

BIOFUELS – AT WHAT COST?

Government support for ethanol and biodiesel in the European Union – 2010 Update

JULY 2010

BY:

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For the Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD)
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EXECUTIVE SUMMARY

Biofuels—both ethanol and biodiesel—benefit from high levels of financial support in almost all European Union Member States. This report aims at quantifying all support measures provided in the European Union. It is one of several studies undertaken for or by the Global Subsidies Initiative (GSI) examining subsidies and support measures in various countries. This report in particular focuses on the years since 2007 and represents an update of the 2007 report on biofuel support measures in the EU, carried out by Kutas et al. (2007).

In order to stimulate the use of renewable energies, to reduce CO₂ emissions and to secure an energy supply that is environmentally friendly, the EU made the promotion and promulgation of biofuels a strategic objective. Identifying and measuring the various subsidies is a complex challenge. Often appropriate data are not available, either because Member States do not report on their measures or because official statistical data—for example on trade volumes—are not sufficient. As a result, most quantities in this report are underestimates. Despite these drawbacks, we believe that the report provides a useful overview on overall support and trends over the last two to three years.

In 2008, total transfers in support of biofuels associated with policies of the EU and the Member States amounted to €3.01 billion. This is a significant decrease compared with the total support of € 3.7 billion in 2006 as presented in Kutas et al. (2007). The decline in support per litre consumed since 2006 is even more striking. In 2006 the support per litre consumed of ethanol was €0.74 and of biodiesel, €0.50, whereas it was €0.24 and €0.22 per litre in 2008, respectively. Despite the sharp decrease in the support per litre, it is notable that there seems to be a convergence of the support intensities of biodiesel and ethanol. In 2006 per litre support of ethanol was yet much higher than that of biodiesel.

SUPPORT FOR ETHANOL AND BIODIESEL IN THE EUROPEAN UNION (2007 AND 2008)

	Units	Ethanol		Biodiesel	
		2007	2008	2007	2008
Total Transfers	€ millions	800	841	2,497	2,170
Support per litre consumed	€ / litre	0.34	0.24	0.34	0.22
Support per gigajoule (GJ)	€/ GJ	14		8	
Support per litre of petrol or diesel equivalent	€/ litre equivalent	0.44		0.30	

Source: Main report.

Biofuels production in Europe has grown significantly since the early 2000s. This was mainly due to rising petroleum prices and favourable legislation adopted by EU institutions. In 2008 biodiesel production reached 7,755,000 tonnes (8.8 billion liters) and ethanol production amounts to roughly one third: 2,255,000 tonnes, (2.9 billion liters). A big share of the EU's consumption of ethanol is produced elsewhere in the world mainly in Brazil.

In order to promote and promulgate the use of biofuels among its Member States, the EU has established several Directives at the supranational level. Among the most important legislative measures regarding biofuels are the **Renewable Energy Directives** (2009/28/EC, 2003/30/EC), the **Energy Taxation Directive** (2003/96/EC) and the new **Directive on the quality of petrol and diesel fuels** (2009/30/EC).

Directive 2003/30/EC explicitly called for a 5.75 per cent market share of biofuels among all transport fuels to be reached by all Member States by 2010. However, most countries are likely to fall short of this target. In 2009 the EU passed a new Directive on the use of biofuels (2009/28/EC) intended to repeal the one from 2003. Whereas the previous market-share targets for 2010 still remain in force, for 2020 the new Directive sets an overall target of 20 per cent for the share of renewable energies among the EU's final gross consumption. This share does not have to be reached by all Member States, but, depending on the current shares and other indicators such as GDP, individual targets for each Member State were set. Furthermore, the new guideline establishes so-called sustainability criteria for biofuels employed in the Member States. Biofuels not meeting the criteria cannot count towards calculating the share of biofuel, measuring compliance with the set targets and are ineligible for financial support.

Following the estimation methods used in the original report we employed the following support elements to estimate **aggregated measures of support**:

- market transfers;
- budgetary support linked to volume produced or consumed;
- support for intermediate inputs;
- support for value-adding factors;
- support related to distribution and consumption; and
- support for research and development.

Market transfers: Market price support measures the intervention affecting both consumer and producer prices by artificially elevating the price of biofuels. In the EU, among the most important instruments are mandatory blending rates and border protection through tariffs. The former establishes mandatory requirements for the share of biofuels in transport fuels sold, whereas the latter aims at protecting European production of biofuels through tariffs on biofuel imports.

Establishing mandatory blending requirements is a powerful government intervention that significantly supports the biofuels industry. In fact, blending requirements exert an upwards pressure on the price of the fuel mix. Since 2006 the number of countries using mandatory blendings has risen significantly. However, data limitations make it impossible to quantify the support provided through them.

What is more, the EU biofuel market is still protected from competition by tariffs on imports. Those primarily aim at fighting downwards price pressures caused by ethanol produced in Brazil. Within the processing under customs control Sweden has currently a one-year permission to apply the lower chemical tariff to ethanol imported from Brazil in order to guarantee the competitiveness of the widely used blend E85. Concerning biodiesel, in 2009 the EU Commission passed anti-dumping and countervailing duties on imports of U.S. biodiesel for a period of five years in order to protect the European biodiesel market against subsidized biodiesel exports from the United States.

Budgetary support linked to volume produced or consumed: Among all support measures for biofuels, tax exemptions and reductions by far account for the largest share of all support and amounted to around €2.80 billion in 2007 as well as in 2008 as measured by foregone tax revenue. Against expectations in the original report in 2007 the absolute support did not rise, but declined from €2.96 billion in 2006. This can be explained by decreasing excise tax exemption rates on average. Today, most of the EU Member States either fully exempt or at least reduce excise taxes falling due on biofuels. One can distinguish between systems without a quota, as employed in most countries, and systems with a quota, as applied in only five countries. In the latter case, exemptions and reductions are only granted up to a certain level of production. In systems

without such a quota an undefined amount of consumption is exempted or reduced from taxation and thus foregone tax revenue highly depends on the level of consumption.

Support for intermediate inputs: Specific subsidies for the support of intermediate inputs, in particular feedstock, were abolished. Import tariffs on biofuels feedstock differ, but in 2007 and 2008, the bulk of them were reduced to zero in response to the tight market situation.

Support for value-adding factors: Until recently, farmers cultivating crops could profit from two different types of assistance: the set-aside requirement and the Energy Crop Scheme. In 2008, the support associated with set-aside requirements and the Energy Crop Scheme still amounted to €119 million. However, this is a steep decline in comparison to the 2007 volume reported by Kutas et al. (2007). Furthermore, some of the Member States subsidize biofuel feedstocks at the national level. In the course of the “Health Check” of the Common Agricultural Policy both provisions were reviewed and definitively abolished in January 2009.

Many Member States also grant investment aids and subsidies for physical capital used to produce biofuels. Usually, support is provided as a certain share of the investment costs. Definitions of eligible investments and percentage support rates strongly vary widely among countries and often even within countries. Aids are provided by many different institutions on all different levels—often even the local level—of administration. Unfortunately, the variety of different aids and institutions involved in granting made it impossible for the authors to quantify investment aids. However, an overview of selected measures in several Member States is presented in this report.

Support related to distribution and consumption: Many Member States have established different incentives for the consumption of biofuels. Among the most important are: reduced registration fees for high-blend biofuel-compatible cars, free parking, funding of filling stations that provide high blends or pure biofuels, or singular premiums for the purchase of “green” cars. What is more, many governments also try to set good examples and make their public car fleets or public transportation vehicles accessible for high blends of biofuels.

Support for research and development: The European Union and the single Member States have continued to foster research and development activities in the biofuel field via various programs. Special focus has been on projects concerning second-generation biofuels that, in contrast to first-generation biofuels, are made from non-edible feedstocks such as wood and straw. Total funding was estimated to be at least €63 million and €68 million in 2007 and 2008, respectively.

Translated into litres of petrol and diesel equivalents, the rates of support are still considerably higher for ethanol than for biodiesel, but all in all show as well a sharp decrease compared with 2006. The subsidy cost per tonne of CO₂ equivalent avoided is estimated to be between €186 and €299 for ethanol made from sugar beet, €669 to €1,422 for ethanol from grains, €90 to €95 for biodiesel made from used cooking oil and €263 to €347 for biodiesel made from rapeseed oil. Comparing this to a price of a CO₂ equivalent offset at the European Climate Exchange, it is obvious that even in the best case—biodiesel made from used cooking oil— one could have purchased more than five times as many tonnes of CO₂ equivalent offsets for the same amount of public funds.

Our study concludes with several recommendations for policy-makers on both the Member State and EU level. We believe that they should:

- Enforce the polluter-pays-principle, thus stress the price of fossil fuels and phase out all biofuel support except for R&D programs;
- Eliminate all tariffs on imported fuel ethanol; and
- Insist on more transparency concerning Member States' biofuel policies so as to allow the evaluation and assessment of their respective support measures.

	Units	Ethanol		Biodiesel	
		From sugarbeets	From grains	From used cooking oil	From rapeseed oil
Support per litre equivalent of fossil fuels displaced	€ per litre equivalent	0.64-0.87	1.38-1.93	0.34-0.39	0.48-0.67
Support per tonne of CO ₂ -equivalent emission avoided	€ per tonne	186-299	669-1,422	90-95	263-347
<i>Price of a CO₂-equivalent offset, European Climate Exchanges, FY 2008-2009</i>	€ per tonne	16.25			

Source: Main report.

1. INTRODUCTION

This report is an update to the report “Biofuels – At What Cost” by Geraldine Kutas, Carina Lindberg and Ronald Steenblik, published in September 2007. It concentrates on policy changes and new developments concerning support of biofuels in the EU27 and aims at quantifying support for biofuels in the European Union. Therefore it follows the same standardized outline common to all the reports in this series. Chapter 2 offers an overview of development of the European biofuel industry after 2006, Chapter 3 focuses on new policy initiatives of the European Union, mainly the amendment of the “Renewable Energy Directive” and Directive 2009/30/EC.

Different types of support for biofuels at European and national levels are described and quantified in Chapter 4. First, elements that influence market price support as well as tentative estimations of its extent are presented. At a national level, support arises mainly from the mandated levels of consumption and excise-tax exemptions on biodiesel and ethanol.

Chapter 5 presents summary estimates of total support to biodiesel and ethanol in the EU. In addition to the figures of total support in euros (€) and euros per litre, the chapter offers estimates of the support in terms of several indicators relevant to the question of its cost-effectiveness: subsidy per litre of gasoline and diesel equivalent, subsidy per unit of fossil fuel avoided, and subsidy per tonne of CO₂ equivalent avoided.

Chapter 6 concludes and provides recommendations.

As in the original report, the description of national policies as well as quantifications are always limited due to lack of up-to-date and available data, language barriers and the problematic access to information on local support measures. Estimations are thus, in most cases, underestimations.

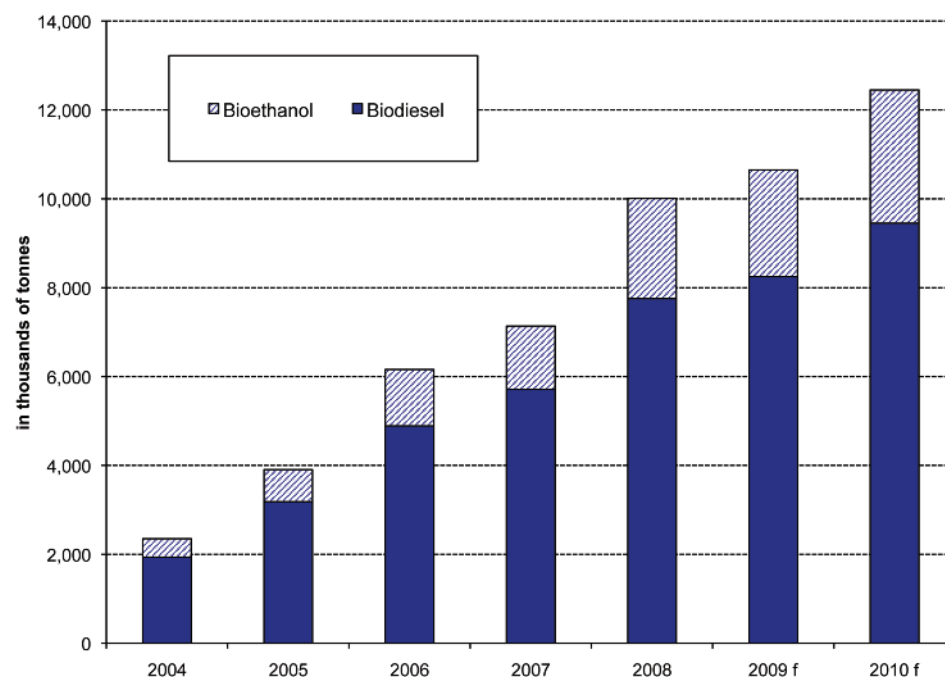
2. OVERVIEW OF THE EU BIOFUELS INDUSTRY

The production of biofuels—both ethanol and biodiesel—has steadily evolved since the early 1990s. Responding to favourable legislation following the 1992 CAP reform of the EU, biofuels were first produced on an industrial scale. Since then, the production of biodiesel has developed at a faster rate than that of ethanol, although support measures in the EU have most of the time been applied equally. This is mostly due to the fact that Europe’s largest producers of biofuels—Germany and France—consume very large quantities of diesel for purposes of transport.

Today, the EU is the world’s biggest producer and consumer of biodiesel. Both consumption and production are considerably higher than of ethanol. Since the initial work by Kutas et al. (2007), production and consumption have continued to rise. This is mainly because of ever stricter and higher support measures and blending obligations implemented at both the EU and the Member State level.

However, due to a downturn in fossil fuel prices and policy changes in Germany, the market for biofuels has deteriorated since the summer of 2008.¹ Furthermore, the market was under pressure due to dumped biodiesel imports originating from the United States. In March 2009, however, the European Commission imposed antidumping and countervailing duties on these imports for a five-year period (see 4.1.1.4).

¹ United States Department of Agriculture (2009a).

FIGURE 2.1: EVOLUTION OF BIOFUEL PRODUCTION IN THE EU

Note: f = forecast; United States Department of Agriculture (2009a)..

Sources: ebio (2010), EBB (2010), United States Department of Agriculture (2009a).

PRODUCTION ON THE RISE

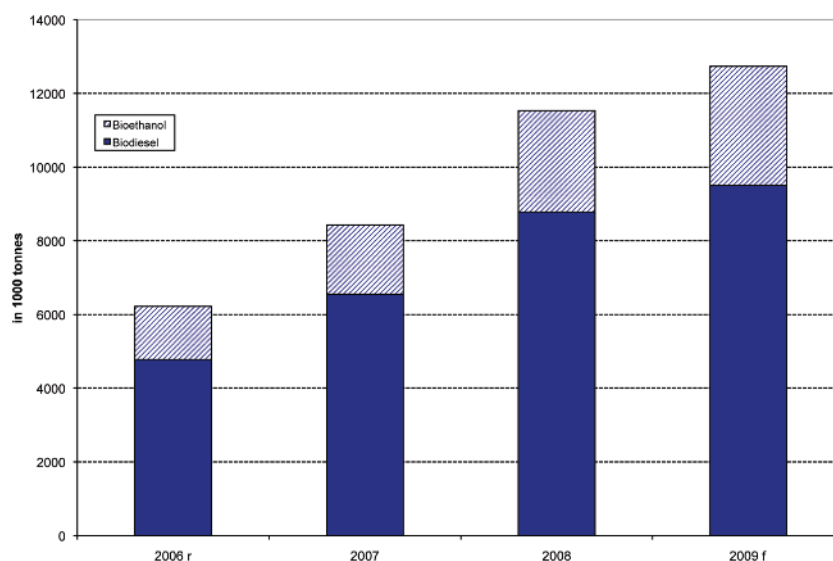
In 2008 biodiesel production reached 7,755,000 tonnes and ethanol production was 2,255,000 tonnes in the EU—a quadrupling of production since 2004 (Figure 2.1). There has been a significant rise in production between 2007 and 2008. High oil prices in the first half of 2008 made it highly attractive and economical to substitute fossil fuels by biofuels. The emergence of new plants used to produce biofuels has also added to this development. However, due to the turmoil in financial markets and a correspondent decline in oil prices, the growth rate in production between 2008 and 2009 is very likely to be lower (United States Department of Agriculture, 2009a).²

Biofuel production is closely linked to the amount of support granted to biofuels. Some incentives—such as tax exemptions—are directly linked to the volume of biofuel consumed. Hence, support varies in line with changes in consumption.

POSITIVE UPWARD TREND IN CONSUMPTION

The consumption of biofuels in the European Union has been increasing over the last years as well (Figure 2.2). In 2008, biodiesel and ethanol consumption was 8,778,088 tonnes and 2,759,272 tonnes, respectively (EurObserv'ER, 2009). Compared with 2007, this represents growth rates of 34 per cent for biodiesel and 47 per cent for ethanol fuels. A sharp decrease was recorded for consumed vegetable oil used as biofuel (46 per cent) (EurObserv'ER, 2009).

² Final data for 2009 are not yet available.

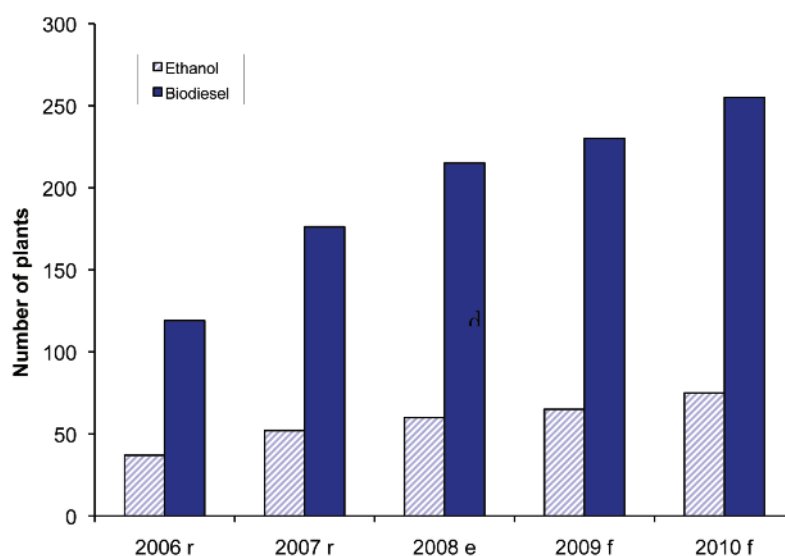
FIGURE 2.2 EVOLUTION OF BIOFUEL CONSUMPTION IN THE EU

Note: r = revised, f = forecast.

Sources: United States Department of Agriculture (2009a), EurObserv'ER (2009)

RISE IN NUMBER OF BIOFUEL PLANTS IN THE EU

The number of plants for biofuels production in Europe continues to increase. In 2008, 215 biodiesel plants and 60 ethanol plants were estimated to be operating in Europe. Forecasts are that by the end of 2010 the EU will have 255 and 75 plants capable of producing biodiesel and ethanol, respectively.

FIGURE 2.3: NUMBER OF BIODIESEL AND ETHANOL PLANTS IN THE EU

Note: r = revised, e = estimate, f = forecast. As of December 31 of each year. EU FAS posts based on industry estimates that have been adjusted for those projects that are unlikely to get past the planning stage.

Source: United States Department of Agriculture (2009a).



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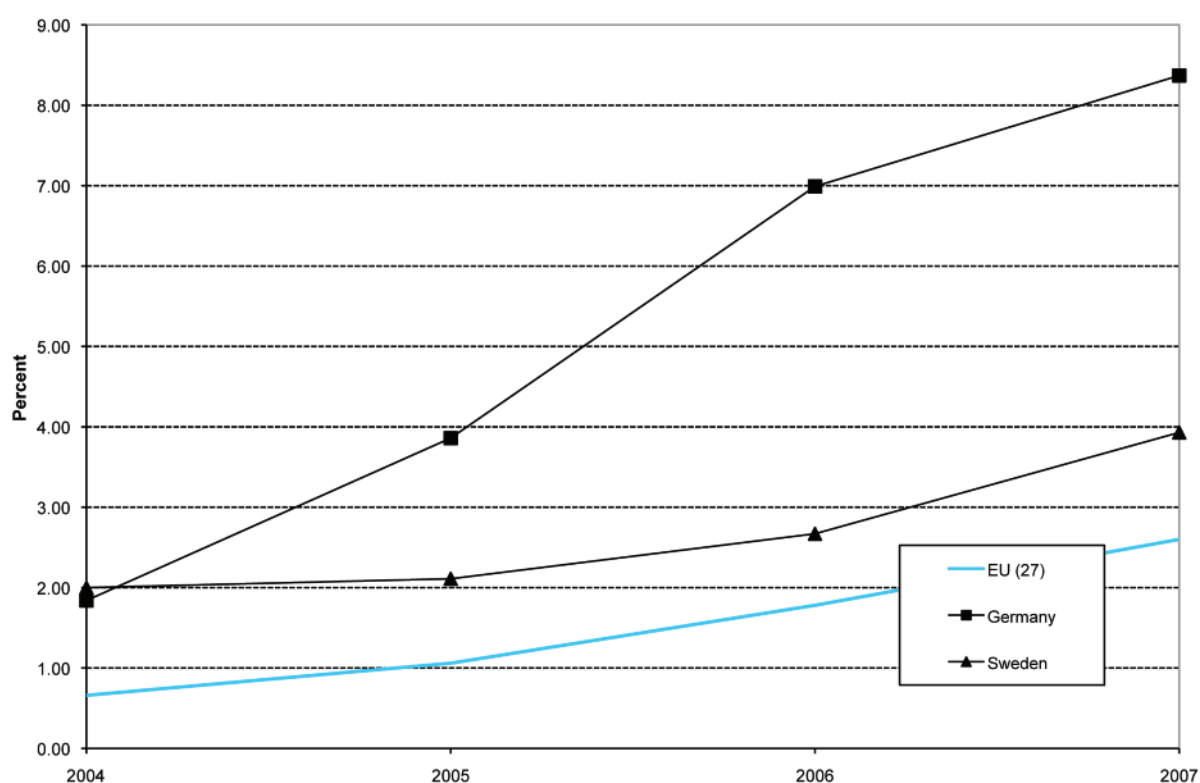
SHARE OF BIOFUELS IN TRANSPORT INCREASES BUT REMAINS BELOW EU TARGET

In directives on the promotion of biofuels (see Chapter 3 for more details), the EU set targets for the share of biofuels in transport. Although consumption of biofuels is on the rise, these are very ambitious and not expected to be reached. Originally set as a target for 2010, the EU postponed the goal of a 5.75 per cent market share to 2011 because most countries fall short of this goal.

Nevertheless, the share of biofuels in transport steadily rises. Between 2004 and 2007 it almost quadrupled in the EU 27 (Figure 2.4 and Table 2.1). Increasing growth rates can be observed. Whereas the share only rose by 0.5 percentage points in the two years between 2003 and 2005, it increased by 1.5 percentage points between 2005 and 2007. If this growth rate continues, the share of biofuels in the transport sector would equal per cent in 2010 and thus be close to the EU indicative target (European Commission, 2009a, p. 6f).

In 2007 market shares were the largest in Germany (8.4 per cent), Slovakia (4.9 per cent) and Sweden (3.9 per cent), though the absolute level of biofuel consumption in Slovakia was negligible in comparison with the other two. Other countries are way below the EU targets. In Estonia, Finland and Malta the share of biofuels was still zero in 2007. Even in bigger countries such as Italy or Poland the market share of biofuels is below 1 per cent.

