oil.

Biofuels can be used in pure form in captive vehicles or blended for use in regular engines. In the case of biodiesel, regular vehicles can run on a 5% blend (this figure is consistent with the Fuel Injection Equipment Manufacturers Common Position Statement on the use of Fatty Acid Methyl Ester Fuels, published in June 2000). Bioethanol can be blended up to 15% in gasoline without the need for vehicle modification.

The second Directive would give Member States the option of applying a reduced rate of excise duty to pure or blended biofuels, when used either as heating or motor fuel (see 2003/96/EC). This taxation Directive proposal would allow Member States, but not oblige them, to reduce excise duties on pure biofuels or biofuels blended into other fuels, when they are used for heating or transport purposes.

Biofuels represented about 0.3% of diesel and gasoline consumption in the EU in 2003. At the current crude oil prices biofuels are not competitive. The production cost of biodiesel is 0.5 euro/litre, as compared to 0.2-0.25 euro/litre for petrodiesel (furthermore, it takes 1.1 litre of biodiesel to replace 1 litre of petrodiesel). In some EU countries, biofuels are already supported by preferential taxation within the existing regulatory framework which is therefore inevitably necessary.

Annual reports with regard to Biofuels Directive 2003 (30) EC:

Website: http://ec.europa.eu/energy/res/legislation/biofuels_members_states_en.htm

The Member States were required to set 2005 targets in 2004 and are required to set 2010 targets in 2007. Nevertheless there is no requirement to set intermediate targets at all. There was a mixed picture whether the Member States have reached their targets or not. On the average the EU-25 have set an indicative target of 1.4% for biofuels market share in 2005, of which the Czech Republic indicates the highest market share of 3.7% and Ireland the lowest of 0.1% (Luxembourg indicates 0%).

Directive 2003/96/EC on the taxation of energy products and electricity

Reference: Directive 2003/96/EC

Publication: 27 October 2003

Websites: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0096:en:HTML>

According to the fact that the Community has ratified the Kyoto Protocol, the taxation of energy products and, where appropriate, electricity is one of the instruments available for achieving the Kyoto Protocol objectives. Besides, energy prices are key elements of the Community's energy, transport and environment policies. Especially taxation and tax differentiation have proved to be very efficient tools to promote fiscal and other Community policy objectives.

For the European Union it is desirable to establish a framework which allows Member States to exempt or reduce excise duties to promote biofuels. Distortions of competition should be limited and the incentive of a reduction in the basic costs for producers and distributors of biofuels should be maintained through the adjustments by Member States taking into account changes in raw material prices.

According to Article 15 of this Directive, the Member States may apply total or partial tax exemptions or reductions to products in the field of pilot projects for the technological development of more environmentally-friendly products or in relation to fuels from renewable resources.

In particular, the Directive will:

- reduce distortions of competition that currently exist between Member States as a result of divergent rates of tax on energy products,
- reduce distortions of competition between mineral oils and the other energy products that have not been subject to Community tax legislation up to now,
- increase incentives to use energy more efficiently (to reduce dependency on imported energy and to cut carbon dioxide emissions), and
- allow Member States to offer companies tax incentives in return for specific undertakings to reduce emissions.

"Biomass" in this context shall mean the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries as well as the biodegradable fraction of industrial and municipal waste (with the exception of peat).

The exemption or reduction in taxation should be adjusted by each Member State to take account of change in raw material prices to avoid over-compensating for the extra costs involved in the manufacture of these products.

No later than 31 December 2009 the Commission shall report to the Council on the fiscal, economic, agricultural, energy, industrial and environmental aspects of the reductions granted in accordance with this Article.

Consistency between emission trading and taxation needs to be further examined, following adoption of Directive 2003/87/EC, establishing a scheme for Greenhouse Gas Emission (GHG) allowance trading.

Directive 2003/17/EC on the quality of petrol and diesel fuels

Reference: 2003/17/EC

Publication: 3 March 2003

Webpage: http://eur-lex.europa.eu/LexUriServ/site/en/oj/2003/l_076/l_07620030322en00100019.pdf

By 1 January 2005 the EU forbid its Member States to market unleaded petrol and diesel fuel with a maximum sulphur content of 10 mg/kg. By no later than 1 January 2009 it has to be ensured that unleaded petrol and diesel fuel complies with the environmental specifications set out in the Annexes III and IV to the Directive.

With regard to gas-oils for non-road machinery and for agricultural and forestry tractors the sulphur content has to be less than 2.000 mg/kg, by the beginning of 2008 even less than 1.000 mg/kg. If there are any infringements, the Member States must introduce penalties to the offenders.

The Member States have to introduce a fuel quality monitoring system and present an annual fuel quality report by June by the latest. Furthermore, the Commission has to publish an annual report on the fuel quality of the Member States.

This Directive is basing on the former Directive 98/70/EC which set the environmental specifications to fuels for vehicles equipped with positive ignition engines (like petrol) and with compression ignition engines (diesel). Progressive improvements in the environmental quality of unleaded petrol and diesel fuels were provided regarding to octane or cetane level, vapour pressure, distillation by evaporation, benzene, oxygen, sulphur and lead content. The Member States had for the first time to monitor compliance with the environmental requirements for fuels by using the analytical methods defined by the Directive. Also proposals were desired basing on the newest knowledge on air quality, pollution reduction technologies and further developments in this field.

