



OVERVIEW AND ANALYSIS OF NATIONAL REPORTS ON THE EU BIOFUEL DIRECTIVE

Prospects and barriers for 2005

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Preface

This study has been performed by the Unit Biomass of the Energy research Centre of the Netherlands (ECN) in the scope of Work Package 3 'Liquid biofuels for transport' of the Network of Excellence project 'Overcoming barriers to bioenergy' (6th Research Framework Programme of the European Union, contract no. SES6-CT-2003-502788). The ECN project number is 7.5243.

Abstract

In 2003 the European Parliament and the Council have adopted a Directive to promote the use of biofuels for transport. This Directive requires member states in 2005 to replace 2% of their diesel and petrol with biofuels, although deviations are possible when justified. In 2004, the member states had to report their measures to promote biofuels, their national target for biofuel use in 2005 and their reasons for any deviation of the 2% target. This report gives a summary of those country reports that were published before April 2005 and makes an analysis of their contents in order to provide an insight on how member states currently deal with the Directive. Especially the reasons to deviate from the indicative 2% target are analysed, since they can be considered as barriers for implementation of liquid biofuels for transport.

Keywords

Barriers, biodiesel, bioethanol, biofuel directive, biofuels, biomass, EU, policy, transport

CONTENTS

1.	INTRODUCTION	7
2.	COUNTRY REPORTS SUMMARIES	9
2.1	Austria	9
2.2	Belgium	10
2.3	Cyprus	10
2.4	Czech Republic	10
2.5	Denmark	12
2.6	Estonia	13
2.7	Finland	14
2.8	France	15
2.9	Germany	15
2.10	Greece	16
2.11	Hungary	17
2.12	Ireland	17
2.13	Italy	18
2.14	Latvia	18
2.15	Lithuania	19
2.16	Luxemburg	19
2.17	Malta	19
2.18	The Netherlands	20
2.19	Poland	21
2.20	Portugal	21
2.21	Slovakia	22
2.22	Slovenia	22
2.23	Spain	23
2.24	Sweden	23
2.25	United Kingdom	24
3.	OVERVIEW OF INDICATIVE TARGETS	27
4.	BARRIERS FOR IMPLEMENTATION OF THE DIRECTIVE	29
4.1	Reasons for deviation of the 2005 reference value	29
4.2	Barriers for biofuel use beyond 2005	32
4.3	Policy measures to overcome barriers	32
5.	CONCLUSIONS	33

LIST OF TABLES

Table 1.1	<i>Overview of different liquid and gaseous biofuels for transport</i>	8
Table 2.1	<i>Prognosis for biofuel use in Austria</i>	9
Table 2.2	<i>Outlook for production of biofuels in the Czech Republic</i>	11
Table 3.1	<i>National indicative targets and corresponding fuel use</i>	27

LIST OF FIGURES

Figure 3.1	<i>Geographical overview of the biofuel use in the EU in 2005</i>	28
Figure 4.1	<i>Barriers for implementation of the Directive in 2005 (detailed)</i>	31
Figure 4.2	<i>Barriers for implementation of the Directive in 2005 (generalised)</i>	31

SUMMARY

In May 2003, the European Parliament and the Council have adopted the 'Directive on the promotion of the use of biofuels or other renewable fuels for transport'. This Directive requires member states in 2005 to replace 2% of their diesel and petrol with biofuels, although deviations are possible when justified. In 2004 the member states had to report their measures to promote biofuels for transport, their national target for biofuel use in 2005 and their reasons for any deviation of the 2% target. These reports express an official view on the Directive by the EU member states and are, therefore, very interesting to analyse.

This report summarises these country reports and analyses their contents with specific attention to the national targets, the motivations for deviation of the 2% target, the views on biofuels for transport and the barriers reported. This was expected to give an insight in how member states currently deal with the Directive and what this could mean for the production and use of biofuels for transport in Europe in the future. It might also reveal the success factors for large-scale implementation of biofuels for transport.

It was found that in March 2005 five reports were still not available, either not submitted or not published yet. Also many of the available reports did not contain all the information that was requested by the Directive. However, from the information available it can be concluded that the EU will not reach 2% of biofuels for transport in 2005. The EU biofuel production will probably still be quite considerable in 2005, approximately 1.5%, mainly because large transport fuel consumers like Germany, France and Spain do intend to reach the 2% target.

The countries that have set a lower national target than 2% give various reasons for this deviation. The main ones are:

- Biofuels for transport are considered not cost-effective for reducing greenhouse gas emissions
- Fuel end use is problematic
- Limited amount of feedstock available in certain countries.

Furthermore, it is mentioned that the current biofuels for transport have some negative environmental aspects, that there are legislative barriers, and that there is currently limited production capacity.

Some of these barriers can be fairly easily removed, whereas others are more complicated. A more complicated barrier is the limited potential of biomass in some countries. This could be overcome by importing of biomass or biofuels, which is, however, generally seen as undesirable, because this is not considered to contribute to the security of energy supply. However, the interpretation of 'security of supply', which was an important argument for the creation of the Directive, seems to vary between countries from a narrow perspective, such as national energy self-sufficiency, to a broad perspective, such as diversity of energy suppliers.

Another complicated barrier is the argument that biofuels for transport are not cost-effective in reducing greenhouse gas emissions. Although this is true for the current biofuels for transport (such as biodiesel, bioethanol, bio-ETBE), it ignores the motivation for the Directive to reduce the dependence on oil, which also has a cost. Many countries mention the need for so-called second-generation biofuels for transport (such as Fischer-tropsch diesel, bioethanol from lignocellulosic materials) that will be more cost-effective and also remove some other barriers, such as some negative environmental performances and technical barriers for end-use of the current biofuels for transport.

Many countries seem to agree on the usefulness and, therefore, the need for second-generation biofuels for transport, but these countries are very different in their current implementation of biofuels for transport. All the European countries have different domestic conditions for energy supply and transportation, but also different political views on the use of biofuels for transport. This makes an analysis of the success factors and barriers for large-scale biofuel implementation based only on the country reports difficult. A wider scope is necessary to determine especially the success factors for large-scale implementation of biofuels for transport and to provide a 'road map' for biofuels for transport.

1. INTRODUCTION

On the 8th of May 2003, the European Parliament and the Council have adopted the 'Directive on the promotion of the use of biofuels or other renewable fuels for transport' (Directive 2003/30/EC, see appendix A). This Directive aims at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes, with a view to contribute to objectives such as improving the security of energy supply, reducing greenhouse gas emissions and creating new opportunities for sustainable rural development.

The Directive requires member states to ensure that a minimum proportion of biofuels¹ and other renewable fuels for transport is placed on the market and, to that effect, set indicative targets. Reference values for these targets are: 2% for the end of 2005 and 5.75% for the end of 2010, on the basis of energy content of all petrol and diesel for transport purposes.

Member states may deviate from the reference values but if they do, they should report their motivations for the deviation to the Commission. These motivations may be based on: limited national potential for production of biofuels, amounts of resources allocated to the application of biomass for energy uses other than transport, specific technical or climatic characteristics of the transport fuel market or policies allocating resources to the production of other transport fuels based on renewable energy sources. Thus, the Directive offers a few 'escape routes' to justify lower targets. It is yet unclear if there will be penalties and of what kind if the Commission finds the deviation unjustified. Setting mandatory targets for the use of biofuels for transport is a serious option. The Commission will draw up a first evaluation report by the end of 2006.

Member states also have to report before 1 July every year on the measures taken to promote biofuels or other renewable fuels, the national resources allocated to the production of biomass for energy uses other than transport, the total sale of transport fuel, and the share of biofuels placed on the market in the preceding year. For the first reports in 2004, which should include the national indicative targets set for 2005, the Commission had extended the deadline to 1 October.

The reports by the EU member states are very interesting, because they express the first official view on the Directive by the EU member states. The reports published by the EU countries contain the different views on biofuels, the policy measures used and intended to promote biofuels, the barriers encountered in implementing the Directive and motivations for deviation (if any) from the reference values.

This report summarises the country reports available and analyses the indicative targets, the motivations for deviations of the 2005 target, the views on biofuels and the barriers reported. This will give an insight on how member states currently deal with the Directive and what this could mean for the production and use of biofuels in Europe in the future. This might also reveal the success factors for large-scale implementation of biofuel for transport.

In chapter 2 of this document the available reports by the EU members to the European Commission are summarised. The following topics are considered:

- Current production and use of biofuels
- National indicative targets
- Policy measures for biofuels
- Motivations for the targets set

¹ In fact the word biofuels is also used for other forms of bioenergy; in this report biofuels are considered biofuels for transport, both liquid and gaseous (see also Table 1.1)

In chapter 3 an overview is given of the targets set by individual countries. From the overview of targets it will be clear that not all member states intend to follow the indicative targets suggested by the European Commission. In chapter 4 the reasons to deviate from the indicative targets are analysed. The report ends with some general conclusions in chapter 5.

Table 1.1 *Overview of different liquid and gaseous biofuels for transport*

Biofuel name in the Directive*	More specific name (if any) & alternative names	Biomass feedstock	Production process
<i>Current biofuels</i>			
Bioethanol		Sugar beets, grains	(Hydrolysis) & fermentation
Pure vegetable oil	<i>Pure plant oil (PPO)</i>	Oil crops (e.g. rape seed)	Cold pressing/extraction
Biodiesel	Biodiesel from energy crops <i>RME, FAME</i>	Oil crops (e.g. rape seed)	Cold pressing/extraction & transesterification
Biodiesel	Biodiesel from waste <i>FAME</i>	Waste/cooking/frying oil	Transesterification
Biogas	<i>Upgraded biogas</i>	Wet biomass	Digestion
Bio-ETBE**		Bioethanol	Chemical synthesis
<i>Second-generation biofuels</i>			
Bioethanol	Cellulosic bioethanol	Lignocellulosic material	Advanced hydrolysis & fermentation
Synthetic biofuels	Fischer-Tropsch (FT) diesel <i>Synthetic (bio)diesel</i> <i>Biomass-to-liquids</i>	Lignocellulosic material	Gasification & synthesis
Synthetic biofuels	Heavier (mixed) alcohols <i>Biomass-to-liquids</i>	Lignocellulosic material	Gasification & synthesis
Biogas	Bio-SNG (Synthetic Natural Gas)	Lignocellulosic material	Gasification & synthesis
Biomethanol	<i>Biomass-to-liquids</i>	Lignocellulosic material	Gasification & synthesis
Biodimethylether	Bio-DME	Lignocellulosic material	Gasification & synthesis
Biohydrogen		Lignocellulosic material	Gasification & synthesis <i>or Biological process</i>

* See also appendix A

** Bio-ETBE is produced from bioethanol and isobutylene (a by-product from oil-refineries) and is therefore only partly biofuel (see also appendix A)

2. COUNTRY REPORTS SUMMARIES

By the end of March 2005 20 country reports were published on the website of the European Commission². Summaries of these reports are given in this chapter. Some of the reports that were published already early in 2004 make reference to intended actions or communications later that year or in early 2005. In most cases it is unknown if these were executed. However, Greece, Sweden and the UK have submitted additional letters to the Commission, which are also published on the website, and their contents have been included in the summaries.