FIGURE 2.4: SHARE OF BIOFUELS IN TRANSPORT CONSUMPTION IN EU (27), GERMANY AND SWEDEN



Source: EUROSTAT (2010).



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TABLE 2.1: SHARE OF BIOFUELS IN TRANSPORT CONSUMPTION (ENERGY CONTENT)

	2004	2005	2006	2007
EU (27)	0.66	1.06	1.78	2.60
EU (25)	0.67	1.08	1.82	2.64
EU (15)	0.72	1.15	1.94	2.82
Austria	0.14	0.72	1.70	2.87
Belgium	0.00	0.00	0.00	1.05
Bulgaria	0.00	0.00	0.24	0.10
Cyprus	0.00	0.00	0.00	0.15
Czech Republic	0.60	0.05	0.34	0.51
Denmark	0.00	0.00	0.09	0.13
Estonia	n.a.	n.a.	n.a.	n.a.
Finland	0.12	0.00	0.02	0.02
France	0.81	0.97	1.72	3.55
Germany	1.84	3.86	6.99	8.37
Greece	0.00	0.00	0.68	1.21
Hungary	0.00	0.13	0.26	0.68
Ireland	0.00	0.02	0.04	0.45
Italy	0.67	0.48	0.43	0.37
Latvia	0.00	0.21	0.28	0.16
Lithuania	0.09	0.27	1.58	3.63
Luxembourg (Grand-Duché)	0.05	0.04	0.05	1.68
Malta	n.a.	n.a.	n.a.	n.a.
Netherlands	0.00	0.00	0.36	2.77
Poland	0.18	0.49	0.83	0.80
Portugal	0.00	0.00	1.15	2.22
Romania	0.00	0.00	0.00	0.93
Slovakia	0.07	0.65	2.66	4.91
Slovenia	0.00	0.00	0.13	0.77
Spain	0.54	0.77	0.50	1.10
Sweden	2.00	2.11	2.67	3.93
UK	0.04	0.17	0.43	0.83

Source: EUROSTAT (2010).

2.1 THE BIODIESEL INDUSTRY

BIODIESEL PRODUCTION STILL WELL BELOW CAPACITY

Although biodiesel production is on the rise, the industry is still not running at anywhere near full capacity. In 2008, biodiesel production amounted to almost 7.8 million tonnes, whereas production capacity was more than twice as high. Despite the low capacity factor the EU's production capacity increased substantially between 2008 and 2009.

TABLE 2.2: ESTIMATION OF CURRENT AND FUTURE BIODIESEL PRODUCTION CAPACITY IN EU 27

Country	Production 2007 (tonnes)	Production 2008 (tonnes)	Production capacity 2008 (tonnes)	Production capacity 2009 (tonnes)
Austria	267,000	213,000	485,000	707,000
Belgium	166,000	277,000	665,000	705,000
Bulgaria	9,000	11,000	215,000	435,000
Cyprus	1,000	9,000	6,000	20,000
Czech Rep.	61,000	104,000	203,000	325,000
Denmark/Sweden	143,000	231,000	352,000	352,000
Estonia	0	0	135,000	135,000
Finland	39,000	85,000	170,000	340,000
France	872,000	1,815,000	1,980,000	2,505,000
Germany	2,890,000	2,819,000	5,302,000	5,200,000
Greece	100,000	107,000	565,000	715,000
Hungary	7,000	105,000	186,000	186,000
Ireland	3,000	24,000	80,000	80,000
Italy	363,000	595,000	1,566,000	1,910,000
Latvia	9,000	30,000	130,000	136,000
Lithuania	26,000	66,000	147,000	147,000
Luxemburg	0	0	0	0
Malta	1,000	1,000	8,000	8,000
Netherlands	85,000	101,000	571,000	1,036,000
Poland	80,000	275,000	450,000	580,000
Portugal	175,000	268,000	406,000	468,000
Romania	36,000	65,000	111,000	307,000
Slovakia	46,000	146,000	206,000	247,000
Slovenia	11,000	9,000	67,000	100,000
Spain	168,000	207,000	1,267,000	3,656,000
UK	150,000	192,000	726,000	609,000
TOTAL EU 27	5,708,000	7,755,000	15,999,000	20,909,000

Source: European Biodiesel Board (2010).



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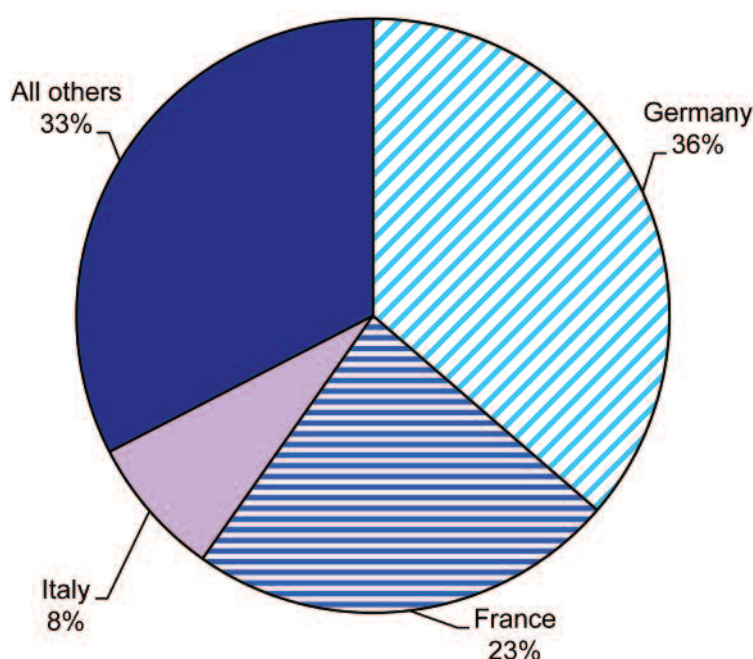
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France was the only of the main producers that managed to produce at 90 per cent of its productive capacity in 2008, thanks largely to the way in which its policies favour local producers. By 2008, Spain had also established significant production capacity, but most of that capacity remained idle.

THREE COUNTRIES ACCOUNT FOR TWO-THIRDS OF EU BIODIESEL PRODUCTION

Germany, France and Italy were the biggest producers of biodiesel in Europe in 2008. All together, the remaining countries only produced some 33 per cent (Figure 2.5).

FIGURE 2.5: LEADING EU BIODIESEL PRODUCING COUNTRIES IN 2008



Source: European Biodiesel Board (2010).

The largest fraction of the major firms producing biodiesel is located in only six countries: France, Germany, Italy, Spain and the United Kingdom. Among all producers, the French company “Dieter Industries” is by far the biggest. It enjoys a near monopoly position within France, as it happens to be the only big producer. It is also one of the leading biodiesel producers worldwide. Having five major producers of biodiesel, the German market is less concentrated. Germany’s second largest producer of biodiesel, Verbio AG, is also well-positioned in the EU ethanol market (EurObserv’ER, 2009).

TABLE 2.3: PRODUCTION CAPACITY OF THE MAIN BIODIESEL PRODUCERS IN EUROPE IN 2008

Company	Country	Number of units	Production capacity (in tonnes)
Diester Industrie	France	10	2,000,000
ADM Biodiesel	Germany	3	1,000,000
Verbio	Germany	2	450,000
Cargill	Germany	2	370,000*
Ital Greenoil	Italy	1	365,000
Bioenergetica Extremena	Spain	1	320,000
Acciona Energía	Spain	2	270,000
Gate	Germany	2	260,000
Biofuels Corporation	United Kingdom	1	250,000
Novaol Srl	Italy	1	250,000
Natural Energy West	Germany	1	250,000

Note: *This figure includes production capacity from the Wittenberg plant (120,000 tonnes), which is jointly owned by Cargill and Agravis.

Source: EurObserv'ER (2009).

RAPESEED OIL CONTINUES TO BE MAIN FEEDSTOCK FOR BIODIESEL PRODUCTION

Some 70 per cent of the EU's biodiesel is produced with rapeseed oil. The use of soybean oil and palm oil is constrained in two ways. The EU biodiesel standard DIN EN 14214 limits their use on the one hand, and on the other hand, palm oil is—according to reports—not winter-stable enough to be used in northern Europe. However, a feedstock mix of rapeseed oil, soybean oil and palm oil is approved to meet the standards.

TABLE 2.4: FEEDSTOCK USE FOR BIODIESEL PRODUCTION (IN 1,000 TONNES)

	2006 _r	2007 _r	2008 _e	2009 _f
Rapeseed oil	3,400	4,360	4,300	5,790
Soybean oil	750	900	870	1,100
Palm oil	150	300	300	450
Sunflower	180	200	200	300
Other and not attributed	110	20	40	50
Subtotal vegetable oils	4,590	5,780	5,710	7,690
Recycled vegetable oil	120	135	200	400
Animal fats	10	35	130	160
Grand total	4,720	5,950	6,040	8,250

Note: r= revised; e=estimate; f= forecast. Data for feedstock use is not available. The figures above represent estimates by EU FAS posts.

Source: United States Department of Agriculture (2009a) GAIN report Number NL9014.

Surprisingly, neither recycled vegetable oil nor animal fats play an important role as feedstocks. Nevertheless, in times of high vegetable prices they are an alternative as cheaper feedstock; for example, this was the case at the end of 2007 and the beginning of 2008. The sustainability criteria might increase their role because of their higher GHG emission-saving values (United States Department of Agriculture, 2009a).

2.2 THE ETHANOL INDUSTRY

GAP BETWEEN PRODUCTION AND CAPACITY FOR ETHANOL EVEN HIGHER THAN FOR BIODIESEL

In 2007 and 2008 the ethanol market grew as well. Between 2007 and 2008 EU production of ethanol increased by almost 60 per cent. As with biodiesel, there is a huge gap between actual production and capacity. Only 44 per cent out of the capacity of more than five million tonnes was used. France was the Member State with most plants and the highest level of ethanol production, followed by Germany, Spain and Poland.

TABLE 2.5: ESTIMATION OF CURRENT AND FUTURE ETHANOL PRODUCTION CAPACITY IN EU 27

	Plants in operation 2008	Production 2007 (tonnes)	Production 2008 (tonnes)	Production capacity 2008 (tonnes)	Plants planned or under construction	Additional production capacity expected
Austria	1	11,835	70,221	189,360		
Belgium	3		40,239	380,298		
Bulgaria	1			7,890	2	33,927
Czech Republic	3	26,037	59,964	213,030		
Denmark					1	13,886
Finland	4		39,450	37,872		
France	14	425,271	749,550	1,404,420	1	27,615
Germany	10	310,866	458,409	914,451	2	117,088
Hungary	2	23,670	118,350	165,690	1	71,010
Ireland	1	5,523	7,890	7,890		
Italy	3	47,340	47,340	238,278		
Latvia	1	14,202	11,835	9,468		
Lithuania	1	15,780	16,569	35,505	1	78,900
Netherlands	1	11,046	7,101	11,046	2	457,620
Poland	10	122,295	157,800	545,199		
Romania	1			14,202		
Slovakia	1	23,670	74,166	108,882		
Slovenia					1	59,175
Spain	4	274,572	272,994	436,317	3	209,085
Sweden	3	94,680	61,542	244,590		
UK	1	15,780	59,175	55,230	1	646,980
TOTAL EU 27	65	1,422,567	2,252,595	5,019,618	15	1,715,286

Source: ebio (2010).

Conversion by authors: 1 litre corresponds to 0.789 kg.

Member States not listed do not have ethanol production capacity installed.

A huge share of additional capacity has been announced for the UK and the Netherlands. The UK produced less than 60,000 tonnes in 2008, but is expected to enlarge its capacities by almost 650,000 tonnes. Compared with prospects in 2007, current expectations concerning the expansion of ethanol-producing capacity in the EU are now more modest.



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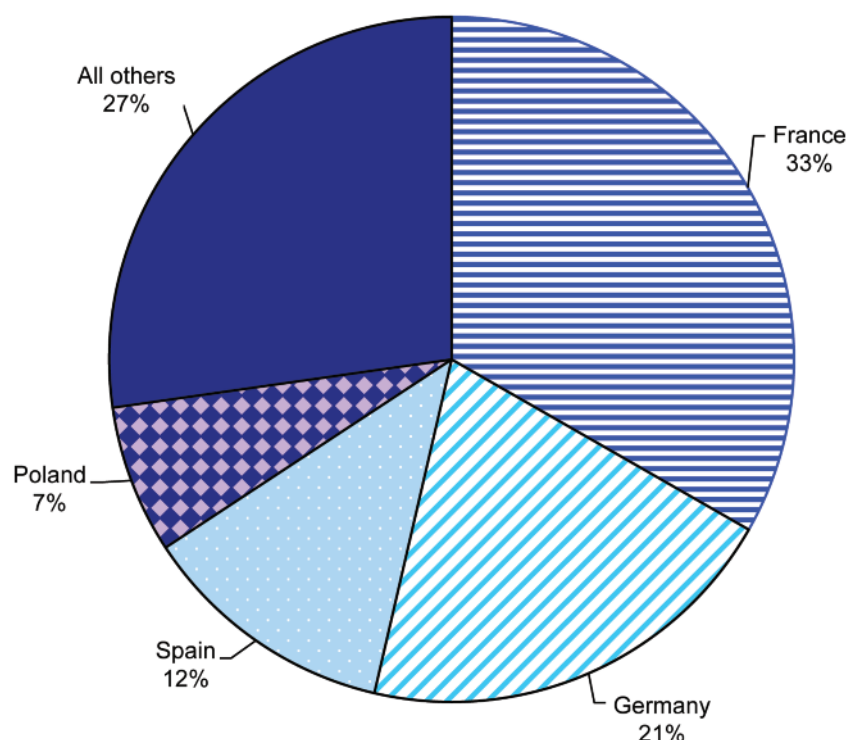


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GERMANY AND FRANCE PRODUCE MORE THAN 50 PER CENT OF ETHANOL PRODUCTION IN THE EU

In 2008, Germany and France were the two leading producers. Together they were responsible for more than half of all EU ethanol production. Poland and Spain are the other two noteworthy ethanol producing countries. Among the new Member States, Hungary is the leading producer of ethanol.

FIGURE 2.6: SHARES OF EU ETHANOL PRODUCTION IN 2008, BY MEMBER STATE



Source: ebio (2009).

MAIN PLAYERS IN THE EUROPEAN ETHANOL MARKET

The countries in which the main ethanol producing firms in Europe can be found are: Spain, France, Germany, Austria, Sweden, Italy and Belgium. Abengoa Bioenergía—a Spanish company—is the largest producer of ethanol in all of Europe, followed closely by Tereos (France) and CropEnergies (Germany).

TABLE 2.6: PRODUCTION CAPACITY OF MAIN ETHANOL PRODUCERS IN EUROPE IN 2008 (1,000 TONNES)

Company	Country	Number of units in Europe*	Production capacity in Europe (in 1000 tonnes)	Raw materials
Abengoa Bioenergía	Spain	4	614	barley, wheat, cereals, raw spirits, maize
Tereos	France	7	609**	sugar juice, wheat
CropEnergies AG	Germany	3	600	sugar juice, cereals
Cristanol	France	4	387	sugar juice, sugar beet, wheat, glucose, raw spirits
Agrana Group	Austria	2	308	wheat, maize
Verbio AG	Germany	2	296	sugar juice, cereals
Agroetanol	Sweden	1	166	cereals
IMA Srl	Italy	1	158	raw spirits
AlcoBioFuel	Belgium	1	118	wheat
Prokon	Germany	1	95	wheat

Note: * Only production capacities located in Europe, the production of which is dedicated to the bioethanol market are taken into account.

** This figure does not include production capacity from its Czech subsidiary Agroetanol TTD (100 million litres), the production of which is only partly dedicated to production of bioethanol.

Conversion by authors: 1 litre corresponds to 0.789 kg.

Source: EurObserv'ER (2009).

FEEDSTOCK FOR ETHANOL PRODUCTION

The most common feedstock for the production of ethanol in the EU is wheat and, to a lesser extent, corn and sugar beet derivatives. Barley, rye and surplus of wine alcohol are also used as feedstock. The use of cereals as feedstock is likely to be limited in the future as producers compete directly with the feed compounders for the feedstock (United States Department of Agriculture, 2009a).

TABLE 2.7: FEEDSTOCK USE FOR ETHANOL PRODUCTION (IN 1,000 TONNES)

	2006 _r	2007 _r	2008 _e	2009 _f
Wheat	2,500	2,500	3,200	3,900
Corn	600	700	1,600	1,800
Barley and rye	500	300	500	500
Sugar*	650	1,000	1,300	1,400

Note: r= revised; e=estimate; f= forecast. Data for feedstock use is not available. The figures above represent estimates by EU FAS posts.

* Expressed on basis of refined sugar, based on a conversion factor of 0.42.

Source: United States Department of Agriculture (2009a).

3. POLICY INITIATIVES OF THE EUROPEAN COMMISSION

In order to promote and promulgate the use of biofuels among Member States, the legislative body of the EU has established several Directives at the supranational EU level. Most Directives require Member States to implement targets for the market share of biofuels or allow them to support biofuels, for example, by allowing tax exemptions. Currently, three Directives are relevant to the promotion of biofuels at the EU level:

- the 2003 Biofuels Directive, which set an indicative target of 5.75 per cent to be reached by 18 May 2010;
- the 2003 Energy Taxation Directive, allowing Member States to reduce or exempt excise duties on biofuels;
- the 2009 Renewable Energy Directive, repealing the 2003 Biofuel Directive and setting a mandatory target for 10 per cent renewables in the transport sector;
- the 2009 Fuel Quality Directive, which set a mandatory 6 per cent decarbonization target for the suppliers of transport fuels.

However, particularly when it comes to reaching targets for market shares, most Member States have not been able to meet the Union's requirements and criteria. So far, targets set at the supranational level have mostly served as guidelines for the Member States and were interpreted as indicative rather than mandatory requirements. This view is supported by the fact that the Commission is not able to fine Member States for not reaching the targets or to sanction them through other measures. This will, however, change with the Renewable Energy Directive as it sets a mandatory 10 per cent target for 2020 and enables the Commission to start infringement procedures for Member States that do not comply.

The most important Directives are further explained and analyzed in the following sections.

3.1 DIRECTIVE EC 2003/30/EC: PROMOTION OF THE USE OF BIOFUELS

3.1.1 MAIN TARGETS

The Directive EC 2003/30/EC on the promotion of the use of biofuels or other renewable fuels first came into force in 2003. It aims to increase the use of biofuels in the Union in order to achieve objectives such as climate change commitments, an environmentally friendly security of supply and to promote renewable energy sources. The Directive EC 2003/30/EC explicitly sets reference values for the share of biofuels of all fuels. The Directive calls for a biofuel market share of 5.75 per cent to be implemented by each Member State by December 2010. A first target share of 2 per cent had to be reached by 2005 (Article 3).

The 2005 target was far from being reached and from today's point of view it also seems to be very unlikely that the 2010 goal can be accomplished—expectations are for around 4.2 per cent.

For 2010 most Member States aim to achieve the overall 5.75 per cent target market share set by the European Commission (Table 3.1). Some Member States plan to exceed the target, notably Portugal, which has changed its initial target for 2010 from 5.75 to 10 per cent market share, but also France, Germany and Spain. Others (Cyprus, Denmark, Ireland, Italy, the Netherlands, Slovenia and the U.K.) are expected to fall far short of the EU target. The Dutch Government, for example, implemented the EC Regulation 2003/30/EC into the Dutch Decision Biofuels 2007. They then reduced the target to 4 per cent in November 2008 due to the uncertainty about the sustainability of biofuels and the absence of sustainability criteria (United States Department of Agriculture, 2009a).

TABLE 3.1: MARKET SHARES AND TARGETS FOR BIOFUELS (ENERGY CONTENT) IN MEMBER STATES (IN PERCENTAGE)

Member State	Market share 2007	Market share 2008	Target for 2007	Target for 2008	Target for 2009	Target for 2010
Austria	4.23	5.5	2.95 (2.5 until 30.9.2007)	4.70 (4.30 until 30.9.2007)	5.75	5.75
Bulgaria	0.10	Probably <2.0	0.00	2.00	3.50	5.75
Belgium	1.05	n.a.	3.50	4.25	5.00	5.75
Cyprus	0.15		1.00	2.50	2.50	2.50
Czech Republic	0.51			2.00	3.50	4.50
Denmark	0.20	n.a.	0.10	n.a.	n.a.	0.75
Estonia	0.00		n.a.	n.a.	n.a.	5.75
Finland	0.02	2.00		2.00	4.00	5.75
France	3.57	5.71	3.50	5.75	6.25	7.00
Germany	7.30	5.90	Diesel: 4.40 Gasoline: 2.00	Diesel: 4.40 Gasoline: 2.80	Diesel: 4.40 Gasoline: 2.80 Overall: 5.25	6.25
Greece	1.21		3.00	4.00	5.00	5.75
Hungary	0.68					5.75
Ireland	0.60	1.60	1.75	2.24	n.a.	4.00
Italy	0.46	0.59	2.00	3.00	4.00	5.00
Latvia	0.16	0.17	3.50	4.25	5.00	5.75
Lithuania	3.63	4.30	n.a.	n.a.	n.a.	5.75
Malta	1.08	0.42	n.a.	n.a.	n.a.	n.a.
Netherlands	2.77	3.26	2.00	3.25	3.75	4.00
Poland	0.80	3.66	2.30	3.45	4.60	5.75
Portugal	2.54	n.a.	3.00	5.75	5.75	10.00
Romania	0.93	2.33	2.00 (by vol.)	3.00 by volume 4 by July	4.00 by volume	5.75
Slovakia	2.59	2.65	2.00	2.00	3.40	5.75
Slovenia	0.83	1.20	2.00	3.00	4.00	5.00
Spain	1.10	n.a.	n.a.	1.90	3.40	5.83
Sweden	4.00	4.90	(3 in 2005)	-	-	5.75
UK	0.84 (1 by volume)	2.04 (2.26 by volume)	n.a.	2.56 by volume	3.36 by volume	3.63 by volume

Notes: Denmark plans on reaching the EU target of 5.75% by 2012.

Source: European Commission (2008d) and (2009f). Member State reports are not always in line with EUROSTAT data. Data from EUROSTAT, because no information in MS report for the following MS in column "Market share 2007": Belgium, Cyprus, Czech Republic, Estonia, Finland, Greece, Hungary, Latvia, Netherlands, Poland, Romania, Spain.

Additional sources: United States Department of Agriculture (2009a) for Spain, European Commission (2007) for Greece, Italy, Portugal.

3.1.2 FURTHER MEASURES AND IMPLEMENTATION OF THE DIRECTIVE

Besides setting indicative targets for market shares in each Member State, the Directive implements a few more measures to promote the use of biofuels in the Union and to familiarize the public with the availability of biofuels. For example, Member States are required to ensure that sufficient information on the availability of biofuels is given to the public, and blended fuels with a share of biofuel exceeding 5 per cent have to be labelled as such at the sales points.

To ensure a fast implementation of the set target shares, the Directive obliges Member States to bring into force laws and regulations. Additionally, Member States have to report their progresses in implementing the Directive by delivering so-called Member State reports every year. In return, the Commission has to prepare an evaluation of the progress in the Member States. The last *Renewable Energy Progress Report* was published in April 2009 (European Commission, 2009a).