The Commission Report of 2 March 2005 ("Quality of petrol and diesel fuel used for road transport in the EU – Second Annual Report - Reporting year 2003") showed that the specifications were generally met. Only very few violations could be identified. There was a big increase in the proportion of fuels containing <10 and <50 ppm sulphur. But there were disparities between national fuel quality monitoring systems, which called for harmonisation.

In the Commission Report of 28 April 2006, the Third Annual Report, also few violations were identified. The EU enlargement had resulted in a slight reduction in the percentage of the <10 and <50 ppm sulphur fuels in the overall fuel supply. On the other side the problem of disparities between national fuel quality monitoring system still persisted.

Common Agricultural Policy (CAP) Reform

Reference: Action Plan

Publication: 26 June 2003

Webpage: http://ec.europa.eu/agriculture/capreform/index_en.htm

In June 2003 the EU farm ministers adopted a fundamental reform of the Common Agricultural Policy (CAP). This reform completely changes the way the EU supports its farm sector. The new CAP focuses on consumers and taxpayers and gives EU farmers the freedom to produce what the market demands. More money is available now to farmers for environmental, quality or animal welfare programmes by reducing on the other side direct payments for bigger farms.

Single payment scheme:

The Single Payment Scheme helps to facilitate the supply of energy crops. Along with the set-aside obligation it allows the cultivation of non-food crops and energy crops on set-aside areas. In future, the vast majority of subsidies will be paid independently from the volume of production. The Single Payment Scheme will replace most of direct aid payments to farmers currently offered. In 2005 0.85 Mio. hectares in the EU were used for growing oilseeds for biodiesel. Sugar beets for bioethanol production can also be grown on set-aside areas since 2005 and therefore benefit from the energy crop aid.

Compulsory cross-compliance:

These new "single farm payments" will be linked to the respect of environmental, food safety and animal welfare standards. The land must be farmed in accordance with cross compliance rules and must not be used for permanent crops, except for energy crops (short rotation coppice and miscanthus), nor for growing fresh fruit and vegetables, including potatoes. Where a farmer fails to comply with such requirements, reductions in his payments will be applied as a sanction.

Strengthened rural development policy:

More money will be available to farmers for environmental, quality or animal welfare programmes by reducing direct payments for bigger farms. A modulation rate of 5% will result in additional rural development funds of 1.2 billion € per year being made available.

Set-aside areas:

There will be 10% compulsory set-aside. It will be based on the amount of land a farmer had in compulsory set-aside in the reference period 2000-2002. This land is also covered by the Single Payment Scheme, but subsidy is only paid if the land is kept in set-aside. Set-aside land may be subject to rotation and may be used for energy crop production.

Set-aside areas must cover at least 0.1 hectare in size and be at least 10 metres wide. For justified environmental reasons a width of 5 metres may be accepted.

Support for energy crops:

An aid of 45 € per hectare for single payment land used to produce energy crops, except set-aside land, has been agreed. Energy crops include crops for the production of

biofuels and electrical and thermal energy from biomass. Farmers qualify to receive the aid if their production of energy crops is covered by a contract between the farmer and the processing industry concerned. Where the processing occurs on the farm concerned no contract is necessary.

A maximum guaranteed area of 1.5 million hectares is fixed for the EU and aid will be reduced if production exceeds that area. By December 2006 the Commission will report on the implementation of the scheme, taking into account progress with the EU biofuels initiative.

This means for the Energy Crops Scheme:

- You can grow energy crops on set-aside land.
- If you grow energy crops on set-aside land you will receive payments under the new Single Payment Scheme.
- If you grow energy crops on non set-aside land you will receive payments under the new Single Payment Scheme plus the new energy crops payment (up to 45 € per hectare, per year).

Therefore energy crops are further eligible for a premium of 45 € per hectare if they are used for biofuels production or as biomass in the production of electric and thermal energy if the area does not exceed 1.5 Mio. hectares across the EU. The total area supported in 2005 was about 570.000 hectares.

Read also more in http://ec.europa.eu/agriculture/index_en.htm

Biomass Action Plan

Reference: COM (2005) 628

Publication: 7 December 2005

Website:

http://ec.europa.eu/energy/res/biomass_action_plan/doc/2005_12_07_comm_biomass_action_plan_en.pdf

In the face of Europe's increasing dependency on fossil fuels, using biomass is one of the most important tools to ensure the security of supply and sustainable energy in Europe. The Biomass Action Plan sets out Community actions aimed at increasing the demand for biomass, improving supply, overcoming technical barriers and developing research.

On 7 December 2005, the EU Commission published this Biomass Action Plan, proposing measures that could more than double biomass use in EU by 2010, while respecting environmental limits. This is the kind of development that is needed to reach the target of 12% renewables by 2010 and most likely also the Kyoto Protocol targets.

The European Commission adopted the Action Plan to increase the use of energy from forestry, agriculture and waste materials. The plan builds on existing Community measures to create a market for renewable energy – the Biofuels Directive and the Directive on renewable energy in electricity generation. It announces more than 20 actions such as:

- promotion of biofuels obligations so that suppliers have to include a minimum proportion of biofuels in the transport fuels;
- a balanced approach to trade in transport biofuels, so that both domestic producers and importers can benefit from new market opportunities;
- support for developing countries that want to produce and use transport biofuels;
- examining how biofuel use could count towards CO₂ emission targets for car fleets;
- reporting on how certificates could be used to ensure minimum standards of cultivation for the raw materials used to make transport biofuels;
- investment in research in “2nd generation” biofuels like liquid fuels made out of wood and waste materials;
- reviewing how fuel standards can be improved to encourage the use of biomass for transport, heating and electricity generation;
- a general campaign to inform farmers and forest owners about energy crops.