The official reports are published in the language of the member states. For most of the reports, English translations are also provided on the website and these have been used for this report. For the French report a third party translation was consulted. This report contains for a large part citations from the English translations of the country reports. Comments by the author are given in *italics*. The summary is not entirely complete, because five country reports (from Belgium, Italy, Luxemburg, Poland and Slovenia) were not available yet.

2.1 Austria

2.1.1 Current production and use of biofuels

Currently, Austria has nine large-scale and three pilot biodiesel plants that have a combined biodiesel production capacity of more than 100,000 tonnes per year. In 2003, 55,000 tonnes of biodiesel were produced in Austria and approximately 90% of this quantity was exported to other countries, as the price that could be obtained for biodiesel in Italy and Germany was higher than in Austria. Austria does not have a bioethanol production plant.

Besides biofuels, in 2003 more than 200 million cubic meters of biogas was produced in Austria, of which almost 100% was converted directly into electricity by the producers. However, some producers are very interested in using biogas as a fuel for transport. Further in Austria in 2001, 67 PJ of solid biomass was used, in particular for residential heating and electricity. This represents a proportion of 5.2% of the gross domestic consumption.

2.1.2 National indicative target

A proposal by the government, out for consultation until August 2004, for the indicative targets of shares of biofuels in the transport sector contains a target of 2.5% from April 1st 2005, a target of 4.3% from April 1st 2007 and a target of 5.75% from April 1st 2008. This results in the prognosis as given in Table 2.1.

Table 2.1 *Prognosis for biofuel use in Austria*

Year	Biofuel target (%)	Biodiesel (tonnes)	Bioethanol* (tonnes)
2005	2.5	220,900	-
2007	4.3	317,500	120,200
2008	5.75	481,900	150,000

* Also as raw material for Bio-ETBE

The report notes that there is a maximum substitution potential for biofuels by blending of fossil fuels based on the European fuel standards: 5% biodiesel in diesel and the use of 5% bioethanol or 15% bio-ETBE in petrol. The combination of these blending variants results in a proportion of biofuels of 4.66%. In order to achieve the required 5.75%, it is necessary to replace 1.09% of the total energy requirements of the transport sector with pure biofuels.

² http://europa.eu.int/comm/energy/res/legislation/biofuels_members_states_en.htm

2.1.3 Policy measures for biofuels

Pure biofuels are exempted from mineral oil tax. The blending of up to 2% biodiesel in diesel is also exempted from mineral oil tax. There is also a tax reduction for the blending of up to 5% biofuels in petrol. A substitution requirement (quota) is proposed.

2.1.4 Motivation for the target

Austria gives no motivation for its commitment to biofuels, but the report mentions that the full implementation of the EU Biofuels Directive (5.75%) could reduce greenhouse gas emissions by up to 1.0 million tonnes CO₂ equivalent per year, which corresponds to approximately 5% of the current greenhouse gas emissions from the Austrian transport sector.

Austria has mainly experience with producing biodiesel for export and has set high targets for its national biofuel use.

2.2 Belgium

The Belgian report was not available yet. Belgium currently uses no or little amounts of biofuels. Federal and Flemish ministers have expressed several times in the media their intention to promote biofuels.

2.3 Cyprus

2.3.1 Current production and use of biofuels

Production and sales of biofuels in Cyprus are considered to be negligible. Interest for investment in this field has been very limited. Since February 2004, when a new grant scheme was put into operation, some interest has been expressed particularly for the production of biodiesel from used edible oils. It is expected that within the next two years there will be further progress, with more applications.

2.3.2 National indicative target

The setting of a national target for biofuels is presently under study by the Ministry of Commerce, Industry and Tourism in co-operation with other interested parties. The final decisions should have been made before the end of 2004.

2.3.3 Policy measures for biofuels

In the last few years Cyprus has taken measures in order to promote the production and use of biofuels for transport, in the context of policy initiatives for the promotion of the Renewable Energy Sources and Energy Saving. The introduction of additional measures for biofuels is presently also under study.

2.3.4 Motivation for the target

The potential for energy crops in Cyprus is considered to be limited, although no studies on this topic have been carried out yet. A three-year study on this topic started in October 2004.

Cyprus has not set the target for biofuels yet and seems to be more interested in other types of renewable energy than biofuels. The main reason is that the potential of domestic feedstock for biofuels is expected to be limited.

2.4 Czech Republic

2.4.1 Current production and use of biofuels

In the years 1991-1995 grants were allocated from the State budget to establish manufacturing capacity for rapeseed methyl ester (RME). Additional public resources have been made

available and are being dedicated exclusively to promoting RME and biodiesel production. A biodiesel blend, i.e. a blend of diesel and RME containing 31% RME by volume, is produced for the domestic market from 1997 onwards. At present there are 14 RME producers in the Czech Republic, which have a total production capacity of approximately 150,000 tonnes of RME annually. In 2001 39,600 tonnes were used in the Czech Republic and in 2002 68,800 tonnes. The use of bioethanol in the form of bio-ETBE has been stimulated and production capacity is available, but limited.

2.4.2 National indicative target

The Czech Republic has set indicative targets, which result in the outlook as given in Table 2.2. The targets will become definitive in the course of 2005, since they depend on the possibilities of the State budget and on agricultural production.

Table 2.2 *Outlook for production of biofuels in the Czech Republic*

Amount of biofuel	2003	2004	2006	2010
RME production (tonnes)	70,000	80,000	100,000	120,000
RME share in diesel (energy %)	2.1	2.2	2.75	3.1
Bioethanol production (tonnes)			174,000	220,000
Bioethanol share in petrol (energy %)			5.2	6.6
Biofuel share (energy %)	1.2	1.3	3.7	4.5

2.4.3 Policy measures for biofuels

The higher costs and lower energy efficiency of the biofuel components were offset by the payment from 1999 to 2001 of direct subsidies to manufacturers of RME and fuel blends. From 2001 to April 2004, compensation took the form of price rebates for the raw material (oilseed rape) grown on set-aside land. In addition, RME producers received direct support for processing rapeseed oil for non-food uses. This support is continued for a maximum of 100,000 tonnes per year. Also, there is a lower excise duty on blended fuel/biodiesel, which means that RME incorporated in a fuel blend carries zero excise duty.

Policy measures are in preparation in order to replace fossil-derived methanol by bioethanol in the production process of RME and MTBE, thus producing respectively rapeseed ethyl ester (also biodiesel) and bio-ETBE. Also, minimum quota for the production of bioethanol intended exclusively for transport purposes are proposed.

2.4.4 Motivation for the target

The admixture of biofuels on a large scale is expected to be implemented in the Czech Republic in 2006-2007, once the technical and legislative prerequisites are in place. The target for 2006 clearly exceeds the percentage specified by the European Commission. The reasons for this lie in EU accession, and the need to create new opportunities in the countryside and systematically pursue a rural development strategy. The report also mentions the number of jobs that will be created by the local biofuel production. Furthermore, increasing energy self-sufficiency and efforts to improve the environment are fundamental issues for the Czech Republic.

Legislative and technical issues might keep the Czech Republic from reaching the reference value of 2% in 2005. However, the Czech Republic is very ambitious in the field of biofuels and commits itself to a very high target of 3.7% for 2006. The main motivation is the rural development caused by the local production of biofuels.

2.5 Denmark

2.5.1 Current production and use of biofuels

Denmark produces 40,000 - 45,000 tonnes of biodiesel, which is exported. Danish biofuel production is mainly dependent on the size of the European market and the competitive position of the Danish producers. The Danish consumption of biofuels for transport is very low and limited to experiments at local levels.

2.5.2 National indicative target

Denmark's indicative target for the use of biofuels in 2005 is zero. This decision is in line with the Government's position during the negotiations on the Directive. Here, Denmark was instrumental in replacing the obligatory targets for the use of biofuels contained in the original proposal for a directive with optional targets in view of the fact that the cost effectiveness of such measures varies from country to country, and that obligatory targets are not cost-effective. In the longer term, developments in biofuel technology or changes in the energy markets may change the outlook for and the costs of using biofuels. Developments will therefore be closely monitored in coming years with a view to fixing the indicative target for 2010 in 2006.

2.5.3 Policy measures for biofuels

The Government plans to abolish the current CO₂ tax on biodiesel (ca. 12 €/tonne CO₂) and introduce similar tax rebates for other biofuels for transport. However, the energy tax, which is the major part of the taxation of transport fuels, remains.

Efforts to promote the use of biofuels for transport in Denmark have taken the form of research. The aim is to bring the costs closer to the prices of fossil fuels. This work may lead to biofuels becoming a cost-effective climate policy measure in the future.

2.5.4 Motivation for the target

According to the Danish Government, biofuels are of no great benefit to the environment. Although biofuels are almost CO₂ neutral, this gain is out of all proportion to the additional costs. Biofuels are far more expensive to produce than ordinary petrol and diesel. In addition to this, considerable additional investment is required in existing systems in order to handle the fuels during storage and distribution. The calculated cost of achieving the CO₂ reductions with biofuels is typically far higher than the indicative sum of DKK 120/tonne CO₂ (ca. 16 €/tonne CO₂) in the Government's climate strategy. It would be far cheaper to reduce CO₂ emissions in other ways.

The Directive points out that an indicative target lower than the reference value may be justified by the amount of national resources used to produce biomass for energy use other than transport. A considerable amount of biomass is used to produce electricity and heat, regarded until now as the most cost-effective use of biomass for energy production in Denmark. Denmark lies well above the EU average in terms of the proportion of its total energy production produced using biomass. In 2002 the total use of biomass was approximately 85 PJ. By way of comparison, it is estimated that the Directive's reference value of 2% biofuel use in 2005 corresponds for Denmark to 3.4 PJ in 2005 and the reference value of 5.75% in 2010 is estimated to correspond to 10.4 PJ.

The issue of reducing the dependence on imported energy is not urgent for Denmark. Because of its North Sea reserves, Denmark can be more than self-sufficient in oil at least until 2010. Denmark is also expected to be self-sufficient in energy as a whole, also because sustainable energy production is expected to continue to account for around 14% of total energy consumption.

Denmark also expects some environmental damages from biofuel production. Energy crops for biofuels are sometimes grown on set-aside land, which puts a strain on the aquatic environment through increased leaching of nitrogen, phosphor and pesticides. There may also be increased emissions of ammonia and nitrous oxide (a greenhouse gas) into the air. This is in addition to the effect on biodiversity and natural amenities.

Furthermore, it is doubtful whether there would be any increase in total employment, particularly in the long term, by stimulating demand for biofuels in Denmark. Also, the report mentions some minor problems with technical aspects of biofuels.

Denmark is quite clear in its report: it does not consider biofuels for transport as an effective means to reduce greenhouse gas emissions. It considers electricity and heat from biomass much more cost-effective greenhouse gas reduction options and does promote this at large scale. When it comes to security of supply, Denmark has a convenient position by having its own oil reserves.

2.6 Estonia

2.6.1 Current production and use of biofuels

No pure or blended biofuel has been sold or consumed for transport purposes in Estonia. Estonia has produced 69,200 tonnes of rapeseed in 2003, but this has been used for the production of cooking oil. Starting production of biodiesel in Estonia requires an extension of the area for rape seed cultivation or imports of rapeseed. The production of biodiesel from rapeseed has been tried, but the fuel obtained did not meet European standards. Industrialists have expressed interest in the possibility of producing biodiesel, but there are no concrete plans for starting production.