3.2 DIRECTIVE 2009/28/EC ON THE PROMOTION OF THE USE OF ENERGY FROM RENEWABLE SOURCES: REPEALING 2003/30/EC

3.2.1 INTERRELATION OF 2003/30/EC AND NEW DIRECTIVE 2009/28/EC

In June 2009 the Directive 2009/28/EC came into force as part of the new “Renewable Energy Directive.” The new Directive is supposed to amend and subsequently repeal the previously described Directive 2003/30/EC on the promotion of biofuels. However, the 2010 targets formulated in the “old” Directive remain in force and now have to be reached by 2011. All other provisions overlapping with the “new” guidelines have to be deleted and transposed by the Member States with the respective provisions in the 2009 Directive.

3.2.2 TARGETS

The 2009 Directive sets a mandatory overall target of a 20 per cent share of energy from renewable sources of the EU’s gross final consumption in 2020 (Article 3.1), though not every Member State has to exactly meet this criterion. Twenty percent will supposedly be the average over all Member States. Depending on the current share of renewable energy sources and GDP, each Member State has to achieve an individual target (Article 3.1; national targets named in Annex 1 of the Directive). The individual, national target shares of renewable energies vary between 10 per cent in Malta (0 per cent in 2005) and 49 per cent in Sweden (39.8 per cent in 2005).³ In order to achieve these targets, each Member State should also promote and encourage energy efficiency and saving (Article 3.1).

The new Directive does not set targets for specific sectors, except for the transport sector. The share of energy from renewable sources in all forms of transport has to be at least 10 per cent of the final consumption of energy in transport by 2020 (Article 3.4). This does not explicitly refer to the share of biofuels and could also be achieved by electricity in cars or in rail transport. However, it is likely that this target will act as a driver for the use of biofuels, as other technologies are unlikely to reach large market shares by 2020 (Birdlife European Division et al., 2009).

3.2.3 THE SUSTAINABILITY CRITERIA

The new 2009 Directive establishes sustainability criteria for biofuels (Article 17) that do not have a counterpart in the 2003 Directive. Biofuels not fulfilling these newly formulated sustainability criteria may not be taken into account for (Article 17.1):

- a. calculating the shares of energy from renewable sources;
- b. measuring compliance with the targets set in the Directives;
- c. the eligibility for financial support for biofuels.

Among the most important sustainability criteria,⁴ the greenhouse gas (GHG) emission savings from the use of biofuels or bioliquids compared with fossil fuels have to be at least 35 per cent. From 2017 onwards these savings have to be at least 50 per cent; and from 2018 onwards 60 per cent for biofuels produced in

³ Directive 2009/28/EC, Annex 1.

⁴ Biofuels produced in installations that were in operation in January 2008 have been exempted from this regulation until 2013.

installations that start their production in 2017 or later (Article 17.2). Provisions on how to calculate GHG savings are laid down in Article 19 and Annex V of the Directive.

Qualifying biofuels and bioliquids may not be made from raw material grown on or harvested from land with high biodiversity value (i.e., undisturbed forests, officially recognized nature protection areas and highly biodiverse grassland⁵ (Article 17.3), with a high carbon stock, including wetlands and continuously forested areas (Article 17.4), or peatland (Article 17.5). Some reporting might also be required to show that biofuels or raw materials for qualifying biofuels were produced in a socially responsible way. In order to ensure this, the Commission is required to report whether producer countries of biofuels or raw materials consumed in the EU (Article 17.7) respect the sustainability criteria outlined above, and have ratified and implemented certain conventions of the International Labour Organisation of the UN.⁶

The Commission was considering extending sustainability standards to solid biomass and was obliged to report on this issue by early 2010 (Article 17.9). However, the report postponed any decision on the sustainability criteria for biomass until 2011, quoting low imports of biomass as one of the main reasons.

By the end of 2010, the Commission also has to report about the impacts of indirect land-use change⁷ and, if appropriate, present a proposal on how to include this in any calculations of biofuels. This might have consequences for the overall sustainability of biofuels.

Of course, verification of compliance with the sustainability criteria is essential. For this purpose, Member States have to require economic operators to prove that the criteria are fulfilled. The Commission still has to determine what information operators exactly have to report on (Article 18). Reporting can be omitted, if the biofuels are certified by voluntary schemes or are produced in countries that have concluded an international agreement that the Commission has recognized.

3.2.4 IMPLEMENTING THE DIRECTIVE

Like the previous Directive, 2009/28/EC requires Member States to bring laws and regulations into force in order to implement the Directive's provisions. In order to comply with the new 2009 Directive, necessary laws and regulations will have to be in force by December 2010 (Article 27 2009/28/EC; Article 7 2003/30/EC). Unlike the 2003 Directive, the new Directive only requires progress reports every other year (Article 22).

The “new” guidelines are somewhat more specific on how Member States have to implement the Directive. Article 4 requires that Member States adopt so-called “national renewable action plans” and send them to the Commission by June 2010. The action plans have to set out national targets for the share of renewable energy in transport, electricity and cooling in 2020. What is more, the plans have to include measures to be taken to achieve the respective national targets, such as sustainability criteria for biofuels.

⁵ Environmental groups complain that these criteria are not very restrictive and do not apply to sufficiently many areas (Birdlife European Division et. al., 2009).

⁶ The conventions can be found at ILOLEX (ILO Database of International Labour Standards: <http://www.ilo.org/ilolex/english/convdisp1.htm>). In particular, countries have to have ratified and implemented conventions 29, 87, 98, 100, 105, 111, 138 and 182.

⁷ There has been quite some concern about indirect land-use change (ILUC). When crops grown on existing agricultural land are used for biofuel production, some portion of these crops will have to be replaced and usually some land elsewhere will have to be converted for agriculture. This “indirect” land-use change releases lots of CO₂ emissions. Modelling carried out for the European Commission seems to show that even at very low levels of conventional biofuel penetration (5.6 per cent in 2020), the policy leads to ILUC emissions of about 107 mt CO₂ over the period between 2010 and 2020. According to the Commission's calculations, that exceeds the direct GHG savings due to the increased use of the biofuels over that period. For a further discussion see BirdLife European Division et al. (2009) and Searchinger (2010).

3.2.5 FOREGONE DISCUSSION

The path to implementation has not been smooth. In 2007 EU leaders had agreed to a binding target of 10 per cent of biofuels in transport fuel to be achieved in each Member State by 2020. However, reports carried out on behalf of several member States—the U.K. and Netherlands among others—questioned this target, arguing that the impact of biofuels is far from being clear. Based on these reports, an intense debate on this target started in 2008. In a compromise, which also found its way into the final directive, the EU and the Member States agreed to keep the target of 10 per cent in transport but expanded it such that it now has to be reached by “renewable energy” in general—thus including electricity generated by renewable energy among others—and not by biofuels in particular anymore. This debate on the questionable impact of biofuels also led to the inclusion of sustainability criteria.

3.3 DIRECTIVE 2003/96/EC: THE ENERGY TAXATION DIRECTIVE

The EU introduced this Directive in order to compensate for the higher costs of producing biofuels. It allows Member States to exempt or reduce excise duties. The Energy Taxation Directive 2003/96/EC has not been amended or repealed since it came into force in 2003, although attempts to do so have been made several times. The problem, however, is that a revision requires unanimity in the Council, which is difficult politically.

The Directive’s main points are:

- energy taxation has to be imposed in accordance with the Directive (Article 1);
- Member States are allowed to reduce or exempt excise duties to promote the use and production of biofuels (Article 15);
- exemption must be proportionate to biofuel blending levels; and
- the exemptions may apply for a maximum period of 10 years (Article 15).

3.4 DIRECTIVE 2009/30/EC: AMENDMENTS TO 98/70/EC

3.4.1 BACKGROUND

The Fuel Quality Directive 98/70/EC on the quality of petrol and diesel fuels limits the share of biofuels in blended fossil fuels to 5 per cent (Appendix of 98/70/EC). This limit was established in view of the potential for increased pollutant emissions with higher proportions of oxygenates in the petrol and for compatibility problems of ethanol with fuel system components. To enable higher volumes of pure ethanol to be blended in petrol, it was decided to allow a second blend of petrol containing up to 10 per cent ethanol to be marketed. In addition following pressure from the ethanol industry, the possibility for a Member State to request a time-limited derogation from the summer vapour pressure limit (set at 60kPa to limit VOC emissions) was foreseen where technical adjustments to refineries limit the current potential to limit ethanol in petrol. In 2007 the Commission published a first proposal on an amendment (Kutas et al., 2007).

3.4.2 AMENDMENTS

The most significant amendments made by Directive 2009/30/EC are:

- Increasing the maximum share of ethanol in blended petrol fuels to 10 per cent (Article 1.3 and Annex). Member States are required to ensure that petrol containing maximum 5 per cent ethanol remains on the market for long enough to enable users of older vehicles not compatible with 10 per cent ethanol to continue to refuel.
- Any diesel fuels with a fatty acid methyl ester (FAME)—so-called biodiesel—content up to 7 per cent may be placed on the market, independent of elsewhere stated requirements for diesel fuels (Article 1.4). Previously there had been no limit on the blending of FAME.
- Member States have to require suppliers to reduce GHG emissions from fuel and energy by 6 per cent by December 2020, compared with a fuel baseline scenario (intermediate targets: 2 per cent by December 2014, 4 per cent by December 2017). An additional 4 per cent reduction by December 2020 may voluntarily be achieved (Article 1.5).
- The new Directive also establishes the sustainability criteria for biofuels, which are identical to those previously mentioned criteria in the Renewables Directive. Again, biofuels may not be taken into account for the purposes of meeting the GHG intensity reduction target in Article 7a of the Directive if these criteria are not satisfied.

4. RECENT DEVELOPMENTS IN BIOFUEL SUPPORT

For estimating the different elements of the aggregated data we had a closer look—mainly by evaluating the Member States Report—at the recent changes in biofuel support. To estimate the aggregated measures of support, we used the same support elements as Kutas et al. (2007):

- market transfers
- budgetary support linked to volume produced or consumed
- support for intermediate input
- support for value-adding factors
- support related to distribution and consumption
- support for research and development.

Support measures such as mandatory blending requirements, tax exemptions, support for consumption and distribution are set—in accordance with the EU Directives—individually at the Member State level. Furthermore, border protection, output payments such as distillation measures, policies affecting costs of intermediate input and support for value-added factors are implemented at the EU level. Namely, the recently abolished Energy Crops Scheme and set-aside requirements are provided at the EU level. Support for R&D is given within the Framework Programmes of the European Union and from the different Member States. However, due to the lack of data, it is not possible to quantify all these elements.

4.1 ASSISTANCE TO OUTPUTS

4.1.1 MARKET PRICE SUPPORT

Market price support results from measures that simultaneously affect producer and consumer prices, generated by public policies that artificially elevate the price of a good. Policy instruments that influence market price support are basically border protection (through tariffs or also through sustainability criteria) and mandatory blending requirements. After having a look at mandatory market shares in the EU, and applied tariffs on biofuels, we make a tentative estimation of the market price support for ethanol.⁸

4.1.1.1 DEVELOPMENTS IN MANDATED LEVELS OF CONSUMPTION (EU AND NATIONAL)⁹

Since the last report (Kutas et al., 2007) several more Member States (especially some of the new Member States) have adopted mandatory blending targets. In addition to the ones named in the original report (Austria, Finland, Germany, Luxembourg, Netherlands, Slovakia, Slovenia, Spain and U.K.), also Belgium, Bulgaria, the Czech Republic, Greece, Italy, Poland, Romania and Sweden have introduced mandatory market shares for biofuels.

⁸ Market price support for biodiesel is difficult—if not impossible—to assess. See section 4.1.1.5 for a discussion.

⁹ All information derived from the respective Member State Reports, unless stated otherwise.

TABLE 4.1: MANDATORY MARKET SHARES OR BLENDING TARGETS FOR BIOFUELS IN THE EU (IN PERCENTAGE)

Member State	2007	2008	2009	2010	2011	2012
Austria	2.95 (2.5 until 30.9.2007)	4.7 (4.3 until 30.9.2007)	5.75	5.75	-	-
Belgium	-	-	-	5.75	-	-
Bulgaria	-	5	-	-	-	-
Czech Republic	-	Diesel: 2 (by vol.) Gas: 2 (by vol.)	Diesel: 4.5 (by vol.) Gas: 3.5 (by vol.)	-	-	-
Finland	-	2	4	5.75	5.75	5.75
Germany	Biodiesel: 4.4	Diesel: 4.4	Diesel: 4.4	Diesel: 4.4	Diesel: 4.4	Diesel: 4.4
	Gasoline: 1.2	Gasoline: 2.0	Gasoline: 2.8	Gasoline: 2.8	Gasoline: 2.8	Gasoline: 2.8
	Total: -	Total: -	Total: 5.25	Total: 6.25	Total: 6.25	Total: 6.25
Greece	-	-	Diesel: 5 max Gasoline: 0 Total: 3	Diesel: 5 max Gasoline: 0 Total: 3.5	-	-
Ireland	-	-	-	4.166 since July 2010	4.166	4.166
Italy	-	2	3	-	-	-
Luxembourg	2	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	2	n.a.	n.a.	4	-	-
Poland	-	3.45	4.6	5.7	6.2	6.65
Romania	Diesel: 2 (by vol.) since July 2007	Diesel: 4 (by vol.) since July 2008	-	-	-	-
	-	-	Gas: 4 (by vol.) since July 2009	-	-	-
Slovakia	2	2	3.4	5.75	-	-
Slovenia	2	3	4	5	5.5	6
Spain	-	Diesel: 1.9 Gasoline: 1.9	Diesel: 2.5 Gasoline: 2.5	Diesel: 3.9 Gasoline: 3.9	Diesel: n.a. Gasoline: n.a.	-
	-	Total: 1.9	Total: 3.4	Total: 5.83	Total: 7	-
	-	-	-	5.75	-	-
Sweden	-	-	-	-	-	-
UK	-	2008/2009 2.5 (by vol.)	2009/2010 3.25 (by vol.)	2010/2011 3.5 (by vol.)	2011/2012 4 (by vol.)	2012/2013 4.5 (by vol.)

Source: Member State reports under Directive 2003/30/EC for the reporting year 2007 and 2008; United States Department of Agriculture (2009) GAIN report Number NL9014; Energy (Biofuel Obligation and Miscellaneous Provisions) Bill 2010 for Ireland.

France has set ambitious targets for the biofuel market share and incorporated relatively high targets into national law in 2005. The 5.75 per cent target initially scheduled for 2010 by EU Directive 2003/30/EC was brought forward to 2008 and increased to 7 per cent in 2010. In 2015 the government aims at a biofuel market share of 10 per cent. France employs a so-called General Tax on Polluting Activities. Operators providing fuels with a proportion below the national targets must pay a penalty proportionate to the percentage of biofuels they have not incorporated.

Germany: The overall quota for 2009 was lowered from 6.25 per cent to 5.25 per cent and the overall quota for the years 2010 to 2014 to 6.25 per cent (previously foreseen in the Biofuel Quota Act: 6.75 per cent [Bundesgesetzblatt, 2006]). From 2015 the benchmark for biofuel quotas will be converted from the present energetic evaluation to net GHG reduction.

Italy requires producers of diesel and petrol to establish a certain percentage share of biofuels in their products. These compulsory blending requirements have increased every year. In 2008 they were set at 2 per cent with a reference to energy content (1 per cent in 2007).

Mandatory blending targets for **Poland** were introduced through the National Goal Indicators for 2008–2013, which became mandatory for all liquid fuel producers and all fuel-importing companies in January 2008 (United States Department of Agriculture, 2009a). Poland has established diverse measures to stimulate the demand for biofuels.



Since 2006 **Sweden** has required that all filling stations above a certain size offer an alternative fuel option, with the aim of having at least 60 per cent of all filling stations selling biofuels by 2010. In 2007 already 45 per cent of the filling stations in Sweden sell a renewable fuel, and over 90 per cent of those were providing E85. What is more, in 2007 Sweden introduced a “clean car premium” to encourage car buyers to buy cars capable of running on biofuels. In Sweden, all gasoline sold contains 5 per cent ethanol. The government wants to implement the new EU biofuel Directive in 2010 and allow blends of 10 per cent ethanol and 7 per cent biodiesel (United States Department of Agriculture, 2009a).

In 2008, the **U.K.** introduced the Renewable Transport Fuel Obligation (RTFO) under which all fossil-fuel suppliers, who supply in excess of 450,000 litres of fossil fuels per year, must provide evidence that a certain percentage of their fuels for transport in the U.K. comes from renewable resources. The U.K. is concerned about indirect land-use change and therefore intentionally set its obligations for 2010/11—3.5 per cent by volume—below the EU-required target share of 5.75 per cent by energy content. However, the U.K. expects a 5 per cent on “volumetric” biofuel obligation for 2013/14. Furthermore, under the new Directive, the U.K. is required to source 10 per cent of its transport energy from renewable sources by 2020. A fuel duty incentive of 20 pence per litre of biofuel ceased on April 1, 2010 due to concern over the sustainability of biofuels (especially related to indirect land-use change). From then, those biofuels judged to be the most sustainable will be directly subsidized.

Bulgaria missed its indicative targets for the share of biofuels in 2006, 2007 and 2008. In 2008 the Renewable and Alternative Energy Sources and Biofuels Act (ZVAEIB) came into force. Among other things, this law sets the rules for public relations concerning the production and use of biofuels with the objective of reducing the use of conventional fuels emission of harmful substances. In accordance with the law’s provisions from January 1, 2008 onwards the producers and importers of liquid fuels for use in transport have an obligation to sell the market petroleum-based fuels mixed with biofuels. However, only licensed tax warehouses may blend the biofuels into petroleum-based fuels and sell them.¹⁰

The revised Air Protection Act, which was amended in 2007, requires anyone in the **Czech Republic** selling transport fuel to the public to keep full records about the percentage of biofuels in that fuel. Failure to do so is penalized at approximately €2.9 (CZK75) per litre. **Slovenia** did not meet its own mandatory targets in 2007 and 2008. Distributors failing the annual obligation are required to increase the amount of biofuels in the following year. At present, **Denmark’s** market share of biofuels is very low. Therefore, in 2009 it passed a new law—coming into force in January 2010—that obliges oil companies to ensure that at least 5.75 per cent of annual sales of fuel for land transport consist of biofuels. Denmark plans on reaching the EU target of 5.75 per cent by 2012. **Ireland** just introduced a biofuels obligation in 2010. A special kind of mandate can be found in **Hungary**. Based on volume, companies must add more than 4.4 per cent of biofuels to be eligible for a lower excise tax (United States Department of Agriculture, 2009a).

4.1.1.2 BORDER PROTECTION FOR BIOFUELS

The EU trade policy has an intermediate impact on the domestic biofuel production market on the one side and, on the other side, lowers the export opportunities and production incentives of foreign biofuel producers (e.g., U.S.A., Brazil, Indonesia, Malaysia, etc.) (Perrihan, Dimaranan & Laborde, 2010, p. 110). In the Renewable Energy Road Map from 2007 the European Commission stated: “From a trade perspective, the

¹⁰ Renewable and Alternative Energy Sources and Biofuels Act (2008), Section II, Art. 24, 25.

EU maintains significant import protection on some types of biofuels, notably ethanol, which has a tariff protection level of around 45 per cent ad valorem. Import duties on other biofuels—biodiesel and vegetable oils—are much lower (between 0 and 5 per cent). If it would appear that supply of sustainable biofuels to the EU is constrained, the EU should be ready to examine whether further market access would be an option to help the development of the market” (Commission of the European Communities, 2007, p. 7).

In the European Union there is no specific code for fuel ethanol or for vegetable oils destined for use as fuel in trade nomenclature. The Combined Nomenclature codes (CN codes) are applied on the imported products and are consequently unrelated to the final use. Tariffs on biodiesel are generally quite low while the tariffs applied on ethanol are rather high.

TABLE 4.2: THE EU'S MOST FAVOURED NATION (MFN)-BOUND TARIFFS ON BIOFUELS AND VEGETABLE OILS FOR BIODIESEL AND PRODUCTION

CN code and description	MFN Bound Tariff
Ethanol	
2207 10 00 <i>Undenatured alcohol with an alcohol content of > 80 percent</i>	€ 19.2 /hl
2207 20 00 <i>Denatured alcohol</i>	€ 10.2 /hl
Biodiesel	
3824 90 91 <i>Fatty-acid mono-alkyl esters, containing by volume 96,5 % or more of esters (FAME)</i>	6.5%
1516 20 98 <i>Other</i>	10.9%
1518 00 91 <i>Other</i>	7.7%
1518 00 99 <i>Other</i>	7.7%
2710 19 41 <i>Other</i>	3.5%*
3824 90 97 <i>Other</i>	6.5%
Vegetable oil for biodiesel production	
1507 10 10 <i>Crude soy oil for industrial use</i>	3.2%
1511 10 10 <i>Crude palm oil for industrial use</i>	free
1512 11 10 <i>Crude sunflower oil for industrial use</i>	3.2%
1514 11 10 <i>Crude rape oil for industrial use</i>	3.2%

Note: *Duty rate suspended, on an autonomous basis, for an indefinite period for gas oil having a sulphur content not exceeding 0.2% by weight.

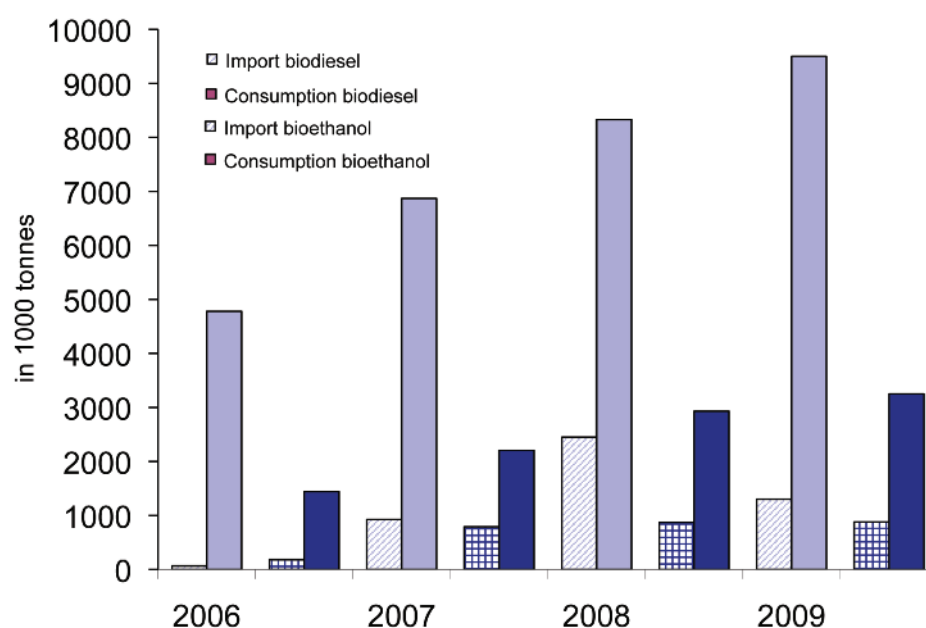
Source: TARIC database and European Commission Regulation (EC) No 948/2009.