As aforementioned, one of the main energy policy targets of the EU is to increase the share of the renewable energy sources (RES) in gross inland consumption up to 12% by 2010. Various legislative actions have already been undertaken in order to reach this target like Directive 2003/30 EC and Directive 2003/96/EC.

Biomass, i.e. all organic plant and animal products used to produce energy (or in agriculture), currently accounts for around half (44 to 65%) of all renewable energy used in the EU. All in all biomass currently meets 4% of the EU's energy needs (69 Mtoe). But to achieve the RES 12% target, a total biomass production of 130 Mtoe is necessary by 2010. Each sector has to contribute to the additional amount of biomass energy: for electricity 32 Mtoe of biomass are needed, for heat production 24 Mtoe, and for biofuels for transport 18 Mtoe. This additional biomass production can only be achieved in the short term with strong measures and actions in all three sectors and a better coordination of EU policies. The Biomass Action Plan shall ensure the achievement of this objective.

The Plan lists 31 measures which, if implemented, are expected to increase biomass use up to 150 Mtoe by 2010. This should be done with a balanced agricultural practice and sustainable production of biomass and without significantly affecting domestic food production. Several areas are described:

1. Biomass for heating and electricity:

Heating is the sector which uses the most biomass, and does so simply and cheaply in terms of technology. However, biomass is growing slowest in this sector. Therefore the legislation on renewable energy in heating and cooling should be examined and, if necessary, renewed. The examination will cover an amendment of the buildings directive, setting up standards for household biomass boilers and a new specific legislation. Also district heating should be encouraged and modernised so that biomass can be used more easily. Furthermore a proper implementation of the directive on renewable energy in electricity will be ensured in order to achieve the full potential of biomass in this area.

2. Transport biofuels:

A new report on the implementation of the Biofuels Directive will be published. The EU will focus on amending the directive with respect to national targets as well as a "biofuel obligation" for fuel suppliers and a certification of minimum standards of sustainable cultivation. The Commission will also look for a balanced approach to biofuels trade, respecting the interests both of domestic producers and trading partners. The Commission is set to put forward a legislative proposal for the vehicle market aimed at encouraging public procurement of clean vehicles. The future strategy on the car industry, which should be published in 2006, provides for various measures concerning the use of biofuels, establishing tax incentives, providing further consumer information and reducing congestion.

In terms of balancing domestic production and imports of biofuels, the Commission approaches to:

- propose the amendment of standard EN14214 to facilitate the use of a wider range of vegetable oils for biodiesel;
- amend the Biofuels Directive so that only biofuels whose cultivation complies with minimum sustainability standards count towards its targets;
- maintain market access conditions for imported bioethanol;
- pursue a balanced approach in ongoing free trade agreement negotiations with ethanol-producing countries;
- support developing countries that wish to produce biofuels and develop their domestic markets.

Biofuels should also be taken into account in a reform of the Fuel Quality Directive and the impact on the achievement of the objectives in the Biofuels Directive. The Commission also plans to remove unjustified or discriminatory technical barriers to using biofuels. Lastly, as Europe is better at producing bioethanol than biodiesel, the use of ethanol will be encouraged in the upcoming years.

3. Cross-cutting issues:

It should be examined how biomass supply can be increased, e.g. through the Common Agricultural Policy (energy crop scheme), a specialised forestry action plan, the waste framework legislation, the animal by-products legislation and standardising biomass fuels. Member States have to be encouraged to take biomass into account in operational plans under the structural funds. Also biomass energy research with regard

to bio-refining and 2nd-generation transport biofuels from wood and wastes will become more necessary.

4. Estimated costs and benefits by 2010:

The imported energy has to be reduced step by step from 48% to 42%. Also greenhouse gas emissions have to be reduced by 209 Mtoe CO₂ per year. By encouraging the production of biofuels, direct employment for up to 250-300.000 people could be provided, mostly in rural areas. A downward pressure on the oil price as a result of reduced demand for oil may become possible by these actions.

Of course, all these actions are not free of charge. The costs thereby incurred amount up to €9 billion per year – equivalent to increases of 1.5 cents/litre for petrol and diesel and 0.1 cents/kWh for electricity.

5. Stimulating biomass supply

With regard to agriculture, the reform of the Common Agricultural Policy (CAP) introduced a special aid for energy crops. The Commission will evaluate this implementation and put forward proposals reflecting the objectives in terms of biofuels. In addition to this the Commission will also fund information campaigns on the priorities for energy crops and the prospects for exploiting them.

About 35% of the annual growth in EU forests remains unused. A special action plan will, in particular, examine the matter of generating electricity from wood. The Commission will also review the impact of the energy use of wood and wood residues on forest-based industries.

Waste is also an underused energy resource. For this reason the Commission is developing a strategy on preventing and recycling waste and is preparing a proposal on the revision of the waste framework legislation.

Animal by-products are also increasingly being recovered for energy. The EU plans to review the regulatory framework governing such production processes, so that new sources of energy may be opened up.