2.6.2 National indicative target

Estonia has not defined a target, but concludes that based on the current situation and the policy measures already taken it is unlikely that biofuel produced in Estonia will come onto the market in 2005. The import of biofuels into Estonia is also seen as unlikely. In the course of 2005 Estonia will assess the impact of the measures taken and plan supplementary measures. The planning of measures will be based on the objectives set in Directive.

2.6.3 Policy measures for biofuels

An act exempting biofuels from excise duty is expected to enter into force on 1 January 2005. Furthermore, the report mentions that growers of energy crops have the possibility of applying for direct EU aid. Similarly, growers and processors of energy crops can apply for investment aid from the EU structural funds.

2.6.4 Motivation for the target

The report mentions that no national resources have been directly allocated to the production of biomass, so Estonia cannot appeal to the fact that biomass is used in other energy sectors than transport. However, policy measures for the promotion of the use of renewable energy sources are being taken.

The report also mentions that car importers do not rate the technical readiness of vehicles in Estonia for the use of biofuels very highly.

It seems that the current policy measures taken by Estonia are not enough to make biofuels competitive and that Estonia is reluctant to introduce more policy measures.

2.7 Finland

2.7.1 Current production and use of biofuels

The use of biofuels in Finland is not widespread and it has mainly been based on pilot projects for a fixed period. The volume of bioethanol, produced from imported raw material, placed on the market in connection with these pilot projects was 1.6 million litres in 2002 and 7.9 million litres in 2003. This bioethanol has been used in blends of 5% by volume with petrol. There have also been small-scale trials on the production of biodiesel and biogas for use as transport fuel. In 2003 biofuels accounted for approximately 0.1 % of the total sales of transport fuels. Furthermore, Finland produces 9 million litres per month of bio-ETBE from bioethanol for blending with petrol. It is based on imported raw material and is subsequently exported.

The total bioenergy consumption, mainly used in combined heat and power production, in Finland in 2003 was approximately 287 PJ, which was approximately 20% of total primary energy consumption.

2.7.2 National indicative target

Given the low starting point of the use of biofuels for transport, the limited possibilities of producing biofuels from biomass and the drive to increase the use of bioenergy for heat and power production, Finland's national indicative target for the proportion of biofuels in 2005 is set at 0.1 %.

The report mentions further that setting a national target for the proportion of biofuels for transport purposes for 2010 would not serve any purpose at this moment.

2.7.3 Policy measures for biofuels

Since 2004 biogas used as transport fuel is exempted from tax, because this is covered by an act intended for the promotion of natural gas and LPG as transport fuel. Other biofuels can be partly exempted from tax on a project basis, intended for research and testing.

There is a large amount of funding of research into the possibilities of crop production, the production and use of biofuels and for projects that aim to develop more economic non-crop based biofuel solutions. Investment aids are granted for demonstration projects on the production of liquid biofuels.

2.7.4 Motivation for the target

Biodiesel production is not considered a viable option for Finland for two reasons. First, because the potential is limited: the production volumes of rape are limited by cultivation techniques such as crop rotation and large quantities of rape for food production are already imported. Second, because the costs are high: the production costs of arable crops in Finland are among the highest in Europe and the estimated cost of reducing carbon dioxide emissions by combined heat and power is much lower (€10-20/t CO₂) than for biofuels derived from arable crops (over €200/t CO₂).

Finland has, in principle, sufficient supply of wood and waste-based raw materials to produce second-generation biofuels at the EU target rate set for 2010. However, this new potential wood fuel supply is likely to be destined mainly for the purposes of combined heat and power production. Furthermore, the production of liquid fuels from wood is still at the development stage, so by 2010 only a few pioneering demonstration plants might be in operation.

The report does acknowledge that the importance of biofuels for transport may increase in the long term, because of technological advances in the production of (second-generation) biofuels, and thereby to lower production costs, and because of trends in prices of crude oil.

Finland is committed to the use of bioenergy, but it sees combined heat and power as a far better option than the current biofuels for transport produced from crops. However, it does actively promote research for second-generation biofuels.

2.8 France

2.8.1 Current production and use of biofuels

France has encouraged the use of biofuels already for more than 10 years. In 2003 the French consumption of bio-ETBE was 164,000 tonnes from 77,190 tonnes of bioethanol. The consumption of biodiesel, used as blend of 5% in diesel, was 321,000 tonnes in 2003. Combined, this is approximately 0.7% of total diesel and petrol use, based on energy content.

2.8.2 National indicative target

The French indicative target for 2005 is set at 2%. Furthermore, France has announced to increase the production of biofuels to an amount of 1,200,000 tonnes³ per year in 2007, which is three times the current production, but this is not much more than the indicative target of 2% in 2005.

2.8.3 Policy measures for biofuels

Biodiesel and bio-ETBE have been partly exempted from taxation since 1992. The amount of the exemption is adjusted each year and is enough to compensate for the cost difference with traditional fuels. Since 2004, bioethanol directly blended in petrol is also partly exempted from taxation. These tax exemptions apply to certain maximum volumes of biofuels and are also adjusted each year. For 2004 the maximum volumes are 387,500 tonnes of biodiesel, 199,000 tonnes of bio-ETBE and 12,000 tonnes of bioethanol.

2.8.4 Motivation for the target

The report does not give any motivation for the French commitment to biofuels production.

The French report is very brief and unclear, but it does contain the target of 2% for 2005, equal to the Directive's reference target. According to the Directive the report is incomplete, because it does not contain the requested information on the national resources allocated to the production of biomass for energy uses other than transport and also the total amount of transport fuels sold in France is missing.

2.9 Germany

2.9.1 Current production and use of biofuels

Biodiesel production started in 1993 and biodiesel is in 2003 still the only biofuel of any substantial importance on the German market. In addition, very small volumes of pure vegetable oil were used in approximately 4 000 cars. In 2003, 800,000 tonnes of biodiesel was used and 5,000 tonnes of pure vegetable oil. The share of biofuels in total transport fuel consumption in Germany was 1.4%.

2.9.2 National indicative target

The report mentions that Germany is aiming at a target of at least 2% of biofuels and that the prospects to achieve this are good.

³ The original French report mentions abusively a figure of 800,000 tonnes.

2.9.3 Policy measures for biofuels

Before 2004, biofuels were exempted from tax, but only when used as a pure biofuel. From 2004 until 2009 all biofuels will be exempted from tax, also when used in blends with other fuels. This change is expected to result in use of bioethanol and bio-ETBE, which were not yet used as biofuel in Germany.

2.9.4 Motivation for the target

Germany does not mention a particular reason for its commitment to biofuels. In 2004 it intended to develop a long-term strategy for the promotion of alternative fuels and transportation technologies in the framework of its national sustainability strategy, and biofuels are an essential component of this.

The report does stress the German activities in the field of research for synthetic biofuels from biomass, because these fuels require no new engines or new filling station infrastructure, make use of the entire biomass raw material and have good emission values on combustion in engines. Also, Germany stresses its activities on Public Relations for biofuels in the past (biodiesel) and in the present (bioethanol, synthetic biofuels). Furthermore, it mentions its other bioenergy activities: Of the total bioenergy produced in 2003, 82% was used for heating, 7.8% for electricity production and 10.2% for biofuels.

Germany is very active in the field of biofuels, both in current production and in research. The report does not give any motivation for this commitment.

2.10 Greece

2.10.1 Current production and use of biofuels

So far, there has been no production or consumption of biofuels in Greece, except for small field tests of biodiesel. Currently, two biodiesel plants with a capacity of 40,000 tons each are under construction and these will initially use mainly imported oils. Also, there has been interest to build a few smaller biodiesel plants and a bioethanol plant.

2.10.2 National indicative target

Based on the current prospects, Greece expects a total local production of 55,000 - 60,000 tons of biodiesel for the year 2005, which is approximately 1% of total fuel use. Some additional small quantities of imported biodiesel are also anticipated. The Greek indicative target for biofuel use in 2005 has been set at 0.7% and was communicated to the European Commission in an additional letter.

2.10.3 Policy measures for biofuels

Greek law has to be changed to allow the use of biofuels. Policy measures for the promotion of biofuels were expected to be finalized in autumn 2004. Various detaxation scenarios, ranging from full to zero detaxation of biofuels, are examined, aiming to secure the biofuels penetration.

2.10.4 Motivation for the target

Greece does not have a target yet, but does mention a few obstacles concerning the introduction of biofuels. For the use of biodiesel, there is some concern that, because the diesel-fuelled vehicles in Greece are old, problems may arise 'in the elastomers or other parts of the engines'. Also, because of some potential technical obstacles in the introduction of bioethanol as a mixture with gasoline, it has been decided that bioethanol should be converted into bio-ETBE.

Greece is still working on incorporating the fuel standards for biodiesel and bioethanol into the national legislation. For biodiesel this was expected to be completed by the end of 2004, thus allowing the use of biodiesel in the Greek fuel market. For bioethanol this is expected by late

2005 and therefore, introduction of bioethanol in the Greek gasoline market is expected to take place in 2006 or later.

However, in the report it is concluded that both the qualitative (fuel properties) and quantitative (land use, yielding capacities, prices, etc) data presented indicate that future biofuels (biodiesel and bioethanol) production in Greece can be supported to a major extent from indigenous resources.

In an additional letter to the European Commission Greece has set a lower target than the Directive's value, but also lower than what might be expected on the basis of the national report. This is probably because it is late with introducing proper legislation and has some problems with the standardization for biofuels.

2.11 Hungary

2.11.1 Current production and use of biofuels

In 1999 two experimental biodiesel plants were built to facilitate biodiesel use among agricultural producers. However, due to the special, low-rate excise duty on diesel granted for agricultural producers, the use of biodiesel was not an economic viable option for them and the programme failed. There was no biofuel use in Hungary in 2003. There is production capacity available to produce an amount of bioethanol enough for 40,000 tons of bio-ETBE.

2.11.2 National indicative target

The national indicative target for biofuels in Hungary in 2005 is 0.4-0.6%.

2.11.3 Policy measures for biofuels

The Hungarian Government has proposed to the Parliament an excise duty refund from January 2005 to December 2010 for bio-ETBE produced on the basis of bioethanol blended in engine fuel as well as standard quality biodiesel blended in diesel oil.

2.11.4 Motivation for the target

Hungary claims that it meets the Directive condition of limited biofuel production potential. The prime factor hindering progress is that production capacities may only be enhanced on the long run. Also, in the case of biodiesel, there is a poor crop yield in Hungary due to climatic factors. However, the crop is still relatively cheap. Collection and utilization of used frying oil could play an important role in Hungary, but it is very time-consuming to design and create a system for this.

It seems that Hungary has started late with the promotion of biofuels and foresees now that not enough production capacity can be installed to meet the 2005 reference value of the Directive. However, it does not give an outlook for the period after 2005.

2.12 Ireland

2.12.1 Current production and use of biofuels

The only biofuel that has been sold in Ireland to date is 18,000 litres of rapeseed oil on a project basis from May 2003 to May 2004.

2.12.2 National indicative target

Ireland proposes an initial indicative target of 0.06% by the end of 2005, rising to 0.13% in 2006. This figure compares with current market penetration of less than 0.0003%. The initial target is based on the projections from a scheme for excise relief on pilot biofuels projects. It reflects a first-stage initiative as part of an emerging national biofuels policy, which is being

formulated and was scheduled for publication in late 2004. Any revised targets arising from this report, will be notified to the Commission as early as possible.