Undenatured alcohol faces a MFN tariff of €19.2 per hectolitre. The MFN tariff for denatured alcohol is €10.2 per hectolitre. Since the Kutas et al. report (2007), these rates have not changed. However, depending on the mixing proportions, blends with petrol could also be subject to other codes (United States Department of Agriculture, 2009a). In January 2008 a special code for biodiesel (FAMAE) was brought into use. Prior to this date, biodiesel imports belonged to the tariff line 3824 90 98 “other chemicals.” The import duty on biodiesel (FAMAE) is set at 6.5 per cent. Biodiesel with a different chemical composition imported in the European Union faces other CN codes. What is new is that since March 2009 all imports of biodiesel originating from the United States are subject to additional antidumping and countervailing duties (see paragraph 4.1.1.4). The tariffs applied on vegetable oil for biodiesel production range from 0 to 3.2 per cent (Table 4.2). Besides these tariffs, the internal market also faces restrictive non-tariff barriers (NTBs) such as quality and environmental standards and sustainability criteria; these mainly have an impact upon exporters from developing countries (Perrihan et al., 2010, p. 110).

To determine how much biofuels enter the EU is difficult due to the way the CN codes work. Until 2008, there was a rapid growth in biodiesel imports, mainly explained by an increase of biodiesel imports originating from the U.S. Due to the additional antidumping and countervailing duties on these imports, a decline in the share of EU demand met by imports is expected. Ethanol imports have risen steadily over the last couple of years.

FIGURE 4.1: NET IMPORTS AND TOTAL CONSUMPTION OF BIODIESEL AND ETHANOL IN THE EU (2006–2009)



Note: Data for 2006 and 2007 revised; those for 2008 are estimated and for 2009 are forecasted.

Biodiesel imports prior to 2008 are estimated based on industry information.

Estimations on ethanol assume that the increase of EU Ethanol imports (HC code 2207) can solely be attributed to expanding bioethanol imports.

Source: United States Department of Agriculture (2009a).



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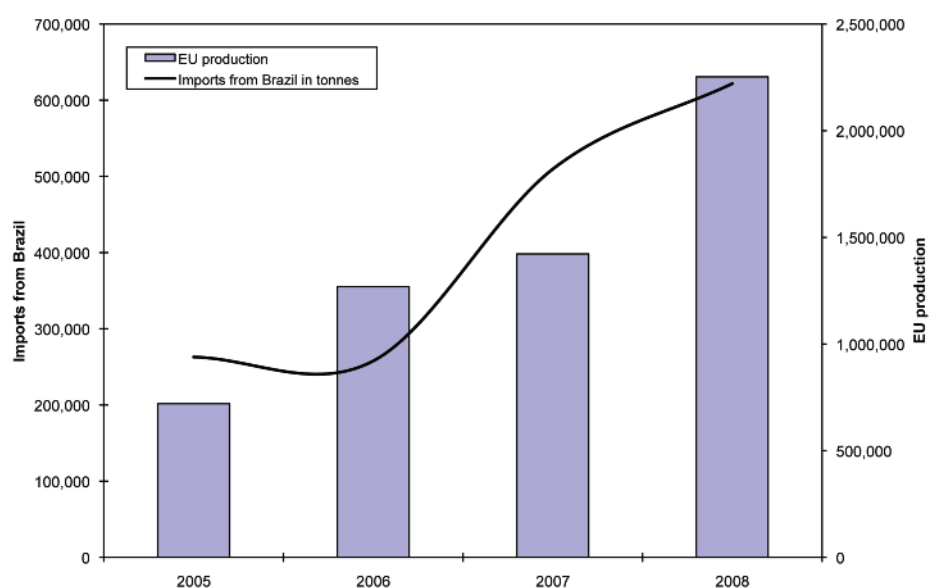
Various developing countries enjoy preferential treatment when exporting ethanol into the European markets. There are three schemes that are covered by the so-called “General System of Preferences” (GSP): Standard GSP, GSP-plus and Everything but Arms.¹¹ Countries in GSP are given tariff reductions when exporting to the EU. GSP-plus provides additional tariff reductions as an incentive arrangement for sustainable development and good governance to support vulnerable developing countries. Countries in the “Everything but Arms” regime have access free of duty and quota to the EU market. Furthermore, countries in other regimes pay reduced rates, which are set in bilateral bargaining.¹²

Even though many exporters from developing countries use these special treatments, Brazil and Pakistan, which are among the countries exporting most of the ethanol into the EU, are since 2006 under the ordinary GSP without any preferences. Liberalization is a contentious issue in the Doha Round of multilateral trade negotiations, as well as in the bilateral negotiations of trade in biofuels, especially ethanol, between the Mercosur States and the European Union (Perrihan et al., 2010, p. 110).

ETHANOL IMPORTS FROM BRAZIL

Since 2005, both ethanol production within the EU as well as imports from Brazil have increased substantially (Figure 4.2). However, estimating ethanol imports is problematic due to the impreciseness of the CN codes.¹³ This makes it—as already highlighted above—difficult to determine exactly how much fuel ethanol enters the EU.

FIGURE 4.2: EU PRODUCTION AND IMPORTS FROM BRAZIL OF ETHANOL SINCE 2005 (IN TONNES)



Note: Ethanol imports are for tariff lines 2207 20 and 2207 10, all the quantities are not necessarily intended for fuel use.

Sources: Data from COMEXT and ebio (2010), elaboration by the authors.

¹¹ Everything but Arms: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros Islands, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Faso, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, Zambia. GSP Plus: Armenia, Azerbaijan, Bolivia, Colombia, Costa Rica, Ecuador, Georgia, Guatemala, Honduras, Sri Lanka, Mongolia, Nicaragua, Peru, Paraguay, El Salvador, Venezuela.

¹² European Commission DG for Trade, Generalised System of Preferences: http://ec.europa.eu/trade/wider-agenda/development/generalised-system-of-preferences/index_en.htm.

¹³ As previously mentioned, depending on characteristics, different types of ethanol are classified into different CN categories.



To estimate the market price support for ethanol requires data on ethanol imports. For the purpose of this study, different estimated figures for imports of Brazilian ethanol were compared. Figure 4.2 shows Brazilian ethanol imported under the specific tariff lines 2207 20 and 2207 10. But note that due to the fact that there is no specific tariff line for ethanol used as a fuel it is not possible to know exactly how much of the imported ethanol was used for fuel. When comparing this data to those published by The European Ethanol Fuel Association (ebio), an association representing the interests of European producers of ethanol for fuel use at EU level, one finds significant differences. For the considered four-year period from 2005 until 2008 ebio reports different and higher quantities (ebio, 2010)¹⁴:

- 2005: 427,830 tonnes
- 2006: 461,210 tonnes
- 2007: 786,538 tonnes
- 2008: 1,171,010 tonnes.

According to ebio, 80 per cent of the ethanol imports to the EU came from Brazil in 2008. Furthermore, they estimate that in 2008 between 700 and 800 million litres of the ethanol imported from Brazil were used for fuel purposes. Ebio emphasizes, again, the problems related with the above discussed CN code classification. According to them, more than half of the Brazilian ethanol is labelled as chemical when entering the EU and duties applied on chemicals are on average one-eighth those for “fuel ethanol” (Chapter 4.1.1.3) (ebio, 2009). This volume relates to the special Swedish dispensation (compare following paragraph).

4.1.1.3 EXTENSION OF THE SPECIAL DISPENSATION TO SWEDEN ON IMPORTS OF ETHANOL

During the last several years Sweden has taken many steps to broaden its national fleet of flexible-fuel vehicles (FFVs), cars that can operate on ethanol-gasoline blends containing up to 85 per cent ethanol by volume (E85). In Sweden, E85 is produced by blending undenatured ethanol made from sugar-cane imported from Brazil. By the end of 2009, some 2000 E85 fuelling stations were expected to be in operation in the country. Around 25 per cent of the new cars sold in 2008 were FFVs, and in 2009 the percentage rose to 35 per cent. This tendency is supposed to lead to around 300,000 FFVs on the road by the end of 2010 (Ethanol Producer Magazine, 2009).

In 2008 Sweden applied for EU approval to import Brazilian ethanol at a lower tariff by classifying ethanol imports from Brazil as chemical products, which are subject to a lower tariff than agricultural products (Box 4.1). The justification given was the need to ensure that E85 competes with gasoline, which is necessarily for propagation of its use. Consumers have the option of switching to regular gasoline if the price for E85 rises.

On February 4, 2008 a bare majority of the Member States voted in favour of the application by Sweden to “grant an authorisation for PCC [Processing under Customs Control] of undenatured ethyl alcohol classified within TARIC Code 2207 10 00 10 for processing into biofuel” (European Commission, 2008b, p. 2). The authorization was for only one year, though, in 2009 and, again, 2010 another one-year permit was granted (Government Offices of Sweden, 2010). There has been speculation that other countries (e.g., the Netherlands) might try to circumvent the higher tariffs by using this loophole as well (E-Energymarket, 2009).

¹⁴ Conversion by the authors.

BOX 4.1: THE EUROPEAN COMMISSION'S DEFINITION OF PROCESSING UNDER CUSTOM CONTROL

The European Commission Taxation and Customs Union defines processing under customs control as “goods [that] may be processed into products which are subject to a lower duty rate before they are put into free circulation.”

Depending on the circumstance, the Customs Code Committee examines the economic conditions at the community level. Its conclusions are not legally binding; however, they are supposed to guarantee the consistent use of the Customs Code, which is why the national customs authorities cannot disregard them without justification.

EU-wide import duties in force in 2009:

- Biodiesel (TARIC Code 38249091): 6.5 per cent
- Ethanol, denatured (TARIC Code 220720): €10.2/hl
- Ethanol, undenatured (TARIC Code 220710): €19.2/hl.

Sources: European Commission (2008a, 2008b) Taxation and Customs Union, E-Energymarket (2009).

4.1.1.4 ANTI-DUMPING AND COUNTERVAILING DUTIES APPLIED TO U.S. BIODIESEL EXPORTS

On behalf of the major share of the whole European community's biodiesel producers, on April 29, 2008 the European Biodiesel Board (EBB) brought in a complaint alleging that biodiesel imported from the United States should benefit from various subsidies granted at the U.S. Federal and State levels. Thanks to these subsidies U.S. biodiesel could be sold at discounted prices, sometimes even below the prices of the raw material necessary for production. The subsidized imports were having an adverse impact on the overall European market (price distortion effects as well as disruptive effects on the European biodiesel producer's margins) for biodiesel.

Following an investigation, the Commission adopted two provisional regulations in March 2009 that turned into definitive regulations by July 2009 (Council Regulation 598/2009; Council Regulation 599/2009). These established anti-dumping and countervailing duties for U.S. biodiesel. The measures are supposed to last five years. Anti-dumping duty rates range from €68.60 per tonne to €198 per tonne net, equivalent to approximately €0.09 per litre to €0.25 per litre. Countervailing duty rates range from €211.20 per tonne to €237 per tonne net that are approximately €0.24–€0.27 per litre (Table 4.3).¹⁵

¹⁵ Affected were: biodiesel in pure form or “in a blend containing by weight more than 20 per cent of fatty-acid mono-alkyl esters and/or paraffinic gasoil obtained from synthesis and/or hydro-treatment, of non-fossil origin” (European Council Regulation No 598/2009 and 599/2009).

FIGURE 4.3: COUNTERVAILING AND ANTIDUMPING DUTY RATES FOR US COMPANIES

TARIC additional code	Company	Counter-vailing duty rate €/tonne net	Anti-dumping duty rate €/tonne net
A933	Archer Daniels Midland Company, Decatur	237.0	68.6
A934	Cargill Inc., Wayzata	213.8	0.0
A935	Green Earth Fuels of Houston LLC, Houston	213.4	70.6
A936	Imperium Renewables Inc., Seattle	216.8	76.5
A937	Peter Cremer North America LP, Cincinnati	211.2	198.0
A938	Vinmar Overseas Limited, Houston	211.2	115.6
A939	World Energy Alternatives LLC, Boston	211.2	82.7
A940	Alabama Clean Fuels Coalition Inc., Birmingham	219.4	115.6
	American Made Fuels, Inc., Canton		
	Arkansas SoyEnergy Group, DeWitt		
	Arlington Energy, LLC, Mansfield		
	Athens Biodiesel, LLC, Athens		
	Beacon Energy, Cleburne		
	Biodiesel of Texas, Inc., Denton		
	BioDiesel One Ltd, Southington		
	Buffalo Biodiesel, Inc, Tonawanda		
	BullDog BioDiesel, Ellenwood		
	Carbon Neutral Solutions, LLC, Mauldin		
	Central Iowa Energy, LLC, Newton		
	Chesapeake Custom Chemical Corp., Ridgeway		
	Community Fuels, Stockton		
	Delta BioFuels, Inc., Natchez		
	Diamond Biofuels, Mazon		
	DirectFuels, Euless		
	Eagle Creek Fuel Services, LLC, Baltimore		
	Earl Fisher Bio Fuels, Chester		
	East Fork Biodiesel, LLC, Algona		
	ECO Solutions, LLC, Chatsworth		
	Ecogy Biofuels, LLC, Tulsa		
	ED & F Man Biofuels Inc., New Orleans		
	Freedom Biofuels, Inc, Madison		
	Fuel & Lube, LLC, Richmond		
	Fuel Bio, Elizabeth		
	FUMPA Bio Fuels, Redwood Falls		
	Galveston Bay Biodiesel LP (BioSelectFuels), Houston		
	GeoGreen Fuels LLC, Houston		
	Georgia Biofuels Corp., Loganville		
	Green River Biodiesel, Inc., Moundville		
	Griffin Industries Inc., Cold Spring		
	High Plains Bioenergy, Guymon		
	Huish Detergents Inc., Salt Lake City		
	Incobrassa Industries Ltd, Gilman		
	Independence Renewable Energy Corp., Perdue Hill		
	Indiana Flex Fuels Inc., LaPorte		
	Innovation Fuels Inc., Newark		
	Iowa Renewable Energy LLC, Washington		
	Johann Haltermann Ltd., Houston		
	Lake Erie Biofuels LLC, Erie		
	Leland Organic Corporation, Leland		
	Louis Dreyfus Agricultural Industries LLC, Claypool, Wilton		
	Louis Dreyfus Claypool Holdings LLC, Claypool		
	Middle Georgia Biofuels, East Dublin		
	Middletown Biofuels LLC, Blairsville		



FIGURE 4.3: COUNTERVAILING AND ANTIDUMPING DUTY RATES FOR US COMPANIES (CONTINUED)

TARIC additional code	Company	Counter-vailing duty rate €/tonne net	Anti-dumping duty rate €/tonne net
A940	Musket Corporation, Oklahoma City New Fuel Company, Dallas North Mississippi Biodiesel, New Albany Northern Biodiesel, Inc. Ontario Northwest Missouri Biofuels, LLC, St Joseph Nova Biofuels Clinton County LLC, Clinton Nova Biosource, Seneca Organic Fuels Ltd., Houston Owensboro Grain Company LLC, Owensboro Paseo Cargill Energy, LLC, Kansas City Peach State Labs Inc., Rome Perihelion Global, Inc., Opp Philadelphia Fry-O-Diesel Inc., Philadelphia Pinnacle Biofuels, Inc., Crossett PK Biodiesel, Woodstock Pleasant Valley Biofuels, LLC, American Falls RBF Port Neches LLC, Houston Red Birch Energy, Inc., Bassett Red River Biodiesel Ltd., New Boston REG Ralston LLC, Ralston Renewable Energy Products, LLC, Santa Fe Springs Riksch BioFuels LLC, Crawfordsville Safe Renewable Corp., Conroe Sanimax Energy Inc., DeForest Seminole Biodiesel, Bainbridge Soy Solutions, Milford SoyMor Biodiesel LLC, Albert Lea Sunshine BioFuels, LLC, Camilla TPA Inc., Warren Trafigura AG, Stamford U.S. Biofuels Inc., Rome United Oil Company, Pittsburgh Valco Bioenergy, Harlingen Vanguard Syntfuels, LLC, Pollock Vitol Inc., Houston Walsh Bio Diesel, LLC, Mauston Western Dubque Biodiesel LLC, Farley Western Iowa Energy LLC, Wall Lake Western Petroleum Company, Eden Prairie	219.4	115.6
A941	AC & S Inc., Nitro BioPur Inc., Bethlehem Freedom Fuels LLC, Mason City Integrity Biofuels, Morristown Natural Biodiesel Plant LLC, Hayti Piedmont Biofuels Industrial LLC, Pittsboro Prairie Pride, Deerfield Southeast BioDiesel LLC, Charlotte Stepan Company, Northfield Yokaya Biofuels Inc., Ukiah	219.4	172.2
A942	AG Processing Inc., Omaha Memphis Biofuels, LLC, Memphis Scott Petroleum, Ita Bena	237.0	115.6
A999	All other companies	237.0	127.2

Source: TARIC database and European Council Regulations 598/2009 and 599/2009.



BOX 4.2: COMPLAINT BY THE EUROPEAN BIODIESEL BOARD (EBB)

In its background note from March 2009 the EBB pinpointed that at least 30 different subsidies (granted by U.S. Federal Programs) were set in place in the U.S. in order to raise the amount of produced and used biodiesel as well as to improve the infrastructure of biodiesel distribution.

The three major federal subsidies mentioned were:

- biodiesel fuel-excise tax credit
- income tax credits
- bio-energy program of the U.S. Department of Agriculture.

Additionally, various tax exemptions, grants programs, R&D measures, etc. at the state level were listed. The Volumetric Biodiesel Credit, an excise tax credit and income tax credit granted to biodiesel mixtures incentive, adopted in October 2004 as part of the American JOBS Creation Act was considered as the one with the greatest overall impact.

The EBB complained that there are no minimum restrictions regarding the biodiesel share constraining the application of the tax credits. By adding just “one drop” of biodiesel, subsidies up to approximately US\$300 per tonne could be obtained when putting the blend out for consumption. Furthermore, the policy imposed no limits on exports, meaning that the U.S. biodiesel first benefited from both the U.S. subsidies and, after being exported to Europe, from the higher tax-free price of biodiesel in the EU.

According to a press release issued in November 2009, the EBB alleged that dumped and subsidized U.S. biodiesel was still entering the EU and thereby circumventing the antidumping and countervailing duties, either via triangular trade with third countries based on fraudulent declarations of origin or through blends just below the B20 threshold.

Sources: European Biodiesel Board (2009a), Official Journal of the European Union (2008).

Biodiesel imports from the United States showed a sharp increase in 2006, and increased more than tenfold between 2006 and 2007. With reference to the Council Regulation 11084/09 the same observation can be made for the dumped imports.¹⁶

TABLE 4.3: BIODIESEL IMPORTS FROM UNITED STATES

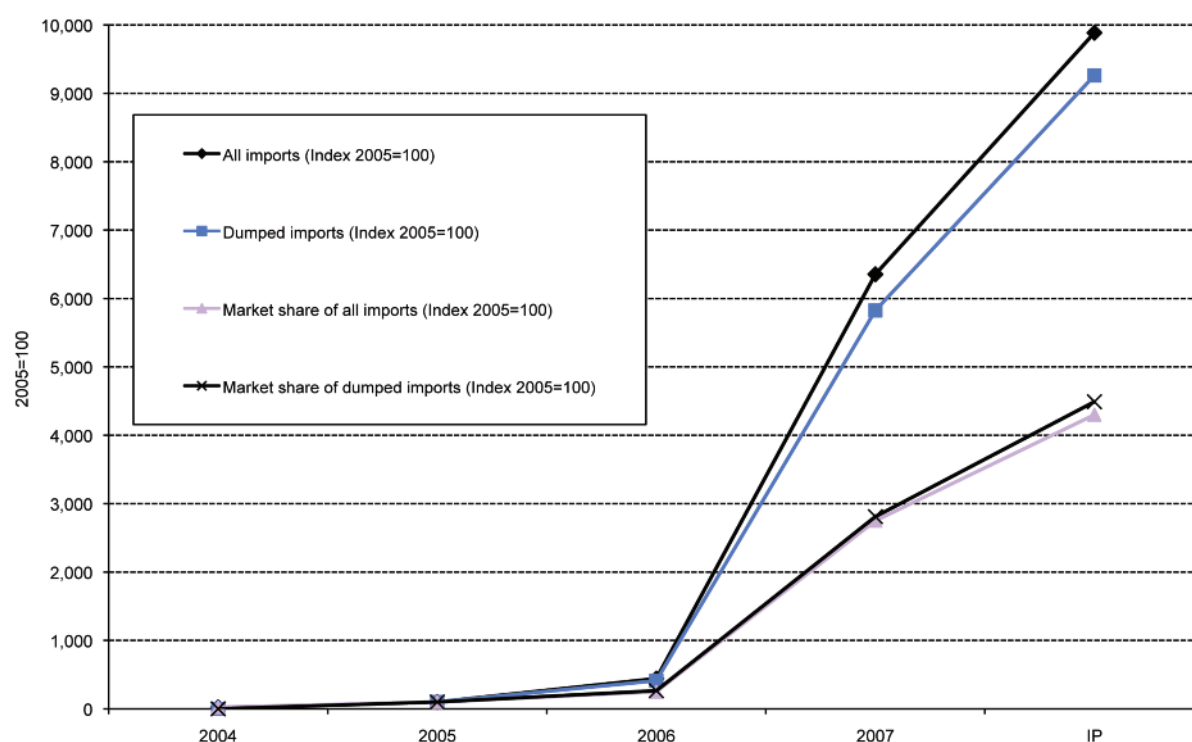
All imports from USA (tonnes)	2004	2005	2006	2007	IP
Tonnes	2,634	11,504	50,838	730,922	1,137,152
Index 2005 = 100	23	100	442	6,354	9,885
Market share (in percent)	0.1	0.4	1.0	11.0	17.2
Index 2005 = 100	25	100	250	2,750	4,300
Dumped imports from USA	2004	2005	2006	2007	IP
Index 2005 = 100	-	100	411	5,825	9,261
Index market share 2005 = 100	-	100	265	2,810	4,490

Note: IP = investigation period: 01/04/2007 until 31/03/2008.

Source: European Council Regulation No 11084/09 of June 30, 2009.

¹⁶ According to the European Commission, DG Trade, “a company is dumping if it is exporting a product to the EU at prices lower than the normal value of the product (the domestic prices of the product or the cost of production) on its own domestic market.” Investigations concerning dumping lie within the responsibility of the European Commission. Retrieved June 2010 from: http://ec.europa.eu/trade/tackling-unfair-trade/trade-defence/anti-dumping/index_en.htm.



FIGURE 4.4: INDEXED IMPORTS AND SHARES OF US BIODIESEL IN THE EU MARKET

Note: IP = investigation period: 01/04/2007 until 31/03/2008.

Source: European Council Regulation No 11084/09 of June 30, 2009.

4.1.1.5 MEASURING MARKET PRICE SUPPORT

When estimating market price support, the small-country case is assumed. As the European Union is the world's biggest biodiesel producer and strongly influences the world market price, it is only valid to estimate the market price support for ethanol (Cahill & Legg, n.d.).

TABLE 4.4: EU MARKET PRICE SUPPORT FOR ETHANOL THROUGH BORDER PROTECTION

	2007	2008
EU production of fuel ethanol (million litres)	1,803	2,855
EU ethanol imports for fuel use (million litres)	n.a.	750
EU ethanol wholesale average price (€/litre)	0.41	0.45
World ethanol average price (€/litre)	0.31	0.36
Transport and handling charges, Brazil to the EU (€/litre)	0.08	0.08
Price gap (€/litre)	0.03	0.01
Market price support (€ millions)	45	16

Sources: Volumes: Ebio (2010); prices: OECD-FAO (2008), transport cost: authors' estimates, market price support: calculation by the authors.