The Commission is also paying particular attention to the adoption of European standards for solid biomass fuels in order to facilitate trade, develop markets and increase consumer confidence. The European Committee for Standardisation is working to define these standards.

From the point of view of supply, a European trading system for pellets and chips has been initiated with support from the EU Intelligent Energy for Europe Programme. The Commission tries to establish a Community-wide trading system for this reason. The EU and the Member States must therefore promote the development of renewable energy sources through regional policy and special structural and cohesion funds. Also biomass research programs will be necessary to find out where agricultural and woody crops for energy purposes can be used in the best way and which conversion processes will be the most useful (e.g. by the Seventh Framework Programme). Furthermore research in the field of the bio-refineries would have to be strengthened, too.

EU Strategy for Biofuels

Reference: COM (2006) 34

Publication: 8 February 2006

Website:

http://europa.eu.int/comm/agriculture/biomass/biofuel/com2006_34_en.pdf

The EU-Strategy for Biofuels complements the Biomass Action Plan of 2005 and presents several policy options. The EU-Strategy for Biofuels heads for three aims:

- to promote biofuels in the EU as well as in developing countries to ensure their production globally,
- to improve their cost-effectiveness by research into second-generation biofuels, to support their market penetration and to remove non-technical barriers, and
- to explore the opportunities for developing countries for biofuels production and to set out the role of the EU in this context.

The Communication also emphasizes a balanced approach in encouraging both domestic production and the import of biofuels.

First-generation biofuels, mostly biodiesel, can already be used as blends with conventional fuels. Also vehicles running on 100% biodiesel and so-called “flex-fuel vehicles” are already available. The EU is a net importer of diesel while it exports petrol. Anyway EU-produced biodiesel reaches the break-even point at oil prices of 60 € per barrel, bioethanol needs even a price of 90 € per barrel to become competitive. Therefore they can be seen only as intermediate step to reduce GHGs and to prepare the economy for other forms of biofuels. Meanwhile the EU can export its knowledge and experience while engaging its further research in this field. In the long term new engine types need to be constructed and a new fuel distribution system has to be built up. Also new technologies and feedstocks have to be introduced into the markets; forestry and waste materials will also play an increasing role for second-generation processes. One of the most promising second-generation technology is the production of lingo-cellulosics. Furthermore new technologies like Fischer-Tropsch-biodiesel and bio-DME are in research. Also renewable synthetic natural gas is taken into account. The *European Biofuels Technology Platform* plays a vital role to prepare for the large-scale use of this biofuels and to make them cost-competitive. Hydrogen offers even emission-free transport but new engine technology as well as a long-term strategy is necessary for the introduction of this form of biofuel.

The EU development policy plays an important role within this field due to specific investigation and competition and, if necessary, regulatory frameworks. Especially the environmental concerns on eco-sensitive areas like rainforests and social effects must not be forgotten.

In order to promote the use of biofuels in the European Union, the European Commission has adopted an **EU Strategy for Biofuels**, along seven policy axes:

- 1. to stimulate demand for biofuels**
- 2. to capture environmental benefits**
- 3. to develop the production and distribution of biofuels**
- 4. to expand feedstock supplies**
- 5. to enhance trade opportunities**
- 6. to support developing countries, and**
- 7. to support further research and development in this field.**

To 1.: Many states have relied on tax exemptions but this measure has not led to the targets set in the Directives. Therefore the Commission has released a report in 2006 announcing a revision of the Biofuels Directive. Second-generation biofuels will have to be favourably treated. The use of clean and efficient vehicles using high blends of biofuels must also be encouraged. Biofuel obligations are seen as promising way of overcoming these difficulties with tax exemptions. For example supply obligations as well as a framework of incentives should be established which encourages the use of more market-driven and demand-side measures. Eco-labelling, emission charges, tradable permits, and environmental performance bonds could be some of other promising ways to encourage the market.

To 2.: The Commission will survey how the use of biofuels can support the CO₂ emission reduction for car fleets and propose optimal measures according to the production and use of biofuels. A sustainable biofuel feedstock cultivation in the EU and in developing countries has to be ensured as well as that the use of biofuels will not cause any environmental or technical problems. Appropriate minimum environmental standards have to be set up to the feedstock production, adapted to the local conditions. Also the Fuel Quality Directive has to be renewed. The EN 590 standard states that diesel must contain no more than 5% biodiesel by volume which puts limits to the increased use of biofuels. Therefore the Commission reviews these quantitative limitations.

To 3.: Especially rural regions in Central and Eastern Europe have still the potential of economic growth. Supporting them in the production of biomass and biofuels can give them a remarkable advantage. Also the mobilisation of unused biomass by forest holders can be supported in this way. Furthermore the industry has to be requested to investigate possible barriers for the introduction of biofuels. The impacts of policies and programs supporting biofuels have to be newly investigated like their effect on the production of ethanol, food, forestry and oil market.

To 4.: The Commission is also looking for the use of sugar crops for the production of bioethanol. In 2003, the CAP reform has decoupled the income support from production. A special topic refers to the production of sugar crops: sugar beet grown for bioethanol production will be continued to be exempt from quotas and is therefore eligible for both the non-food regime on set-aside land and the energy crop premium which offers new market possibilities for sugar beet in the EU.