2.12.3 Policy measures for biofuels

Ireland has proposed a scheme for excise relief for pure plant oil, biodiesel blends, and bioethanol blends, but only on a project basis. The maximum amount of biofuels produced under this scheme is six million liters of pure plant oil, one million liters of biodiesel and one million liters of bioethanol per year, which adds up to approximately 0.3% of total transport fuels. Ireland also offers capital grant aid for biofuels projects. Also, an aid of € 45 per hectare is granted for production of energy crops, which are used for the production biofuels or electric and thermal energy.

2.12.4 Motivation for the target

A number of factors have impeded the development of an indigenous biofuels industry in Ireland, or the widespread placing of biofuels on the transport fuels market. The first factor is the relatively high cost of biofuels for transport as a carbon abatement measure, which are in the order of several 100 euros per tonne CO₂ avoided. Long term costs for second-generation biofuels could be much lower, which points to the desirability of accelerating research into the possibilities for developing FT-diesel or cellulosic bioethanol. Second is the potential conflict with the EU Directive on NO_x emissions, because biodiesel, compared to diesel, increases NO_x vehicle emissions by 5% and on a life-cycle basis up to 30%. Third is a potential increase in particulate emissions from production and use of biodiesel, which according to the report could be in the order of 15%. Fourth, there are technical difficulties for biodiesel, pure vegetable oil and bioethanol with blending and its impact on conventional engines.

Finally, there are agricultural limitations on the amount of feedstock for biofuels in Ireland. The amount of biofuels that can be produced from Irish residues is about 1% of total transport fuel use. Currently unproductive set-aside land could account for approximately 1.4% if used for biofuel production. However, under the Blair House Agreement, there are at present some restrictions on the growing of oilseeds in Ireland on set-aside land. Use of currently productive land would induce additional feed imports. Also, cultivation rotation schemes limit the amounts of sugar beet and rapeseed that can be produced.

However, within the frame of their national climate change strategy, Ireland has set a target of reducing greenhouse gas emissions in the transport sector by 2.67 million tonnes in 2010 compared to the year 2000.

Ireland seems very thorough in exploring the possibilities and consequences of the production and use of biofuels for transport. As a consequence, market penetration of biofuels is very limited and the targets set are very low. However, Ireland has set an ambitious target for 2010 to reduce greenhouse gas emission in the transport sector.

2.13 Italy

The Italian report was not yet available. Italy has a current biofuel use of approximately 1% of total road transport fuels.

2.14 Latvia

2.14.1 Current production and use of biofuels

Both in 2002 and in 2003, Latvia has used 2,500 t biodiesel, which is 0.3% of the total amount of transport fuels.

2.14.2 National indicative target

Latvia has determined approximate targets of 1.25% of biofuels in 2004, 2% in 2005, 2.75% in 2006, 3.5% in 2007, 4.25% in 2008, 5% in 2009 and 5.75% in 2010.

2.14.3 Policy measures for biofuels

Latvia has adopted a policy program for production and use of biofuel 2003-2010. A new agri-production sector will be created and there will be established preconditions for the use of its products, biofuel and by-products. A full legislative framework for biofuels is being prepared. State funding allocated for bioenergy will be ten times higher in 2005 compared to 2002.

2.14.4 Motivation for the target

Latvia expects that the targets will be reached, because there is significant interest from entrepreneurs in production of biofuels. Also, the report mentions that there are no specific technical or climatic effects in the Latvian fuel market, which could substantially impact (negatively) the use of biofuels.

The Latvian report gives very little background information, but it seems that Latvia's motivation for promoting biofuels is mainly based on strengthening the agricultural sector.

2.15 Lithuania

2.15.1 Current production and use of biofuels

Not mentioned in the report.

2.15.2 National indicative target

The Lithuanian Government has adopted a programme for the promotion of the production and use of biofuels in the period 2004-2010, which creates the conditions necessary to reach at least 2% of biofuels in the transport market by 31 December 2005, and at least 5.75% by 31 December 2010.

2.15.3 Policy measures for biofuels

In February 2004 Lithuania has adopted an act, which governs the legal framework for the production, use and promotion of biofuels. Since May 2004 energy products produced from substances of biological origin receive an excise duty relief.

2.15.4 Motivation for the target

The report mentions in particular as a purpose of the act on biofuels, to reduce the Lithuanian energy sector's dependence on petroleum-based fuels and to increase the use of local energy resources.

The report of Lithuania is extremely brief and mentions only adopted policies.

2.16 Luxemburg

The report of Luxemburg was not yet available. Luxemburg uses no or little amounts of biofuels.

2.17 Malta

2.17.1 Current production and use of biofuels

The only form of biofuels used in Malta in 2003 was biodiesel produced for a Governmental demonstration project by a local company from waste industrial oil. The amount of biodiesel was 30,000 liter or 1 TJ, which is 0.02% of Malta's total transport fuels.

2.17.2 National indicative target

Noting that biofuels can be used more cost-effectively elsewhere, other than transport, and that difficulties are being experienced with regard to the vehicles driven by biodiesel, Malta is exerting caution in setting realistic interim targets.

2.17.3 Policy measures for biofuels

Except for the demonstration project, in which difficulties in operation have been met, no further measures have been taken yet to promote the use of biofuels.

2.17.4 Motivation for the target

Malta is keen to exploit its potential biomass availability. This is particularly in view of the total dependence on imported fuels and the environmental benefits of renewable energy sources, including biofuel. However, in Malta there is negligible potential in biofuels from agriculture due to the limited freshwater resources, high population density and poor soil fertility. Industrial and domestic waste is the only source of biomass. A Commission document indicates a potential of 1,000 ktoe per year of biofuels for road transport in Malta, which is equivalent to 0.7% of total transport fuel consumption. However, material recovery and composting is given a higher priority than energy recovery.

Malta presents a clear report on its specific situation and its reason for not setting a target.

2.18 The Netherlands

2.18.1 Current production and use of biofuels

Apart from a number of small-scale demonstration projects, involving some 4 million litres of biodiesel and pure vegetable oil, no biofuels are being placed on the market in the Netherlands.

2.18.2 National indicative target

The Netherlands is adopting an indicative biofuel target percentage of 2% for 2006. This includes niche markets, such as the use of pure vegetable oil, pure biodiesel and mixtures of 85% bioethanol with 15% petrol.

2.18.3 Policy measures for biofuels

The report states that the Dutch Government is doing all it can to introduce incentive arrangements for biofuels with effect from 2006. The incentive measures will be structured in such a way as to ensure that no more than 2% of road transport fuels is replaced by biofuels. The exact method of implementation will be announced in 2005.

2.18.4 Motivation for the target

The Netherlands gives two reasons for not complying with the indicative target for 2005. The first is that at present, the Dutch potential for producing biofuels from biomass is virtually nil. The Netherlands does not have the production facilities needed for the manufacture of biofuels. However, various Dutch market participants have indicated that, once the Dutch Government has made clear how it intends to implement the Directive, they will immediately take steps to build up production potential. It is assumed that this will take about a year and a half.

Secondly, the Netherlands wants to look more closely at the possibility of imposing minimum sustainability requirements (including CO₂ reduction) for biofuels. It would like to give a strong incentive for the development of the so-called second-generation biofuels, because these biofuels, such as biomass-to-liquid diesel and bioethanol from lignocellulosic materials, have the following advantages compared with the old biofuels: greater CO₂ reduction, less competition with food production, higher yield per hectare and lower costs. In the event of biofuel sustainability requirements being imposed with effect from 2006, these requirements

should be set at such a level as to enable the present generation of biofuels, such as bioethanol and biodiesel, to comply with that level. Little by little, the requirements will need to be tightened. Biofuels offering improved sustainability performance may be eligible for higher compensation. Arranging such a system will require time and consequently, the possibility of biofuel incentives being introduced before 2006 is ruled out.

The Netherlands has developed a clear vision on biofuels and does intend to promote them, in particularly second-generation biofuels, which are more effective in reducing CO₂-emissions. However, policy measures are still not taken and while the market is still awaiting them, the biofuel production is minimal. Also, it seems from the fact that no more than 2% biofuels will be supported in 2006 that financial matters play an important role.

2.19 Poland

The Polish report was not yet available. Poland has a substantial use of biofuels, but is currently faced with political and legislative difficulties concerning biofuels.⁴

2.20 Portugal

2.20.1 Current production and use of biofuels

There have not been any sales of biofuels in Portugal.

2.20.2 National indicative target

The targets for biofuel use in 2005 in Portugal are laid down in a draft bill and are 50,000 tonnes of biodiesel and 15,000 tonnes of bioethanol, which totals approximately 1% of the road transport fuels in Portugal. An additional 18,000 tonnes of biodiesel is covered by voluntary agreements with public or private undertakings operating public passenger transport fleets. This raises the figure for biofuel incorporation to approximately 1.15% of total fuel sales.

2.20.3 Policy measures for biofuels

Portugal is finalizing its law for biofuel use, which will give biofuels exemption from excise duties up to certain quota set every year, which for 2005 should correspond to 1% of the total transport fuels. In addition, biofuels produced in pilot projects may be covered even beyond this quota. Also, if the quota is not reached in a certain year, there is a possibility to introduce mandatory quota for biofuel use the next year. Finally, there is a possibility of establishing voluntary agreements on the use of biofuels in blends higher than 15% with public or private undertakings operating public passenger transport fleets.

Furthermore, there have been events to promote biofuels, including debates on their introduction in Portugal, and demonstrations of the production of biofuels from waste cooking oil and their use.

2.20.4 Motivation for the target

The target set for 2005 is below the reference value laid down in the Directive. This is due to two factors. First is Portugal's low level of agricultural biomass production for energy purposes. There is almost no additional irrigated land available in Portugal and irrigated areas used for growing food crops are not switching to energy crops. Also, Portugal considers importing raw material or processed products to be no improvement of the security of energy supply. Secondly, there is the delay in starting up potential biofuel production units, essentially because the industry is awaiting a decision on how biofuels are to be promoted.

⁴ A. Kulczycki, M. Rogulska, *Alternative fuels in the transport sector in Poland*, JRC Enlargement workshop on alternative fuels in transport, Petten, The Netherlands, November 2004.

Portugal is late with its promotion of biofuels and uses this as an excuse for not reaching the target. Still, the target set by Portugal is progressive considering it does not have any production of biofuels at the moment.

2.21 Slovakia

2.21.1 Current production and use of biofuels

From 2001 to 2003 Slovakia had a biodiesel production capacity of 62,000 t. In 2001, 30,290 t biodiesel was actually produced and used in Slovakia, which was approximately 1.6 % of the total transport fuel use⁵. In 2002, 6,267 t biodiesel was produced, of which approximately a quarter was exported and the remainder used domestically. In 2003 even less biodiesel was produced. Data for the production of bioethanol are not known. Many companies that originally produced biofuels have, in consequence to the abolition of state subsidies, rapidly restrained their production and either stopped the construction of new capacities or converted their business activities.