We used the same method as Kutas et al. (2007) to calculate market price support. We estimated the difference between the average world ethanol price and the average EU ethanol wholesale price. This “price gap” we applied to the quantities produced in the EU. The market price support for ethanol was €45 million and €16 million in 2007 and 2008, respectively.¹⁷ Obviously, the higher the world market price, the lower the market price support for European ethanol.

4.1.2 NATIONAL FUEL-TAX EXEMPTIONS

Biodiesel and ethanol are fully or partly exempt from excise taxes in the majority of European Member States. Therefore, excise-tax exemptions constitute the main form of support for biofuels provided by the Member States. The support schemes differ significantly within the EU making comparisons among them rather complex. Based on Directive EC 2003/96, Member States have to report annually their biofuels support measures to the Commission. However, not all Member States comply with this regulation. Furthermore, information contained in the reports varies widely: while some Member States list all measures meticulously, others present rather scarce information. As tax exemptions need to be notified to the Commission, the state aid database is a helpful additional source.¹⁸

Concerning the design of excise-tax exemptions, one can distinguish between systems with and without production quotas. In countries with production quotas, only a defined amount of ethanol or biodiesel is tax exempt. Other Member States use a combination of excise-tax relief and penalties on blenders who do not fulfil the mandatory share of biofuels. As in many other countries, Germany has an obligatory share of biofuels in all fuels sold but, different from others, only biofuels sold *in addition* to that quota are granted a tax relief.

Altogether it can be observed that, over the last 3–4 years, excise-tax exemption rates have declined. Some Member States are shifting to other ways of supporting biofuels, such as mandatory blending. Others, such as the U.K. for instance, seem to have cast doubt on the sustainability of biofuels, because of their potential negative impacts on food prices and the environment.

4.1.2.1 EXCISE-TAX EXEMPTION ON BIOFUELS IN THE ABSENCE OF PRODUCTION QUOTAS

In the **Czech Republic** an amendment to the Consumption Taxes Act has been notified to the Commission in 2008. As of 2009, tax relief is granted only for high-percentage fuel mixes (E85, E95) and pure biofuels are fully exempt. The tax reduction is supposed to last for 6 years (Unites States Department of Agriculture, 2009a).¹⁹ To be eligible for a lower excise-tax in **Hungary** companies must use more than 4.4 per cent bio-component in their fuels (based on volume) (Unites States Department of Agriculture, 2009a).

With the increasing penetration of biofuels in **Germany**, the taxation system has undergone several changes. Tax incentives, in the form of subsidies and tax exemptions, are being phased out in favour of requirements of mandatory minimum shares of bio components in liquid fuels with the introduction of the Biofuels Quota

¹⁷ The situation concerning EU ethanol prices is very opaque and unsatisfactory. Having two sources at hand (the OECD and data from a private company called FO Licht) prices vary extremely, although apparently the OECD also relies on FO Licht data. Unfortunately reasons for the price differences could not be clarified. For our estimations we used figures from OECD as a reliable source. Based on OECD data, we obtained conservative estimations for the market price support as EU ethanol prices presented by FO Licht are much higher: 0.57 and 0.58 €/l for 2007 and 2008 respectively.

¹⁸ All information in this chapter is derived from the respective Member State Reports and the state aid database, unless otherwise stated.

¹⁹ See also State aid case N305/2008 – Czech Republic.

Act on January 1, 2007. Such fuels can either be “pure” biofuels or diesel and gasoline blended with biofuels. Thus, from 2007, diesel and gasoline fuels must include a predetermined share of biofuel components. The minimums in 2007 were 4.4 per cent and 1.2 per cent for diesel and gasoline, respectively (for gasoline rising to 2.8 per cent in 2010). From 2009 an additional “total quota” of 6.25 per cent applies that exceeds the specific minimum quotas for biodiesel and ethanol. From July 2010 biofuels have needed sustainability certificates in order to be eligible for the quota or for tax exemptions (Biokraftstoff-Nachhaltigkeitsverordnung, 2009). Biofuels used to fulfil the obligatory quota have been subject to the full tax rate for mineral oil fuel since 2007. This follows a regular review of the needed compensation to make biofuels competitive, which deemed that recent improvements in technology allowed a lower subsidy rate that avoids over-compensation (Fifo et al., 2009). By contrast, pure biofuels or vegetable oil in excess of the obligatory quota is subject to a reduced tax rate.

Notably, supportable fuels (among them E85 as well as second-generation biofuels) are then totally exempt from energy taxes.²⁰ For pure biodiesel the Biofuels Quota Act foresaw a degressive tax incentive outside the quota for a transitional period until the end of 2011. Starting with €14.88 per hectolitre in 2008, the originally foreseen tax rate for 2009 of €21 per hectolitre was reduced to €18 per hectolitre and thereafter supposed to rise by about €6 per hectolitre per year until it would reach the full tax rate (€45 per hectolitre) in 2013.²¹ However, in December 2009 the rates were revised again and the process of phasing out tax reductions was stopped. At least for 2010 and 2011 the tax rate will remain €18 per hectolitre (Federal Government of Germany, 2010).

This means:

- 14.9 €/hl in 2008
- 18.0 €/hl in 2009
- 18.0 €/hl in 2010
- 18.0 €/hl in 2011

Biofuels used in farming machinery agricultural processes remain tax-exempt (Federal Government of Germany, 2010).

Besides offering exemptions from excise taxes, as stated in table below, **Poland** employs tax deductions for bio-component producers, which compensate up to 19 per cent of the amount by which the cost of producing bio-components exceeds the cost of producing fossil fuels.

In the **U.K.**, fuel suppliers are awarded certificates for each litre of biofuel they blend. These certificates are tradable and worth 20 pence per litre. Suppliers have to pay a penalty or buy-out price of currently 15 pence per litre, if they do not meet the requirement of the blending obligation. After March 31, 2011 the duty differential is scheduled to cease and the buy-out price will rise to 30 pence per litre. Despite the current lower tax rate for ethanol and biodiesel, the lack of suppliers and high manufacturing and distribution costs makes biofuels only marginally cheaper than standard fuels for the consumer. One tax-break for consumers is that owners of flex-fuel vehicles get a £20 (as of May 2010: €35) discount per year (around 10 per cent) on their road tax (Unites States Department of Agriculture, 2009a).

According to the statistics provided by the State Tax Inspectorate under the Ministry of Finance of the Republic of **Lithuania**, exemptions from the excise duty on biofuels for transport sold on the domestic market totalled €21.43 million in 2008. Exemptions from the excise duty were applied to 20,300 tonnes of pure ethanol blended with mineral fuels or as a compound of ethyl-tertiary-butyl-ether (ETBE) and to 42,400 tonnes of biodiesel (FAME) blended with diesel. The Government of Lithuania raised the excise duty on petroleum fuels

²⁰ Second generation biofuels are mainly made from non-edible feedstocks like wood and straw.

²¹ Member State report under Directive 2003/30/EC for the reporting year 2007 and 2008 – Germany.

by 12 per cent as from January 1, 2008 onwards. The excise duties on petrol and diesel were increased up to approximately €0.33 per litre (LTL 1,116/1,000 litres) and €0.27 per litre (LTL 947/1,000 litres) respectively in order to bring them in line with the minimum excise rates of the European Union.

The Netherlands introduced a tax-reduction scheme in 2006. However, its duration was limited to 2006. Since then the Netherlands have supported biofuels mainly by mandatory blending targets.

The last two countries that joined the European Union in 2007, **Romania** and **Bulgaria**, fully exempt ethanol from excise duties. In Bulgaria, biodiesel is also excise-tax exempt.

TABLE 4.5: FUEL EXCISE-TAX EXEMPTION ON BIODIESEL, COUNTRIES WITHOUT PRODUCTION QUOTA (€/HL)

	Excise tax on diesel 2007*	Exemption on biodiesel 2007*	Excise tax on diesel 2008**	Exemption on biodiesel 2008	Period of exemption	Granted for biodiesel from all origin
Austria	32.50	Full	37.50	Full	Until 30.09.2011	Yes
Bulgaria	n.a.	Full	30.67	Full	Since 2006	n.a.
Cyprus	n.a.	Full	24.50	Full	31.10.2006 - 31.12.2010	Yes
Czech Republic	31.11	Full	39.89	Full	n.a.	Yes
Denmark	35.49	Full	38.00	Full	2005 - 2011	n.a.
Estonia	24.54	Full	36.99	Full	1.5.2004 - 2010	Yes
Finland	31.9	No tax exemption	39.05	No tax exemption	n.a.	n.a.
Germany	47.04	Reduced rate for pure biodiesel outside the obligatory quota	47.04	Reduced rate for pure biodiesel outside the obligatory quota: 14.88	Until 31.12.2011	Yes
Greece	n.a.	n.a.	30.20	n.a.	n.a.	n.a.
Hungary	34.00	Full	35.00	Full	n.a.	Yes
Latvia	23.00	Full	33.00	Full	2007-2012	n.a.
Lithuania	24.37	Full	27.46	Full	Until 31.12.2010	Yes
Luxembourg	27.80	Pure biofuels only	30.54	n.a.	n.a.	n.a.
Malta	n.a.	Yes	35.24	n.a.	n.a.	n.a.
Netherlands	37.49	No exemption	37.49	No exemption		
Poland	29.75	26.00	29.84	29.55	01.01.2007 – 30.04.2011	Yes
Romania	n.a.	n.a.	28.39	No exemption	n.a.	n.a.
Slovakia	n.a.	n.a.	43.50	Full (though limited to 5% of blending)	From 01.05.2004	n.a.
Slovenia	n.a.	Proportionate to the percent of biofuels added but may not exceed 25% of excise duty paid	43.33	Proportionate to the percent of biofuels added but may not exceed 5% of excise duty paid	n.a.	n.a.
Spain	26.98	Full	33.10	Full	Until 2012	n.a.
Sweden	39.00	Full	39.00	Full	Until 31.12.2013	Yes
United Kingdom	68.06	28.90	68.43	25.12	Until 2010/2011	Yes

Sources: European Commission (2008d) and (2009f): Member State Reports, State Aid Database, European Commission (2009d): Excise duties. For data from 2007 Kutas et al. (2007).



TABLE 4.6: FUEL EXCISE-TAX EXEMPTION ON ETHANOL, COUNTRIES WITHOUT PRODUCTION QUOTA (€/HL)

	Excise tax on gasoline 2007*	Exemption on ethanol 2007*	Excise tax on gasoline 2008**	Exemption on ethanol 2008	Period of exemption	Granted for ethanol from all origin
Austria	44.50	Full	46.20	Full	1.10.2007 - 30.09.2011	Yes
Bulgaria	n.a.	n.a.	35.02	Full	Since 2006	n.a.
Cyprus	n.a.	Full	29.87	Full	31.10.2006 - 31.12.2010	Yes
Czech Republic	41.44	under consideration	47.46	Full	2009-2015	Pure or in high blends (E85, E95)
Denmark	52.39	3	55.68	Full	From 2005 for 6 years	n.a.
Estonia	n.a.	Full	39.80	Full	From 2005 for 6 years	
Finland	62.70	No tax exemption	62.70	No tax exemption	n.a.	n.a.
Germany	65.45	For biofuels exceeding obligatory quota: Full for E85	65.45	For biofuels exceeding obligatory quota: Full for E85	Until 2015	Yes
Greece	31.30	No tax exemption	41.00	n.a.	n.a.	n.a.
Hungary	41.40	Full	42.45	Full	n.a.	Yes
Latvia	27.00	Full	37.93	Full	2007-2012	n.a.
Lithuania	27.88	Full	32.36	Full	n.a.	Yes
Luxembourg	44.20	No tax exemption	46.46	n.a.	n.a.	n.a.
Malta	n.a.	yes	45.95	n.a.	n.a.	n.a.
Netherlands	66.81	No exemption	66.81	No exemption	n.a.	n.a.
Poland	39.12	39.00	44.56	44.28	01.01.2007-30.04.2011	Yes
Romania	n.a.	n.a.	33.57	Full	n.a.	n.a.
Slovakia	46.50	n.a.	46.50	Full (though limited to 7.05% of blending)	From 01.05.2004	n.a.
Slovenia	n.a.	Proportionate to the percent of biofuels added but may not exceed 25% of excise duty paid	46.21	Full	n.a.	n.a.
Spain	31.17	Full	42.47	Full	Until 2013	n.a.
Sweden	53.00	Full	53.00	Full	Until 2013	Yes
UK	68.06	28.90	68.43	25.25	Until 2010/2011	Yes

Sources: European Commission (2008d) and (2009f): Member State Reports, State Aid Database, European Commission (2009d): Excise duties. For data from 2007 Kutas et al. (2007).



4.1.2.2 EXCISE-TAX EXEMPTION ON BIOFUELS IN COMBINATION WITH PRODUCTION QUOTAS

In contrast to those tax-reduction systems described previously, five countries allow tax exemptions and reductions in combination with so-called production quotas. That is, tax reliefs are only granted up to a certain level of production. Quotas are intended to limit the amount of foregone tax revenue and hence the burden on taxpayers. In systems without a quota, an undefined amount of consumption is exempted or reduced from taxation. Foregone tax revenue then depends highly on levels of consumption and can heavily rise even without allowing more and higher tax exemptions.

The production quotas put in place in 2006 in Belgium are still valid (for a period of six years). In France, production quotas depend on the quantities necessary to meet the biofuel market-share targets (see section 4.1). As the targets are very ambitious and rise annually, the approved quantity quotas rise sharply every year as well. Since 2005, France has a strongly increasing production quota for biodiesel and ethanol. Starting with 417,000 tonnes for biodiesel in 2005, the quota rose annually up to 2,728,000 tonnes in 2009. For 2010 a biodiesel quota of 3,148,000 tonnes is planned. Quantities within the quota benefit from a partial tax exemption of €15 per hectolitre, down from € 25 per hectolitre in 2007. In 2010 the tax exemption will keep falling and amount to €11 per hectolitre.

TABLE 4.7 TAX EXEMPTION AMOUNTS FOR BIODIESEL, ETBE AND ETHANOL IN FRANCE

	Biodiesel (€/hl)	ETBE / Ethanol (€/hl)
2007	25	33
2008	22	27
2009	15	21
2010	11	18
2011	8	14

Source: French Member State report for the reporting year 2008.

The quotas for ethanol and ethanol used in the production of ETBE are considerably lower; however, the trend is comparable: 561,000 tonnes in 2007 and 1,091,000 tonnes in 2009 and 2010. Coming from €33 per hectolitre in 2007, tax exemptions for ethanol have also dropped to €21 per hectolitre in 2009 and €18 per hectolitre in 2010.

TABLE 4.8 ANNUAL QUOTA BENEFITING FROM TAX EXEMPTIONS IN FRANCE (IN 10³ TONNES)

	2005	2006	2007	2008	2009	2010
Biodiesel	417	677	1,343	2,478	2,728	3,148
ETBE	130	169	224	224	224	224
Ethanol	72	137	337	717	867	867

Source: French Member State report for the reporting year 2008.

Within the quota of 1,091,000 tonnes total for 2009, 224,000 tonnes are reserved for ethanol for ETBE. In 2008 production quotas are attributed through a call for tender published in the *Official Journal of the European Union*.

Italy has a four-year program (2007–10) specifying an annual quota and a tax reduction for biodiesel. Within an annual quota of 250,000 tonnes, the applied excise duty rate on biodiesel may be reduced to 20 per cent, meaning that during the reporting period the original excise duty for biodiesel used as a fuel of €423.00 per 1000 litres was reduced to €406.17 between March 20 and April 30, 2008. The level of this tax reduction may be recalculated depending on the relative costs of diesel and biodiesel in the future. Reduced rates of excise duties on specified fuels and additives obtained from ethanol are provided within a three-year incentive program. The tax-reduced quota is shared among producers as a proportion of their actual production figures, so that only a fraction of each producer's total biodiesel output will benefit from the tax reduction. According to the letter of the European Commission concerning State aid N 326/07 on Italy's tax reduction for biodiesel, Italy introduced an obligation to release biofuels into the Italian market in 2007. A penalty in case of non-compliance was added as of January 1, 2008. The penalty has been fixed as €600 per missing certificate for the release of biodiesel. For ethanol and bio-ETBE, Italy applies tax reductions as well.²² Information on the quota for ethanol could not be found.

No changes in the tax system have been introduced in **Ireland**. Biodiesel and ethanol are fully tax exempt within the respective quota systems.

TABLE 4.9: FUEL EXCISE-TAX EXEMPTION ON BIODIESEL AND ETHANOL, COUNTRIES WITH PRODUCTION QUOTA (€/HL)

	Excise tax on fossil fuels 2007*	Exemption on biofuels 2007*	Quota (tonnes) 2007*	Excise tax on fossil fuels 2008**	Exemption on biofuels 2008	Period of exemption	Quota (tonnes) 2008	Final excise tax pure biofuel 2008	Final excise tax blended biofuels 2008
BIODIESEL									
Belgium	16.31	Full	251,680 until 09/07	35.29	Full	6 years	334,346	0	n.a.
France	42.84	25.00	1,343,000	42.84	15.00	6 years	2,728,000	27.84	-
Italy	41.95	33.56	250,000	42.30	33.84	01.01.2007-31.12.2010	250,000	8.46	-
Ireland	36.80	Full	52800	36.80	Full	Until 2010	52,800	0	-
Portugal	n.a.	n.a.	n.a.	36.44	n.a.	n.a.	n.a.	n.a.	n.a.
ETHANOL									
Belgium	35.30	Full	37,884	61.36	Full	6 years	195,409	0	n.a.
France	60.69	33.00	561,000	60.69	21.00	6 years	1,091,000	39.69	-
Italy	56.40	27.50	No	56.40	27.50	01.01.2008-31.12.2010	n.a.	28.90	n.a.
Ireland	44.27	Full	67,087	44.37	Full	Until 2010	67,087	0	-
Portugal	n.a.	n.a.	n.a.	36.44	n.a.	n.a.	n.a.	n.a.	n.a.

Sources: European Commission (2008d) and (2009f); Member State Reports, State Aid Database, European Commission (2009d); Excise duties. For data from 2007 Kutas et al. (2007).

4.1.2.3 ASSESSING THE COST OF EXCISE-TAX EXEMPTIONS

Tax reliefs represent the largest share of all financial support for biofuels in the EU by far. These measures, of course, imply high fiscal losses for governments granting the exemptions. As the EU steadily increases the target on the biofuel share among all fuels, the revenue losses are likely to keep rising. In fact, one can observe that in recent years the overall amount of lost revenue remained almost stable, although tax exemption rates

²² State aid case N63/2008 – Italy.

have declined on average. In order to limit the costs of tax exemptions, some five countries have introduced quotas. Germany, however, employs a so-called hybrid system: tax reliefs are granted only if the share of biofuel exceeds the obligatory share.

Assessing the cost of tax exemptions allows a clear picture of the quantity of support for biofuels both on the national as well as on the aggregated EU level. We carried out calculations on fore-gone tax revenue for 2007 and 2008 based on the quantity of biofuels consumed and the respective tax exemptions (Table 4.10 and Table 4.11). Of course, this method of calculation has an obvious drawback: it is based on the assumption that the amount of biofuels consumed would be unchanged, if the tax reliefs were not in force. However, as did Kutas et al. (2007), we believe that the calculations still serve as an appropriate indicator for the cost of supporting biofuels through tax reliefs.

The total amount of lost tax revenue in the EU amounted to €2.76 billion and €2.8 billion in 2007 and 2008, respectively. Compared with €2.96 billion in 2006, support through tax relief has only slightly declined. This was the case, even though tax exemption rates tended to be reduced in most countries. Stable total amounts of support, despite declining exemption rates, can be explained by sharply increasing volumes consumed.

TABLE 4.10: ESTIMATED COST OF EXCISE TAX EXEMPTION IN EU (2007)

2007	ETHANOL			BIODIESEL & PURE PLANT OIL			TOTAL COST
	Quantities (litres)	Exemption (€/l)	Loss of fiscal revenues (€)	Quantities (litres)	Exemption (€/l)	Loss of fiscal revenues (€)	
Austria	33,888,291	0.45	15,080,289	252,915,253	0.33	82,197,457	97,277,747
Belgium	0	0.00	0	115,190,400	0.16	0	0
Bulgaria	0	0.00	0	2,524,444	0.00	0	0
Cyprus	0	0.00	0	946,667	0.00	0	0
Czech Republic	227,664	0.00	0	35,453,298	0.31	11,029,521	11,029,521
Denmark	10,219,147	0.03	306,574	0	0.35	0	306,574
Estonia	25,736	0.00	0	628,587	0.25	154,255	154,255
Finland	3,355,570	0.00	0	145,156	0.00	0	0
France	538,663,070	0.33	177,758,813	1,532,590,222	0.25	383,147,556	560,906,369
Germany	42,197,039	0.65	27,617,962	2,786,884,427	0.47	1,310,950,434	1,338,568,396
Greece	0	0.00	0	102,545,458	0.00	0	0
Hungary	53,451,563	0.41	22,128,947	2,524,444	0.34	858,311	22,987,258
Ireland	10,096,406	0.44	4,469,679	21,836,444	0.37	8,035,812	12,505,491
Italy	0	0.00	0	171,510,756	0.38	65,517,109	65,517,109
Latvia	7,919	0.27	2,138	2,147,040	0.23	493,819	495,957
Lithuania	22,831,736	0.28	6,365,488	53,118,098	0.24	12,944,880	19,310,368
Luxembourg	2,369,686	0.00	0	53,038,578	0.00	0	0
Malta	0	0.00	0	2,288,409	0.00	0	0
Netherlands	174,212,500	0.00	0	281,475,556	0.00	0	0
Poland	142,537,500	0.39	55,589,625	31,555,556	0.26	8,204,444	63,794,069
Portugal	0	0.00	0	170,348,249	0.00	0	0
Romania	0	0.00	0	50,488,889	0.00	0	0
Slovakia	23,756,250	0.00	0	97,191,111	0.00	0	0
Slovenia	1,571,872	0.00	0	16,416,462	0.00	0	0
Spain	257,359,375	0.31	80,218,917	326,915,556	0.27	88,201,817	168,420,734
Sweden	360,786,169	0.53	191,216,669	160,097,742	0.39	62,438,119	253,654,789
United Kingdom	154,265,169	0.29	44,582,634	341,552,284	0.29	98,708,610	143,291,244
TOTAL	1,831,822,661		625,337,736	6,612,329,084		2,132,882,145	2,758,219,882

Sources: European Commission (2008d) and (2009f): Member State Reports, State Aid Database, European Commission (2009d): Excise duties. For data from 2007 Kutas et al. (2007).



Total consumption of all biofuels (biodiesel, ethanol, pure plant oil) rose by 14 per cent between 2006 and 2007 and by 35 per cent between 2007 and 2008.

In both 2007 and 2008, the costs for the support of biodiesel were roughly four times that of ethanol. In particular, in 2008 (2007) tax reliefs for biodiesel amounted to €2.04 billion (€2.13 billion), whereas it was €0.77 billion (€0.63 billion) for ethanol.

In 2007, Germany's foregone tax revenue represented almost half (€1.34 billion) of the total amount in the EU. However, due to its hybrid support system and lower exemption rates for biodiesel, Germany's tax relief declined considerably in 2008, to €0.59 billion. It nevertheless accounted for the largest share of tax reliefs in both 2007 and 2008.

Close behind Germany were France, Sweden and Spain. Italy jumped up from €0.07 billion in 2007 to €0.23 billion in 2008. Consequently, it ranked among the biggest supporters of biofuels through tax reliefs in 2008.