Of course it is worrying that, if the global demand for biofuels would grow, the availability for food crops can be endangered, especially in developing countries. The Commission will therefore closely monitor this development. Furthermore, a Forestry Action Plan is prepared in which the use of forest material for energy is examined. Also the use of animal by-products should be amended to facilitate the use for biofuel production. Organic waste from paper industry, recycled cooking-oils and other by-products are also still underused. A new proposal for the waste framework legislation has therefore been submitted.

To 5.: There are still no specific customs classifications for biofuels. The exact amount of imported ethanol, oilseeds and vegetable oil actually used in the transport sector cannot be quantified in an exact manner. A proposal for separate nomenclature codes for biofuels will be put forward. Another important factor refers to the market access conditions for imported bioethanol. The EU has to guarantee that the interests of both domestic biofuel producers and EU trading partners are respected. Especially in the so-called Doha Round, tariff cuts and market access with regard to bioethanol are discussed. Also the free trade agreements between the EU and the South-American

Mercosur countries have an impact on the further market development for bioethanol. An amendment of the EN-standard 14214 could facilitate the use of a wider range of vegetable oils for biodiesel production.

To 6.: With regard to the Sugar Protocol countries the Commission will try to support these countries concerning the production of bioethanol. For example the *EU Energy Initiative* focuses on specific partnerships for energy access and poverty alleviation. Renewable energy can play an important part in this field. Also the *JREC (Johannesburg Renewable Energy Coalition)* is a platform to strengthen renewable energy. So-called "Biofuels Assistance Packages" should support business-to-business relations and private sector investments to help smallholder involvement in biofuel production. Besides the EU will examine how it can best assist the development of national biofuel platforms and regional biofuel action plans.

To 7.: The proposal for the *7th Framework Programme (2007-2013)* gives further priority to strengthen the competitiveness of the EU biofuels industry. Further specific programmes will concentrate on the topics "energy", "food, agriculture and biotechnology", "market introduction" and further dissemination of proven biofuel technologies, as well as on the international cooperation with developed and developing countries to exploit mutual benefits and technology transfer in this field.

The market share of biofuels in the EU accounted for 0,6% of market share in 2003 according to the national reports of the EU Member States. Therefore an active biofuels policy is necessary to reach the indicative national targets. In non-EU countries, like Brazil or Canada, a percentage blend is mandatory in all or parts of the country.

The EU 25 produced 491.000 tonnes of bioethanol in 2004 (about 10% of the world's bioethanol) and 1.933.000 tonnes of biodiesel in 2004. The leading bioethanol producers in the EU are France and Spain, the leading consumer is Sweden (with about 80% of the quantities imported mostly from Brazil). Besides, the EU is the world's leading producer and consumer of biodiesel, Germany it's main producer, followed by France and Italy. Although the production of biogas has increased significantly in the EU during the last years, it is mainly used for CHP generation.

Biodiesel imports into the EU are generally liable for an ad valorem duty of 6.5%. However, there is no significant external trade with regard to biodiesel. More important is the external trade with bioethanol. It is traded under "Code 2207" for denatured and un-denatured alcohol that are subject to an import duty of 10.2 € respectively 19.2 € per hl. Nevertheless it is still not possible to record data whether or not imported alcohol is used in the fuel ethanol industry in the EU.

This strategy was accompanied by an *Impact Assessment* (*Webpage: http://europa.eu.int/comm/agriculture/biomass/biofuel/sec2006_142_en.pdf*) that is presenting different policy options to reach these targets.

Review of the EU Biofuels Directive

Overall

Website:

http://ec.europa.eu/energy/res/legislation/biofuels_consultation_en.htm

a. Public consultation exercise, April-June 2006

Publication: April 2006

Website:

http://ec.europa.eu/energy/res/legislation/doc/biofuels/2006_05_05_consultation_en.pdf

The Commission started a public consultation in April 2006 with regard to the publication of the “*Review of the EU Biofuels Directive*” in the end of the year 2006. Especially the opinions with regard to the *Biomass Action Plan* and the *Biofuels Strategy* should be investigated and an insight into the views of public authorities, business enterprises, non-governmental organisations and other interested parties should be presented. The main questions were

- if the objective of promoting biofuels was still valid,
- if the share of biofuels of 5,75% in 2010 could be achieved by the existing policies and measures,
- if the EU targets needed to be adapted,
- if a certification system should be introduced to enforce better performing biofuels on the market,
- if further measures were necessary by 2015 and 2020, and
- if additional technical issues were essential.

The questions covered political, scientific, legal and economic aspects. Of course also additional opinions and proposals could be laid down in this questionnaire by the answering parties.

b. ECN - Summary of the responses, October 2006

Publication: October 2006

Website:

http://ec.europa.eu/energy/res/legislation/doc/biofuels/contributions/2006_08_23_summary_responses.pdf

In October 2006 the Energy Research Centre of the Netherlands ECN published a summary of the result of the aforementioned inquiry.

A balanced and exhaustive impression of the responses was given, and the most relevant remarks were presented. In total, 144 responses were submitted and all responses are still available at the above mentioned EU website. All in all 26 NGOs, 16 institutions of the Member States, 83 enterprises of the industrial and/or private sector – like universities, biodiesel and bioethanol industries, car manufacturers – and others (private citizens, group or individual responses) presented their opinions and also suggestions to this topic. A detailed insight into the result of this questionnaire can be found on the website.