2.21.2 National indicative target

Slovakia seems to have accepted the reference values of 2% for 2005 and 5.75% for 2010 and has targets for the years in-between, but it also mentions that the quantification of national targets in 2005 and 2010 will be conditioned by availability of biofuels and investment preparedness of interested companies. It intends to start with blending 5% of biodiesel into diesel with reduced excise tax ('red diesel'), which is used in agricultural and forestry production, in railway transport and in public transport.

2.21.3 Policy measures for biofuels

The report mentions that several Government bodies will take certain policy measures to promote biofuels, but they are not very concrete. One of them is to set up a proposal for determining the means for stimulation of biofuel price support.

2.21.4 Motivation for the target

Slovakia seems to commit to the Directive targets, but mentions no motivation for it. Further, it mentions that it wants to introduce biofuels 'step-by-step' and especially stresses good management over fuel quality, taxes and state budget.

Slovakia has experience in biofuels and it has biodiesel production capacity. Because of its history, Slovakia should know very well what is necessary to promote biofuels, i.e. money. Their hesitation in introducing policy measures is probably because the costs are high or at least because they want to do it more cost-effectively than in the past. However, it could also be because it wants the legislation to be thorough and thus prevent abuse.

2.22 Slovenia

*The Slovenian report was not yet available. There was no use of biofuels in Slovenia in 2004, it intended to implement the 2% of the Directive in 2005, but this might be unrealistic.*⁶

⁵ The report mentions abusively 2.9%.

⁶ F. Al-Mansour, A. Hanžič, *Traffic energy consumption in Slovenia*, JRC Enlargement workshop on alternative fuels in transport, Petten, The Netherlands, November 2004.

2.23 Spain

2.23.1 Current production and use of biofuels

In 2003 approximately 152,000 t bioethanol was produced and used as bio-ETBE. The amount of biodiesel used in 2003 was 65,810 t. The total share of biofuels in the transport sector in 2003 was 1.09%.

2.23.2 National indicative target

Spain has set its national indicative target for biofuel use in 2005 at 2%.

2.23.3 Policy measures for biofuels

Since 2002 Spain has a complete exemption of excise duty for biofuels, which is valid until 2012. However, if the comparative trend in the production costs of petroleum products and biofuels so warrants, this may be replaced with a positive rate of tax.

2.23.4 Motivation for the target

The Spanish report is brief, mentions exactly and no more than what is required by the Directive and gives no motivations.

2.24 Sweden

2.24.1 Current production and use of biofuels

In 2003 the amounts of biofuels used in Sweden were 0.2 PJ biodiesel, 3.1 PJ bioethanol and 0.4 PJ biogas. Other biofuels, such as synthetic diesel and heavier alcohols, are used in very small quantities. The biofuel share therefore stood at 1.3% in 2003. In 2003, imports of bioethanol increased sharply and now accounts for most of the bioethanol used in fuel in Sweden. It is imported from Norway, Spain, Italy, France and Brazil. The most expensive imported bioethanol is wine bioethanol from France, and the cheapest is sugar-cane bioethanol from Brazil. About 85% of all fuel bioethanol is used in low-level blends, i.e. petrol with a 5% bioethanol content. At the end of 2003, about half of all 95-octane petrol contained 5% bioethanol. About 15% of fuel bioethanol is used in a pure or an almost pure form (E85). In 2003 and 2004 about 7,000 Flexible Fuel Vehicles have been sold.

2.24.2 National indicative target

Sweden has established a target of 3% biofuels for 2005.

2.24.3 Policy measures for biofuels

From 2004 to 2009 CO₂-neutral fuels are exempted from both CO₂ tax and energy tax. However, changes to avoid over-compensation can be made at any time, as is required by the Commission. From 2002 to 2008 it is possible to obtain a tax reduction for the purchase of environmental friendly company cars, such as cars that run on bioethanol or biogas.

Furthermore, Sweden supports research, development and demonstration measures for developing more energy-efficient and more cost-effective processes for the production of biofuels.

2.24.4 Motivation for the target

Sweden has started a strategy for switching to green taxes in 2001. Under this strategy, increased taxes on energy and environmentally harmful emissions are offset by reduced taxes on labour. This green tax reform is expected in particular to encourage the use of biofuels. The use of biofuels in Sweden is rising, mainly due to increased imports of bioethanol, and takes the view that the 2% reference value recommended by the European Union for the national target

could be reached as early as 2004. Based on these expectations and in order to boost the introduction process for biofuels, Sweden has established a target for 2005 that is higher than the indicative target of the Directive.

However, there is uncertainty as to what will happen to imports of bioethanol and RME if demand from other countries increases in the future. Increased demand could drive up prices and hence make imports and distribution less economic and possibly cause them to fall. In the longer term, there is a clear risk of this happening.

Sweden expects that biofuels offer a significant potential as regards to its energy supply. Research and development efforts are being made to develop more energy-efficient and more cost-effective processes for the production of biofuels. As a part of this an estimated 15,000 ha of land is used for short-rotation forestry.

Further, the report mentions particularly that there is some disagreement about the energy value to be assigned to bioethanol in 5% low-level blends and it recommends that further studies need to be executed to clarify the issue.

Sweden uses biofuels for transport mainly because of environmental considerations. It is the only country that is importing biofuels on a large scale. On the longer term, Sweden hopes to produce more biofuels domestically by using lignocellulosic biomass from short rotation forestry.

2.25 United Kingdom

2.25.1 Current production and use of biofuels

The total sales of biofuels in the UK in 2003 were some 19,446,000 litres, which corresponds to approximately 0.04% of total road transport fuels. Biodiesel sales have increased from 150,000 litres a month in August 2002 to around 2 million litres a month. To a large extent, production is from waste vegetable oil, since this is currently the cheapest feedstock. Biodiesel is currently available at over 100 filling stations in the UK; the majority is at or below 5% level blend in diesel. Negligible quantities of bioethanol were used in road transport in 2003.

2.25.2 National indicative target

With current policy measures and the additional incentives announced in 2004, it is estimated that UK biofuel sales could be as much as 12 million litres a month in 2005. This would represent a six-fold increase over current levels of biofuel. As a percentage of total road fuel sales, this would equate to something like 0.3% biofuels, which will be the national target for 2005.

2.25.3 Policy measures for biofuels

A 20 pence (ca. € 0.29) per litre duty incentive on biodiesel has been in place since July 2002, and a similar duty incentive for bioethanol will be introduced from January 2005. The current duty incentives will remain in place for at least the next three years. The UK is also seriously considering the possibility of introducing a renewable fuel obligation for the road fuel sector. Yet, at the moment still many questions remain to how such an obligation might work and whether it is the most effective mechanism.

Also, European and regional funds have been used to construct biofuel plant in less developed regions. Furthermore, the UK Government is discussing the application of certain favourable write-off mechanism for capital assets for biofuel production, thus supporting investment in the most environmentally beneficial biofuel processing.

The UK Government has been leading in promoting and using biofuels by driving part of the diesel fleets of the ministerial and delivery vehicle services and also of local Governments on biodiesel blends. When it comes to information provision, the Government has sponsored several promotional leaflets.

Also, when it comes to research and development, the UK has already supported important work in expanding knowledge on energy crops and advanced conversion technologies like gasification and pyrolysis.

2.25.4 Motivation for the target

The national target is below the Directive's reference value, because of the UK's low starting point, the considerable growth this target would imply and the limited time between now and the target period.

The industry has called for a higher level of incentive, but biofuels are currently already an expensive method of carbon abatement. Also, economic analysis suggests that greater incentive levels at this time would largely result in imports, including from outside the EU. This would limit the potential benefits to the UK and broader EU agricultural & rural sectors of a new market. In addition, there is strong concern that greater demand from the EU for biofuel feedstock could lead to further deforestation in South East Asia and South America; thereby undermining the environmental benefit sought through the measure.

The report also stresses that it takes time to consider carefully the most appropriate mechanisms to ensure the greatest carbon savings possible from biofuels and other renewable fuels, and at the lowest cost. This includes developing the right framework to support renewable fuels into the long term needs, considering major changes to the fiscal regime to enable the direct processing of biofuels into the conventional refineries and possibly some form of renewable fuel obligation.

The UK has recently started promoting biofuels and started with the current cheapest biofuel, biodiesel from waste vegetable oils. The UK is reluctant to spend more money on biofuels, also because it fears that this will result in import from biofuels from outside the EU, which is seen as undesirable.

3. OVERVIEW OF INDICATIVE TARGETS

From all the indicative targets mentioned in the available country reports an overview has been made, giving an expected result for the entire European Union. This overview is given in Table 3.1 and a geographical overview based on this table is given in Figure 3.1

Table 3.1 *National indicative targets and corresponding fuel use*

Country	2003 biofuel use (%)	2005 biofuel target (%)	2006 biofuel target (%)	2003 petrol & diesel use (PJ)	2003 biofuel use (PJ)	2005 biofuel target* (PJ)	2006 biofuel target* (PJ)
Austria	0.06	2.5		342	0.2	8.5	8.5
Belgium							
Cyprus	0	-		25	0		
Czech Republic	1.2	-	3.7	233	2.8	2.8	8.6
Denmark	0	0		162	0	0	0
Estonia	0	0**		39	0	0	0
Finland	0.1	0.1		162	0.2	0.2	0.2
France	0.7	2.0		1931	14.3	38.6	38.6
Germany	1.4	2.0		2385	33.4	47.7	47.7
Greece	0	0.7		233	0	1.6	1.6
Hungary	0	0.4-0.6		146	0	0.7	0.7
Ireland	0	0.06	0.13	113	0	0.1	0.1
Italy							
Latvia	0.3	2.0	2.75	42	0.1	0.8	1.1
Lithuania	?	2.0		?	?	?	?
Luxemburg							
Malta	0.02	-		6	0.0		
Poland							
Portugal	0	1.15		306	0	3.5	3.5
Slovakia	0.14	2.0	2.5	75	0.1	1.5	1.9
Slovenia							
Spain	1.09	2.0		1237	13.5	24.7	24.7
Sweden	1.3	3.0		273	3.5	8.2	8.2
The Netherlands	0.04	-	2.0	429	0.2	0.2	8.6
United Kingdom	0.04	0.3		1641	0.7	4.9	4.9
EU total***	0.7	1.5	1.6	9779	69	144	159

* Based on the target percentage and the total petrol and diesel use in 2003

** Not a target, but an expected value mentioned in the report

*** Excluding Belgium, Italy, Luxemburg, Lithuania, Poland and Slovenia

From the table it is clear that there are several countries that adopt the reference value of 2% for 2005 and a few an even higher value, but also that there are many countries that adopt a lower target. It can be expected that the 2% value for the entire EU will not be met in 2005. However, if the indicative targets are met by 2005, the EU biofuel production is still quite considerable, mainly because large transport fuel consumers like Germany, France and Spain have committed themselves to the reference value.

There are very few countries that give an outlook for the period after 2005/2006. Austria is very progressive and has set a 5.75% indicative target already for 2008. Czech Republic, that has a

high target for 2006, expects 4.5% in 2010, which is lower than the reference value of 5.75%. Latvia, Lithuania and Slovakia are aiming for this reference value in 2010.