TABLE 4.11: ESTIMATED COST OF EXCISE TAX EXEMPTION IN EU (2008)

2008	ETHANOL			BIODIESEL & PURE PLANT OIL			TOTAL COST
	Quantities (litres)	Exemption (€/l)	Loss of fiscal revenues (€)	Quantities (litres)	Exemption (€/l)	Loss of fiscal revenues (€)	
Austria	107,760,330	0.46	49,785,272	251,019,396	0.38	94,132,273	143,917,546
Belgium	24,724,317	0.00	0	108,739,182	0.35	0	0
Bulgaria	12,289,900	0.35	4,303,923	37,124,480	0.31	11,386,078	15,690,001
Cyprus	0	0.30	0	17,898,311	0.25	4,385,086	4,385,086
Czech Republic	64,203,245	0.00	0	95,654,987	0.00	0	0
Denmark	8,520,575	0.56	4,744,256	0	0.38	0	4,744,256
Estonia	2,876,486	0.40	1,144,841	3,505,191	0.37	1,296,570	2,441,412
Finland	146,106,877	0.00	0	14,441,084	0.00	0	0
France	798,823,703	0.21	167,752,978	2,550,559,822	0.15	382,583,973	550,336,951
Germany	0	0.65	0	1,831,719,218	0.32	589,080,900	589,080,900
Greece	0	0.00	0	95,524,978	0.00	0	0
Hungary	77,287,000	0.42	32,808,332	102,240,000	0.35	35,784,000	68,592,332
Ireland	0	0.44	0	50,488,889	0.37	18,579,911	18,579,911
Italy	35,238,438	0.00	0	703,411,200	0.33	228,608,640	228,608,640
Latvia	35,634	0.38	13,516	2,432,302	0.33	0	13,516
Lithuania	30,984,089	0.32	10,027,691	57,764,338	0.27	15,863,820	25,891,511
Luxembourg	1,825,272	0.00	0	52,917,404	0.00	0	0
Malta	0	0.00	0	1,216,782	0.00	0	0
Netherlands	257,359,375	0.00	0	258,755,556	0.00	0	0
Poland	235,174,997	0.44	104,124,917	429,862,400	0.30	127,045,691	231,170,608
Portugal	0	0.00	0	167,684,960	0.00	0	0
Romania	0	0.34	0	75,985,778	0.00	0	0
Slovakia	12,968,933	0.47	6,030,554	73,297,244	0.44	31,884,301	37,914,855
Slovenia	4,691,859	0.46	2,168,108	28,090,756	0.00	0	2,168,108
Spain	247,460,938	0.42	105,096,660	655,093,333	0.33	216,835,893	321,932,553
Sweden	423,589,775	0.53	224,502,581	163,947,520	0.39	63,939,533	288,442,114
United Kingdom	208,241,348	0.25	52,580,940	872,618,400	0.25	218,154,600	270,735,540
TOTAL	2,700,163,091		765,084,569	8,701,993,511		2,039,561,271	2,804,645,840

Sources: European Commission (2008d) and (2009f): Member State Reports, State Aid Database, European Commission (2009d): Excise duties. For data from 2007 Kutas et al. (2007).

4.1.3 OUTPUT PAYMENTS

SUPPORT FOR CRISIS DISTILLATION

European Union wine farmers produce roughly 2.6 billion litres of unwanted and unsold wine every year. This surplus production has the potential to depress wine prices (EURPOPA Press Releases, 2006). One way the EU supports ethanol production is to subsidize distillation of surplus wine. Some of the resulting ethanol is used as a fuel. In the 2007 report it was expected that distillation support would be abolished by 2008 (Kutas et al., 2007). This turned out to be an optimistic projection. The latest EU regulations on “Common Market Organisation for Wine” (479/2008, 555/2008) still contain support to distillation of wine surpluses.²³

However, support for crisis distillation is guaranteed until July 31, 2012 only. Until then, the distillation subsidies will be gradually withdrawn. Regulation 479/2008 requires all alcohol resulting from the supported distillation to be used exclusively for either industrial or energy purposes—e.g., the production of biofuels. Resulting alcohol may not be used for potable alcohol.

4.2 POLICIES AFFECTING COSTS OF INTERMEDIATE INPUTS

The feedstock for biofuels production, which is cultivated in the EU, is not subject to specific subsidies anymore. In the course of the Common Agricultural Policy (CAP) reform, which was adopted by the EU farm ministers in 2003, the modalities of agricultural support were revised considerably. While the total level of support remained basically untouched, the reform “decoupled” the direct aid to farmers: it delinked the vast majority of the subsidies from the production volume to enhance independence of farmers’ decisions from subsidy measures.²⁴ Due to this “decoupling,” it is not appropriate to include these payments in the conducted estimation (Kutas et al., 2007).

What remains is an intervention price mechanism that still guarantees a minimum price of €101.31 per tonne including monthly varying adoptions for most of the cereals. Hence, it also affects commodities that are required for the production of biofuels (European Council Regulation No 1784/2003).

The EU market of the feedstock for ethanol and biofuel production is still protected from tariffs. The MFN-bound tariffs as well as the tariff-rate quotas, which are applied on wheat, barley and rye, are listed in Table 4.12.

Rye and corn face variable tariffs: the rates of duty are calculated on the basis of the difference between 155 per cent of the effective EU intervention price for cereals, including monthly increments, and the representative CIF import price for cereals (EUROPA Press release, 2007b). In March 2010 rye faced a specific-rate tariff of €36.84 per tonne and corn one of €17.08 per tonne.

In December 2007 the EU temporarily suspended the import tariffs on almost all of the cereals listed in Table 4.12 in response to the high price level on cereals and the tight situation in the cereal markets. In October 2008, Mariann Fischer Boel, Commissioner for Agriculture and Rural Development imposed the duties on cereals, citing the decreasing prices for cereals (EUROPA Press Releases, 2008).

²³ European Council Regulation No 479/2008 and Commission Regulation No 555/2008.

²⁴ European Commission DG for Agriculture and Rural Development, CAP Reform.

TABLE 4.12: THE EU'S MFN-BOUND TARIFF ON FEEDSTOCK INTENDED FOR BIOFUELS

CN code and description	MFN bound tariff	Tariff rate quota with reduced tariffs
Feedstock for ethanol production		
1001 90 99 <i>wheat (medium and low quality)</i>	€ 95/ tonne	US: 572,000 tonnes CA: 38,853 tonnes Other: 2,378,387 tonnes import duty: € 12/ tonne
1002 00 00 <i>rye</i>	variable tariffs max. tariff is € 93	no
1003 00 90 <i>barley</i>	€ 93/ tonne	306,215 tonnes import duty: € 16/ tonne
1005 90 00 <i>corn</i>	variable tariffs max. tariff is € 94/ tonne	500 000 tonnes to be imported into Portugal 200 000 tonnes to be imported into Spain
1212 91 80 <i>sugar beet</i>	€ 67/ tonne	no
1212 99 20 <i>sugar cane</i>	€ 46/ tonne	no
Feedstock for biofuel production		
Oilseeds <i>(rape, sunflower, soybeans)</i>	free	no

Source: TARIC database, European Commission Regulation No 948/2009.

4.3 SUPPORT FOR VALUE-ADDED FACTORS

4.3.1 ELIMINATION OF THE ENERGY CROPS SCHEME AND THE SET-ASIDE REQUIREMENT

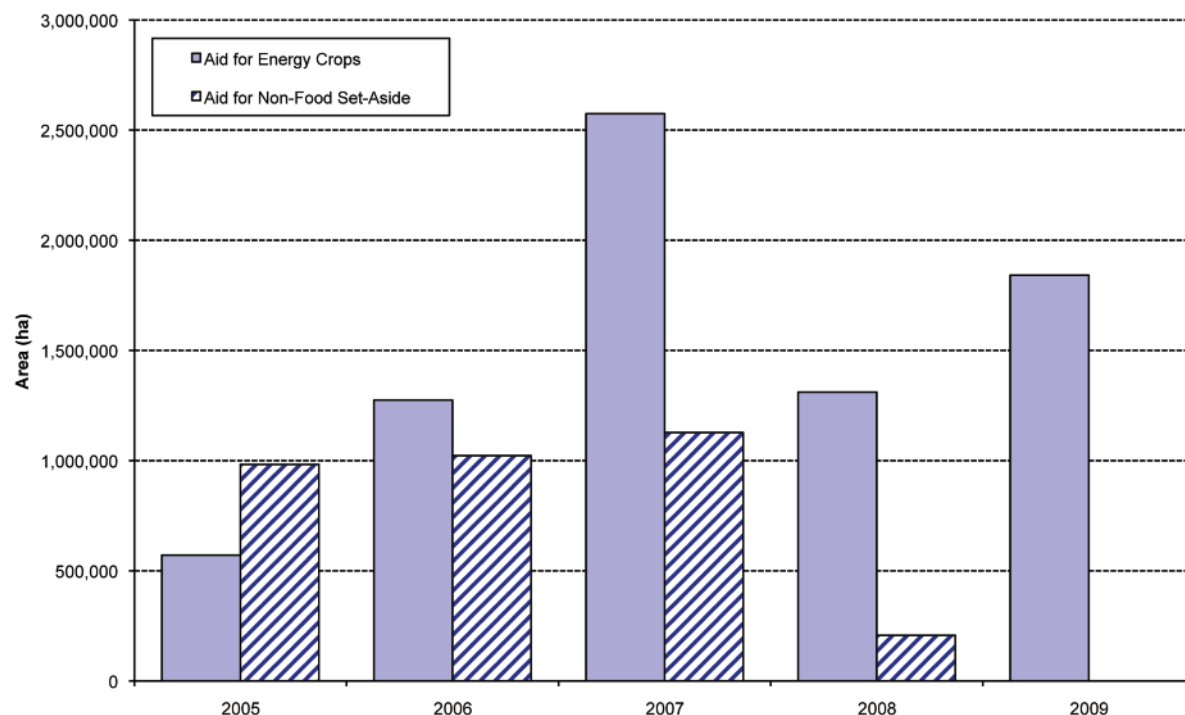
Until 2008 farmers could profit from two types of assistance to value-adding factors: payments for energy crops grown on set-aside land and payments under the Energy Crops Scheme (Kutas et al., 2007). The non-food **set-aside requirement**, originally designed to reduce agricultural surpluses, obliged farmers to set aside 10 per cent of their arable land in order to receive support payments. However, beneficiaries of the set-aside compensatory payments could still produce non-food crops (e.g., oilseed rape). Therefore, the set-aside requirement was de facto favouring energy crops—the share of energy crops in set-aside areas was 95 per cent in 2006. Due to the market situation in 2007, having seen a sharp increase in cereal prices, the set aside rate was set at 0 per cent for the year 2008 (for all crops planted in autumn 2007 and spring 2008). The area for bio-energy on set-aside land dropped from 1.1 million hectares in 2007 to 0.2 million in 2008. The major part of farmland set aside was used for oilseeds for biodiesel production (around 80 per cent). With €63 per tonne and an average yield of 4.6 tonnes per hectare in 2007/2008, the set aside payment was worth approximately €290 per hectare (European Commission, 2010a). The Health Check of the Common Agricultural Policy the EU agriculture ministers reached a political agreement on November 20, 2008 to abolish set-aside requirement starting January 2009.

Under the EU's Energy Crops Scheme, farmers could receive up to €45 per hectare for land that is used to grow energy crops. From 2007, all new Member States (including Romania and Bulgaria) were eligible for aid for energy crops, so the maximum guaranteed area has been expanded from 1.5 to 2 million hectares. In 2007, the area that a farmer could claim for special aid for energy crops was reduced, because the Maximum Guaranteed Area of 2 million hectares had been exceeded by 0.55 million hectares. With a total budget of €90 million the eligible area had to be reduced by a coefficient of 0.78 meaning that farmers received the €45 per hectare only for 78 per cent of the land on which they claimed the aid. The last year for which farmers could receive the Energy Crop Premium was 2009. In 2008 and 2009 the Maximum Guaranteed Area of 2 million hectares was not reached: in 2008 farmers claimed the aid for 1.3 million hectares, and, in 2009 they claimed aid for 1.84 million hectares of land. The distribution concerning the raw material was similar to the energy crops in set-aside areas: around 70–80 per cent of the crops were oil seeds used for biodiesel production (European Commission, 2010b).

TABLE 4.13: CULTIVATION OF ENERGY CROPS AND ASSOCIATED COSTS, 2007–2008

Member State	Areas under aid for energy crops (ha)		Estimated associated costs (€)	
	2007	2008	2007	2008
Austria	17,484	20,565	611,270	925,417
Belgium	8,920	3,652	311,854	164,327
Bulgaria	39,148	0	1,368,647	0
Cyprus	0	0	0	0
Czech Republic	44,065	29,056	1,540,537	1,307,503
Denmark	56,090	24,473	1,960,960	1,101,273
Estonia	11,382	19,521	397,934	878,437
Finland	16,412	14,677	573,792	660,476
France	717,973	440,728	25,100,957	19,832,753
Germany	639,276	412,039	22,349,643	18,541,742
Greece	0	0	0	0
Hungary	89,209	19,809	3,118,814	891,421
Ireland	5,137	0	179,598	0
Italy	36,357	14,380	1,271,073	647,107
Latvia	43,800	17,027	1,531,293	766,205
Lithuania	149,142	68,620	5,214,142	3,087,918
Luxembourg	331	258	11,561	11,614
Malta	0	0	0	0
Netherlands	1,044	521	36,492	23,454
Poland	112,573	44,790	3,935,637	2,015,554
Portugal	11,883	2,621	415,442	117,938
Romania	27,012	38,954	944,378	1,752,931
Slovakia	80,754	54,815	2,823,241	2,466,669
Slovenia	2,437	991	85,206	44,573
Spain	184,980	9,283	6,467,071	417,724
Sweden	46,364	19,090	1,620,917	859,045
United Kingdom	232,533	54,870	8,129,542	2,469,137
Total	2,574,306	1,310,738	90,000,000	58,983,216

Sources: European Commission (2010a), and calculations by the authors.

FIGURE 4.5: AREA UNDER THE ENERGY CROP SCHEME AND SET-ASIDE REQUIREMENT

Source: European Commission, DG Agriculture and Rural Development

4.3.2 PROGRAMS TO SUPPORT CAPITAL FORMATION IN THE INDUSTRY: RECENT DEVELOPMENTS

Subsidies and investment aids for capital used to produce biofuels are granted in many EU Member States. Usually, support is provided as a certain share of the investment costs necessary to produce biofuels. The definition of eligible costs and the percentage share being covered differs between, and often even within, countries. Investment aids are provided by many different institutions and on different levels of administration, often even on local policy levels.

Some Member States have established environmental agencies, which operate and manage investment grants, other States' programs are administered by ministries—on both the federal and sub-national levels. Additionally, programs are established to reach a wide field of different aims. Many measures do not primarily aim at boosting biofuel production, but, for example, seek to strengthen the agricultural sector or wish to support underdeveloped areas. Supporting different sectors or areas by granting investment for biofuel facilities, hence, provides opportunities to “kill two birds with one stone.” However, the variety of different sorts of grants, institutions providing aid and intended goals unfortunately makes it impossible to deliver a complete list of measures in the Member States or to give an acceptable estimate of the overall amount on subsidies spent for investments in the European Union.

Since 2007, **Austria** introduced its new Rural Development Programme, which runs from 2007 to 2013. The scheme is based on a Council regulation (No 1698/2005), which provides guidelines for supporting rural development in the Union and was approved by the Commission in 2007. The measure allows investment grants for operators of biofuel production facilities as long as the facility is mostly owned by farmers (the main



target beneficiaries supported of the Rural Development Programme). Unfortunately, the authors were not able to identify the value of the grants spent under this scheme.²⁵

Denmark enforces its efforts to develop second-generation biofuel technologies by earmarking a special fund of DKK200 million (January 2010: €26.8 million) as a subsidy to co-finance large-scale private biofuel demonstration projects. In 2009 the fund was entirely allocated to private firms. Subsidized projects mainly cover the capital costs of new demonstration projects, but also research expenses.²⁶

Germany's federal Ministry for the Environment set up a support program to enforce the energetic use of biomass. To increase the share of biofuels in transport, the program covers grants for R&D projects as well as pilot and demonstration plans. Investment aid is granted to private companies and local municipalities for up to 50 per cent of eligible costs. The share of grants directly allocated to biofuel projects cannot be identified as the program covers other areas of biomass support as well and figures are only published for the program as a whole. The support measure expires by December 2012.²⁷ Furthermore, Germany introduced a grant scheme to support demonstration projects for the use of renewable energy. The measure was approved by the European Commission in 2005 and will run through December 2010. Under the measure, operators of demonstration plants are granted direct investment aid. The annual budget was estimated to be €8 million.²⁸

The **Dutch** government allocated €60 million between 2006 and 2010 to encourage the development of innovative biofuels. Criteria for projects include the greatest possible reduction in CO₂ emissions and market viability.²⁹

In **Poland**, resources allocated to the production of renewable energy sources are mainly derived from the National Environmental Protection and Water Management Fund and several provincial, district and municipal environmental protection and water-management funds. These funds are accumulated out of charges and fines from entities that have failed to comply with environmental laws. Under the terms of the Environmental Protection Act, these funds are intended to support the use of renewable energy sources and the introduction of more environmentally benign energy carriers. The EcoFund Foundation was established in 1992 to manage funds allocated from government-secured debt for the purpose of eco-innovation and environmental protection projects. The provision of state aid for renewable energy sources is governed by the Decree of the Minister for the Environment of January 16, 2008. The Long-Term Project for the Promotion of Biofuels or Other Renewable Fuels (Resolution No 134/2007) also implements investment aids. For example, investment projects involving the construction of plants producing biofuel components or liquid fuels are supported under this program. Also, projects involving innovative technology for energy production can apply for funding. The maximum amount of a grant is PLN40 million. Under the 2007–2013 Rural Development Programme, aid to investments in bio-component production is provided for increasing the added value of basic agricultural and forestry production.³⁰

In order to achieve the EU biofuel reference value of 5.75 per cent of all fuel on the market by 2010, **Sweden** set up an investment grant scheme to increase the number of filling stations operating biofuels. Investment grants are given to costs that exceed the costs of the cheapest biofuel filling station investment, which is today the installation of an ethanol pump. Some 30 per cent of eligible costs—extra costs compared with an ethanol pump—were being granted. The scheme, which expired in December 2009, had an overall budget of approximately €16.4 million over 4 years.³¹

²⁵ Austrian environment agency <http://www.umweltbundesamt.at> and <http://land.lebensministerium.at>.

²⁶ Member State report under Directive 2003/30/EC for the reporting year 2008 – Denmark.

²⁷ The German Federal Ministry for the Environment (www.bmu.de) and www.erneuerbare-energien.de.

²⁸ State aid cases N175a/2005 and N175b/2005 – Germany.

²⁹ Member State report under Directive 2003/30/EC for the reporting year 2008 – the Netherlands.

³⁰ Member State report under Directive 2003/30/EC for the reporting year 2008 – Poland.

³¹ State aid cases N 413/2006 – Sweden and N 410/2007 – Sweden.

The **United Kingdom** runs several investment support measures. Among them is the Regional Selective Assistance (RSA) scheme, which supported a private business named “Argent Energy Limited” by providing assistance towards investment costs around £8 million (February 2010: ca €9 million) out of a total investment of around £15 million. The supported plant produces biodiesel from a variety of raw materials and is able to produce almost 50 million litres of biodiesel per year if running at full capacity.³² All in all, according to the U.K.’s latest Member State report, the British government has so far invested around £800 million (February 2010: ca. €910 million) in capital grants and R&D in the field of renewable energies. This report has not been able to identify the amount of capital grants in biofuel production.

4.4 GENERAL SERVICES

4.4.1 ANY NEW EUROPEAN FRAMEWORK PROGRAMMES

Over the last few years transport biofuels have become a priority in the EU policy, as a significant research budget of €347 million in 2007 shows. Due to uncertainties concerning the potential negative impacts of first-generation biofuel production on food prices and the environment, especially biofuels produced from non-edible plants (second-generation biofuels) are being given priority (European Commission, 2009b).

At the community level, the Seventh Framework Programme for Research and Technological Development (FP7) is the key instrument to provide funding for research and innovation. In order to complement the FP7, whose energy component concentrates on research, development and demonstration, the Intelligent Energy – Europe II Programme (IEE II) has been designed. The IEE II is a sub-program of the Competitiveness and Innovation Programme (CIP) and focuses on projects involving the best available energy technologies and non-technological actions (Intelligent Energy, 2008).

FP7 started in 2007 and will last until 2013. Its total budget of €53.2 billion represents a substantial rise compared with the previous Framework Programmes.³³ The FP7 is organized into five major categories. Projects related to biofuels can be found in various subsections, which are allocated in the category “Cooperation” (to which two-thirds of the overall budget is assigned). Subsections of major importance for biofuels are:

- Food, Agriculture and Fisheries, and Biotechnology
- Energy
- Environment
- Transport³⁴

Most of the projects relating to biofuels, however, are assigned to “Energy,” especially to the part of “Renewable fuel production” that puts emphasis on “new types of biofuels, in particular for transport and electricity as well as on new production, storage and distribution routes for existing biofuels, including the integrated production of energy and other added-value products through biorefineries.”³⁵

Table 4.15 shows that, during the first half of FP7, 16 projects concerning the specific area of biodiesel and ethanol have been approved for a total cost of €84.7 million. The financial contribution of the EU amounts to €45 million. When evaluating these expenditures, one has to take into consideration that there may be more calls for proposals in this area before FP7 expires. However, by now there is a strong indication that

³² Regional Selective Assistance: www.rsascotland.gov.uk..

³³ Seventh Framework Programme.

³⁴ Seventh Framework Programme.

³⁵ Seventh Framework Programme.

funding related to biofuel under FP7 will by far exceed that of FP6. Table 4.15 shows that, in addition to the projects approved under FP7, there are some relevant projects in the biofuel areas initiated under FP6 that are still ongoing after 2007. The total cost of these projects are €56.6 million. The financial participation of the EU amounts to €28.3 million.