Biofuels Progress Report – Report on the progress made in the use of biofuels and other renewable fuels in the Member States of the EU

Reference: COM (2006) 845

Publication: 19 January 2007

Website: http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0845en01.pdf

In 2007, the EU Commission released the *Biofuels Progress Report* which focused on the progress made by the Member States towards the objectives of the Biofuels Directive 2003/30/EC. The report indicates that the target for 2010 is not likely to be achieved. Biofuels production is estimated to reach between 2.4% and 4.2% instead of the original 5.75% target. In order to increase the attaining of the goals of the Directive, the *Progress Report* proposes a 10% binding minimum standard for the share of biofuels use in overall transport consumption by 2020.

The first steps made in the framework of biofuels were in 2003 with the publication of the *Biofuels Directive* and the *Energy Taxation Directive*. In 2001 the market share of biofuels amounted to 0.3%, and only few Member States had made experiences with biofuels so far. By 2005 biofuels were used in all but four of the 21 Member States. Their market share reached about 1% (0.8% for biodiesel and 0.2% for bioethanol). Nevertheless progress was very uneven, and definitely only Germany and Sweden had made respectful steps forward in their production. Germany's success is basing mainly on biodiesel, Sweden focuses on bioethanol. The countries have several analogies: both promote high-blend or pure biofuels as well as low blends; both have given biofuels tax exemptions; both combine domestic production with imports from Europe or Brazil, and both have already made steps to second-generation biofuels. Tax exemptions are seen as a very successful form of support. A new possibility is the introduction of biofuel obligations, like Austria and France have already done so. These obligations can bring down the cost of promoting biofuels because their use is ensured anyway. The Austrian obligation was introduced in October 2005 with a biofuel share of 2.5%. Within few months the share rose to 3.2%. Data on the cost impacts are not available yet.

19 Member States have also set targets for 2010. If these targets are received, the common success of the EU Member States will amount to 5.45% of biofuels share – which is a small shortfall compared to the original objective. Basing on the experiences the shortfall will become even greater.

The *Progress Report* emphasizes that a commitment to the promotion of biofuels is still the best way of insuring against high oil prices. Another successful way is legally binding targets that give companies, investors and scientists the real confidence in doing their work on more efficient ways. Voluntary commitment seems not to be enough anymore to satisfy the annual market of 300 Mio. tonnes of biofuel for transport in Europe. Therefore there is mentioned the need for setting also a minimum target for 2020. An appropriate level would be 10%.

There is furthermore mentioned the need for a high level of efficiency so that biofuel policy can operate in a successful way. Creating frameworks all over the Member States, keeping the administrative burden on its minimum, and encouraging the production of biofuels so that an environmentally friendly supply is secured, are important targets.

One of the most discussed questions is the environmental and economic impact of biofuels production. The Commission therefore draws up a balanced account of impacts of biofuels use with regard to costs, security of supply, greenhouse gas emissions, and

other environmental and economic impacts. For example there has been disseminated the claim that Europe's consumption of biodiesel has caused deforestation in South-East Asia. Definitely about 30.000 tons of biodiesel have been produced in 2005, which is only a small part of the whole production of palm oil in Indonesia. The increase has been driven mainly by the food market. There is no need to use these kinds of areas - like rain forest - to achieve a biofuel share of 14%.

EU produced biofuels still have problems to compete with fossil fuels. Biodiesel becomes competitive to an oil price of about 60 € per barrel, bioethanol at about 90 € per barrel. Second-generation biofuels are still not commercially available. Their costs are expected to fall by 2020. The best way to keep a long-term security of supply is to diversify energy sources and to keep the range of raw materials wide. Of course, on the other side biofuels production within the EU would bring employment and a rise in GDP. Biofuel imports from countries that would have new opportunities to produce and export their products (e.g. developing countries) could lead to new partnerships.

The resultant development of GHG would have two sides: first-generation biofuels would result generally in a GHG reduction, whereas one production pathway – ethanol production in coal-fired plant with by-products used for animal feed – would lead to higher emissions. Second-generation biofuels can lead to clear savings in GHG emissions. Also should the growing of feedstock take place on appropriate land (for example not on wetlands). Then the environmental impacts will be manageable. Rain forest destruction has to be avoided. Certification schemes could help to ascertain the compatibility of resource. Also the *Fuel Quality Directive* would have to be revised to approach to these developments if higher biofuel blends in ordinary vehicles would be used in future.

A simple system of incentives and supports is necessary so that biofuel development can be further increased. Then the security of support and supply benefits can be guaranteed. A system of diversity of energy sources, different biomass types and import regions has to be ensured. Wood farming has to be introduced as well as a development of rape seed cultivation in Europe. Regular monitoring and reporting to the Commission in form of well-to-wheel environmental analyses have to be made. Without a strong framework there will be no probability that biofuels can reach a constant share in fuels industry and to move to a lower-carbon economy.

The PREMIA project

Project duration: June 2004 - May 2007

Webpage: www.premia-eu.org

PREMIA is a specific support action within the 6th Framework Programme of the EC that investigated the effectiveness of support programs for the market penetration of biofuels. It ran from June 2004 to May 2007. One of the aims was to give policy recommendations which can support the market transition of alternative motor fuels like biodiesel, bio-alcohol, biogas, biomass-to-liquid fuels and hydrogen. Country-specific policy options, which can indicate the most effective methods how to introduce biofuels in relation to market maturity, were given.

Common assessment frameworks for research, development and demonstration were introduced, and national incentive programmes that can facilitate the market introduction of alternative motor fuels were developed. This work has been done e.g. by local and international workshops, expert interviews or scenario calculations for the introduction of biofuels in the EU.