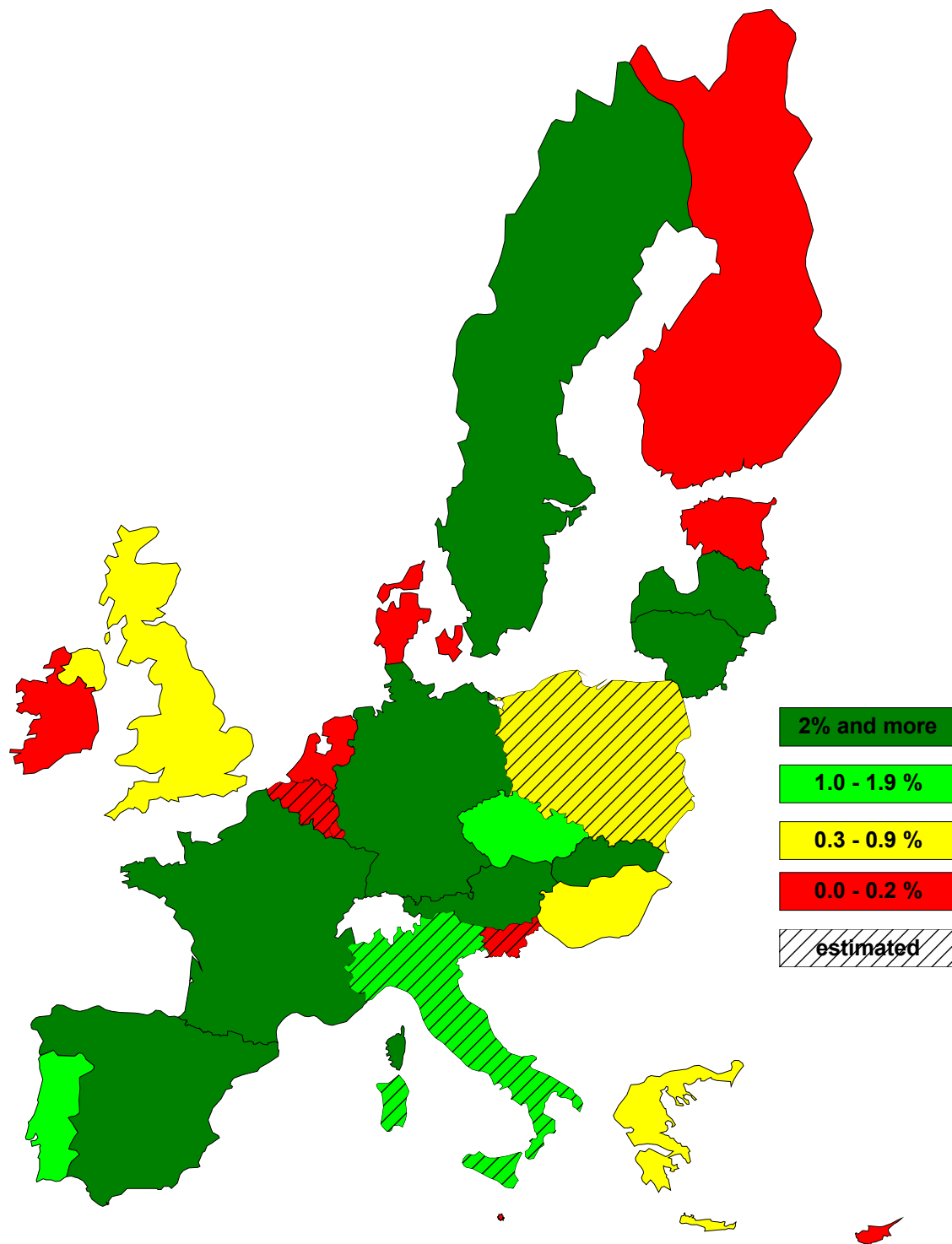


Figure 3.1 *Geographical overview of the biofuel use in the EU in 2005*

4. BARRIERS FOR IMPLEMENTATION OF THE DIRECTIVE

4.1 Reasons for deviation of the 2005 reference value

In this chapter the reasons mentioned for deviation of the Directive's reference value of 2% for 2005 are summarised and categorised in seven different types of barriers: economic, legislative, technology, biomass supply, sustainability, social acceptance and security of supply. The first six are based on an earlier barrier analysis⁷ and the seventh, security of supply, was added, because issues related to this aspect of the Directive cannot be categorised in one of the other six.

4.1.1 Economics

Biofuels for transport are currently more expensive than petrol and diesel and many countries have, therefore, introduced measures to compensate the difference. In some countries, such as Cyprus and Estonia, the measures taken did not result in the expected biofuel production. Although they are considering additional measures, it will not be possible to reach a 2% target in 2005. Many countries mention that they currently do not consider the use of biofuels to be a cost-effective measure to reduce greenhouse gas emissions. Some of these countries, such as Finland and Denmark, use considerable amounts of biomass for the production of heat and power, which is currently more cost-effective. Also, it is mentioned that further research is necessary in order to make the use of (second-generation) biofuels a cost-effective measure to reduce greenhouse gas emissions.

4.1.2 Legislation

Some countries do not yet have the proper legislation ready for the (large-scale) introduction of biofuels in 2005. This applies to legislation making biofuels economically competitive, which is the case in The Netherlands, but also to other areas of legislation, such as legislation regulating the fuel quality. A few countries also mention that there is currently not enough production capacity and that the time is too short to build extra capacity in order to meet the Directive's reference value for 2005. Although this is a barrier, it seems that this is caused by a delay in promoting biofuels in these countries. One other specific legislative barrier is mentioned by Ireland: the Blairhouse Agreement, which is a trade agreement between the USA and the EU. This agreement essentially limits the amount of oil seeds that can be produced in the EU and thus limits the amount of biodiesel that can be produced from these seeds.

4.1.3 Technology

When it comes to technology an important barrier is the end use of several types of biofuels, because of their different physical properties compared to petrol and diesel. Many reports mention that blending of biodiesel in diesel and bioethanol in petrol can be a problem and that the distribution of the fuel is not straightforward. However, in most cases this is not seen as an actual barrier for implementation of the Directive. A real barrier for some countries is the difficulty to obtain a good fuel quality. Especially Malta and Estonia mention this for respectively biodiesel produced from waste oil and biodiesel produced from rapeseed. Another barrier is the incompatibility of the current cars and engines with some types of biofuels, which is mentioned in the reports of Greece and Estonia. However, technology is also seen by many countries as a solution for existing barriers, especially the technology that is being developed for the production of second-generation biofuels.

⁷ In an internal Network of Excellence 'Overcoming barriers to bioenergy' WP3 document 'Barrier analysis & RTD goals', by H. den Uil and E.P. Deurwaarder.

4.1.4 Biomass supply

In some countries, such as Malta and Cyprus, there is a limited amount of any kind biomass feedstock, which means that a 2% target cannot be achieved by using only domestically produced biomass. In other countries, such as Finland, Hungary and Portugal there is a limited amount of certain types of biomass, such energy crops in general or a specific crop as rapeseed. Also, countries that have a limited amount of arable land, such as Finland, prefer to use this for food production. Most of the countries that mention a limited amount of biomass available do not mention or consider imports of biomass feedstock.

4.1.5 Sustainability

Some countries argue that current implementation of biofuels has several negative environmental effects. Denmark mentions that the cultivation of energy crops used as feedstock for liquid biofuels causes increased emissions to water, air and soil and has negative effects on biodiversity due to a high use of fertilisers and pesticides. The UK fears deforestation, especially in South-America, because of the increased demand for agricultural land. Ireland mentions a very different aspect: the increased hazardous exhaust emissions such as NO_x and particulate emissions especially from vehicles driven on biodiesel. The Netherlands mention that the currently used biofuels, bioethanol and biodiesel, do not reduce CO₂ emissions enough when a life cycle basis is considered. They want to impose minimum sustainability requirements, such as a certain amount of CO₂ reduction. This would stimulate the research for and use of second-generation liquid biofuels, which have better environmental performance.

4.1.6 Social acceptance

There are no countries that consider issues related to social acceptance to be a barrier for implementation of the Directive. However, some countries, like Germany, do stress that public relations for biofuels are important.

4.1.7 Security of supply

Security of energy supply was one of the main arguments for the realisation of the Directive. However, Denmark does not consider this an argument for the use of biofuels, because it has its own oil reserves. This can, in fact, be considered a barrier for the implementation of biofuels in Denmark. The UK fears that full implementation of the Directive will lead to large-scale imports of biofuels from outside the EU and considers this undesirable, (amongst others) because the UK does not regard this as more security of energy supply.

Interestingly, the interpretation of security of energy supply seems to vary. Most countries seem to interpret this as larger energy self-sufficiency within their own country, some as larger energy self-sufficiency within the European Union. Some countries that argue that they have a limited amount of biomass do not consider or mention the possibility of imports from other EU countries. Sweden, which is importing biofuels on a large scale, also from outside the EU, is very much an exception in this respect. On this issue, the Directive itself mentions only that 'the use of biofuels (...) can reduce the dependence on imported energy (...) and hence the security of supply.' However, in the Commission's Green Paper 'Towards a European strategy for the security of energy supply'⁸ it is stated that 'Security of supply does not seek to maximise energy self-sufficiency or to minimise dependence, but aims to reduce the risks linked to such dependence. Among the objectives to be pursued are those balancing between and diversifying the various sources of supply (by product and by geographical region).' Finally, in the proposal for the Directive⁹ there was even a reference to the fact that biofuel development could open a new market for agricultural products, which could benefit developing countries.

⁸ Green Paper 'Towards a European strategy for the security of energy supply', COM(2000) 769 final, 29 November 2000.

⁹ Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of biofuels for transport, COM(2001) 547 provisional version, 7 November 2001.

4.1.8 Overall view on the barriers for 2005

The barriers that are mentioned in the country reports were categorised and counted. Some interpretations had to be made, because not all the reports mention explicitly the barriers to the implementation of the Directive. The countries that expect to meet the 2% of biofuels target in 2005 were not included in this analysis. Most of the countries mentioned more than one important barrier and these were all included and counted. The results of the barriers found in the country reports are summarised in Figure 4.1 and Figure 4.2.