TABLE 4.14: LIST OF PROJECTS IN THE BIOFUEL AREAS UNDER THE SEVENTH FRAMEWORK

Project	Date	Total cost (€)	EU contribution (€)
AQUAFUELS Algae and aquatic biomass for a sustainable production of 2nd generation biofuels	01/2010 - 06/2011	869,001	747,152
BIOMAP Development of time-enabled mapping and dissemination tool for biofuels projects	08/2008 - 08/2010	765,430	538,782
BIOFUELSTP European biofuels technology platform secretariat	04/2009 - 03/2012	974,800	463,065
DIBANET The production of sustainable Diesel-Miscible-Biofuels from the residues and wastes of Europe and Latin America	07/2009 - 12/2012	4,840,000	3,730,000
CANEBIOFUEL Conversion of sugar cane biomass into ethanol	03/2009 - 02/2011	2,490,000	1,660,000
OPTFUEL Optimized fuels for sustainable transport in Europe	01/2009 - 06/2012	13,480,000	7,920,000
2NDVEGOIL Demonstration of 2nd generation vegetable oil fuels in advanced engines	08/2008 - 07/2011	3,480,000	2,180,000
BABETHANOL New feedstock and innovative transformation process for a more sustainable development and production of lignocellulosic ethanol	05/2009 - 04/2013	4,300,000	3,170,000
ECODIESEL High efficiency biodiesel plant with minimum GHG emissions for improved fame production from various raw materials	01/2008 - 12/2011	8,990,000	4,970,000
BIOREF-INTEG Development of advanced biorefinery schemes to be integrated into existing industrial fuel producing complexes	06/2008 - 05/2010	1,450,000	995,082
BIODME Production of DME from biomass and utilisation as fuel for transport and for industrial use	09/2008 - 08/2012	28,260,000	8,200,000
HYPE High efficiency consolidated bioprocess technology for lignocellulose ethanol	10/2008 - 09/2012	5,430,000	3,660,000
BIOTOP Biofuels assessment on technical opportunities and research needs for Latin America	03/2008 - 08/2010	1,290,000	986,562
SUSTOIL Developing advanced Biorefinery schemes for integration into existing oil production/transesterification plants	06/2008 - 05/2010	1,010,000	992,197
SUPER METHANOL Reforming of crude glycerine in supercritical water to produce methanol for re-use in biodiesel plants	01/2008 - 12/2011	3,000,000	2,090,000
GREENSYNGAS Advanced cleaning devices for production of green syngas	01/2008 - 02/2011	4,090,000	2,720,000
Total FP7		84,719,231	45,022,840

Note: only projects related to energy research, renewable fuel production under FP7 are listed. Categories: 3.1 First generation biofuel from biomass, 3.2 Second generation fuel from biomass, 3.3 Biorefinery, 3.4 Biofuels from energy crops, 3.5 Alternative routes to renewable fuel production, 3.6 Biofuel use in transport, 3.7 Cross-cutting issues. For more information, see http://cordis.europa.eu/fp7/energy/about-fuel_en.html.

Source: Seventh Framework Programme, Energy Research, Renewable Fuel Production: <http://cordis.europa.eu/fp7>.



TABLE 4.15: RELEVANT PROJECTS IN THE BIOFUEL AREAS UNDER THE SIXTH FRAMEWORK PROGRAMME ON-GOING AFTER 01/2007

Project	Date	Total cost (€)	EU contribution (€)
BIO-ETOH energy and cost reductions in production of fuel ethanol from biomass through membrane technology	04/2004 - 10/2007	6,840,000	1,710,000
BIOFUELTP Biofuels Technology Platform Secretariat	04/2005 - 09/2007	650,360	490,360
GREASOLINE new technology for conversion of waste fats to high-quality fuels	07/2005 - 07/2007	2,000,000	1,040,000
FLEXFUEL demonstration of a flexible plant processing organic waste, manure and/or energycrops to bio-ethanol and biogas for transport	07/2004 - 12/2007	12,750,000	3,740,000
NILE new improvements for ligno-cellulosic ethanol	10/2005 - 10/2009	12,460,000	7,520,000
NOE-BIOENERGY overcoming barriers to bioenergy	01/2004 - 01/2009	8,050,000	8,050,000
SOLVSAFE advanced safer solvents for innovative industrial eco-processing	03/2005 - 03/2009	9,890,000	5,700,000
Total FP6 (ongoing after 01/2007)		52,640,360	28,250,360

Source: Kutas et al. (2007), p. 60.

The Intelligent Energy – Europe II Programme (IEE II) started in 2007 and will continue through 2013. The IEE II Programme intends (amongst other things) to promote measures that foster new and renewable energy sources as well as its use in transport (Intelligent Energy, 2008, p. 6).

Most projects related to biofuels are supported under ALTENER: New and renewable resources. The program aims at fostering the propagation of sustainable types of biodiesel, alcohols, biogas and bio-additives in order to reduce the use of fossil fuels in transport and realizing future EU targets. Other projects related to biofuel should be embodied under STEER: Energy in transport. One of STEER's key actions is to stimulate the demand for alternative fuels and clean vehicles and thereby complement actions under ALTENER. Table 4.16 lists all projects, which have been approved under IEE I and were still ongoing after 2007 as well as the ones that have been approved under IEE 2. Nineteen projects relating to biofuels and alternative fuels are listed in Table 4.16. The support of the EU amounts to €13.2 million.

It is likely that additional projects related to biofuels will be approved in the near future; however, details of these projects are still under negotiation, which is why they are not listed.

TABLE 4.16: BIOFUEL PROJECTS UNDER ALTENER AND STEER (ALTERNATIVE FUELS AND BIOFUELS)

Project	Date	Total cost (€)	EU contribution (€)
<i>Alternative fuels</i>			
BioMotion Biofuels in Motion information, motivation and conversion strategies for biofuels with consideration of the special regional structures	09/2007 - 04/2010	986,418	493,209
ALTER-MOTIVE Deriving effective least-cost policy strategies for alternative automotive concepts and alternative fuels	10/2008 - 03/2011	1,364,475	1,023,356
BIOSIRE Biofuels and electric propulsion creating sustainable transport in tourism resorts	09/2008 - 08/2011	1,685,020	1,263,765
<i>Biofuel</i>			
ADORE IT Adolescence for renewable energies in transport	09/2008 - 08/2011	822,724	617,043
PROBIO Integrated promotion of the biofuel chain	01/2007 - 06/2009	965,121	472,909
BIONIC Biofuels networks in the community	11/2007 - 10/2010	1,406,284	703,142
PROCURA Green fleet procurement models	01/2006 - 12/2008	1,748,546	856,788
REFUEL Renewable fuels for Europe	01/2006 - 03/2008	1,836,570	918,285
COMPRO Common procurement of collective and public service transport clean vehicles	01/2007 - 12/2009	1,593,594	796,797
Bio-NETT Developing local supply chain networks, linking bio-fuel producers with public sector users	01/2006 - 08/2008	1,148,305	574,153
BIOFUEL MARKETPLACE Web-based biofuel marketplace for supporting the e-Commerce of biofuel products and technologies	01/2006 - 12/2008	792,014	396,007
MAGALOG Marine gas fuel logistics	01/2007 - 12/2008	1,257,745	628,873
Carbon Labelling Carbon/efficiency labelling & bio-blending for optimising benefits of biodiesel & additive use	10/2006 - 09/2008	808,726	404,363
BIODIENET Developing a network of actors to stimulate demand for locally produced biodiesel from used cooking oils	01/2007 - 12/2009	1,564,359	782,180
ELOBIO Effective and low-disturbing biofuel policies	11/2007 - 04/2010	1,040,383	520,192
STAR BUS Promoting sustainable energetic pathways for buses' fleet	01/2006 - 12/2008	1,407,194	703,597
BIODIESEL CHAINS Promoting favourable conditions to establish biodiesel market actions	01/2006 - 12/2007	759,995	379,998
Pro-Biodiesel Overcoming Non-Technological Barriers for full-scale use of Biodiesel in Europe	01/2006 - 12/2007	772,244	386,122
SUGRE Sustainable Green Fleets	01/2006 - 12/2008	2,580,588	1,290,294
Total IEE		24,540,305	13,211,071

Source: Intelligent Energy Projects.



4.4.2 NATIONAL RESEARCH PROGRAMS

In 2006 the **Danish** Government decided to foster the development of second-generation fuel technologies with a special fund of almost €27 million paid out through Energy Technology and Demonstration Programme (EUDP) grants. The EUDP was created in 2007 to promote the development and demonstration of new energy technologies in order to reduce dependency on fossil fuels. In addition, the Danish Government provided €8.5 billion for pilot projects involving the use of biodiesel in limited “fleets” of vehicles between 2007 and 2009.

TABLE 4.17: DENMARK ENERGY TECHNOLOGY AND DEMONSTRATION PROGRAMME (EUDP)

Year	Project	Applicant	Grant in €
2007	Demonstration of 2nd generation bioethanol production, WP1: Design and engineering	DONG Energy	3,019,891
	BornBioFuel 1: A fully integrated 2nd generation demonstration plant on the island of Bornholm based on the Maxi-Fuel concept	BioOasol ApS	3,690,978
2008	Yeast strains for 2nd generation bioethanol production	TerranolA/S 1	1,508,852
	Demonstration of 2nd generation bioethanol production, WP2: Construction and erection of demonstration 1 plant	InbiconA/S (subsidiary of DONG Energy)	7,269,313
2009	BornBioFuel 2: A fully integrated 2nd generation demonstration plant on the island of Bornholm based on the Maxi-Fuel concept	BioGasol ApS	10,500,658
	Optimisation of the BornBioFuels' 2nd generation bioethanol concept	University of Aalborg	914,560
Total			26,904,253

During the last five years, R&D projects in Germany have been focusing on the support of BTL (biomass to liquid) due to its potential importance. In (the financial year) 2007, the field covered by the Specialised Agency for Renewable Resources (Fachagentur Nachwachsende Rohstoffe e.V. FNR) had €11.7 million in funding for projects related to BTL; in 2008, it had €10 million. Aside from this, there is a great variety of research projects concerning the sustainability of biofuels in Germany.

In 2007 the **Finnish** Funding Agency for Technology and Innovation (Tekes) set up the program, BioRefine – New Biomass products (2007–2012), which aims to propagate the development of second-generation biofuel production technologies for transport. Its total budget for the five years amounts to €137 million. Additionally, a special Tekes/Ministry of Employment and the Economy development program has been designed, which works in close collaboration with BioRefine, to provide funding for pilot projects related to new technologies on the one hand and demonstration projects on the other hand. In 2007, its volume was €9 million and in 2008 it was €5 million.

The **Swedish** Energy Agency runs a research and development program on cellulose-based fuels. **Poland** runs several research programs. The Polish Technology Platform on Biofuels and Bio-components was established to advance biofuel-production technologies. Poland's expenses for many research projects in 2008 added up to about €7.3 million.

4.5 SUPPORT FOR CONSUMPTION³⁶

Different support measures encouraging the consumption of biofuels are presented in this section, with the exceptions of the tax reliefs and exemptions discussed in section 4.1.2. Support for the consumption of biofuels covers a wide range of measures: reduced registration fees for biofuel compatible cars, free parking, funding of filling stations that sell biofuels, singular premiums for the purchase of “green” cars, or funding for public transportation operators for the purchase of vehicles running on fuels derived from alternative energies. What is more, many governments try to set good examples and make their public car fleets or public transportation vehicles accessible for biofuels. These measures will be discussed in this section as well.

Many measures aim not only at reducing the price for the purchase of biofuels and biofuel-compatible cars or filling stations, but try to present biofuels and their merits to the public and establish the use of biofuels as “normal.” For example, **Poland** obliges its public departments to mark all public-sector cars running on biofuels visibly “green.” **Romania** even runs a public information campaign on the advantages of using fuels from renewable sources, propagated through radio and television programs, advertisements, brochures, leaflets, etc.

In **Cyprus**, the government grants a tax relief of CYP700 (approximately €1200) towards the cost of purchasing a new flexible-fuel vehicle, including electric and hybrid vehicles. The measure aims to encourage the owners of captive fleets to use biofuels, especially those who can produce biofuels from their own resources (used edible oils) such as restaurants and hotels.³⁷

In 2007, **Denmark** allocated circa €8 million (DKK60 million) for the 2007–2009 period for the use of biofuels in special fleets of vehicles. In late 2007 and early 2008 four projects were selected for funding. In autumn 2008 the first vehicles—buses and lorries running on high-blend animal and vegetable diesel—became operational.³⁸

France has adopted several measures to support the sale of fuels with high biofuel content—all granted by the so-called Finance Law. “Super Ethanol” E85 is eligible for a beneficial tax rate of €28.33 per hectolitre instead of €33.43 per hectolitre (data as from 2007). What is more, E85-capable vehicles are assured amortization of additional purchasing-costs within 12 months, a tax reduction on company cars over eight quarters, and a 50 per cent exemption on the additional taxes for registration fees. High biofuel-content diesel fuels usually are not compatible with most of the car engines in Europe. Nevertheless, the French central government supports local authorities that wish to experiment with high-content biodiesels in vehicles not operating in public transport.³⁹

In 2008, **Ireland** changed its Vehicle Registration Tax (VRT), now basing the tax amount on the vehicle’s CO₂ emissions. In addition to the CO₂ emission-related system, hybrid-electric and flexible-fuel cars are granted a VRT tax relief of up to €2,500. Series production electric cars, which can be propelled solely by a rechargeable battery, are fully exempted from VRT for a period of three years. In February 2009, Ireland launched its Smarter Travel Policy, which is to be implemented over a 12-year period to 2020. It proposes that all public transportation providers prepare plans to replace their fleet with the most sustainable vehicle and fuel types. Also, the government provided significant funding to two of the country’s largest bus operators for the purchase of hybrid-electric buses. In the 2009 Finance Act Ireland introduced a new tax incentive for businesses purchasing electric vehicles. It enables firms to write off 100 per cent of the purchase costs against taxes.⁴⁰

³⁶ All information derived from the respective Member State Reports, unless otherwise stated.

³⁷ Member State report under Directive 2003/30/EC for the reporting year 2008 – Cyprus.

³⁸ Member State report under Directive 2003/30/EC for the reporting year 2008 – Denmark.

³⁹ Member State report under Directive 2003/30/EC for the reporting year 2008 – France.

⁴⁰ Member State report under Directive 2003/30/EC for the reporting year 2008 – Ireland.

Poland has implemented several actions to increase the demand for biofuels. Among others, vehicles running on biofuels are exempted from parking charges with the duration of the exemption depending on the total biofuel content used. The government also obliges all its departments to gradually replace their vehicles with biofuel-capable vehicles and to visibly mark them as “green” to the public.⁴¹

The **U.K.** continued to provide funds to encourage organizations and all kinds of firms to install alternative refueling stations through the Refuelling Infrastructure Grant Programme. The grants funded by the Department of Transport cover up to 50 per cent of the eligible costs for new or refurbished fuelling stations that can be used for fuels from alternative sources (electric recharging points, natural gas, biogas and hydrogen dispensing equipment).⁴²

Vehicles purchased by the **Swedish** public sector must be clean vehicles. Between 2007 and February 2009, at least 85 per cent of passenger cars leased or bought by the government authorities had to be clean vehicles, and since February 2009 all new public-sector cars had to satisfy clean requirements. Exceptions apply to certain types of cars such as emergency vehicles.

In another Act from 2006 Sweden obliges its bigger filling stations to sell fuel from renewable sources. It aims at a share of filling stations selling biofuels of 60 per cent by 2010.

In 2007 the Swedish government introduced a premium for clean vehicles running on fuel-efficient or environmentally friendly fuels. Individuals who had purchased a conventional fuel-efficient car, cars running on alternative fuels, electric hybrids and electric cars with a certain level of efficiency received a premium of SEK10,000, (January 2010: €985). Since June 2009 this premium has been abolished and replaced by a five-year vehicle tax exemption for clean vehicles.⁴³ Since 2003 the counties of Västernorrland and Västerbotten make up the BioFuel Region, a pilot project supported by the EU.⁴⁴ Among others, vehicles running on biofuels are granted free parking spaces.

⁴¹ Member State report under Directive 2003/30/EC for the reporting year 2008 – Poland.

⁴² Member State report under Directive 2003/30/EC for the reporting year 2008 – UK; CENEX – Center of Excellence for low carbon and fuel technologies.

⁴³ Member State report under Directive 2003/30/EC for the reporting year 2008 – Sweden.

⁴⁴ Swedish Biofuel Region.

5. AGGREGATE SUPPORT TO BIODIESEL AND ETHANOL

After having analyzed the different elements of the support measures of biofuels associated with policies of the EU and its 27 EU Member States in detail, this chapter gives an overview by presenting aggregated data.

First, we estimate the total support to the biofuel industry, then we discuss calculations on subsidies per unit of energy output, subsidies per unit of fossil energy displaced and costs for GHG reductions.

By interpreting the estimated measures presented in this study, a range of policy questions can be answered, such as: How high are the financial costs of the subsidy policy to the taxpayer? Have biofuels a better environmental profile than fossil fuels? How high are the costs of achieving the targeted political goals?

The results of this chapter then form the basis for the policy recommendations given in Chapter 6.

5.1 TOTAL SUPPORT ESTIMATES

Estimations concerning the total support for biofuels consist of several elements, of which not all could be calculated mainly due to missing data. Therefore, the provided estimates are underestimates.

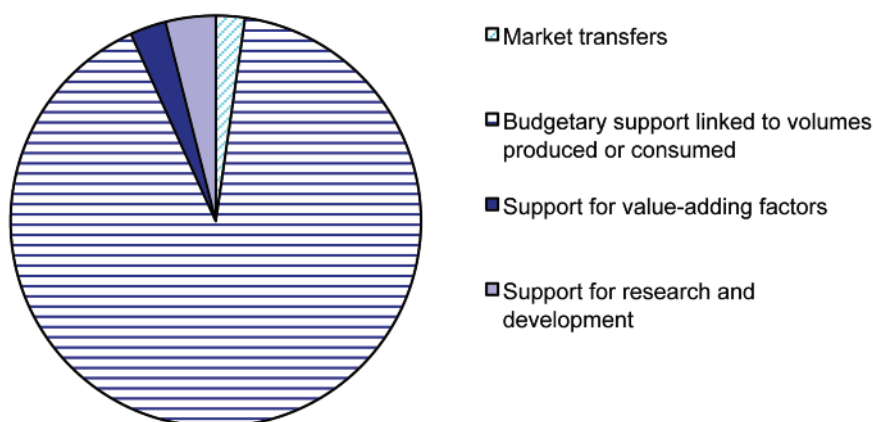
TABLE 5.1: TOTAL SUPPORT ESTIMATE FOR ETHANOL IN THE EU, 2007 AND 2008 (€ MILLIONS)

Support element	2007	2008
Market transfers	60	19
Market price support	45	16
Other market transfers	14	4
Budgetary support linked to volumes produced or consumed	625	765
Reductions in or exemptions from fuel excise tax	625	765
Distillation aid	NC	NC
Support for intermediate inputs (feedstock)	NC	NC
Support for value-adding factors	83	24
Grants for investment in fixed capital	NC	NC
Payments for crops grown on set-aside land	65	12
Payments under the energy crops scheme	18	12
Support related to distribution and consumption	NC	NC
Support for research and development	32	33
Budget revenues (revenues from import duties)	NC	NC
Total Support Estimate (TSE)	800	841
Consumption (millions of litres)	2,377	3,496
Support per litre consumed (€ /litre)	0.34	0.24

NC = not calculated

Source: authors' estimates

The total support estimate (TSE) for ethanol was estimated to be €800 million and €841 million in 2007 and 2008, respectively (Table 5.1). This is a decrease compared with €1,290 million in 2006 (Kutas et al., 2007). Just as in 2005 and 2006 the two largest of the identified support elements are market price support and the support via reductions from excise taxes (Figure 5.1).

FIGURE 5.1: ELEMENTS OF THE TSE FOR ETHANOL IN PROPORTIONS (2008)

It is striking that both support elements significantly declined in 2007 and 2008, even though biofuel consumption and production within the EU grew steadily. In 2006, market price support added up to €306 million and support via reductions from excise taxes added €829 million. As already mentioned, the figure measured for market price support is a very conservative estimation based on comparably low European ethanol prices (compare 4.1.1.5). Furthermore, it can be stated that in comparison to 2005/2006, world prices for ethanol rose slightly in 2007 and 2008. A further explanation for the declining total support is that more of the burden seems to have been shifted from taxpayers to consumers (via blending mandates).

Dividing the TSE by the consumption yields support on a per-litre basis. We estimate €0.24 of support per litre (including support for research and development) of ethanol for the year 2008. This number is much lower than in 2005 and 2006 when the per litre support equalled to €0.72 and €0.74 respectively.

TABLE 5.2: TOTAL SUPPORT ESTIMATE FOR BIODIESEL IN EU, 2007 AND 2008 (€ MILLIONS)

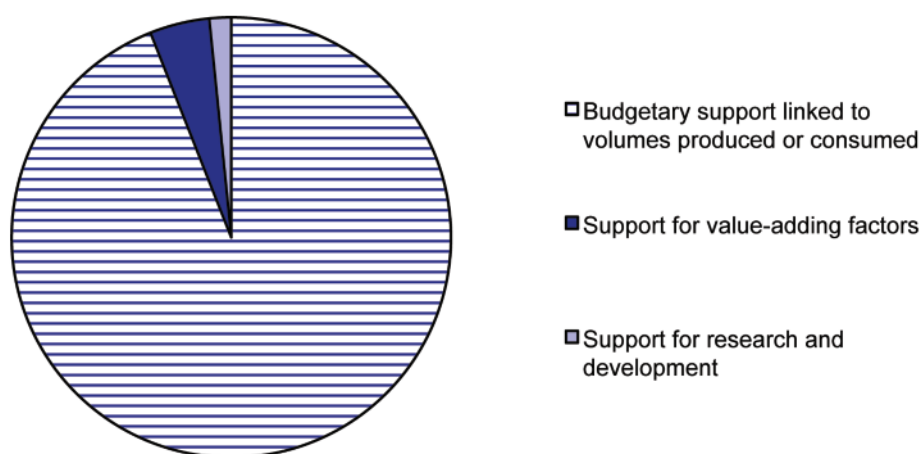
Support element	2007	2008
Market transfers	NC	NC
Budgetary support linked to volumes produced or consumed	2,133	2,040
Reductions in or exemptions from fuel excise tax	2,133	2,040
Support for intermediate inputs (feedstock)	NC	NC
Support for value-adding factors	333	95
Grants for investment in fixed capital	NC	NC
Payments for crops grown on set-aside land	261	48
Payments under the energy crops scheme	72	47
Support related to distribution and consumption	NC	NC
Support for research and development	31	35
Total Support Estimate (TSE)	2,497	2,170
Consumption (millions of litres)	7,446	9,972
Support per litre consumed (€ /litre)	0.34	0.22

NC = not calculated

Source: authors' estimates

We used the same support elements to estimate the support of biodiesel (Table 5.2), with exception of market transfers (Chapter 4.1.1.5). As with ethanol, not all support elements could be quantified. We estimate a TSE of €2,497 million and €2,170 million in 2007 and 2008 respectively. For 2006 Kutas et al. (2007) estimated a TSE of €2,436 million.

FIGURE 5.2: ELEMENTS OF THE TSE FOR BIODIESEL IN PROPORTIONS (2008)



Although support from excise-tax reduction has decreased since 2006, it still constitutes by far the largest element (Figure 5.2). On a per-litre basis (including research and development support), biodiesel was supported at the rate of €0.22 per litre in 2008—a major reduction compared with 2006 (€0.50 per litre). For biodiesel, the decline of the estimated support can also be explained by a shift of the burden from taxpayers to consumers (blending mandates instead of tax exemptions).

The total support for biodiesel is significantly larger than for ethanol; the per-litre basis was €0.34 for both biodiesel and ethanol in 2007. In 2008 the support the per-litre consumed was €0.26 for ethanol and €0.22 for biodiesel. Compared with 2005 and 2006, this represents a significant convergence.

5.2 SUBSIDY INTENSITY

For measuring potential market distortions caused by subsidies, total support estimates are just crude measures. By dividing the total support through the consumed litres, the average cost per litre was evaluated. In addition, we will now calculate the marginal support. Marginal support is the change in total support when the amount of produced litres of biofuels increases by one. In the case of excise-tax exemptions, it means that every additional litre of ethanol is supported at the rate of 23.9 cents (Table 5.3). Support for R&D is not included in the marginal estimation, because there is no direct linkage between the production level and expenses for R&D.

We calculated the marginal support per litre for ethanol and biodiesel for averages of the years 2007 and 2008 by summing the main per-litre components of support (Table 5.3). What is more, our estimation method for calculating the marginal support differs slightly by taking more country-specific details into account (production quotas, for instance). With these estimations, the marginal support estimate is slightly higher than the average support per-unit values for 2008 (Table 5.1 and Table 5.2). Nevertheless, for estimating the following subsidy intensity values, we used the average support per litre values for 2008.