The project analysed the production and consumption of biofuels, price evolutions (both for fossil and biofuels), feedstock production and the active policy measures and market conditions in different Member States. Also the experiences gained all over Europe were described. So the most important key drivers for biofuel support could be evaluated for the future as well as the conditions that influence a Member State's potential and interest in producing and consuming biofuels.

PREMIA grouped therefore countries based on their economic strength, the energy situation and the natural suitability of growing bioenergy crops as well as the importance of the agricultural sector for the economy. Additionally scenarios for 2010 and 2020 were assessed. That estimated the use of biofuels in each country, taking into account the impacts of biofuel production on the energy and agricultural markets (e.g. through increasing feedstock prices).

Latest measures in the field of biofuels

Strategic EU Energy Review

Reference: COM (2006) 105

Publication: 8 March 2006

Website: http://ec.europa.eu/energy/green-paper-energy/index_en.htm

The primal aim of the EU is to link the internal European energy market with the topic of climate change; a cohesive European energy policy should be the key to this. The Commission therefore wants to have a unilateral, binding target of reducing greenhouse gas emissions by 20% compared to 1990 by 2020. Therefore a wider international support amongst the industrialised countries is necessary. Six priority areas have been identified:

1. Completing the internal European electricity and gas markets:

This aim shall be achieved by new measures such as a European energy grid code, a priority European interconnection plan, a European Energy Regulator and new initiatives to ensure a level playing field, regarding the unbundling of networks from competitive activities and boosting the competitiveness of the European industry.

2. An Internal Energy Market for guaranteeing security of supply:

This priority concerns the security of supply by ensuring solidarity among the Member States. The market needs to be transparent. Several possible measures are proposed like the establishment of a European Energy Supply Observatory, and a revision of the EU's approach to emergency oil and gas stocks for preventing disruptions.

3. A sustainable, efficient and diverse energy mix:

It must not be forgotten that the choices of energy by one Member State inevitably have an impact on the energy security of its neighbours, also on the competitiveness and the environment. The Strategic EU Energy Review will offer a clear European framework for national decisions on the energy mix, analysing all the advantages and disadvantages of this choice. This in turn will lead to objectives that are established on the Community level regarding the EU's overall energy mix.

4. An integrated approach to tackling climate change:

In this Action area the Commission suggests measures with regard to the challenges of global warming. Global GHG emissions should therefore reach their peak no later than 2025 and then be reduced by at least 15% compared to 1990 levels. An EU Emissions Trading Scheme will be a flexible and cost-efficient framework for climate friendly energy production. Also the new "*Renewable Energy Road Map*" for renewable energy resources (see below) is mentioned in order to provide a stable investment situation to create competitive renewable energy in Europe.

5. A strategic European energy technology plan:

The EU needs an appropriately resourced strategic energy technology plan that will ensure that European industries will be world leaders in this new generation of technologies. The plan should strengthen the European research effort and put the focus on agreed EU-level goals. The 7th Framework Programme emphasizes that there is no single solution to our energy problems. Therefore a wide portfolio of technologies has to be researched, developing economically viable biofuels for transport. Also new ways to finance a more strategic approach to energy research is needed.

6. A coherent external energy policy:

For reacting on growing demands of energy, high and volatile energy prices and the increasing import dependency, Europe has to speak with a single voice in the international field of policy. Therefore the EU has to identify infrastructure priorities, new approaches to its partners (like Russia), reflecting its inter-dependence and finally propose a new Community policy for rapid and coordinated reactions to special situations. A coherent external policy will finally be essential to deliver sustainable, competitive and secure energy for Europe.

All in all there is an urgent need for investments to meet future needs in energy and to replace old infrastructure. Europe has not yet developed its fully competitive internal energy network. Only when these markets will be fully developed, the citizens and enterprises of the EU will enjoy all the benefits of security of supply and lower prices.

Renewable Energy Road Map

Reference: COM (2006) 848

Publication: 10 January 2007

Website:

http://ec.europa.eu/energy/energy_policy/doc/03_renewable_energy_roadmap_en.pdf

As part of its Energy Policy for Europe the Commission has put forward a proposal for a so-called “*Renewable Energy Road Map*”. This document includes an overall binding 20% target for renewable energy and a binding minimum target of 10% for transport biofuels for the EU by 2020. It should also help to bring renewables into the field of electricity, heating and cooling. The Member States are required to establish National Action Plans that outline their specific objectives and sectoral targets for each of the renewable energy sectors – electricity, biofuels and heating and cooling.

The Energy Roadmap emphasizes the need for a coordinated development of biofuels throughout the EU. Biofuels are the only significant way to reduce oil dependence in the transport sector, although they are still more expensive than fossil fuels and other forms of renewable energy.

The EU will remove unnecessary barriers to the integration of RES into the EU energy system and help to develop and liberalise the internal electricity market. It will cooperate with grid authorities, electricity regulators and the renewable industry to enable an easier integration of renewables into the overall power grid. Structural and cohesion funds also need to be improved. The Member States are asked to establish fair and simple procedures for enlarging the use of renewable energies, to improve planning mechanisms where to find locations, and to integrate renewable energies into their regional and local plans. Therefore especially regional and local authorities will have a considerable power to reach the objectives set by this Road Map.