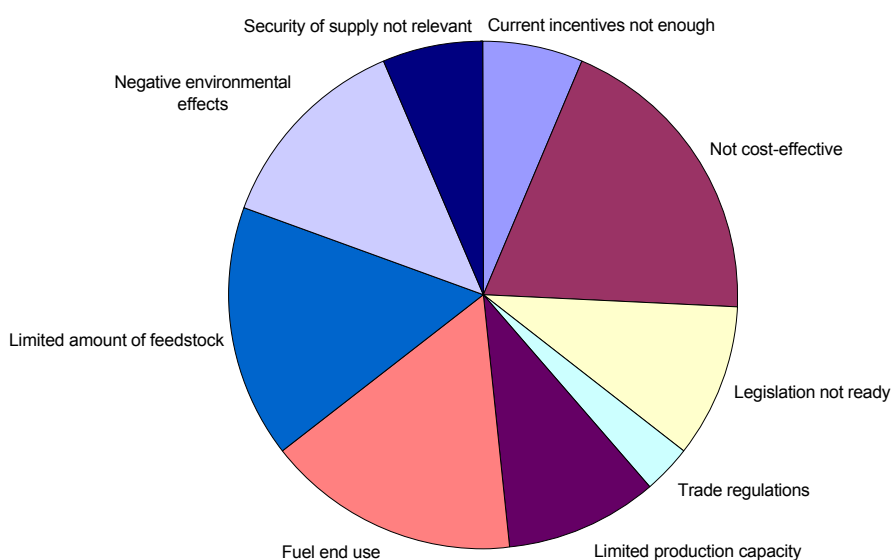


Figure 4.1 *Barriers for implementation of the Directive in 2005 (detailed)*

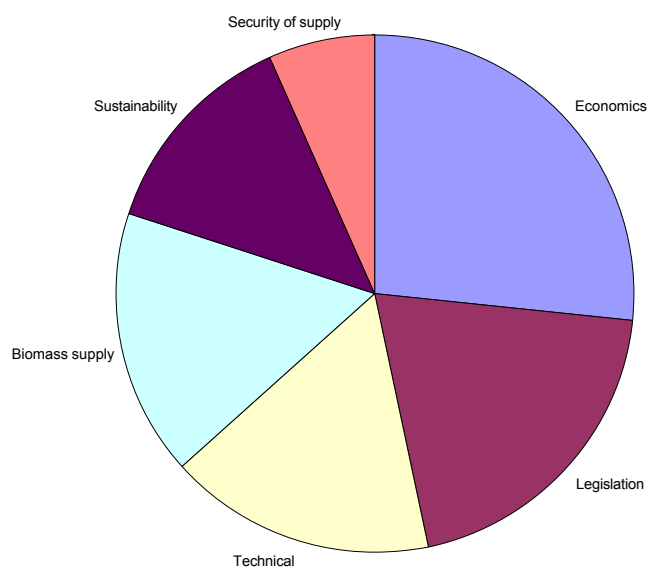


Figure 4.2 *Barriers for implementation of the Directive in 2005 (generalised)*

It is clear that there are several different barriers for the implementation of the Directive in 2005 and the main ones are that biofuels are considered not cost-effective for reducing greenhouse gas emissions, that the fuel end use is problematic and that there is limited amount of feedstock in certain countries. Besides, the current biofuels have some negative environmental aspects.

Furthermore, there are legislative problems and there is limited production capacity, but it seems that these two barriers can be removed fairly easily in time and could have been removed already if these countries had acted earlier.

4.2 Barriers for biofuel use beyond 2005

Most of the countries do not look in detail beyond 2005. Austria mentions that the 2010 target will exceed the maximum substitution potential for biofuels by blending with diesel and petrol, due to fuel specifications. Finland foresees a competition for biomass feedstock between CHP and biofuel producers. Sweden fears a competition for its biofuel imports when demand for biofuels in other countries rises. On the basis of these country reports, it is difficult to determine which barriers for biofuel use there will be after 2005, but it seems that the availability of biomass feedstock is an important one.

4.3 Policy measures to overcome barriers

Most policy actions already taken are to overcome the economic barriers. The most common one is a (partial) tax exemption for biofuels. It depends of course on how much tax exemption is given and for how long this is guaranteed, but this measure seems the most effective one for current implementation of biofuels. Some countries also give investment subsidies or make use of EU funds. A few countries are considering mandatory quota for biofuels. The countries that consider biofuels as not cost-effective for reducing greenhouse gas emissions are not willing or reluctant to take these measures and stress the need for more research to improve this cost-effectiveness for biofuels.

Most legislative problems can be overcome by changing the legislation. This is a process that takes time and some countries have started it too late. This is also true for the argument of limited production capacity.

The technical problems mentioned are all related to end-use. For some countries they can be overcome by improving the fuel qualities of the biofuels by means of some more research and development. The incompatibility of the cars and engines with biofuels in a few countries is more difficult to overcome in the short-term.

The limited amount of biomass in certain countries could be offset by imports of biomass. Many countries do not consider imports of biomass, not even from within the EU. This is a political decision, probably because of economic reasons: the money spent for the implementation of biofuels would flow for the most part to other countries.

When it comes to sustainability, the current biofuels are better than their fossil counterparts, but they have some drawbacks. Promotion of biofuel research can lead to so-called second-generation biofuels, which have a better performance with respect to sustainability. Besides promoting research, requiring minimum sustainability requirements for biofuels, as proposed by the Netherlands, could be a viable policy measure.

The security of supply issue, such as in Denmark where this argument of the Directive is not relevant because of the national oil reserves, is not a matter of a barrier that can or needs to be removed, but it is more a question of strategic or political decision.

5. CONCLUSIONS

The EU member states had to report in 2004 on their progress in implementing the EU Biofuel Directive. This overview on the reports available in March 2005 has learned that five member states (Belgium, Italy, Luxemburg, Poland and Slovenia) have not reported yet and several others have not completely reported all the information that was requested by the Directive. The reports are also very different in the amount of detail reported and their length varies from 1 to 35 pages.

From the available country reports it can be concluded that the EU will not reach the target of 2% of biofuels for transport in 2005, which was the objective of the EU Directive for the promotion of biofuels. Still, the EU biofuel consumption will be quite considerable in 2005, approximately 1.5%, mainly because large transport fuel consumers like Germany, France and Spain have committed themselves to the reference value of the Directive.

The countries that have set a lower national target than the reference value give various reasons for this deviation. The main ones are that biofuels are considered not cost-effective for reducing greenhouse gas emissions, that the fuel end use is problematic and that there is limited amount of feedstock in certain countries. Besides, the current biofuels have some negative environmental aspects. Furthermore, there are legislative barriers and there is currently limited production capacity. Some of these barriers can be removed fairly easy, especially these latter two.

Some of the mentioned barriers are more difficult to remove because they are more fundamental and depend on political choices. A few countries mention that they have a limited potential of biomass and can therefore not adopt the reference value of 2%. These countries do not consider or mention imports of biomass or biofuels, probably because they do not consider this to contribute this to the security of energy supply. Interestingly, the interpretation of 'security of supply', which was an important argument for the creation of the Directive, seems to vary between countries. It varies from very narrow perspectives, e.g. national energy self-sufficiency, to wider ones, such as energy-sufficiency on a European level, and to broad perspectives, such as diversity of energy suppliers. The Directive is not very clear on this part, but the Commission Green Paper shares the broad perspective.

Another difficult barrier is the argument that the use of biofuels is not cost-effective compared to other options for reducing greenhouse gas emissions. This is true for the current biofuels, but the motivation for the Directive was not only to reduce greenhouse gas emissions, but also to reduce the dependence on oil, which also has a cost. Many countries mention the need for so-called second-generation biofuels that will be more cost-effective. These biofuels will probably also remove some other barriers, such as some negative environmental performances of current biofuels and the technical barriers for end-use of the current biofuels.

As mentioned earlier, many countries mention the need for second-generation biofuels. This includes both the countries that do and the countries that do not adopt the Directive's reference value. Thus, all these countries agree on the usefulness of these second-generation biofuels, whereas they are very different in their current implementation of biofuels. It can be concluded that the different European countries do not only have different climatic and market conditions when it comes to energy supply and transportation, but also different political views on the use of biofuels. This makes an analysis of the success factors and barriers for large-scale biofuel implementation based only on the country reports impossible. A wider scope is necessary to determine especially the success factors for large-scale implementation of biofuels for transport. This could be included in or be the main topic of the 'road map' for large-scale

implementation of biofuels for transport, as proposed to establish within the Network of Excellence project 'Overcoming barriers to bioenergy'.¹⁰

¹⁰ As proposed in the project meeting of Work Package 3 'Liquid biofuels for transport' in January 2005.

APPENDIX A DIRECTIVE 2003/30/EC

DIRECTIVE 2003/30/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 May 2003

on the promotion of the use of biofuels or other renewable fuels for transport

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission ⁽¹⁾,

Having regard to the opinion of the European Economic and Social Committee ⁽²⁾,

Having regard to the opinion of the Committee of the Regions ⁽³⁾,

Acting in accordance with the procedure laid down in Article 251 of the Treaty ⁽⁴⁾,

Whereas:

- (1) The European Council meeting at Gothenburg on 15 and 16 June 2001 agreed on a Community strategy for sustainable development consisting in a set of measures, which include the development of biofuels.
- (2) Natural resources, and their prudent and rational utilisation as referred to in Article 174(1) of the Treaty, include oil, natural gas and solid fuels, which are essential sources of energy but also the leading sources of carbon dioxide emissions.
- (3) However, there is a wide range of biomass that could be used to produce biofuels, deriving from agricultural and forestry products, as well as from residues and waste from forestry and the forestry and agrifoodstuffs industry.
- (4) The transport sector accounts for more than 30 % of final energy consumption in the Community and is expanding, a trend which is bound to increase, along with carbon dioxide emissions and this expansion will be greater in percentage terms in the candidate countries following their accession to the European Union.
- (5) The Commission White Paper 'European transport policy for 2010: time to decide' expects CO₂ emissions from transport to rise by 50 % between 1990 and 2010, to around 1 113 million tonnes, the main responsibility resting with road transport, which accounts for 84 % of transport-related CO₂ emissions. From an ecological

point of view, the White Paper therefore calls for dependence on oil (currently 98 %) in the transport sector to be reduced by using alternative fuels such as biofuels.

- (6) Greater use of biofuels for transport forms a part of the package of measures needed to comply with the Kyoto Protocol, and of any policy package to meet further commitments in this respect.
- (7) Increased use of biofuels for transport, without ruling out other possible alternative fuels, including automotive LPG and CNG, is one of the tools by which the Community can reduce its dependence on imported energy and influence the fuel market for transport and hence the security of energy supply in the medium and long term. However, this consideration should not detract in any way from the importance of compliance with Community legislation on fuel quality, vehicle emissions and air quality.
- (8) As a result of technological advances, most vehicles currently in circulation in the European Union are capable of using a low biofuel blend without any problem. The most recent technological developments make it possible to use higher percentages of biofuel in the blend. Some countries are already using biofuel blends of 10 % and higher.
- (9) Captive fleets offer the potential of using a higher concentration of biofuels. In some cities captive fleets are already operating on pure biofuels and, in some cases, this has helped to improve air quality in urban areas. Member States could therefore further promote the use of biofuels in public transport modes.
- (10) Promoting the use of biofuels in transport constitutes a step towards a wider application of biomass which will enable biofuel to be more extensively developed in the future, whilst not excluding other options and, in particular, the hydrogen option.
- (11) The research policy pursued by the Member States relating to increased use of biofuels should incorporate the hydrogen sector to a significant degree and promote this option, taking into account the relevant Community framework programmes.

⁽¹⁾ OJ C 103 E, 30.4.2002, p. 205 and OJ C 331 E, 31.12.2002, p. 291.

⁽²⁾ OJ C 149, 21.6.2002, p. 7.

⁽³⁾ OJ C 278, 14.11.2002, p. 29.

⁽⁴⁾ Opinion of the European Parliament of 4 July 2002 (not yet published in the Official Journal), Council Common Position of 18 November 2002 (OJ C 32 E, 11.2.2003, p. 1) and decision of the European Parliament of 12 March 2003 (not yet published in the Official Journal).