TABLE 5.3: MARGINAL SUPPORT PER LITRE FOR ETHANOL AND BIODIESEL IN THE EU (2007/2008 AVERAGES)

Support element	Ethanol	Biodiesel
Market price support	0.015	NC
Excise tax exemption	0.239	0.224
Energy crop payment	0.006	0.011
Set-aside-payment	0.045	0.115
Total support (€ /litre)	0.305	0.350

Note: All calculations are made on 2007-2008 averages.

NC = not calculated.

Source: Authors' estimates.

One suggestive measure of the degree to which a product is subsidized is the share of support as a percentage of its market value (Table 5.4). The support as percent of market value is based on average fossil fuel prices in 2007 and 2008 and ranges between 27 per cent to 41 per cent for ethanol and 28 per cent to 31 per cent for biodiesel. This indicates that biofuels would cost consumers 27 per cent to 41 per cent more than their actual market value, if all the support were reflected in the price of the fuels.⁴⁵ Of course, as the support measures for biofuels do not change in response to market prices of the fuels, varying market prices will yield varying values of support as a share of market prices. Thus, this decrease of support as a per cent of the market value in comparison to figures from 2005/2006 does not necessarily reflect a change in biofuel support policies.

Other interesting measures are the support per unit of energy and support per litre of fuel equivalent (Table 5.4). By measuring the support per unit of energy—euros per giga joule (GJ)—one can account for the fact that the heating value of ethanol is only 66 per cent of that of biodiesel: this is why, using this measure, the support for ethanol in terms of euro per giga joule (GJ) is considerably higher than for biodiesel. Every GJ biofuel produced in the EU is subsidized between €8 and €14. Furthermore, both values fell substantially compared with 2005 and 2006. The support per gross GJ of biofuel consumed in 2005/2006 was €35 per GJ for ethanol and €15 per GJ for biodiesel.

We get the same results when looking at support in terms of litre of fuel equivalent. Again, the rates of support for ethanol are higher than for biodiesel. When comparing these numbers to the ones from 2005 and 2006, we can show, once more, a considerable reduction in support in 2007 and 2008. In 2005/2006, the average support per litre of petrol or diesel equivalent for ethanol and for biodiesel was €1.10 per litre equivalent and €0.55 per litre equivalent, respectively while in 2007/2008 ethanol is supported with €0.44 and biodiesel with €0.30 per litre of petrol or diesel equivalent.

⁴⁵ The comparably wide range for ethanol values can be explained by the fact that it makes a big difference whether one assumes that there is a loss in vehicle performance using ethanol in ethanol-gasoline blends or not.

TABLE 5.4: SUPPORT INTENSITY VALUES FOR ETHANOL AND BIODIESEL

Indicator	Unit	Ethanol		Biodiesel	
		Low	High	Low	High
Support per litre average 2007-2008	€/ litre		0.29		0.28
Estimated market value, average 2007-2008	€/ litre	0.70	1.05	0.89	0.98
Support as a percent of market value	percent	41%	27%	31%	28%
Support per gross GJ of biofuel consumed	€/ GJ	14		8	
Support per litre of petrol or diesel equivalent	€/ litre equivalent	0.44		0.30	

Notes:

(1) The higher reference market value for ethanol is the price of RON 91 unleaded petrol, including excise taxes but not the value added tax (VAT). The lower reference value assumes the price for ethanol would be proportional to the relative thermal value of ethanol compared with RON 91 unleaded petrol. The average price for biodiesel is assumed to be proportional to the relative thermal value of biodiesel compared with non-commercial petroleum diesel sold for non-commercial purposes, including excise taxes but not VAT.

(2) The range for ethanol reflects support per litre divided by, respectively, the highest and lowest market values in the previous line.

(3) For ethanol, the lower value in the range is based on an assumption that there would be no loss in vehicle performance, if used in a low-ethanol (less than E5) blend; the higher value assumes a penalty proportional to the ratio of the heating values of ethanol (21.41 MJ /litre) and petrol (31.88 MJ /litre), which is more typical of vehicle performance when used in a higher ethanol blend. For biodiesel, the support per litre estimates are both grossed up by the ratio of the heating values of biodiesel (32.65 MJ /litre) and petroleum diesel (35.95 MJ /litre). The range in values thus represents the range in support under these different assumptions.

Sources: - Support Estimates: Own Calculations; - Heat Values: Zah et al. (2007a); - Fossil Fuel Retail Prices: International Energy Agency (IEA), Energy Prices Taxes. Quarterly Statistics: First Quarter 2010, Published jointly by IEA and OECD in Paris.

5.3 SUPPORT PER UNIT OF FOSSIL-FUEL-EQUIVALENT DISPLACED

Reducing the dependency on fossil fuel generally serves as a major justification for supporting biofuels financially. This is why our estimations concerning the support per unit of fossil-fuel equivalent displaced are of special interest. However, in order to estimate accurately, it is important to account for fossil fuels needed to create and deliver biofuels by using displacement factors. Displacement factors describe the quotient of energy input divided by energy output. A displacement factor of 0.5 means that with one GJ of fossil fuel input, we receive an energy output of 2 GJ, or: to receive one GJ of energy through biofuels, we have to give an input of 0.5 GJ fossil fuels. That equals a net gain of non-fossil energy of 50 per cent. The lower the displacement factor, the higher the net gain in non-fossil energy.

For our estimations we used the same displacement factors as in Kutas et al. (2007), based on published sources such as CSIRO et al. (2003), the International Energy Agency (IEA, 2004), Edwards et al. (2007), Farrell et al. (2006b), Jank et al. (2007) and Zah et al. (2007a and 2007b).

TABLE 5.5: SUPPORT FOR ETHANOL PER UNIT OF FOSSIL FUEL DISPLACED

Indicator	Unit	Ethanol from sugar beet		Ethanol from grains	
		Low	High	Low	High
Support per litre of petrol equivalent ⁽¹⁾	€/ litre equiv.	0.44			
Displacement factor ⁽²⁾	GJ fossil-fuel Input / GJ output	0.325	0.500	0.685	0.774
Net gain in non-fossil energy	Percent	50-68%		22-32%	
Support per litre equivalent of fossil fuels displaced ⁽³⁾	€/ litre equiv.	0.64	0.87	1.38	1.93

Notes:

(1) For explanation of the ranges, see note 3 to Table 5.4.

(2) Ranges reflect ranges in the literature for ethanol from sugar beet and, respectively, ethanol from maize in the USA and rye in the EU.

(3) Equals support per litre of petrol equivalent divided by the percentage net gain in non-fossil energy.

Sources: support estimate: GSI; displacement factor: GSI estimates, based on Jank et al. (2007) and Zah et al. (2007a).

When deriving ethanol from sugar beet, the support per litre equivalent for fossil fuels displaced ranges from €0.64 to €0.87 per litre equivalent. In the case of ethanol derived from grains, the support is between €1.38 and €1.93 per litre equivalent. That means, when looking at the net gain in non-fossil energy, it is better to produce ethanol from sugar beet than from grains.

TABLE 5.6: SUPPORT FOR BIODIESEL PER UNIT OF FOSSIL FUEL DISPLACED

Indicator	Unit	Biodiesel from used cooking oil		Biodiesel from canola (rape) oil	
		Low	High	Low	High
Support per litre of diesel equivalent ⁽¹⁾	€/ litre equiv.	0.30			
Displacement factor ⁽²⁾	GJ fossil-fuel Input / GJ output	0.105	0.225	0.370	0.549
Net gain in non-fossil energy	Percent	77-89%		45-63%	
Support per litre equivalent of fossil fuels displaced ⁽³⁾	€/ litre equiv.	0.34	0.39	0.48	0.67

Notes:

(1) For explanation of the ranges, see note 3 to Table 5.4.

(2) Ranges reflect ranges in the literature for, respectively cellulosic ethanol and biodiesel made from canola (rapeseed) oil.

(3) Equals support per litre of diesel equivalent divided by the percentage net gain in non-fossil energy.

Sources: support estimate: GSI; displacement factor: GSI estimates, based on CSIRO et al. (2003) and Zah et al. (2007a).

When looking at biodiesel, the subsidy cost of displacing fossil fuel is between €0.34 and €0.39 per litre equivalent for biodiesel made from cooking oil and between €0.48 per litre and €0.67 per litre equivalent for biodiesel derived from virgin rapeseed oil.

5.4 SUPPORT PER TON OF CO₂-EQUIVALENT DISPLACED

The last discussed measure addresses a key policy question: are investments in biofuels efficient with regard to GHG reduction? In order to measure, we estimate the support per unit of CO₂-equivalent displaced through the substitution of biofuels for their petroleum-derived equivalents. For measuring cost efficiency, we compare the level of support per unit of CO₂-equivalent avoided with the cost of purchasing carbon credits at the European Climate Exchange.⁴⁶

As a result, we see that buying GHG reductions by subsidizing grain-based ethanol is the less cost-efficient: to avoid one tonne of CO₂ via subsidizing grain-based ethanol costs between €670 and €1500, while ethanol from sugar beet is more cost-efficient (€200–€260 per tonne of CO₂ equivalent).

TABLE 5.7: SUPPORT PER TONNE OF CO₂ EQUIVALENT AVOIDED FROM USING ETHANOL

Indicator	Unit	Ethanol from sugar beet		Ethanol from grains	
		Low	High	Low	High
Baseline emissions (from gasoline or petroleum diesel)	Kg of CO ₂ equivalent/GJ	94.00			
Percentage reduction from baseline	Percent	50%	65%	8.5%	18%
Support per GJ of biofuel consumed	€ /GJ	11			
Support per tonne of CO ₂ equivalent avoided ⁽¹⁾	€ /Tonne of CO ₂ equivalent	186	259	669	1422
Price of a CO ₂ -equivalent offset, European Climate Exchanges, FY 2008-2009	€ /Tonne of CO ₂ equivalent	16.25			

Notes: (1) Calculated as support per GJ divided by the product of the baseline emissions and the percentage reduction. Ranges reflect the combination of ranges of subsidy values and estimated emission reductions.

Sources: support estimates: GSI; CO₂ equivalent reduction values: GSI estimates, based on CSIRO et al. (2003), Edwards et al. (2007) and Zah et al. (2007). CO₂-equivalent futures prices: European Climate Exchange www.europeclimatexchange.com

Estimations concerning biodiesel are less on average: avoiding a tonne of CO₂ via biodiesel based on used cooking oil costs around € 90–€95. However, if the biodiesel is based on canola oil, it is more expensive (€260–€350 per tonne of CO₂ equivalent). These figures are very high when it comes to a comparison with the futures price of a tonne of CO₂-equivalent on the European Climate Exchange, which was on average €16.25 between 2008 and 2009.

Looking at the lowest numbers for support per tonne of CO₂ equivalent avoided from using ethanol and biodiesel, one could purchase more than 12 tonnes in the case of ethanol (7 tonnes in the case of biodiesel) of CO₂-equivalent at the European Climate Exchange. This result indicates that when it comes to biofuels, the support levels are not really cost-effective. Considering the impact of indirect land-use change, the cost-effectiveness would even be worse.

⁴⁶ Judging figures for the support per tonne is precarious in a way. On the one hand, one could argue that the support is an investment for the future as it leads to a transition to lower GHG-intense fuels. On the other hand, results are strongly dependent on how emissions due to land conversion are taken into account. The assumption that the GHG emissions are averaged out over 20 years where there is land conversion is critical if the fuel is not actually produced over that time period. Thus GHG savings might even be lower than currently estimated.

TABLE 5.8: SUPPORT PER TONNE CO₂ EQUIVALENT AVOIDED FROM USING BIODIESEL

Indicator	Unit	Biodiesel from used cooking oil		Biodiesel from canola oil	
		Low	High	Low	High
Baseline emissions (from gasoline or petroleum diesel)	Kg of CO ₂ equivalent /GJ	82.32			
Percentage reduction from baseline	Percent	85%	89%	23%	30%
Support per GJ of biofuel consumed	€ /GJ	7			
Support per tonne of CO ₂ equivalent avoided ⁽¹⁾	€ /Tonne of CO ₂ equivalent	90	95	263	347
Price of a CO ₂ -equivalent offset, European Climate Exchanges, FY 2008-2009	€ /Tonne of CO ₂ equivalent	16.25			

Notes: (1) Calculated as support per GJ divided by the product of the baseline emissions and the percentage reduction. Ranges reflect the combination of ranges of subsidy values and estimated emission reductions.

Sources: support estimates: GSI; CO₂ equivalent reduction values: GSI estimates, based on CSIRO et al. (2003), Edwards et al. (2007) and Zah et al. (2007). CO₂-equivalent futures prices: European Climate Exchange www.europeclimateexchange.com

6. DISCUSSION AND RECOMMENDATIONS

This report aims to provide an overview and quantification of the support for biofuels—ethanol and biodiesel—in the European Union. Measures on both the national and the Member State level were presented. Unfortunately, difficulties with obtaining data relating to a number of programs prevented quantifying all of them. However, data and results should at least be sufficient to indicate major trends. Other researchers are warmly welcomed to build on our findings and to carry out more research on the biofuels industry in the European Union.

The focus is on the years since 2007 and thus tied to the findings by Kutas et al. (2007), who mainly reported on the years 2006 and 2007. Our findings conclude that since 2007 total support on biofuels has declined, but is still high within the EU and therefore deserves further and closer examination by both policy-makers and researchers.

The remainder of this chapter presents our key findings, followed by recommendations for policy-makers.

6.1 KEY FINDINGS

Total support for biofuels has declined slightly but is still significant in the European Union. In 2008 total annual support for biofuels amounted to some €3 billion in the European Union, where biodiesel (€2.17 billion) received more subsidies than ethanol (€0.84 billion). Therewith, overall support in 2008 was lower than the total support of €3.7 billion found by Kutas et al. (2007) for the 2006 reporting year. Support per consumed litre in 2008 was €0.24 and €0.22 for ethanol and biodiesel respectively. This represents a very sharp decline compared with the 2006 support figures of €0.74 and €0.50.

DATA NOT SUFFICIENT

As mentioned, various times before, most support estimations should be treated as underestimates due to insufficient data. Although the European Commission obliges Member States to annually publish Member State reports and to provide information on biofuel support quantities and support measures, data conditions are highly unsatisfactory. Member State reports are not standardized but can take any form wished by the reporting nation. As a result, most countries only report on measures and politics that put themselves in a good light. Drawbacks in national policies and unsatisfactory quantities and data are usually not reported. A lack of transparency exists, especially for Spain, where no up-to-date reports and information were available. Along with a standardization of Member State reports, there is further need for better official data. Figures and statistics on trade, such as biofuel imports but also prices (especially EU-ethanol prices) are especially poor.

THE LARGEST SHARE OF ALL SUPPORT IS STILL GRANTED THROUGH TAX RELIEFS

There are several support measures in force in the EU. Many of them are national measures and thus differ considerably among Member States. Confirming the findings of the Kutas et al. (2007) report, we were able to observe that tax exemptions and reductions by far represent the largest share of financial support. However, there seems to be a trend towards lower and less generous tax reliefs passing more of the costs onto consumers. Foregone tax revenue through tax measures has remained stable over the last years, although, on average, per-litre tax reliefs were reduced recently. This is due to considerably higher levels of production (see next point). Tax reliefs without quotas place an unpredictable burden on taxpayers as undefined amounts of biofuels are exempted from taxes. Among other measures implemented at the EU level and within the Member States are support of R&D, the

existence of tariffs on ethanol imports (mainly from Brazil), help for investments in capital used to produce biofuels, subsidization of intermediate goods, and different measures to support consumption such as free parking in cities for cars running on biofuels.

Most of the measures create price distortions and biases. Tariffs on imports, for example, keep the consumption price high and where mandates are not in place, create a countervailing effect on the intended promotion of biofuels.

PRODUCTION ON THE RISE

EU production of biofuels has been increasing considerably over the last 10 years. We are able to confirm the overall trend already reported in the previous study by Kutas et al. (2007). In 2008, 7,755,000 tonnes of biodiesel and 2,255,000 tonnes of ethanol were produced in the European Union.

BLENDING REQUIREMENTS BECOME STRICTER

The trend has been for Member States to switch to promoting biofuels through higher biofuel blending requirements for all fuels sold. This is mainly due to legislation on the EU level, which calls for constantly rising market shares. Because biofuels are still considerably more expensive than fossil fuels, blending requirements create an upward price pressure on fuels. As demand for fuels is usually inelastic in the short run, sellers will burden higher costs over to consumers.

BENEFITS FROM BIOFUELS FAR FROM BEING CLEAR

The promotion and promulgation of biofuels is used to pursue various policy objectives. Among the most important ones are reducing the dependency of exporters of fossil fuels or oil and lowering environmental pollution and CO₂ emissions. However, there has been quite some concern in scientific literature and political dispute if biofuels indeed benefit the environment.

In particular, the impact of indirect land-use change and higher food prices caused by higher production of biofuels is far from unambiguous. Indirect land-use change might create CO₂ emissions through converting land fields, and thus countervails positive effects on the CO₂ record of biofuels. Obviously, the promotion of biofuels becomes undesirable if the indirect land-use change outweighs positive CO₂ effects through the use of biofuels in transport and elsewhere. The impact on food prices remains unclear as well. Food crops used to produce biofuels reduce the supply of food and hence add to higher prices. The evaluation of the overall impact of biofuels certainly was beyond the scope of this report.

In their latest legislation on biofuels, the EU undertook first steps towards ensuring a positive impact of biofuels by implementing sustainability criteria. These have to be fulfilled for all biofuels that are taken into account for biofuel market shares and are eligible for financial support. This must be seen as a first step in the right direction, but we do not consider the sustainability criteria to be sufficient.

6.2 RECOMMENDATIONS

Enforce the polluter-pays principle; phase out all biofuel support

In times of huge government debts, the EU needs to phase out the costly support of biofuels and to transition to climate policy that respects the polluter-pays principle. That is, rather than subsidizing biofuels, fossil fuels should

be stressed through pollution and carbon taxes or a cap-and-trade system. This principle is not only more economical, as it makes the polluter pay the burden of environmental protection, but can also help to rehabilitate public debts. This is sometimes referred to as “greening the debt.” With increasing prices for fossil fuels, renewable energy would become more marketable without expanding the national budget deficits. Thus, our recommendation is to phase out all biofuel support in terms of blending targets and tax exemptions.

In terms of increasing prices of fossil fuels, we recognize the Fuel Quality Directive to be a first step in the right direction. It requires reductions of GHG emissions but leaves the strategy to accomplish this goal to the suppliers of fuels. At the same time negative effects of mandatory requirements named below remain and, compared to taxing fossil fuels directly, it does not generate any income for the Member States.

If Member States wish to keep on supporting biofuels, support via reduced fuel taxes (tied to environmental characteristics) is superior to establishing mandatory blending requirements. Although mandatory blending requirements have a positive short term fiscal effect compared to tax exemptions, they are less controllable, measurable and reversible for the government. They do have great distorting effects on the market, but as the government budget is not directly affected, the incentives for abolishing a blending obligation is very low. This is also due to the fact that mandatory blending requirements constitute a hidden subsidy, while tax exemptions are transparent. If a system of excise-tax exemptions is established, a quota that caps the amount of litres supported is suggestive.

On the EU level, R&D measures are reasonable.

A twofold market failure, in the field of environment and innovation, justifies some R&D support for biofuels. The impacts of biofuels on CO₂ emissions reductions, indirect land-use changes and food prices need careful analysis, which currently seems to be insufficient. Furthermore, a big share of EU R&D support goes to research concerning second-generation biofuels, a better alternative to first-generation biofuels. All in all, R&D support should be maintained, especially for second-generation biofuels.

Eliminate all tariffs on imported fuel ethanol

Tariffs on biofuels are a form of undesirable protectionism and protect the European ethanol market from more cheaply-produced ethanol, mainly from Brazil. This argument obviously does not apply to antidumping and countervailing duties on U.S. biodiesel. Hence, we recommend to abolish all regular tariffs, but to keep the antidumping measures on U.S. biodiesel as long as they are necessary.

Insist on more transparency concerning Member States biofuel policy to allow thorough assessments

Currently, Member States are obliged to report regularly to the European Commission on their biofuel policies. However, not all Member States stick to this regulation, and the reports differ widely in the amount and quality of their information. There is an urgent need to standardize Member State reports and force every country to report all figures being of interest. An EU-wide standardized report should be introduced and Member States should be penalized if they do not hand it in on time. With the current non-standardized reports, the degree of the Member States' support, especially for capital investments and consumption, is extremely difficult to identify and quantify.

⁴⁷ The extent of the distortion is heavily dependent on the relation of fossil fuel to biofuel prices. Obviously, the less the difference, the less the distortion.

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European Biodiesel Board

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European Commission DG for Trade

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Generalised System of Preferences:

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European Ethanol Fuel Association

<http://ebio.org>

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USDA Foreign Agricultural Service

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About the FiFo Institute. The **FiFo Institute for Public Economics, University of Cologne (Finanzwissenschaftliches Forschungsinstitut an der Universität zu Köln) was founded in 1927. It is an independent, non-profit institute pursuing economic research and policy consultancy in fiscal and budget policy, taxation and fiscal relations.*

THE GLOBAL SUBSIDIES INITIATIVE (GSI) OF THE INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT (IISD)

The International Institute for Sustainable Development (IISD) launched the Global Subsidies Initiative (GSI) in December 2005 to put a spotlight on subsidies – transfers of public money to private interests – and how they undermine efforts to put the world economy on a path toward sustainable development.

Subsidies are powerful instruments. They can play a legitimate role in securing public goods that would otherwise remain beyond reach. But they can also be easily subverted. The interests of lobbyists and the electoral ambitions of officeholders can hijack public policy. Therefore, the GSI starts from the premise that full transparency and public accountability for the stated aims of public expenditure must be the cornerstones of any subsidy program.

But the case for scrutiny goes further. Even when subsidies are legitimate instruments of public policy, their efficacy – their fitness for purpose – must still be demonstrated. All too often, the unintended and unforeseen consequences of poorly designed subsidies overwhelm the benefits claimed for these programs. Meanwhile, the citizens who foot the bills remain in the dark.

When subsidies are the principal cause of the perpetuation of a fundamentally unfair trading system, and lie at the root of serious environmental degradation, the questions have to be asked: Is this how taxpayers want their money spent? And should they, through their taxes, support such counterproductive outcomes?

Eliminating harmful subsidies would free up scarce funds to support more worthy causes. The GSI's challenge to those who advocate creating or maintaining particular subsidies is that they should be able to demonstrate that the subsidies are environmentally, socially and economically sustainable – and that they do not undermine the development chances of some of the poorest producers in the world.

To encourage this, the GSI, in cooperation with a growing international network of research and media partners, seeks to lay bare just what good or harm public subsidies are doing; to encourage public debate and awareness of the options that are available; and to help provide policy-makers with the tools they need to secure sustainable outcomes for our societies and our planet

www.globalsubsidies.org

The GSI is an initiative of the International Institute for Sustainable Development (IISD). Established in 1990, the IISD is a Canadian-based not-for-profit organization with a diverse team of more than 150 people located in more than 30 countries. The GSI is headquartered in Geneva, Switzerland and works with partners located around the world. Its principal funders have included the governments of Denmark, the Netherlands, New Zealand, Norway, Sweden and the United Kingdom. The William and Flora Hewlett Foundation have also contributed to funding GSI research and communications activities.

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