An Energy Policy for Europe

Reference: COM (2007) 1

Publication: 10 January 2007

Website:

http://ec.europa.eu/energy/energy_policy/doc/01_energy_policy_for_europe_en.pdf

The European Commission published the communication “*An Energy Policy for Europe*” stressing on the special European energy policy for combating climate change, limiting the EU’s vulnerability to hydrocarbons and promoting growth and jobs. The EU enforces its commitment to achieve at least a 20% reduction of greenhouse gases by 2020 compared to 1990. In its Action Plan the EU emphasizes that the existing measures like

renewable energy, biofuels, energy efficiency and the Internal Energy Market have to be enforced so that sustainability, security of supply and competitiveness will more likely be achieved. The present rules and measures have not yet achieved these objectives. Therefore the Commission wants to set a coherent series of measures with the objective of creating a European Gas and Electricity Grid and a competitive European-wide energy market within 3 years.

In its Communication *“Limiting Climate Change to 2°C – Policy Options for the EU and the world for 2020 and beyond”*, the Commission enforces that the emission trading mechanism has to remain a key mechanism for stimulating reductions. The ETS (Emission Trading System) has to reach its full potential for creating the most successful incentives.

Also the key point of energy efficiency is stressed in this document. In 2006, the Commission has already published the *“Energy Efficiency Action Plan”* that contains measures for reducing the European primary energy use by 20% by 2020. This would lead to 13% less energy consumption, saving 100 billion € and around 780 Mio. tonnes CO₂ each year. One of the key measures is the increased use of fuel efficient vehicles for transport and an enforced use of renewable energy.

The use of renewable energy will not exceed 10% by 2010. One of the reasons for this failure to achieve the original target of 12% share of renewable energy in its overall mix is the lack of a coherent and effective policy framework in the EU. In its *“Renewable Energy Road Map”* a binding target of renewable energy of 20% by 2020 is aspired (see above). This target is of course ambitious and will require major efforts by the Member States. Each Member State has different national circumstances, including climate and energy sources. Therefore the Member States should be flexible to promote their renewable energies according to their specific potentials and priorities. This goal will be set out in so-called *“National Action Plans”* to be notified to the Commission, containing sectoral targets and measures. Each energy plan should contain the very best specific objectives for electricity, heating, cooling and of course for biofuels.

Also in the *“European Strategic Energy Technology Plan”* two key objectives are mentioned: to lower the costs of clean energy and to make the European industry leading in the low carbon technology sector. For realising this vision the EU has to act jointly and even more ambitious than it has ever done before. Better coordination throughout the Union and setting of clear targets with precise milestones will be necessary. Especially the development of second generation biofuels has to be intensified. The annual spending on energy research therefore has to be increased.

Furthermore, the EU and its Member States have to develop effective energy relations on an international level, basing on cooperation and well organised interdependence. It needs to work with both developed and developing countries. Future international agreements should be used more effectively by establishing legally binding agreements. This also affects sustainably produced biofuels and the international pricing of carbon emissions.

III. Links to documents in the world wide web:

Link to abstract	Link to website
EU Biofuels Directive	http://ec.europa.eu/energy/res/legislation/doc/biofuels/en_final.pdf
Energy Taxation Directive	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0096:en:HTML
Annual Reports to the Biofuels Directive	http://ec.europa.eu/energy/res/legislation/biofuels_members_states_en.htm
White Paper	http://europa.eu.int/comm/energy/library/599fi_en.pdf
Green Paper	http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2000&nu_doc=769
Fuel Quality Directive	http://eur-lex.europa.eu/LexUriServ/site/en/oj/2003/l_076/l_07620030322en0100019.pdf
CAP Reform	http://ec.europa.eu/agriculture/capreform/index_en.htm
Biomass Action Plan	http://ec.europa.eu/energy/res/biomass_action_plan/doc/2005_12_07_comm_biomass_action_plan_en.pdf
EU Strategy for Biofuels	http://ec.europa.eu/comm/agriculture/biomass/biofuel/com2006_34_en.pdf
ECN - Review of EU Biofuels Directive	http://ec.europa.eu/energy/res/legislation/doc/biofuels/contributions/2006_08_23_summary_responses.pdf
Biofuels Progress Report	http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0845en01.pdf
PREMIA	www.premia-eu.org/
Renewable Energy Roadmap	http://ec.europa.eu/energy/energy_policy/doc/03_renewable_energy_roadmap_en.pdf
Strategic EU Energy Review	http://ec.europa.eu/energy/green-paper-energy/index_en.htm
An Energy Policy for Europe	http://ec.europa.eu/energy/energy_policy/doc/01_energy_policy_for_europe_en.pdf

FP7 – 7 th Framework Programme	http://europa.eu.int/comm/research/future/themes/index_en.cfm
IEE Intelligent Energy Europe	http://ec.europa.eu/energy/intelligent/index_en.html
European Biofuels Technology Platform	http://www.biofuelstp.eu/
EBB European Biodiesel Board	www.ebb-eu.org
ebio – European Bioethanol Fuel Association	http://www.ebio.org/home.php
AGQM – Arbeitsgemeinschaft Qualitätsmanagement Biodiesel e.V.	http://www.agqm-biodiesel.de/_10_.html
UFOP – Union zur Förderung von Öl- und Proteinpflanzen e.V.	http://www.ufop.de/english_news.php
Presidency Conclusions March 2007	http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/ec/93135.pdf