- (12) Pure vegetable oil from oil plants produced through pressing, extraction or comparable procedures, crude or refined but chemically unmodified, can also be used as biofuel in specific cases where its use is compatible with the type of engines involved and the corresponding emission requirements.
- (13) New types of fuel should conform to recognised technical standards if they are to be accepted to a greater extent by customers and vehicle manufacturers and hence penetrate the market. Technical standards also form the basis for requirements concerning emissions and the monitoring of emissions. Difficulties may be encountered in ensuring that new types of fuel meet current technical standards, which, to a large extent, have been developed for conventional fossil fuels. The Commission and standardisation bodies should monitor developments and adapt and develop actively standards, particularly volatility aspects, so that new types of fuel can be introduced, whilst maintaining environmental performance requirements.
- (14) Bioethanol and biodiesel, when used for vehicles in pure form or as a blend, should comply with the quality standards laid down to ensure optimum engine performance. It is noted that in the case of biodiesel for diesel engines, where the processing option is esterification, the standard prEN 14214 of the European Committee for Standardisation (CEN) on fatty acid methyl esters (FAME) could be applied. Accordingly, the CEN should establish appropriate standards for other transport biofuel products in the European Union.
- (15) Promoting the use of biofuels in keeping with sustainable farming and forestry practices laid down in the rules governing the common agricultural policy could create new opportunities for sustainable rural development in a more market-orientated common agriculture policy geared more to the European market and to respect for flourishing country life and multifunctional agriculture, and could open a new market for innovative agricultural products with regard to present and future Member States.
- (16) In its resolution of 8 June 1998 ⁽¹⁾, the Council endorsed the Commission's strategy and action plan for renewable energy sources and requested specific measures in the biofuels sector.
- (17) The Commission Green Paper 'Towards a European strategy for the security of energy supply' sets the objective of 20 % substitution of conventional fuels by alternative fuels in the road transport sector by the year 2020.
- (18) Alternative fuels will only be able to achieve market penetration if they are widely available and competitive.
- (19) In its resolution of 18 June 1998 ⁽²⁾, the European Parliament called for an increase in the market share of biofuels to 2 % over five years through a package of measures, including tax exemption, financial assistance for the processing industry and the establishment of a compulsory rate of biofuels for oil companies.
- (20) The optimum method for increasing the share of biofuels in the national and Community markets depends on the availability of resources and raw materials, on national and Community policies to promote biofuels and on tax arrangements, and on the appropriate involvement of all stakeholders/parties.
- (21) National policies to promote the use of biofuels should not lead to prohibition of the free movement of fuels that meet the harmonised environmental specifications as laid down in Community legislation.
- (22) Promotion of the production and use of biofuels could contribute to a reduction in energy import dependency and in emissions of greenhouse gases. In addition, biofuels, in pure form or as a blend, may in principle be used in existing motor vehicles and use the current motor vehicle fuel distribution system. The blending of biofuel with fossil fuels could facilitate a potential cost reduction in the distribution system in the Community.
- (23) Since the objective of the proposed action, namely the introduction of general principles providing for a minimum percentage of biofuels to be marketed and distributed, cannot be achieved sufficiently by the Member States by reason of the scale of the action, and can therefore be achieved better at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve that objective.
- (24) Research and technological development in the field of the sustainability of biofuels should be promoted.
- (25) An increase in the use of biofuels should be accompanied by a detailed analysis of the environmental, economic and social impact in order to decide whether it is advisable to increase the proportion of biofuels in relation to conventional fuels.

⁽¹⁾ OJ C 198, 24.6.1998, p. 1.

⁽²⁾ OJ C 210, 6.7.1998, p. 215.

- (26) Provision should be made for the possibility of adapting rapidly the list of biofuels, the percentage of renewable contents, and the schedule for introducing biofuels in the transport fuel market, to technical progress and to the results of an environmental impact assessment of the first phase of introduction.
- (27) Measures should be introduced for developing rapidly the quality standards for the biofuels to be used in the automotive sector, both as pure biofuels and as a blending component in the conventional fuels. Although the biodegradable fraction of waste is a potentially useful source for producing biofuels, the quality standard has to take into account the possible contamination present in the waste to avoid special components damaging the vehicle or causing emissions to deteriorate.
- (28) Encouragement of the promotion of biofuels should be consistent with security of supply and environmental objectives and related policy objectives and measures within each Member State. In doing so, Member States may consider cost-effective ways of publicising the possibilities of using biofuels.
- (29) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission ⁽¹⁾,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

This Directive aims at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes in each Member State, with a view to contributing to objectives such as meeting climate change commitments, environmentally friendly security of supply and promoting renewable energy sources.

Article 2

1. For the purpose of this Directive, the following definitions shall apply:

- (a) 'biofuels' means liquid or gaseous fuel for transport produced from biomass;
- (b) 'biomass' means 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;

⁽¹⁾ OJ L 184, 17.7.1999, p. 23.

(c) 'other renewable fuels' means renewable fuels, other than biofuels, which originate from renewable energy sources as defined in Directive 2001/77/EC ⁽²⁾ and used for transport purposes;

(d) 'energy content' means the lower calorific value of a fuel.

2. At least the products listed below shall be considered biofuels:

- (a) 'bioethanol': ethanol produced from biomass and/or the biodegradable fraction of waste, to be used as biofuel;
- (b) 'biodiesel': a methyl-ester produced from vegetable or animal oil, of diesel quality, to be used as biofuel;
- (c) 'biogas': a fuel gas produced from biomass and/or from the biodegradable fraction of waste, that can be purified to natural gas quality, to be used as biofuel, or woodgas;
- (d) 'biomethanol': methanol produced from biomass, to be used as biofuel;
- (e) 'biodimethylether': dimethylether produced from biomass, to be used as biofuel;
- (f) 'bio-ETBE (ethyl-tertio-butyl-ether)': ETBE produced on the basis of bioethanol. The percentage by volume of bio-ETBE that is calculated as biofuel is 47 %;
- (g) 'bio-MTBE (methyl-tertio-butyl-ether)': a fuel produced on the basis of biomethanol. The percentage by volume of bio-MTBE that is calculated as biofuel is 36 %;
- (h) 'synthetic biofuels': synthetic hydrocarbons or mixtures of synthetic hydrocarbons, which have been produced from biomass;
- (i) 'biohydrogen': hydrogen produced from biomass, and/or from the biodegradable fraction of waste, to be used as biofuel;
- (j) 'pure vegetable oil': oil produced from oil plants through pressing, extraction or comparable procedures, crude or refined but chemically unmodified, when compatible with the type of engines involved and the corresponding emission requirements.

Article 3

1. (a) Member States should ensure that a minimum proportion of biofuels and other renewable fuels is placed on their markets, and, to that effect, shall set national indicative targets.

- (b) (i) A reference value for these targets shall be 2 %, calculated on the basis of energy content, of all petrol and diesel for transport purposes placed on their markets by 31 December 2005.

⁽²⁾ Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market (OJ L 283, 27.10.2001, p. 33).

- (ii) A reference value for these targets shall be 5,75 %, calculated on the basis of energy content, of all petrol and diesel for transport purposes placed on their markets by 31 December 2010.

2. Biofuels may be made available in any of the following forms:

- (a) as pure biofuels or at high concentration in mineral oil derivatives, in accordance with specific quality standards for transport applications;
- (b) as biofuels blended in mineral oil derivatives, in accordance with the appropriate European norms describing the technical specifications for transport fuels (EN 228 and EN 590);
- (c) as liquids derived from biofuels, such as ETBE (ethyl-tertiobutyl-ether), where the percentage of biofuel is as specified in Article 2(2).

3. Member States shall monitor the effect of the use of biofuels in diesel blends above 5 % by non-adapted vehicles and shall, where appropriate, take measures to ensure compliance with the relevant Community legislation on emission standards.

4. In the measures that they take, the Member States should consider the overall climate and environmental balance of the various types of biofuels and other renewable fuels and may give priority to the promotion of those fuels showing a very good cost-effective environmental balance, while also taking into account competitiveness and security of supply.

5. Member States shall ensure that information is given to the public on the availability of biofuels and other renewable fuels. For percentages of biofuels, blended in mineral oil derivatives, exceeding the limit value of 5 % of fatty acid methyl ester (FAME) or of 5 % of bioethanol, a specific labelling at the sales points shall be imposed.

Article 4

1. Member States shall report to the Commission, before 1 July each year, on:

- the measures taken to promote the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes,
- the national resources allocated to the production of biomass for energy uses other than transport, and
- the total sales of transport fuel and the share of biofuels, pure or blended, and other renewable fuels placed on the market for the preceding year. Where appropriate, Member States shall report on any exceptional conditions in the supply of crude oil or oil products that have affected the marketing of biofuels and other renewable fuels.

In their first report following the entry into force of this Directive, Member States shall indicate the level of their national indicative targets for the first phase. In the report covering the year 2006, Member States shall indicate their national indicative targets for the second phase.

In these reports, differentiation of the national targets, as compared to the reference values referred to in Article 3(1)(b), shall be motivated and could be based on the following elements:

- (a) objective factors such as the limited national potential for production of biofuels from biomass;
- (b) the amount of resources allocated to the production of biomass for energy uses other than transport and the specific technical or climatic characteristics of the national market for transport fuels;
- (c) national policies allocating comparable resources to the production of other transport fuels based on renewable energy sources and consistent with the objectives of this Directive.

2. By 31 December 2006 at the latest, and every two years thereafter, the Commission shall draw up an evaluation report for the European Parliament and for the Council on the progress made in the use of biofuels and other renewable fuels in the Member States.

This report shall cover at least the following:

- (a) the cost-effectiveness of the measures taken by Member States in order to promote the use of biofuels and other renewable fuels;
- (b) the economic aspects and the environmental impact of further increasing the share of biofuels and other renewable fuels;
- (c) the life-cycle perspective of biofuels and other renewable fuels, with a view to indicating possible measures for the future promotion of those fuels that are climate and environmentally friendly, and that have the potential of becoming competitive and cost-efficient;
- (d) the sustainability of crops used for the production of biofuels, particularly land use, degree of intensity of cultivation, crop rotation and use of pesticides;
- (e) the assessment of the use of biofuels and other renewable fuels with respect to their differentiating effects on climate change and their impact on CO₂ emissions reduction;
- (f) a review of further more long-term options concerning energy efficiency measures in transport.

On the basis of this report, the Commission shall submit, where appropriate, proposals to the European Parliament and to the Council on the adaptation of the system of targets, as laid down in Article 3(1). If this report concludes that the indicative targets are not likely to be achieved for reasons that are unjustified and/or do not relate to new scientific evidence, these proposals shall address national targets, including possible mandatory targets, in the appropriate form.

Article 5

The list contained in Article 2(2) may be adapted to technical progress in accordance with the procedure referred to in Article 6(2). When adapting this list, the environmental impact of biofuels shall be taken into account.

Article 6

1. The Commission shall be assisted by a Committee.
2. Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at three months.

3. The Committee shall adopt its Rules of Procedure.

Article 7

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 2004 at the latest. They shall forthwith inform the Commission thereof.

When Member States adopt these measures, they shall contain a reference to this Directive or be accompanied by such reference on the occasion of their official publication. The methods of making such a reference shall be laid down by the Member States.

2. Member States shall communicate to the Commission the provisions of national law which they adopt in the field covered by this Directive.

Article 8

This Directive shall enter into force on the day of its publication in the *Official Journal of the European Union*.

Article 9

This Directive is addressed to the Member States.

Done at Brussels, 8 May 2003.

For the European Parliament
The President
P. COX

For the Council
The President
M. CHRISOCHOIDIS